rudow + berry

4032 north miller road   suite A-100   scottsdale   arizona   85251
structural engineering

Project: Copper Crest East
Job Number: 15105
Date: January 25, 2017
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APPENDIX: Geotechnical Investigation Report by Intermountain GeoEnvironmental Services, Inc.

PROFESSIONAL ENGINEER
9250862-2202
MARK A. RUDOW
7/25/17
STATE OF UTAH

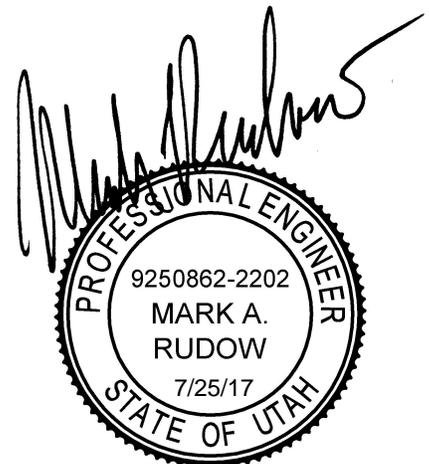| rudow + berry	job name:	Copper Crest East	pg 1
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I.   GENERAL:

A.   ALL CONSTRUCTION AND TESTING IS TO BE IN STRICT ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AND ALL RELATED PUBLICATIONS OF THE I.C.C.

B.   ALL ICC REPORTS REFERENCED IN THIS REPORT ARE AVAILABLE FREE OF CHARGE AT HTTP://WWW.ICC-ES.ORG.

C.   THE STRUCTURAL DRAWINGS SHOW THE COMPLETED PROJECT. THEY DO NOT INCLUDE COMPONENTS THAT MAY BE NECESSARY FOR CONSTRUCTION SAFETY. THE CONTRACTOR IS RESPONSIBLE FOR SAFETY ON AND AROUND THE JOBSITE DURING CONSTRUCTION.

D.   STRUCTURAL NOTES SHALL BE USED ALONG WITH THE SPECIFICATIONS AND DRAWINGS. WHERE THE STRUCTURAL NOTES, STRUCTURAL AND ARCHITECTURAL DRAWINGS OR SPECIFICATIONS DISAGREE, THE CONTRACTOR MAY REQUEST A CLARIFICATION DURING THE BIDDING PERIOD, OTHERWISE THE MORE STRINGENT REQUIREMENTS SHALL CONTROL (AS DETERMINED BY THIS ENGINEER).

E.   PROVIDE ALL TEMPORARY BRACING, SHORING, GUYING OR OTHER MEANS TO AVOID EXCESSIVE STRESSES AND TO HOLD STRUCTURAL ELEMENTS IN PLACE DURING CONSTRUCTION.

F.   ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR MECHANICAL, ELECTRICAL AND PLUMBING WITH THE APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION.

G.   VERIFY AND COORDINATE ALL DIMENSIONS AND CONDITIONS PRIOR TO STARTING WORK. NOTIFY THE ARCHITECT OF ANY DISCREPANCIES OR INCONSISTENCIES.

H.   STRUCTURAL DETAILS: DETAILS ARE APPLICABLE WHERE INDICATED BY SECTION CUT, BY NOTE OR BY DETAIL TITLE. PROVIDE SIMILAR DETAILS AT SIMILAR CONDITIONS UNLESS NOTED OTHERWISE. THE CONTRACTOR MAY REQUEST A CLARIFICATION DURING THE BIDDING PERIOD OTHERWISE THE MORE STRINGENT REQUIREMENTS SHALL CONTROL (AS DETERMINED BY THIS ENGINEER).

I.   REFER TO ARCHITECTURAL DRAWINGS FOR ALL SLAB ELEVATIONS AND SLOPES NOT NOTED.

J.   ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN UTAH.

K.   THE COST OF DESIGN WORK RESULTING FROM ERRORS OR OMISSIONS IN CONSTRUCTION SHALL BE BORNE BY THE CONTRACTOR.

II.   DESIGN CRITERIA:

A.   BUILDING CODE: WEBER COUNTY, UTAH, 2015 I.B.C.

B.   LOADINGS:

1.   INTERIOR FLOOR DEAD LOAD FINISH ALLOWANCE = 12 PSF MAX.

2.   GROUND SNOW LOAD = 263.1 PSF w/ DRIFTS PER ASCE 7-10

3.   TYPICAL FLOOR & STAIR LIVE LOAD = 40 PSF (RESIDENTIAL)

4.   EXTERIOR TERRACE LIVE LOAD = 60 PSF

5.   PROJECT RISK CATEGORY = II

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7. <u>WIND LOADS:</u>

    a) ULTIMATE VELOCITY = 115 MPH
    b) ENCLOSED
    c) EXPOSURE = C

8. <u>SEISMIC LOADS:</u>

    a) SOIL SITE CLASS = D
    b) $Ss = 0.81$, $SDS = .635$
    c) $S1 = 0.269$, $SD1 = .334$
    d) SEISMIC DESIGN CATEGORY = D
    e) $R = 6.5$, $Cd=4$, OMEGA = 3 (WOOD SHEAR WALLS)
    f) RHO = 1.3
    g) Ie = 1.00
    h) $Cs = 0.0977$ ULT, 0.0684 ASD

B. <u>SOIL BEARING ALLOWABLE:</u>

1. PER SOILS INVESTIGATION REPORT BY "INTERMOUNTAIN GEOENVIRONMENTAL SERVICES, INC.", PROJECT NO. 01628-010. REFER TO THIS REPORT FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL FOOTINGS ARE TO BE FOUNDED ON COMPETENT NATIVE SOILS AS DESCRIBED IN THE GEOTECHNICAL REPORT. THESE SOILS ARE EXPECTED TO OCCUR AT BETWEEN 2 AND 3 FEET BELOW THE ORIGINAL PRE-ROAD GRADE ON THE SITE. ALLOWABLE NET BEARING PRESSURE ON THESE SOILS IS 2400 PSF AS INDICATED IN THE GEOTECHNICAL REPORT. ALL FOOTING BEARING MATERIALS, WIDTHS AND DEPTHS ARE TO BE VERIFIED BY THE GEOTECHNICAL SPECIAL INSPECTOR.
3. IN ADDITION TO THE ABOVE REQUIREMENTS, ALL FOOTINGS EXPOSED TO THE EXTERIOR ARE TO BE FOUNDED AT NOT LESS THAN 3'-6" BELOW FINAL EXTERIOR GRADE FOR FROST COVERAGE.
4. ALL FOOTINGS ARE TO BE FOUNDED AT THE LOWER OF THE ABOVE TWO PARAGRAPH REQUIREMENTS, BUT AT DEPTHS NOT LESS THAN INDICATED ON THE STRUCTURAL DRAWINGS. IF ANY FOOTINGS NEED TO BE LOWERED BELOW THE DEPTHS INDICATED ON THE STRUCTURAL DRAWINGS, NOTIFIY THIS ENGINEER FOR FURTHER RECOMMENDATIONS PRIOR TO PROCEEDING WITH ANY FOUNDATION INSTALLATION.
5. ALL SLABS ON GRADE ARE TO BEAR ON THE ASSEMBLIES NOTED ON THE STRUCTURAL AND ARCHITECTURAL DRAWINGS AND ON PREPARED SUBGRADE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.

III. <u>MATERIALS AND EXECUTION:</u>

A. <u>CONCRETE:</u>

B. <u>CONCRETE:</u>

1. ALL CONCRETE CONSTRUCTION SHALL COMPLY WITH ACI 301, LATEST ADOPTION.

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2.   CONCRETE MATERIAL PROPERTIES: HIGH-RANGE WATER REDUCERS ARE NOT PERMITTED IN ANY CONCRETE USED IN FLATWORK (SLABS ON GRADE, TOPPING SLABS, ETC.). 28-DAY COMPRESSIVE STRENGTHS ARE TO BE AS FOLLOWS.

     a)   SPREAD FOOTINGS   3000 PSI.
     b)   SLABS ON GRADE: 4000 PSI.
     c)   CONCRETE WALLS: 4000 PSI.

3.   AGGREGATE SIZE: 1" MAXIMUM FOR FOOTINGS, 3/4" MAXIMUM FOR ALL OTHER CONCRETE.

4.   SLUMP: 4" PLUS OR MINUS 1" FOR ALL CONCRETE UNLESS HISTORICAL DATA SHOWS ACCEPTABLE PERFORMANCE AT A DIFFERENT SLUMP (SUBJECT TO APPROVAL BY THE STRUCTURAL ENGINEER).

5.   CAST IN PLACE CONCRETE:

     a)   SPACING OF CONSTRUCTION JOINTS OR CONTROL JOINTS IN WALLS EXPOSED TO VIEW SHALL NOT EXCEED 40 FEET UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS.

     b)   PROVIDE EXTRA REINFORCING AROUND ALL OPENINGS EXCEEDING 24 INCHES SQUARE OR ROUND IN ALL SLABS AND WALLS EQUAL TO TWO #5 BARS ON FOUR SIDES (ONE BAR EACH FACE) AND EXTEND TWO FEET BEYOND THE OPENING.

     c)   COORDINATE CHAMFER SIZE ON ALL EXPOSED CORNERS OF CONCRETE WITH THE ARCHITECT. OMIT CHAMFER WHERE INDICATED ON THE ARCHITECTURAL DRAWINGS OR IN THE SPECIFICATIONS.

     d)   PROVIDE CLASS B LAP SPLICES FOR ALL REINFORCING UNLESS NOTED OTHERWISE.

     e)   PROVIDE ISOLATION JOINTS AROUND ALL COLUMNS AT ALL SLAB ON GRADE AREAS.

     f)   PROVIDE CORNER BARS AT ALL WALL CORNER AND TEE CONDITIONS WITH CLASS B LAPS PER ACI.

     g)   FOLLOW ACI 306R REQUIREMENTS FOR COLD WEATHER CONCRETING AND 305R REQUIREMENTS FOR HOT WEATHER CONCRETING AS REQUIRED.

     h)   DO NOT BACKFILL AGAINST RETAINING WALLS UNTIL ALL SLAB-ON-GRADE, FOOTING AND WALL CONCRETE HAS REACHED FULL DESIGN STRENGTH. SEE PLANS FOR ADDITIONAL REQUIREMENTS.

     i)   SLAB ON GRADE JOINTING: ALL SLABS ON GRADE ARE TO BE JOINTED AT NO MORE THAN 10'-0" EA. WAY USING JOINTS AS PER DETAIL 1/S0.11. IN ADDITION, NO SECTION OF CONCRETE SHALL HAVE AN ASPECT RATIO OF GREATER THAN 1 1/2:1. PROVIDE (2) #4 x 4'-0" MID-HEIGHT SLAB BARS ADJACENT TO ALL DISCONTINUOUS JOINT LOCATIONS, AND AT ANY WALL OR PILASTER CORNERS NOT

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INTERSECTED BY JOINTS. SUBMIT COMPLETE JOINT LAYOUT PLAN TO THE ARCHITECT FOR PRIOR REVIEW.

6.   <u>CONCRETE TESTING REQUIREMENTS:</u>

     a)   ALL CONCRETE MATERIALS SHALL BE TESTED IN ACCORDANCE WITH THE APPROPRIATE STANDARDS AND CRITERIA FOR THE MATERIAL IN CHAPTER 3 OF ACI 301.

     b)   OBTAIN AT LEAST ONE COMPOSITE SAMPLE FOR EACH 100 CUBIC YARDS, OR FRACTION THEREOF, OF EACH CONCRETE MIXTURE PLACED IN ANY ONE DAY.

     c)   CONDUCT STRENGTH TESTS OF CONCRETE DURING CONSTRUCTION IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:

         (1)   MOLD AND CURE THREE CYLINDERS FROM EACH SAMPLE IN ACCORDANCE WITH ASTM C 31/C 31M. RECORD ANY DEVIATIONS FROM THE ASTM REQUIREMENTS IN THE TEST REPORT.

         (2)   DETERMINE SLUMP OF EACH COMPOSITE SAMPLE TAKEN.

         (3)   DETERMINE TEMPERATURE OF EACH COMPOSITE SAMPLE TAKEN.

         (4)   TEST CYLINDERS IN ACCORDANCE WITH ASTM C 39. TEST ONE SPECIMEN AT 7 DAYS FOR INFORMATION, AND TWO SPECIMENS AT 28 DAYS FOR ACCEPTANCE, UNLESS OTHERWISE SPECIFIED. THE COMPRESSIVE STRENGTH TEST RESULTS FOR ACCEPTANCE SHALL BE THE AVERAGE OF THE COMPRESSIVE STRENGTHS FROM THE TWO SPECIMENS TESTED AT 28 DAYS.

         (5)   SUBMIT TEST REPORTS TO THIS ENGINEER AFTER EACH COMPRESSIVE STRENGTH TEST. REPORT SHALL INCLUDE SLUMP AND TEMPERATURE READINGS TAKEN AT TIME OF SAMPLING.

7.   <u>BASEPLATE GROUT:</u> GROUT FOR USE UNDER BASE PLATES AND BEARING PLATES IS TO BE HIGH-STRENGTH, NON-METALLIC, NON-SHRINK GROUT. MINIMUM COMPRESSIVE STRENGTH AT 3 DAYS IS TO BE 3000 PSI. GROUT MAY BE INSTALLED EITHER AS A DRYPACK OR FLOWABLE MIXTURE, BUT SHALL BE DRYPACKED AT ALL EXPOSED CONDITIONS. EDGES OF GROUT AT EXPOSED CONDITIONS SHALL BE CUT AT A 15 DEGREE ANGLE FROM VERTICAL SUCH THAT THE GROUT IS THE SAME WIDTH AT THE STEEL PLATE AT THE TOP AND WIDER AT THE BOTTOM.

8.   <u>REINFORCING STEEL:</u>

     a)   ALL BARS #4 AND LARGER TO BE ASTM A 615, GRADE 60. ALL #2 AND #3 BARS TO BE ASTM A 615, GRADE 40. DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH ACI-301, LATEST ADOPTION.

     b)   WELDED WIRE FABRIC TO BE IN ACCORDANCE WITH ASTM A 185.

     c)   ALL BARS INDICATED ON THE PLANS TO BE WELDED SHALL CONFORM TO ASTM A 706 (GRADE 60).

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    d)   MINIMUM CONCRETE COVER FOR REINFORCING BARS TO FACE OF BARS INCLUDING TIES:

        (1)   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"

        (2)   CONCRETE EXPOSED TO EARTH OR WEATHER:

            #6 BARS AND LARGER: 2"
            #5 BARS AND SMALLER: 1-1/2"

C.   STRUCTURAL AND MISCELLANEOUS STEEL:

    1.   MATERIAL PROPERTIES:

        a)   TO BE ASTM A 36 UNLESS NOTED OTHERWISE.
        b)   ALL WIDE-FLANGE SHAPES ARE TO BE ASTM A992 - GRADE 50.
        c)   PIPE IS TO BE ASTM A 501, Fy = 36 KSI OR ASTM A 53, TYPE E OR TYPE S, GRADE B, Fy = 35 KSI.
        d)   SQUARE OR RECTANGULAR TUBES ARE TO BE ASTM A 500, GRADE B, Fy = 46 KSI.
        e)   ALL STEEL IS TO BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH A.I.S.C. SPECIFICATIONS, LATEST ADOPTION.

    2.   WELDING:

        a)   FOR STRUCTURAL STEEL TO BE IN ACCORDANCE WITH A.W.S. REQUIREMENTS FOR E70XX ELECTRODES.
        b)   ALL FILLET WELDS UP TO 5/16" SHALL BE MADE AS SINGLE PASS WELDS. ALL MULTI-PASS WELDS REQUIRE VISUAL INSPECTION FOR EACH WELD PASS PRIOR TO INSTALLING SUBSEQUENT PASSES. MULTI-PASS WELDS THAT HAVE NOT BEEN PROPERLY INSPECTED WILL BE REJECTED.
        c)   ALL WELD BACKER BARS AND/OR ERECTION AIDS ARE TO BE REMOVED AT CONDITIONS THAT ARE EXPOSED TO VIEW. BACKER BARS ARE TO BE REMOVED WHEN AWS WELD TYPE REQUIRES BACK-GOUGING. EXPOSED SURFACES SHALL BE GROUND SMOOTH WITH ANY HOLES OR GOUGES FILLED AND GROUND SMOOTH.

    3.   BOLTS AND OTHER FASTENERS:

        a)   ALL BOLTS AT STEEL TO STEEL CONNECTIONS TO BE ASTM A 325-N UNLESS NOTED OTHERWISE. ALL BOLTS ARE TO BE TIGHTENED TO A SNUG-TIGHT CONDITION UNLESS NOTED OTHERWISE.
        b)   FULLY PRETENSION BOLTS PER AISC REQUIREMENTS WHERE NOTED. USE TENSION CONTROL BOLTS OR WELD-INDICATOR WASHERS AT PRETENSIONED BOLTS TO FACILITATE ERECTION.
        c)   ALL BOLTS AT WOOD TO STEEL OR WOOD TO WOOD CONNECTIONS TO BE ASTM A 307 UNLESS NOTED OTHERWISE.

    d)   TYPICAL ANCHOR RODS SHALL BE ASTM A 307, A 36, OR F1554, GRADE 36, U.N.O

    e)   ADHESIVE ANCHORS FOR ATTACHMENT TO CONCRETE ARE TO BE ASTM A307 OR A36 THREADED RODS WITH SIMPSON "SET-XP" ADHESIVE, INSTALLED IN ACCORDANCE WITH ICC ESR-2508. DRILLED HOLE DIMENSIONS ARE TO BE AS FOLLOWS IN EXISTING CONCRETE UNLESS NOTED OTHERWISE. HOLE DEPTH IS MEASURED FROM THE OUTSIDE FACE OF THE CONCRETE. ALL CONCRETE SHALL BE AT ITS SPECIFIED DESIGN STRENGTH AT THE TIME OF INSTALLATION.

ROD DIA./BAR SIZE	DRILL BIT DIA.	HOLE DEPTH
1/2"	5/8"	4"
5/8"	3/4"	5"
#4	5/8"	4"
#5	3/4"	5"

4.   <u>HEADED STUD SHEAR CONNECTORS:</u> TO BE ASTM A 108. ALL HEADED STUDS ARE TO BE BY "NELSON STUD WELDING" OR APPROVED EQUAL AND ARE TO BE FLASH WELDED TO THE SUPPORTING STEEL USING AN ELECTRIC ARC WELDING PROCESS.

D.   <u>WOOD:</u>

1.   <u>DIMENSIONAL LUMBER:</u> ALL TO BE GRADE STAMPED PER W.C.L.B. RULES.

    a)   ALL STUDS, JOISTS, BEAMS, PLATES, HEADERS AND OTHER LUMBER TO BE D.FIR/LARCH #2 UNLESS OTHERWISE NOTED.

    b)   4x, 6x AND 8x POSTS TO BE D.FIR/LARCH NO.1.

    c)   ALL WOOD PLATES IN CONTACT WITH STEM WALLS OR SLABS ON GRADE ARE TO BE PRESSURE TREATED.

2.   <u>RIMBOARD:</u> TO BE 1-1/2" THICK LSL OR LVL RIMBOARD BY REDBUILT OR OTHER PRE-APPROVED EQUAL WITH DEPTH AS INDICATED. USE 2.0E REDLAM LVL WHERE 3-1/2" THICKNESS IS INDICATED.

3.   <u>GLU-LAMS:</u>

    a)   SHALL BE MANUFACTURED IN ACCORDANCE WITH ANSI/AITC A190.1, CURRENT EDITION.

    b)   ALL MEMBERS SHALL BE GRADE-STAMPED WITH AN AITC QUALITY MARK, AND SHALL MEET THE REQUIREMENTS OF D.FIR/LARCH COMBINATION 24F-V8 FOR MULTI-SPANS AND CANTILEVERED MEMEBERS, AND D.FIR/LARCH COMBINATION 24F-V4 FOR SINGLE SPAN MEMBERS.

    c)   ALL GLULAM MEMBERS SHALL BE CONSTRUCTED WITH EXTERIOR-GRADE ADHESIVES.

4. SHEATHING:

    a) ALL SHEATHING TO BE APA RATED PLYWOOD APPROPRIATE TO THE SPAN LENGTHS AND DIRECTIONS INDICATED ON THE DRAWINGS. SHEATHING LAY-UP TO BE WITH FACE GRAIN OR STRONG DIRECTION PERPENDICULAR TO SUPPORTS EXCEPT WHERE SPECIFICALLY SHOWN OTHERWISE. ALL SINGLE SPAN CONDITIONS ARE TO HAVE 2X4 BLOCKING ACROSS THE SPAN AT 24" O.C. MAX.

    b) ROOF SHEATHING TO BE 3/4" PERFORMANCE CATEGORY, APA RATED SHEATHING, EXPOSURE 1, WITH A SPAN RATING OF 48/24. NAIL WITH 10d NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND WITH 10d NAILS AT 12" O.C. AT ALL INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE.

    c) FLOOR SHEATHING AT TERRACES TO BE 1-1/8" PERFORMANCE CATEGORY, T&G, APA RATED 48" O.C., STURDI-I-FLOOR SHEATHING, EXPOSURE 1. BLOCK AND NAIL ALL PANEL EDGES WITH 3" NOMINAL BLOCKING. NAIL WITH 10d NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND WITH 10d NAILS AT 10" O.C. AT ALL INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE.

    d) ALL OTHER FLOOR SHEATHING TO BE WARMBOARD AS DESCRIBED BELOW.

    e) ALL ROOF AND FLOOR SHEATHING IS TO BE LAID UP IN RUNNING BOND WITH STRENGTH AXIS PERPENICUALR TO SUPPORTS. ROTATE PANEL DIRECTION AS REQUIRED TO REFLECT FRAMING DIRECTION CHANGES.

    f) IN ADDITION TO THE NAILING REQUIREMENTS INDICATED, ALL FLOOR SHEATHING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "APA GLUED FLOOR SYSTEM" AS DESCRIBED IN APA PUBLICATION E30, "ENGINEERED WOOD CONSTRUCTION GUIDE" AVAILABLE AT http://www.apawood.org/. ALL PANEL EDGES AND PANEL CONTACT WITH SUPPORTS SHALL BE GLUED AS DESCRIBED.

    g) FOR ALL WALLS OR PORTIONS OF WALLS NOTED TO BE SHEARWALLS, TO BE 1/2" OR 5/8" PERFORMANCE CATEGORY (THICKNESS AS INDICATED), APA RATED SHEATHING WITH 32/16 SPAN RATING, EXPOSURE 1, INSTALLED ON ONE OR TWO SIDES OF THE WALL AS INDICATED. FULLY BLOCK AND NAIL ALL PANEL EDGES. NAIL AS INDICATED IN THE SHEAR WALL SCHEDULE.

5. WARMBOARD SHEATHING:

    a) TO BE 1-1/8" THICK WARMBOARD-S RADIANT FLOOR HEATING PANELS BY WARMBOARD INC. MANUFACTURED AND INSTALLED IN ACCORDANCE WITH ICC ESR-1421.

    b) ALL SHEATHING IS TO BE LAID UP IN RUNNING BOND WITH STRENGTH AXIS PERPENICUALR TO SUPPORTS. ROTATE PANEL DIRECTION AS REQUIRED TO REFLECT FRAMING DIRECTION CHANGES.

    c) AT ALL SHEATHING EAST OF GRID C, BLOCK AND NAIL ALL PANEL EDGES WITH 3" NOMINAL BLOCKING. NAIL WITH 10d NAILS AT 6" O.C. AT ALL EDGE SUPPORTS AND WITH 10d NAILS AT 12" O.C. AT ALL INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE.

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    d)   WHERE PANEL EDGES ABUT ON I-JOISTS AND OTHER FRAMING, STAGGER NAILS ON OPPOSING PANEL EDGES AND MAINTAIN MINIMUM 3/8 EDGE DISTANCE TO PANEL EDGE AND TO EDGE OF JOIST CHORD BELOW SHEATHING.

    e)   IN ADDITION TO THE NAILING REQUIREMENTS INDICATED, ALL WARMBOARD FLOOR SHEATHING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "APA GLUED FLOOR SYSTEM" AS DESCRIBED IN APA PUBLICATION E30, "ENGINEERED WOOD CONSTRUCTION GUIDE" AVAILABLE AT http://www.apawood.org/. ALL PANEL EDGES AND PANEL CONTACT WITH SUPPORTS SHALL BE GLUED AS DESCRIBED.

6.   PLYWOOD WEB I JOISTS:

    a)   TO BE DETAILED AND FABRICATED BY REDBUILT OR PRE-APPROVED EQUAL, AND ARE TO HAVE THE APPROVAL OF ICC.

    b)   JOISTS HAVE BEEN SIZED BY THIS ENGINEER AND MANUFACTURER CALCULATIONS ARE NOT REQUIRED IF THE SPECIFIC PRODUCTS INDICATED ARE SUPPLIED.

    c)   IF AN ALTERNATE MANUFACTURER'S PRODUCT IS TO BE SUBMITTED FOR REVIEW, FURNISH MANUFACTURER'S PUBLISHED TECHNICAL INFO, AND A TABLE THAT SHOWS THAT THE PROPOSED PRODUCT VALUES FOR EACH JOIST TYPE MEET OR EXCEED THOSE FOR THE REDBUILT PRODUCT SPECIFIED. THE TABLE SHALL INCLUDE THE FOLLOWING ITEMS FOR EACH REDBUILT AND PROPOSED ALTERNATE JOIST TYPE.

        (1)   UNFACTORED RESISTING MOMENT
        (2)   UNFACOTRED RESISTING SHEAR
        (3)   MOMENT OF INERTIA OF BARE JOIST PRODUCT.

    SUBMITTALS THAT DO NOT INCLUDE THE TABLE AS DESCRIBED WILL BE REJECTED.

    d)   LUMBER USED IN THE JOIST TOP FLANGES IS TO BE OF A WOOD SPECIES HAVING A SPECIFIC GRAVITY OF NOT LESS THAN 0.5.

    e)   DOUBLE JOISTS ARE TO BE CONNECTED TOGETHER PER MANUFACTURER'S TYPICAL DETAIL. INCLUDE THIS DETAIL ON THE SHOP DRAWING SUBMITTAL.

    f)   SUBMITTALS: SHOP DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW BY THE ENGINEER PRIOR TO FABRICATION.

7.   PREFABRICATED WOOD ROOF TRUSSES:

    a)   TO BE "GANG-NAIL" OR "ALPINE" OR APPROVED EQUAL DESIGNED, DETAILED AND FABRICATED IN ACCORDANCE WITH THE NATIONAL FOREST PRODUCTS ASSOCIATION "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION", AND THE TRUSS PLATE

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INSTITUTE "NATIONAL DESIGN STANDARD FOR METAL PLATE CONNECTED WOOD TRUSS CONSTRUCTION ", LATEST ADOPTIONS.

b) <u>DESIGN REQUIREMENTS:</u>

(1) TRUSS TOP CHORDS ARE TO BE DESIGNED FOR THE SNOW LOADS INDICATED FOLLOWING AND FOR A SUPERIMPOSED DEAD LOAD OF NOT LESS THAN 12 PSF.
  (a) SNOW LOAD CASE 1: UNIFORM ROOF SNOW LOAD OF 240 PSF.
  (b) SNOW LOAD CASE 2: SNOW LOAD AT RIDGE SIDE DEMISING WALL = 368 PSF, SNOW LOAD AT VALLEY SIDE DEMISING WALL = 102 PSF.

(2) TRUSS BOTTOM CHORDS ARE TO BE DESIGNED FOR A SUPERIMPOSED DEAD LOAD OF NOT LESS THAN 8 PSF.

(3) THE MAXIMUM ALLOWABLE STRESS INCREASE FOR DURATION OF LOAD IS TO BE 15%.

(4) TRUSS DEFLECTION TO BE LIMITED TO L/180 FOR TOTAL LOAD AND L/240 FOR LIVE LOAD.

(5) TRUSS DEPTH TO BE 24" WITH BEARING CONDITIONS AS SHOWN.

(6) PROVIDE CONTINUOUS TRUSS BLOCKING PANELS AS DETAILED WITH HORIZONTAL SEISMIC LOAD TRANSFER CAPACITY NOTED ON THE DETAILS.

c) <u>SUBMITTALS:</u>

(1) COMPLETE DESIGN CALCULATIONS SHALL BE FURNISHED TO THE ENGINEER FOR EACH TRUSS. CALCULATIONS MUST BE PREPARED AND SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF UTAH. UNSEALED SUBMITTALS WILL BE REJECTED.

(2) SHOP DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW BY THE ENGINEER PRIOR TO FABRICATION.

(3) THE TRUSS MANUFACTURER SHALL PROVIDE WRITTEN CERTIFICATION THAT THE TRUSS QUALITY IS IN CONFORMANCE WITH THE QUALITY CRITERIA DESCRIBED IN ANSI/TPI-1, LATEST ADOPTION, PUBLISHED BY THE TRUSS PLATE INSTITUTE.

(4) THE TRUSS MANUFACTURER SHALL HAVE A QUALITY ASSURANCE PROGRAM IN ACCORDANCE WITH CHAPTER 3 OF ANSI/TPI-1, LATEST EDITION, AND PROVIDE WRITTEN CERTIFICATION OF COMPLIANCE.

d) <u>GENERAL:</u>

(1) ALL TRUSSES AND RELATED BRACING SHALL BE SIZED AND DETAILED TO FIT THE DIMENSIONS AND LOADS INDICATED ON THE PLANS.

(2) LUMBER USED FOR CHORDS AND WEBS SHALL HAVE A MAXIMUM MOISTURE CONTENT BELOW 19% AT THE TIME OF FABRICATION.

(3) LUMBER USED FOR CHORDS AND WEBS THAT ARE TO RECEIVE PLYWOOD SHEATHING ARE TO BE OF WOOD SPECIES HAVING A SPECIFIC GRAVITY OF NOT LESS THAN 0.5.

(4) ALL TRUSS MEMBERS SHALL MEET OR EXCEED VISUAL REQUIREMENTS FOR NO. 2 GRADE. NO WANE SHALL BE PERMITTED IN THE CONNECTION AREA.

(5) DESIGN LATERAL RESISTANCE VALUES FOR TRUSS PLATES AND METAL WEBS SHALL BE 80% OF TPI ALLOWABLE LOAD VALUES.

(6) THE HANKINSON FORMULA OR STRAIGHT LINE INTERPOLATION SHALL BE USED TO DETERMINE LATERAL RESISTANCE VALUES FOR PLATE TO WOOD GRAIN ANGLES BETWEEN 0 AND 90 DEGREES.

(7) TRUSS PLATES SHALL BE SIZED SO THAT THEY CAN BE CENTERED BOTH HORIZONTALLY AND VERTICALLY ON THE JOINT UNLESS THE CHORD DEPTH OR THE TRUSS GEOMETRY PROHIBITS SUCH PLACEMENT.

(8) EVERY TRUSS PLATE SHALL BE FULLY EMBEDDED INTO THE UNDERLYING WOOD ACROSS THE ENTIRE CONTACT AREA.

(9) ALL TRUSSES SHALL BE ERECTED AND BRACED IN ACORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND IN ACCORDANCE WITH TRUSS PLATE INSTITUTE RECOMMENDATIONS.

8. WOOD NAILING SCHEDULE (U.N.O. ON PLANS):

a) JOIST TO SILL OR GIRDER, TOENAIL 3-8d
b) SOLE PLATE TO JOIST OR BLOCKING, FACE NAIL 2-16d
c) TOP PLATE TO STUD, END NAIL 2-16d
d) 2x STUD TO PLATE, TOENAIL 4-8d or FACE NAIL 2-16d
e) 3x STUD TO 3x PLATE, TOENAIL 4-10d OR FACE NAIL 3-20d
f) DOUBLE STUDS, FACE NAIL 16d @ 24" O.C.
g) DOUBLED TOP PLATES, FACE NAIL 16d @ 16" O.C.
h) TOP PLATES, LAPS AND INTERSECTIONS, FACE NAIL 2-16d
i) CONTINUOUS HEADER TO STUD, TOENAIL 4-8d
j) BUILT UP CORNER STUDS, 16d @ 24" O.C.
k) BUILT-UP GIRDERS AND BEAMS, 20d @ 32"O.C. AT TOP AND BOTTOM AND STAGGERED 2-20d AT EACH END & SPLICE
l) RIMBOARD TO I-JOIST, 10d FACE NAIL TO T&B JOIST CHORD

9. LAG SCREW INSTALLATION:

a) ALL LAG SCREWS REQUIRE PRE-DRILLING OF HOLES.
b) LAG SCREWS SHALL BE INSTALLED INTO PROPERLY SIZED LEAD AND CLEARANCE HOLES PER N.F.P.A. "NATIONAL DESIGN SPECIFICATION" REQUIREMENTS AS FOLLOWS.

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c)   THE CLEARANCE HOLE FOR THE SHANK SHALL HAVE THE SAME DIAMETER AS THE SHANK AND THE SAME DEPTH OF PENETRATION AS THE LENGTH OF UNTHREADED SHANK.

d)   THE LEAD HOLE FOR THE THREADED PORTION SHALL HAVE A DIAMETER EQUAL TO 40 TO 70 PERCENT OF THE SHANK DIAMETER AND A LENGTH EQUAL TO AT LEAST THE LENGTH OF THE THREADED PORTION.

e)   THE THREADED PORTION OF THE SCREW SHALL BE INSERTED IN ITS LEAD HOLE BY TURNING WITH A WRENCH, NOT BY DRIVING WITH A HAMMER.

f)   SOAP OR OTHER LUBRICANT SHALL BE USED ON THE SCREWS OR IN THE LEAD HOLE TO FACILITATE INSERTION AND PREVENT DAMAGE TO THE SCREW.

10.   <u>WOOD CONNECTORS:</u>

a)   UNLESS NOTED OTHERWISE, ALL NAILS ARE TO BE COMMON NAILS PER ASTM F1667 WITH ASTM A153 HOT-DIP GALVANIZED FINISH. NAILS IN CONTACT WITH TREATED LUMBER ARE TO BE G185 HOT-DIP GALVANIZED OR STAINLESS STEEL.

b)   LAG SCREWS SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A307, LOW-CARBON STEEL EXTERNALLY AND INTERNALLY THREADED STANDARD FASTENERS.

c)   ALL LUMBER CONNECTORS SPECIFIED AS "SIMPSON" TYPE TO BE MANUFACTURED BY "SIMPSON STRONG-TIE COMPANY, INC." OR PRE-APPROVED EQUAL. INSTALL CONNECTORS USING MAXIMUM SIZE AND NUMBER OF FASTENERS PER MANUFACTURER'S LITERATURE UNLESS NOTED OTHERWISE. INSTALL SDS SCREWS PER MANUFACTURER'S RECOMMENDATIONS.

E.   <u>SIMPSON STRONG ROD CONTINUOUS ROD TIEDOWN SYSTEM:</u>

1.   THE CONTINUOUS ROD TIEDOWN SYSTEM SHALL BE SIMPSON STRONG-TIE STRONG-ROD ANCHOR TIEDOWN SYSTEM FOR SHEARWALL OVERTURNING RESTRAINT. SUBSTITUTIONS OF OTHER MANUFACTURER'S PRODUCTS ARE NOT ALLOWED.

2.   IN A MULTI-STORY SHEARWALL INSTALLATION, THE CONTINUOUS ROD TIEDOWN SYSTEM SHALL BE RESTRAINED BY BEARING PLATES AT EACH STORY OF THE MULTI-STORY SHEARWALL. SHRINKAGE COMPENSATING DEVICES SHALL BE PROVIDED AT EACH RESTRAINT LOCATION.

3.   SKIPPING STORIES, WHERE BEARING PLATES ARE OMITTED AT INTERMEDIATE FLOORS THAT RESULT IN MULTIPLE STORIES BEING TIED TOGETHER, IS PROHIBITED.

4.   THE COMPUTED ROD ELONGATION OR STRETCH BETWEEN RESTRAINT LOCATIONS, TOGETHER WITH COMPUTED DEFORMATIONS OF SHRINKAGE COMPENSATING DEVICE IN COMPLIANCE WITH ICC-ES AC 316, WITHIN ANY STORY UNDER WORKING STRESS LEVEL (ALLOWABLE STRESS DESIGN) SHORT-TERM DURATION LOADING, SUCH AS WIND OR EARTHQUAKE LOADS, SHALL NOT EXCEED "Dmax" AS SPECIFIED BELOW. ROD ELONGATION OR STRETCH SHALL BE COMPUTED AS THE PRODUCT PL/AE, WHERE P IS THE AXIAL LOAD

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(LBS.), L IS THE INITIAL ROD LENGTH BETWEEN RESTRAINTS AT THE STORY UNDER CONSIDERATION (INCHES), E IS 29,000,000 (PSI) AND A IS THE NET TENSILE AREA OF THE ROD (IN2). DEVICE DISPLACEMENT SHALL BE AS SPECIFIED IN THE EVALUATION REPORT INCLUDING $\Delta R + \Delta A$ (PD/PA).

5. CALCULATIONS AND SHOP DRAWINGS MEETING ALL THE ABOVE REQUIREMENTS SHALL BE SUBMITTED AND PROVIDED BY THE MANUFACTURER OF THE CONTINUOUS ROD TIEDOWN SYSTEM FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION. DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A UTAH REGISTERED STRUCTURAL ENGINEER.

6. DRAWINGS PROVIDED BY THE MANUFACTURER SHALL SPECIFY THE PROPRIETARY COMPONENTS OR SYSTEMS.

7. DESIGN LOADS FOR THE THREE REQUIRED SYSTEMS ARE INDICATED FOLLOWING. "ASDIB" DENOTES ASD INCREMENTAL BEARING LOAD IN POUNDS. "ASDCT" DENOTES ASD CUMULATIVE TENSION LOAD IN POUNDS. "Dmax" DENOTES THE ALLOWABLE ELONGATION IN INCHES AS DESCRIBED ABOVE.

    a)   <u>TYPE SRS-1</u> (SEE 1/S2.10, Dmax = 0.2"):

LEVEL	ASDIB	ASDCT
2	21,513	21,513
1	9,107	30,620

    b)   <u>TYPE SRS-2</u> (SEE 1/S2.10, Dmax = 0.2"):

LEVEL	ASDIB	ASDCT
1	13,367	13,367

    c)   <u>TYPE SRS-3</u> (SEE 2/S2.10, Dmax = 0.2"):

LEVEL	ASDIB	ASDCT
1	23,508	23,508

F.   <u>SHOP DRAWINGS:</u>

1. SHOP DRAWINGS ARE TO BE SUBMITTED FOR ALL STRUCTURAL ITEMS AND AS REQUIRED BY THE SPECIFICATIONS. CONTRACT DRAWINGS SHALL NOT BE REPRODUCED FOR USE AS SHOP DRAWINGS.

2. CONTRACTOR SHALL THOROUGHLY REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE DESIGN TEAM AND SHALL INCLUDE HIS REVIEW STAMP ON THE SUBMITTAL. ALL INFORMATION NOT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS SHALL BE SO NOTED ON THE SUBMITTAL BY THE CONTRACTOR DURING HIS REVIEW. IF DEFFICIENCIES ARE SUBSTANTIAL, THE SUBMITTAL SHALL BE RETURNED TO THE SUBCONTRACTOR FOR REVISIONS PRIOR TO SUBMITTING IT TO THE DESIGN TEAM.

3. ANY CHANGE FROM THE CONTRACT DOCUMENTS SHALL BE CLEARLY NOTED BY THE SUBMITTING PARTY WITH CLOUDS AND SPECIFIC REQUEST FOR APPROVAL. ANY CHANGES NOT NOTED AND CLOUDED SHALL BE CONSIDERED AS NOT APPROVED UNLESS SPECIFICALLY NOTED OTHERWISE BY THIS ENGINEER. THE SHOP DRAWING STAMP SHALL NOT BE CONSIDERED TO BE IMPLIED APPROVAL OF ANY CHANGES.

4.   SHOP DRAWINGS SHALL NOT REPLACE THE CONTRACT DOCUMENTS. ITEMS OMITTED AND/OR SHOWN INCORRECTLY AND NOT NOTED BY THE REVIEWER ARE NOT TO BE CONSIDERED TO BE CHANGES TO THE CONTRACT DOCUMENTS. SHOP DRAWING REVIEW IS INTENDED AS AN AID TO THE CONTRACTOR IN HIS OBTAINING CORRECT SHOP DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL ITEMS ARE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

5.   ANY ENGINEERING DESIGN PERFORMED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF UTAH. COMPLETE DESIGN CALCULATIONS FOR EACH ITEM SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW BY THE ENGINEER. THE ADEQUACY AND ACCURACY OF THE DESIGNS AND LAYOUTS PERFORMED BY OTHERS RESTS WITH THE DESIGNING AND/OR SUBMITTING PARTY.

G.   STRUCTURAL STEEL ERECTOR AND FABRICATOR CERTIFICATION REQUIREMENTS:

1.   THE STEEL FABRICATOR FOR THIS PROJECT SHALL HAVE AISC BUILDING STANDARD [STD] CERTIFICATION. EVIDENCE OF CERTIFICATION SHALL BE SUBMITTED TO THIS ENGINEER FOR REVIEW, AND APPROVAL SHALL BE OBTAINED PRIOR TO PROCEEDING WITH ANY DETAILING OF STEEL OR FABRICATION.

2.   THE STEEL ERECTOR FOR THIS PROJECT SHALL HAVE AISC CATEGORY "CSE" CERTIFICATION. AN ALTERNATE CERTIFICATION WITH ANOTHER RECOGNIZED AUTHORITY MAY BE SUBMITTED FOR REVIEW AND APPROVAL ALONG WITH EVIDENCE OF THE SUCCESSFUL COMPLETION OF NOT LESS THAN THREE PROJECTS OF SIMILAR SCOPE IN THE PAST FIVE YEARS. ACCEPTABILITY OF THE ALTERNATE CERTIFICATION AND EXPERIENCE WILL BE DETERMINED BY THIS ENGINEER. NO STEEL ERECTION SHALL PROCEED PRIOR TO RECEIVING APPROVAL.

H.   SPECIAL INSPECTION:

1.   ALL SPECIAL STRUCTURAL INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH IBC CHAPTER 17 AND AS DESCRIBED IN THE STATEMENT OF SPECIAL INSPECTIONS (SOSI) ON SHEET S0.13. THE PROJECT OWNER OR HIS AGENT SHALL ENGAGE A QUALIFIED INSPECTION AGENCY OR AGENCIES TO PERFORM THE INSPECTIONS THAT ARE LISTED. ALL STRUCTURAL INSPECTORS TO BE ENGAGED SHALL BE COMPETENT AND HAVE ADEQUATE TRAINING OR EXPERIENCE AS REQUIRED BY THE SOSI, AND SHALL BE PRE-APPROVED AS INDICATED.

2.   STRUCTURAL INSPECTORS OF ALL STRUCTURAL WELDING SHALL BE WELDING INSPECTORS (WI) OR SENIOR WELDING INSPECTORS (SWI) AS DEFINED IN AWS B5.1, OR SHALL BE QUALIFIED UNDER THE PROVISIONS OF AWS D1.1, SECTION 6.1.4. WRITTEN EVIDENCE OF THESE QUALIFICATIONS SHALL BE SUBMITTED TO THIS ENGINEER FOR PRIOR REVIEW AND APPROVAL.

3.   THE CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING AND MONITORING OF ALL SPECIAL INSPECTIONS. REASONABLE ADVANCE NOTICE SHALL BE GIVEN TO THE SPECIAL INSPECTOR, STRUCTURAL SPECIAL INSPECTION COORDINATOR, AND/OR THE INSPECTION AGENCY. NO

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PERTINENT WORK SHALL PROCEED OR BE COVERED UP BY OTHER WORK UNTIL SPECIAL INSPECTION HAS TAKEN PLACE AND HAS INDICATED COMPLIANCE. COPIES OF ALL WRITTEN SPECIAL INSPECTION REPORTS SHALL BE PROMPTLY FORWARDED TO THIS ENGINEER BY THE INSPECTING AGENCY.

I.   <u>DEFERRED SUBMITTALS:</u> IN ACCORDANCE WITH IBC SECTION 107.3.4.1, THE CALCULATION AND SHOP DRAWING SUBMITTAL FOR THE FOLLOWING LISTED ITEMS SHALL BE DEFERRED UNTIL AFTER ISSUANCE OF THE BUILDING PERMIT BUT PRIOR TO THEIR INSTALLATION. THE SUBMITTAL IS TO BE REVIEWED BY THIS ENGINEER. AFTER THE APPROVAL HAS BEEN PROVIDED BY THIS ENGINEER, THE CONTRACTOR SHALL FORWARD COPIES OF THE APPROVED SUBMITTAL TO WEBER COUNTY FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION OF THE ITEM.

    1.   PREFABRICATED WOOD ROOF TRUSSES
    2.   SIMPSON STRONG ROD SYSTEM

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ROOF LOADS

ROOFING	—	3.0 PSF
3/4" CEM. BD	—	4.8 PSF
1 1/2" RIGID INSUL	—	1.0 PSF
3/4" OSB	—	2.2 PSF
TRUSSES	—	4.0 PSF
5/8" OSB	—	2.4 PSF
SYNTHETIC STUCCO	—	1.0 PSF
MISC & MPE	—	5.0 PSF

24.0 PSF DL
SNOW LOAD PER FOLLOWING

TYPICAL FLOOR

3/4" STONE & SET	—	12.0 PSF
1 1/2" WARMBOARD	—	3.0 PSF
JOISTS	—	2.0 PSF
5/8" GYP BOARD	—	2.2 PSF
MISC & MPE	—	4.0 PSF

25.0 PSF DL
40.0 PSF LL

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TERRACE FLOOR

WOOD TILES   —   8.0 PSF
SNOW MELT   —   2.0 PSF
5" INSUL.   —   2.0 PSF
MISC.   —   2.0 PSF
1½" SHTG.   —   3.6 PSF
JOISTS   —   3.2 PSF
5/8" GYP   —   2.8 PSF
MISC & MPE   —   4.4 PSF
                    ─────────
                    28.0 PSF DL
                    60.0 PSF LL OR SNOW

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SNOW LOADS   (SITE ELEVATION = 8620 FT)

$P_g = 263.1$ PSF   — WORST CASE

$C_e = 1.1$
$C_t = 0.7$
$I_s = 1.00$

$P_f = 1.1(0.7)(1.0)(263.1) = 203$ PSF

ROOF OVERHANGS — $R \geq 30 \implies$ USE P_f
(ASCE 7.4.5)

UNBALANCED SNOW LOADS — SAWTOOTH DIRECTION
(ASCE 7.6.3)   (LONGIT. DIRECTION)

ROOF SLOPE $\geq 5°$ MAX $\implies$ USE UNBALANCED SNOW

$q_{VALLEY} = \dfrac{.2}{1.1}(203) = 368$ PSF

$q_{RIDGE} = 0.5(203) = 102$ PSF

— SEE NEXT SHT FOR
TRANSVERSE SECTION

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UNBALANCED SNOW LOADING (CONT'D)

$$0.3(203) = 61.0 \text{ PSF} \qquad 240 \text{ PSF}$$

9.33

28-0   28-0
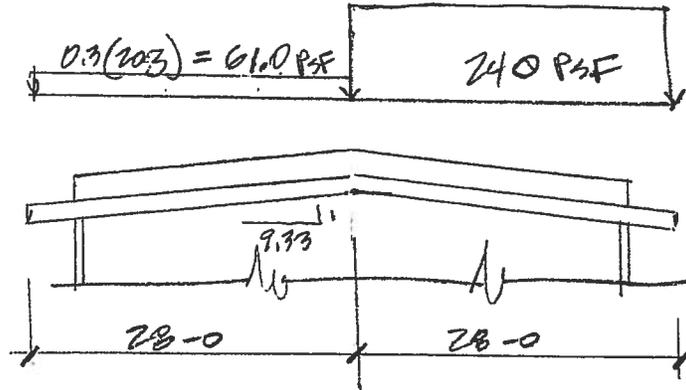
TRANSVERSE SECTION

$$h_d = 0.43 (28)^{\frac{1}{3}} (203.1 + 10)^{\frac{1}{4}} - 1.5 = 3.80 \text{ FT}$$

$$\gamma = 30 \text{ PCF} \qquad S = 9.33$$

$$W_d = \frac{8}{3}(h_d)(S)^{\frac{1}{2}} = 31 \text{ FT} \implies \text{FULL WIDTH}$$

$$f_{BY} = 203 + \frac{3.8(30)}{\sqrt{9.33}} = 240 \text{ PSF} \impliedby \text{CONTROLS}$$

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DRIFT AT TERRACES

TERRACE WIDTH = 22' ± MAX

ROOF WIDTH = 56' ±

$P_f = 203$ PSF

$\gamma = 0.13(203) + 14 = 30$ PCF (MAX)

$h_b = \dfrac{203}{30} = 6.77$ FT

LEEWARD DRIFT

$$h_d = 0.43(56)^{\frac{1}{3}}(203 + 10)^{\frac{1}{4}} - 1.5 = 5.19 \text{ FT} \quad \leftarrow \text{CONTROLS}$$

WINDWARD DRIFT

$$h_d = \frac{3}{4}\left[.43(22)^{\frac{1}{3}}(203)^{\frac{1}{4}} - 1.5 \right] = 2.51 \text{ FT}$$

$$W_d = 4(5.19) = 20.75 \text{ FT}$$

$$q_{max} = (6.77 + 5.19)(30) = 359 \text{ PSF AT GLASS}$$

$$q_{min} = 203 \text{ PSF}$$

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SEISMIC LOADS

$\left.\begin{array}{l} \text{LATITUDE} = 41.36° \\ \text{LONGITUDE} = -111.74° \end{array}\right\}$ SEE NEXT SHT FOR SUMMARY RPT.

$\left.\begin{array}{l} SDS = 0.635 \\ SD1 = 0.334 \end{array}\right\}$ SDC = D

RISK CAT. = II , $I_E = 1.00$

RESPONSE MOD. FACTOR $\Rightarrow$ R = 6.5 (WOOD SHEAR WALL)
$C_D = 4$ $\Omega = 3$

REDUNDANCY $\rho = 1.3$

$C_S = \dfrac{0.635}{6.5/1} = 0.0977$

$T_L = 8$ SEC (FIG 22-12)

$T_a = .02(35)^{.75} = 0.29$ SEC

$C_S (MAX) = \dfrac{.334}{.29(6.5)} = 0.177$

$\left.\begin{array}{l} V = .0977 \, W \ (ULT) \\ = .0684 \, W \ (ASD) \end{array}\right\}$ ρ TO BE APPLIED AT MEMBER & CONN DESIGN

≋USGS Design Maps Summary Report

User–Specified Input

Report Title Copper Crest East
Thu December 1, 2016 22:40:31 UTC

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 41.3627°N, 111.7445°W

Site Soil Classification Site Class D – "Stiff Soil"

Risk Category I/II/III

USGS–Provided Output

$S_S =$ 0.810 g	$S_{MS} =$ 0.953 g	$S_{DS} =$ 0.635 g
$S_1 =$ 0.269 g	$S_{M1} =$ 0.500 g	$S_{D1} =$ 0.334 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE$_R$ Response Spectrum

Design Response Spectrum

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WIND LOADS

2015 IBC, ASCE 7-10

MWFRS   REF ASCE CH28, PART 1

$V = 115 \text{ MPH}$,   EXP = C , ENCLOSED

$K_d = 0.85$ $K_{zt} = 1.0$

$GC_{pi} = \pm 0.18$

RISK CATEGORY = II $I_W = 1.00$, $I_E = 1.00$

$K_z = 1.01$ (MEAN ROOF HT = 35' ±)

$q_z = .00256 (1.01)(1.0)(.85)(115)^2 = 29.0 \text{ PSF (ULT)}$
$= 17.4 \text{ PSF (ASD)}$

GC_{pf} : $\theta = 10° \pm$

$GC_{pf} = 0.44 @ Z1$,$-0.34 @ Z4$
$= 0.67 @ Z1E$,$-0.50 @ Z4E$

WIND $p = 17.4(.44+.18) = 10.8 \text{ PSF (MAX WINDWARD)}$ $\Big\}$ Z1 &
$= 17.4(.34+.18) = 9.0 \text{ PSF (MAX LEEWARD)}$ Z3

$= 17.4(.67+.18) = 14.8 \text{ PSF (MAX WINDWARD)}$ (8.5 PSF MIN PR.)
$= 17.4(.5+.18) = 11.8 \text{ PSF (MAX LEEWARD)}$ (5.6 PSF MIN SUCTION)

$a = 0.10(70) = 7'$ ⟵ CONTROLS $\Big\}$ $2a = 14 \text{ FT}$
$= 0.4(35) = 14'$

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MWFRS (CONT'D)

PARAPETS (MAX HT = 28'±)

$$q_p = .00256 \, (.96)(1.0)(.85)(115)^2 = 27.6 \text{ PSF ULT}$$
$$= 16.6 \text{ PSF ASD}$$

$$P = 1.5(16.6) = 24.9 \text{ PSF (WINDWARD)}$$
$$= 1.0(11) = 16.6 \text{ PSF (LEEWARD)}$$
$$\overline{41.5 \text{ PSF (TOTAL)}}$$

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COMPONENTS & CLADDING   REF ASCE CH30, PART 2

$$P_{net} = \lambda K_{zt} P_{net30} \qquad \lambda = 1.45, \quad K_{zt} = 1.0$$

$$P_{net30} = +22.7, \quad -24.7 \quad @ \quad Z4 \Big\} \quad 20 \, FT^2$$
$$= +22.7, \quad -29.7 \quad @ \quad Z5 \Big\}$$

$$P_{net} = 1.45 (22.7, -24.7) = 32.9 \, PSF \, OR \, -35.8 \, PSF \, @ \, Z4 \Big\}$$
$$= \text{"} \quad (22.7, -29.7) = 32.9 \, PSF \, OR \, -43.1 \, PSF \, @ \, Z5 \Big\} \, ULT$$
$$= 19.7 \, PSF \, OR \, -21.5 \, PSF \, @ \, Z4 \Big\}$$
$$19.7 \, PSF \, OR \, -25.8 \, PSF \, @ \, Z5 \Big\} \, ASD \, LOADS$$

$$a = 7.0 \, FT \, PER \, PREVIOUS$$

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Roof Framing   20' Unit
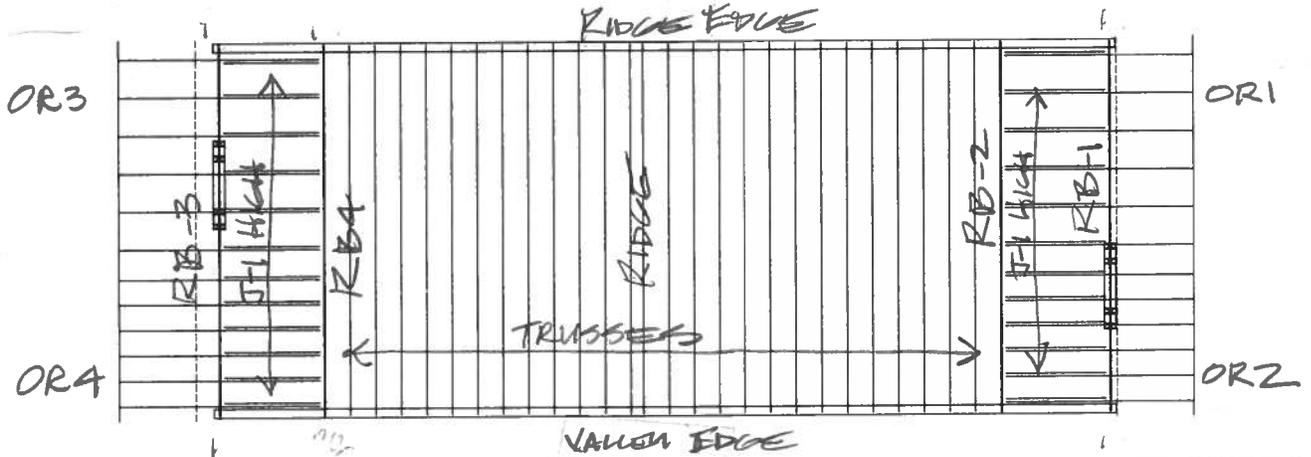
Key Plan

Roof DL = 24 psf

Roof Snow = 240 psf Uniform (controls trusses)
    or = 368 psf @ Valley Edge
        102 psf @ Ridge Edge

Trusses   Span = 19'-3" ±
            q = 24 + 240 = 264 psf Max

Per Alpine Table: 24" Truss @ 55 psf TL @ 24" OC
                   Max Span = 33 ft

$$M_R = 14.97^{1k} \geq \frac{w(19)^2}{8}$$

$$w \leq 332 \text{ plf}$$

$$S = \frac{332}{264}(12) = 15.1"$$

Use 24" Trusses
@ 16" O.C. Max

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OUTRIGGERS

__OR1__   SPAN = 5-8   CANT = 4-4

$W_{SPAN} = 2(8.5) = 17_D$

$W_{CANT} = 2(20 + 102 \text{ or } 240) = 40_D + 204_S \text{ or } 480_S$
   LC1   LC2   LC1   LC2

__OR2__   SPAN = 5-8   CANT = 4-4

$W_{SPAN} = 1.33(8.5) = 11_D$

$W_{CANT} = 1.33(20 + 368 \text{ or } 240) = 27_D + 491_S \text{ or } 320_S$
                              LC1   LC2

__OR3__   SPAN = 5'-8"   CANT = 5'-2½"

$W_{SPAN} = 2(8.5) = 17_D$

$W_{CANT} = 2(20 + 102 \text{ or } 240) = 40_D + 204_S \text{ or } 480_S$

__OR4__   SPAN = 5-6   CANT = 5-2½

$W_{SPAN} = 1.33(8.5) = 11_D$

$W_{CANT} = 1.33(20 + 368 \text{ or } 240) = 27_D + 491_S \text{ or } 320_S$

__J-1__   SPAN = 5-8 $W = 1.33(11.5 + 368) = 15_D + 491_S$
                         $= 2.0(11.5 + 240) = 23_D + 480_S$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : OR1 w/ 240 Snow - 2-1/2 x 9 GLB @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.017)   D(0.04) S(0.48)

2.5x9   2.5x9

Span = 5.670 ft   Span = 4.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0170 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.040 , S = 0.480 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.634 1	Maximum Shear Stress Ratio	=	0.411 : 1
Section used for this span		2.5x9	Section used for this span		2.5x9
fb : Actual	=	1,749.48 psi	fv : Actual	=	125.27 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	5.670 ft	Location of maximum on span	=	5.670 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.366 in Ratio =   284 >=240.
    Max Upward Transient Deflection   -0.059 in Ratio =   1151 >=240.
    Max Downward Total Deflection   0.395 in Ratio =   262 >=180
    Max Upward Total Deflection   -0.063 in Ratio =   1083 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.069	0.045	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2160.00	0.16	10.71	238.50
Length = 4.330 ft	2	0.069	0.045	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2160.00	0.16	10.71	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.062	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2400.00	0.16	10.71	265.00
Length = 4.330 ft	2	0.062	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2400.00	0.16	10.71	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   28

Wood Beam

Lic. # : KW-06002357

Description :   OR1 w/ 240 Snow - 2-1/2 x 9 GLB @ 24" O.C.

Load Combination / Segment Length	Span #	M	V	C$_d$	C$_{F/V}$	C$_i$	C$_r$	C$_m$	C$_t$	C$_L$	M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
Length = 4.330 ft	2	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.634	0.411	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.92	1,749.48	2760.00	1.88	125.27	304.75
Length = 4.330 ft	2	0.634	0.411	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.92	1,749.48	2760.00	1.88	125.27	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
Length = 4.330 ft	2	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.489	0.317	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	2760.00	1.45	96.63	304.75
Length = 4.330 ft	2	0.489	0.317	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	2760.00	1.45	96.63	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.351	0.228	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	3840.00	1.45	96.63	424.00
Length = 4.330 ft	2	0.351	0.228	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	3840.00	1.45	96.63	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.351	0.228	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	3840.00	1.45	96.63	424.00
Length = 4.330 ft	2	0.351	0.228	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.80	1,349.50	3840.00	1.45	96.63	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
Length = 4.330 ft	2	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
Length = 4.330 ft	2	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0000	0.000	+D+S+H	-0.0628	3.294
	2	0.3952	4.330		0.0000	3.294

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.806	3.203	
Overall MINimum	-0.007	0.198	
+D+H	-0.012	0.331	
+D+L+H	-0.012	0.331	
+D+Lr+H	-0.012	0.331	
+D+S+H	-0.806	3.203	
+D+0.750Lr+0.750L+H	-0.012	0.331	
+D+0.750L+0.750S+H	-0.607	2.485	
+D+W+H	-0.012	0.331	
+D+0.70E+H	-0.012	0.331	
+D+0.750Lr+0.750L+0.750W+H	-0.012	0.331	
+D+0.750L+0.750S+0.750W+H	-0.607	2.485	
+D+0.750L+0.750S+0.5250E+H	-0.607	2.485	
+0.60D+W+0.60H	-0.007	0.198	
+0.60D+0.70E+0.60H	-0.007	0.198	
D Only	-0.012	0.331	
Lr Only			
L Only			
S Only	-0.794	2.872	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 **Licensee : RUDOW & BERRY**

Description : OR1 w/ 240 Snow - 2-1/2 x 9 GLB @ 24" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
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scottsdale, arizona 85251
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Project Title: Copper Crest East
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Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 Licensee : RUDOW & BERRY

Description : OR1 w/ 102 Snow - 2-1/2 x 9 GLB @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.017) D(0.04) S(0.204)

2.5x9   2.5x9

Span = 5.670 ft   Span = 4.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.0170 , Tributary Width = 1.0 ft
Load for Span Number 2
   Uniform Load : D = 0.040 , S = 0.2040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.301: 1	Maximum Shear Stress Ratio	=	0.195 : 1
Section used for this span		2.5x9	Section used for this span		2.5x9
fb : Actual	=	829.53 psi	fv : Actual	=	59.40 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	5.670 ft	Location of maximum on span	=	5.670 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.155 in Ratio =   668 >=240.
   Max Upward Transient Deflection   -0.025 in Ratio =   2709 >=240.
   Max Downward Total Deflection   0.185 in Ratio =   560 >=180
   Max Upward Total Deflection   -0.029 in Ratio =   2361 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.069	0.045	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2160.00	0.16	10.71	238.50
Length = 4.330 ft	2	0.069	0.045	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2160.00	0.16	10.71	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.062	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2400.00	0.16	10.71	265.00
Length = 4.330 ft	2	0.062	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	2400.00	0.16	10.71	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : OR1 w/ 102 Snow - 2-1/2 x 9 GLB @ 24" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
Length = 4.330 ft	2	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.301	0.195	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.33	829.53	2760.00	0.89	59.40	304.75
Length = 4.330 ft	2	0.301	0.195	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.33	829.53	2760.00	0.89	59.40	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
Length = 4.330 ft	2	0.050	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3000.00	0.16	10.71	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.239	0.155	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	2760.00	0.71	47.23	304.75
Length = 4.330 ft	2	0.239	0.155	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	2760.00	0.71	47.23	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
Length = 4.330 ft	2	0.039	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.42	149.57	3840.00	0.16	10.71	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.172	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	3840.00	0.71	47.23	424.00
Length = 4.330 ft	2	0.172	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	3840.00	0.71	47.23	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.172	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	3840.00	0.71	47.23	424.00
Length = 4.330 ft	2	0.172	0.111	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.85	659.54	3840.00	0.71	47.23	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
Length = 4.330 ft	2	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00
Length = 4.330 ft	2	0.023	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	89.74	3840.00	0.10	6.43	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0288	3.326
+D+S+H	2	0.1850	4.330		0.0000	3.326

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.349	1.551	
Overall MINimum	-0.007	0.198	
+D+H	-0.012	0.331	
+D+L+H	-0.012	0.331	
+D+Lr+H	-0.012	0.331	
+D+S+H	-0.349	1.551	
+D+0.750Lr+0.750L+H	-0.012	0.331	
+D+0.750L+0.750S+H	-0.265	1.246	
+D+W+H	-0.012	0.331	
+D+0.70E+H	-0.012	0.331	
+D+0.750Lr+0.750L+0.750W+H	-0.012	0.331	
+D+0.750L+0.750S+0.750W+H	-0.265	1.246	
+D+0.750L+0.750S+0.5250E+H	-0.265	1.246	
+0.60D+W+0.60H	-0.007	0.198	
+0.60D+0.70E+0.60H	-0.007	0.198	
D Only	-0.012	0.331	
Lr Only			
L Only			
S Only	-0.337	1.221	
W Only			

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Lic. # : KW-06002357

Description : OR1 w/ 102 Snow - 2-1/2 x 9 GLB @ 24" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description :   OR2 w/ 368 Snow - 2-1/2 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		F_b - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind		F_b - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
		F_c - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF		F_c - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F - V8		F_v	265.0 psi	Eminbend - yy	850.0 ksi
		F_t	1,100.0 psi	Density	31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.011)   D(0.027) S(0.491)

2.5x9   2.5x9

Span = 5.670 ft   Span = 4.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0270, S = 0.4910 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.631: 1	Maximum Shear Stress Ratio	=	0.410 : 1	
Section used for this span		2.5x9	Section used for this span		2.5x9	
f_b : Actual	=	1,742.81 psi	f_v : Actual	=	124.80 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.670 ft	Location of maximum on span	=	5.670 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection   0.374 in   Ratio =   276 >=240.
    Max Upward Transient Deflection   -0.060 in   Ratio =   1125 >=240.
    Max Downward Total Deflection   0.395 in   Ratio =   262 >=180
    Max Upward Total Deflection   -0.063 in   Ratio =   1079 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	f_b	F'b	V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.049	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	2160.00	0.11	7.61	238.50
Length = 4.330 ft	2	0.049	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	2160.00	0.11	7.61	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.044	0.029	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	2400.00	0.11	7.61	265.00
Length = 4.330 ft	2	0.044	0.029	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	2400.00	0.11	7.61	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description : OR2 w/ 368 Snow - 2-1/2 x 9 GLB @ 16" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.035	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3000.00	0.11	7.61	331.25
Length = 4.330 ft	2	0.035	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3000.00	0.11	7.61	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.631	0.410	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.90	1,742.81	2760.00	1.87	124.80	304.75
Length = 4.330 ft	2	0.631	0.410	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.90	1,742.81	2760.00	1.87	124.80	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.035	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3000.00	0.11	7.61	331.25
Length = 4.330 ft	2	0.035	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3000.00	0.11	7.61	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.483	0.313	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	2760.00	1.43	95.50	304.75
Length = 4.330 ft	2	0.483	0.313	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	2760.00	1.43	95.50	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
Length = 4.330 ft	2	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
Length = 4.330 ft	2	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
Length = 4.330 ft	2	0.028	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	106.24	3840.00	0.11	7.61	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.347	0.225	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	3840.00	1.43	95.50	424.00
Length = 4.330 ft	2	0.347	0.225	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	3840.00	1.43	95.50	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.347	0.225	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	3840.00	1.43	95.50	424.00
Length = 4.330 ft	2	0.347	0.225	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	1,333.67	3840.00	1.43	95.50	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.017	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.18	63.75	3840.00	0.07	4.56	424.00
Length = 4.330 ft	2	0.017	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.18	63.75	3840.00	0.07	4.56	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.017	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.18	63.75	3840.00	0.07	4.56	424.00
Length = 4.330 ft	2	0.017	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.18	63.75	3840.00	0.07	4.56	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0630	3.294
+D+S+H	2	0.3949	4.330		0.0000	3.294

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.819	3.174	
Overall MINimum	-0.005	0.141	
+D+H	-0.008	0.236	
+D+L+H	-0.008	0.236	
+D+Lr+H	-0.008	0.236	
+D+S+H	-0.819	3.174	
+D+0.750Lr+0.750L+H	-0.008	0.236	
+D+0.750L+0.750S+H	-0.617	2.439	
+D+W+H	-0.008	0.236	
+D+0.70E+H	-0.008	0.236	
+D+0.750Lr+0.750L+0.750W+H	-0.008	0.236	
+D+0.750L+0.750S+0.750W+H	-0.617	2.439	
+D+0.750L+0.750S+0.5250E+H	-0.617	2.439	
+0.60D+W+0.60H	-0.005	0.141	
+0.60D+0.70E+0.60H	-0.005	0.141	
D Only	-0.008	0.236	
Lr Only			
L Only			
S Only	-0.812	2.938	
W Only			

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Description :   OR2 w/ 368 Snow - 2-1/2 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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480.946.8171

Project Title:	Copper Crest East		
Engineer:	MAR	Project ID:	15105
Project Descr:			

Wood Beam

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Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR3 w/ 240 Snow - 3-1/8 x 9 GLB @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species	: DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade	: 24F - V8	Fv	265.0 psi	Eminbend - yy	850.0 ksi
		Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.017)   D(0.04) S(0.48)

3.125x9   3.125x9

Span = 5.50 ft   Span = 5.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
     Uniform Load : D = 0.0170 , Tributary Width = 1.0 ft
Load for Span Number 2
     Uniform Load : D = 0.040 , S = 0.480 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.678 1	Maximum Shear Stress Ratio	=	0.393 : 1	
Section used for this span		3.125x9	Section used for this span		3.125x9	
fb : Actual	=	1,870.56 psi	fv : Actual	=	119.91 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	5.500 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
     Max Downward Transient Deflection   0.467 in Ratio =   256 >=
     Max Upward Transient Deflection   -0.059 in Ratio =   1112 >=
     Max Downward Total Deflection   0.508 in Ratio =   236 >=180
     Max Upward Total Deflection   -0.064 in Ratio =   1037 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.076	0.044	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2160.00	0.20	10.51	238.50
Length = 5.0 ft	2	0.076	0.044	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2160.00	0.20	10.51	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.068	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2400.00	0.20	10.51	265.00
Length = 5.0 ft	2	0.068	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2400.00	0.20	10.51	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357　　　　　　　　　　　　　　　　　　　**Licensee : RUDOW & BERRY**

Description :　　OR3 w/ 240 Snow - 3-1/8 x 9 GLB @ 24" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.50 ft	1	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
Length = 5.0 ft	2	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.678	0.393	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.58	1,870.56	2760.00	2.25	119.91	304.75
Length = 5.0 ft	2	0.678	0.393	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.58	1,870.56	2760.00	2.25	119.91	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
Length = 5.0 ft	2	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.523	0.304	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	2760.00	1.74	92.56	304.75
Length = 5.0 ft	2	0.523	0.304	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	2760.00	1.74	92.56	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.376	0.218	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	3840.00	1.74	92.56	424.00
Length = 5.0 ft	2	0.376	0.218	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	3840.00	1.74	92.56	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.376	0.218	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	3840.00	1.74	92.56	424.00
Length = 5.0 ft	2	0.376	0.218	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	1,443.89	3840.00	1.74	92.56	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
Length = 5.0 ft	2	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
Length = 5.0 ft	2	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0636	3.196
+D+S+H	2	0.5078	5.000		0.0000	3.196

Vertical Reactions

Support notation : Far left is #1　　　Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-1.132	3.890	
Overall MINimum	-0.025	0.239	
+D+H	-0.041	0.399	
+D+L+H	-0.041	0.399	
+D+Lr+H	-0.041	0.399	
+D+S+H	-1.132	3.890	
+D+0.750Lr+0.750L+H	-0.041	0.399	
+D+0.750L+0.750S+H	-0.859	3.017	
+D+W+H	-0.041	0.399	
+D+0.70E+H	-0.041	0.399	
+D+0.750Lr+0.750L+0.750W+H	-0.041	0.399	
+D+0.750L+0.750S+0.750W+H	-0.859	3.017	
+D+0.750L+0.750S+0.5250E+H	-0.859	3.017	
+0.60D+W+0.60H	-0.025	0.239	
+0.60D+0.70E+0.60H	-0.025	0.239	
D Only	-0.041	0.399	
Lr Only			
L Only			
S Only	-1.091	3.491	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   OR3 w/ 240 Snow - 3-1/8 x 9 GLB @ 24" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 | Licensee : RUDOW & BERRY

Description : OR3 w/ 102 Snow - 3-1/8 x 9 GLB @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	F_c - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
	F_c - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF	F_v	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V8	F_t	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.017)   D(0.04) S(0.204)

3.125x9   3.125x9

Span = 5.50 ft   Span = 5.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0170 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.040, S = 0.2040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.322 1**	Maximum Shear Stress Ratio	=	**0.187 : 1**
Section used for this span		**3.125x9**	Section used for this span		**3.125x9**
f_b : Actual	=	889.22 psi	f_v : Actual	=	57.00 psi
F_B : Allowable	=	2,760.00 psi	F_v : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	5.500 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.198 in	Ratio =	604 >=240.
Max Upward Transient Deflection	-0.025 in	Ratio =	2618 >=240.
Max Downward Total Deflection	0.239 in	Ratio =	500 >=180
Max Upward Total Deflection	-0.030 in	Ratio =	2234 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.076	0.044	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2160.00	0.20	10.51	238.50
Length = 5.0 ft	2	0.076	0.044	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2160.00	0.20	10.51	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.068	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2400.00	0.20	10.51	265.00
Length = 5.0 ft	2	0.068	0.040	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	2400.00	0.20	10.51	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 **40**

Wood Beam

Description :   OR3 w/ 102 Snow - 3-1/8 x 9 GLB @ 24" O.C.

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.50 ft	1	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
Length = 5.0 ft	2	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.322	0.187	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.13	889.22	2760.00	1.07	57.00	304.75
Length = 5.0 ft	2	0.322	0.187	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.13	889.22	2760.00	1.07	57.00	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
Length = 5.0 ft	2	0.055	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3000.00	0.20	10.51	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.256	0.149	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	2760.00	0.85	45.38	304.75
Length = 5.0 ft	2	0.256	0.149	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	2760.00	0.85	45.38	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
Length = 5.0 ft	2	0.043	0.025	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	163.89	3840.00	0.20	10.51	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.184	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	3840.00	0.85	45.38	424.00
Length = 5.0 ft	2	0.184	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	3840.00	0.85	45.38	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.184	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	3840.00	0.85	45.38	424.00
Length = 5.0 ft	2	0.184	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.49	707.89	3840.00	0.85	45.38	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
Length = 5.0 ft	2	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00
Length = 5.0 ft	2	0.026	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	98.33	3840.00	0.12	6.30	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0295	3.226
+D+S+H	2	0.2393	5.000		0.0000	3.226

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.505	1.882	
Overall MINimum	-0.025	0.239	
+D+H	-0.041	0.399	
+D+L+H	-0.041	0.399	
+D+Lr+H	-0.041	0.399	
+D+S+H	-0.505	1.882	
+D+0.750Lr+0.750L+H	-0.041	0.399	
+D+0.750L+0.750S+H	-0.389	1.511	
+D+W+H	-0.041	0.399	
+D+0.70E+H	-0.041	0.399	
+D+0.750Lr+0.750L+0.750W+H	-0.041	0.399	
+D+0.750L+0.750S+0.750W+H	-0.389	1.511	
+D+0.750L+0.750S+0.5250E+H	-0.389	1.511	
+0.60D+W+0.60H	-0.025	0.239	
+0.60D+0.70E+0.60H	-0.025	0.239	
D Only	-0.041	0.399	
Lr Only			
L Only			
S Only	-0.464	1.484	
W Only			

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Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   OR3 w/ 102 Snow - 3-1/8 x 9 GLB @ 24" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR4 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V8		Ft	1,100.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				

D(0.011)   D(0.027) S(0.491)

3.125x9   3.125x9

Span = 5.50 ft   Span = 5.0 ft

Applied Loads   Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0270, S = 0.4910 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.675 1	Maximum Shear Stress Ratio	=	0.392 : 1
Section used for this span		3.125x9	Section used for this span		3.125x9
fb : Actual	=	1,863.44 psi	fv : Actual	=	119.46 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	5.500 ft	Location of maximum on span	=	5.500 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.478 in Ratio =   250 >=240.
    Max Upward Transient Deflection   -0.061 in Ratio =   1087 >=240.
    Max Downward Total Deflection   0.507 in Ratio =   236 >=180
    Max Upward Total Deflection   -0.064 in Ratio =   1035 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
Length = 5.0 ft	2	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
Length = 5.0 ft	2	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

43

Wood Beam

File = C:_jobs\15105C-1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR4 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.50 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.675	0.392	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.55	1,863.44	2760.00	2.24	119.46	304.75
Length = 5.0 ft	2	0.675	0.392	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.55	1,863.44	2760.00	2.24	119.46	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.517	0.300	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	2760.00	1.72	91.48	304.75
Length = 5.0 ft	2	0.517	0.300	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	2760.00	1.72	91.48	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.372	0.216	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	91.48	424.00
Length = 5.0 ft	2	0.372	0.216	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	91.48	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.372	0.216	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	91.48	424.00
Length = 5.0 ft	2	0.372	0.216	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	91.48	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0637	3.196
+D+S+H	2	0.5070	5.000		0.0000	3.196

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-1.144	3.859	
Overall MINimum	-0.017	0.173	
+D+H	-0.028	0.288	
+D+L+H	-0.028	0.288	
+D+Lr+H	-0.028	0.288	
+D+S+H	-1.144	3.859	
+D+0.750Lr+0.750L+H	-0.028	0.288	
+D+0.750L+0.750S+H	-0.865	2.966	
+D+W+H	-0.028	0.288	
+D+0.70E+H	-0.028	0.288	
+D+0.750Lr+0.750L+0.750W+H	-0.028	0.288	
+D+0.750L+0.750S+0.750W+H	-0.865	2.966	
+D+0.750L+0.750S+0.5250E+H	-0.865	2.966	
+0.60D+W+0.60H	-0.017	0.173	
+0.60D+0.70E+0.60H	-0.017	0.173	
D Only	-0.028	0.288	
Lr Only			
L Only			
S Only	-1.116	3.571	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   44

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   OR4 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C-1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-1 @ 368 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	F_c - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	F_c - Perp	625.0 psi	
Wood Grade : No.2	F_v	180.0 psi	
	F_t	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015) S(0.491)

2x10

Span = 5.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0150, S = 0.4910 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.876 1	Maximum Shear Stress Ratio	=	0.550 : 1
Section used for this span		2x10	Section used for this span		2x10
f_b : Actual	=	1,147.51 psi	f_v : Actual	=	113.87 psi
F_B : Allowable	=	1,309.28 psi	F_v : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.835 ft	Location of maximum on span	=	4.904 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.073 in Ratio =   937 >=360
   Max Upward Transient Deflection   0.000 in Ratio =   0 <360
   Max Downward Total Deflection   0.075 in Ratio =   904 >=180
   Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	f_b	F'b	V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.040	0.025	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.07	40.59	1024.65	0.04	4.03	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.036	0.022	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.07	40.59	1138.50	0.04	4.03	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.029	0.018	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	40.59	1423.13	0.04	4.03	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.876	0.550	1.15	1.100	1.00	1.15	1.00	1.00	1.00	2.05	1,147.51	1309.28	1.05	113.87	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.029	0.018	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	40.59	1423.13	0.04	4.03	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-1 @ 368 Snow - 2x10 @ 16" O.C.

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.665	0.417	1.15	1.100	1.00	1.15	1.00	1.00	1.00		1.55	870.78	1309.28	0.80	86.41	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.022	0.014	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	40.59	1821.60	0.04	4.03	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.022	0.014	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	40.59	1821.60	0.04	4.03	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.022	0.014	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	40.59	1821.60	0.04	4.03	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.478	0.300	1.60	1.100	1.00	1.15	1.00	1.00	1.00		1.55	870.78	1821.60	0.80	86.41	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.478	0.300	1.60	1.100	1.00	1.15	1.00	1.00	1.00		1.55	870.78	1821.60	0.80	86.41	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.013	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.04	24.36	1821.60	0.02	2.42	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.013	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.04	24.36	1821.60	0.02	2.42	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0752	2.856		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.443	1.443
Overall MINimum	0.031	0.031
+D+H	0.051	0.051
+D+L+H	0.051	0.051
+D+Lr+H	0.051	0.051
+D+S+H	1.443	1.443
+D+0.750Lr+0.750L+H	0.051	0.051
+D+0.750L+0.750S+H	1.095	1.095
+D+W+H	0.051	0.051
+D+0.70E+H	0.051	0.051
+D+0.750Lr+0.750L+0.750W+H	0.051	0.051
+D+0.750L+0.750S+0.750W+H	1.095	1.095
+D+0.750L+0.750S+0.5250E+H	1.095	1.095
+0.60D+W+0.60H	0.031	0.031
+0.60D+0.70E+0.60H	0.031	0.031
D Only	0.051	0.051
Lr Only		
L Only		
S Only	1.392	1.392
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   J-1 @ 240 Snow - 2x10 @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	*E : Modulus of Elasticity*
Load Combination ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.023) S(0.48)

2x10

Span = 5.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
    Uniform Load : D = 0.0230, S = 0.480 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.871: 1**	Maximum Shear Stress Ratio	=	**0.547 : 1**	
Section used for this span		**2x10**	Section used for this span		**2x10**	
fb : Actual	=	1,140.75 psi	fv : Actual	=	113.20 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	2.835 ft	Location of maximum on span	=	4.904 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection   0.071 in Ratio =   959 >=360
Max Upward Transient Deflection   0.000 in Ratio =   0 <360
Max Downward Total Deflection   0.075 in Ratio =   909 >=180
Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.057	0.036	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1024.65	0.05	5.82	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.051	0.032	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1138.50	0.05	5.82	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.041	0.026	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1423.13	0.05	5.82	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.871	0.547	1.15	1.100	1.00	1.15	1.00	1.00	1.00	2.03	1,140.75	1309.28	1.05	113.20	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.041	0.026	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1423.13	0.05	5.82	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   48

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : J-1 @ 240 Snow - 2x10 @ 24" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.665	0.417	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.55	870.22	1309.28	0.80	86.35	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.478	0.300	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.55	870.22	1821.60	0.80	86.35	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.478	0.300	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.55	870.22	1821.60	0.80	86.35	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.019	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.06	35.18	1821.60	0.03	3.49	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.019	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.06	35.18	1821.60	0.03	3.49	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0748	2.856		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.435	1.435
Overall MINimum	0.044	0.044
+D+H	0.074	0.074
+D+L+H	0.074	0.074
+D+Lr+H	0.074	0.074
+D+S+H	1.435	1.435
+D+0.750Lr+0.750L+H	0.074	0.074
+D+0.750L+0.750S+H	1.094	1.094
+D+W+H	0.074	0.074
+D+0.70E+H	0.074	0.074
+D+0.750Lr+0.750L+0.750W+H	0.074	0.074
+D+0.750L+0.750S+0.750W+H	1.094	1.094
+D+0.750L+0.750S+0.5250E+H	1.094	1.094
+0.60D+W+0.60H	0.044	0.044
+0.60D+0.70E+0.60H	0.044	0.044
D Only	0.074	0.074
Lr Only		
L Only		
S Only	1.361	1.361
W Only		
E Only		
H Only		

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
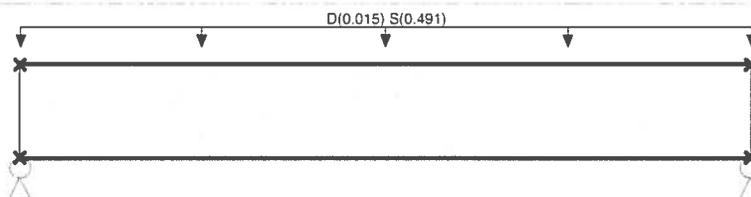ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-1 @ 102 Snow - 2x10 @ 24" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.023) S(0 204)

2x10

Span = 5.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0230, S = 0.2040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.396 : 1	Maximum Shear Stress Ratio	=	0.249 : 1
Section used for this span		2x10	Section used for this span		2x10
fb : Actual	=	518.53 psi	fv : Actual	=	51.46 psi
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.835 ft	Location of maximum on span	=	4.904 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection   0.030 in Ratio =   2257 >=360
Max Upward Transient Deflection   0.000 in Ratio =   0 <360
Max Downward Total Deflection   0.034 in Ratio =   2001 >=180
Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.057	0.036	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1024.65	0.05	5.82	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.051	0.032	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1138.50	0.05	5.82	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.041	0.026	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1423.13	0.05	5.82	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.396	0.249	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.92	518.53	1309.28	0.48	51.46	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.041	0.026	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1423.13	0.05	5.82	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : J-1 @ 102 Snow - 2x10 @ 24" O.C.

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.670 ft	1	0.308	0.193	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.72	403.55	1309.28	0.37	40.05	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.032	0.020	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.10	58.63	1821.60	0.05	5.82	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.222	0.139	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.72	403.55	1821.60	0.37	40.05	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.222	0.139	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.72	403.55	1821.60	0.37	40.05	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.019	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.06	35.18	1821.60	0.03	3.49	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.019	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.06	35.18	1821.60	0.03	3.49	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0340	2.856		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.652	0.652
Overall MINimum	0.044	0.044
+D+H	0.074	0.074
+D+L+H	0.074	0.074
+D+Lr+H	0.074	0.074
+D+S+H	0.652	0.652
+D+0.750Lr+0.750L+H	0.074	0.074
+D+0.750L+0.750S+H	0.507	0.507
+D+W+H	0.074	0.074
+D+0.70E+H	0.074	0.074
+D+0.750Lr+0.750L+0.750W+H	0.074	0.074
+D+0.750L+0.750S+0.750W+H	0.507	0.507
+D+0.750L+0.750S+0.5250E+H	0.507	0.507
+0.60D+W+0.60H	0.044	0.044
+0.60D+0.70E+0.60H	0.044	0.044
D Only	0.074	0.074
Lr Only		
L Only		
S Only	0.578	0.578
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg **51**
of

BEAM RB1

SPAN 1 = 4-4
SPAN 2 = 4-2½ } 19-3
SPAN 3 = 10-8½

$$W_L = (177_D + 1204_S) + (38_D + 1044_S) = 215_D + 3246_S$$

$$W_R = (166_D + 611_S) + (37_D + 289_S) = 203_D + 900_S$$

OR

$$W_{TMP} = (172_D + 1436_S) + (37_D + 681_S) = 209_D + 2117_S$$

BEAM RB2

SPAN = 19-3

$$W_L = (-6_D - 609_S) + (38_D + 1044_S) + .61(24 + 308)$$
$$= 48_D + 680_S$$

$$W_R = (-6_D - 169_S) + (37_D + 289_S) + .67(24 + 102)$$
$$= 48_D + 188_S$$

OR

$$W_{TMP} = (-6_D - 392_S) + (37_D + 681_S) + .67(24 + 240)$$

$$= 48_D + 444_S$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-1 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.209,0.209) S(3.246,2.718) D(0.209,0.209) S(2.718,2.205) D(0.209,0.209) S(2.205,0.9)

5.125x15   5.125x15   5.125x15

Span = 4.330 ft   Span = 4.210 ft   Span = 10.710 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.2090->0.2090, S(S,E) = 3.246->2.718 k/ft, Extent = 0.0 -->> 4.330 ft, Trib Width = 1.0 ft
Load for Span Number 2
  Varying Uniform Load : D(S,E) = 0.2090->0.2090, S(S,E) = 2.718->2.205 k/ft, Extent = 0.0 -->> 4.210 ft, Trib Width = 1.0 ft
Load for Span Number 3
  Varying Uniform Load : D(S,E) = 0.2090->0.2090, S(S,E) = 2.205->0.90 k/ft, Extent = 0.0 -->> 10.710 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.456 :1	Maximum Shear Stress Ratio	=	0.628 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
fb : Actual	=	1,259.27 psi	fv : Actual	=	191.40 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	4.210 ft	Location of maximum on span	=	4.210 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2

Maximum Deflection
Max Downward Transient Deflection   0.094 in Ratio = 1365 >=360
Max Upward Transient Deflection   -0.008 in Ratio = 6062 >=360
Max Downward Total Deflection   0.108 in Ratio = 1186 >=180
Max Upward Total Deflection   -0.010 in Ratio = 5278 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.017	0.019	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	2160.00	0.23	4.52	238.50
Length = 4.210 ft	2	0.072	0.096	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2160.00	1.18	22.94	238.50
Length = 10.710 ft	3	0.072	0.096	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2160.00	1.18	22.94	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 53

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-1 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 4.330 ft	1	0.015	0.017	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	2400.00	0.23	4.52	265.00
Length = 4.210 ft	2	0.064	0.087	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2400.00	1.18	22.94	265.00
Length = 10.710 ft	3	0.064	0.087	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2400.00	1.18	22.94	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.012	0.014	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3000.00	0.23	4.52	331.25
Length = 4.210 ft	2	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
Length = 10.710 ft	3	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.151	0.220	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.67	416.50	2760.00	3.43	66.90	304.75
Length = 4.210 ft	2	0.456	0.628	1.15	1.000	1.00	1.00	1.00	1.00	1.00	20.17	1,259.27	2760.00	9.81	191.40	304.75
Length = 10.710 ft	3	0.456	0.628	1.15	1.000	1.00	1.00	1.00	1.00	1.00	20.17	1,259.27	2760.00	9.81	191.40	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.012	0.014	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3000.00	0.23	4.52	331.25
Length = 4.210 ft	2	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
Length = 10.710 ft	3	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.116	0.168	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.15	321.28	2760.00	2.62	51.09	304.75
Length = 4.210 ft	2	0.356	0.490	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	2760.00	7.65	149.29	304.75
Length = 10.710 ft	3	0.356	0.490	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	2760.00	7.65	149.29	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.084	0.120	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.15	321.28	3840.00	2.62	51.09	424.00
Length = 4.210 ft	2	0.256	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	3840.00	7.65	149.29	424.00
Length = 10.710 ft	3	0.256	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	3840.00	7.65	149.29	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.084	0.120	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.15	321.28	3840.00	2.62	51.09	424.00
Length = 4.210 ft	2	0.256	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	3840.00	7.65	149.29	424.00
Length = 10.710 ft	3	0.256	0.352	1.60	1.000	1.00	1.00	1.00	1.00	1.00	15.75	983.12	3840.00	7.65	149.29	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.006	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	21.65	3840.00	0.14	2.71	424.00
Length = 4.210 ft	2	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
Length = 10.710 ft	3	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.006	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	21.65	3840.00	0.14	2.71	424.00
Length = 4.210 ft	2	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
Length = 10.710 ft	3	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0085	2.110		0.0000	0.000
	2	0.0000	2.110	+D+S+H	-0.0096	2.653
+D+S+H	3	0.1083	5.850		0.0000	2.653

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	6.726	8.631	22.416	6.474
Overall MINimum	0.306	0.198	1.516	0.586
+D+H	0.511	0.330	2.526	0.977
+D+L+H	0.511	0.330	2.526	0.977

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   54

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   Beam RB-1 - 368/102 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+Lr+H	0.511	0.330	2.526	0.977
+D+S+H	6.726	8.631	22.416	6.474
+D+0.750Lr+0.750L+H	0.511	0.330	2.526	0.977
+D+0.750L+0.750S+H	5.172	6.556	17.443	5.100
+D+W+H	0.511	0.330	2.526	0.977
+D+0.70E+H	0.511	0.330	2.526	0.977
+D+0.750Lr+0.750L+0.750W+H	0.511	0.330	2.526	0.977
+D+0.750L+0.750S+0.750W+H	5.172	6.556	17.443	5.100
+D+0.750L+0.750S+0.5250E+H	5.172	6.556	17.443	5.100
+0.60D+W+0.60H	0.306	0.198	1.516	0.586
+0.60D+0.70E+0.60H	0.306	0.198	1.516	0.586
D Only	0.511	0.330	2.526	0.977
Lr Only				
L Only				
S Only	6.215	8.300	19.890	5.497
W Only				
E Only				
H Only				

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-1 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr 2,400.0 psi	E_{bend}- xx 1,800.0 ksi
	F_c - Prll 1,650.0 psi	$E_{minbend}$ - xx 950.0 ksi
Wood Species : DF/DF	F_c - Perp 650.0 psi	E_{bend}- yy 1,600.0 ksi
Wood Grade : 24F - V8	F_v 265.0 psi	$E_{minbend}$ - yy 850.0 ksi
	F_t 1,100.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		

D(0.209) S(2.117)   D(0.209) S(2.117)   D(0.209) S(2.117)

5.125x15   5.125x15   5.125x15

Span = 4.330 ft   Span = 4.210 ft   Span = 10.710 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.2090, S = 2.117 , Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 0.2090, S = 2.117 , Tributary Width = 1.0 ft
Load for Span Number 3
Uniform Load : D = 0.2090, S = 2.117 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.582 1**	Maximum Shear Stress Ratio	=	**0.781 : 1**	
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**	
f_b : Actual	=	1,605.70 psi	f_v : Actual	=	238.15 psi	
F_B : Allowable	=	2,760.00 psi	F_v : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	4.210 ft	Location of maximum on span	=	4.210 ft	
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2	

Maximum Deflection
Max Downward Transient Deflection	0.133 in	Ratio =	964	>=360
Max Upward Transient Deflection	-0.012 in	Ratio =	4354	>=360
Max Downward Total Deflection	0.147 in	Ratio =	871	>=180
Max Upward Total Deflection	-0.013 in	Ratio =	3934	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.017	0.019	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	2160.00	0.23	4.52	238.50
Length = 4.210 ft	2	0.072	0.096	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2160.00	1.18	22.94	238.50
Length = 10.710 ft	3	0.072	0.096	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2160.00	1.18	22.94	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : Beam RB-1 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 4.330 ft	1	0.015	0.017	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	2400.00	0.23	4.52	265.00
Length = 4.210 ft	2	0.064	0.087	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2400.00	1.18	22.94	265.00
Length = 10.710 ft	3	0.064	0.087	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	2400.00	1.18	22.94	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.012	0.014	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3000.00	0.23	4.52	331.25
Length = 4.210 ft	2	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
Length = 10.710 ft	3	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.136	0.154	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.00	374.62	2760.00	2.40	46.90	304.75
Length = 4.210 ft	2	0.582	0.781	1.15	1.000	1.00	1.00	1.00	1.00	1.00	25.72	1,605.70	2760.00	12.21	238.15	304.75
Length = 10.710 ft	3	0.582	0.781	1.15	1.000	1.00	1.00	1.00	1.00	1.00	25.72	1,605.70	2760.00	12.21	238.15	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.012	0.014	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3000.00	0.23	4.52	331.25
Length = 4.210 ft	2	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
Length = 10.710 ft	3	0.052	0.069	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3000.00	1.18	22.94	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.105	0.119	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.64	289.98	2760.00	1.86	36.31	304.75
Length = 4.210 ft	2	0.450	0.605	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	2760.00	9.45	184.35	304.75
Length = 10.710 ft	3	0.450	0.605	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	2760.00	9.45	184.35	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.009	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.58	36.08	3840.00	0.23	4.52	424.00
Length = 4.210 ft	2	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
Length = 10.710 ft	3	0.040	0.054	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.48	154.67	3840.00	1.18	22.94	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.076	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.64	289.98	3840.00	1.86	36.31	424.00
Length = 4.210 ft	2	0.324	0.435	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	3840.00	9.45	184.35	424.00
Length = 10.710 ft	3	0.324	0.435	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	3840.00	9.45	184.35	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.076	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.64	289.98	3840.00	1.86	36.31	424.00
Length = 4.210 ft	2	0.324	0.435	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	3840.00	9.45	184.35	424.00
Length = 10.710 ft	3	0.324	0.435	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.91	1,242.94	3840.00	9.45	184.35	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.006	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	21.65	3840.00	0.14	2.71	424.00
Length = 4.210 ft	2	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
Length = 10.710 ft	3	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.330 ft	1	0.006	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.35	21.65	3840.00	0.14	2.71	424.00
Length = 4.210 ft	2	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00
Length = 10.710 ft	3	0.024	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.49	92.80	3840.00	0.71	13.76	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0080	2.220		0.0000	0.000
	2	0.0000	2.220	+D+S+H	-0.0128	2.653
+D+S+H	3	0.1474	5.940		0.0000	2.653

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	5.302	3.428	26.222	10.144
Overall MINimum	0.306	0.198	1.516	0.586
+D+H	0.511	0.330	2.526	0.977
+D+L+H	0.511	0.330	2.526	0.977

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   57

Wood Beam

Description :   Beam RB-1 - 240 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+Lr+H	0.511	0.330	2.526	0.977
+D+S+H	5.302	3.428	26.222	10.144
+D+0.750Lr+0.750L+H	0.511	0.330	2.526	0.977
+D+0.750L+0.750S+H	4.104	2.654	20.298	7.852
+D+W+H	0.511	0.330	2.526	0.977
+D+0.70E+H	0.511	0.330	2.526	0.977
+D+0.750Lr+0.750L+0.750W+H	0.511	0.330	2.526	0.977
+D+0.750L+0.750S+0.750W+H	4.104	2.654	20.298	7.852
+D+0.750L+0.750S+0.5250E+H	4.104	2.654	20.298	7.852
+0.60D+W+0.60H	0.306	0.198	1.516	0.586
+0.60D+0.70E+0.60H	0.306	0.198	1.516	0.586
D Only	0.511	0.330	2.526	0.977
Lr Only				
L Only				
S Only	4.791	3.098	23.697	9.167
W Only				
E Only				
H Only				

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4021 north 75th street, #101
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Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Lic. # : KW-06002357 — **Licensee : RUDOW & BERRY**

Description : Beam RB-2 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design
Load Combination :ASCE 7-10 w/ ASD Wind

Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

F_b - Tension	2,400.0 psi	*E : Modulus of Elasticity*	
F_b - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
F_c - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
F_c - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
F_v	265.0 psi	Eminbend - yy	850.0 ksi
F_t	1,100.0 psi	Density	31.20 pcf

D(0.048,0.048) S(0.68,0.188)

5.125x15

Span = 19.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.0480->0.0480, S(S,E) = 0.680->0.1880 k/ft, Extent = 0.0 -->> 19.250 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.533 1**	Maximum Shear Stress Ratio	=	**0.302 : 1**
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**
fb : Actual	=	1,451.83 psi	fv : Actual	=	92.05 psi
FB : Allowable	=	2,722.68 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.852 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.520 in	Ratio = 444 >=360
Max Upward Transient Deflection	0.000 in	Ratio = 0 <360
Max Downward Total Deflection	0.598 in	Ratio = 386 >=180
Max Upward Total Deflection	0.000 in	Ratio = 0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.088	0.045	0.90	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2130.79	0.55	10.64	238.50
+D+L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.079	0.040	1.00	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2367.55	0.55	10.64	265.00
+D+Lr+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.063	0.032	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2959.44	0.55	10.64	331.25
+D+S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.533	0.302	1.15	0.986	1.00	1.00	1.00	1.00	1.00	23.25	1,451.83	2722.68	4.72	92.05	304.75
+D+0.750Lr+0.750L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.063	0.032	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2959.44	0.55	10.64	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-2 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.417	0.235	1.15	0.986	1.00	1.00	1.00	1.00	1.00	18.18	1,135.32	2722.68	3.67	71.70	304.75
+D+W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.70E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.750Lr+0.750L+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.750L+0.750S+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.300	0.169	1.60	0.986	1.00	1.00	1.00	1.00	1.00	18.18	1,135.32	3788.08	3.67	71.70	424.00
+D+0.750L+0.750S+0.5250E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.300	0.169	1.60	0.986	1.00	1.00	1.00	1.00	1.00	18.18	1,135.32	3788.08	3.67	71.70	424.00
+0.60D+W+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.030	0.015	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.80	112.20	3788.08	0.33	6.38	424.00
+0.60D+0.70E+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.030	0.015	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.80	112.20	3788.08	0.33	6.38	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.5977	9.484		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.589	4.010
Overall MINimum	0.373	0.373
+D+H	0.622	0.622
+D+L+H	0.622	0.622
+D+Lr+H	0.622	0.622
+D+S+H	5.589	4.010
+D+0.750Lr+0.750L+H	0.622	0.622
+D+0.750L+0.750S+H	4.347	3.163
+D+W+H	0.622	0.622
+D+0.70E+H	0.622	0.622
+D+0.750Lr+0.750L+0.750W+H	0.622	0.622
+D+0.750L+0.750S+0.750W+H	4.347	3.163
+D+0.750L+0.750S+0.5250E+H	4.347	3.163
+0.60D+W+0.60H	0.373	0.373
+0.60D+0.70E+0.60H	0.373	0.373
D Only	0.622	0.622
Lr Only		
L Only		
S Only	4.967	3.388
W Only		
E Only		
H Only		

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Description : Beam RB-2 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.048) S(0.444)

5.125x15

Span = 19.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0480, S = 0.4440 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.540 : 1		Maximum Shear Stress Ratio	=	0.275 : 1
Section used for this span		5.125x15		Section used for this span		5.125x15
fb : Actual	=	1,471.13 psi		fv : Actual	=	83.67 psi
FB : Allowable	=	2,722.68 psi		Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H		Load Combination		+D+S+H
Location of maximum on span	=	9.625 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.532 in	Ratio =	434 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.609 in	Ratio =	379 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.088	0.045	0.90	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2130.79	0.55	10.64	238.50
+D+L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.079	0.040	1.00	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2367.55	0.55	10.64	265.00
+D+Lr+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.063	0.032	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2959.44	0.55	10.64	331.25
+D+S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.540	0.275	1.15	0.986	1.00	1.00	1.00	1.00	1.00	23.56	1,471.13	2722.68	4.29	83.67	304.75
+D+0.750Lr+0.750L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.063	0.032	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	2959.44	0.55	10.64	331.25
+D+0.750L+0.750S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-2 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 19.250 ft	1	0.422	0.215	1.15	0.986	1.00	1.00	1.00	1.00	1.00	18.42	1,150.10	2722.68	3.35	65.41	304.75
+D+W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.70E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.750Lr+0.750L+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.049	0.025	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.99	187.00	3788.08	0.55	10.64	424.00
+D+0.750L+0.750S+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.304	0.154	1.60	0.986	1.00	1.00	1.00	1.00	1.00	18.42	1,150.10	3788.08	3.35	65.41	424.00
+D+0.750L+0.750S+0.5250E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.304	0.154	1.60	0.986	1.00	1.00	1.00	1.00	1.00	18.42	1,150.10	3788.08	3.35	65.41	424.00
+0.60D+W+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.030	0.015	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.80	112.20	3788.08	0.33	6.38	424.00
+0.60D+0.70E+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.030	0.015	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.80	112.20	3788.08	0.33	6.38	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6093	9.695		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.896	4.896
Overall MINimum	0.373	0.373
+D+H	0.622	0.622
+D+L+H	0.622	0.622
+D+Lr+H	0.622	0.622
+D+S+H	4.896	4.896
+D+0.750Lr+0.750L+H	0.622	0.622
+D+0.750L+0.750S+H	3.827	3.827
+D+W+H	0.622	0.622
+D+0.70E+H	0.622	0.622
+D+0.750Lr+0.750L+0.750W+H	0.622	0.622
+D+0.750L+0.750S+0.750W+H	3.827	3.827
+D+0.750L+0.750S+0.5250E+H	3.827	3.827
+0.60D+W+0.60H	0.373	0.373
+0.60D+0.70E+0.60H	0.373	0.373
D Only	0.622	0.622
Lr Only		
L Only		
S Only	4.274	4.274
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 62
of

BEAM RB3

SPAN 1 = 9'-10"
SPAN 2 = 4'-4½"   } 19'-3"
SPAN 3 = 4'-0½"

$$W_L = (21_D + 267B_S) + (31_D + 1013_S) = 253_D + 369.1_S$$

$$W_R = (200_D + 742_S) + (31_D + 289_S) = 231_D + 1031_S$$

OR

$$W_{TRP} = (208_D + 1746_S) + (31_D + 681_S) = 245_D + 2427_S$$

BEAM RB4

SPAN = 19'-3"

$$W_L = (-21_D - 837_S) + (38_D + 1044_S) + (24 + 368) = 41_D + 575_S$$

$$W_R = (-21_D - 273_S) + (31_D + 289_S) + (24 + 102) = 40_D + 159_S$$

OR

$$W_{TRP} = (-21_D - 546_S) + (31_D + 681_S) + (24 + 240) = 40_D + 375_S$$

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   63

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-3 - 368/120 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
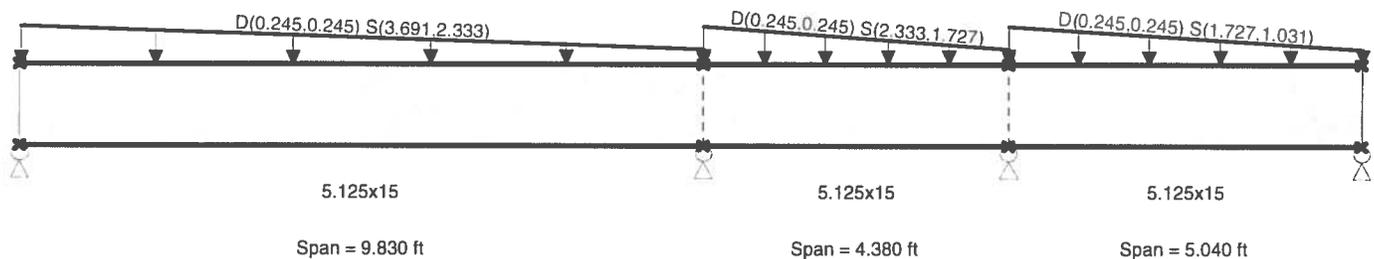Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy	850.0 ksi
	Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.245,0.245) S(3.691,2.333)   D(0.245,0.245) S(2.333,1.727)   D(0.245,0.245) S(1.727,1.031)

5.125x15   5.125x15   5.125x15

Span = 9.830 ft   Span = 4.380 ft   Span = 5.040 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.2450->0.2450, S(S,E) = 3.691->2.333 k/ft, Extent = 0.0 -->> 9.830 ft, Trib Width = 1.0 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.2450->0.2450, S(S,E) = 2.333->1.727 k/ft, Extent = 0.0 -->> 4.380 ft, Trib Width = 1.0 ft
Load for Span Number 3
   Varying Uniform Load : D(S,E) = 0.2450->0.2450, S(S,E) = 1.727->1.031 k/ft, Extent = 0.0 -->> 5.040 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.654 1	Maximum Shear Stress Ratio	=	0.935 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
fb : Actual	=	1,804.06 psi	fv : Actual	=	284.80 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	9.830 ft	Location of maximum on span	=	8.591 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection   0.141 in Ratio =   833 >=360
Max Upward Transient Deflection   -0.015 in Ratio =   3546 >=360
Max Downward Total Deflection   0.154 in Ratio =   768 >=180
Max Upward Total Deflection   -0.016 in Ratio =   3261 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.068	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2160.00	1.20	23.43	238.50
Length = 4.380 ft	2	0.068	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2160.00	0.75	23.43	238.50
Length = 5.040 ft	3	0.021	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	2160.00	0.38	23.43	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description : Beam RB-3 - 368/120 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 9.830 ft	1	0.061	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	2400.00	1.20	23.43	265.00
Length = 4.380 ft	2	0.061	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	2400.00	0.75	23.43	265.00
Length = 5.040 ft	3	0.019	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	2400.00	0.38	23.43	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3000.00	1.20	23.43	331.25
Length = 4.380 ft	2	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3000.00	0.75	23.43	331.25
Length = 5.040 ft	3	0.015	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	3000.00	0.38	23.43	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.654	0.935	1.15	1.000	1.00	1.00	1.00	1.00	1.00		28.89	1,804.06	2760.00	14.60	284.80	304.75
Length = 4.380 ft	2	0.654	0.935	1.15	1.000	1.00	1.00	1.00	1.00	1.00		28.89	1,804.06	2760.00	9.10	284.80	304.75
Length = 5.040 ft	3	0.134	0.935	1.15	1.000	1.00	1.00	1.00	1.00	1.00		5.94	370.91	2760.00	2.42	284.80	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3000.00	1.20	23.43	331.25
Length = 4.380 ft	2	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3000.00	0.75	23.43	331.25
Length = 5.040 ft	3	0.015	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	3000.00	0.38	23.43	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.504	0.720	1.15	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	2760.00	11.25	219.46	304.75
Length = 4.380 ft	2	0.504	0.720	1.15	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	2760.00	7.01	219.46	304.75
Length = 5.040 ft	3	0.105	0.720	1.15	1.000	1.00	1.00	1.00	1.00	1.00		4.64	289.42	2760.00	1.89	219.46	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.362	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	3840.00	11.25	219.46	424.00
Length = 4.380 ft	2	0.362	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	3840.00	7.01	219.46	424.00
Length = 5.040 ft	3	0.075	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		4.64	289.42	3840.00	1.89	219.46	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.362	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	3840.00	11.25	219.46	424.00
Length = 4.380 ft	2	0.362	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		22.26	1,389.74	3840.00	7.01	219.46	424.00
Length = 5.040 ft	3	0.075	0.518	1.60	1.000	1.00	1.00	1.00	1.00	1.00		4.64	289.42	3840.00	1.89	219.46	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.41	88.06	3840.00	0.72	14.06	424.00
Length = 4.380 ft	2	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.41	88.06	3840.00	0.45	14.06	424.00
Length = 5.040 ft	3	0.007	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.44	27.67	3840.00	0.23	14.06	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.41	88.06	3840.00	0.72	14.06	424.00
Length = 4.380 ft	2	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.41	88.06	3840.00	0.45	14.06	424.00
Length = 5.040 ft	3	0.007	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.44	27.67	3840.00	0.23	14.06	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1535	4.461		0.0000	0.000
	2	0.0000	4.461	+D+S+H	-0.0161	1.656
+D+S+H	3	0.0108	2.456		0.0000	1.656

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	14.263	30.063	2.048	4.112
Overall MINimum	0.628	1.555	0.466	0.373
+D+H	1.047	2.591	0.777	0.622
+D+L+H	1.047	2.591	0.777	0.622

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scottsdale, arizona 85251
480.946.8171

Wood Beam

Description :   Beam RB-3 - 368/120 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+Lr+H	1.047	2.591	0.777	0.622
+D+S+H	14.263	30.063	2.048	4.112
+D+0.750Lr+0.750L+H	1.047	2.591	0.777	0.622
+D+0.750L+0.750S+H	10.959	23.195	1.730	3.239
+D+W+H	1.047	2.591	0.777	0.622
+D+0.70E+H	1.047	2.591	0.777	0.622
+D+0.750Lr+0.750L+0.750W+H	1.047	2.591	0.777	0.622
+D+0.750L+0.750S+0.750W+H	10.959	23.195	1.730	3.239
+D+0.750L+0.750S+0.5250E+H	10.959	23.195	1.730	3.239
+0.60D+W+0.60H	0.628	1.555	0.466	0.373
+0.60D+0.70E+0.60H	0.628	1.555	0.466	0.373
D Only	1.047	2.591	0.777	0.622
Lr Only				
L Only				
S Only	13.216	27.472	1.271	3.490
W Only				
E Only				
H Only				

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-3 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		
Load Combination :ASCE 7-10 w/ ASD Wind		
Wood Species : DF/DF		
Wood Grade : 24F - V8		
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		

Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Fb - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Fv	265.0 psi	Eminbend - yy	850.0 ksi
Ft	1,100.0 psi	Density	31.20 pcf

D(0.245) S(2.427)   D(0.245) S(2.427)   D(0.245) S(2.427)

5.125x15   5.125x15   5.125x15

Span = 9.830 ft   Span = 4.380 ft   Span = 5.040 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.2450, S = 2.427 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.2450, S = 2.427 , Tributary Width = 1.0 ft
Load for Span Number 3
    Uniform Load : D = 0.2450, S = 2.427 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.546 1	Maximum Shear Stress Ratio	=	0.790 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
fb : Actual	=	1,508.03 psi	fv : Actual	=	240.79 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	9.830 ft	Location of maximum on span	=	8.591 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.112 in Ratio =   1054 >=360
    Max Upward Transient Deflection   -0.012 in Ratio =   4370 >=360
    Max Downward Total Deflection   0.124 in Ratio =   951 >=180
    Max Upward Total Deflection   -0.013 in Ratio =   3944 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.068	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2160.00	1.20	23.43	238.50
Length = 4.380 ft	2	0.068	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2160.00	0.75	23.43	238.50
Length = 5.040 ft	3	0.021	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	2160.00	0.38	23.43	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-3 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 9.830 ft	1	0.061	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2400.00	1.20	23.43	265.00
Length = 4.380 ft	2	0.061	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	2400.00	0.75	23.43	265.00
Length = 5.040 ft	3	0.019	0.088	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	2400.00	0.38	23.43	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3000.00	1.20	23.43	331.25
Length = 4.380 ft	2	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3000.00	0.75	23.43	331.25
Length = 5.040 ft	3	0.015	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	3000.00	0.38	23.43	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.546	0.790	1.15	1.000	1.00	1.00	1.00	1.00	1.00	24.15	1,508.03	2760.00	12.34	240.79	304.75
Length = 4.380 ft	2	0.546	0.790	1.15	1.000	1.00	1.00	1.00	1.00	1.00	24.15	1,508.03	2760.00	7.69	240.79	304.75
Length = 5.040 ft	3	0.172	0.790	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.59	473.89	2760.00	3.86	240.79	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3000.00	1.20	23.43	331.25
Length = 4.380 ft	2	0.049	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3000.00	0.75	23.43	331.25
Length = 5.040 ft	3	0.015	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	3000.00	0.38	23.43	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.423	0.612	1.15	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	2760.00	9.56	186.45	304.75
Length = 4.380 ft	2	0.423	0.612	1.15	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	2760.00	5.96	186.45	304.75
Length = 5.040 ft	3	0.133	0.612	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.88	366.94	2760.00	2.99	186.45	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	1.20	23.43	424.00
Length = 4.380 ft	2	0.038	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.35	146.76	3840.00	0.75	23.43	424.00
Length = 5.040 ft	3	0.012	0.055	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.74	46.12	3840.00	0.38	23.43	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.304	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	3840.00	9.56	186.45	424.00
Length = 4.380 ft	2	0.304	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	3840.00	5.96	186.45	424.00
Length = 5.040 ft	3	0.096	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.88	366.94	3840.00	2.99	186.45	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.304	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	3840.00	9.56	186.45	424.00
Length = 4.380 ft	2	0.304	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	18.70	1,167.71	3840.00	5.96	186.45	424.00
Length = 5.040 ft	3	0.096	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.88	366.94	3840.00	2.99	186.45	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	88.06	3840.00	0.72	14.06	424.00
Length = 4.380 ft	2	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	88.06	3840.00	0.45	14.06	424.00
Length = 5.040 ft	3	0.007	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.44	27.67	3840.00	0.23	14.06	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.830 ft	1	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	88.06	3840.00	0.72	14.06	424.00
Length = 4.380 ft	2	0.023	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.41	88.06	3840.00	0.45	14.06	424.00
Length = 5.040 ft	3	0.007	0.033	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.44	27.67	3840.00	0.23	14.06	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1240	4.461		0.0000	0.000
	2	0.0000	4.461	+D+S+H	-0.0133	1.693
+D+S+H	3	0.0131	2.584		0.0000	1.693

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	10.758	26.629	7.982	6.388
Overall MINimum	0.628	1.555	0.466	0.373
+D+H	1.047	2.591	0.777	0.622
+D+L+H	1.047	2.591	0.777	0.622

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Description :   Beam RB-3 - 240 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+Lr+H	1.047	2.591	0.777	0.622
+D+S+H	10.758	26.629	7.982	6.388
+D+0.750Lr+0.750L+H	1.047	2.591	0.777	0.622
+D+0.750L+0.750S+H	8.330	20.619	6.181	4.947
+D+W+H	1.047	2.591	0.777	0.622
+D+0.70E+H	1.047	2.591	0.777	0.622
+D+0.750Lr+0.750L+0.750W+H	1.047	2.591	0.777	0.622
+D+0.750L+0.750S+0.750W+H	8.330	20.619	6.181	4.947
+D+0.750L+0.750S+0.5250E+H	8.330	20.619	6.181	4.947
+0.60D+W+0.60H	0.628	1.555	0.466	0.373
+0.60D+0.70E+0.60H	0.628	1.555	0.466	0.373
D Only	1.047	2.591	0.777	0.622
Lr Only				
L Only				
S Only	9.711	24.037	7.205	5.767
W Only				
E Only				
H Only				

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Wood Beam

Description : Beam RB-4 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4		Fv	265.0 psi	Eminbend - yy 850.0 ksi
		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.041,0.041) S(0.575,0.159)

5.125x15

Span = 19.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.0410->0.0410, S(S,E) = 0.5750->0.1590 k/ft, Extent = 0.0 -->> 19.250 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.454 1	Maximum Shear Stress Ratio	=	0.257 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
fb : Actual	=	1,236.27 psi	fv : Actual	=	78.33 psi
FB : Allowable	=	2,722.68 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.852 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.440 in Ratio =   525 >=360
    Max Upward Transient Deflection   0.000 in Ratio =   0 <360
    Max Downward Total Deflection   0.509 in Ratio =   453 >=180
    Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00			
Length = 19.250 ft	1	0.078	0.040	0.90	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2130.79	0.49	9.48	238.50
+D+L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.070	0.036	1.00	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2367.55	0.49	9.48	265.00
+D+Lr+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.056	0.029	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2959.44	0.49	9.48	331.25
+D+S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.454	0.257	1.15	0.986	1.00	1.00	1.00	1.00	1.00	19.80	1,236.27	2722.68	4.01	78.33	304.75
+D+0.750Lr+0.750L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.056	0.029	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2959.44	0.49	9.48	331.25

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Beam RB-4 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.356	0.201	1.15	0.986	1.00	1.00	1.00	1.00	1.00	15.51	968.62	2722.68	3.13	61.12	304.75
+D+W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.70E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.750Lr+0.750L+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.750L+0.750S+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.256	0.144	1.60	0.986	1.00	1.00	1.00	1.00	1.00	15.51	968.62	3788.08	3.13	61.12	424.00
+D+0.750L+0.750S+0.5250E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.256	0.144	1.60	0.986	1.00	1.00	1.00	1.00	1.00	15.51	968.62	3788.08	3.13	61.12	424.00
+0.60D+W+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.026	0.013	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.60	100.05	3788.08	0.29	5.69	424.00
+0.60D+0.70E+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.026	0.013	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.60	100.05	3788.08	0.29	5.69	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.5090	9.484		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.755	3.420
Overall MINimum	0.333	0.333
+D+H	0.555	0.555
+D+L+H	0.555	0.555
+D+Lr+H	0.555	0.555
+D+S+H	4.755	3.420
+D+0.750Lr+0.750L+H	0.555	0.555
+D+0.750L+0.750S+H	3.705	2.704
+D+W+H	0.555	0.555
+D+0.70E+H	0.555	0.555
+D+0.750Lr+0.750L+0.750W+H	0.555	0.555
+D+0.750L+0.750S+0.750W+H	3.705	2.704
+D+0.750L+0.750S+0.5250E+H	3.705	2.704
+0.60D+W+0.60H	0.333	0.333
+0.60D+0.70E+0.60H	0.333	0.333
D Only	0.555	0.555
Lr Only		
L Only		
S Only	4.200	2.865
W Only		
E Only		
H Only		

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Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam RB-4 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy	850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.041) S(0.375)

5.125x15

Span = 19.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0410, S = 0.3750 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.460: 1**	Maximum Shear Stress Ratio	=	**0.234 : 1**
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**
fb : Actual	=	1,251.33 psi	fv : Actual	=	71.17 psi
FB : Allowable	=	2,722.68 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	9.625 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.449 in Ratio =   514 >=360
   Max Upward Transient Deflection   0.000 in Ratio =   0 <360
   Max Downward Total Deflection   0.518 in Ratio =   445 >=180
   Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.078	0.040	0.90	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2130.79	0.49	9.48	238.50
+D+L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.070	0.036	1.00	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2367.55	0.49	9.48	265.00
+D+Lr+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.056	0.029	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2959.44	0.49	9.48	331.25
+D+S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.460	0.234	1.15	0.986	1.00	1.00	1.00	1.00	1.00	20.04	1,251.33	2722.68	3.65	71.17	304.75
+D+0.750Lr+0.750L+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.056	0.029	1.25	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	2959.44	0.49	9.48	331.25
+D+0.750L+0.750S+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-4 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 19.250 ft	1	0.360	0.183	1.15	0.986	1.00	1.00	1.00	1.00	1.00	15.70	980.18	2722.68	2.86	55.75	304.75
+D+W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.70E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.750Lr+0.750L+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.044	0.022	1.60	0.986	1.00	1.00	1.00	1.00	1.00	2.67	166.75	3788.08	0.49	9.48	424.00
+D+0.750L+0.750S+0.750W+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.259	0.131	1.60	0.986	1.00	1.00	1.00	1.00	1.00	15.70	980.18	3788.08	2.86	55.75	424.00
+D+0.750L+0.750S+0.5250E+H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.259	0.131	1.60	0.986	1.00	1.00	1.00	1.00	1.00	15.70	980.18	3788.08	2.86	55.75	424.00
+0.60D+W+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.026	0.013	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.60	100.05	3788.08	0.29	5.69	424.00
+0.60D+0.70E+0.60H					0.986	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.250 ft	1	0.026	0.013	1.60	0.986	1.00	1.00	1.00	1.00	1.00	1.60	100.05	3788.08	0.29	5.69	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.5182	9.695		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.164	4.164
Overall MINimum	0.333	0.333
+D+H	0.555	0.555
+D+L+H	0.555	0.555
+D+Lr+H	0.555	0.555
+D+S+H	4.164	4.164
+D+0.750Lr+0.750L+H	0.555	0.555
+D+0.750L+0.750S+H	3.262	3.262
+D+W+H	0.555	0.555
+D+0.70E+H	0.555	0.555
+D+0.750Lr+0.750L+0.750W+H	0.555	0.555
+D+0.750L+0.750S+0.750W+H	3.262	3.262
+D+0.750L+0.750S+0.5250E+H	3.262	3.262
+0.60D+W+0.60H	0.333	0.333
+0.60D+0.70E+0.60H	0.333	0.333
D Only	0.555	0.555
Lr Only		
L Only		
S Only	3.609	3.609
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of **73**

FLOOR FRAMING   20' UNIT

UPPER LEVEL

ENTRY LEVEL

rudow + berry
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job name: Copper Crest East
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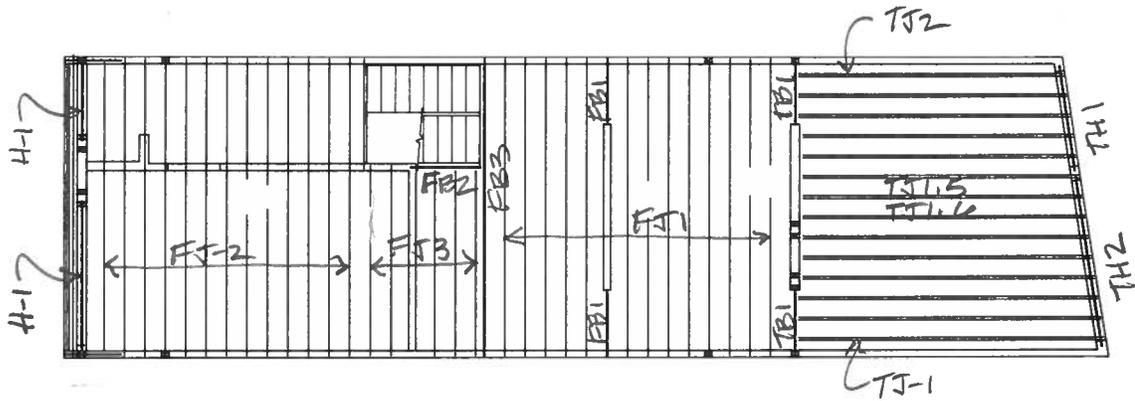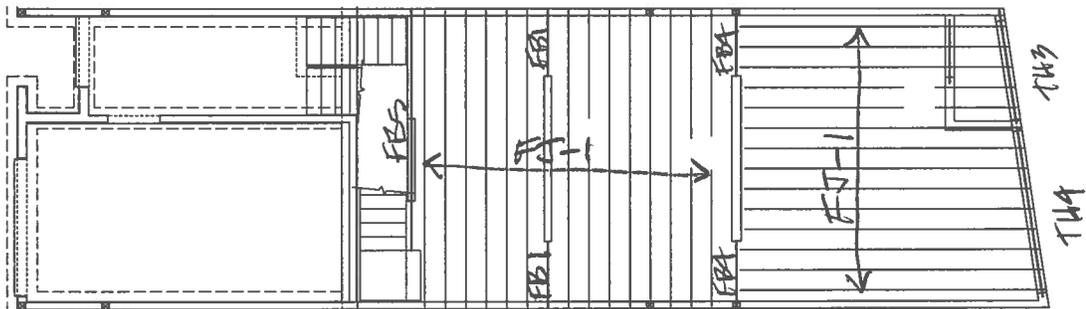
TERRACE JOISTS

TJ1   SPAN = 19'-7"

$q_L = 28D + 359S$

$q_R = 28D + 217S$

TJ2   SPAN = 17'-0"

$q_L = 28 + 359S$

$q_R = 28 + 235S$

TJ1.5   SPAN = 18'-8"

$q_L = 28D + 359S$

$q_R = 28D + 223S$

HEADERS @ TERRACE

TH1   SPAN = 8'-4" CLR

$W = 8.63(28 + 254) + 17.25(125)\frac{1}{6} + 65(15)$

$= 339D + 2378S$

TH2   SPAN = 8'-9½" CLR

$W_R = \frac{1}{2}(17.83)(28 + 229) + 17.83(130)\frac{1}{6} + 65(15) = 341D + 2428S$

$W_L = \frac{1}{2}(19.5)(28 + 218) + \frac{1}{2}(19.5)(141) + 65(15) = 371D + 2584S$

RedSPEC

RedSpec™ by RedBuilt™
v7.1.4

Project:	Project	**Type: TJ1**
Location:	Utah	
Folder:	Folder	
Date:	11/16/16 11:27 AM	
Designer:	MAR	
Comment:		

DOUBLE 14" Red-I90™ @ 16" o.c.
This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	76%	4435	5842	Snow(115%)	1.0D+1.0S	All Spans	PASS
Positive Moment (ft-lb)	77%	20226	26289	Snow(115%)	1.0D+1.0S	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	78%	0.763	0.979	L / 308	L / 240	1.0D+1.0S	All Spans	PASS
Span Total	65%	0.843	1.306	L / 279	L / 180	1.0D+1.0S	All Spans	PASS

SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	4069 (115)	3451 (115)
Dead Reaction (lb)	366	366
Total Reaction (lb) (DOL%)	4435 (115)	3817 (115)
Bearing	Flush	Bottom
Support	Beam	Wall
Req'd Bearing, No Stiffeners (in)	-	2.68
Req'd Bearing, Stiffeners (in)	1.94	1.75

HANGERS	Model		Top	Face	Member	Header	Size
Left	HB7.12/14*		6-16d	16-16d	10-16d	Sawn DF	6x12
	(* = Web stiffeners required)						

SPANS AND LOADS
Dimensions represent horizontal design spans.   Member Slope: 0/12

19'- 7.0"

APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	60	28	0	16"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	359 to 217	28 to 28	0'-0.0" to 19'-7.0"	Replaces	

NOTES
- Building code and design methodology: 2012 IBC ASD (US).
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Connect multiple ply members per RedBuilt™ Installation Guidelines.

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RedSPEC

RedSpec™ by RedBuilt™
v7.1.4

Project:	Project
Location:	Utah
Folder:	Folder
Date:	11/16/16 11:30 AM
Designer:	MAR
Comment:	

Type: TJ2

DOUBLE 14" Red-I65™ @ 16" o.c.
This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS

	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	67%	3918	5842	Snow(115%)	1.0D+1.0S	All Spans	PASS
Positive Moment (ft-lb)	85%	15670	18469	Snow(115%)	1.0D+1.0S	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	72%	0.611	0.850	L / 334	L / 240	1.0D+1.0S	All Spans	PASS
Span Total	59%	0.672	1.133	L / 303	L / 180	1.0D+1.0S	All Spans	PASS

SUPPORTS

	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	3600 (115)	3132 (115)
Dead Reaction (lb)	317	317
Total Reaction (lb) (DOL%)	3918 (115)	3449 (115)
Bearing	Flush	Bottom
Support	Beam	Wall
Req'd Bearing, No Stiffeners (in)	2.87	2.17
Req'd Bearing, Stiffeners (in)	1.75	1.75

HANGERS

	Model	Top	Face	Member	Header	Size
Left	HB5.12/14*	6-16d	16-16d	10-16d	Sawn DF	6x12

(* = Web stiffeners required)

SPANS AND LOADS
Dimensions represent horizontal design spans.

Member Slope: 0/12

17'- 0.0"
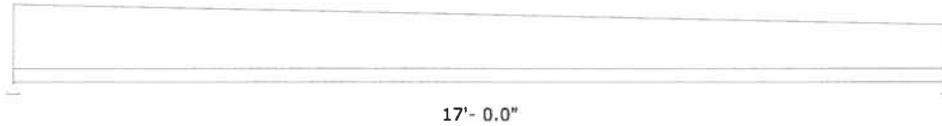
APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	60	28	0	16"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	359 to 235	28 to 28	0'-0.0" to 17'-0.0"	Replaces	

NOTES
- Building code and design methodology: 2012 IBC ASD (US).
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Connect multiple ply members per RedBuilt™ Installation Guidelines.

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11/16/2016 11:30:02 AM   Project : Folder : TJ2   Page 1 of 1

The products noted are intended for interior, untreated, non-corrosive applications with normal temperatures and dry conditions of use, and must be installed in accordance with local building code requirements and RedBuilt™ recommendations. The loads, spans, and spacing have been provided by others and must be approved for the specific application by the design professional for the project. Unless otherwise noted, this output has not been reviewed by a RedBuilt™ associate. PRODUCT SUBSTITUTION VOIDS THIS ANALYSIS.

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RedSPEC

RedSpec™ by RedBuilt™
v7.1.4

Project: Project
Location: Utah
Folder: Folder
Date: 11/16/16 11:34 AM
Designer: MAR
Comment:

Type: TJ1.5

DOUBLE 14" Red-I90™ @ 16" o.c.
This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS

	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	73%	4252	5842	Snow(115%)	1.0D+1.0S	All Spans	PASS
Positive Moment (ft-lb)	71%	18549	26289	Snow(115%)	1.0D+1.0S	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	69%	0.647	0.933	L / 346	L / 240	1.0D+1.0S	All Spans	PASS
Span Total	57%	0.714	1.244	L / 314	L / 180	1.0D+1.0S	All Spans	PASS

SUPPORTS

	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	3903 (115)	3339 (115)
Dead Reaction (lb)	348	348
Total Reaction (lb) (DOL%)	4252 (115)	3688 (115)
Bearing	Flush	Bottom
Support	Beam	Wall
Req'd Bearing, No Stiffeners (in)	3.36	2.48
Req'd Bearing, Stiffeners (in)	1.75	1.75

HANGERS

	Model	Top	Face	Member	Header	Size
Left	HB7.12/14*	6-16d	16-16d	10-16d	Sawn DF	2x6 TPL
	(* = Web stiffeners required)					

SPANS AND LOADS
Dimensions represent horizontal design spans.

Member Slope: 0/12

18'- 8.0"
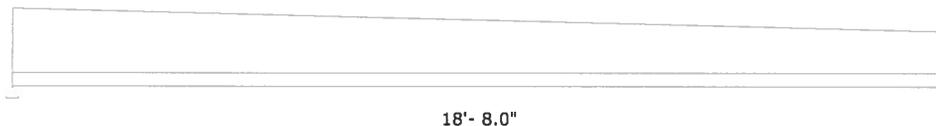
APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	60	28	0	16"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	359 to 223	28 to 28	0'-0.0" to 18'-8.0"	Replaces	

NOTES
- Building code and design methodology: 2012 IBC ASD (US).
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Connect multiple ply members per RedBuilt™ Installation Guidelines.

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RedSPEC

RedSpec™ by RedBuilt™
v7.1.4

Project: Project
Location: Utah
Folder: Folder
Date: 11/16/16 11:35 AM
Designer: MAR
Comment:

Type: TJ1.6

DOUBLE 14" Red-I65™ @ 16" o.c.
This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	72%	4203	5842	Snow(115%)	1.0D+1.0S	All Spans	PASS
Positive Moment (ft-lb)	98%	18111	18469	Snow(115%)	1.0D+1.0S	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	88%	0.808	0.921	L / 274	L / 240	1.0D+1.0S	All Spans	PASS
Span Total	73%	0.891	1.228	L / 248	L / 180	1.0D+1.0S	All Spans	PASS

SUPPORTS

	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	3859 (115)	3311 (115)
Dead Reaction (lb)	344	344
Total Reaction (lb) (DOL%)	4203 (115)	3655 (115)
Bearing	Flush	Bottom
Support	Beam	Wall
Req'd Bearing, No Stiffeners (in)	3.30	2.48
Req'd Bearing, Stiffeners (in)	1.92	1.75

HANGERS

	Model	Top	Face	Member	Header	Size
Left	HB5.12/14*	6-16d	16-16d	10-16d	Sawn DF	2x6 TPL
	(* = Web stiffeners required)					

SPANS AND LOADS
Dimensions represent horizontal design spans.

Member Slope: 0/12

18'- 5.0"

APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	60	28	0	16"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	359 to 225	28 to 28	0'-0.0" to 18'-5.0"	Replaces	

NOTES
- Building code and design methodology: 2012 IBC ASD (US).
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Connect multiple ply members per RedBuilt™ Installation Guidelines.

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rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH1 - 6 3/4 x 12 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.339) S(2.378)

6.75x12

Span = 8.580 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.3390, S = 2.378 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.675 : 1	Maximum Shear Stress Ratio	=	0.552 : 1
Section used for this span		6.75x12	Section used for this span		6.75x12
fb : Actual	=	1,863.96 psi	fv : Actual	=	168.09 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	4.290 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.167 in Ratio =   617 >=360.
   Max Upward Transient Deflection   0.000 in Ratio =   0 <360.0
   Max Downward Total Deflection   0.192 in Ratio =   537 >=120.
   Max Upward Total Deflection   0.000 in Ratio =   0 <120.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.113	0.092	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	2160.00	1.18	21.92	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.101	0.083	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	2400.00	1.18	21.92	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.081	0.066	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	3000.00	1.18	21.92	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.675	0.552	1.15	1.000	1.00	1.00	1.00	1.00	1.00	25.16	1,863.96	2760.00	9.08	168.09	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.081	0.066	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	3000.00	1.18	21.92	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH1 - 6 3/4 x 12 GLB

Load Combination	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
Length = 8.580 ft	1	0.529	0.432	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.69	1,458.73	2760.00	7.10	131.54	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.063	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	3840.00	1.18	21.92	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.063	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	3840.00	1.18	21.92	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.063	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.28	243.04	3840.00	1.18	21.92	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.380	0.310	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.69	1,458.73	3840.00	7.10	131.54	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.380	0.310	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.69	1,458.73	3840.00	7.10	131.54	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.038	0.031	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.97	145.82	3840.00	0.71	13.15	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.580 ft	1	0.038	0.031	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.97	145.82	3840.00	0.71	13.15	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1917	4.321		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	11.731	11.731
Overall MINimum	0.918	0.918
+D+H	1.530	1.530
+D+L+H	1.530	1.530
+D+Lr+H	1.530	1.530
+D+S+H	11.731	11.731
+D+0.750Lr+0.750L+H	1.530	1.530
+D+0.750L+0.750S+H	9.181	9.181
+D+W+H	1.530	1.530
+D+0.70E+H	1.530	1.530
+D+0.750Lr+0.750L+0.750W+H	1.530	1.530
+D+0.750L+0.750S+0.750W+H	9.181	9.181
+D+0.750L+0.750S+0.5250E+H	9.181	9.181
+0.60D+W+0.60H	0.918	0.918
+0.60D+0.70E+0.60H	0.918	0.918
D Only	1.530	1.530
Lr Only		
L Only		
S Only	10.202	10.202
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH2 - 6 3/4 x 12 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
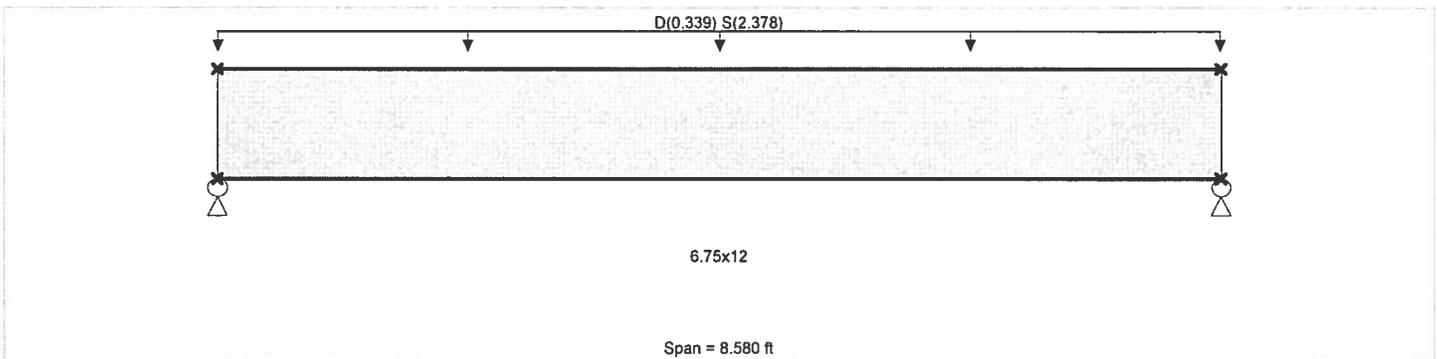Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		F_b - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		F_b - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		F_c - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF		F_c - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4		F_v	265.0 psi	Eminbend - yy 850.0 ksi
		F_t	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.347,0.371) S(2.428,2.584)

6.75x12

Span = 8.920 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.3470->0.3710, S(S,E) = 2.428->2.584 k/ft, Extent = 0.0 --> 8.920 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.769: 1	Maximum Shear Stress Ratio	=	0.614 : 1	
Section used for this span		6.75x12	Section used for this span		6.75x12	
f_b : Actual	=	2,123.70 psi	f_v : Actual	=	186.97 psi	
FB : Allowable	=	2,760.00 psi	F_v : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	4.493 ft	Location of maximum on span	=	7.943 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.205 in	Ratio =	521 >=360.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	0.236 in	Ratio =	453 >=120.
Max Upward Total Deflection	0.000 in	Ratio =	0 <120.0

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	f_b	F'b	Shear Values V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.128	0.102	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	2160.00	1.32	24.43	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.116	0.092	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	2400.00	1.32	24.43	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.092	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	3000.00	1.32	24.43	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.769	0.614	1.15	1.000	1.00	1.00	1.00	1.00	1.00	28.67	2,123.70	2760.00	10.10	186.97	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.092	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	3000.00	1.32	24.43	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : TH2 - 6 3/4 x 12 GLB

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.602	0.480	1.15	1.000	1.00	1.00	1.00	1.00	1.00	22.44	1,662.13	2760.00	7.90	146.34	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.072	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	3840.00	1.32	24.43	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.072	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	3840.00	1.32	24.43	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.072	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.75	277.42	3840.00	1.32	24.43	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.433	0.345	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.44	1,662.13	3840.00	7.90	146.34	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.433	0.345	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.44	1,662.13	3840.00	7.90	146.34	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.043	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.25	166.45	3840.00	0.79	14.66	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.920 ft	1	0.043	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.25	166.45	3840.00	0.79	14.66	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2361	4.493		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	12.722	12.990
Overall MINimum	0.997	1.018
+D+H	1.662	1.697
+D+L+H	1.662	1.697
+D+Lr+H	1.662	1.697
+D+S+H	12.722	12.990
+D+0.750Lr+0.750L+H	1.662	1.697
+D+0.750L+0.750S+H	9.957	10.167
+D+W+H	1.662	1.697
+D+0.70E+H	1.662	1.697
+D+0.750Lr+0.750L+0.750W+H	1.662	1.697
+D+0.750L+0.750S+0.750W+H	9.957	10.167
+D+0.750L+0.750S+0.5250E+H	9.957	10.167
+0.60D+W+0.60H	0.997	1.018
+0.60D+0.70E+0.60H	0.997	1.018
D Only	1.662	1.697
Lr Only		
L Only		
S Only	11.061	11.293
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 83
of 83

BEAMS @ TERRACE GRID C

TB1   SPAN = 3'-11"

$$W = \frac{19.75}{2}(28 + 21.9) + \frac{19.75}{3}(40) + 12(10)$$

$$= 390_D + 300_{LS}$$

FLOOR JOISTS — SEE NEXT SHTS

FB1   SPAN = 4'-2"

$$W = 1.33(25 + 40) = 33_D + 53_L$$

FB2   SPAN = 4'-6"

$$W = 6.42(25 + 40) = 161_D + 251_L$$

FB3   SPAN = 19'-4"

$$W = 1(25 + 40) = 25 + 40$$

$$P_1 = R_{FB2} = 316_D + 600_L \quad @ \; x = 12-4$$

$$P_2 = 3.00(1.5)(25 + 40) = 138_D + 220_L \quad @ \; x = 12-7, 15-8, 15-11, 19-0$$

FB4   SPAN = 3'-11"

$$W = \tfrac{1}{2}(21.17)(25 + 40) + 4(10) = 305_D + 423_L$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Terrace Beam TB1 - 6x10 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
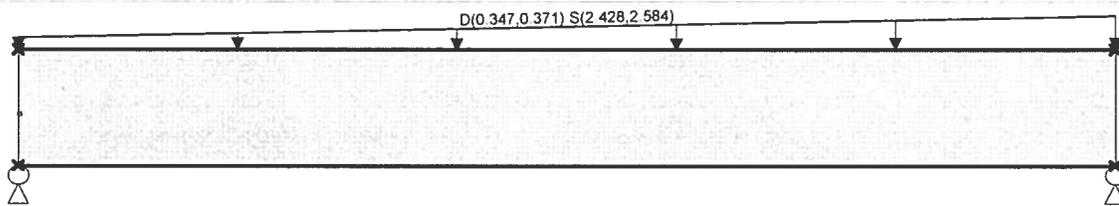Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 875 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 875 psi	Ebend- xx 1300 ksi
	Fc - Prll 600 psi	Eminbend - xx 470 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp 625 psi	
Wood Grade : No.2	Fv 170 psi	
	Ft 425 psi	Density 31.2 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		

D(0.39) S(3.006)

6x10

Span = 3.920 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.390, S = 3.006 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.940 : 1**	Maximum Shear Stress Ratio	=	**0.585 : 1**	
Section used for this span		**6x10**	Section used for this span		**6x10**	
fb : Actual	=	946.18 psi	fv : Actual	=	114.37 psi	
FB : Allowable	=	1,006.25 psi	Fv : Allowable	=	195.50 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	1.960 ft	Location of maximum on span	=	3.133 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection 0.031 in Ratio = 1495 >=240.
Max Upward Transient Deflection 0.000 in Ratio = 0 <240.0
Max Downward Total Deflection 0.036 in Ratio = 1324 >=180
Max Upward Total Deflection 0.000 in Ratio = 0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00		0.00	0.00
Length = 3.920 ft	1	0.138	0.086	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	787.50	0.46	13.13	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.124	0.077	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	875.00	0.46	13.13	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.099	0.062	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	1093.75	0.46	13.13	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.940	0.585	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.52	946.18	1006.25	3.98	114.37	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.099	0.062	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	1093.75	0.46	13.13	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.732	0.456	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.08	736.80	1006.25	3.10	89.06	195.50

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Terrace Beam TB1 - 6x10 D.Fir #2

| Load Combination | | Max Stress Ratios | | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.078	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	1400.00	0.46	13.13	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.078	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	1400.00	0.46	13.13	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.078	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	108.66	1400.00	0.46	13.13	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.526	0.327	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	736.80	1400.00	3.10	89.06	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.526	0.327	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.08	736.80	1400.00	3.10	89.06	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.047	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.45	65.20	1400.00	0.27	7.88	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1	0.047	0.029	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.45	65.20	1400.00	0.27	7.88	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0355	1.974		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.656	6.656
Overall MINimum	0.459	0.459
+D+H	0.764	0.764
+D+L+H	0.764	0.764
+D+Lr+H	0.764	0.764
+D+S+H	6.656	6.656
+D+0.750Lr+0.750L+H	0.764	0.764
+D+0.750L+0.750S+H	5.183	5.183
+D+W+H	0.764	0.764
+D+0.70E+H	0.764	0.764
+D+0.750Lr+0.750L+0.750W+H	0.764	0.764
+D+0.750L+0.750S+0.750W+H	5.183	5.183
+D+0.750L+0.750S+0.5250E+H	5.183	5.183
+0.60D+W+0.60H	0.459	0.459
+0.60D+0.70E+0.60H	0.459	0.459
D Only	0.764	0.764
Lr Only		
L Only		
S Only	5.892	5.892
W Only		
E Only		
H Only		

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16
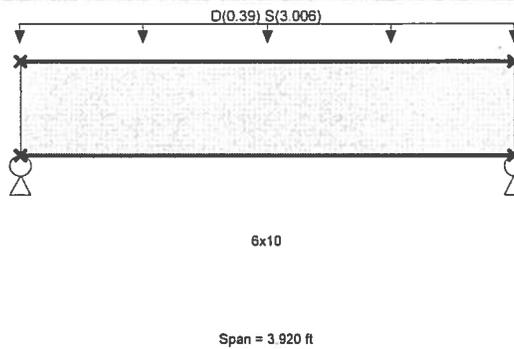
Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   FB1 - 6x6 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	875.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	875.0 psi	Ebend- xx 1,300.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx 470.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	170.0 psi	
	Ft	425.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.033) L(0.053)

6x6

Span = 4.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0330, L = 0.0530 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.092 1**	Maximum Shear Stress Ratio	=	**0.041 : 1**	
Section used for this span		**6x6**	Section used for this span		**6x6**	
fb : Actual	=	80.90 psi	fv : Actual	=	6.94 psi	
FB : Allowable	=	875.00 psi	Fv : Allowable	=	170.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	2.085 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection   0.004 in Ratio =   13677 >=240.
Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
Max Downward Total Deflection   0.006 in Ratio =   8428 >=180
Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.039	0.017	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.07	31.04	787.50	0.05	2.66	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.092	0.041	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.19	80.90	875.00	0.14	6.94	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.028	0.013	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.07	31.04	1093.75	0.05	2.66	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.031	0.014	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.07	31.04	1006.25	0.05	2.66	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.063	0.028	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.16	68.43	1093.75	0.12	5.87	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.068	0.030	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.16	68.43	1006.25	0.12	5.87	195.50

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : FB1 - 6x6 D.Fir #2

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.022	0.010	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.07	31.04	1400.00	0.05	2.66	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.022	0.010	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.07	31.04	1400.00	0.05	2.66	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.049	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.16	68.43	1400.00	0.12	5.87	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.049	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.16	68.43	1400.00	0.12	5.87	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.049	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.16	68.43	1400.00	0.12	5.87	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.013	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.04	18.62	1400.00	0.03	1.60	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.013	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.04	18.62	1400.00	0.03	1.60	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0059	2.100		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.179	0.179
Overall MINimum	0.041	0.041
+D+H	0.069	0.069
+D+L+H	0.179	0.179
+D+Lr+H	0.069	0.069
+D+S+H	0.069	0.069
+D+0.750Lr+0.750L+H	0.152	0.152
+D+0.750L+0.750S+H	0.152	0.152
+D+W+H	0.069	0.069
+D+0.70E+H	0.069	0.069
+D+0.750Lr+0.750L+0.750W+H	0.152	0.152
+D+0.750L+0.750S+0.750W+H	0.152	0.152
+D+0.750L+0.750S+0.5250E+H	0.152	0.152
+0.60D+W+0.60H	0.041	0.041
+0.60D+0.70E+0.60H	0.041	0.041
D Only	0.069	0.069
Lr Only		
L Only	0.111	0.111
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
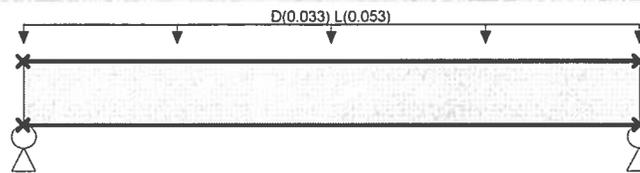
Licensee : RUDOW & BERRY

Description : FB2 - 6x8 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	875.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	875.0 psi	Ebend- xx 1,300.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx 470.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	170.0 psi	
	Ft	425.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			

D(0.161) L(0.257)

6x8

Span = 4.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.1610, L = 0.2570 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.303** 1		Maximum Shear Stress Ratio	=	**0.154** : 1	
Section used for this span		**6x8**		Section used for this span		**6x8**	
fb : Actual	=	265.20 psi		fv : Actual	=	26.17 psi	
FB : Allowable	=	875.00 psi		Fv : Allowable	=	170.00 psi	
Load Combination		+D+L+H		Load Combination		+D+L+H	
Location of maximum on span	=	2.335 ft		Location of maximum on span	=	4.056 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection   0.011 in   Ratio =   5092 >=240.
Max Upward Transient Deflection   0.000 in   Ratio =   0 <240.0
Max Downward Total Deflection   0.018 in   Ratio =   3130 >=180
Max Upward Total Deflection   0.000 in   Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.130	0.066	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.44	102.14	787.50	0.28	10.08	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.303	0.154	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.14	265.20	875.00	0.72	26.17	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.093	0.047	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.44	102.14	1093.75	0.28	10.08	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.102	0.052	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.44	102.14	1006.25	0.28	10.08	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.205	0.104	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.96	224.43	1093.75	0.61	22.14	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.223	0.113	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.96	224.43	1006.25	0.61	22.14	195.50

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   FB2 - 6x8 D.Fir #2

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.073	0.037	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.44	102.14	1400.00	0.28	10.08	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.073	0.037	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.44	102.14	1400.00	0.28	10.08	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.160	0.081	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.96	224.43	1400.00	0.61	22.14	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.160	0.081	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.96	224.43	1400.00	0.61	22.14	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.160	0.081	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.96	224.43	1400.00	0.61	22.14	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.044	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.26	61.29	1400.00	0.17	6.05	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.044	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.26	61.29	1400.00	0.17	6.05	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0179	2.352		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.976	0.976
Overall MINimum	0.226	0.226
+D+H	0.376	0.376
+D+L+H	0.976	0.976
+D+Lr+H	0.376	0.376
+D+S+H	0.376	0.376
+D+0.750Lr+0.750L+H	0.826	0.826
+D+0.750L+0.750S+H	0.826	0.826
+D+W+H	0.376	0.376
+D+0.70E+H	0.376	0.376
+D+0.750Lr+0.750L+0.750W+H	0.826	0.826
+D+0.750L+0.750S+0.750W+H	0.826	0.826
+D+0.750L+0.750S+0.5250E+H	0.826	0.826
+0.60D+W+0.60H	0.226	0.226
+0.60D+0.70E+0.60H	0.226	0.226
D Only	0.376	0.376
Lr Only		
L Only	0.600	0.600
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : FB3 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2400 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-10 w/ ASD Wind	Fb - Compr	1850 psi	Ebend- xx 1800 ksi
	Fc - Prll	1650 psi	Eminbend - xx 950 ksi
Wood Species : DF/DF	Fc - Perp	650 psi	Ebend- yy 1600 ksi
Wood Grade : 24F - V4	Fv	265 psi	Eminbend - yy 850 ksi
	Ft	1100 psi	Density 31.2 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.025) L(0.04) D(0.7680)(0.60 22) D(0.138)(0.22 22) D(0.138) L(0.22)

3.125x13.5

Span = 19.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.0250, L = 0.040 , Tributary Width = 1.0 ft
  Point Load : D = 0.3760, L = 0.60 k @ 12.330 ft
  Point Load : D = 0.1380, L = 0.220 k @ 12.580 ft
  Point Load : D = 0.1380, L = 0.220 k @ 15.670 ft
  Point Load : D = 0.1380, L = 0.220 k @ 15.920 ft
  Point Load : D = 0.1380, L = 0.220 k @ 19.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.568 : 1	Maximum Shear Stress Ratio	=	0.278 : 1	
Section used for this span		3.125x13.5	Section used for this span		3.125x13.5	
fb : Actual	=	1,362.79 psi	fv : Actual	=	73.69 psi	
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	12.346 ft	Location of maximum on span	=	18.272 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
  Max Downward Transient Deflection   0.332 in Ratio =   699 >=240.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
  Max Downward Total Deflection   0.564 in Ratio =   411 >=180
  Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.257	0.126	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.39	555.51	2160.00	0.85	30.10	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.568	0.278	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.78	1,362.79	2400.00	2.07	73.69	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.185	0.091	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.39	555.51	3000.00	0.85	30.10	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : FB3 - 3 1/8 x 13 1/2 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.201	0.099	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.39	555.51	2760.00	0.85	30.10	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.387	0.190	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.18	1,160.97	3000.00	1.77	62.80	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.421	0.206	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.18	1,160.97	2760.00	1.77	62.80	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.145	0.071	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.39	555.51	3840.00	0.85	30.10	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.145	0.071	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.39	555.51	3840.00	0.85	30.10	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.302	0.148	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.18	1,160.97	3840.00	1.77	62.80	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.302	0.148	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.18	1,160.97	3840.00	1.77	62.80	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.302	0.148	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.18	1,160.97	3840.00	1.77	62.80	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.087	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.64	333.30	3840.00	0.51	18.06	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 19.330 ft	1	0.087	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.64	333.30	3840.00	0.51	18.06	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5641	10.300		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.332	2.509
Overall MINimum	0.340	0.612
+D+H	0.567	1.021
+D+L+H	1.332	2.509
+D+Lr+H	0.567	1.021
+D+S+H	0.567	1.021
+D+0.750Lr+0.750L+H	1.141	2.137
+D+0.750L+0.750S+H	1.141	2.137
+D+W+H	0.567	1.021
+D+0.70E+H	0.567	1.021
+D+0.750Lr+0.750L+0.750W+H	1.141	2.137
+D+0.750L+0.750S+0.750W+H	1.141	2.137
+D+0.750L+0.750S+0.5250E+H	1.141	2.137
+0.60D+W+0.60H	0.340	0.612
+0.60D+0.70E+0.60H	0.340	0.612
D Only	0.567	1.021
Lr Only		
L Only	0.765	1.488
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description : FB4 - 6x8 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties
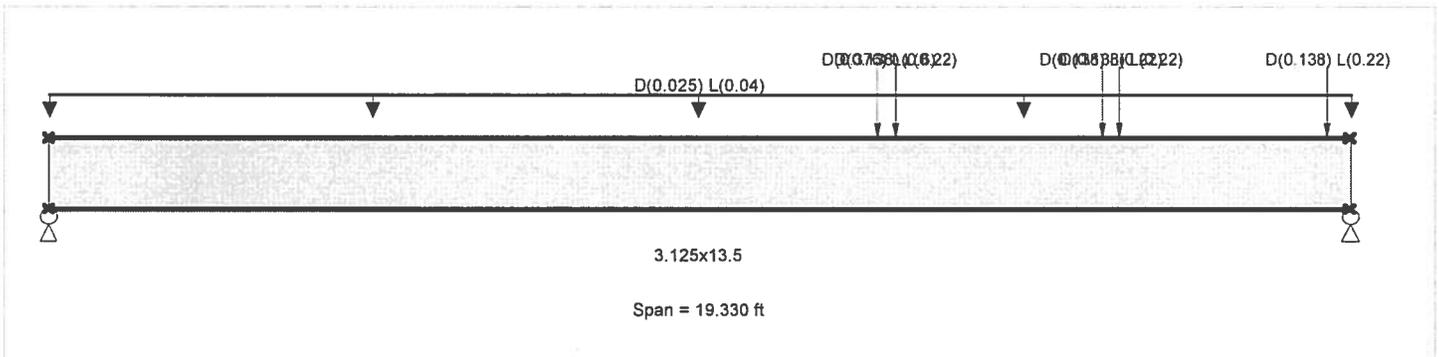
Analysis Method : Allowable Stress Design	Fb - Tension	875.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	875.0 psi	Ebend- xx 1,300.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx 470.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	170.0 psi	
	Ft	425.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			

D(0.305) L(0.423)

6x8

Span = 4.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.3050, L = 0.4230 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.421: 1**	Maximum Shear Stress Ratio	=	**0.228 : 1**	
Section used for this span		**6x8**	Section used for this span		**6x8**	
fb : Actual	=	368.27 psi	fv : Actual	=	38.68 psi	
FB : Allowable	=	875.00 psi	Fv : Allowable	=	170.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	2.085 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection   0.012 in Ratio = 4345 >=480.
Max Upward Transient Deflection   0.000 in Ratio = 0 <480.0
Max Downward Total Deflection   0.020 in Ratio = 2524 >=240.
Max Upward Total Deflection   0.000 in Ratio = 0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.196	0.106	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.66	154.29	787.50	0.45	16.20	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.421	0.228	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.58	368.27	875.00	1.06	38.68	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.141	0.076	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.66	154.29	1093.75	0.45	16.20	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.153	0.083	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.66	154.29	1006.25	0.45	16.20	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.288	0.156	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.35	314.77	1093.75	0.91	33.06	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.313	0.169	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.35	314.77	1006.25	0.91	33.06	195.50

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB4 - 6x8 D.Fir #2

Load Combination	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.110	0.060	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.66	154.29	1400.00	0.45	16.20	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.110	0.060	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.66	154.29	1400.00	0.45	16.20	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.225	0.122	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.35	314.77	1400.00	0.91	33.06	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.225	0.122	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.35	314.77	1400.00	0.91	33.06	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.225	0.122	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.35	314.77	1400.00	0.91	33.06	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.066	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.40	92.57	1400.00	0.27	9.72	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.170 ft	1	0.066	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.40	92.57	1400.00	0.27	9.72	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0198	2.100		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.518	1.518
Overall MINimum	0.382	0.382
+D+H	0.636	0.636
+D+L+H	1.518	1.518
+D+Lr+H	0.636	0.636
+D+S+H	0.636	0.636
+D+0.750Lr+0.750L+H	1.297	1.297
+D+0.750L+0.750S+H	1.297	1.297
+D+W+H	0.636	0.636
+D+0.70E+H	0.636	0.636
+D+0.750Lr+0.750L+0.750W+H	1.297	1.297
+D+0.750L+0.750S+0.750W+H	1.297	1.297
+D+0.750L+0.750S+0.5250E+H	1.297	1.297
+0.60D+W+0.60H	0.382	0.382
+0.60D+0.70E+0.60H	0.382	0.382
D Only	0.636	0.636
Lr Only		
L Only	0.882	0.882
S Only		
W Only		
E Only		
H Only		

rudow + berry
structural engineering
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 94
of

FBS   SPAN1 = 7'-1"   SPAN2 = 5'-1"   CANT = 3'-7"

$$W = .61(25+40) + 4(10) = 57D + 29L$$

$$P_{EHB} = 1.5(3.33)(25+40) = 125D + 200L$$

TH3   SPAN = 7'-3"

$$W = 8.61(25+40) + 4(15) = 217D + 342L$$

$$P = R_{TH1} = 1530^\#D + 10202^\#SL \quad @ x = 6'-6"$$

TH4   SPAN = 10'-7" CLR

$$W_L = 9.15(25+40) + 10(15) = 394D + 390L$$

$$W_R = 9.0 (\quad '' \quad) + \quad '' \quad = 315D + 360L$$

$$P_1 = R_{TH2} = 1497^\#D + 11293^\#SL \quad @ x = 8'-11"$$

$$P_2 = R_{TH1} = 1530^\#D + 10202^\#SL \quad @ x = 9'-10"$$

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

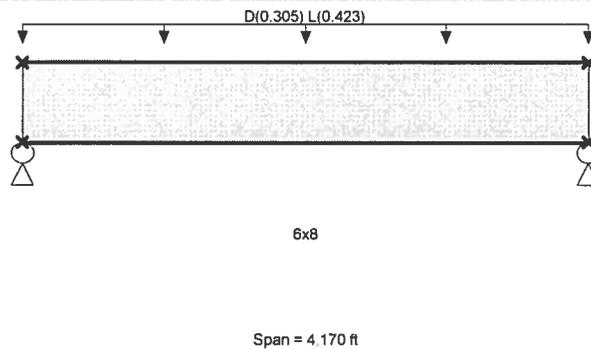# Wood Beam

Lic. # : KW-06002357

Description : FB5 - 5 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy	850.0 ksi
	Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.125) L(0.2)
D(0.057) L(0.027)   D(0.057) L(0.027)   D(0.057) L(0.027)

5.125x13.5   5.125x13.5   5.125x13.5

Span = 3.580 ft   Span = 5.080 ft   Span = 7.080 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.0570, L = 0.0270 , Tributary Width = 1.0 ft
   Point Load : D = 0.1250, L = 0.20 k @ 0.0 ft
Load for Span Number 2
   Uniform Load : D = 0.0570, L = 0.0270 , Tributary Width = 1.0 ft
Load for Span Number 3
   Uniform Load : D = 0.0570, L = 0.0270 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.075 : 1	Maximum Shear Stress Ratio	=	0.047 : 1
Section used for this span		5.125x13.5	Section used for this span		5.125x13.5
fb : Actual	=	138.59 psi	fv : Actual	=	12.34 psi
FB : Allowable	=	1,850.00 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	3.580 ft	Location of maximum on span	=	2.467 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.008 in	Ratio =	11272 >=480.
Max Upward Transient Deflection	-0.001 in	Ratio =	55596 >=480.
Max Downward Total Deflection	0.015 in	Ratio =	5744 >=240.
Max Upward Total Deflection	-0.002 in	Ratio =	28039 >=240.

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.042	0.028	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	1665.00	0.30	6.56	238.50
Length = 5.080 ft	2	0.042	0.028	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	1665.00	0.25	6.56	238.50
Length = 7.080 ft	3	0.013	0.028	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.37	28.53	2160.00	0.20	6.56	238.50

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357　　　　　　　　　　　　　　　　　　　　**Licensee : RUDOW & BERRY**

Description : FB5 - 5 1/8 x 13 1/2 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.075	0.047	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.80	138.59	1850.00	0.57	12.34	265.00
Length = 5.080 ft	2	0.075	0.047	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.80	138.59	1850.00	0.47	12.34	265.00
Length = 7.080 ft	3	0.018	0.047	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.56	43.33	2400.00	0.26	12.34	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.030	0.020	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2312.50	0.30	6.56	331.25
Length = 5.080 ft	2	0.030	0.020	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2312.50	0.25	6.56	331.25
Length = 7.080 ft	3	0.010	0.020	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.37	28.53	3000.00	0.20	6.56	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.033	0.022	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2127.50	0.30	6.56	304.75
Length = 5.080 ft	2	0.033	0.022	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2127.50	0.25	6.56	304.75
Length = 7.080 ft	3	0.010	0.022	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.37	28.53	2760.00	0.20	6.56	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.053	0.033	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2312.50	0.50	10.90	331.25
Length = 5.080 ft	2	0.053	0.033	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2312.50	0.42	10.90	331.25
Length = 7.080 ft	3	0.013	0.033	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.51	39.62	3000.00	0.25	10.90	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.057	0.036	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2127.50	0.50	10.90	304.75
Length = 5.080 ft	2	0.057	0.036	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2127.50	0.42	10.90	304.75
Length = 7.080 ft	3	0.014	0.036	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.51	39.62	2760.00	0.25	10.90	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.024	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2960.00	0.30	6.56	424.00
Length = 5.080 ft	2	0.024	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2960.00	0.25	6.56	424.00
Length = 7.080 ft	3	0.007	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.37	28.53	3840.00	0.20	6.56	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.024	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2960.00	0.30	6.56	424.00
Length = 5.080 ft	2	0.024	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.91	70.06	2960.00	0.25	6.56	424.00
Length = 7.080 ft	3	0.007	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.37	28.53	3840.00	0.20	6.56	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.50	10.90	424.00
Length = 5.080 ft	2	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.42	10.90	424.00
Length = 7.080 ft	3	0.010	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.51	39.62	3840.00	0.25	10.90	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.50	10.90	424.00
Length = 5.080 ft	2	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.42	10.90	424.00
Length = 7.080 ft	3	0.010	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.51	39.62	3840.00	0.25	10.90	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.50	10.90	424.00
Length = 5.080 ft	2	0.041	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.58	121.46	2960.00	0.42	10.90	424.00
Length = 7.080 ft	3	0.010	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.51	39.62	3840.00	0.25	10.90	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.014	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.55	42.03	2960.00	0.18	3.94	424.00
Length = 5.080 ft	2	0.014	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.55	42.03	2960.00	0.15	3.94	424.00
Length = 7.080 ft	3	0.004	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.22	17.12	3840.00	0.12	3.94	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.014	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.55	42.03	2960.00	0.18	3.94	424.00
Length = 5.080 ft	2	0.014	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.55	42.03	2960.00	0.15	3.94	424.00
Length = 7.080 ft	3	0.004	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.22	17.12	3840.00	0.12	3.94	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0150	0.000		0.0000	0.000
	2	0.0000	0.000	+D+L+H	-0.0022	2.092
+D+L+H	3	0.0027	3.629		0.0000	2.092

Vertical Reactions

Support notation : Far left is #1　　　　　　Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		1.261	0.316	0.334
Overall MINimum		0.427	-0.028	0.103
+D+H		0.711	0.316	0.231

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Project Descr:

Project ID: 15105

Wood Beam

Description :   FB5 - 5 1/8 x 13 1/2 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+L+H		1.261	0.288	0.334
+D+Lr+H		0.711	0.316	0.231
+D+S+H		0.711	0.316	0.231
+D+0.750Lr+0.750L+H		1.124	0.295	0.308
+D+0.750L+0.750S+H		1.124	0.295	0.308
+D+W+H		0.711	0.316	0.231
+D+0.70E+H		0.711	0.316	0.231
+D+0.750Lr+0.750L+0.750W+H		1.124	0.295	0.308
+D+0.750L+0.750S+0.750W+H		1.124	0.295	0.308
+D+0.750L+0.750S+0.5250E+H		1.124	0.295	0.308
+0.60D+W+0.60H		0.427	0.190	0.139
+0.60D+0.70E+0.60H		0.427	0.190	0.139
D Only		0.711	0.316	0.231
Lr Only				
L Only		0.550	-0.028	0.103
S Only				
W Only				
E Only				
H Only				

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH3 - 6 3/4 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy	850.0 ksi
	Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(1.53) S(10.202)

D(0.277) L(0.347)

6.75x13.5

Span = 7.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.2770, L = 0.3470, Tributary Width = 1.0 ft
  Point Load : D = 1.530, S = 10.202 k @ 6.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.182 : 1**	Maximum Shear Stress Ratio	=	**0.127 : 1**	
Section used for this span		**6.75x13.5**	Section used for this span		**6.75x13.5**	
fb : Actual	=	503.68 psi	fv : Actual	=	38.68 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+0.750L+0.750S+H	
Location of maximum on span	=	6.483 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
  Max Downward Transient Deflection   0.018 in Ratio =   4916 >=360.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <360.0
  Max Downward Total Deflection   0.030 in Ratio =   2927 >=240.
  Max Upward Total Deflection   0.000 in Ratio =   0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.070	0.062	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.57	150.16	2160.00	0.90	14.88	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.118	0.110	1.00	1.000	1.00	1.00	1.00	1.00	1.00	4.82	282.27	2400.00	1.78	29.24	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.050	0.045	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.57	150.16	3000.00	0.90	14.88	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.182	0.106	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.61	503.68	2760.00	1.96	32.26	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.083	0.077	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.26	249.08	3000.00	1.56	25.65	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   TH3 - 6 3/4 x 13 1/2 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.168	0.127	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.91	463.10	2760.00	2.35	38.68	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.039	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.57	150.16	3840.00	0.90	14.88	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.039	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.57	150.16	3840.00	0.90	14.88	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.065	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.26	249.08	3840.00	1.56	25.65	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.121	0.091	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.91	463.10	3840.00	2.35	38.68	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.121	0.091	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.91	463.10	3840.00	2.35	38.68	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.023	0.021	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.54	90.10	3840.00	0.54	8.93	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.023	0.021	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.54	90.10	3840.00	0.54	8.93	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.0297	3.916		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.969	11.594
Overall MINimum	0.740	1.258
+D+H	1.234	2.447
+D+L+H	2.492	3.705
+D+Lr+H	1.234	2.447
+D+S+H	2.289	11.594
+D+0.750Lr+0.750L+H	2.177	3.391
+D+0.750L+0.750S+H	2.969	10.251
+D+W+H	1.234	2.447
+D+0.70E+H	1.234	2.447
+D+0.750Lr+0.750L+0.750W+H	2.177	3.391
+D+0.750L+0.750S+0.750W+H	2.969	10.251
+D+0.750L+0.750S+0.5250E+H	2.969	10.251
+0.60D+W+0.60H	0.740	1.468
+0.60D+0.70E+0.60H	0.740	1.468
D Only	1.234	2.447
Lr Only		
L Only	1.258	1.258
S Only	1.055	9.147
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description : TH4 - 6 3/4 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design
Load Combination :ASCE 7-10 w/ ASD Wind

Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

F_b - Tension	2,400.0 psi	E : Modulus of Elasticity
F_b - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
F_c - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
F_c - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
F_v	265.0 psi	Eminbend - yy 850.0 ksi
F_t	1,100.0 psi	Density 31.20 pcf

D(1.697) S(11.293)   D(1.53) S(10.202)

D(0.394,0.375) L(0.39,0.36)

6.75x13.5

Span = 10.580 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.3940->0.3750, L(S,E) = 0.390->0.360 k/ft, Extent = 0.0 –>> 10.580 ft, Trib Width = 1.0 ft
  Point Load : D = 1.697, S = 11.293 k @ 6.50 ft
  Point Load : D = 1.530, S = 10.202 k @ 9.830 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.917: 1	Maximum Shear Stress Ratio	=	0.477 : 1
Section used for this span		6.75x13.5	Section used for this span		6.75x13.5
fb : Actual	=	2,531.20 psi	fv : Actual	=	145.31 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	6.487 ft	Location of maximum on span	=	9.460 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
  Max Downward Transient Deflection   0.219 in Ratio =   579 >=360.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <360.0
  Max Downward Total Deflection   0.298 in Ratio =   426 >=240.
  Max Upward Total Deflection   0.000 in Ratio =   0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.279	0.180	0.90	1.000	1.00	1.00	1.00	1.00	1.00	10.31	603.18	2160.00	2.61	43.01	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.373	0.259	1.00	1.000	1.00	1.00	1.00	1.00	1.00	15.29	895.01	2400.00	4.17	68.56	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.201	0.130	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.31	603.18	3000.00	2.61	43.01	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.917	0.477	1.15	1.000	1.00	1.00	1.00	1.00	1.00	43.25	2,531.20	2760.00	8.83	145.31	304.75

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH4 - 6 3/4 x 13 1/2 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.274	0.188	1.25	1.000	1.00	1.00	1.00	1.00	1.00	14.03	821.28	3000.00	3.78	62.17	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.821	0.456	1.15	1.000	1.00	1.00	1.00	1.00	1.00	38.73	2,267.07	2760.00	8.44	138.90	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.157	0.101	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.31	603.18	3840.00	2.61	43.01	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.157	0.101	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.31	603.18	3840.00	2.61	43.01	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.214	0.147	1.60	1.000	1.00	1.00	1.00	1.00	1.00	14.03	821.28	3840.00	3.78	62.17	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.590	0.328	1.60	1.000	1.00	1.00	1.00	1.00	1.00	38.73	2,267.07	3840.00	8.44	138.90	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.590	0.328	1.60	1.000	1.00	1.00	1.00	1.00	1.00	38.73	2,267.07	3840.00	8.44	138.90	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.094	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.18	361.91	3840.00	1.57	25.80	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.580 ft	1	0.094	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.18	361.91	3840.00	1.57	25.80	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2975	5.676		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	8.234	21.003
Overall MINimum	1.751	1.957
+D+H	2.918	4.586
+D+L+H	4.928	6.543
+D+Lr+H	2.918	4.586
+D+S+H	7.996	21.003
+D+0.750Lr+0.750L+H	4.426	6.054
+D+0.750L+0.750S+H	8.234	18.366
+D+W+H	2.918	4.586
+D+0.70E+H	2.918	4.586
+D+0.750Lr+0.750L+0.750W+H	4.426	6.054
+D+0.750L+0.750S+0.750W+H	8.234	18.366
+D+0.750L+0.750S+0.5250E+H	8.234	18.366
+0.60D+W+0.60H	1.751	2.751
+0.60D+0.70E+0.60H	1.751	2.751
D Only	2.918	4.586
Lr Only		
L Only	2.010	1.957
S Only	5.078	16.417
W Only		
E Only		
H Only		

rudow + berry
structural engineering
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t (480) 946-8171
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of

Roof Framing
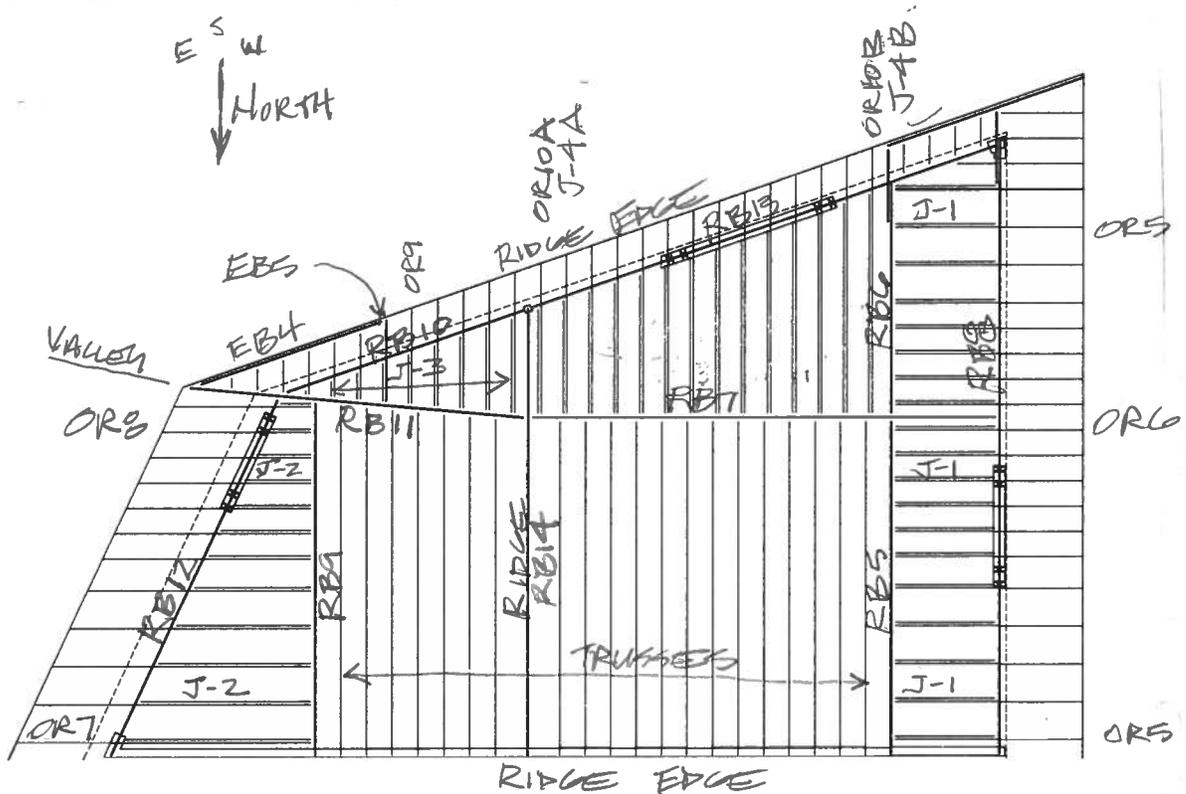
Snow Drift / Unbalance on South Section

For wind from E, $w = 12'\pm$, $h_d = 2.5$ ft

$$W_d = \tfrac{8}{3}(2.5)(9.373)^{\frac{1}{2}} = 20'-4''$$

$$q_{tot} = 203 + \frac{2.5(30)}{\sqrt{9.373}} = 228 \text{ psf}$$

For wind from W, $w = 28'$

$$q_{tot} = 240 \text{ psf} \quad \text{per previous}$$

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designed by: MAR   date: 1/17
checked by: date:

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SNOW CASE I

228 PSF

203 PSF

240 PSF

SNOW CASE II

102 PSF

306 PSF   306 PSF

102 PSF

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designed by: MAR   date: 1/17
checked by: date:

pg 104
of
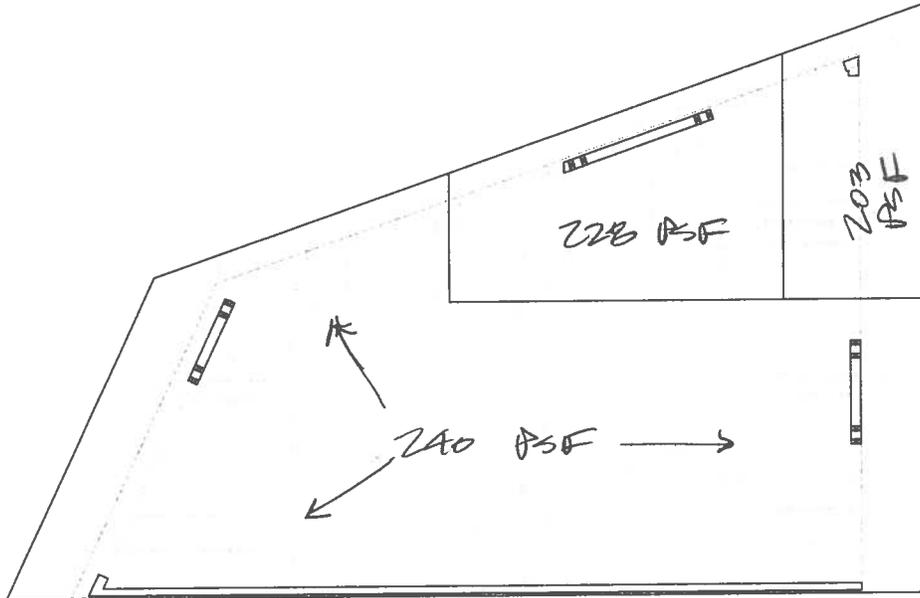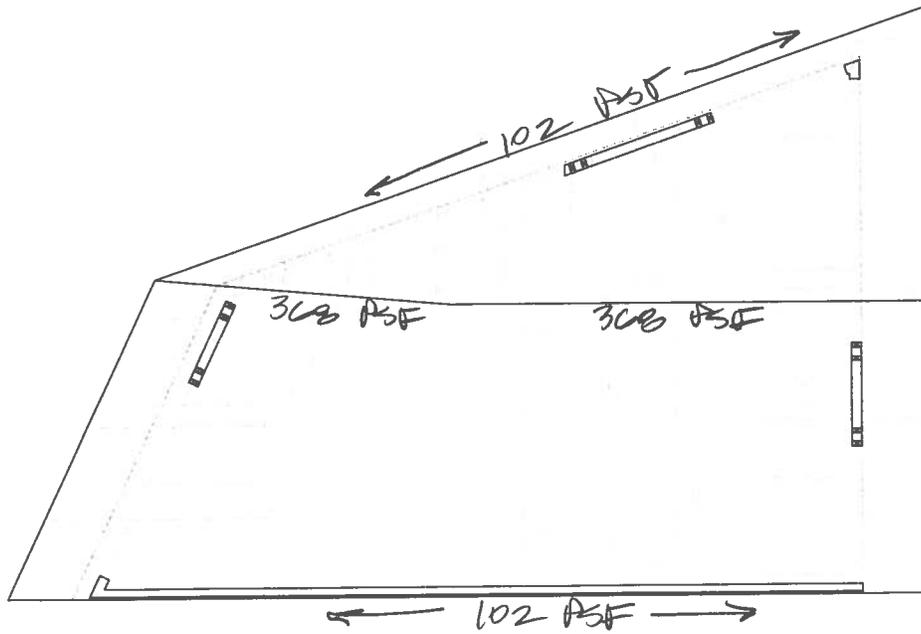
<u>OR5</u> — SEE OR1 FROM 20' UNIT

<u>OR6</u> — SEE OR2 FROM 20' UNIT

<u>OR7</u>   SPAN = 10'-4"   CANT = 5'-0"

$$W_{SPAN} = 11D$$
$$W_{CANT} = 27D + 136S \text{ OR } 320S$$ } PER 20' UNIT

<u>OR8</u>   SPAN = 2'-3"   CANT = 5'-0"

$$W_{SPAN} = 11D$$
$$W_{CANT} = 27D + 491S \text{ OR } 320S$$ } PER 20' UNIT

<u>J-2</u>   SPAN = 2'-2" MIN, 10'-3" MAX

$$W = 1.33(11S + 102 \text{ OR } 240 \text{ OR } 368)$$
$$= 15D + 136S \text{ OR } 320S \text{ OR } 491S$$

<u>OR9</u>   SPAN = $\begin{array}{l}3'-1" \text{ MIN}\\5'-5" \text{ MAX}\end{array}$ CANT = 2'-2"

$$W_{SPAN} \; 1.33(8.5) = 11 \, DL$$
$$W_{CANT} = 1.33(11S + 240) = 15D + 320S$$

<u>J-3</u>   SPAN = 3-1' MIN, 5-5 MAX

$$W = 2(11S + 240) = 23D + 480S$$
$$\text{OR } W_L = 2(11S + 368) = 23D + 736S$$
$$W_R = 2(11S + 178 @ MAX, 212 @ MIN) = 23D + 356S \text{ OR } 424S$$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description : OR7 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
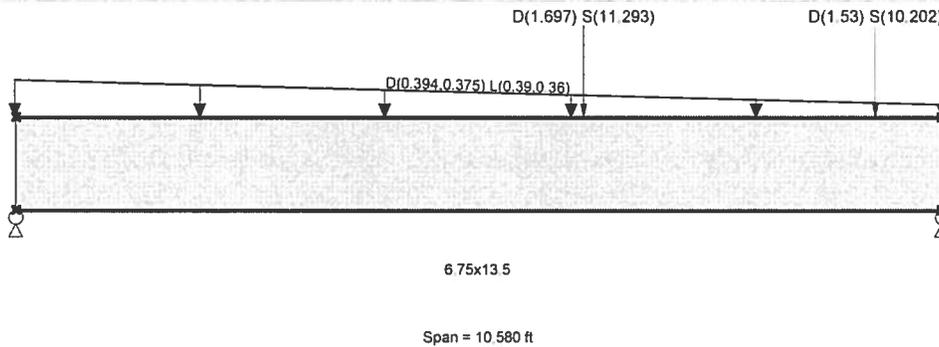Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		
Load Combination ASCE 7-10 w/ ASD Wind		

F_b - Tension	2,400.0 psi	E : Modulus of Elasticity		
F_b - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
F_c - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
F_c - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
F_v	265.0 psi	Eminbend - yy	850.0 ksi
F_t	1,100.0 psi	Density	31.20 pcf

Wood Species : DF/DF
Wood Grade : 24F - V8

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.011)   D(0.027) S(0.32)

3.125x9   3.125x9

Span = 10.250 ft   Span = 5.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
   Uniform Load : D = 0.0270, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.455 1**	Maximum Shear Stress Ratio	=	**0.264 : 1**
Section used for this span		**3.125x9**	Section used for this span		**3.125x9**
f_b : Actual	=	1,255.44 psi	f_v : Actual	=	80.48 psi
F_B : Allowable	=	2,760.00 psi	F_v : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	10.250 ft	Location of maximum on span	=	10.250 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.471 in	Ratio =	254 >=240.
Max Upward Transient Deflection	-0.137 in	Ratio =	895 >=240.
Max Downward Total Deflection	0.501 in	Ratio =	238 >=180
Max Upward Total Deflection	-0.139 in	Ratio =	882 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	f_b	F'b	Shear Values V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
Length = 5.0 ft	2	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
Length = 5.0 ft	2	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR7 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 10.250 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.455	0.264	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.41	1,255.44	2760.00	1.51	80.48	304.75
Length = 5.0 ft	2	0.455	0.264	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.41	1,255.44	2760.00	1.51	80.48	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.352	0.204	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	2760.00	1.17	62.25	304.75
Length = 5.0 ft	2	0.352	0.204	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	2760.00	1.17	62.25	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.253	0.147	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	3840.00	1.17	62.25	424.00
Length = 5.0 ft	2	0.253	0.147	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	3840.00	1.17	62.25	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.253	0.147	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	3840.00	1.17	62.25	424.00
Length = 5.0 ft	2	0.253	0.147	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.41	971.00	3840.00	1.17	62.25	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.1394	6.013
+D+S+H	2	0.5009	5.000		0.0000	6.013

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.390	2.284	
Overall MINimum	0.028	0.176	
+D+H	0.047	0.293	
+D+L+H	0.047	0.293	
+D+Lr+H	0.047	0.293	
+D+S+H	-0.343	2.284	
+D+0.750Lr+0.750L+H	0.047	0.293	
+D+0.750L+0.750S+H	-0.245	1.786	
+D+W+H	0.047	0.293	
+D+0.70E+H	0.047	0.293	
+D+0.750Lr+0.750L+0.750W+H	0.047	0.293	
+D+0.750L+0.750S+0.750W+H	-0.245	1.786	
+D+0.750L+0.750S+0.5250E+H	-0.245	1.786	
+0.60D+W+0.60H	0.028	0.176	
+0.60D+0.70E+0.60H	0.028	0.176	
D Only	0.047	0.293	
Lr Only			
L Only			
S Only	-0.390	1.990	
W Only			

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   107

Wood Beam

Lic. # : KW-06002357

Description :   OR7 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   OR7 w/ 102 Snow - 3-1/8 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.011)   D(0.027) S(0.136)

3.125x9   3.125x9

Span = 10.250 ft   Span = 5.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0270, S = 0.1360 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.218 : 1**	Maximum Shear Stress Ratio	=	**0.126 : 1**	
Section used for this span		**3.125x9**	Section used for this span		**3.125x9**	
fb : Actual	=	601.22 psi	fv : Actual	=	38.54 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	10.250 ft	Location of maximum on span	=	10.250 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.200 in	Ratio =	598 >=240.
Max Upward Transient Deflection	-0.058 in	Ratio =	2107 >=240.
Max Downward Total Deflection	0.230 in	Ratio =	522 >=180
Max Upward Total Deflection	-0.060 in	Ratio =	2034 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
Length = 5.0 ft	2	0.054	0.032	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	7.54	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
Length = 5.0 ft	2	0.049	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	7.54	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : OR7 w/ 102 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 10.250 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.218	0.126	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.11	601.22	2760.00	0.72	38.54	304.75
Length = 5.0 ft	2	0.218	0.126	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.11	601.22	2760.00	0.72	38.54	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
Length = 5.0 ft	2	0.039	0.023	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	7.54	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.174	0.101	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	2760.00	0.58	30.79	304.75
Length = 5.0 ft	2	0.174	0.101	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	2760.00	0.58	30.79	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
Length = 5.0 ft	2	0.031	0.018	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	7.54	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.125	0.073	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	3840.00	0.58	30.79	424.00
Length = 5.0 ft	2	0.125	0.073	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	3840.00	0.58	30.79	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.125	0.073	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	3840.00	0.58	30.79	424.00
Length = 5.0 ft	2	0.125	0.073	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.69	480.33	3840.00	0.58	30.79	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00
Length = 5.0 ft	2	0.018	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	4.53	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0605	6.127
+D+S+H	2	0.2298	5.000		0.0000	6.127

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.166	1.139	
Overall MINimum	0.028	0.176	
+D+H	0.047	0.293	
+D+L+H	0.047	0.293	
+D+Lr+H	0.047	0.293	
+D+S+H	-0.119	1.139	
+D+0.750Lr+0.750L+H	0.047	0.293	
+D+0.750L+0.750S+H	-0.077	0.928	
+D+W+H	0.047	0.293	
+D+0.70E+H	0.047	0.293	
+D+0.750Lr+0.750L+0.750W+H	0.047	0.293	
+D+0.750L+0.750S+0.750W+H	-0.077	0.928	
+D+0.750L+0.750S+0.5250E+H	-0.077	0.928	
+0.60D+W+0.60H	0.028	0.176	
+0.60D+0.70E+0.60H	0.028	0.176	
D Only	0.047	0.293	
Lr Only			
L Only			
S Only	-0.166	0.846	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   110

Wood Beam

Lic. # : KW-06002357

Description :   OR7 w/ 102 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR8 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
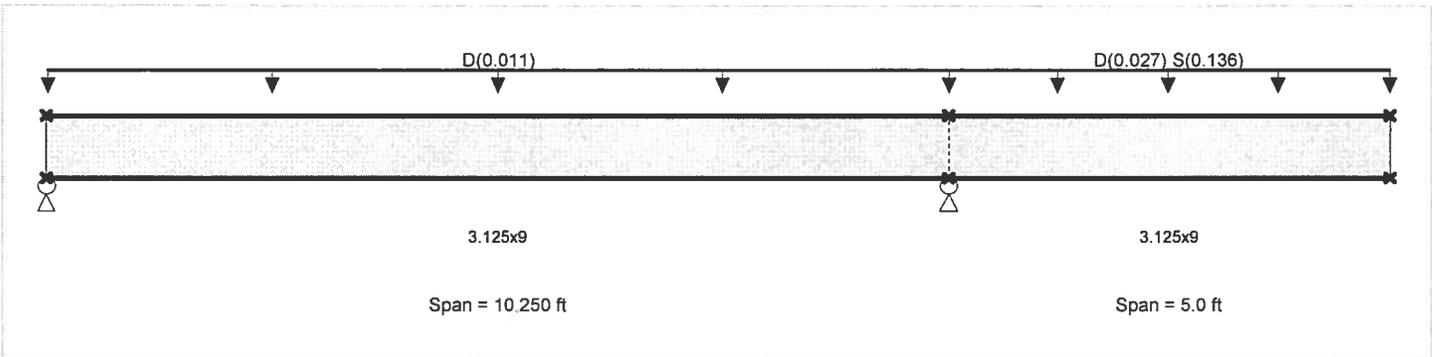Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0270 , S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.455 : 1	Maximum Shear Stress Ratio	=	0.344 : 1	
Section used for this span		3.125x9	Section used for this span		3.125x9	
fb : Actual	=	1,255.44 psi	fv : Actual	=	104.97 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	2.250 ft	Location of maximum on span	=	1.508 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.202 in	Ratio =	594 >=240.
Max Upward Transient Deflection	-0.007 in	Ratio =	4080 >=240.
Max Downward Total Deflection	0.222 in	Ratio =	538 >=180
Max Upward Total Deflection	-0.007 in	Ratio =	3712 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.054	0.043	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.19	10.16	238.50
Length = 5.0 ft	2	0.054	0.043	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	10.16	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.049	0.038	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.19	10.16	265.00
Length = 5.0 ft	2	0.049	0.038	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	10.16	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 112

Wood Beam

Description : OR8 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 2.250 ft	1	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3000.00	0.19	10.16	331.25
Length = 5.0 ft	2	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3000.00	0.14	10.16	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.455	0.344	1.15	1.000	1.00	1.00	1.00	1.00	1.00		4.41	1,255.44	2760.00	1.97	104.97	304.75
Length = 5.0 ft	2	0.455	0.344	1.15	1.000	1.00	1.00	1.00	1.00	1.00		4.41	1,255.44	2760.00	1.51	104.97	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3000.00	0.19	10.16	331.25
Length = 5.0 ft	2	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3000.00	0.14	10.16	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.352	0.267	1.15	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	2760.00	1.52	81.27	304.75
Length = 5.0 ft	2	0.352	0.267	1.15	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	2760.00	1.17	81.27	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.253	0.192	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	3840.00	1.52	81.27	424.00
Length = 5.0 ft	2	0.253	0.192	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	3840.00	1.17	81.27	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.253	0.192	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	3840.00	1.52	81.27	424.00
Length = 5.0 ft	2	0.253	0.192	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.41	971.00	3840.00	1.17	81.27	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.25	70.60	3840.00	0.11	6.09	424.00
Length = 5.0 ft	2	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.25	70.60	3840.00	0.08	6.09	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.25	70.60	3840.00	0.11	6.09	424.00
Length = 5.0 ft	2	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.25	70.60	3840.00	0.08	6.09	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0073	1.307
+D+S+H	2	0.2225	5.000		0.0000	1.307

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-1.942	3.746	
Overall MINimum	-0.099	0.221	
+D+H	-0.165	0.369	
+D+L+H	-0.165	0.369	
+D+Lr+H	-0.165	0.369	
+D+S+H	-1.942	3.746	
+D+0.750Lr+0.750L+H	-0.165	0.369	
+D+0.750L+0.750S+H	-1.498	2.902	
+D+W+H	-0.165	0.369	
+D+0.70E+H	-0.165	0.369	
+D+0.750Lr+0.750L+0.750W+H	-0.165	0.369	
+D+0.750L+0.750S+0.750W+H	-1.498	2.902	
+D+0.750L+0.750S+0.5250E+H	-1.498	2.902	
+0.60D+W+0.60H	-0.099	0.221	
+0.60D+0.70E+0.60H	-0.099	0.221	
D Only	-0.165	0.369	
Lr Only			
L Only			
S Only	-1.778	3.378	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   113

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR8 w/ 240 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR8 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	2,400.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species : DF/DF		Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade : 24F - V8		Fv	265.0 psi	Eminbend - yy	850.0 ksi
		Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Span = 2.250 ft   Span = 5.0 ft
3.125x9   3.125x9
D(0.011)   D(0.027) S(0.491)

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0270, S = 0.4910 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.675 : 1	Maximum Shear Stress Ratio	=	0.511 : 1
Section used for this span		3.125x9	Section used for this span		3.125x9
fb : Actual	=	1,863.44 psi	fv : Actual	=	155.64 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.250 ft	Location of maximum on span	=	1.508 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.310 in Ratio =   386 >=240.
    Max Upward Transient Deflection   -0.010 in Ratio =   2659 >=240.
    Max Downward Total Deflection   0.330 in Ratio =   362 >=180
    Max Upward Total Deflection   -0.011 in Ratio =   2498 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.054	0.043	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.19	10.16	238.50
Length = 5.0 ft	2	0.054	0.043	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2160.00	0.14	10.16	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.049	0.038	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.19	10.16	265.00
Length = 5.0 ft	2	0.049	0.038	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	2400.00	0.14	10.16	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : OR8 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 2.250 ft	1	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.19	10.16	331.25
Length = 5.0 ft	2	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	10.16	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.675	0.511	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.55	1,863.44	2760.00	2.92	155.64	304.75
Length = 5.0 ft	2	0.675	0.511	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.55	1,863.44	2760.00	2.24	155.64	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.19	10.16	331.25
Length = 5.0 ft	2	0.039	0.031	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3000.00	0.14	10.16	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.517	0.391	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	2760.00	2.24	119.27	304.75
Length = 5.0 ft	2	0.517	0.391	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	2760.00	1.72	119.27	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.19	10.16	424.00
Length = 5.0 ft	2	0.031	0.024	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.41	117.67	3840.00	0.14	10.16	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.372	0.281	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	2.24	119.27	424.00
Length = 5.0 ft	2	0.372	0.281	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	119.27	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.372	0.281	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	2.24	119.27	424.00
Length = 5.0 ft	2	0.372	0.281	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.02	1,427.00	3840.00	1.72	119.27	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.11	6.09	424.00
Length = 5.0 ft	2	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	6.09	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.11	6.09	424.00
Length = 5.0 ft	2	0.018	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	70.60	3840.00	0.08	6.09	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0108	1.307
+D+S+H	2	0.3303	5.000		0.0000	1.307

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-2.892	5.551	
Overall MINimum	-0.099	0.221	
+D+H	-0.165	0.369	
+D+L+H	-0.165	0.369	
+D+Lr+H	-0.165	0.369	
+D+S+H	-2.892	5.551	
+D+0.750Lr+0.750L+H	-0.165	0.369	
+D+0.750L+0.750S+H	-2.210	4.256	
+D+W+H	-0.165	0.369	
+D+0.70E+H	-0.165	0.369	
+D+0.750Lr+0.750L+0.750W+H	-0.165	0.369	
+D+0.750L+0.750S+0.750W+H	-2.210	4.256	
+D+0.750L+0.750S+0.5250E+H	-2.210	4.256	
+0.60D+W+0.60H	-0.099	0.221	
+0.60D+0.70E+0.60H	-0.099	0.221	
D Only	-0.165	0.369	
Lr Only			
L Only			
S Only	-2.728	5.183	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 116

Wood Beam

Lic. # : KW-06002357

Description :   OR8 w/ 368 Snow - 3-1/8 x 9 GLB @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Printed: 24 JAN 2017, 7:55PM

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-2 @ 368 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015) S(0.491)

2x10

Span = 2.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0150, S = 0.4910, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.138 : 1	Maximum Shear Stress Ratio	=	0.096 : 1
Section used for this span		2x10	Section used for this span		2x10
fb : Actual	=	180.70 psi	fv : Actual	=	19.88 psi
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	1.125 ft	Location of maximum on span	=	1.486 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.002 in	Ratio =	15007 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.002 in	Ratio =	14476 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.006	0.004	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1024.65	0.01	0.70	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.006	0.004	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1138.50	0.01	0.70	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.003	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1423.13	0.01	0.70	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.138	0.096	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.32	180.70	1309.28	0.18	19.88	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.003	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1423.13	0.01	0.70	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-2 @ 368 Snow - 2x10 @ 16" O.C.

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 2.250 ft	1	0.105	0.073	1.15	1.100	1.00	1.15	1.00	1.00	1.00		0.24	137.12	1309.28	0.14	15.09	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.075	0.052	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.24	137.12	1821.60	0.14	15.09	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.075	0.052	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.24	137.12	1821.60	0.14	15.09	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.002	0.001	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.01	3.84	1821.60	0.00	0.42	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.002	0.001	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.01	3.84	1821.60	0.00	0.42	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0019	1.133		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.573	0.573
Overall MINimum	0.012	0.012
+D+H	0.020	0.020
+D+L+H	0.020	0.020
+D+Lr+H	0.020	0.020
+D+S+H	0.573	0.573
+D+0.750Lr+0.750L+H	0.020	0.020
+D+0.750L+0.750S+H	0.435	0.435
+D+W+H	0.020	0.020
+D+0.70E+H	0.020	0.020
+D+0.750Lr+0.750L+0.750W+H	0.020	0.020
+D+0.750L+0.750S+0.750W+H	0.435	0.435
+D+0.750L+0.750S+0.5250E+H	0.435	0.435
+0.60D+W+0.60H	0.012	0.012
+0.60D+0.70E+0.60H	0.012	0.012
D Only	0.020	0.020
Lr Only		
L Only		
S Only	0.552	0.552
W Only		
E Only		
H Only		

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-2 Min Span @ 240 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	Fv	180.0 psi	
Wood Grade : No.2	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

Span = 2.250 ft

2x10

D(0.015) S(0.32)

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.0150, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.092 1	Maximum Shear Stress Ratio	=	0.064 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	119.99 psi	fv : Actual	=	13.20 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	1.125 ft	Location of maximum on span	=	1.486 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.001 in	Ratio =	23026 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.001 in	Ratio =	21799 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.006	0.004	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1024.65	0.01	0.70	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.006	0.004	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1138.50	0.01	0.70	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.003	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1423.13	0.01	0.70	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.092	0.064	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.21	119.99	1309.28	0.12	13.20	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.003	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1423.13	0.01	0.70	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J-2 Min Span @ 240 Snow - 2x10 @ 16" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 2.250 ft	1	0.070	0.049	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.16	91.59	1309.28	0.09	10.08	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.004	0.002	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	6.39	1821.60	0.01	0.70	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.050	0.035	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.16	91.59	1821.60	0.09	10.08	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.050	0.035	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.16	91.59	1821.60	0.09	10.08	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.002	0.001	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	3.84	1821.60	0.00	0.42	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.250 ft	1	0.002	0.001	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	3.84	1821.60	0.00	0.42	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0012	1.133		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.380	0.380
Overall MINimum	0.012	0.012
+D+H	0.020	0.020
+D+L+H	0.020	0.020
+D+Lr+H	0.020	0.020
+D+S+H	0.380	0.380
+D+0.750Lr+0.750L+H	0.020	0.020
+D+0.750L+0.750S+H	0.290	0.290
+D+W+H	0.020	0.020
+D+0.70E+H	0.020	0.020
+D+0.750Lr+0.750L+0.750W+H	0.020	0.020
+D+0.750L+0.750S+0.750W+H	0.290	0.290
+D+0.750L+0.750S+0.5250E+H	0.290	0.290
+0.60D+W+0.60H	0.012	0.012
+0.60D+0.70E+0.60H	0.012	0.012
D Only	0.020	0.020
Lr Only		
L Only		
S Only	0.360	0.360
W Only		
E Only		
H Only		

Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		Project ID: 15105

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Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY
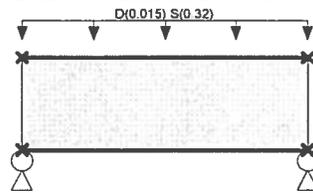
Description :   J-2 @ 240 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	F_c - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
	F_c - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	F_v	180.0 psi	
Wood Grade : No.2	F_t	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015) S(0.32)

2x10

Span = 7.250 ft

Applied Loads   Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0150, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY   Design OK

Maximum Bending Stress Ratio	=	0.952 1	Maximum Shear Stress Ratio	=	0.504 : 1		
Section used for this span		2x10	Section used for this span		2x10		
f_b : Actual	=	1,245.86 psi	f_v : Actual	=	104.42 psi		
FB : Allowable	=	1,309.28 psi	F_v : Allowable	=	207.00 psi		
Load Combination		+D+S+H	Load Combination		+D+S+H		
Location of maximum on span	=	3.625 ft	Location of maximum on span	=	0.000 ft		
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1		

Maximum Deflection

Max Downward Transient Deflection	0.126 in	Ratio =	688 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.134 in	Ratio =	651 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.065	0.034	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1024.65	0.05	5.56	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.058	0.031	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1138.50	0.05	5.56	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.047	0.025	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1423.13	0.05	5.56	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.952	0.504	1.15	1.100	1.00	1.15	1.00	1.00	1.00	2.22	1,245.86	1309.28	0.97	104.42	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.047	0.025	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1423.13	0.05	5.56	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   122

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-2 @ 240 Snow - 2x10 @ 16" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 7.250 ft	1	0.726	0.385	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.70	950.99	1309.28	0.74	79.71	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.036	0.019	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1821.60	0.05	5.56	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.036	0.019	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1821.60	0.05	5.56	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.036	0.019	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.12	66.37	1821.60	0.05	5.56	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.522	0.277	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.70	950.99	1821.60	0.74	79.71	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.522	0.277	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.70	950.99	1821.60	0.74	79.71	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.022	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.07	39.82	1821.60	0.03	3.34	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.250 ft	1	0.022	0.012	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.07	39.82	1821.60	0.03	3.34	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1335	3.651		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.225	1.225
Overall MINimum	0.039	0.039
+D+H	0.065	0.065
+D+L+H	0.065	0.065
+D+Lr+H	0.065	0.065
+D+S+H	1.225	1.225
+D+0.750Lr+0.750L+H	0.065	0.065
+D+0.750L+0.750S+H	0.935	0.935
+D+W+H	0.065	0.065
+D+0.70E+H	0.065	0.065
+D+0.750Lr+0.750L+0.750W+H	0.065	0.065
+D+0.750L+0.750S+0.750W+H	0.935	0.935
+D+0.750L+0.750S+0.5250E+H	0.935	0.935
+0.60D+W+0.60H	0.039	0.039
+0.60D+0.70E+0.60H	0.039	0.039
D Only	0.065	0.065
Lr Only		
L Only		
S Only	1.160	1.160
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-2 Max Span @ 240 Snow - (2)2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-10 w/ ASD Wind	Fb - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp 625.0 psi	
Wood Species : Douglas Fir - Larch	Fv 180.0 psi	
Wood Grade : No.2	Ft 575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.015) S(0.32)

2-2x10

Span = 10.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0150, S = 0.320, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.959 : 1	Maximum Shear Stress Ratio	=	0.390 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb : Actual	=	1,256.19 psi	fv : Actual	=	80.68 psi
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	5.125 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.253 in	Ratio =	487 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.269 in	Ratio =	457 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.076	0.031	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1024.65	0.09	4.97	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.068	0.028	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1138.50	0.09	4.97	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.054	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1423.13	0.09	4.97	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.959	0.390	1.15	1.100	1.00	1.15	1.00	1.00	1.00	4.48	1,256.19	1309.28	1.49	80.68	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.054	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1423.13	0.09	4.97	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description : J-2 Max Span @ 240 Snow - (2)2x10 @ 16" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 10.250 ft	1	0.734	0.298	1.15	1.100	1.00	1.15	1.00	1.00	1.00	3.43	961.49	1309.28	1.14	61.75	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.042	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1821.60	0.09	4.97	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.042	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1821.60	0.09	4.97	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.042	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	77.40	1821.60	0.09	4.97	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.528	0.214	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.43	961.49	1821.60	1.14	61.75	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.528	0.214	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.43	961.49	1821.60	1.14	61.75	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.025	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.17	46.44	1821.60	0.06	2.98	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.025	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.17	46.44	1821.60	0.06	2.98	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2691	5.162		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.748	1.748
Overall MINimum	0.065	0.065
+D+H	0.108	0.108
+D+L+H	0.108	0.108
+D+Lr+H	0.108	0.108
+D+S+H	1.748	1.748
+D+0.750Lr+0.750L+H	0.108	0.108
+D+0.750L+0.750S+H	1.338	1.338
+D+W+H	0.108	0.108
+D+0.70E+H	0.108	0.108
+D+0.750Lr+0.750L+0.750W+H	0.108	0.108
+D+0.750L+0.750S+0.750W+H	1.338	1.338
+D+0.750L+0.750S+0.5250E+H	1.338	1.338
+0.60D+W+0.60H	0.065	0.065
+0.60D+0.70E+0.60H	0.065	0.065
D Only	0.108	0.108
Lr Only		
L Only		
S Only	1.640	1.640
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY
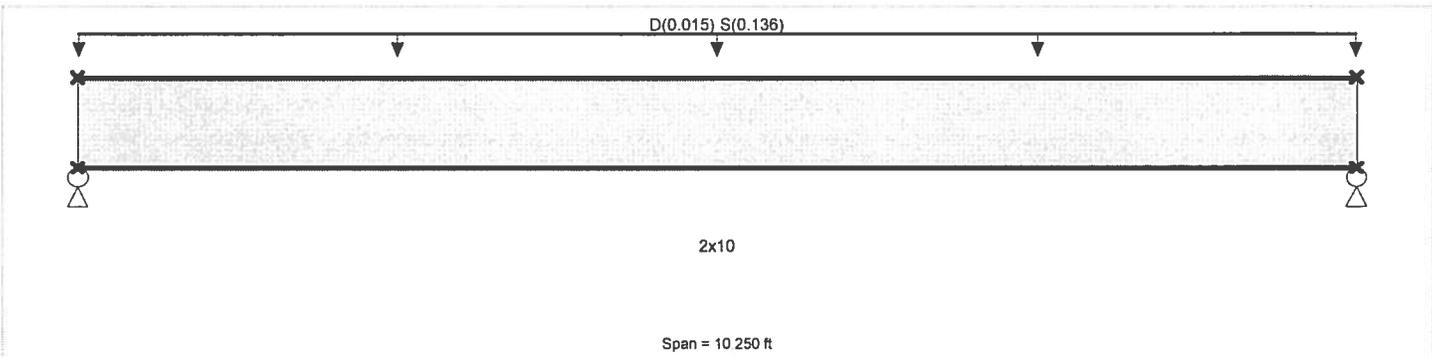
Description :   J-2 @ 102 Snow - (2) 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	Fv	180.0 psi	
Wood Grade : No.2	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015) S(0.136)

2x10

Span = 10 250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0150, S = 0.1360 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.867: 1	Maximum Shear Stress Ratio	=	0.352 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	1,134.63 psi	fv : Actual	=	72.87 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.125 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.215 in	Ratio =	573 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.243 in	Ratio =	506 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.129	0.053	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1024.65	0.08	8.52	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.117	0.047	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1138.50	0.08	8.52	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.093	0.038	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1423.13	0.08	8.52	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.867	0.352	1.15	1.100	1.00	1.15	1.00	1.00	1.00	2.02	1,134.63	1309.28	0.67	72.87	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.093	0.038	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1423.13	0.08	8.52	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   J-2 @ 102 Snow - (2) 2x10 @ 16" O.C.

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 10.250 ft	1	0.675	0.274	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.58	884.14	1309.28	0.53	56.78	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.073	0.030	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1821.60	0.08	8.52	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.073	0.030	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1821.60	0.08	8.52	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.073	0.030	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	132.66	1821.60	0.08	8.52	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.485	0.197	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.58	884.14	1821.60	0.53	56.78	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.485	0.197	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.58	884.14	1821.60	0.53	56.78	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.044	0.018	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.14	79.60	1821.60	0.05	5.11	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.250 ft	1	0.044	0.018	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.14	79.60	1821.60	0.05	5.11	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2430	5.162		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.789	0.789
Overall MINimum	0.055	0.055
+D+H	0.092	0.092
+D+L+H	0.092	0.092
+D+Lr+H	0.092	0.092
+D+S+H	0.789	0.789
+D+0.750Lr+0.750L+H	0.092	0.092
+D+0.750L+0.750S+H	0.615	0.615
+D+W+H	0.092	0.092
+D+0.70E+H	0.092	0.092
+D+0.750Lr+0.750L+0.750W+H	0.092	0.092
+D+0.750L+0.750S+0.750W+H	0.615	0.615
+D+0.750L+0.750S+0.5250E+H	0.615	0.615
+0.60D+W+0.60H	0.055	0.055
+0.60D+0.70E+0.60H	0.055	0.055
D Only	0.092	0.092
Lr Only		
L Only		
S Only	0.697	0.697
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East
Engineer:	MAR
Project Descr:	

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR9 Min @ 240 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
		Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch		Fc - Perp	625.0 psi	
Wood Grade : No.2		Fv	180.0 psi	
		Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				Repetitive Member Stress Increase

D(0.011)   D(0.015) S(0.32)

2x10   2x10

Span = 3.080 ft   Span = 2.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0150, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.341: 1**	Maximum Shear Stress Ratio	=	**0.248 : 1**	
Section used for this span		**2x10**	Section used for this span		**2x10**	
fb : Actual	=	446.45 psi	fv : Actual	=	51.39 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	3.080 ft	Location of maximum on span	=	3.080 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.028 in	Ratio =	1860 >=360
Max Upward Transient Deflection	-0.005 in	Ratio =	7331 >=360
Max Downward Total Deflection	0.029 in	Ratio =	1786 >=180
Max Upward Total Deflection	-0.005 in	Ratio =	7177 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.023	0.017	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1024.65	0.03	2.74	162.00
Length = 2.170 ft	2	0.023	0.017	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1024.65	0.03	2.74	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.021	0.015	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1138.50	0.03	2.74	180.00
Length = 2.170 ft	2	0.021	0.015	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1138.50	0.03	2.74	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : OR9 Min @ 240 Snow - 2x10 @ 16" O.C.

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 3.080 ft	1	0.017	0.012	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	2.74	225.00
Length = 2.170 ft	2	0.017	0.012	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	2.74	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.341	0.248	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.80	446.45	1309.28	0.48	51.39	207.00
Length = 2.170 ft	2	0.341	0.248	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.80	446.45	1309.28	0.48	51.39	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.017	0.012	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	2.74	225.00
Length = 2.170 ft	2	0.017	0.012	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	2.74	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.260	0.189	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1309.28	0.36	39.22	207.00
Length = 2.170 ft	2	0.260	0.189	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1309.28	0.36	39.22	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
Length = 2.170 ft	2	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
Length = 2.170 ft	2	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
Length = 2.170 ft	2	0.013	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	2.74	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
Length = 2.170 ft	2	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
Length = 2.170 ft	2	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.008	0.006	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	1.64	288.00
Length = 2.170 ft	2	0.008	0.006	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	1.64	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.008	0.006	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	1.64	288.00
Length = 2.170 ft	2	0.008	0.006	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	1.64	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0051	1.789
+D+S+H	2	0.0291	2.170		0.0000	1.789

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.245	1.013	
Overall MINimum	0.005	0.045	
+D+H	0.008	0.074	
+D+L+H	0.008	0.074	
+D+Lr+H	0.008	0.074	
+D+S+H	-0.237	1.013	
+D+0.750Lr+0.750L+H	0.008	0.074	
+D+0.750L+0.750S+H	-0.176	0.779	
+D+W+H	0.008	0.074	
+D+0.70E+H	0.008	0.074	
+D+0.750Lr+0.750L+0.750W+H	0.008	0.074	
+D+0.750L+0.750S+0.750W+H	-0.176	0.779	
+D+0.750L+0.750S+0.5250E+H	-0.176	0.779	
+0.60D+W+0.60H	0.005	0.045	
+0.60D+0.70E+0.60H	0.005	0.045	
D Only	0.008	0.074	
Lr Only			
L Only			
S Only	-0.245	0.939	
W Only			

rudow + berry, inc.
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : OR9 Min @ 240 Snow - 2x10 @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   OR9 Max @ 240 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase


```
                              D(0.011)                          D(0 015) S(0 32)
                                                                                      
   2x10                                          2x10

         Span = 5.420 ft                              Span = 2.170 ft
```

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0110 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0150, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.341: 1**	Maximum Shear Stress Ratio	=	**0.248 : 1**	
Section used for this span		**2x10**	Section used for this span		**2x10**	
fb : Actual	=	446.45 psi	fv : Actual	=	51.39 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.420 ft	Location of maximum on span	=	5.420 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection   0.042 in Ratio =   1242 >=360
    Max Upward Transient Deflection   -0.016 in Ratio =   4165 >=360
    Max Downward Total Deflection   0.042 in Ratio =   1238 >=180
    Max Upward Total Deflection   -0.015 in Ratio =   4391 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.023	0.023	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1024.65	0.04	3.80	162.00
Length = 2.170 ft	2	0.023	0.023	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1024.65	0.03	3.80	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.021	0.021	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1138.50	0.04	3.80	180.00
Length = 2.170 ft	2	0.021	0.021	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1138.50	0.03	3.80	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : OR9 Max @ 240 Snow - 2x10 @ 16" O.C.

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 5.420 ft	1	0.017	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.04	3.80	225.00
Length = 2.170 ft	2	0.017	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	3.80	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.341	0.248	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.80	446.45	1309.28	0.48	51.39	207.00
Length = 2.170 ft	2	0.341	0.248	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.80	446.45	1309.28	0.48	51.39	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.017	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.04	3.80	225.00
Length = 2.170 ft	2	0.017	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1423.13	0.03	3.80	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.260	0.189	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1309.28	0.36	39.22	207.00
Length = 2.170 ft	2	0.260	0.189	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1309.28	0.36	39.22	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.04	3.80	288.00
Length = 2.170 ft	2	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	3.80	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.04	3.80	288.00
Length = 2.170 ft	2	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	3.80	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.04	3.80	288.00
Length = 2.170 ft	2	0.013	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	23.78	1821.60	0.03	3.80	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
Length = 2.170 ft	2	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
Length = 2.170 ft	2	0.187	0.136	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.61	340.78	1821.60	0.36	39.22	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.008	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	2.28	288.00
Length = 2.170 ft	2	0.008	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	2.28	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.008	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	2.28	288.00
Length = 2.170 ft	2	0.008	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	14.27	1821.60	0.02	2.28	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	S Only	-0.0156	3.149
+D+S+H	2	0.0420	2.170		0.0000	3.149

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.139	0.918	
Overall MINimum	0.018	0.051	
+D+H	0.030	0.085	
+D+L+H	0.030	0.085	
+D+Lr+H	0.030	0.085	
+D+S+H	-0.109	0.918	
+D+0.750Lr+0.750L+H	0.030	0.085	
+D+0.750L+0.750S+H	-0.074	0.710	
+D+W+H	0.030	0.085	
+D+0.70E+H	0.030	0.085	
+D+0.750Lr+0.750L+0.750W+H	0.030	0.085	
+D+0.750L+0.750S+0.750W+H	-0.074	0.710	
+D+0.750L+0.750S+0.5250E+H	-0.074	0.710	
+0.60D+W+0.60H	0.018	0.051	
+0.60D+0.70E+0.60H	0.018	0.051	
D Only	0.030	0.085	
Lr Only			
L Only			
S Only	-0.139	0.833	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   OR9 Max @ 240 Snow - 2x10 @ 16" O.C.

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project Title: Copper Crest East
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Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description :   J-3 @ 240 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015) S(0.32)

2x10

Span = 5.420 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.0150, S = 0.320 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.532 : 1**	Maximum Shear Stress Ratio	=	**0.346 : 1**		
Section used for this span		**2x10**	Section used for this span		**2x10**		
fb : Actual	=	696.29 psi	fv : Actual	=	71.56 psi		
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi		
Load Combination		+D+S+H	Load Combination		+D+S+H		
Location of maximum on span	=	2.710 ft	Location of maximum on span	=	4.668 ft		
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1		

Maximum Deflection
  Max Downward Transient Deflection   0.039 in Ratio =   1647 >=240.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
  Max Downward Total Deflection   0.042 in Ratio =   1559 >=180
  Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.036	0.024	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1024.65	0.04	3.81	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.033	0.021	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1138.50	0.04	3.81	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.026	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1423.13	0.04	3.81	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.532	0.346	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.24	696.29	1309.28	0.66	71.56	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.026	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1423.13	0.04	3.81	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : J-3 @ 240 Snow - 2x10 @ 16" O.C.

Load Combination		Max Stress Ratios										Moment Values				Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 5.420 ft	1	0.406	0.264	1.15	1.100	1.00	1.15	1.00	1.00	1.00		0.95	531.49	1309.28	0.51	54.62	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.292	0.190	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.95	531.49	1821.60	0.51	54.62	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.292	0.190	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.95	531.49	1821.60	0.51	54.62	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.012	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.04	22.26	1821.60	0.02	2.29	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.012	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.04	22.26	1821.60	0.02	2.29	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0417	2.730		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.916	0.916
Overall MINimum	0.029	0.029
+D+H	0.049	0.049
+D+L+H	0.049	0.049
+D+Lr+H	0.049	0.049
+D+S+H	0.916	0.916
+D+0.750Lr+0.750L+H	0.049	0.049
+D+0.750L+0.750S+H	0.699	0.699
+D+W+H	0.049	0.049
+D+0.70E+H	0.049	0.049
+D+0.750Lr+0.750L+0.750W+H	0.049	0.049
+D+0.750L+0.750S+0.750W+H	0.699	0.699
+D+0.750L+0.750S+0.5250E+H	0.699	0.699
+0.60D+W+0.60H	0.029	0.029
+0.60D+0.70E+0.60H	0.029	0.029
D Only	0.049	0.049
Lr Only		
L Only		
S Only	0.867	0.867
W Only		
E Only		
H Only		

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480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam.

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-3 @ 368/212 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	F_c - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	F_c - Perp	625.0 psi	
Wood Grade : No.2	F_v	180.0 psi	
	F_t	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.015,0.015) S(0.491,0.283)

2x10

Span = 3.080 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.0150->0.0150, S(S,E) = 0.4910->0.2830 k/ft, Extent = 0.0 –>> 3.080 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.206 1	Maximum Shear Stress Ratio	=	0.167 : 1	
Section used for this span		**2x10**	Section used for this span		**2x10**	
f_b : Actual	=	269.91 psi	f_v : Actual	=	34.65 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	1.473 ft	Location of maximum on span	=	2.316 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.005 in	Ratio =	7420 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.005 in	Ratio =	7091 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	f_b	F'b	V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.012	0.009	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1024.65	0.01	1.51	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.011	0.008	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1138.50	0.01	1.51	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.008	0.007	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1423.13	0.01	1.51	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.206	0.167	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.48	269.91	1309.28	0.32	34.65	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-3 @ 368/212 Snow - 2x10 @ 16" O.C.

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 3.080 ft	1	0.008	0.007	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1423.13	0.01	1.51	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.157	0.127	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.37	205.42	1309.28	0.24	26.36	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.007	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1821.60	0.01	1.51	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.007	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1821.60	0.01	1.51	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.007	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.98	1821.60	0.01	1.51	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.113	0.092	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.37	205.42	1821.60	0.24	26.36	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.113	0.092	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.37	205.42	1821.60	0.24	26.36	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.004	0.003	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	7.19	1821.60	0.01	0.91	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.080 ft	1	0.004	0.003	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.01	7.19	1821.60	0.01	0.91	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0052	1.529		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.677	0.570
Overall MINimum	0.017	0.017
+D+H	0.028	0.028
+D+L+H	0.028	0.028
+D+Lr+H	0.028	0.028
+D+S+H	0.677	0.570
+D+0.750Lr+0.750L+H	0.028	0.028
+D+0.750L+0.750S+H	0.515	0.435
+D+W+H	0.028	0.028
+D+0.70E+H	0.028	0.028
+D+0.750Lr+0.750L+0.750W+H	0.028	0.028
+D+0.750L+0.750S+0.750W+H	0.515	0.435
+D+0.750L+0.750S+0.5250E+H	0.515	0.435
+0.60D+W+0.60H	0.017	0.017
+0.60D+0.70E+0.60H	0.017	0.017
D Only	0.028	0.028
Lr Only		
L Only		
S Only	0.649	0.543
W Only		
E Only		
H Only		

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Engineer: MAR
Project Descr:

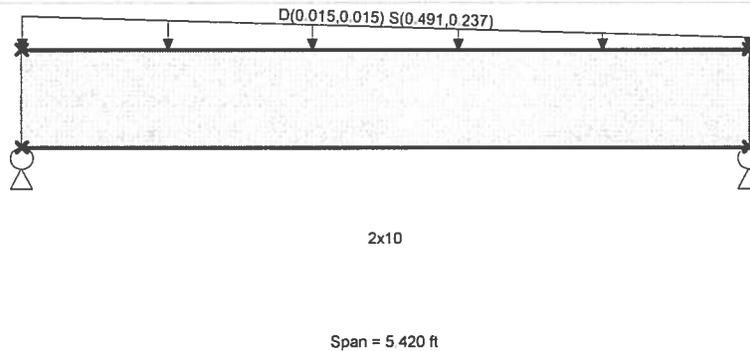Project ID: 15105   137

Wood Beam

Description :   J-3 @ 368/178 Snow - 2x10 @ 16" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension 900.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind	F_b - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	F_c - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	F_c - Perp 625.0 psi	
Wood Grade : No.2	F_v 180.0 psi	
	F_t 575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.015,0.015) S(0.491,0.237)

2x10

Span = 5 420 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.0150->0.0150, S(S,E) = 0.4910->0.2370 k/ft, Extent = 0.0 -->> 5.420 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.603 1	Maximum Shear Stress Ratio	=	0.408 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	789.32 psi	fv : Actual	=	84.39 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	2.552 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.045 in	Ratio =	1447 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.047 in	Ratio =	1379 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.036	0.024	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1024.65	0.04	3.81	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.033	0.021	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1138.50	0.04	3.81	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.026	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1423.13	0.04	3.81	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.603	0.408	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.41	789.32	1309.28	0.78	84.39	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J-3 @ 368/178 Snow - 2x10 @ 16" O.C.

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 5.420 ft	1	0.026	0.017	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1423.13	0.04	3.81	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.459	0.310	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.07	601.24	1309.28	0.59	64.24	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.020	0.013	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.07	37.09	1821.60	0.04	3.81	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.330	0.223	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.07	601.24	1821.60	0.59	64.24	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.330	0.223	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.07	601.24	1821.60	0.59	64.24	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.012	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	22.26	1821.60	0.02	2.29	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.420 ft	1	0.012	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.04	22.26	1821.60	0.02	2.29	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0471	2.690		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.150	0.921
Overall MINimum	0.029	0.029
+D+H	0.049	0.049
+D+L+H	0.049	0.049
+D+Lr+H	0.049	0.049
+D+S+H	1.150	0.921
+D+0.750Lr+0.750L+H	0.049	0.049
+D+0.750L+0.750S+H	0.875	0.703
+D+W+H	0.049	0.049
+D+0.70E+H	0.049	0.049
+D+0.750Lr+0.750L+0.750W+H	0.049	0.049
+D+0.750L+0.750S+0.750W+H	0.875	0.703
+D+0.750L+0.750S+0.5250E+H	0.875	0.703
+0.60D+W+0.60H	0.029	0.029
+0.60D+0.70E+0.60H	0.029	0.029
D Only	0.049	0.049
Lr Only		
L Only		
S Only	1.101	0.872
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of

<u>OR10A</u> $SPAN = 3'-0''$ $CANT = 2'-2''$

228 SNOW : $W_{SPAN} = 1.33(8.5) = 11_D$

$\quad W_{CANT} = 1.33(11.5 + 228) = 15_D + 304_S$

$368/173$ SNOW : $W_{SPAN} = 11_D$

$\quad W_{CANT} = 1.33\left(11.5 + \dfrac{177+102}{2}\right) = 15_D + 183_S$

<u>J4-A</u> $SPAN = 5'-10''$

228 SNOW : $W = 1.33(11.5 + 228) = 15_D + 304_S$ $x = 3'$ TO END

$\quad = 1.33(20 + 228) = 27_D + 304_S$ $x = 0$ TO $3'$

$\quad P = 7_D - 239_S @ x = 3'$

$368/173$ SNOW : $W_1 = 1.33(20 + 368) = 27_D + 491_S$ $x = 0$

$\quad W_2 = 1.33(20 + 268) = 27_D + 357_S$ $x = 3'$

$\quad W_3 = 1.33(11.5 + 268) = 15_D + 357_S$ $x = 3'$

$\quad W_4 = 1.33(11.5 + 173) = 15_D + 231_S$ $x = 5-10$

$\quad P = 7_D - 144_S @ x = 3'$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR10A @ 228 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	Fv	180.0 psi	
Wood Grade : No.2	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.0085)   D(0.0115) S(0.228)

2x10   2x10

Span = 3.0 ft   Span = 2.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.00850 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.01150, S = 0.2280 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.245 :1	Maximum Shear Stress Ratio	=	0.178 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	320.31 psi	fv : Actual	=	36.87 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	3.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection   0.020 in Ratio =   2658 >=360
    Max Upward Transient Deflection   -0.003 in Ratio =   10563 >=360
    Max Downward Total Deflection   0.021 in Ratio =   2536 >=180
    Max Upward Total Deflection   -0.003 in Ratio =   10300 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
Length = 2.170 ft	2	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
Length = 2.170 ft	2	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : OR10A @ 228 Snow - 2x10 @ 12" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.245	0.178	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.57	320.31	1309.28	0.34	36.87	207.00
Length = 2.170 ft	2	0.245	0.178	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.57	320.31	1309.28	0.34	36.87	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.187	0.136	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1309.28	0.26	28.20	207.00
Length = 2.170 ft	2	0.187	0.136	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1309.28	0.26	28.20	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
Length = 2.170 ft	2	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
Length = 2.170 ft	2	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0035	1.743
+D+S+H	2	0.0205	2.170		0.0000	1.743

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.179	0.734	
Overall MINimum	0.004	0.036	
+D+H	0.006	0.060	
+D+L+H	0.006	0.060	
+D+Lr+H	0.006	0.060	
+D+S+H	-0.173	0.734	
+D+0.750Lr+0.750L+H	0.006	0.060	
+D+0.750L+0.750S+H	-0.128	0.565	
+D+W+H	0.006	0.060	
+D+0.70E+H	0.006	0.060	
+D+0.750Lr+0.750L+0.750W+H	0.006	0.060	
+D+0.750L+0.750S+0.750W+H	-0.128	0.565	
+D+0.750L+0.750S+0.5250E+H	-0.128	0.565	
+0.60D+W+0.60H	0.004	0.036	
+0.60D+0.70E+0.60H	0.004	0.036	
D Only	0.006	0.060	
Lr Only			
L Only			
S Only	-0.179	0.674	
W Only			

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Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR10A @ 228 Snow - 2x10 @ 12" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR10A @ 368/173 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.0085)   D(0.0115) S(0.14)

2x10   2x10

Span = 3.0 ft   Span = 2.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.00850 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.01150 , S = 0.140 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.156 : 1	Maximum Shear Stress Ratio	=	0.113 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	204.08 psi	fv : Actual	=	23.49 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	3.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.012 in	Ratio =	4328	>=360
Max Upward Transient Deflection	-0.002 in	Ratio =	17203	>=360
Max Downward Total Deflection	0.013 in	Ratio =	4014	>=180
Max Upward Total Deflection	-0.002 in	Ratio =	16515	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
Length = 2.170 ft	2	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
Length = 2.170 ft	2	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : OR10A @ 368/173 Snow - 2x10 @ 12" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.156	0.113	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.36	204.08	1309.28	0.22	23.49	207.00
Length = 2.170 ft	2	0.156	0.113	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.36	204.08	1309.28	0.22	23.49	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.121	0.088	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1309.28	0.17	18.17	207.00
Length = 2.170 ft	2	0.121	0.088	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1309.28	0.17	18.17	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.087	0.063	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1821.60	0.17	18.17	288.00
Length = 2.170 ft	2	0.087	0.063	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1821.60	0.17	18.17	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.087	0.063	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1821.60	0.17	18.17	288.00
Length = 2.170 ft	2	0.087	0.063	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.28	157.85	1821.60	0.17	18.17	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0022	1.760
+D+S+H	2	0.0130	2.170		0.0000	1.760

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.110	0.474	
Overall MINimum	0.004	0.036	
+D+H	0.006	0.060	
+D+L+H	0.006	0.060	
+D+Lr+H	0.006	0.060	
+D+S+H	-0.104	0.474	
+D+0.750Lr+0.750L+H	0.006	0.060	
+D+0.750L+0.750S+H	-0.077	0.370	
+D+W+H	0.006	0.060	
+D+0.70E+H	0.006	0.060	
+D+0.750Lr+0.750L+0.750W+H	0.006	0.060	
+D+0.750L+0.750S+0.750W+H	-0.077	0.370	
+D+0.750L+0.750S+0.5250E+H	-0.077	0.370	
+0.60D+W+0.60H	0.004	0.036	
+0.60D+0.70E+0.60H	0.004	0.036	
D Only	0.006	0.060	
Lr Only			
L Only			
S Only	-0.110	0.414	
W Only			

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

145

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   OR10A @ 368/173 Snow - 2x10 @ 12" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

rudow + berry, inc.
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scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 | Licensee : RUDOW & BERRY

Description :   J4A @ 228 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
		Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch		Fc - Perp	625.0 psi	
Wood Grade : No.2		Fv	180.0 psi	
		Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				Repetitive Member Stress Increase

D(0.006) S(-0.179)   D(0.0115) S(0.228)

D(0.02) S(0.228)

2x10

Span = 5.830 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Uniform Load : D = 0.020, S = 0.2280 k/ft, Extent = 0.0 -->> 3.0 ft, Tributary Width = 1.0 ft
  Uniform Load : D = 0.01150, S = 0.2280 k/ft, Extent = 3.0 -->> 5.830 ft, Tributary Width = 1.0 ft
  Point Load : D = 0.0060, S = -0.1790 k @ 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.352** 1		Maximum Shear Stress Ratio	=	**0.235** : 1
Section used for this span		**2x10**		Section used for this span		**2x10**
fb : Actual	=	460.40 psi		fv : Actual	=	48.61 psi
FB : Allowable	=	1,309.28 psi		Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H		Load Combination		+D+S+H
Location of maximum on span	=	2.553 ft		Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.030 in	Ratio =	2366 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.033 in	Ratio =	2122 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.049	0.031	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1024.65	0.05	5.03	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.044	0.028	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1138.50	0.05	5.03	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.035	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1423.13	0.05	5.03	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   J4A @ 228 Snow - 2x10 @ 12" O.C.

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 5.830 ft	1	0.352	0.235	1.15	1.100	1.00	1.15	1.00	1.00	1.00		0.82	460.40	1309.28	0.45	48.61	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.035	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00		0.09	50.15	1423.13	0.05	5.03	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.273	0.182	1.15	1.100	1.00	1.15	1.00	1.00	1.00		0.64	357.75	1309.28	0.35	37.71	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.196	0.131	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.64	357.75	1821.60	0.35	37.71	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.196	0.131	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.64	357.75	1821.60	0.35	37.71	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.017	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.05	30.09	1821.60	0.03	3.02	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.017	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00		0.05	30.09	1821.60	0.03	3.02	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0330	2.915		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.642	0.624
Overall MINimum	0.038	0.031
+D+H	0.064	0.052
+D+L+H	0.064	0.052
+D+Lr+H	0.064	0.052
+D+S+H	0.642	0.624
+D+0.750Lr+0.750L+H	0.064	0.052
+D+0.750L+0.750S+H	0.497	0.481
+D+W+H	0.064	0.052
+D+0.70E+H	0.064	0.052
+D+0.750Lr+0.750L+0.750W+H	0.064	0.052
+D+0.750L+0.750S+0.750W+H	0.497	0.481
+D+0.750L+0.750S+0.5250E+H	0.497	0.481
+0.60D+W+0.60H	0.038	0.031
+0.60D+0.70E+0.60H	0.038	0.031
D Only	0.064	0.052
Lr Only		
L Only		
S Only	0.578	0.573
W Only		
E Only		
H Only		

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   J4A @ 368/173 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp 625.0 psi	
Wood Species : Douglas Fir - Larch	Fv 180.0 psi	
Wood Grade : No.2	Ft 575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.006) S(-0.11)
D(0.0115,0.0115) S(0.268,0.173)
D(0.02,0.02) S(0.368,0.268)

2x10

Span = 5.830 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1

  Varying Uniform Load : D(S,E) = 0.020->0.020, S(S,E) = 0.3680->0.2680 k/ft, Extent = 0.0 -->> 3.0 ft, Trib Width = 1.0 ft
  Varying Uniform Load : D(S,E) = 0.01150->0.01150, S(S,E) = 0.2680->0.1730 k/ft, Extent = 3.0 -->> 5.830 ft, Trib Width = 1.0 ft
  Point Load : D = 0.0060, S = -0.110 k @ 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.472 1**	Maximum Shear Stress Ratio	=	**0.316 : 1**
Section used for this span		**2x10**	Section used for this span		**2x10**
fb : Actual	=	618.12 psi	fv : Actual	=	65.38 psi
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.575 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
  Max Downward Transient Deflection   0.040 in Ratio =   1759 >=240.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
  Max Downward Total Deflection   0.043 in Ratio =   1620 >=180
  Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.049	0.031	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1024.65	0.05	5.03	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.044	0.028	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1138.50	0.05	5.03	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.035	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1423.13	0.05	5.03	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
Licensee : RUDOW & BERRY

Description : J4A @ 368/173 Snow - 2x10 @ 12" O.C.

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
Length = 5.830 ft	1	0.472	0.316	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.10	618.12	1309.28	0.60	65.38	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.035	0.022	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1423.13	0.05	5.03	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.364	0.243	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.85	476.06	1309.28	0.47	50.29	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.028	0.017	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.09	50.15	1821.60	0.05	5.03	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.261	0.175	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.85	476.06	1821.60	0.47	50.29	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.261	0.175	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.85	476.06	1821.60	0.47	50.29	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.017	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.05	30.09	1821.60	0.03	3.02	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.830 ft	1	0.017	0.010	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.05	30.09	1821.60	0.03	3.02	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0432	2.872		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.894	0.690
Overall MINimum	0.038	0.031
+D+H	0.064	0.052
+D+L+H	0.064	0.052
+D+Lr+H	0.064	0.052
+D+S+H	0.894	0.690
+D+0.750Lr+0.750L+H	0.064	0.052
+D+0.750L+0.750S+H	0.687	0.530
+D+W+H	0.064	0.052
+D+0.70E+H	0.064	0.052
+D+0.750Lr+0.750L+0.750W+H	0.064	0.052
+D+0.750L+0.750S+0.750W+H	0.687	0.530
+D+0.750L+0.750S+0.5250E+H	0.687	0.530
+0.60D+W+0.60H	0.038	0.031
+0.60D+0.70E+0.60H	0.038	0.031
D Only	0.064	0.052
Lr Only		
L Only		
S Only	0.830	0.638
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 150
of

OR10B   SPAN = 3'   CANT = 2'-2"

  228 SNOW: $W_{SPAN} = 1.00 \cdot (85) = 85 D$

               $W_{CANT} = 11.5 D + 228 S$

  368/137 SNOW: $W_{SPAN} = 85 D$

                 $W_{CANT} = 11.5 D + 119 S$

J4B   SPAN = 12'-0"

  228 SNOW: $W_1 = 1.00 \cdot (20 + 228) = 20 D + 228 S$ $x = 0'$ to $9'$

             $W_2 = 1.00 (11.5 + 228) = 11.5 D + 228 S$ $x = 9'$ to END

             $P = 6 D - 119 S$ @ $x = 9'$

  368/137 SNOW: $W_1 = 1.0 (20 + 368) = 20 D + 368 S$, $x = 0$

                $W_2 = 1.0 (20 + 195) = 20 D + 195 S$, $x = 9'$

                $W_3 = 1.0 (11.5 + 195) = 11.5 D + 195 S$, $x = 9'$

                $W_4 = 1.0 (11.5 + 137) = 11.5 D + 137 S$, $x = 12'$

                $P = 6 D - 93 S$ @ $x = 9'$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR10B @ 228 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase

D(0.0085)   D(0.0115) S(0.228)

2x10   2x10

Span = 3.0 ft   Span = 2.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.00850 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.01150, S = 0.2280 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.245 : 1	Maximum Shear Stress Ratio	=	0.178 : 1	
Section used for this span		2x10	Section used for this span		2x10	
fb : Actual	=	320.31 psi	fv : Actual	=	36.87 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	3.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.020 in	Ratio =	2658	>=360
Max Upward Transient Deflection	-0.003 in	Ratio =	10563	>=360
Max Downward Total Deflection	0.021 in	Ratio =	2536	>=180
Max Upward Total Deflection	-0.003 in	Ratio =	10300	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
Length = 2.170 ft	2	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
Length = 2.170 ft	2	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   OR10B @ 228 Snow - 2x10 @ 12" O.C.

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.245	0.178	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.57	320.31	1309.28	0.34	36.87	207.00
Length = 2.170 ft	2	0.245	0.178	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.57	320.31	1309.28	0.34	36.87	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.187	0.136	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1309.28	0.26	28.20	207.00
Length = 2.170 ft	2	0.187	0.136	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1309.28	0.26	28.20	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
Length = 2.170 ft	2	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
Length = 2.170 ft	2	0.135	0.098	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.44	245.02	1821.60	0.26	28.20	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0035	1.743
+D+S+H	2	0.0205	2.170		0.0000	1.743

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.179	0.734	
Overall MINimum	0.004	0.036	
+D+H	0.006	0.060	
+D+L+H	0.006	0.060	
+D+Lr+H	0.006	0.060	
+D+S+H	-0.173	0.734	
+D+0.750Lr+0.750L+H	0.006	0.060	
+D+0.750L+0.750S+H	-0.128	0.565	
+D+W+H	0.006	0.060	
+D+0.70E+H	0.006	0.060	
+D+0.750Lr+0.750L+0.750W+H	0.006	0.060	
+D+0.750L+0.750S+0.750W+H	-0.128	0.565	
+D+0.750L+0.750S+0.5250E+H	-0.128	0.565	
+0.60D+W+0.60H	0.004	0.036	
+0.60D+0.70E+0.60H	0.004	0.036	
D Only	0.006	0.060	
Lr Only			
L Only			
S Only	-0.179	0.674	
W Only			

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : OR10B @ 228 Snow - 2x10 @ 12" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project Title:	Copper Crest East
Engineer:	MAR
Project Descr:	

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   OR10B @ 368/137 Snow - 2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	900.0 psi
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	900.0 psi
		Fc - Prll	1,350.0 psi
		Fc - Perp	625.0 psi
Wood Species : Douglas Fir - Larch		Fv	180.0 psi
Wood Grade : No.2		Ft	575.0 psi

E : Modulus of Elasticity
Ebend- xx   1,600.0 ksi
Eminbend - xx   580.0 ksi

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

Density   31.20 pcf
Repetitive Member Stress Increase

D(0.0085)   D(0.0115) S(0.119)

2x10   2x10

Span = 3.0 ft   Span = 2.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.00850 , Tributary Width = 1.0 ft
Load for Span Number 2
   Uniform Load : D = 0.01150, S = 0.1190 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.135 :1	Maximum Shear Stress Ratio	=	0.098 : 1	
Section used for this span		**2x10**	Section used for this span		**2x10**	
fb : Actual	=	176.34 psi	fv : Actual	=	20.30 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	3.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.010 in	Ratio =	5092 >=360	
Max Upward Transient Deflection	-0.002 in	Ratio =	20239 >=360	
Max Downward Total Deflection	0.011 in	Ratio =	4664 >=180	
Max Upward Total Deflection	-0.002 in	Ratio =	19293 >=180	

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
Length = 2.170 ft	2	0.019	0.014	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1024.65	0.02	2.21	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
Length = 2.170 ft	2	0.017	0.012	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1138.50	0.02	2.21	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description : OR10B @ 368/137 Snow - 2x10 @ 12" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.135	0.098	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.31	176.34	1309.28	0.19	20.30	207.00
Length = 2.170 ft	2	0.135	0.098	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.31	176.34	1309.28	0.19	20.30	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
Length = 2.170 ft	2	0.013	0.010	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1423.13	0.02	2.21	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.105	0.076	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1309.28	0.15	15.77	207.00
Length = 2.170 ft	2	0.105	0.076	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1309.28	0.15	15.77	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
Length = 2.170 ft	2	0.011	0.008	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.03	19.16	1821.60	0.02	2.21	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.075	0.055	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1821.60	0.15	15.77	288.00
Length = 2.170 ft	2	0.075	0.055	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1821.60	0.15	15.77	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.075	0.055	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1821.60	0.15	15.77	288.00
Length = 2.170 ft	2	0.075	0.055	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	137.04	1821.60	0.15	15.77	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00
Length = 2.170 ft	2	0.006	0.005	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.02	11.50	1821.60	0.01	1.32	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0019	1.760
+D+S+H	2	0.0112	2.170		0.0000	1.760

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.093	0.412	
Overall MINimum	0.004	0.036	
+D+H	0.006	0.060	
+D+L+H	0.006	0.060	
+D+Lr+H	0.006	0.060	
+D+S+H	-0.088	0.412	
+D+0.750Lr+0.750L+H	0.006	0.060	
+D+0.750L+0.750S+H	-0.064	0.324	
+D+W+H	0.006	0.060	
+D+0.70E+H	0.006	0.060	
+D+0.750Lr+0.750L+0.750W+H	0.006	0.060	
+D+0.750L+0.750S+0.750W+H	-0.064	0.324	
+D+0.750L+0.750S+0.5250E+H	-0.064	0.324	
+0.60D+W+0.60H	0.004	0.036	
+0.60D+0.70E+0.60H	0.004	0.036	
D Only	0.006	0.060	
Lr Only			
L Only			
S Only	-0.093	0.352	
W Only			

rudow + berry, inc.
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480.946.8171

Wood Beam

Lic. # : KW-06002357

Description :   OR10B @ 368/137 Snow - 2x10 @ 12" O.C.

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J4B @ 228 Snow - (2)2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp 625.0 psi	
Wood Grade : No.2	Fv 180.0 psi	
	Ft 575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.02) S(0.228)   D(0.006) S(-0.179)   D(0.0115) S(0.228)

2-2x10

Span = 12.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.020, S = 0.2280 k/ft, Extent = 0.0 –>> 9.0 ft, Tributary Width = 1.0 ft
   Uniform Load : D = 0.01150, S = 0.2280 k/ft, Extent = 9.0 –>> 12.0 ft, Tributary Width = 1.0 ft
   Point Load : D = 0.0060, S = -0.1790 k @ 9.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.921: 1	Maximum Shear Stress Ratio	=	0.336 : 1	
Section used for this span		2-2x10	Section used for this span		2-2x10	
fb : Actual	=	1,205.53 psi	fv : Actual	=	69.65 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.825 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.314 in	Ratio =	459 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.351 in	Ratio =	409 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.125	0.045	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1024.65	0.14	7.30	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.113	0.041	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1138.50	0.14	7.30	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.090	0.032	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1423.13	0.14	7.30	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   J4B @ 228 Snow - (2)2x10 @ 12" O.C.

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 12.0 ft	1	0.921	0.336	1.15	1.100	1.00	1.15	1.00	1.00	1.00	4.30	1,205.53	1309.28	1.29	69.65	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.090	0.032	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1423.13	0.14	7.30	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.715	0.261	1.15	1.100	1.00	1.15	1.00	1.00	1.00	3.34	936.26	1309.28	1.00	54.06	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.514	0.188	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.34	936.26	1821.60	1.00	54.06	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.514	0.188	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.34	936.26	1821.60	1.00	54.06	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.042	0.015	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.27	77.11	1821.60	0.08	4.38	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.042	0.015	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.27	77.11	1821.60	0.08	4.38	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3513	5.956		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.478	1.372
Overall MINimum	0.093	0.083
+D+H	0.154	0.138
+D+L+H	0.154	0.138
+D+Lr+H	0.154	0.138
+D+S+H	1.478	1.372
+D+0.750Lr+0.750L+H	0.154	0.138
+D+0.750L+0.750S+H	1.147	1.064
+D+W+H	0.154	0.138
+D+0.70E+H	0.154	0.138
+D+0.750Lr+0.750L+0.750W+H	0.154	0.138
+D+0.750L+0.750S+0.750W+H	1.147	1.064
+D+0.750L+0.750S+0.5250E+H	1.147	1.064
+0.60D+W+0.60H	0.093	0.083
+0.60D+0.70E+0.60H	0.093	0.083
D Only	0.154	0.138
Lr Only		
L Only		
S Only	1.323	1.234
W Only		
E Only		
H Only		

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   J4B @ 368/137 Snow - (2)2x10 @ 12" O.C.

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	900.0 psi
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	900.0 psi
	Fc - Prll	1,350.0 psi
	Fc - Perp	625.0 psi
Wood Species : Douglas Fir - Larch	Fv	180.0 psi
Wood Grade : No.2	Ft	575.0 psi

E : Modulus of Elasticity
Ebend- xx   1,600.0 ksi
Eminbend - xx   580.0 ksi

Density   31.20 pcf
Repetitive Member Stress Increase

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

$D(0.006)\ S(-0.093)$
$D(0.0115,0.0115)\ S(0.195,0.137)$
$D(0.02,0.02)\ S(0.368,0.195)$

2-2x10

Span = 12.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.020->0.020, S(S,E) = 0.3680->0.1950 k/ft, Extent = 0.0 –>> 9.0 ft, Trib Width = 1.0 ft
    Varying Uniform Load : D(S,E) = 0.01150->0.01150, S(S,E) = 0.1950->0.1370 k/ft, Extent = 9.0 -->> 12.0 ft, Trib Width = 1.0 ft
    Point Load : D = 0.0060, S = -0.0930 k @ 9.0 ft

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	**1.050: 1**	Maximum Shear Stress Ratio	=	**0.415 : 1**	
Section used for this span		**2-2x10**	Section used for this span		**2-2x10**	
fb : Actual	=	1,374.78 psi	fv : Actual	=	85.93 psi	
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.518 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection   0.362 in Ratio =   397 >=240.
    Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
    Max Downward Total Deflection   0.400 in Ratio =   360 >=180
    Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.125	0.045	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1024.65	0.14	7.30	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.113	0.041	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1138.50	0.14	7.30	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.090	0.032	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1423.13	0.14	7.30	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec5
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : J4B @ 368/137 Snow - (2)2x10 @ 12" O.C.

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 12.0 ft	1	1.050	0.415	1.15	1.100	1.00	1.15	1.00	1.00	1.00	4.90	1,374.78	1309.28	1.59	85.93	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.090	0.032	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1423.13	0.14	7.30	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.812	0.320	1.15	1.100	1.00	1.15	1.00	1.00	1.00	3.79	1,063.06	1309.28	1.23	66.27	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.071	0.025	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.46	128.51	1821.60	0.14	7.30	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.584	0.230	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.79	1,063.06	1821.60	1.23	66.27	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.584	0.230	1.60	1.100	1.00	1.15	1.00	1.00	1.00	3.79	1,063.06	1821.60	1.23	66.27	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.042	0.015	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.27	77.11	1821.60	0.08	4.38	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.042	0.015	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.27	77.11	1821.60	0.08	4.38	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3997	5.912		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.878	1.353
Overall MINimum	0.093	0.083
+D+H	0.154	0.138
+D+L+H	0.154	0.138
+D+Lr+H	0.154	0.138
+D+S+H	1.878	1.353
+D+0.750Lr+0.750L+H	0.154	0.138
+D+0.750L+0.750S+H	1.447	1.050
+D+W+H	0.154	0.138
+D+0.70E+H	0.154	0.138
+D+0.750Lr+0.750L+0.750W+H	0.154	0.138
+D+0.750L+0.750S+0.750W+H	1.447	1.050
+D+0.750L+0.750S+0.5250E+H	1.447	1.050
+0.60D+W+0.60H	0.093	0.083
+0.60D+0.70E+0.60H	0.093	0.083
D Only	0.154	0.138
Lr Only		
L Only		
S Only	1.723	1.215
W Only		
E Only		
H Only		

rudow + berry
structural engineering
scottsdale, arizona 85251
t (480) 946-8171
f (480) 946-9480

job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 161
of

CORNER FRAME AT SW CORNER

- 203 PSF SNOW CONTROLS DESIGN
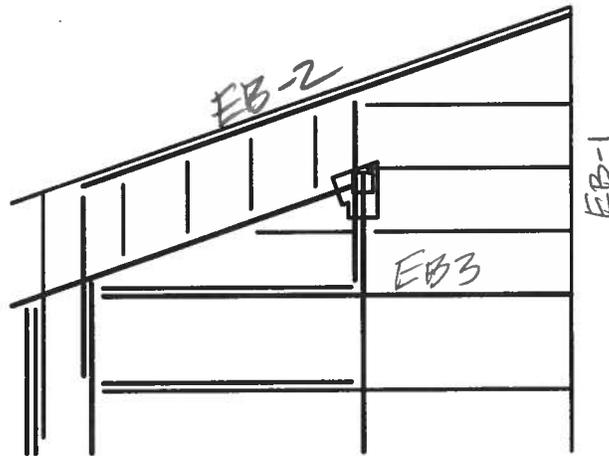
EB-1   SPAN = 6'-0"

$$W = 2.17(24 + 203) = 52_D + 440_S$$

EB-2   SPAN = 6'-0"   CANT = 4'-7"

$$N_{SPAN} = 1.08(24 + 203) = 26_D + 220_S$$

$$W_{CANT} = SELF\ WT$$

$$P_{EB3} = R_{EB1} = 165^\#_D + 1320^\#_S$$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   EB1 - 2x10

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900.0 psi	*E : Modulus of Elasticity*
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp 625.0 psi	
Wood Species : Douglas Fir - Larch	Fv 180.0 psi	
Wood Grade : No.2	Ft 575.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.052) S(0.44)

2x10

Span = 6.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.0520, S = 0.440 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.954 1**	Maximum Shear Stress Ratio	=	**0.577 : 1**
Section used for this span		**2x10**	Section used for this span		**2x10**
fb : Actual	=	1,249.63 psi	fv : Actual	=	119.53 psi
FB : Allowable	=	1,309.28 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection			
Max Downward Transient Deflection	0.082 in	Ratio =	883 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.092 in	Ratio =	784 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.136	0.082	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1024.65	0.12	13.28	162.00
+D+L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.122	0.074	1.00	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1138.50	0.12	13.28	180.00
+D+Lr+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.098	0.059	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1423.13	0.12	13.28	225.00
+D+S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.954	0.577	1.15	1.100	1.00	1.15	1.00	1.00	1.00	2.23	1,249.63	1309.28	1.11	119.53	207.00
+D+0.750Lr+0.750L+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.098	0.059	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1423.13	0.12	13.28	225.00
+D+0.750L+0.750S+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : EB1 - 2x10

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.742	0.449	1.15	1.100	1.00	1.15	1.00	1.00	1.00	1.73	971.94	1309.28	0.86	92.97	207.00
+D+W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.076	0.046	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1821.60	0.12	13.28	288.00
+D+0.70E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.076	0.046	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1821.60	0.12	13.28	288.00
+D+0.750Lr+0.750L+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.076	0.046	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.25	138.86	1821.60	0.12	13.28	288.00
+D+0.750L+0.750S+0.750W+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.534	0.323	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.73	971.94	1821.60	0.86	92.97	288.00
+D+0.750L+0.750S+0.5250E+H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.534	0.323	1.60	1.100	1.00	1.15	1.00	1.00	1.00	1.73	971.94	1821.60	0.86	92.97	288.00
+0.60D+W+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.046	0.028	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.15	83.32	1821.60	0.07	7.97	288.00
+0.60D+0.70E+0.60H					1.100	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.046	0.028	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.15	83.32	1821.60	0.07	7.97	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0917	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.485	1.485
Overall MINimum	0.099	0.099
+D+H	0.165	0.165
+D+L+H	0.165	0.165
+D+Lr+H	0.165	0.165
+D+S+H	1.485	1.485
+D+0.750Lr+0.750L+H	0.165	0.165
+D+0.750L+0.750S+H	1.155	1.155
+D+W+H	0.165	0.165
+D+0.70E+H	0.165	0.165
+D+0.750Lr+0.750L+0.750W+H	0.165	0.165
+D+0.750L+0.750S+0.750W+H	1.155	1.155
+D+0.750L+0.750S+0.5250E+H	1.155	1.155
+0.60D+W+0.60H	0.099	0.099
+0.60D+0.70E+0.60H	0.099	0.099
D Only	0.165	0.165
Lr Only		
L Only		
S Only	1.320	1.320
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East
Engineer:	MAR
Project Descr:	

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description : EB2 - 6x10

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	875 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species	: Douglas Fir - Larch	Fc - Perp	625 psi		
Wood Grade	: No.2	Fv	170 psi		
		Ft	425 psi	Density	31.2 pcf
Beam Bracing	: Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increase	

D(0.026) S(0.22)   D(0.165) S(1.32)

6x10   6x10

Span = 6 0 ft   Span = 4.580 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Uniform Load : D = 0.0260, S = 0.220 , Tributary Width = 1.0 ft
Load for Span Number 2
  Point Load : D = 0.1650, S = 1.320 k @ 4.580 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.867: 1**	Maximum Shear Stress Ratio	=	**0.254 : 1**	
Section used for this span		**6x10**	Section used for this span		**6x10**	
fb : Actual	=	1,003.76 psi	fv : Actual	=	49.58 psi	
FB : Allowable	=	1,157.19 psi	Fv : Allowable	=	195.50 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	5.229 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.299 in	Ratio =	366 >=240.
Max Upward Transient Deflection	-0.035 in	Ratio =	2034 >=240.
Max Downward Total Deflection	0.341 in	Ratio =	322 >=180
Max Upward Total Deflection	-0.040 in	Ratio =	1790 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.140	0.043	0.90	1.000	1.00	1.15	1.00	1.00	1.00	0.87	126.84	905.63	0.23	6.57	153.00
Length = 4.580 ft	2	0.140	0.043	0.90	1.000	1.00	1.15	1.00	1.00	1.00	0.87	126.84	905.63	0.21	6.57	153.00
+D+L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.126	0.039	1.00	1.000	1.00	1.15	1.00	1.00	1.00	0.87	126.84	1006.25	0.23	6.57	170.00
Length = 4.580 ft	2	0.126	0.039	1.00	1.000	1.00	1.15	1.00	1.00	1.00	0.87	126.84	1006.25	0.21	6.57	170.00
+D+Lr+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : EB2 - 6x10

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.101	0.031	1.25	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1257.81	0.23	6.57	212.50
Length = 4.580 ft	2	0.101	0.031	1.25	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1257.81	0.21	6.57	212.50
+D+S+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.867	0.254	1.15	1.000	1.00	1.15	1.00	1.00	1.00		6.92	1,003.76	1157.19	1.73	49.58	195.50
Length = 4.580 ft	2	0.867	0.254	1.15	1.000	1.00	1.15	1.00	1.00	1.00		6.92	1,003.76	1157.19	1.53	49.58	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.101	0.031	1.25	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1257.81	0.23	6.57	212.50
Length = 4.580 ft	2	0.101	0.031	1.25	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1257.81	0.21	6.57	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.678	0.199	1.15	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1157.19	1.35	38.83	195.50
Length = 4.580 ft	2	0.678	0.199	1.15	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1157.19	1.20	38.83	195.50
+D+W+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.23	6.57	272.00
Length = 4.580 ft	2	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.21	6.57	272.00
+D+0.70E+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.23	6.57	272.00
Length = 4.580 ft	2	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.21	6.57	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.23	6.57	272.00
Length = 4.580 ft	2	0.079	0.024	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.87	126.84	1610.00	0.21	6.57	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.487	0.143	1.60	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1610.00	1.35	38.83	272.00
Length = 4.580 ft	2	0.487	0.143	1.60	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1610.00	1.20	38.83	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.487	0.143	1.60	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1610.00	1.35	38.83	272.00
Length = 4.580 ft	2	0.487	0.143	1.60	1.000	1.00	1.15	1.00	1.00	1.00		5.41	784.53	1610.00	1.20	38.83	272.00
+0.60D+W+0.60H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.047	0.014	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.52	76.10	1610.00	0.14	3.94	272.00
Length = 4.580 ft	2	0.047	0.014	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.52	76.10	1610.00	0.12	3.94	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.15	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.047	0.014	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.52	76.10	1610.00	0.14	3.94	272.00
Length = 4.580 ft	2	0.047	0.014	1.60	1.000	1.00	1.15	1.00	1.00	1.00		0.52	76.10	1610.00	0.12	3.94	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0402	3.654
+D+S+H	2	0.3408	4.580		0.0000	3.654

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.381	3.462	
Overall MINimum	-0.020	0.285	
+D+H	-0.034	0.475	
+D+L+H	-0.034	0.475	
+D+Lr+H	-0.034	0.475	
+D+S+H	-0.381	3.462	
+D+0.750Lr+0.750L+H	-0.034	0.475	
+D+0.750L+0.750S+H	-0.294	2.715	
+D+W+H	-0.034	0.475	
+D+0.70E+H	-0.034	0.475	
+D+0.750Lr+0.750L+0.750W+H	-0.034	0.475	
+D+0.750L+0.750S+0.750W+H	-0.294	2.715	
+D+0.750L+0.750S+0.5250E+H	-0.294	2.715	
+0.60D+W+0.60H	-0.020	0.285	
+0.60D+0.70E+0.60H	-0.020	0.285	
D Only	-0.034	0.475	
Lr Only			
L Only			
S Only	-0.348	2.988	
W Only			

**rudow + berry
structural engineering**
scottsdale, arizona 85251
t (480) 946-8171
f (480) 946-9480

job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 168
of 484

EB3   SPAN = 5-8   CANT = 4'-4"

$$W_{SPAN} = \tfrac{1}{2}(3.35)(24 + 203) = 40_D + 338_S$$

$$W_{CANT} = 1.0(24 + 203) = 24_D + 203_S$$

$$P_{END} = R_{EB1} = 165^\#{}_D + 1320^\#{}_S$$

RB-5   SPAN = 17'-8"

   - SEE RB2 FOR LOADS

RB-6   SPAN = 12-4   CANT = 2'-0"

   - SEE RB2 FOR SIM. LOADS

$$W_D = 48_D + 680_S \qquad P_{CANT} = R_{EB2} = -34_D - 348\left(\tfrac{102}{203}\right)$$

$$W_R = 48_D + 188_S \qquad\qquad\qquad\quad = -34_D - 175_S$$

OR

$$W_{TMP} = 48_D + 444\left(\tfrac{203}{244}\right) = 48_D + 361_S$$

$$P_{CANT} = -34_D - 348_S$$

   - CHECK CANT MEMBER

      SPAN = 2'-0"   CANT = 2'-0"

$$P_{END} = -34_D - 175_S \text{ OR } -348_S$$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : EB3 - 5-1/8 x 9 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		Repetitive Member Stress Increase

D(0.165) S(1.32)

D(0.04) S(0.338)   D(0.024) S(0.203)

5.125x9   5.125x9

Span = 5.670 ft   Span = 4.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.040, S = 0.3380 , Tributary Width = 1.0 ft
Load for Span Number 2
    Point Load : D = 0.1650, S = 1.320 k @ 4.330 ft
    Uniform Load : D = 0.0240, S = 0.2030 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.544 : 1	Maximum Shear Stress Ratio	=	0.250 : 1	
Section used for this span		5.125x9	Section used for this span		5.125x9	
fb : Actual	=	1,500.57 psi	fv : Actual	=	76.20 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.670 ft	Location of maximum on span	=	4.941 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection 0.295 in Ratio = 352 >=240.
    Max Upward Transient Deflection -0.035 in Ratio = 1931 >=240.
    Max Downward Total Deflection 0.334 in Ratio = 310 >=180
    Max Upward Total Deflection -0.040 in Ratio = 1708 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.083	0.039	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	2160.00	0.29	9.35	238.50
Length = 4.330 ft	2	0.083	0.039	0.90	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	2160.00	0.29	9.35	238.50
+D+L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.075	0.035	1.00	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	2400.00	0.29	9.35	265.00
Length = 4.330 ft	2	0.075	0.035	1.00	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	2400.00	0.29	9.35	265.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   EB3 - 5-1/8 x 9 GLB

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+Lr+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.060	0.028	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3000.00	0.29	9.35	331.25
Length = 4.330 ft	2	0.060	0.028	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3000.00	0.29	9.35	331.25
+D+S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.544	0.250	1.15	1.000	1.00	1.15	1.00	1.00	1.00	8.65	1,500.57	2760.00	2.34	76.20	304.75
Length = 4.330 ft	2	0.544	0.250	1.15	1.000	1.00	1.15	1.00	1.00	1.00	8.65	1,500.57	2760.00	2.33	76.20	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.060	0.028	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3000.00	0.29	9.35	331.25
Length = 4.330 ft	2	0.060	0.028	1.25	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3000.00	0.29	9.35	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.424	0.195	1.15	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	2760.00	1.83	59.49	304.75
Length = 4.330 ft	2	0.424	0.195	1.15	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	2760.00	1.82	59.49	304.75
+D+W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
Length = 4.330 ft	2	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
+D+0.70E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
Length = 4.330 ft	2	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
Length = 4.330 ft	2	0.047	0.022	1.60	1.000	1.00	1.15	1.00	1.00	1.00	1.03	179.19	3840.00	0.29	9.35	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.305	0.140	1.60	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	3840.00	1.83	59.49	424.00
Length = 4.330 ft	2	0.305	0.140	1.60	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	3840.00	1.82	59.49	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.305	0.140	1.60	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	3840.00	1.83	59.49	424.00
Length = 4.330 ft	2	0.305	0.140	1.60	1.000	1.00	1.15	1.00	1.00	1.00	6.75	1,170.23	3840.00	1.82	59.49	424.00
+0.60D+W+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.028	0.013	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.62	107.51	3840.00	0.17	5.61	424.00
Length = 4.330 ft	2	0.028	0.013	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.62	107.51	3840.00	0.17	5.61	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.028	0.013	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.62	107.51	3840.00	0.17	5.61	424.00
Length = 4.330 ft	2	0.028	0.013	1.60	1.000	1.00	1.15	1.00	1.00	1.00	0.62	107.51	3840.00	0.17	5.61	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0398	3.484
+D+S+H	2	0.3343	4.330		0.0000	3.484

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.426	5.137	
Overall MINimum	-0.024	0.382	
+D+H	-0.040	0.636	
+D+L+H	-0.040	0.636	
+D+Lr+H	-0.040	0.636	
+D+S+H	-0.426	5.137	
+D+0.750Lr+0.750L+H	-0.040	0.636	
+D+0.750L+0.750S+H	-0.330	4.012	
+D+W+H	-0.040	0.636	
+D+0.70E+H	-0.040	0.636	
+D+0.750Lr+0.750L+0.750W+H	-0.040	0.636	
+D+0.750L+0.750S+0.750W+H	-0.330	4.012	
+D+0.750L+0.750S+0.5250E+H	-0.330	4.012	
+0.60D+W+0.60H	-0.024	0.382	
+0.60D+0.70E+0.60H	-0.024	0.382	
D Only	-0.040	0.636	
Lr Only			
L Only			
S Only	-0.385	4.501	

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : EB3 - 5-1/8 x 9 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
W Only			
E Only			
H Only			

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Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-5 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.048,0.048) S(0.68,0.188)

5.125x15

Span = 17.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.0480->0.0480, S(S,E) = 0.680->0.1880 k/ft, Extent = 0.0 -->> 17.670 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.445 1	Maximum Shear Stress Ratio	=	0.271 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
fb : Actual	=	1,223.29 psi	fv : Actual	=	82.70 psi
FB : Allowable	=	2,746.10 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.126 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.369 in	Ratio =	574 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.424 in	Ratio =	499 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.073	0.040	0.90	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2149.12	0.49	9.60	238.50
+D+L+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.066	0.036	1.00	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2387.91	0.49	9.60	265.00
+D+Lr+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.053	0.029	1.25	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2984.89	0.49	9.60	331.25
+D+S+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.445	0.271	1.15	0.995	1.00	1.00	1.00	1.00	1.00	19.59	1,223.29	2746.10	4.24	82.70	304.75
+D+0.750Lr+0.750L+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.053	0.029	1.25	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2984.89	0.49	9.60	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-5 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.348	0.211	1.15	0.995	1.00	1.00	1.00	1.00	1.00	15.32	956.60	2746.10	3.30	64.43	304.75
+D+W+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.70E+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.750Lr+0.750L+0.750W+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.750L+0.750S+0.750W+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.250	0.152	1.60	0.995	1.00	1.00	1.00	1.00	1.00	15.32	956.60	3820.66	3.30	64.43	424.00
+D+0.750L+0.750S+0.5250E+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.250	0.152	1.60	0.995	1.00	1.00	1.00	1.00	1.00	15.32	956.60	3820.66	3.30	64.43	424.00
+0.60D+W+0.60H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.025	0.014	1.60	0.995	1.00	1.00	1.00	1.00	1.00	1.51	94.54	3820.66	0.30	5.76	424.00
+0.60D+0.70E+0.60H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.025	0.014	1.60	0.995	1.00	1.00	1.00	1.00	1.00	1.51	94.54	3820.66	0.30	5.76	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4243	8.706		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.130	3.681
Overall MINimum	0.343	0.343
+D+H	0.571	0.571
+D+L+H	0.571	0.571
+D+Lr+H	0.571	0.571
+D+S+H	5.130	3.681
+D+0.750Lr+0.750L+H	0.571	0.571
+D+0.750L+0.750S+H	3.990	2.904
+D+W+H	0.571	0.571
+D+0.70E+H	0.571	0.571
+D+0.750Lr+0.750L+0.750W+H	0.571	0.571
+D+0.750L+0.750S+0.750W+H	3.990	2.904
+D+0.750L+0.750S+0.5250E+H	3.990	2.904
+0.60D+W+0.60H	0.343	0.343
+0.60D+0.70E+0.60H	0.343	0.343
D Only	0.571	0.571
Lr Only		
L Only		
S Only	4.559	3.110
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Printed: 24 JAN 2017, 7:56PM

Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-5 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		F_b - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		F_b - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		F_c - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF		F_c - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4		F_v	265.0 psi	Eminbend - yy 850.0 ksi
		F_t	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.048) S(0.444)

5.125x15

Span = 17.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.0480, S = 0.4440 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.451: 1	Maximum Shear Stress Ratio	=	0.248 : 1
Section used for this span		5.125x15	Section used for this span		5.125x15
f_b : Actual	=	1,239.55 psi	f_v : Actual	=	75.53 psi
F_B : Allowable	=	2,746.10 psi	F_v : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.835 ft	Location of maximum on span	=	16.445 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.378 in	Ratio =	561 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.433 in	Ratio =	490 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.073	0.040	0.90	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2149.12	0.49	9.60	238.50
+D+L+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.066	0.036	1.00	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2387.91	0.49	9.60	265.00
+D+Lr+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.053	0.029	1.25	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2984.89	0.49	9.60	331.25
+D+S+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.451	0.248	1.15	0.995	1.00	1.00	1.00	1.00	1.00	19.85	1,239.55	2746.10	3.87	75.53	304.75
+D+0.750Lr+0.750L+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.053	0.029	1.25	0.995	1.00	1.00	1.00	1.00	1.00	2.52	157.56	2984.89	0.49	9.60	331.25
+D+0.750L+0.750S+H					0.995	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Beam RB-5 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 17.670 ft	1	0.353	0.194	1.15	0.995	1.00	1.00	1.00	1.00	1.00		15.52	969.05	2746.10	3.03	59.04	304.75
+D+W+H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00		2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.70E+H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00		2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.750Lr+0.750L+0.750W+H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.041	0.023	1.60	0.995	1.00	1.00	1.00	1.00	1.00		2.52	157.56	3820.66	0.49	9.60	424.00
+D+0.750L+0.750S+0.750W+H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.254	0.139	1.60	0.995	1.00	1.00	1.00	1.00	1.00		15.52	969.05	3820.66	3.03	59.04	424.00
+D+0.750L+0.750S+0.5250E+H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.254	0.139	1.60	0.995	1.00	1.00	1.00	1.00	1.00		15.52	969.05	3820.66	3.03	59.04	424.00
+0.60D+W+0.60H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.025	0.014	1.60	0.995	1.00	1.00	1.00	1.00	1.00		1.51	94.54	3820.66	0.30	5.76	424.00
+0.60D+0.70E+0.60H					0.995	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 17.670 ft	1	0.025	0.014	1.60	0.995	1.00	1.00	1.00	1.00	1.00		1.51	94.54	3820.66	0.30	5.76	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4325	8.899		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.494	4.494
Overall MINimum	0.343	0.343
+D+H	0.571	0.571
+D+L+H	0.571	0.571
+D+Lr+H	0.571	0.571
+D+S+H	4.494	4.494
+D+0.750Lr+0.750L+H	0.571	0.571
+D+0.750L+0.750S+H	3.513	3.513
+D+W+H	0.571	0.571
+D+0.70E+H	0.571	0.571
+D+0.750Lr+0.750L+0.750W+H	0.571	0.571
+D+0.750L+0.750S+0.750W+H	3.513	3.513
+D+0.750L+0.750S+0.5250E+H	3.513	3.513
+0.60D+W+0.60H	0.343	0.343
+0.60D+0.70E+0.60H	0.343	0.343
D Only	0.571	0.571
Lr Only		
L Only		
S Only	3.923	3.923
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-6 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-10 w/ ASD Wind	Fb - Compr	2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(-0.034) S(-0.175)

D(0.048,0.048) S(0.68,0.188)

5.125x15

5.125x15

Span = 12.330 ft

Span = 2.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.0480->0.0480, S(S,E) = 0.680->0.1880 k/ft, Extent = 0.0 -->> 12.330 ft, Trib Width = 1.0 ft
Load for Span Number 2
    Point Load : D = -0.0340, S = -0.1750 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.220 : 1	Maximum Shear Stress Ratio	=	0.174 : 1	
Section used for this span		5.125x15	Section used for this span		5.125x15	
fb : Actual	=	606.73 psi	fv : Actual	=	53.04 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.717 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.090 in	Ratio =	1642 >=360
Max Upward Transient Deflection	-0.046 in	Ratio =	1050 >=360
Max Downward Total Deflection	0.103 in	Ratio =	1431 >=180
Max Upward Total Deflection	-0.053 in	Ratio =	912 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_FN	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.036	0.026	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	2160.00	0.32	6.27	238.50
Length = 2.0 ft	2	0.001	0.026	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2160.00	0.03	6.27	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.032	0.024	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	2400.00	0.32	6.27	265.00
Length = 2.0 ft	2	0.001	0.024	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2400.00	0.03	6.27	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 | 175

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 | Licensee : RUDOW & BERRY

Description : Beam RB-6 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 12.330 ft	1	0.026	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3000.00	0.32	6.27	331.25
Length = 2.0 ft	2	0.001	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.03	6.27	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.220	0.174	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.72	606.73	2760.00	2.72	53.04	304.75
Length = 2.0 ft	2	0.009	0.174	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.38	24.02	2760.00	0.21	53.04	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.026	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3000.00	0.32	6.27	331.25
Length = 2.0 ft	2	0.001	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.03	6.27	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.172	0.136	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.60	474.38	2760.00	2.12	41.35	304.75
Length = 2.0 ft	2	0.007	0.136	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.30	18.56	2760.00	0.17	41.35	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.124	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.60	474.38	3840.00	2.12	41.35	424.00
Length = 2.0 ft	2	0.005	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	18.56	3840.00	0.17	41.35	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.124	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.60	474.38	3840.00	2.12	41.35	424.00
Length = 2.0 ft	2	0.005	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.30	18.56	3840.00	0.17	41.35	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.012	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	46.68	3840.00	0.19	3.76	424.00
Length = 2.0 ft	2	0.000	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.02	1.30	3840.00	0.02	3.76	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.012	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	46.68	3840.00	0.19	3.76	424.00
Length = 2.0 ft	2	0.000	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.02	1.30	3840.00	0.02	3.76	424.00

Overall Maximum Deflections

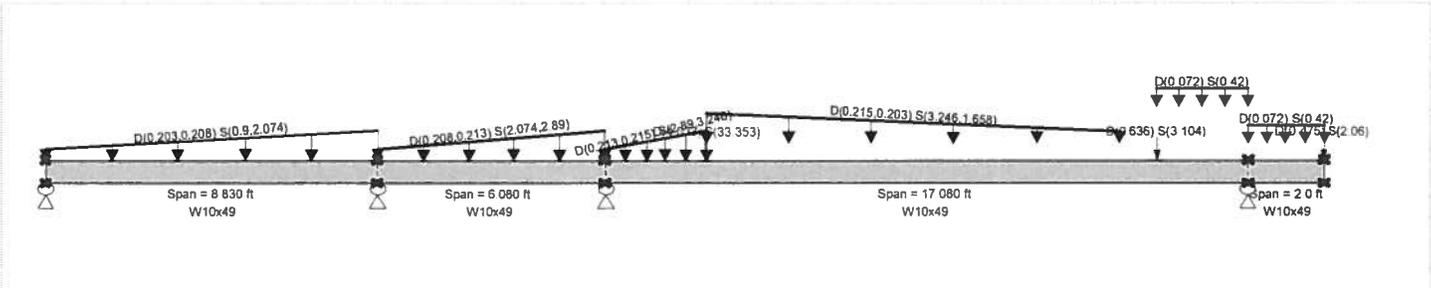| Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1034	6.131		0.0000	0.000
	2	0.0000	6.131	+D+S+H	-0.0526	2.000

Vertical Reactions

Support notation : Far left is #1 | Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	3.611	2.362	
Overall MINimum	0.241	0.237	
+D+H	0.401	0.395	
+D+L+H	0.401	0.395	
+D+Lr+H	0.401	0.395	
+D+S+H	3.611	2.362	
+D+0.750Lr+0.750L+H	0.401	0.395	
+D+0.750L+0.750S+H	2.809	1.870	
+D+W+H	0.401	0.395	
+D+0.70E+H	0.401	0.395	
+D+0.750Lr+0.750L+0.750W+H	0.401	0.395	
+D+0.750L+0.750S+0.750W+H	2.809	1.870	
+D+0.750L+0.750S+0.5250E+H	2.809	1.870	
+0.60D+W+0.60H	0.241	0.237	
+0.60D+0.70E+0.60H	0.241	0.237	
D Only	0.401	0.395	
Lr Only			
L Only			
S Only	3.210	1.967	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   Beam RB-6 - 368/102 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-6 - 203 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 2,400.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF	Fv 265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V8	Ft 1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.048) S(0.367)

D(-0.034) S(-0.348)

5.125x15

5.125x15

Span = 12.330 ft

Span = 2.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0480, S = 0.3670 , Tributary Width = 1.0 ft
Load for Span Number 2
    Point Load : D = -0.0340, S = -0.3480 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.194 : 1**	
Section used for this span		**5.125x15**	
fb : Actual	=	535.24 psi	
FB : Allowable	=	2,760.00 psi	
Load Combination		+D+S+H	
Location of maximum on span	=	6.268 ft	
Span # where maximum occurs	=	Span # 1	

Maximum Shear Stress Ratio	=	**0.140 : 1**
Section used for this span		**5.125x15**
fv : Actual	=	42.64 psi
Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H
Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.079 in	Ratio =	1880 >=360
Max Upward Transient Deflection	-0.043 in	Ratio =	1126 >=360
Max Downward Total Deflection	0.092 in	Ratio =	1608 >=180
Max Upward Total Deflection	-0.050 in	Ratio =	968 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.036	0.026	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	2160.00	0.32	6.27	238.50
Length = 2.0 ft	2	0.001	0.026	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2160.00	0.03	6.27	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.032	0.024	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	2400.00	0.32	6.27	265.00
Length = 2.0 ft	2	0.001	0.024	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2400.00	0.03	6.27	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-6 - 203 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 12.330 ft	1	0.026	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3000.00	0.32	6.27	331.25
Length = 2.0 ft	2	0.001	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.03	6.27	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.194	0.140	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.57	535.24	2760.00	2.19	42.64	304.75
Length = 2.0 ft	2	0.017	0.140	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.73	45.62	2760.00	0.38	42.64	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.026	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3000.00	0.32	6.27	331.25
Length = 2.0 ft	2	0.001	0.019	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.03	6.27	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.152	0.110	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.74	420.88	2760.00	1.72	33.55	304.75
Length = 2.0 ft	2	0.013	0.110	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.56	34.76	2760.00	0.29	33.55	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.020	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.25	77.81	3840.00	0.32	6.27	424.00
Length = 2.0 ft	2	0.001	0.015	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3840.00	0.03	6.27	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.110	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.74	420.88	3840.00	1.72	33.55	424.00
Length = 2.0 ft	2	0.009	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.56	34.76	3840.00	0.29	33.55	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.110	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.74	420.88	3840.00	1.72	33.55	424.00
Length = 2.0 ft	2	0.009	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.56	34.76	3840.00	0.29	33.55	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.012	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	46.68	3840.00	0.19	3.76	424.00
Length = 2.0 ft	2	0.000	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.02	1.30	3840.00	0.02	3.76	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.330 ft	1	0.012	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.75	46.68	3840.00	0.19	3.76	424.00
Length = 2.0 ft	2	0.000	0.009	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.02	1.30	3840.00	0.02	3.76	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0920	6.268		0.0000	0.000
	2	0.0000	6.268	+D+S+H	-0.0496	2.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	2.720	2.253	
Overall MINimum	0.241	0.237	
+D+H	0.401	0.395	
+D+L+H	0.401	0.395	
+D+Lr+H	0.401	0.395	
+D+S+H	2.720	2.253	
+D+0.750Lr+0.750L+H	0.401	0.395	
+D+0.750L+0.750S+H	2.141	1.789	
+D+W+H	0.401	0.395	
+D+0.70E+H	0.401	0.395	
+D+0.750Lr+0.750L+0.750W+H	0.401	0.395	
+D+0.750L+0.750S+0.750W+H	2.141	1.789	
+D+0.750L+0.750S+0.5250E+H	2.141	1.789	
+0.60D+W+0.60H	0.241	0.237	
+0.60D+0.70E+0.60H	0.241	0.237	
D Only	0.401	0.395	
Lr Only			
L Only			
S Only	2.319	1.858	
W Only			

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Printed: 24 JAN 2017, 7:56PM

Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

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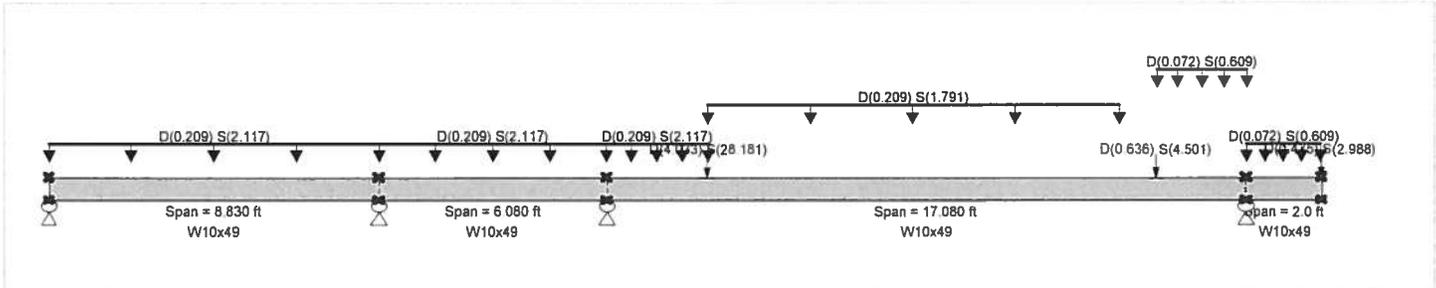
Description : Beam RB-6 Cantilever - LC2 - 5 1/8 x 9 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	F_b - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	F_b - Compr 2,400.0 psi	Ebend- xx 1,800.0 ksi
	F_c - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	F_c - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V8	F_v 265.0 psi	Eminbend - yy 850.0 ksi
	F_t 1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(-0.034) S(-0.348)

5.125x15   5.125x15

Span = 2.0 ft   Span = 2.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 2
   Point Load : D = -0.0340, S = -0.3480 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.017: 1	Maximum Shear Stress Ratio	=	0.024 : 1	
Section used for this span		5.125x15	Section used for this span		5.125x15	
fb : Actual	=	45.62 psi	fv : Actual	=	7.45 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	2.000ft	Location of maximum on span	=	1.989 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 2	

Maximum Deflection
   Max Downward Transient Deflection   0.000 in Ratio =   0 <360
   Max Upward Transient Deflection   -0.001 in Ratio =   38912 >=360
   Max Downward Total Deflection   0.000 in Ratio = 187433 >=180
   Max Upward Total Deflection   -0.001 in Ratio =   36648 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2160.00	0.01	0.26	238.50
Length = 2.0 ft	2	0.001	0.003	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2160.00	0.03	0.66	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2400.00	0.01	0.26	265.00
Length = 2.0 ft	2	0.001	0.002	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	2400.00	0.03	0.66	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.01	0.26	331.25
Length = 2.0 ft	2	0.001	0.002	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.03	2.17	3000.00	0.03	0.66	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : Beam RB-6 Cantilever - LC2 - 5 1/8 x 9 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
Length = 2.0 ft	1	0.017	0.023	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.73	45.62	2760.00	0.36	7.05	304.75
Length = 2.0 ft	2	0.017	0.024	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.73	45.62	2760.00	0.38	7.45	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3000.00	0.01	0.26	331.25
Length = 2.0 ft	2	0.001	0.002	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3000.00	0.03	0.66	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.013	0.018	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	2760.00	0.27	5.35	304.75
Length = 2.0 ft	2	0.013	0.019	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	2760.00	0.29	5.75	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.01	0.26	424.00
Length = 2.0 ft	2	0.001	0.002	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.03	0.66	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.01	0.26	424.00
Length = 2.0 ft	2	0.001	0.002	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.03	0.66	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.001	0.001	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.01	0.26	424.00
Length = 2.0 ft	2	0.001	0.002	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.03	2.17	3840.00	0.03	0.66	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.009	0.013	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	3840.00	0.27	5.35	424.00
Length = 2.0 ft	2	0.009	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	3840.00	0.29	5.75	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.009	0.013	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	3840.00	0.27	5.35	424.00
Length = 2.0 ft	2	0.009	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.56	34.76	3840.00	0.29	5.75	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.000	0.000	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.02	1.30	3840.00	0.01	0.16	424.00
Length = 2.0 ft	2	0.000	0.001	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.02	1.30	3840.00	0.02	0.40	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.0 ft	1	0.000	0.000	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.02	1.30	3840.00	0.01	0.16	424.00
Length = 2.0 ft	2	0.000	0.001	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.02	1.30	3840.00	0.02	0.40	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0001	1.162		0.0000	0.000
	2	0.0000	1.162	+D+S+H	-0.0013	2.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.382	-0.697	
Overall MINimum	0.020	-0.001	
+D+H	0.034	-0.001	
+D+L+H	0.034	-0.001	
+D+Lr+H	0.034	-0.001	
+D+S+H	0.382	-0.697	
+D+0.750Lr+0.750L+H	0.034	-0.001	
+D+0.750L+0.750S+H	0.295	-0.523	
+D+W+H	0.034	-0.001	
+D+0.70E+H	0.034	-0.001	
+D+0.750Lr+0.750L+0.750W+H	0.034	-0.001	
+D+0.750L+0.750S+0.750W+H	0.295	-0.523	
+D+0.750L+0.750S+0.5250E+H	0.295	-0.523	
+0.60D+W+0.60H	0.020	-0.001	
+0.60D+0.70E+0.60H	0.020	-0.001	
D Only	0.034	-0.001	
Lr Only			
L Only			
S Only	0.348	-0.696	
W Only			
E Only			
H Only			

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of

RB1   SPAN = 24'-8"

LC1 (3GS/10Z SNOW)

$$W_1 = (212_D + 2468_S) + (64_D + 830_S) = 276_D + 3298_S, \; x = 0$$
$$\quad\quad\quad\text{TRUSS} \quad\quad\quad\quad \text{J4A}$$

$$W_2 = (212_D + 2468_S) + (154_D + 1723_S) = 366_D + 4191_S, \; x = 19'\tfrac{1}{0}"$$
$$\quad\quad\quad\text{TRUSS} \quad\quad\quad\quad \text{J4B}$$

$$P = R_{RB5R} + R_{RB6L} = (511_D + 3110_S) + (401_D + 3210_S)$$
$$\quad\quad\quad\quad\quad\quad\quad = 912_D + 6320_S \; @ \; x = 19'$$

LC2 (24D SNOW)

$$W_1 = (212_D + 2120_S) + (64_D + 518_S) = 276_D + 2698_S \quad x = 0$$
$$W_2 = (212_D + 2120_S) + (154_D + 1323_S) = 366_D + 3443_S \quad x = 19'$$
$$P = (511_D + 3923_S) + (401_D + 2319_S) = 912_D + 6242_S \quad x = 19'$$

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

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Steel Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   RB7 - 368/102 Snow - W16x67

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

D(0.276,0.366) S(3.298,4.191)

D(0 972) S(6 32)

Span = 24.670 ft
W16x67

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.2760->0.3660, S(S,E) = 3.298->4.191 k/ft, Extent = 0.0 –>> 19.0 ft, Trib Width = 1.0 ft
    Point Load : D = 0.9720, S = 6.320 k @ 19.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.952** : 1	Maximum Shear Stress Ratio =	**0.379** : 1
Section used for this span	**W16x67**	Section used for this span	**W16x67**
Ma : Applied	308.804 k-ft	Va : Applied	48.803 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	12.335ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection			
Max Downward Transient Deflection	1.093 in	Ratio =	270 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	1.214 in	Ratio =	244 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+L+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+Lr+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+S+H													
Dsgn. L = 24.67 ft	1	0.952	0.379	308.80		308.80	541.67	324.35	1.00	1.00	48.80	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 24.67 ft	1	0.737	0.293	239.17		239.17	541.67	324.35	1.00	1.00	37.77	193.16	128.77
+D+W+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.70E+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 24.67 ft	1	0.737	0.293	239.17		239.17	541.67	324.35	1.00	1.00	37.77	193.16	128.77
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 24.67 ft	1	0.737	0.293	239.17		239.17	541.67	324.35	1.00	1.00	37.77	193.16	128.77
+0.60D+W+0.60H													

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 183

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   RB7 - 368/102 Snow - W16x67

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.67 ft	1	0.056	0.022	18.18		18.18	541.67	324.35	1.00	1.00	2.81	193.16	128.77
+0.60D+0.70E+0.60H													
Dsgn. L = 24.67 ft	1	0.056	0.022	18.18		18.18	541.67	324.35	1.00	1.00	2.81	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	1.2144	12.335		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	48.803	37.387
Overall MINimum	2.814	2.420
+D+H	4.690	4.033
+D+L+H	4.690	4.033
+D+Lr+H	4.690	4.033
+D+S+H	48.803	37.387
+D+0.750Lr+0.750L+H	4.690	4.033
+D+0.750L+0.750S+H	37.775	29.048
+D+W+H	4.690	4.033
+D+0.70E+H	4.690	4.033
+D+0.750Lr+0.750L+0.750W+H	4.690	4.033
+D+0.750L+0.750S+0.750W+H	37.775	29.048
+D+0.750L+0.750S+0.5250E+H	37.775	29.048
+0.60D+W+0.60H	2.814	2.420
+0.60D+0.70E+0.60H	2.814	2.420
D Only	4.690	4.033
Lr Only		
L Only		
S Only	44.112	33.353
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Description : RB7 - 240 Snow - W16x67

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Span = 24.670 ft
W16x67

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.2760->0.3660, S(S,E) = 2.698->3.443 k/ft, Extent = 0.0 -->> 19.0 ft, Trib Width = 1.0 ft
    Point Load : D = 0.9720, S = 6.242 k @ 19.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.807 : 1**	**Maximum Shear Stress Ratio =**	**0.319 : 1**
Section used for this span	**W16x67**	Section used for this span	**W16x67**
Ma : Applied	261.766 k-ft	Va : Applied	41.091 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	12.405 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection			
Max Downward Transient Deflection	0.911 in	Ratio =	324 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	1.031 in	Ratio =	287 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Span #	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length		M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+L+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+Lr+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+S+H													
Dsgn. L = 24.67 ft	1	0.807	0.319	261.77		261.77	541.67	324.35	1.00	1.00	41.09	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 24.67 ft	1	0.629	0.248	203.90		203.90	541.67	324.35	1.00	1.00	31.99	193.16	128.77
+D+W+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.70E+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 24.67 ft	1	0.093	0.036	30.29		30.29	541.67	324.35	1.00	1.00	4.69	193.16	128.77
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 24.67 ft	1	0.629	0.248	203.90		203.90	541.67	324.35	1.00	1.00	31.99	193.16	128.77
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 24.67 ft	1	0.629	0.248	203.90		203.90	541.67	324.35	1.00	1.00	31.99	193.16	128.77
+0.60D+W+0.60H													

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : RB7 - 240 Snow - W16x67

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 24.67 ft +0.60D+0.70E+0.60H	1	0.056	0.022	18.18		18.18	541.67	324.35	1.00	1.00	2.81	193.16	128.77
Dsgn. L = 24.67 ft	1	0.056	0.022	18.18		18.18	541.67	324.35	1.00	1.00	2.81	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	1.0310	12.335		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	41.091	32.215
Overall MINimum	2.814	2.420
+D+H	4.690	4.033
+D+L+H	4.690	4.033
+D+Lr+H	4.690	4.033
+D+S+H	41.091	32.215
+D+0.750Lr+0.750L+H	4.690	4.033
+D+0.750L+0.750S+H	31.991	25.169
+D+W+H	4.690	4.033
+D+0.70E+H	4.690	4.033
+D+0.750Lr+0.750L+0.750W+H	4.690	4.033
+D+0.750L+0.750S+0.750W+H	31.991	25.169
+D+0.750L+0.750S+0.5250E+H	31.991	25.169
+0.60D+W+0.60H	2.814	2.420
+0.60D+0.70E+0.60H	2.814	2.420
D Only	4.690	4.033
Lr Only		
L Only		
S Only	36.400	28.181
W Only		
E Only		
H Only		
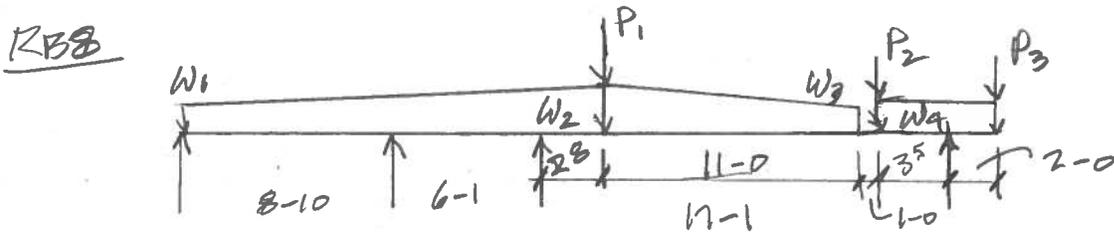
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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<u>RB8</u>

<u>368/102 SNOW CASE</u>

$$W_1 = 203D + 900s$$
$$W_2 = 215D + 3246s$$ } SEE RB1

$$W_3 = 203D + 1658s$$

$$W_4 = 3(24 + 140) = 72D + 420s$$

$$P_1 = R_{RB1R} = 4033D + 33353s$$

$$P_2 = R_{EB3} = 636D + 4501\left(\frac{140}{203}\right) = 636D + 3104s$$

$$P_3 = R_{EB2} = 475D + 2988\left(\text{''}\right) = 475D + 2060s$$

<u>240 SNOW CASE</u>

$$W_1 = W_{2L} = 209D + 2117s$$
$$W_{2R} = W_3 = 209D + 2117\left(\frac{203}{240}\right) =$$
$$W_4 = 3(24 + 203) = 72D + 609s$$

$$P_1 = 4033D + 28181s$$

$$P_2 = 636D + 4501s$$

$$P_3 = 475D + 2988s$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Description :   RB8 - 368/102 Snow - W10x49

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing : Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis : Major Axis Bending		

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.2030->0.2080, S(S,E) = 0.90->2.074 k/ft, Extent = 0.0 -->> 8.830 ft, Trib Width = 1.0 ft
Load for Span Number 2
  Varying Uniform Load : D(S,E) = 0.2080->0.2130, S(S,E) = 2.074->2.890 k/ft, Extent = 0.0 -->> 6.080 ft, Trib Width = 1.0 ft
Load for Span Number 3
  Varying Uniform Load : D(S,E) = 0.2130->0.2150, S(S,E) = 2.890->3.246 k/ft, Extent = 0.0 -->> 2.670 ft, Trib Width = 1.0 ft
  Varying Uniform Load : D(S,E) = 0.2150->0.2030, S(S,E) = 3.246->1.658 k/ft, Extent = 2.670 -->> 13.670 ft, Trib Width = 1.0 ft
  Point Load : D = 4.033, S = 33.353 k @ 2.670 ft
  Point Load : D = 0.6360, S = 3.104 k @ 14.670 ft
  Uniform Load : D = 0.0720, S = 0.420 k/ft, Extent = 14.670 -->> 17.080 ft, Tributary Width = 1.0 ft
Load for Span Number 4
  Uniform Load : D = 0.0720, S = 0.420 k/ft, Tributary Width = 1.0 ft
  Point Load : D = 0.4750, S = 2.060 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.884 : 1**	Maximum Shear Stress Ratio =	**0.945 : 1**
Section used for this span	**W10x49**	Section used for this span	**W10x49**
Ma : Applied	133.186 k-ft	Va : Applied	64.289 k
Mn / Omega : Allowable	150.699 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	6.080 ft	Location of maximum on span	6.080 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection
Max Downward Transient Deflection	0.427 in	Ratio =	479 >=240.
Max Upward Transient Deflection	-0.155 in	Ratio =	310 >=240.
Max Downward Total Deflection	0.476 in	Ratio =	431 >=180
Max Upward Total Deflection	-0.172 in	Ratio =	278 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+L+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+Lr+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description : RB8 - 368/102 Snow - W10x49

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+S+H													
Dsgn. L = 8.83 ft	1	0.157	0.234	23.73		23.73	251.67	150.70	1.13	1.00	15.92	102.00	68.00
Dsgn. L = 6.08 ft	2	0.884	0.945	11.76	-133.19	133.19	251.67	150.70	2.00	1.00	64.29	102.00	68.00
Dsgn. L = 17.08 ft	3	0.884	0.945	76.95	-133.19	133.19	251.67	150.70	1.75	1.00	64.29	102.00	68.00
Dsgn. L = 2.00 ft	4	0.041	0.053		-6.15	6.15	251.67	150.70	1.00	1.00	3.62	102.00	68.00
+D+0.750Lr+0.750L+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750L+0.750S+H													
Dsgn. L = 8.83 ft	1	0.123	0.181	18.50		18.50	251.67	150.70	1.13	1.00	12.32	102.00	68.00
Dsgn. L = 6.08 ft	2	0.685	0.732	9.01	-103.21	103.21	251.67	150.70	2.00	1.00	49.81	102.00	68.00
Dsgn. L = 17.08 ft	3	0.685	0.732	59.67	-103.21	103.21	251.67	150.70	1.75	1.00	49.81	102.00	68.00
Dsgn. L = 2.00 ft	4	0.033	0.043		-4.91	4.91	251.67	150.70	1.00	1.00	2.89	102.00	68.00
+D+W+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.70E+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.87		2.87	251.67	150.70	1.12	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.094	0.75	-13.30	13.30	251.67	150.70	1.94	1.00	6.36	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.094	7.83	-13.30	13.30	251.67	150.70	1.72	1.00	6.36	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 8.83 ft	1	0.123	0.181	18.50		18.50	251.67	150.70	1.13	1.00	12.32	102.00	68.00
Dsgn. L = 6.08 ft	2	0.685	0.732	9.01	-103.21	103.21	251.67	150.70	2.00	1.00	49.81	102.00	68.00
Dsgn. L = 17.08 ft	3	0.685	0.732	59.67	-103.21	103.21	251.67	150.70	1.75	1.00	49.81	102.00	68.00
Dsgn. L = 2.00 ft	4	0.033	0.043		-4.91	4.91	251.67	150.70	1.00	1.00	2.89	102.00	68.00
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 8.83 ft	1	0.123	0.181	18.50		18.50	251.67	150.70	1.13	1.00	12.32	102.00	68.00
Dsgn. L = 6.08 ft	2	0.685	0.732	9.01	-103.21	103.21	251.67	150.70	2.00	1.00	49.81	102.00	68.00
Dsgn. L = 17.08 ft	3	0.685	0.732	59.67	-103.21	103.21	251.67	150.70	1.75	1.00	49.81	102.00	68.00
Dsgn. L = 2.00 ft	4	0.033	0.043		-4.91	4.91	251.67	150.70	1.00	1.00	2.89	102.00	68.00
+0.60D+W+0.60H													
Dsgn. L = 8.83 ft	1	0.011	0.013	1.72		1.72	251.67	150.70	1.12	1.00	0.91	102.00	68.00
Dsgn. L = 6.08 ft	2	0.053	0.056	0.45	-7.98	7.98	251.67	150.70	1.94	1.00	3.82	102.00	68.00
Dsgn. L = 17.08 ft	3	0.053	0.056	4.70	-7.98	7.98	251.67	150.70	1.72	1.00	3.82	102.00	68.00
Dsgn. L = 2.00 ft	4	0.005	0.006		-0.72	0.72	251.67	150.70	1.00	1.00	0.43	102.00	68.00
+0.60D+0.70E+0.60H													
Dsgn. L = 8.83 ft	1	0.011	0.013	1.72		1.72	251.67	150.70	1.12	1.00	0.91	102.00	68.00
Dsgn. L = 6.08 ft	2	0.053	0.056	0.45	-7.98	7.98	251.67	150.70	1.94	1.00	3.82	102.00	68.00
Dsgn. L = 17.08 ft	3	0.053	0.056	4.70	-7.98	7.98	251.67	150.70	1.72	1.00	3.82	102.00	68.00
Dsgn. L = 2.00 ft	4	0.005	0.006		-0.72	0.72	251.67	150.70	1.00	1.00	0.43	102.00	68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0433	4.650		0.0000	0.000
	2	0.0000	4.650	+D+S+H	-0.0539	3.729
+D+S+H	3	0.4760	8.768		0.0000	3.729
	4	0.0000	8.768	+D+S+H	-0.1725	2.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum	8.153	-8.698	96.879	20.511	
Overall MINimum	0.723	-0.289	5.680	1.741	
+D+H	1.205	-0.482	9.467	2.902	
+D+L+H	1.205	-0.482	9.467	2.902	
+D+Lr+H	1.205	-0.482	9.467	2.902	
+D+S+H	8.153	-8.698	96.879	20.511	

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   RB8 - 368/102 Snow - W10x49

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+0.750Lr+0.750L+H	1.205	-0.482	9.467	2.902	
+D+0.750L+0.750S+H	6.416	-6.644	75.026	16.109	
+D+W+H	1.205	-0.482	9.467	2.902	
+D+0.70E+H	1.205	-0.482	9.467	2.902	
+D+0.750Lr+0.750L+0.750W+H	1.205	-0.482	9.467	2.902	
+D+0.750L+0.750S+0.750W+H	6.416	-6.644	75.026	16.109	
+D+0.750L+0.750S+0.5250E+H	6.416	-6.644	75.026	16.109	
+0.60D+W+0.60H	0.723	-0.289	5.680	1.741	
+0.60D+0.70E+0.60H	0.723	-0.289	5.680	1.741	
D Only	1.205	-0.482	9.467	2.902	
Lr Only					
L Only					
S Only	6.948	-8.215	87.412	17.609	
W Only					
E Only					
H Only					

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Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : RB8 - 240 Snow - W10x49

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
    Uniform Load : D = 0.2090, S = 2.117 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.2090, S = 2.117 k/ft, Tributary Width = 1.0 ft
Load for Span Number 3
    Uniform Load : D = 0.2090, S = 2.117 k/ft, Extent = 0.0 -->> 2.670 ft, Tributary Width = 1.0 ft
    Uniform Load : D = 0.2090, S = 1.791 k/ft, Extent = 2.670 -->> 13.670 ft, Tributary Width = 1.0 ft
    Point Load : D = 4.033, S = 28.181 k @ 2.670 ft
    Point Load : D = 0.6360, S = 4.501 k @ 14.670 ft
    Uniform Load : D = 0.0720, S = 0.6090 k/ft, Extent = 14.670 -->> 17.080 ft, Tributary Width = 1.0 ft
Load for Span Number 4
    Uniform Load : D = 0.0720, S = 0.6090 k/ft, Tributary Width = 1.0 ft
    Point Load : D = 0.4750, S = 2.988 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.706** : 1	Maximum Shear Stress Ratio =	**0.756** : 1
Section used for this span	**W10x49**	Section used for this span	**W10x49**
Ma : Applied	106.408 k-ft	Va : Applied	51.378 k
Mn / Omega : Allowable	150.699 k-ft	Vn/Omega : Allowable	68.0 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	6.080 ft	Location of maximum on span	6.080 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2

Maximum Deflection
Max Downward Transient Deflection	0.340 in	Ratio =	601 >=240.
Max Upward Transient Deflection	-0.124 in	Ratio =	386 >=240.
Max Downward Total Deflection	0.389 in	Ratio =	526 >=180
Max Upward Total Deflection	-0.142 in	Ratio =	338 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+L+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+Lr+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   RB8 - 240 Snow - W10x49

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+S+H													
Dsgn. L = 8.83 ft	1	0.165	0.160	24.94		24.94	251.67	150.70	1.13	1.00	10.88	102.00	68.00
Dsgn. L = 6.08 ft	2	0.706	0.756	3.51	-106.41	106.41	251.67	150.70	1.93	1.00	51.38	102.00	68.00
Dsgn. L = 17.08 ft	3	0.706	0.756	62.43	-106.41	106.41	251.67	150.70	1.72	1.00	51.38	102.00	68.00
Dsgn. L = 2.00 ft	4	0.056	0.072		-8.39	8.39	251.67	150.70	1.00	1.00	4.92	102.00	68.00
+D+0.750Lr+0.750L+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750L+0.750S+H													
Dsgn. L = 8.83 ft	1	0.129	0.125	19.42		19.42	251.67	150.70	1.13	1.00	8.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.552	0.590	2.82	-83.12	83.12	251.67	150.70	1.93	1.00	40.12	102.00	68.00
Dsgn. L = 17.08 ft	3	0.552	0.590	48.78	-83.12	83.12	251.67	150.70	1.72	1.00	40.12	102.00	68.00
Dsgn. L = 2.00 ft	4	0.044	0.057		-6.59	6.59	251.67	150.70	1.00	1.00	3.87	102.00	68.00
+D+W+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.70E+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 8.83 ft	1	0.019	0.022	2.89		2.89	251.67	150.70	1.13	1.00	1.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.088	0.093	0.73	-13.28	13.28	251.67	150.70	1.93	1.00	6.34	102.00	68.00
Dsgn. L = 17.08 ft	3	0.088	0.093	7.84	-13.28	13.28	251.67	150.70	1.71	1.00	6.34	102.00	68.00
Dsgn. L = 2.00 ft	4	0.008	0.011		-1.19	1.19	251.67	150.70	1.00	1.00	0.72	102.00	68.00
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 8.83 ft	1	0.129	0.125	19.42		19.42	251.67	150.70	1.13	1.00	8.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.552	0.590	2.82	-83.12	83.12	251.67	150.70	1.93	1.00	40.12	102.00	68.00
Dsgn. L = 17.08 ft	3	0.552	0.590	48.78	-83.12	83.12	251.67	150.70	1.72	1.00	40.12	102.00	68.00
Dsgn. L = 2.00 ft	4	0.044	0.057		-6.59	6.59	251.67	150.70	1.00	1.00	3.87	102.00	68.00
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 8.83 ft	1	0.129	0.125	19.42		19.42	251.67	150.70	1.13	1.00	8.52	102.00	68.00
Dsgn. L = 6.08 ft	2	0.552	0.590	2.82	-83.12	83.12	251.67	150.70	1.93	1.00	40.12	102.00	68.00
Dsgn. L = 17.08 ft	3	0.552	0.590	48.78	-83.12	83.12	251.67	150.70	1.72	1.00	40.12	102.00	68.00
Dsgn. L = 2.00 ft	4	0.044	0.057		-6.59	6.59	251.67	150.70	1.00	1.00	3.87	102.00	68.00
+0.60D+W+0.60H													
Dsgn. L = 8.83 ft	1	0.012	0.013	1.74		1.74	251.67	150.70	1.13	1.00	0.91	102.00	68.00
Dsgn. L = 6.08 ft	2	0.053	0.056	0.44	-7.97	7.97	251.67	150.70	1.93	1.00	3.81	102.00	68.00
Dsgn. L = 17.08 ft	3	0.053	0.056	4.71	-7.97	7.97	251.67	150.70	1.71	1.00	3.81	102.00	68.00
Dsgn. L = 2.00 ft	4	0.005	0.006		-0.72	0.72	251.67	150.70	1.00	1.00	0.43	102.00	68.00
+0.60D+0.70E+0.60H													
Dsgn. L = 8.83 ft	1	0.012	0.013	1.74		1.74	251.67	150.70	1.13	1.00	0.91	102.00	68.00
Dsgn. L = 6.08 ft	2	0.053	0.056	0.44	-7.97	7.97	251.67	150.70	1.93	1.00	3.81	102.00	68.00
Dsgn. L = 17.08 ft	3	0.053	0.056	4.71	-7.97	7.97	251.67	150.70	1.71	1.00	3.81	102.00	68.00
Dsgn. L = 2.00 ft	4	0.005	0.006		-0.72	0.72	251.67	150.70	1.00	1.00	0.43	102.00	68.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0454	4.474		0.0000	0.000
	2	0.0000	4.474	+D+S+H	-0.0451	3.648
+D+S+H	3	0.3894	8.882		0.0000	3.648
	4	0.0000	8.882	+D+S+H	-0.1419	2.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum	10.883	-0.771	76.677	21.585	
Overall MINimum	0.733	-0.278	5.659	1.746	
+D+H	1.222	-0.463	9.432	2.909	
+D+L+H	1.222	-0.463	9.432	2.909	
+D+Lr+H	1.222	-0.463	9.432	2.909	
+D+S+H	10.883	-0.771	76.677	21.585	

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Steel Beam

Lic. # : KW-06002357

Description : RB8 - 240 Snow - W10x49

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+0.750Lr+0.750L+H	1.222	-0.463	9.432	2.909	
+D+0.750L+0.750S+H	8.468	-0.694	59.866	16.916	
+D+W+H	1.222	-0.463	9.432	2.909	
+D+0.70E+H	1.222	-0.463	9.432	2.909	
+D+0.750Lr+0.750L+0.750W+H	1.222	-0.463	9.432	2.909	
+D+0.750L+0.750S+0.750W+H	8.468	-0.694	59.866	16.916	
+D+0.750L+0.750S+0.5250E+H	8.468	-0.694	59.866	16.916	
+0.60D+W+0.60H	0.733	-0.278	5.659	1.746	
+0.60D+0.70E+0.60H	0.733	-0.278	5.659	1.746	
D Only	1.222	-0.463	9.432	2.909	
Lr Only					
L Only					
S Only	9.661	-0.308	67.245	18.675	
W Only					
E Only					
H Only					

rudow + berry
structural engineering
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of

$\underline{RB9}$ SPAN $= 16'-8''$

$$W_1 = \left[(48D - 116_{EW} \text{ OR } -387_S) + (92D + 69_{W} \text{ OR } 1640_S) \right] \frac{12}{16}$$

$$= 105_D + 399_S \text{ OR } +940_S$$

$$W_2 = \left[(-165_D - 2127_S \text{ OR } -1778_S) + (20_D + 547_{W} \text{ OR } +341_S) \right] \frac{12}{16}$$

$$= -109_D - 1646_S \text{ OR } -1075_S$$

$\underline{EB4}$ SPAN $= 10'-9''$

$$W = 1.0(24 + 240) = 24_D + 240_S$$

$\underline{EB5}$ SPAN $= 2'-6''$ CANT $= 2'-0''$

$$W = .67(24 + 240) = 16_D + 160_S$$

$$P_{EB5} = R_{EB4} = 161_D + 1290_S$$

$\underline{RB10}$ SPAN $= 13'-9''$

$$W_1 = 2(24 + 240) = 48_D + 480_S \qquad x = 0 \text{ to } 6'-0''$$

$$W_2 = \left[(74_D + 939_S) + (49_D + 861_S \left(\tfrac{9.08}{5.42}\right)) \right] \frac{12}{16} = 76_D + 1074_S \quad x = 6'$$

$$W_3 = \left[(85_D + 833_S) + (49_D + 861_S) \right] \frac{12}{16} = 134_D + 1700_S \quad x = END$$

$$P = R_{EB5} = 329_D + 2322_S \ @ \ x = 6'-0''$$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   Beam RB-9 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Species : DF/DF	Fv	265.0 psi	Eminbend - yy	850.0 ksi
Wood Grade : 24F - V4	Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing   : Completely Unbraced

D(0.105,-0.109) S(0.399,-1.646)

5.125x15

Span = 18.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.1050->-0.1090, S(S,E) = 0.3990->-1.646 k/ft, Extent = 0.0 ->> 18.670 ft, Trib Width = 1.0 ft

DESIGN SUMMARY   **Design OK**

Maximum Bending Stress Ratio	=	**0.880: 1**	Maximum Shear Stress Ratio	=	**0.458 : 1**
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**
fb : Actual	=	1,792.91 psi	fv : Actual	=	139.65 psi
FB : Allowable	=	2,037.11 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	11.652 ft	Location of maximum on span	=	17.444 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.000 in Ratio =   0 <240.0
   Max Upward Transient Deflection   -0.664 in Ratio =   337 >=240.
   Max Downward Total Deflection   0.017 in Ratio = 13299 >=180
   Max Upward Total Deflection   -0.649 in Ratio =   345 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.032	0.027	0.90	0.990	1.00	1.00	1.00	1.00	0.96	1.07	66.63	2065.86	0.33	6.42	238.50
+D+L+H					0.990	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.029	0.024	1.00	0.990	1.00	1.00	1.00	1.00	0.95	1.07	66.63	2274.35	0.33	6.42	265.00
+D+Lr+H					0.990	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.024	0.019	1.25	0.990	1.00	1.00	1.00	1.00	0.92	1.07	66.63	2758.35	0.33	6.42	331.25
+D+S+H					0.990	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.880	0.458	1.15	0.990	1.00	1.00	1.00	1.00	0.96	28.71	1,792.91	2037.11	7.16	139.65	304.75
+D+0.750Lr+0.750L+H					0.990	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.024	0.019	1.25	0.990	1.00	1.00	1.00	1.00	0.92	1.07	66.63	2758.35	0.33	6.42	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-9 - 368/102 Snow - 5 1/8 x 15 GLB

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.990	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.658	0.345	1.15	0.990	1.00	1.00	1.00	1.00	0.96	21.48	1,341.13	2037.11	5.39	105.18	304.75
+D+W+H					0.990	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86	1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.70E+H					0.990	1.00	1.00	1.00	1.00	0.86			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86	1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.750Lr+0.750L+0.750W+H					0.990	1.00	1.00	1.00	1.00	0.86			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86	1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.750L+0.750S+0.750W+H					0.990	1.00	1.00	1.00	1.00	0.86			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.492	0.248	1.60	0.990	1.00	1.00	1.00	1.00	0.92	21.48	1,341.13	2728.08	5.39	105.18	424.00
+D+0.750L+0.750S+0.5250E+H					0.990	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.492	0.248	1.60	0.990	1.00	1.00	1.00	1.00	0.92	21.48	1,341.13	2728.08	5.39	105.18	424.00
+0.60D+W+0.60H					0.990	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.012	0.009	1.60	0.990	1.00	1.00	1.00	1.00	0.86	0.64	39.98	3306.92	0.20	3.85	424.00
+0.60D+0.70E+0.60H					0.990	1.00	1.00	1.00	1.00	0.86			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.012	0.009	1.60	0.990	1.00	1.00	1.00	1.00	0.86	0.64	39.98	3306.92	0.20	3.85	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	S Only	-0.6635	9.948

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	-2.639	-9.198
Overall MINimum	0.282	-0.118
+D+H	0.470	-0.196
+D+L+H	0.470	-0.196
+D+Lr+H	0.470	-0.196
+D+S+H	-2.169	-9.198
+D+0.750Lr+0.750L+H	0.470	-0.196
+D+0.750L+0.750S+H	-1.509	-6.948
+D+W+H	0.470	-0.196
+D+0.70E+H	0.470	-0.196
+D+0.750Lr+0.750L+0.750W+H	0.470	-0.196
+D+0.750L+0.750S+0.750W+H	-1.509	-6.948
+D+0.750L+0.750S+0.5250E+H	-1.509	-6.948
+0.60D+W+0.60H	0.282	-0.118
+0.60D+0.70E+0.60H	0.282	-0.118
D Only	0.470	-0.196
Lr Only		
L Only		
S Only	-2.639	-9.002
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   Beam RB-9 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf
Beam Bracing : Completely Unbraced		

D(0.105,-0.109) S(0.94,-1.073)

5.125x15

Span = 18.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.1050->-0.1090, S(S,E) = 0.940->-1.073 k/ft, Extent = 0.0 -->> 18.670 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

                     Design OK

Maximum Bending Stress Ratio	=	**0.239: 1**	Maximum Shear Stress Ratio	=	**0.167 : 1**	
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**	
fb : Actual	=	486.28 psi	fv : Actual	=	50.91 psi	
FB : Allowable	=	2,037.11 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	14.309 ft	Location of maximum on span	=	17.444 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
   Max Downward Transient Deflection   0.000 in   Ratio =   0 <240.0
   Max Upward Transient Deflection   -0.089 in   Ratio =   2522 >=240.
   Max Downward Total Deflection   0.017 in   Ratio =   13299 >=180
   Max Upward Total Deflection   -0.079 in   Ratio =   2848 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.032	0.027	0.90	0.990	1.00	1.00	1.00	1.00	0.96	1.07	66.63	2065.86	0.33	6.42	238.50
+D+L+H					0.990	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.029	0.024	1.00	0.990	1.00	1.00	1.00	1.00	0.95	1.07	66.63	2274.35	0.33	6.42	265.00
+D+Lr+H					0.990	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.024	0.019	1.25	0.990	1.00	1.00	1.00	1.00	0.92	1.07	66.63	2758.35	0.33	6.42	331.25
+D+S+H					0.990	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.239	0.167	1.15	0.990	1.00	1.00	1.00	1.00	0.96	7.79	486.28	2037.11	2.61	50.91	304.75
+D+0.750Lr+0.750L+H					0.990	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.024	0.019	1.25	0.990	1.00	1.00	1.00	1.00	0.92	1.07	66.63	2758.35	0.33	6.42	331.25

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : Beam RB-9 - 240 Snow - 5 1/8 x 15 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.990	1.00	1.00	1.00	1.00	0.92				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.180	0.127	1.15	0.990	1.00	1.00	1.00	1.00	0.96		5.88	366.86	2037.11	1.98	38.63	304.75
+D+W+H					0.990	1.00	1.00	1.00	1.00	0.96				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86		1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.70E+H					0.990	1.00	1.00	1.00	1.00	0.86				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86		1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.750Lr+0.750L+0.750W+H					0.990	1.00	1.00	1.00	1.00	0.86				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.020	0.015	1.60	0.990	1.00	1.00	1.00	1.00	0.86		1.07	66.63	3306.92	0.33	6.42	424.00
+D+0.750L+0.750S+0.750W+H					0.990	1.00	1.00	1.00	1.00	0.86				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.134	0.091	1.60	0.990	1.00	1.00	1.00	1.00	0.92		5.88	366.86	2728.08	1.98	38.63	424.00
+D+0.750L+0.750S+0.5250E+H					0.990	1.00	1.00	1.00	1.00	0.92				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.134	0.091	1.60	0.990	1.00	1.00	1.00	1.00	0.92		5.88	366.86	2728.08	1.98	38.63	424.00
+0.60D+W+0.60H					0.990	1.00	1.00	1.00	1.00	0.92				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.012	0.009	1.60	0.990	1.00	1.00	1.00	1.00	0.86		0.64	39.98	3306.92	0.20	3.85	424.00
+0.60D+0.70E+0.60H					0.990	1.00	1.00	1.00	1.00	0.86				0.00	0.00	0.00	0.00
Length = 18.670 ft	1	0.012	0.009	1.60	0.990	1.00	1.00	1.00	1.00	0.86		0.64	39.98	3306.92	0.20	3.85	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.0140	4.361	S Only	-0.0888	12.469

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.981	-3.949
Overall MINimum	0.282	-0.118
+D+H	0.470	-0.196
+D+L+H	0.470	-0.196
+D+Lr+H	0.470	-0.196
+D+S+H	2.981	-3.949
+D+0.750Lr+0.750L+H	0.470	-0.196
+D+0.750L+0.750S+H	2.353	-3.011
+D+W+H	0.470	-0.196
+D+0.70E+H	0.470	-0.196
+D+0.750Lr+0.750L+0.750W+H	0.470	-0.196
+D+0.750L+0.750S+0.750W+H	2.353	-3.011
+D+0.750L+0.750S+0.5250E+H	2.353	-3.011
+0.60D+W+0.60H	0.282	-0.118
+0.60D+0.70E+0.60H	0.282	-0.118
D Only	0.470	-0.196
Lr Only		
L Only		
S Only	2.511	-3.753
W Only		
E Only		
H Only		

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4021 north 75th street, #101
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357 Licensee : RUDOW & BERRY

Description : Beam EB-4 - 240 Snow - 4x10

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 900 psi	Ebend- xx 1600 ksi
	Fc - Prll 1350 psi	Eminbend - xx 580 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp 625 psi	
Wood Grade : No.2	Fv 180 psi	
	Ft 575 psi	Density 31.2 pcf
Beam Bracing : Completely Unbraced		

D(0.024) S(0.24)

4x10

Span = 10.750 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Uniform Load : D = 0.0240, S = 0.240 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.775 : 1	Maximum Shear Stress Ratio	=	0.281 : 1	
Section used for this span		4x10	Section used for this span		4x10	
fb : Actual	=	941.24 psi	fv : Actual	=	58.13 psi	
FB : Allowable	=	1,214.27 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.375 ft	Location of maximum on span	=	10.005 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection   0.196 in Ratio =   656 >=240.
Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
Max Downward Total Deflection   0.222 in Ratio =   581 >=180
Max Upward Total Deflection   0.000 in Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.113	0.041	0.90	1.200	1.00	1.00	1.00	1.00	0.98	0.45	107.71	956.32	0.14	6.65	162.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.102	0.037	1.00	1.200	1.00	1.00	1.00	1.00	0.98	0.45	107.71	1060.02	0.14	6.65	180.00
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.082	0.030	1.25	1.200	1.00	1.00	1.00	1.00	0.97	0.45	107.71	1316.12	0.14	6.65	225.00
+D+S+H					1.200	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.775	0.281	1.15	1.200	1.00	1.00	1.00	1.00	0.98	3.91	941.24	1214.27	1.25	58.13	207.00
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.082	0.030	1.25	1.200	1.00	1.00	1.00	1.00	0.97	0.45	107.71	1316.12	0.14	6.65	225.00
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam EB-4 - 240 Snow - 4x10

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 10.750 ft	1	0.604	0.219	1.15	1.200	1.00	1.00	1.00	1.00	0.98	3.05	732.86	1214.27	0.98	45.26	207.00
+D+W+H					1.200	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.065	0.023	1.60	1.200	1.00	1.00	1.00	1.00	0.96	0.45	107.71	1665.19	0.14	6.65	288.00
+D+0.70E+H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.065	0.023	1.60	1.200	1.00	1.00	1.00	1.00	0.96	0.45	107.71	1665.19	0.14	6.65	288.00
+D+0.750Lr+0.750L+0.750W+H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.065	0.023	1.60	1.200	1.00	1.00	1.00	1.00	0.96	0.45	107.71	1665.19	0.14	6.65	288.00
+D+0.750L+0.750S+0.750W+H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.440	0.157	1.60	1.200	1.00	1.00	1.00	1.00	0.96	3.05	732.86	1665.19	0.98	45.26	288.00
+D+0.750L+0.750S+0.5250E+H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.440	0.157	1.60	1.200	1.00	1.00	1.00	1.00	0.96	3.05	732.86	1665.19	0.98	45.26	288.00
+0.60D+W+0.60H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.039	0.014	1.60	1.200	1.00	1.00	1.00	1.00	0.96	0.27	64.63	1665.19	0.09	3.99	288.00
+0.60D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 10.750 ft	1	0.039	0.014	1.60	1.200	1.00	1.00	1.00	1.00	0.96	0.27	64.63	1665.19	0.09	3.99	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2218	5.414		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.457	1.457
Overall MINimum	0.100	0.100
+D+H	0.167	0.167
+D+L+H	0.167	0.167
+D+Lr+H	0.167	0.167
+D+S+H	1.457	1.457
+D+0.750Lr+0.750L+H	0.167	0.167
+D+0.750L+0.750S+H	1.134	1.134
+D+W+H	0.167	0.167
+D+0.70E+H	0.167	0.167
+D+0.750Lr+0.750L+0.750W+H	0.167	0.167
+D+0.750L+0.750S+0.750W+H	1.134	1.134
+D+0.750L+0.750S+0.5250E+H	1.134	1.134
+0.60D+W+0.60H	0.100	0.100
+0.60D+0.70E+0.60H	0.100	0.100
D Only	0.167	0.167
Lr Only		
L Only		
S Only	1.290	1.290
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY
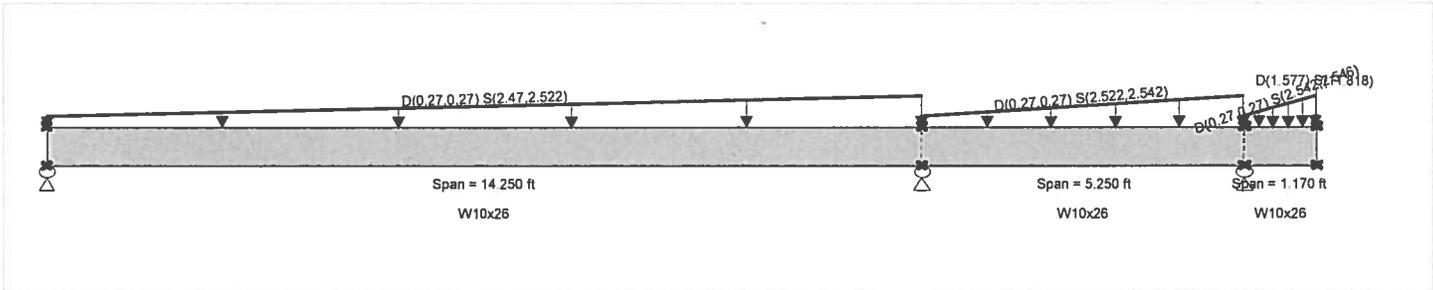
Description : Beam EB-5 - 240 Snow - 4x10

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 900.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind	Fb - Compr 900.0 psi	Ebend- xx 1,600.0 ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0 ksi
	Fc - Perp 625.0 psi	
Wood Species : Douglas Fir - Larch	Fv 180.0 psi	
Wood Grade : No.2	Ft 575.0 psi	Density 31.20 pcf
Beam Bracing : Completely Unbraced		

D(0.167) S(1.29)

D(0.016) S(0.16)   D(0.016) S(0.16)

4x10   4x10

Span = 2.50 ft   Span = 2.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.0160, S = 0.160 , Tributary Width = 1.0 ft
Load for Span Number 2
    Uniform Load : D = 0.0160, S = 0.160 , Tributary Width = 1.0 ft
    Point Load : D = 0.1670, S = 1.290 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.638 : 1**	Maximum Shear Stress Ratio	=	**0.377 : 1**	
Section used for this span		**4x10**	Section used for this span		**4x10**	
fb : Actual	=	788.60 psi	fv : Actual	=	78.02 psi	
FB : Allowable	=	1,236.41 psi	Fv : Allowable	=	207.00 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	2.500 ft	Location of maximum on span	=	2.500 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
    Max Downward Transient Deflection   0.039 in Ratio =   1224 >=240.
    Max Upward Transient Deflection   -0.005 in Ratio =   5874 >=240.
    Max Downward Total Deflection   0.044 in Ratio =   1084 >=180.
    Max Upward Total Deflection   -0.006 in Ratio =   5197 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.094	0.056	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.38	91.37	968.64	0.20	9.06	162.00
Length = 2.0 ft	2	0.094	0.056	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.38	91.37	969.34	0.20	9.06	162.00
+D+L+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.085	0.050	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.38	91.37	1075.82	0.20	9.06	180.00
Length = 2.0 ft	2	0.085	0.050	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.38	91.37	1076.70	0.20	9.06	180.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam EB-5 - 240 Snow - 4x10

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+Lr+H					1.200	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.068	0.040	1.25	1.200	1.00	1.00	1.00	1.00	1.00		0.38	91.37	1343.35	0.20	9.06	225.00
Length = 2.0 ft	2	0.068	0.040	1.25	1.200	1.00	1.00	1.00	1.00	1.00		0.38	91.37	1344.77	0.20	9.06	225.00
+D+S+H					1.200	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.638	0.377	1.15	1.200	1.00	1.00	1.00	1.00	1.00		3.28	788.60	1236.41	1.68	78.02	207.00
Length = 2.0 ft	2	0.637	0.377	1.15	1.200	1.00	1.00	1.00	1.00	1.00		3.28	788.60	1237.60	1.68	78.02	207.00
+D+0.750Lr+0.750L+H					1.200	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.068	0.040	1.25	1.200	1.00	1.00	1.00	1.00	1.00		0.38	91.37	1343.35	0.20	9.06	225.00
Length = 2.0 ft	2	0.068	0.040	1.25	1.200	1.00	1.00	1.00	1.00	1.00		0.38	91.37	1344.77	0.20	9.06	225.00
+D+0.750L+0.750S+H					1.200	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.497	0.294	1.15	1.200	1.00	1.00	1.00	1.00	1.00		2.56	614.29	1236.41	1.31	60.78	207.00
Length = 2.0 ft	2	0.496	0.294	1.15	1.200	1.00	1.00	1.00	1.00	1.00		2.56	614.29	1237.60	1.31	60.78	207.00
+D+W+H					1.200	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1716.83	0.20	9.06	288.00
Length = 2.0 ft	2	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1719.27	0.20	9.06	288.00
+D+0.70E+H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1716.83	0.20	9.06	288.00
Length = 2.0 ft	2	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1719.27	0.20	9.06	288.00
+D+0.750Lr+0.750L+0.750W+H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1716.83	0.20	9.06	288.00
Length = 2.0 ft	2	0.053	0.031	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.38	91.37	1719.27	0.20	9.06	288.00
+D+0.750L+0.750S+0.750W+H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.358	0.211	1.60	1.200	1.00	1.00	1.00	1.00	0.99		2.56	614.29	1716.83	1.31	60.78	288.00
Length = 2.0 ft	2	0.357	0.211	1.60	1.200	1.00	1.00	1.00	1.00	0.99		2.56	614.29	1719.27	1.31	60.78	288.00
+D+0.750L+0.750S+0.5250E+H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.358	0.211	1.60	1.200	1.00	1.00	1.00	1.00	0.99		2.56	614.29	1716.83	1.31	60.78	288.00
Length = 2.0 ft	2	0.357	0.211	1.60	1.200	1.00	1.00	1.00	1.00	0.99		2.56	614.29	1719.27	1.31	60.78	288.00
+0.60D+W+0.60H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.032	0.019	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.23	54.82	1716.83	0.12	5.44	288.00
Length = 2.0 ft	2	0.032	0.019	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.23	54.82	1719.27	0.12	5.44	288.00
+0.60D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	0.99				0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.032	0.019	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.23	54.82	1716.83	0.12	5.44	288.00
Length = 2.0 ft	2	0.032	0.019	1.60	1.200	1.00	1.00	1.00	1.00	0.99		0.23	54.82	1719.27	0.12	5.44	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0058	1.466
+D+S+H	2	0.0443	2.000		0.0000	1.466

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-1.083	3.364	
Overall MINimum	-0.074	0.236	
+D+H	-0.123	0.394	
+D+L+H	-0.123	0.394	
+D+Lr+H	-0.123	0.394	
+D+S+H	-1.083	3.364	
+D+0.750Lr+0.750L+H	-0.123	0.394	
+D+0.750L+0.750S+H	-0.843	2.621	
+D+W+H	-0.123	0.394	
+D+0.70E+H	-0.123	0.394	
+D+0.750Lr+0.750L+0.750W+H	-0.123	0.394	
+D+0.750L+0.750S+0.750W+H	-0.843	2.621	
+D+0.750L+0.750S+0.5250E+H	-0.843	2.621	
+0.60D+W+0.60H	-0.074	0.236	
+0.60D+0.70E+0.60H	-0.074	0.236	
D Only	-0.123	0.394	
Lr Only			
L Only			
S Only	-0.960	2.970	

rudow + berry, inc.
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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam EB-5 - 240 Snow - 4x10

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
W Only			
E Only			
H Only			

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Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357　　　　　　　　　　　　　　　　　　**Licensee : RUDOW & BERRY**

Description :　　Beam RB-10 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
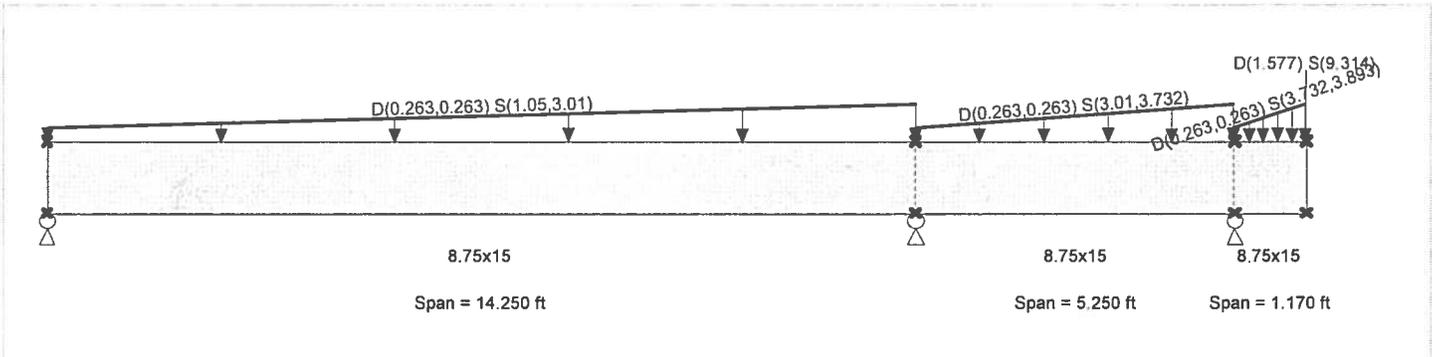Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		
Load Combination : ASCE 7-10 w/ ASD Wind		

			E : Modulus of Elasticity	
Fb - Tension	2,400.0 psi			
Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi	
Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi	
Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi	
Fv	265.0 psi	Eminbend - yy	850.0 ksi	
Ft	1,100.0 psi	Density	31.20 pcf	

Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Completely Unbraced

D(0.329) S(2.322)
D(0.048) S(0.48)
D(0.076,0.134) S(1.074,1.7)

5.125x15

Span = 13.750 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
　Uniform Load : D = 0.0480, S = 0.480 k/ft, Extent = 0.0 -->> 6.0 ft, Tributary Width = 1.0 ft
　Varying Uniform Load : D(S,E) = 0.0760->0.1340, S(S,E) = 1.074->1.70 k/ft, Extent = 6.0 -->> 13.750 ft, Trib Width = 1.0 ft
　Point Load : D = 0.3290, S = 2.322 k @ 6.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.787 : 1**	Maximum Shear Stress Ratio	=	**0.535 : 1**		
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**		
fb : Actual	=	2,082.09 psi	fv : Actual	=	162.95 psi		
FB : Allowable	=	2,645.08 psi	Fv : Allowable	=	304.75 psi		
Load Combination		+D+S+H	Load Combination		+D+S+H		
Location of maximum on span	=	6.975 ft	Location of maximum on span	=	12.546 ft		
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1		

Maximum Deflection
Max Downward Transient Deflection	0.387 in	Ratio =	426 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.428 in	Ratio =	385 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.096	0.061	0.90	1.000	1.00	1.00	1.00	1.00	0.97	3.24	202.15	2098.66	0.75	14.64	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.087	0.055	1.00	1.000	1.00	1.00	1.00	1.00	0.97	3.24	202.15	2320.11	0.75	14.64	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.071	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.95	3.24	202.15	2856.04	0.75	14.64	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.787	0.535	1.15	1.000	1.00	1.00	1.00	1.00	0.96	33.35	2,082.09	2645.08	8.35	162.95	304.75

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam RB-10 - 240 Snow - 5 1/8 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.071	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.95	3.24	202.15	2856.04	0.75	14.64	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	0.95			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.609	0.413	1.15	1.000	1.00	1.00	1.00	1.00	0.96	25.81	1,611.63	2645.08	6.45	125.87	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	0.96			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.057	0.035	1.60	1.000	1.00	1.00	1.00	1.00	0.92	3.24	202.15	3546.48	0.75	14.64	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.057	0.035	1.60	1.000	1.00	1.00	1.00	1.00	0.92	3.24	202.15	3546.48	0.75	14.64	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.057	0.035	1.60	1.000	1.00	1.00	1.00	1.00	0.92	3.24	202.15	3546.48	0.75	14.64	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.454	0.297	1.60	1.000	1.00	1.00	1.00	1.00	0.92	25.81	1,611.63	3546.48	6.45	125.87	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.454	0.297	1.60	1.000	1.00	1.00	1.00	1.00	0.92	25.81	1,611.63	3546.48	6.45	125.87	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.034	0.021	1.60	1.000	1.00	1.00	1.00	1.00	0.92	1.94	121.29	3546.48	0.45	8.79	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	0.92			0.00	0.00	0.00	0.00
Length = 13.750 ft	1	0.034	0.021	1.60	1.000	1.00	1.00	1.00	1.00	0.92	1.94	121.29	3546.48	0.45	8.79	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4277	7.026		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	7.095	10.516
Overall MINimum	0.440	0.556
+D+H	0.733	0.926
+D+L+H	0.733	0.926
+D+Lr+H	0.733	0.926
+D+S+H	7.095	10.516
+D+0.750Lr+0.750L+H	0.733	0.926
+D+0.750L+0.750S+H	5.505	8.118
+D+W+H	0.733	0.926
+D+0.70E+H	0.733	0.926
+D+0.750Lr+0.750L+0.750W+H	0.733	0.926
+D+0.750L+0.750S+0.750W+H	5.505	8.118
+D+0.750L+0.750S+0.5250E+H	5.505	8.118
+0.60D+W+0.60H	0.440	0.556
+0.60D+0.70E+0.60H	0.440	0.556
D Only	0.733	0.926
Lr Only		
L Only		
S Only	6.362	9.589
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR
checked by:

date: 1/17
date:

pg
of 205

<u>RB-11</u>   CANT = 4-8   SPAN = 12-11

$W_1 = 2(24 + 240) = 48D + 480S$

$W_2 = 224D + 2408S \text{ or } 2240S$
$\qquad (@ 9L8) \qquad (@ 240)$

$W_3 = (212D + 2468S \text{ or } 2120S) + \left[(90D - 139S) + (49D + 1101S \text{ or } 868)\right]\frac{12}{11}$

$\qquad = 271D + 3190S \text{ or } 2461S$

$P_1 = -196D - 9002S \text{ or } -31549S$

$P_2 = -123D - 960S \text{ or } -960S$

$P_3 = 161D + 1290S \text{ or } 1290S$

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(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-10: ASD - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

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Company	:
Designer	: MAR
Job Number	: 15105
Model Name	: CCE RB-11

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(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	TS1046	HSS10x4x6	Beam	Tube	A500 Gr.B Rect	Typical	8.97	24.3	104	66.5
2	TS646	HSS6x4x6	Beam	Tube	A500 Gr.B Rect	Typical	6.18	14.9	28.3	32.8

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	4.67	0	0	0	
3	N3	17.58	0	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction	Reaction		
2	N3	Reaction	Reaction	Reaction			

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			TS646	Beam	Tube	A500 Gr.B Rect	Typical
2	M2	N2	N3			TS1046	Beam	Tube	A500 Gr.B Rect	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M1						Yes			None
2	M2						Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torque[ft]	Kyy	Kzz	Cb	Function
1	M1	TS646	4.67			Lbyy						Lateral
2	M2	TS1046	12.91			Lbyy						Lateral

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	.196	1.92
2	M2	Y	.123	5.58

Member Point Loads (BLC 2 : Snow 368)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	9.002	1.92
2	M2	Y	.96	5.58

Member Point Loads (BLC 3 : Snow 240)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	3.753	1.92
2	M2	Y	.96	5.58

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.048	-.048	0	0
2	M2	Y	-.224	-.271	1.92	0

Member Distributed Loads (BLC 2 : Snow 368)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.48	-.48	0	0
2	M2	Y	-2.608	-3.19	1.92	0

Member Distributed Loads (BLC 3 : Snow 240)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.48	-.48	0	0
2	M2	Y	-2.24	-2.667	1.92	0

Load Combinations

	Description	S...	PDelta	SRSS	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	Dead	Yes	Y		1	1																		
2	DL + S368	Yes	Y		1	1	2	1																
3	DL + S240	Yes	Y		1	1	3	1																

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Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	0	1	13.521	3	0	1	0	1	0	1	0	1
2		min	0	1	1.713	1	0	1	0	1	0	1	0	1
3	N3	max	0	1	17.736	2	0	1	0	1	0	1	0	1
4		min	0	1	1.608	1	0	1	0	1	0	1	0	1
5	Totals:	max	0	1	29.104	3	0	1						
6		min	0	1	3.322	1	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation ...	LC	Y Rotation ...	LC	Z Rotation ...	LC
1	N1	max	0	1	.221	2	0	1	0	1	0	1	-1.61e-04	1
2		min	0	1	.02	1	0	1	0	1	0	1	-2.332e-03	2
3	N2	max	0	1	0	1	0	1	0	1	0	1	-8.233e-04	1
4		min	0	1	0	3	0	1	0	1	0	1	-7.866e-03	2
5	N3	max	0	1	0	1	0	1	0	1	0	1	1.173e-02	2
6		min	0	1	0	2	0	1	0	1	0	1	1.121e-03	1

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
1	M1	1	max	0	1	-.167	1	0	1	0	1	0	1	0	1
2			min	0	1	-1.457	3	0	1	0	1	0	1	0	1
3		2	max	0	1	-.249	1	0	1	0	1	0	1	2.076	3
4			min	0	1	-2.1	3	0	1	0	1	0	1	.243	1
5		3	max	0	1	-.332	1	0	1	0	1	0	1	4.903	3
6			min	0	1	-2.743	3	0	1	0	1	0	1	.582	1
7		4	max	0	1	-.414	1	0	1	0	1	0	1	8.48	3
8			min	0	1	-3.386	3	0	1	0	1	0	1	1.018	1
9		5	max	0	1	-.497	1	0	1	0	1	0	1	12.808	3
10			min	0	1	-4.028	3	0	1	0	1	0	1	1.55	1
11	M2	1	max	0	1	9.493	3	0	1	0	1	0	1	12.808	2
12			min	0	1	1.216	1	0	1	0	1	0	1	1.55	1
13		2	max	0	1	12.328	2	0	1	0	1	0	1	-2.268	1
14			min	0	1	1.01	1	0	1	0	1	0	1	-20.699	3
15		3	max	0	1	3.625	2	0	1	0	1	0	1	-4.244	1
16			min	0	1	.264	1	0	1	0	1	0	1	-44.26	2
17		4	max	0	1	-.65	1	0	1	0	1	0	1	-3.633	1
18			min	0	1	-6.757	2	0	1	0	1	0	1	-39.365	2
19		5	max	0	1	-1.608	1	0	1	0	1	0	1	0	1
20			min	0	1	-17.736	2	0	1	0	1	0	1	0	1

Envelope AISC 14th(360-10): ASD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/o...	Pnt/o...	Mnyy/...	Mnzz/...	Eqn
1	M1	HSS6x4..	.469	4.67	3	.071	4.67	y	3	155.9..	170.2..	20.521	27.315	H1-1b
2	M2	HSS10x..	.748	7.665	2	.172	12.91	y	2	136.15	247.0..	32.136	61.976	H1-1b

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of

RB12

$$SPAN\ 1 = 14\text{-}3$$
$$SPAN\ 2 = 5\text{-}3$$
$$CANT = 1\text{-}2$$
$$\left.\right\}\ 20\text{-}8$$

368/102 SNOW)
$$W_L = \left[(294_D + 845_S) + (.92_D + 691_S)\right]\frac{12}{12}(.908) = 2630_D + 1050_S$$

$$W_R = \left[(369_D + 5183_S) + (20_D + 533_S)\right]\frac{12}{12}(.908) = 2630_D + 3893_S$$

240 SNOW) $$P_{END} = 1511_D + 9314_S$$

$$W_L = \left[(294_D + 1987_S) + (108_D + 1140_S)\right]\frac{112}{12}(.908) = 274_D + 2470_S$$
$$(2700_R)$$

$$W_R = \left[(369_D + 3378_S) + (20_D + 360_S)\right]\frac{12}{12}(.908) = 2650_D + 2546_S$$

$$P_{END} = 1511_D + 11818_S$$

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job name: Copper Crest East
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rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam RB-12 - 368/102 Snow - W10x26

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing : Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis : Major Axis Bending		

| Span = 14.250 ft | Span = 5.250 ft | Span = 1.170 ft |
| W10x26 | W10x26 | W10x26 |

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 1.050->3.010 k/ft, Extent = 0.0 -->> 14.250 ft, Trib Width = 1.0 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 3.010->3.732 k/ft, Extent = 0.0 -->> 5.250 ft, Trib Width = 1.0 ft
Load for Span Number 3
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 3.732->3.893 k/ft, Extent = 0.0 -->> 1.170 ft, Trib Width = 1.0 ft
   Point Load : D = 1.577, S = 9.314 k @ 1.170 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.606 : 1	Maximum Shear Stress Ratio =	0.412 : 1
Section used for this span	W10x26	Section used for this span	W10x26
Ma : Applied	45.504 k-ft	Va : Applied	22.044 k
Mn / Omega : Allowable	75.061 k-ft	Vn/Omega : Allowable	53.560 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	14.250ft	Location of maximum on span	14.250 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.245 in	Ratio =	698 >=360
Max Upward Transient Deflection	-0.025 in	Ratio =	2,482 >=360
Max Downward Total Deflection	0.282 in	Ratio =	607 >=180
Max Upward Total Deflection	-0.030 in	Ratio =	2131 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+L+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+Lr+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+S+H													
Dsgn. L = 14.25 ft	1	0.606	0.412	37.01	-45.50	45.50	125.35	75.06	1.48	1.00	22.04	80.34	53.56
Dsgn. L = 5.25 ft	2	0.583	0.293	-0.00	-45.50	45.50	130.42	78.09	1.82	1.00	15.69	80.34	53.56
Dsgn. L = 1.17 ft	3	0.199	0.293		-15.57	15.57	130.42	78.09	1.00	1.00	15.69	80.34	53.56
+D+0.750Lr+0.750L+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description : Beam RB-12 - 368/102 Snow - W10x26

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750L+0.750S+H													
Dsgn. L = 14.25 ft	1	0.474	0.320	28.98	-35.47	35.47	125.01	74.86	1.48	1.00	17.14	80.34	53.56
Dsgn. L = 5.25 ft	2	0.454	0.229	-0.00	-35.47	35.47	130.42	78.09	1.81	1.00	12.25	80.34	53.56
Dsgn. L = 1.17 ft	3	0.156	0.229		-12.19	12.19	130.42	78.09	1.00	1.00	12.25	80.34	53.56
+D+W+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.70E+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 14.25 ft	1	0.077	0.045	4.90	-5.35	5.35	116.46	69.74	1.38	1.00	2.43	80.34	53.56
Dsgn. L = 5.25 ft	2	0.069	0.036	-0.00	-5.35	5.35	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.04	2.04	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 14.25 ft	1	0.474	0.320	28.98	-35.47	35.47	125.01	74.86	1.48	1.00	17.14	80.34	53.56
Dsgn. L = 5.25 ft	2	0.454	0.229	-0.00	-35.47	35.47	130.42	78.09	1.81	1.00	12.25	80.34	53.56
Dsgn. L = 1.17 ft	3	0.156	0.229		-12.19	12.19	130.42	78.09	1.00	1.00	12.25	80.34	53.56
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 14.25 ft	1	0.474	0.320	28.98	-35.47	35.47	125.01	74.86	1.48	1.00	17.14	80.34	53.56
Dsgn. L = 5.25 ft	2	0.454	0.229	-0.00	-35.47	35.47	130.42	78.09	1.81	1.00	12.25	80.34	53.56
Dsgn. L = 1.17 ft	3	0.156	0.229		-12.19	12.19	130.42	78.09	1.00	1.00	12.25	80.34	53.56
+0.60D+W+0.60H													
Dsgn. L = 14.25 ft	1	0.046	0.027	2.94	-3.21	3.21	116.46	69.74	1.38	1.00	1.46	80.34	53.56
Dsgn. L = 5.25 ft	2	0.041	0.021	-0.00	-3.21	3.21	130.42	78.09	1.60	1.00	1.15	80.34	53.56
Dsgn. L = 1.17 ft	3	0.016	0.021		-1.23	1.23	130.42	78.09	1.00	1.00	1.15	80.34	53.56
+0.60D+0.70E+0.60H													
Dsgn. L = 14.25 ft	1	0.046	0.027	2.94	-3.21	3.21	116.46	69.74	1.38	1.00	1.46	80.34	53.56
Dsgn. L = 5.25 ft	2	0.041	0.021	-0.00	-3.21	3.21	130.42	78.09	1.60	1.00	1.15	80.34	53.56
Dsgn. L = 1.17 ft	3	0.016	0.021		-1.23	1.23	130.42	78.09	1.00	1.00	1.15	80.34	53.56

Overall Maximum Deflections

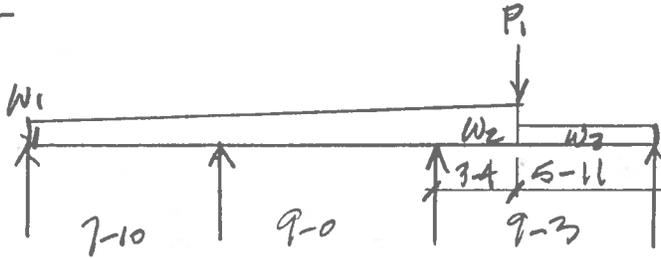| Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2818	6.650		0.0000	0.000
	2	0.0000	6.650	+D+S+H	-0.0296	2.275
+D+S+H	3	0.0245	1.170		0.0000	2.275

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	11.002	37.037	19.911	
Overall MINimum	1.010	2.294	1.226	
+D+H	1.683	3.824	2.043	
+D+L+H	1.683	3.824	2.043	
+D+Lr+H	1.683	3.824	2.043	
+D+S+H	11.002	37.037	19.911	
+D+0.750Lr+0.750L+H	1.683	3.824	2.043	
+D+0.750L+0.750S+H	8.672	28.734	15.444	
+D+W+H	1.683	3.824	2.043	
+D+0.70E+H	1.683	3.824	2.043	
+D+0.750Lr+0.750L+0.750W+H	1.683	3.824	2.043	
+D+0.750L+0.750S+0.750W+H	8.672	28.734	15.444	
+D+0.750L+0.750S+0.5250E+H	8.672	28.734	15.444	
+0.60D+W+0.60H	1.010	2.294	1.226	
+0.60D+0.70E+0.60H	1.010	2.294	1.226	
D Only	1.683	3.824	2.043	
Lr Only				
L Only				
S Only	9.319	33.213	17.868	
W Only				
E Only				
H Only				

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Beam RB-12 - 240 Snow - W10x26

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Strength Design	Fy : Steel Yield : 50.0 ksi
Beam Bracing : Completely Unbraced	E: Modulus : 29,000.0 ksi
Bending Axis : Major Axis Bending	

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.470->2.522 k/ft, Extent = 0.0 –>> 14.250 ft, Trib Width = 1.0 ft
Load for Span Number 2
    Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.522->2.542 k/ft, Extent = 0.0 –>> 5.250 ft, Trib Width = 1.0 ft
Load for Span Number 3
    Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.542->2.546 k/ft, Extent = 0.0 –>> 1.170 ft, Trib Width = 1.0 ft
    Point Load : D = 1.577, S = 11.818 k @ 1.170 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.740 : 1	Maximum Shear Stress Ratio =	0.441 : 1
Section used for this span	W10x26	Section used for this span	W10x26
Ma : Applied	52.072 k-ft	Va : Applied	23.609 k
Mn / Omega : Allowable	70.345 k-ft	Vn/Omega : Allowable	53.560 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	14.250ft	Location of maximum on span	14.250 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.317 in	Ratio =	538 >=360
Max Upward Transient Deflection	-0.035 in	Ratio =	1,803 >=360
Max Downward Total Deflection	0.355 in	Ratio =	481 >=180
Max Upward Total Deflection	-0.039 in	Ratio =	1607 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+L+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+Lr+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+S+H													
Dsgn. L = 14.25 ft	1	0.740	0.441	47.18	-52.07	52.07	117.48	70.34	1.39	1.00	23.61	80.34	53.56
Dsgn. L = 5.25 ft	2	0.667	0.312	-0.00	-52.07	52.07	130.42	78.09	1.64	1.00	16.72	80.34	53.56
Dsgn. L = 1.17 ft	3	0.226	0.312		-17.62	17.62	130.42	78.09	1.00	1.00	16.72	80.34	53.56
+D+0.750Lr+0.750L+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56

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Project Title: Copper Crest East
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Project ID: 15105

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : Beam RB-12 - 240 Snow - W10x26

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750L+0.750S+H													
Dsgn. L = 14.25 ft	1	0.575	0.342	36.64	-40.43	40.43	117.39	70.29	1.39	1.00	18.33	80.34	53.56
Dsgn. L = 5.25 ft	2	0.518	0.243	-0.00	-40.43	40.43	130.42	78.09	1.64	1.00	13.02	80.34	53.56
Dsgn. L = 1.17 ft	3	0.176	0.243		-13.72	13.72	130.42	78.09	1.00	1.00	13.02	80.34	53.56
+D+W+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.70E+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 14.25 ft	1	0.079	0.047	5.02	-5.49	5.49	116.63	69.84	1.38	1.00	2.49	80.34	53.56
Dsgn. L = 5.25 ft	2	0.070	0.036	-0.00	-5.49	5.49	130.42	78.09	1.60	1.00	1.92	80.34	53.56
Dsgn. L = 1.17 ft	3	0.026	0.036		-2.05	2.05	130.42	78.09	1.00	1.00	1.92	80.34	53.56
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 14.25 ft	1	0.575	0.342	36.64	-40.43	40.43	117.39	70.29	1.39	1.00	18.33	80.34	53.56
Dsgn. L = 5.25 ft	2	0.518	0.243	-0.00	-40.43	40.43	130.42	78.09	1.64	1.00	13.02	80.34	53.56
Dsgn. L = 1.17 ft	3	0.176	0.243		-13.72	13.72	130.42	78.09	1.00	1.00	13.02	80.34	53.56
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 14.25 ft	1	0.575	0.342	36.64	-40.43	40.43	117.39	70.29	1.39	1.00	18.33	80.34	53.56
Dsgn. L = 5.25 ft	2	0.518	0.243	-0.00	-40.43	40.43	130.42	78.09	1.64	1.00	13.02	80.34	53.56
Dsgn. L = 1.17 ft	3	0.176	0.243		-13.72	13.72	130.42	78.09	1.00	1.00	13.02	80.34	53.56
+0.60D+W+0.60H													
Dsgn. L = 14.25 ft	1	0.047	0.028	3.01	-3.29	3.29	116.63	69.84	1.38	1.00	1.50	80.34	53.56
Dsgn. L = 5.25 ft	2	0.042	0.022	-0.00	-3.29	3.29	130.42	78.09	1.60	1.00	1.15	80.34	53.56
Dsgn. L = 1.17 ft	3	0.016	0.022		-1.23	1.23	130.42	78.09	1.00	1.00	1.15	80.34	53.56
+0.60D+0.70E+0.60H													
Dsgn. L = 14.25 ft	1	0.047	0.028	3.01	-3.29	3.29	116.63	69.84	1.38	1.00	1.50	80.34	53.56
Dsgn. L = 5.25 ft	2	0.042	0.022	-0.00	-3.29	3.29	130.42	78.09	1.60	1.00	1.15	80.34	53.56
Dsgn. L = 1.17 ft	3	0.016	0.022		-1.23	1.23	130.42	78.09	1.00	1.00	1.15	80.34	53.56

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3553	6.460		0.0000	0.000
	2	0.0000	6.460	+D+S+H	-0.0392	2.345
+D+S+H	3	0.0319	1.170		0.0000	2.345

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	16.177	37.587	17.587	
Overall MINimum	1.034	2.356	1.227	
+D+H	1.724	3.927	2.045	
+D+L+H	1.724	3.927	2.045	
+D+Lr+H	1.724	3.927	2.045	
+D+S+H	16.177	37.587	17.587	
+D+0.750Lr+0.750L+H	1.724	3.927	2.045	
+D+0.750L+0.750S+H	12.564	29.172	13.701	
+D+W+H	1.724	3.927	2.045	
+D+0.70E+H	1.724	3.927	2.045	
+D+0.750Lr+0.750L+0.750W+H	1.724	3.927	2.045	
+D+0.750L+0.750S+0.750W+H	12.564	29.172	13.701	
+D+0.750L+0.750S+0.5250E+H	12.564	29.172	13.701	
+0.60D+W+0.60H	1.034	2.356	1.227	
+0.60D+0.70E+0.60H	1.034	2.356	1.227	
D Only	1.724	3.927	2.045	
Lr Only				
L Only				
S Only	14.453	33.660	15.542	
W Only				
E Only				
H Only				

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam RB-12 - 368/102 Snow - 8 3/4 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
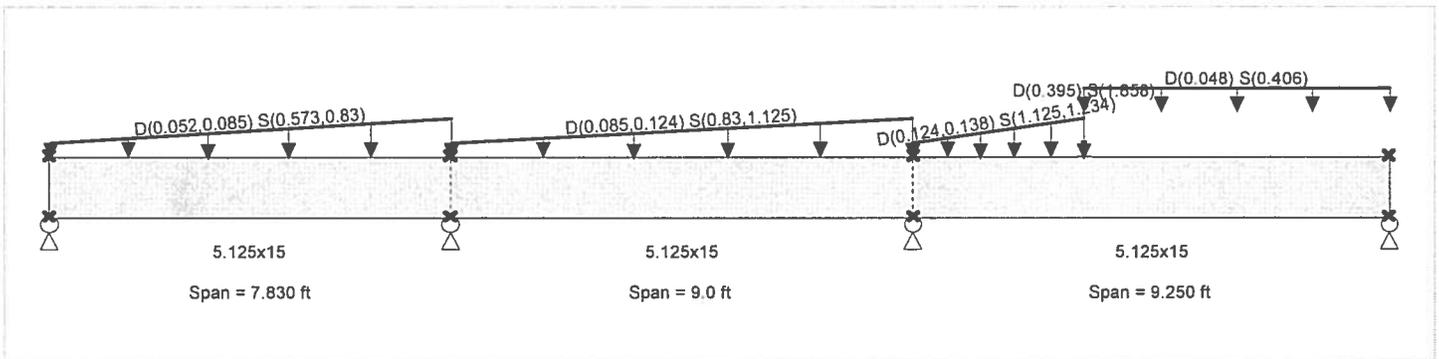Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		F_b - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		F_b - Compr	1,850.0 psi

Analysis Method : Allowable Stress Design
Load Combination :ASCE 7-10 w/ ASD Wind

F_b - Tension   2,400.0 psi   E : Modulus of Elasticity
F_b - Compr   1,850.0 psi E_{bend}- xx   1,800.0 ksi
F_c - Prll   1,650.0 psi $E_{minbend}$ - xx   950.0 ksi
F_c - Perp   650.0 psi E_{bend}- yy   1,600.0 ksi

Wood Species   : DF/DF
Wood Grade   : 24F - V4

F_v 265.0 psi $E_{minbend}$ - yy   850.0 ksi
F_t 1,100.0 psi   Density   31.20 pcf

Beam Bracing   : Completely Unbraced

8.75x15
Span = 14.250 ft

8.75x15
Span = 5.250 ft

8.75x15
Span = 1.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 1.050->3.010 k/ft, Extent = 0.0 -->> 14.250 ft, Trib Width = 1.0 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 3.010->3.732 k/ft, Extent = 0.0 -->> 5.250 ft, Trib Width = 1.0 ft
Load for Span Number 3
   Varying Uniform Load : D(S,E) = 0.2630->0.2630, S(S,E) = 3.732->3.893 k/ft, Extent = 0.0 -->> 1.170 ft, Trib Width = 1.0 ft
   Point Load : D = 1.577, S = 9.314 k @ 1.170 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.813 1**	Maximum Shear Stress Ratio	=	**0.683 : 1**
Section used for this span		**8.75x15**	Section used for this span		**8.75x15**
f_b : Actual	=	1,665.87 psi	f_v : Actual	=	208.11 psi
FB : Allowable	=	2,050.16 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	14.250 ft	Location of maximum on span	=	13.053 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.231 in Ratio =   738 >=240.
   Max Upward Transient Deflection   -0.024 in Ratio =   2621 >=240.
   Max Downward Total Deflection   0.267 in Ratio =   641 >=180
   Max Upward Total Deflection   -0.028 in Ratio =   2247 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	f_b	F'b	V	f_v	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.123	0.101	0.90	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	1604.47	2.11	24.07	238.50
Length = 5.250 ft	2	0.119	0.101	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	1661.41	1.92	24.07	238.50
Length = 1.170 ft	3	0.045	0.101	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	1664.22	1.92	24.07	238.50

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-12 - 368/102 Snow - 8 3/4 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.111	0.091	1.00	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	1782.75	2.11	24.07	265.00
Length = 5.250 ft	2	0.107	0.091	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	1845.55	1.92	24.07	265.00
Length = 1.170 ft	3	0.040	0.091	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	1849.04	1.92	24.07	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.089	0.073	1.25	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	2228.43	2.11	24.07	331.25
Length = 5.250 ft	2	0.086	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	2305.47	1.92	24.07	331.25
Length = 1.170 ft	3	0.032	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	2311.00	1.92	24.07	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.813	0.683	1.15	0.964	1.00	1.00	1.00	1.00	0.99	45.55	1,665.87	2050.16	18.21	208.11	304.75
Length = 5.250 ft	2	0.785	0.683	1.15	1.000	1.00	1.00	1.00	1.00	1.00	45.55	1,665.87	2121.58	15.69	208.11	304.75
Length = 1.170 ft	3	0.268	0.683	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.57	569.41	2126.23	15.69	208.11	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.089	0.073	1.25	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	2228.43	2.11	24.07	331.25
Length = 5.250 ft	2	0.086	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	2305.47	1.92	24.07	331.25
Length = 1.170 ft	3	0.032	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	2311.00	1.92	24.07	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.634	0.532	1.15	0.964	1.00	1.00	1.00	1.00	0.99	35.51	1,298.78	2050.16	14.18	162.10	304.75
Length = 5.250 ft	2	0.612	0.532	1.15	1.000	1.00	1.00	1.00	1.00	1.00	35.51	1,298.78	2121.58	12.25	162.10	304.75
Length = 1.170 ft	3	0.210	0.532	1.15	1.000	1.00	1.00	1.00	1.00	1.00	12.19	445.75	2126.23	12.25	162.10	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.069	0.057	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	2852.40	2.11	24.07	424.00
Length = 5.250 ft	2	0.067	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	2948.31	1.92	24.07	424.00
Length = 1.170 ft	3	0.025	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	2957.53	1.92	24.07	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.069	0.057	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	2852.40	2.11	24.07	424.00
Length = 5.250 ft	2	0.067	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	2948.31	1.92	24.07	424.00
Length = 1.170 ft	3	0.025	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	2957.53	1.92	24.07	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.069	0.057	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.40	197.52	2852.40	2.11	24.07	424.00
Length = 5.250 ft	2	0.067	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.40	197.52	2948.31	1.92	24.07	424.00
Length = 1.170 ft	3	0.025	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.04	74.77	2957.53	1.92	24.07	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.455	0.382	1.60	0.964	1.00	1.00	1.00	1.00	0.99	35.51	1,298.78	2852.40	14.18	162.10	424.00
Length = 5.250 ft	2	0.441	0.382	1.60	1.000	1.00	1.00	1.00	1.00	1.00	35.51	1,298.78	2948.31	12.25	162.10	424.00
Length = 1.170 ft	3	0.151	0.382	1.60	1.000	1.00	1.00	1.00	1.00	1.00	12.19	445.75	2957.53	12.25	162.10	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.455	0.382	1.60	0.964	1.00	1.00	1.00	1.00	0.99	35.51	1,298.78	2852.40	14.18	162.10	424.00
Length = 5.250 ft	2	0.441	0.382	1.60	1.000	1.00	1.00	1.00	1.00	1.00	35.51	1,298.78	2948.31	12.25	162.10	424.00
Length = 1.170 ft	3	0.151	0.382	1.60	1.000	1.00	1.00	1.00	1.00	1.00	12.19	445.75	2957.53	12.25	162.10	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.042	0.034	1.60	0.964	1.00	1.00	1.00	1.00	0.99	3.24	118.51	2852.40	1.26	14.44	424.00
Length = 5.250 ft	2	0.040	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.24	118.51	2948.31	1.15	14.44	424.00
Length = 1.170 ft	3	0.015	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	44.86	2957.53	1.15	14.44	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.042	0.034	1.60	0.964	1.00	1.00	1.00	1.00	0.99	3.24	118.51	2852.40	1.26	14.44	424.00
Length = 5.250 ft	2	0.040	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.24	118.51	2948.31	1.15	14.44	424.00
Length = 1.170 ft	3	0.015	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	44.86	2957.53	1.15	14.44	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2667	6.586		0.0000	0.000
	2	0.0000	6.586	+D+S+H	-0.0280	2.294
+D+S+H	3	0.0231	1.170		0.0000	2.294

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	11.016	37.073	19.912	
Overall MINimum	1.018	2.316	1.226	
+D+H	1.697	3.860	2.044	

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Beam RB-12 - 368/102 Snow - 8 3/4 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+L+H	1.697	3.860	2.044	
+D+Lr+H	1.697	3.860	2.044	
+D+S+H	11.016	37.073	19.912	
+D+0.750Lr+0.750L+H	1.697	3.860	2.044	
+D+0.750L+0.750S+H	8.686	28.770	15.445	
+D+W+H	1.697	3.860	2.044	
+D+0.70E+H	1.697	3.860	2.044	
+D+0.750Lr+0.750L+0.750W+H	1.697	3.860	2.044	
+D+0.750L+0.750S+0.750W+H	8.686	28.770	15.445	
+D+0.750L+0.750S+0.5250E+H	8.686	28.770	15.445	
+0.60D+W+0.60H	1.018	2.316	1.226	
+0.60D+0.70E+0.60H	1.018	2.316	1.226	
D Only	1.697	3.860	2.044	
Lr Only				
L Only				
S Only	9.319	33.213	17.868	
W Only				
E Only				
H Only				

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

**Lic. # : KW-06002357**
Licensee : RUDOW & BERRY

Description : Beam RB-12 - 240 Snow - 8 3/4 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf
Beam Bracing : Completely Unbraced			

Span = 14.250 ft   Span = 5.250 ft   Span = 1.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.470->2.522 k/ft, Extent = 0.0 –>> 14.250 ft, Trib Width = 1.0 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.522->2.542 k/ft, Extent = 0.0 –>> 5.250 ft, Trib Width = 1.0 ft
Load for Span Number 3
   Varying Uniform Load : D(S,E) = 0.270->0.270, S(S,E) = 2.542->2.546 k/ft, Extent = 0.0 –>> 1.170 ft, Trib Width = 1.0 ft
   Point Load : D = 1.577, S = 11.818 k @ 1.170 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.930 : 1**	Maximum Shear Stress Ratio	=	**0.760 : 1**	
Section used for this span		**8.75x15**	Section used for this span		**8.75x15**	
fb : Actual	=	1,906.08 psi	fv : Actual	=	231.48 psi	
FB : Allowable	=	2,050.16 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	14.250 ft	Location of maximum on span	=	13.053 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
   Max Downward Transient Deflection   0.300 in Ratio =   569 >=240.
   Max Upward Transient Deflection   -0.033 in Ratio =   1904 >=240.
   Max Downward Total Deflection   0.336 in Ratio =   508 >=180
   Max Upward Total Deflection   -0.037 in Ratio =   1696 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.126	0.103	0.90	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	1604.47	2.16	24.66	238.50
Length = 5.250 ft	2	0.122	0.103	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	1661.41	1.93	24.66	238.50
Length = 1.170 ft	3	0.045	0.103	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	1664.22	1.93	24.66	238.50

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-12 - 240 Snow - 8 3/4 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.114	0.093	1.00	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	1782.75	2.16	24.66	265.00
Length = 5.250 ft	2	0.110	0.093	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	1845.55	1.93	24.66	265.00
Length = 1.170 ft	3	0.041	0.093	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	1849.04	1.93	24.66	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.091	0.074	1.25	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	2228.43	2.16	24.66	331.25
Length = 5.250 ft	2	0.088	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	2305.47	1.93	24.66	331.25
Length = 1.170 ft	3	0.032	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	2311.00	1.93	24.66	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.930	0.760	1.15	0.964	1.00	1.00	1.00	1.00	0.99	52.12	1,906.08	2050.16	20.25	231.48	304.75
Length = 5.250 ft	2	0.898	0.760	1.15	1.000	1.00	1.00	1.00	1.00	1.00	52.12	1,906.08	2121.58	16.72	231.48	304.75
Length = 1.170 ft	3	0.303	0.760	1.15	1.000	1.00	1.00	1.00	1.00	1.00	17.62	644.32	2126.23	16.72	231.48	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.091	0.074	1.25	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	2228.43	2.16	24.66	331.25
Length = 5.250 ft	2	0.088	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	2305.47	1.93	24.66	331.25
Length = 1.170 ft	3	0.032	0.074	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	2311.00	1.93	24.66	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.722	0.590	1.15	0.964	1.00	1.00	1.00	1.00	0.99	40.47	1,480.18	2050.16	15.73	179.78	304.75
Length = 5.250 ft	2	0.698	0.590	1.15	1.000	1.00	1.00	1.00	1.00	1.00	40.47	1,480.18	2121.58	13.02	179.78	304.75
Length = 1.170 ft	3	0.236	0.590	1.15	1.000	1.00	1.00	1.00	1.00	1.00	13.73	501.98	2126.23	13.02	179.78	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.071	0.058	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	2852.40	2.16	24.66	424.00
Length = 5.250 ft	2	0.069	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	2948.31	1.93	24.66	424.00
Length = 1.170 ft	3	0.025	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	2957.53	1.93	24.66	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.071	0.058	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	2852.40	2.16	24.66	424.00
Length = 5.250 ft	2	0.069	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	2948.31	1.93	24.66	424.00
Length = 1.170 ft	3	0.025	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	2957.53	1.93	24.66	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.071	0.058	1.60	0.964	1.00	1.00	1.00	1.00	0.99	5.54	202.48	2852.40	2.16	24.66	424.00
Length = 5.250 ft	2	0.069	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.54	202.48	2948.31	1.93	24.66	424.00
Length = 1.170 ft	3	0.025	0.058	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.05	74.95	2957.53	1.93	24.66	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.519	0.424	1.60	0.964	1.00	1.00	1.00	1.00	0.99	40.47	1,480.18	2852.40	15.73	179.78	424.00
Length = 5.250 ft	2	0.502	0.424	1.60	1.000	1.00	1.00	1.00	1.00	1.00	40.47	1,480.18	2948.31	13.02	179.78	424.00
Length = 1.170 ft	3	0.170	0.424	1.60	1.000	1.00	1.00	1.00	1.00	1.00	13.73	501.98	2957.53	13.02	179.78	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.519	0.424	1.60	0.964	1.00	1.00	1.00	1.00	0.99	40.47	1,480.18	2852.40	15.73	179.78	424.00
Length = 5.250 ft	2	0.502	0.424	1.60	1.000	1.00	1.00	1.00	1.00	1.00	40.47	1,480.18	2948.31	13.02	179.78	424.00
Length = 1.170 ft	3	0.170	0.424	1.60	1.000	1.00	1.00	1.00	1.00	1.00	13.73	501.98	2957.53	13.02	179.78	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.043	0.035	1.60	0.964	1.00	1.00	1.00	1.00	0.99	3.32	121.49	2852.40	1.29	14.79	424.00
Length = 5.250 ft	2	0.041	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.32	121.49	2948.31	1.16	14.79	424.00
Length = 1.170 ft	3	0.015	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	44.97	2957.53	1.16	14.79	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.250 ft	1	0.043	0.035	1.60	0.964	1.00	1.00	1.00	1.00	0.99	3.32	121.49	2852.40	1.29	14.79	424.00
Length = 5.250 ft	2	0.041	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.32	121.49	2948.31	1.16	14.79	424.00
Length = 1.170 ft	3	0.015	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	44.97	2957.53	1.16	14.79	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3363	6.466		0.0000	0.000
	2	0.0000	6.466	+D+S+H	-0.0371	2.338
+D+S+H	3	0.0301	1.170		0.0000	2.338

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	16.191	37.622	17.588	
Overall MINimum	1.043	2.378	1.227	
+D+H	1.738	3.963	2.045	

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description : Beam RB-12 - 240 Snow - 8 3/4 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+L+H	1.738	3.963	2.045	
+D+Lr+H	1.738	3.963	2.045	
+D+S+H	16.191	37.622	17.588	
+D+0.750Lr+0.750L+H	1.738	3.963	2.045	
+D+0.750L+0.750S+H	12.578	29.207	13.702	
+D+W+H	1.738	3.963	2.045	
+D+0.70E+H	1.738	3.963	2.045	
+D+0.750Lr+0.750L+0.750W+H	1.738	3.963	2.045	
+D+0.750L+0.750S+0.750W+H	12.578	29.207	13.702	
+D+0.750L+0.750S+0.5250E+H	12.578	29.207	13.702	
+0.60D+W+0.60H	1.043	2.378	1.227	
+0.60D+0.70E+0.60H	1.043	2.378	1.227	
D Only	1.738	3.963	2.045	
Lr Only				
L Only				
S Only	14.453	33.660	15.542	
W Only				
E Only				
H Only				

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job name: Copper Crest East
job number: 15105

designed by: MAR
checked by:

date: 1/17
date:

pg
of 222

RB13

PG8/102 SNOW

$$W_1 = (52_D + 698_S)$$
$$W_2 = 138_D + 1215_S$$
$$W_3 = 2(24 + 140) = 48_D + 280_S$$
$$P_1 = R_{REACT} = 395_D + 1961_S$$

240 SNOW

$$W_1 = 52_D + 573_S$$
$$W_2 = 138_D + 1234_S$$
$$W_3 = 2(24 + 203) = 48_D + 406_S$$
$$P_1 = 395_D + 1858_S$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description : Beam RB-13 - 368/102 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		
Load Combination ASCE 7-10 w/ ASD Wind		

			E : Modulus of Elasticity	
F_b - Tension	2,400.0 psi			
F_b - Compr	1,850.0 psi		Ebend- xx	1,800.0 ksi
F_c - Prll	1,650.0 psi		Eminbend - xx	950.0 ksi
F_c - Perp	650.0 psi		Ebend- yy	1,600.0 ksi
F_v	265.0 psi		Eminbend - yy	850.0 ksi
F_t	1,100.0 psi		Density	31.20 pcf

Wood Species : DF/DF
Wood Grade : 24F - V4

Beam Bracing : Completely Unbraced

D(0.052,0.085) S(0.638,0.862) · D(0.085,0.124) S(0.862,1.12) · D(0.124,0.138) S(1.12,1.215) · D(0.395) S(1.967) · D(0.048) S(0.28)

5.125x15   Span = 7.830 ft   5.125x15   Span = 9.0 ft   5.125x15   Span = 9.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.0520->0.0850, S(S,E) = 0.6380->0.8620 k/ft, Extent = 0.0 -->> 7.830 ft, Trib Width = 1.0 ft
Load for Span Number 2
    Varying Uniform Load : D(S,E) = 0.0850->0.1240, S(S,E) = 0.8620->1.120 k/ft, Extent = 0.0 ->> 9.0 ft, Trib Width = 1.0 ft
Load for Span Number 3
    Varying Uniform Load : D(S,E) = 0.1240->0.1380, S(S,E) = 1.120->1.215 k/ft, Extent = 0.0 -->> 3.330 ft, Trib Width = 1.0 ft
    Uniform Load : D = 0.0480, S = 0.280 k/ft, Extent = 3.330 ->> 9.250 ft, Tributary Width = 1.0 ft
    Point Load : D = 0.3950, S = 1.967 k @ 3.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.295 : 1**	Maximum Shear Stress Ratio	=	**0.334 : 1**	
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**	
fb : Actual	=	615.66 psi	fv : Actual	=	101.81 psi	
FB : Allowable	=	2,089.95 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	9.000 ft	
Span # where maximum occurs	=	Span # 3	Span # where maximum occurs	=	Span # 2	

Maximum Deflection
Max Downward Transient Deflection	0.023 in	Ratio =	4809	>=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0	<240.0
Max Downward Total Deflection	0.028 in	Ratio =	3975	>=180
Max Upward Total Deflection	-0.001 in	Ratio =	114100	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.023	0.026	0.90	1.000	1.00	1.00	1.00	1.00	0.99	0.60	37.63	1647.11	0.31	6.14	238.50
Length = 9.0 ft	2	0.050	0.061	0.90	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1644.00	0.74	14.48	238.50

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-13 - 368/102 Snow - 5 1/8 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios		C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
Length = 9.250 ft	3	0.050	0.061	0.90	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1643.43	0.74	14.48	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	0.99			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.021	0.023	1.00	1.000	1.00	1.00	1.00	1.00	0.99	0.60	37.63	1827.44	0.31	6.14	265.00
Length = 9.0 ft	2	0.045	0.055	1.00	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1823.43	0.74	14.48	265.00
Length = 9.250 ft	3	0.045	0.055	1.00	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1822.69	0.74	14.48	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	0.99			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.017	0.019	1.25	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2275.27	0.31	6.14	331.25
Length = 9.0 ft	2	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2268.24	0.74	14.48	331.25
Length = 9.250 ft	3	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2266.93	0.74	14.48	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.189	0.205	1.15	1.000	1.00	1.00	1.00	1.00	0.99	6.34	395.86	2096.68	3.20	62.45	304.75
Length = 9.0 ft	2	0.294	0.334	1.15	1.000	1.00	1.00	1.00	1.00	0.98	9.86	615.66	2091.00	5.22	101.81	304.75
Length = 9.250 ft	3	0.295	0.334	1.15	1.000	1.00	1.00	1.00	1.00	0.98	9.86	615.66	2089.95	5.22	101.81	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.017	0.019	1.25	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2275.27	0.31	6.14	331.25
Length = 9.0 ft	2	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2268.24	0.74	14.48	331.25
Length = 9.250 ft	3	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2266.93	0.74	14.48	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.146	0.159	1.15	1.000	1.00	1.00	1.00	1.00	0.99	4.91	306.30	2096.68	2.48	48.35	304.75
Length = 9.0 ft	2	0.231	0.262	1.15	1.000	1.00	1.00	1.00	1.00	0.98	7.73	482.40	2091.00	4.10	79.98	304.75
Length = 9.250 ft	3	0.231	0.262	1.15	1.000	1.00	1.00	1.00	1.00	0.98	7.73	482.40	2089.95	4.10	79.98	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.106	0.114	1.60	1.000	1.00	1.00	1.00	1.00	0.98	4.91	306.30	2893.89	2.48	48.35	424.00
Length = 9.0 ft	2	0.167	0.189	1.60	1.000	1.00	1.00	1.00	1.00	0.97	7.73	482.40	2880.23	4.10	79.98	424.00
Length = 9.250 ft	3	0.168	0.189	1.60	1.000	1.00	1.00	1.00	1.00	0.97	7.73	482.40	2877.65	4.10	79.98	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.106	0.114	1.60	1.000	1.00	1.00	1.00	1.00	0.98	4.91	306.30	2893.89	2.48	48.35	424.00
Length = 9.0 ft	2	0.167	0.189	1.60	1.000	1.00	1.00	1.00	1.00	0.97	7.73	482.40	2880.23	4.10	79.98	424.00
Length = 9.250 ft	3	0.168	0.189	1.60	1.000	1.00	1.00	1.00	1.00	0.97	7.73	482.40	2877.65	4.10	79.98	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.008	0.009	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.36	22.58	2893.89	0.19	3.68	424.00
Length = 9.0 ft	2	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2880.23	0.45	8.69	424.00
Length = 9.250 ft	3	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2877.65	0.45	8.69	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.008	0.009	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.36	22.58	2893.89	0.19	3.68	424.00
Length = 9.0 ft	2	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2880.23	0.45	8.69	424.00
Length = 9.250 ft	3	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2877.65	0.45	8.69	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0116	3.356		0.0000	0.000
+D+S+H	2	0.0088	4.235	+D+S+H	-0.0009	8.395
+D+S+H	3	0.0279	4.819		0.0000	8.395

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	2.292	8.638	12.429	1.971
Overall MINimum	0.141	0.521	0.945	0.210

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   Beam RB-13 - 368/102 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+H	0.235	0.868	1.575	0.349
+D+L+H	0.235	0.868	1.575	0.349
+D+Lr+H	0.235	0.868	1.575	0.349
+D+S+H	2.292	8.638	12.429	1.971
+D+0.750Lr+0.750L+H	0.235	0.868	1.575	0.349
+D+0.750L+0.750S+H	1.778	6.695	9.716	1.566
+D+W+H	0.235	0.868	1.575	0.349
+D+0.70E+H	0.235	0.868	1.575	0.349
+D+0.750Lr+0.750L+0.750W+H	0.235	0.868	1.575	0.349
+D+0.750L+0.750S+0.750W+H	1.778	6.695	9.716	1.566
+D+0.750L+0.750S+0.5250E+H	1.778	6.695	9.716	1.566
+0.60D+W+0.60H	0.141	0.521	0.945	0.210
+0.60D+0.70E+0.60H	0.141	0.521	0.945	0.210
D Only	0.235	0.868	1.575	0.349
Lr Only				
L Only				
S Only	2.057	7.770	10.855	1.622
W Only				
E Only				
H Only				

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Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Beam RB-13 - 240 Snow - 5 1/8 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF	Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4	Ft	1,100.0 psi	Density 31.20 pcf
Beam Bracing : Completely Unbraced			

D(0.052,0.085) S(0.573,0.83)   D(0.085,0.124) S(0.83,1.125)   D(0.124,0.138) S(1.125,1.234)   D(0.395)S(1.858)   D(0.048) S(0.406)

5.125x15   5.125x15   5.125x15

Span = 7.830 ft   Span = 9.0 ft   Span = 9.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.0520->0.0850, S(S,E) = 0.5730->0.830 k/ft, Extent = 0.0 -->> 7.830 ft, Trib Width = 1.0 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.0850->0.1240, S(S,E) = 0.830->1.125 k/ft, Extent = 0.0 -->> 9.0 ft, Trib Width = 1.0 ft
Load for Span Number 3
   Varying Uniform Load : D(S,E) = 0.1240->0.1380, S(S,E) = 1.125->1.234 k/ft, Extent = 0.0 -->> 3.330 ft, Trib Width = 1.0 ft
   Uniform Load : D = 0.0480, S = 0.4060 k/ft, Extent = 3.330 -->> 9.250 ft, Tributary Width = 1.0 ft
   Point Load : D = 0.3950, S = 1.858 k @ 3.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.307 : 1**	Maximum Shear Stress Ratio	=	**0.349 : 1**
Section used for this span		**5.125x15**	Section used for this span		**5.125x15**
fb : Actual	=	640.70 psi	fv : Actual	=	106.38 psi
FB : Allowable	=	2,089.95 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	9.000 ft
Span # where maximum occurs	=	Span # 3	Span # where maximum occurs	=	Span # 2

Maximum Deflection
   Max Downward Transient Deflection   0.027 in   Ratio =   4168 >=240.
   Max Upward Transient Deflection   -0.001 in   Ratio =   107495 >=240.
   Max Downward Total Deflection   0.031 in   Ratio =   3527 >=180
   Max Upward Total Deflection   -0.001 in   Ratio =   79737 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.023	0.026	0.90	1.000	1.00	1.00	1.00	1.00	0.99	0.60	37.63	1647.11	0.31	6.14	238.50
Length = 9.0 ft	2	0.050	0.061	0.90	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1644.00	0.74	14.48	238.50

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : Beam RB-13 - 240 Snow - 5 1/8 x 15 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 9.250 ft	3	0.050	0.061	0.90	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1643.43	0.74	14.48	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	0.99			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.021	0.023	1.00	1.000	1.00	1.00	1.00	1.00	0.99	0.60	37.63	1827.44	0.31	6.14	265.00
Length = 9.0 ft	2	0.045	0.055	1.00	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1823.43	0.74	14.48	265.00
Length = 9.250 ft	3	0.045	0.055	1.00	1.000	1.00	1.00	1.00	1.00	0.99	1.32	82.64	1822.69	0.74	14.48	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	0.99			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.017	0.019	1.25	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2275.27	0.31	6.14	331.25
Length = 9.0 ft	2	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2268.24	0.74	14.48	331.25
Length = 9.250 ft	3	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2266.93	0.74	14.48	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.178	0.196	1.15	1.000	1.00	1.00	1.00	1.00	0.99	5.98	373.63	2096.68	3.06	59.78	304.75
Length = 9.0 ft	2	0.306	0.349	1.15	1.000	1.00	1.00	1.00	1.00	0.98	10.26	640.70	2091.00	5.45	106.38	304.75
Length = 9.250 ft	3	0.307	0.349	1.15	1.000	1.00	1.00	1.00	1.00	0.98	10.26	640.70	2089.95	5.45	106.38	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.017	0.019	1.25	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2275.27	0.31	6.14	331.25
Length = 9.0 ft	2	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2268.24	0.74	14.48	331.25
Length = 9.250 ft	3	0.036	0.044	1.25	1.000	1.00	1.00	1.00	1.00	0.98	1.32	82.64	2266.93	0.74	14.48	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.138	0.152	1.15	1.000	1.00	1.00	1.00	1.00	0.99	4.64	289.63	2096.68	2.38	46.34	304.75
Length = 9.0 ft	2	0.240	0.274	1.15	1.000	1.00	1.00	1.00	1.00	0.98	8.03	501.18	2091.00	4.27	83.40	304.75
Length = 9.250 ft	3	0.240	0.274	1.15	1.000	1.00	1.00	1.00	1.00	0.98	8.03	501.18	2089.95	4.27	83.40	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	0.98			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.60	37.63	2893.89	0.31	6.14	424.00
Length = 9.0 ft	2	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2880.23	0.74	14.48	424.00
Length = 9.250 ft	3	0.029	0.034	1.60	1.000	1.00	1.00	1.00	1.00	0.97	1.32	82.64	2877.65	0.74	14.48	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.100	0.109	1.60	1.000	1.00	1.00	1.00	1.00	0.98	4.64	289.63	2893.89	2.38	46.34	424.00
Length = 9.0 ft	2	0.174	0.197	1.60	1.000	1.00	1.00	1.00	1.00	0.97	8.03	501.18	2880.23	4.27	83.40	424.00
Length = 9.250 ft	3	0.174	0.197	1.60	1.000	1.00	1.00	1.00	1.00	0.97	8.03	501.18	2877.65	4.27	83.40	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.100	0.109	1.60	1.000	1.00	1.00	1.00	1.00	0.98	4.64	289.63	2893.89	2.38	46.34	424.00
Length = 9.0 ft	2	0.174	0.197	1.60	1.000	1.00	1.00	1.00	1.00	0.97	8.03	501.18	2880.23	4.27	83.40	424.00
Length = 9.250 ft	3	0.174	0.197	1.60	1.000	1.00	1.00	1.00	1.00	0.97	8.03	501.18	2877.65	4.27	83.40	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.008	0.009	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.36	22.58	2893.89	0.19	3.68	424.00
Length = 9.0 ft	2	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2880.23	0.45	8.69	424.00
Length = 9.250 ft	3	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2877.65	0.45	8.69	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	0.97			0.00	0.00	0.00	0.00
Length = 7.830 ft	1	0.008	0.009	1.60	1.000	1.00	1.00	1.00	1.00	0.98	0.36	22.58	2893.89	0.19	3.68	424.00
Length = 9.0 ft	2	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2880.23	0.45	8.69	424.00
Length = 9.250 ft	3	0.017	0.020	1.60	1.000	1.00	1.00	1.00	1.00	0.97	0.79	49.58	2877.65	0.45	8.69	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0109	3.356		0.0000	0.000
+D+S+H	2	0.0079	4.084	+D+S+H	-0.0014	8.319
+D+S+H	3	0.0315	4.897		0.0000	8.319

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	2.126	8.251	12.724	2.404
Overall MINimum	0.141	0.521	0.945	0.210

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Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB-13 - 240 Snow - 5 1/8 x 15 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+H	0.235	0.868	1.575	0.349
+D+L+H	0.235	0.868	1.575	0.349
+D+Lr+H	0.235	0.868	1.575	0.349
+D+S+H	2.126	8.251	12.724	2.404
+D+0.750Lr+0.750L+H	0.235	0.868	1.575	0.349
+D+0.750L+0.750S+H	1.653	6.406	9.937	1.890
+D+W+H	0.235	0.868	1.575	0.349
+D+0.70E+H	0.235	0.868	1.575	0.349
+D+0.750Lr+0.750L+0.750W+H	0.235	0.868	1.575	0.349
+D+0.750L+0.750S+0.750W+H	1.653	6.406	9.937	1.890
+D+0.750L+0.750S+0.5250E+H	1.653	6.406	9.937	1.890
+0.60D+W+0.60H	0.141	0.521	0.945	0.210
+0.60D+0.70E+0.60H	0.141	0.521	0.945	0.210
D Only	0.235	0.868	1.575	0.349
Lr Only				
L Only				
S Only	1.891	7.384	11.149	2.055
W Only				
E Only				
H Only				

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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RB14

$$\text{SPAN} = 23'-4''$$

$$P = R_{B11R} + R_{B7L}$$

$$= (1511_D + 16144_S) + (4690_D + 44112_S) = 6.2^k{}_D + 60.26^k{}_S$$

$$= (1511_D + 13989_S) + (4690_D + 28181_S) = 6.2^k{}_D + 42.17^k{}_S$$

$$@ \; x = 17'-8''$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Beam RB14 - 368/102 Snow - W16x67

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method :	Allowable Strength Design	
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	
Bending Axis :	Major Axis Bending	

F_y : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi
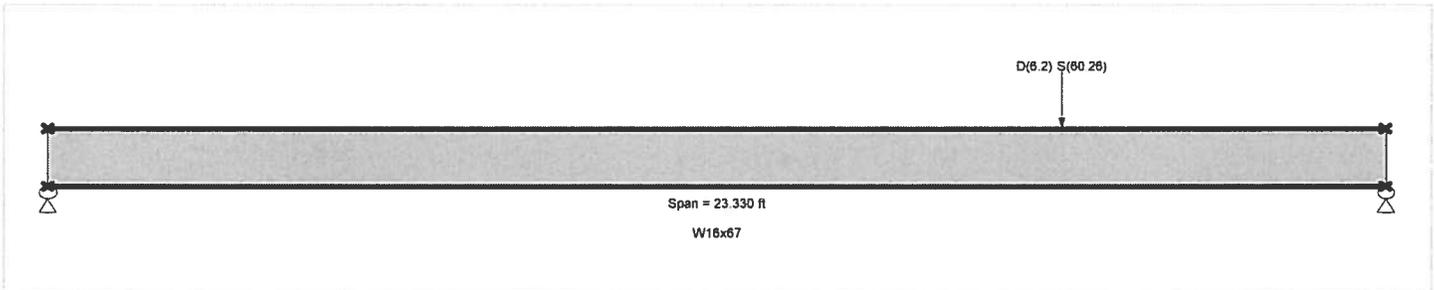
D(6.2) S(60.26)

Span = 23.330 ft

W16x67

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : D = 6.20, S = 60.260 k @ 17.670 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.888 : 1	Maximum Shear Stress Ratio =	0.397 : 1
Section used for this span	W16x67	Section used for this span	W16x67
Ma : Applied	288.162 k-ft	Va : Applied	51.118 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	17.664 ft	Location of maximum on span	23.330 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.681 in	Ratio =	410 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.768 in	Ratio =	365 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+L+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+Lr+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+S+H													
Dsgn. L = 23.33 ft	1	0.888	0.397	288.16		288.16	541.67	324.35	1.00	1.00	51.12	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 23.33 ft	1	0.689	0.308	223.60		223.60	541.67	324.35	1.00	1.00	39.71	193.16	128.77
+D+W+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.70E+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 23.33 ft	1	0.689	0.308	223.60		223.60	541.67	324.35	1.00	1.00	39.71	193.16	128.77
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 23.33 ft	1	0.689	0.308	223.60		223.60	541.67	324.35	1.00	1.00	39.71	193.16	128.77
+0.60D+W+0.60H													
Dsgn. L = 23.33 ft	1	0.055	0.026	17.95		17.95	541.67	324.35	1.00	1.00	3.29	193.16	128.77

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Description : Beam RB14 - 368/102 Snow - W16x67

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 23.33 ft	1	0.055	0.026	17.95		17.95	541.67	324.35	1.00	1.00	3.29	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.7678	13.065		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	16.905	51.118
Overall MINimum	1.371	3.286
+D+H	2.286	5.477
+D+L+H	2.286	5.477
+D+Lr+H	2.286	5.477
+D+S+H	16.905	51.118
+D+0.750Lr+0.750L+H	2.286	5.477
+D+0.750L+0.750S+H	13.250	39.708
+D+W+H	2.286	5.477
+D+0.70E+H	2.286	5.477
+D+0.750Lr+0.750L+0.750W+H	2.286	5.477
+D+0.750L+0.750S+0.750W+H	13.250	39.708
+D+0.750L+0.750S+0.5250E+H	13.250	39.708
+0.60D+W+0.60H	1.371	3.286
+0.60D+0.70E+0.60H	1.371	3.286
D Only	2.286	5.477
Lr Only		
L Only		
S Only	14.619	45.641
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Description : Beam RB14 - 240 Snow - W16x67

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis : Major Axis Bending		

D(6.2) S(42.17)

Span = 23.330 ft

W16x67

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load(s) for Span Number 1
  Point Load : D = 6.20, S = 42.170 k @ 17.670 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.649 : 1**	Maximum Shear Stress Ratio =	**0.291 : 1**
Section used for this span	**W16x67**	Section used for this span	**W16x67**
Ma : Applied	210.639 k-ft	Va : Applied	37.417 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	17.664 ft	Location of maximum on span	23.330 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.477 in	Ratio =	586 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.563 in	Ratio =	497 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+L+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+Lr+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+S+H													
Dsgn. L = 23.33 ft	1	0.649	0.291	210.64		210.64	541.67	324.35	1.00	1.00	37.42	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 23.33 ft	1	0.510	0.229	165.46		165.46	541.67	324.35	1.00	1.00	29.43	193.16	128.77
+D+W+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.70E+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 23.33 ft	1	0.092	0.043	29.92		29.92	541.67	324.35	1.00	1.00	5.48	193.16	128.77
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 23.33 ft	1	0.510	0.229	165.46		165.46	541.67	324.35	1.00	1.00	29.43	193.16	128.77
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 23.33 ft	1	0.510	0.229	165.46		165.46	541.67	324.35	1.00	1.00	29.43	193.16	128.77
+0.60D+W+0.60H													
Dsgn. L = 23.33 ft	1	0.055	0.026	17.95		17.95	541.67	324.35	1.00	1.00	3.29	193.16	128.77

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Steel Beam

Lic. # : KW-06002357

Description : Beam RB14 - 240 Snow - W16x67

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 23.33 ft	1	0.055	0.026	17.95		17.95	541.67	324.35	1.00	1.00	3.29	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.5632	13.065		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	12.516	37.417
Overall MINimum	1.371	3.286
+D+H	2.286	5.477
+D+L+H	2.286	5.477
+D+Lr+H	2.286	5.477
+D+S+H	12.516	37.417
+D+0.750Lr+0.750L+H	2.286	5.477
+D+0.750L+0.750S+H	9.959	29.432
+D+W+H	2.286	5.477
+D+0.70E+H	2.286	5.477
+D+0.750Lr+0.750L+0.750W+H	2.286	5.477
+D+0.750L+0.750S+0.750W+H	9.959	29.432
+D+0.750L+0.750S+0.5250E+H	9.959	29.432
+0.60D+W+0.60H	1.371	3.286
+0.60D+0.70E+0.60H	1.371	3.286
D Only	2.286	5.477
Lr Only		
L Only		
S Only	10.231	31.939
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

FLOOR FRAMING — UNIT 62R
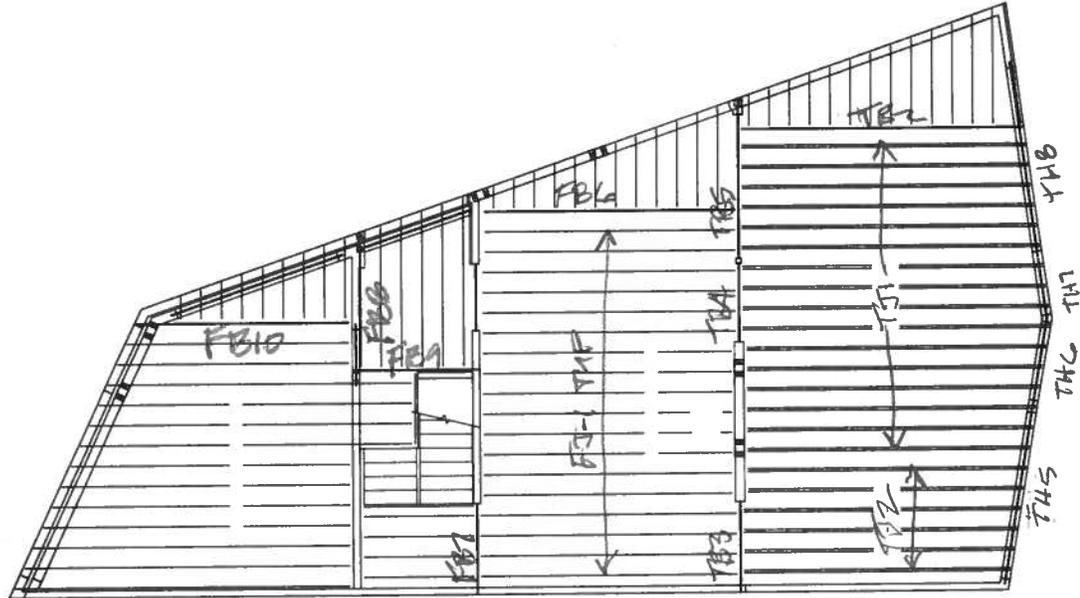
UPPER LEVEL
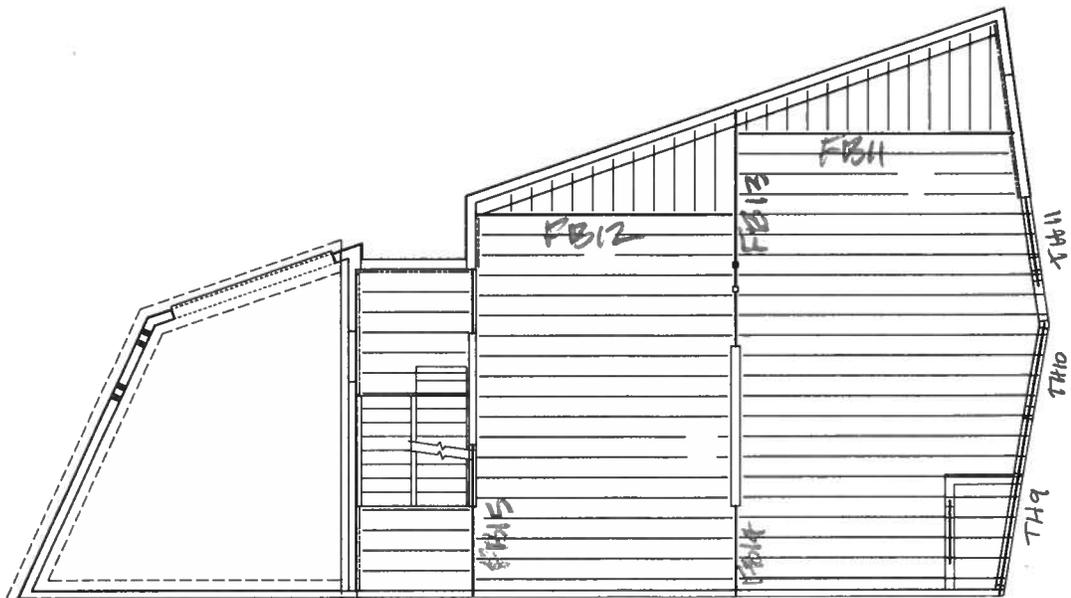
ENTRY LEVEL

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
of 235

$\underline{TB2}$ SPAN = 18-3

$\quad W_L = 1.25(28+359) = 350 + 449_S$

$\quad W_R = 4.25(28+229) = 1196 + 973_S$

$\underline{TB3}$ SPAN = 5'-6"

$\quad W = \frac{1}{2}(17.42)(28+254) + \frac{1}{3}(17.42)(125) + \frac{1}{2}(17.17)(30+40)$

$\quad = 601_D + 343_L + 2164_S$

$\underline{TB4}$ SPAN = 5'-4"

$\quad W = \frac{1}{2}(17.17)(30+40) + \frac{1}{2}(19.42)(28+216) + \frac{1}{3}(19.42)(141)$

$\quad = 529_D + 343_L + 3030_S$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   TB2 - 6 3/4 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.035,0.119) S(0.449,0.973)

6.75x13.5

Span = 18.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.0350->0.1190, S(S,E) = 0.4490->0.9730 k/ft, Extent = 0.0 –>> 18.250 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.734: 1	Maximum Shear Stress Ratio	=	0.385 : 1
Section used for this span		6.75x13.5	Section used for this span		6.75x13.5
fb : Actual	=	1,975.86 psi	fv : Actual	=	117.36 psi
FB : Allowable	=	2,691.09 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	9.658 ft	Location of maximum on span	=	17.184 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.717 in	Ratio =	305 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.814 in	Ratio =	269 >=180.
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.113	0.060	0.90	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	2106.07	0.87	14.24	238.50
+D+L+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.101	0.054	1.00	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	2340.08	0.87	14.24	265.00
+D+Lr+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.081	0.043	1.25	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	2925.10	0.87	14.24	331.25
+D+S+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.734	0.385	1.15	0.975	1.00	1.00	1.00	1.00	1.00	33.76	1,975.86	2691.09	7.13	117.36	304.75
+D+0.750Lr+0.750L+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.081	0.043	1.25	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	2925.10	0.87	14.24	331.25

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : TB2 - 6 3/4 x 13 1/2 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.573	0.301	1.15	0.975	1.00	1.00	1.00	1.00	1.00	26.33	1,541.13	2691.09	5.56	91.58	304.75
+D+W+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.063	0.034	1.60	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	3744.13	0.87	14.24	424.00
+D+0.70E+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.063	0.034	1.60	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	3744.13	0.87	14.24	424.00
+D+0.750Lr+0.750L+0.750W+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.063	0.034	1.60	0.975	1.00	1.00	1.00	1.00	1.00	4.05	236.95	3744.13	0.87	14.24	424.00
+D+0.750L+0.750S+0.750W+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.412	0.216	1.60	0.975	1.00	1.00	1.00	1.00	1.00	26.33	1,541.13	3744.13	5.56	91.58	424.00
+D+0.750L+0.750S+0.5250E+H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.412	0.216	1.60	0.975	1.00	1.00	1.00	1.00	1.00	26.33	1,541.13	3744.13	5.56	91.58	424.00
+0.60D+W+0.60H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.038	0.020	1.60	0.975	1.00	1.00	1.00	1.00	1.00	2.43	142.17	3744.13	0.52	8.55	424.00
+0.60D+0.70E+0.60H					0.975	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.250 ft	1	0.038	0.020	1.60	0.975	1.00	1.00	1.00	1.00	1.00	2.43	142.17	3744.13	0.52	8.55	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.8141	9.325		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.446	8.295
Overall MINimum	0.453	0.606
+D+H	0.755	1.011
+D+L+H	0.755	1.011
+D+Lr+H	0.755	1.011
+D+S+H	6.446	8.295
+D+0.750Lr+0.750L+H	0.755	1.011
+D+0.750L+0.750S+H	5.023	6.474
+D+W+H	0.755	1.011
+D+0.70E+H	0.755	1.011
+D+0.750Lr+0.750L+0.750W+H	0.755	1.011
+D+0.750L+0.750S+0.750W+H	5.023	6.474
+D+0.750L+0.750S+0.5250E+H	5.023	6.474
+0.60D+W+0.60H	0.453	0.606
+0.60D+0.70E+0.60H	0.453	0.606
D Only	0.755	1.011
Lr Only		
L Only		
S Only	5.691	7.285
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Lic. # : KW-06002357　　　　　　　　　　　　　　　　　　　　　　**Licensee : RUDOW & BERRY**

Description :　　TB3 - 6 3/4 x 7 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		F_b - Tension	2400 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		F_b - Compr	1850 psi	Ebend- xx	1800 ksi
		F_c - Prll	1650 psi	Eminbend - xx	950 ksi
Wood Species : DF/DF		F_c - Perp	650 psi	Ebend- yy	1600 ksi
Wood Grade : 24F - V4		F_v	265 psi	Eminbend - yy	850 ksi
		F_t	1100 psi	Density	31.2 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				

D(0.501) L(0.343) S(2.764)

6.75x7.5

Span = 5.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
　　Uniform Load : D = 0.5010, L = 0.3430, S = 2.764 , Tributary Width = 1.0 ft

DESIGN SUMMARY　　　　　　　　　　　　　　　　　　　　　　　　　　　　**Design OK**

Maximum Bending Stress Ratio	=	**0.905 : 1**	Maximum Shear Stress Ratio	=	**0.705 : 1**
Section used for this span		**6.75x7.5**	Section used for this span		**6.75x7.5**
f_b : Actual	=	2,496.45 psi	f_v : Actual	=	214.92 psi
FB : Allowable	=	2,760.00 psi	F_v : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.835 ft	Location of maximum on span	=	5.049 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection				
Max Downward Transient Deflection	0.151 in	Ratio =	449 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.179 in	Ratio =	379 >=180.
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.181	0.141	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.06	390.14	2160.00	1.13	33.59	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.271	0.212	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.44	651.53	2400.00	1.89	56.09	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.130	0.101	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.06	390.14	3000.00	1.13	33.59	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.905	0.705	1.15	1.000	1.00	1.00	1.00	1.00	1.00	13.16	2,496.45	2760.00	7.25	214.92	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.195	0.152	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.09	586.18	3000.00	1.70	50.47	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : TB3 - 6 3/4 x 7 1/2 GLB

Load Combination	Span #	Max Stress Ratios		C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
Length = 5.670 ft	1	0.785	0.612	1.15	1.000	1.00	1.00	1.00	1.00	1.00	11.42	2,165.91	2760.00	6.29	186.47	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.102	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.06	390.14	3840.00	1.13	33.59	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.102	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.06	390.14	3840.00	1.13	33.59	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.153	0.119	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.09	586.18	3840.00	1.70	50.47	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.564	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.42	2,165.91	3840.00	6.29	186.47	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.564	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.42	2,165.91	3840.00	6.29	186.47	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.061	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	234.09	3840.00	0.68	20.15	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.061	0.048	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.23	234.09	3840.00	0.68	20.15	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1794	2.856		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.287	9.287
Overall MINimum	0.871	0.871
+D+H	1.451	1.451
+D+L+H	2.424	2.424
+D+Lr+H	1.451	1.451
+D+S+H	9.287	9.287
+D+0.750Lr+0.750L+H	2.181	2.181
+D+0.750L+0.750S+H	8.058	8.058
+D+W+H	1.451	1.451
+D+0.70E+H	1.451	1.451
+D+0.750Lr+0.750L+0.750W+H	2.181	2.181
+D+0.750L+0.750S+0.750W+H	8.058	8.058
+D+0.750L+0.750S+0.5250E+H	8.058	8.058
+0.60D+W+0.60H	0.871	0.871
+0.60D+0.70E+0.60H	0.871	0.871
D Only	1.451	1.451
Lr Only		
L Only	0.972	0.972
S Only	7.836	7.836
W Only		
E Only		
H Only		

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scottsdale, arizona 85251
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg 242
of 484

FB6   SPAN = 17-2

$$W_L = 4.08 (30 + 40)\quad 320 + 43L$$

$$W_R = 4.00 (30 + 40) = 120 D + 160 L$$

TB5   SPAN = 10'-4"

$$W_1 = \tfrac{1}{2}(17.17)(30+40) + \tfrac{1}{2}(19.17)(28 + 223) + \tfrac{1}{3}(19.17)(136)$$
$$= 526 D + 343 L + 300 G s \quad x = 0 \text{ to } 3'-4"$$

$$W_2 = \tfrac{1}{2}(19.92)(28 + 220) + \tfrac{1}{3}(19.92)(133)$$
$$= 279 D + 3134 s \quad x = 3-4 \text{ to } 8'-8"$$

$$P_1 = R_{FB5R} = 852 D + 1039 L @ x = 3-4$$

$$P_2 = R_{TB2L} = 1555 D + 5691 L @ x = 8-8$$

FB7   SPAN = 5-8"

$$W = \tfrac{1}{2}(24.42)(30 + 40) = 866 D + 988 L$$

FB8   SPAN = 8'-0"   CANT = 9 3/8"

$$P_{END} = R_{FB5R} = 5.44^{k} D + 45.64^{k} s$$

FB9   SPAN = 7-9"

$$W = 5(30 + 40) = 150 D + 200 L$$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB6 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
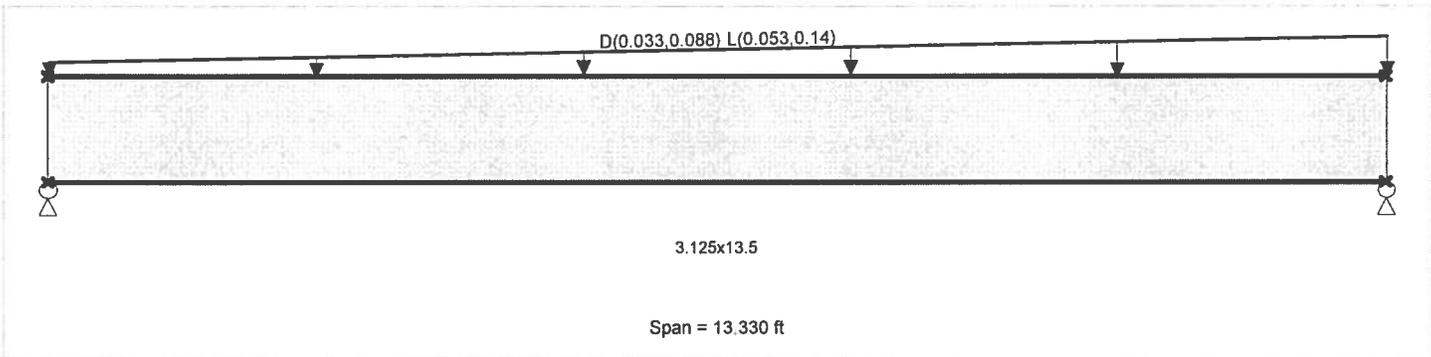Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy	850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.032,0.12) L(0.043,0.16)

3.125x13.5

Span = 17.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.0320->0.120, L(S,E) = 0.0430->0.160 k/ft, Extent = 0.0 -->> 17.170 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.365 : 1**	Maximum Shear Stress Ratio	=	**0.214 : 1**	
Section used for this span		**3.125x13.5**	Section used for this span		**3.125x13.5**	
fb : Actual	=	876.67 psi	fv : Actual	=	56.69 psi	
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	9.337 ft	Location of maximum on span	=	16.105 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.173 in	Ratio =	1189 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.318 in	Ratio =	647 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.185	0.108	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.16	399.54	2160.00	0.72	25.68	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.365	0.214	1.00	1.000	1.00	1.00	1.00	1.00	1.00	6.93	876.67	2400.00	1.59	56.69	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.133	0.078	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.16	399.54	3000.00	0.72	25.68	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.145	0.084	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.16	399.54	2760.00	0.72	25.68	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.252	0.148	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.99	757.39	3000.00	1.38	48.94	331.25

rudow + berry, inc.
4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB6 - 3 1/8 x 13 1/2 GLB

Load Combination	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.274	0.161	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.99	757.39	2760.00	1.38	48.94	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.104	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.16	399.54	3840.00	0.72	25.68	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.104	0.061	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.16	399.54	3840.00	0.72	25.68	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.197	0.115	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.99	757.39	3840.00	1.38	48.94	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.197	0.115	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.99	757.39	3840.00	1.38	48.94	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.197	0.115	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.99	757.39	3840.00	1.38	48.94	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.062	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.90	239.72	3840.00	0.43	15.41	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.170 ft	1	0.062	0.036	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.90	239.72	3840.00	0.43	15.41	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.3184	8.773		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.309	1.896
Overall MINimum	0.363	0.514
+D+H	0.605	0.857
+D+L+H	1.309	1.896
+D+Lr+H	0.605	0.857
+D+S+H	0.605	0.857
+D+0.750Lr+0.750L+H	1.133	1.636
+D+0.750L+0.750S+H	1.133	1.636
+D+W+H	0.605	0.857
+D+0.70E+H	0.605	0.857
+D+0.750Lr+0.750L+0.750W+H	1.133	1.636
+D+0.750L+0.750S+0.750W+H	1.133	1.636
+D+0.750L+0.750S+0.5250E+H	1.133	1.636
+0.60D+W+0.60H	0.363	0.514
+0.60D+0.70E+0.60H	0.363	0.514
D Only	0.605	0.857
Lr Only		
L Only	0.704	1.039
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
Licensee : RUDOW & BERRY
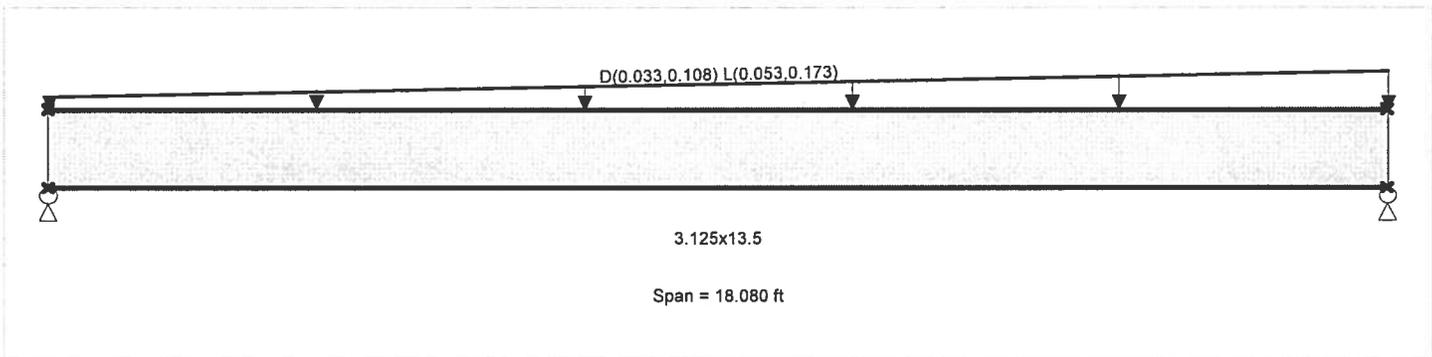
Description : TB4 + TB5 - 5 1/8 x 31.5 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.857) L(1.039)   D(0.755) S(5.691)

D(0.279) S(3.134)

D(0.526) L(0.343) S(3.006)

5.125x31.5

Span = 16.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Uniform Load : D = 0.5260, L = 0.3430, S = 3.006 k/ft, Extent = 0.0 -->> 9.0 ft, Tributary Width = 1.0 ft
    Uniform Load : D = 0.2790, S = 3.134 k/ft, Extent = 9.0 -->> 14.330 ft, Tributary Width = 1.0 ft
    Point Load : D = 0.8570, L = 1.039 k @ 9.0 ft
    Point Load : D = 0.7550, S = 5.691 k @ 14.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.653 1	Maximum Shear Stress Ratio	=	0.608 : 1
Section used for this span		5.125x31.5	Section used for this span		5.125x31.5
fb : Actual	=	1,681.08 psi	fv : Actual	=	185.26 psi
FB : Allowable	=	2,575.17 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.175 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.195 in	Ratio =	986 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.229 in	Ratio =	837 >=180.
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.129	0.121	0.90	0.933	1.00	1.00	1.00	1.00	1.00	18.36	259.99	2015.35	3.10	28.78	238.50
+D+L+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.182	0.171	1.00	0.933	1.00	1.00	1.00	1.00	1.00	28.77	407.36	2239.28	4.89	45.43	265.00
+D+Lr+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.093	0.087	1.25	0.933	1.00	1.00	1.00	1.00	1.00	18.36	259.99	2799.10	3.10	28.78	331.25
+D+S+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   TB4 + TB5 - 5 1/8 x 31.5 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 16.0 ft	1	0.653	0.608	1.15	0.933	1.00	1.00	1.00	1.00	1.00	118.73	1,681.08	2575.17	19.94	185.26	304.75
+D+0.750Lr+0.750L+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.132	0.125	1.25	0.933	1.00	1.00	1.00	1.00	1.00	26.17	370.51	2799.10	4.44	41.27	331.25
+D+0.750L+0.750S+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.558	0.521	1.15	0.933	1.00	1.00	1.00	1.00	1.00	101.44	1,436.21	2575.17	17.07	158.63	304.75
+D+W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.073	0.068	1.60	0.933	1.00	1.00	1.00	1.00	1.00	18.36	259.99	3582.85	3.10	28.78	424.00
+D+0.70E+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.073	0.068	1.60	0.933	1.00	1.00	1.00	1.00	1.00	18.36	259.99	3582.85	3.10	28.78	424.00
+D+0.750Lr+0.750L+0.750W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.103	0.097	1.60	0.933	1.00	1.00	1.00	1.00	1.00	26.17	370.51	3582.85	4.44	41.27	424.00
+D+0.750L+0.750S+0.750W+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.401	0.374	1.60	0.933	1.00	1.00	1.00	1.00	1.00	101.44	1,436.21	3582.85	17.07	158.63	424.00
+D+0.750L+0.750S+0.5250E+H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.401	0.374	1.60	0.933	1.00	1.00	1.00	1.00	1.00	101.44	1,436.21	3582.85	17.07	158.63	424.00
+0.60D+W+0.60H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.044	0.041	1.60	0.933	1.00	1.00	1.00	1.00	1.00	11.02	156.00	3582.85	1.86	17.27	424.00
+0.60D+0.70E+0.60H					0.933	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.044	0.041	1.60	0.933	1.00	1.00	1.00	1.00	1.00	11.02	156.00	3582.85	1.86	17.27	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2292	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	29.104	28.738
Overall MINimum	2.673	1.453
+D+H	4.539	3.854
+D+L+H	7.212	5.306
+D+Lr+H	4.539	3.854
+D+S+H	29.104	28.738
+D+0.750Lr+0.750L+H	6.544	4.943
+D+0.750L+0.750S+H	24.968	23.606
+D+W+H	4.539	3.854
+D+0.70E+H	4.539	3.854
+D+0.750Lr+0.750L+0.750W+H	6.544	4.943
+D+0.750L+0.750S+0.750W+H	24.968	23.606
+D+0.750L+0.750S+0.5250E+H	24.968	23.606
+0.60D+W+0.60H	2.723	2.312
+0.60D+0.70E+0.60H	2.723	2.312
D Only	4.539	3.854
Lr Only		
L Only	2.673	1.453
S Only	24.565	24.884
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Licensee : RUDOW & BERRY

Description :   FB7 - 6x8 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	875.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	875.0 psi	Ebend- xx 1,300.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx 470.0 ksi
	Fc - Perp	625.0 psi	
Wood Species : Douglas Fir - Larch	Fv	170.0 psi	
Wood Grade : No.2	Ft	425.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			

D(0.366) L(0.488)

6x8

Span = 5.670 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.3660, L = 0.4880 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.913 1	Maximum Shear Stress Ratio	=	0.404 : 1	
Section used for this span		6x8	Section used for this span		6x8	
fb : Actual	=	798.70 psi	fv : Actual	=	68.76 psi	
FB : Allowable	=	875.00 psi	Fv : Allowable	=	170.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	2.835 ft	Location of maximum on span	=	5.049 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.045 in	Ratio =	1498 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.079 in	Ratio =	856 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.435	0.193	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.47	342.30	787.50	0.81	29.47	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.913	0.404	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.43	798.70	875.00	1.89	68.76	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.313	0.139	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.47	342.30	1093.75	0.81	29.47	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.340	0.151	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.47	342.30	1006.25	0.81	29.47	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.626	0.277	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.94	684.60	1093.75	1.62	58.94	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.680	0.301	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.94	684.60	1006.25	1.62	58.94	195.50

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Description :   FB7 - 6x8 D.Fir #2

| Load Combination | | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.244	0.108	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.47	342.30	1400.00	0.81	29.47	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.244	0.108	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.47	342.30	1400.00	0.81	29.47	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.489	0.217	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.94	684.60	1400.00	1.62	58.94	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.489	0.217	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.94	684.60	1400.00	1.62	58.94	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.489	0.217	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.94	684.60	1400.00	1.62	58.94	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.147	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.88	205.38	1400.00	0.49	17.68	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.147	0.065	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.88	205.38	1400.00	0.49	17.68	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0795	2.856		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.421	2.421
Overall MINimum	0.623	0.623
+D+H	1.038	1.038
+D+L+H	2.421	2.421
+D+Lr+H	1.038	1.038
+D+S+H	1.038	1.038
+D+0.750Lr+0.750L+H	2.075	2.075
+D+0.750L+0.750S+H	2.075	2.075
+D+W+H	1.038	1.038
+D+0.70E+H	1.038	1.038
+D+0.750Lr+0.750L+0.750W+H	2.075	2.075
+D+0.750L+0.750S+0.750W+H	2.075	2.075
+D+0.750L+0.750S+0.5250E+H	2.075	2.075
+0.60D+W+0.60H	0.623	0.623
+0.60D+0.70E+0.60H	0.623	0.623
D Only	1.038	1.038
Lr Only		
L Only	1.383	1.383
S Only		
W Only		
E Only		
H Only		

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Beam

Lic. # : KW-06002357

Description : FB8 - HSS10x6x3/8

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method :	Allowable Strength Design	F_y : Steel Yield :	46.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

D(6 638) S(63 925)

Span = 3 330 ft   Span = 1.30 ft

HSS10x6x5/8   HSS10x6x5/8

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load(s) for Span Number 2
    Point Load : D = 6.638, S = 63.925 k @ 1.30 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.779 : 1	Maximum Shear Stress Ratio =	0.445 : 1
Section used for this span	HSS10x6x5/8	Section used for this span	HSS10x6x5/8
Ma : Applied	91.782 k-ft	Va : Applied	70.640 k
Mn / Omega : Allowable	117.754 k-ft	Vn/Omega : Allowable	158.570 k
Load Combination	+D+S+H	Load Combination	+D+S+H
Location of maximum on span	3.330 ft	Location of maximum on span	3.330 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.049 in	Ratio =	631 >=360
Max Upward Transient Deflection	-0.018 in	Ratio =	2,268 >=360
Max Downward Total Deflection	0.055 in	Ratio =	572 >=180
Max Upward Total Deflection	-0.019 in	Ratio =	2057 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+L+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+Lr+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+S+H													
Dsgn. L = 3.33 ft	1	0.779	0.445		-91.78	91.78	196.65	117.75	1.00	1.00	70.64	264.81	158.57
Dsgn. L = 1.30 ft	2	0.779	0.445		-91.78	91.78	196.65	117.75	1.00	1.00	70.64	264.81	158.57
+D+0.750Lr+0.750L+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+0.750L+0.750S+H													
Dsgn. L = 3.33 ft	1	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
Dsgn. L = 1.30 ft	2	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
+D+W+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+0.70E+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57

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Project ID: 15105

Steel Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   FB8 - HSS10x6x3/8

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+0.750Lr+0.750L+0.750W+H													
Dsgn. L = 3.33 ft	1	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
Dsgn. L = 1.30 ft	2	0.074	0.042		-8.68	8.68	196.65	117.75	1.00	1.00	6.72	264.81	158.57
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 3.33 ft	1	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
Dsgn. L = 1.30 ft	2	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 3.33 ft	1	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
Dsgn. L = 1.30 ft	2	0.603	0.345		-71.01	71.01	196.65	117.75	1.00	1.00	54.66	264.81	158.57
+0.60D+W+0.60H													
Dsgn. L = 3.33 ft	1	0.044	0.025		-5.21	5.21	196.65	117.75	1.00	1.00	4.03	264.81	158.57
Dsgn. L = 1.30 ft	2	0.044	0.025		-5.21	5.21	196.65	117.75	1.00	1.00	4.03	264.81	158.57
+0.60D+0.70E+0.60H													
Dsgn. L = 3.33 ft	1	0.044	0.025		-5.21	5.21	196.65	117.75	1.00	1.00	4.03	264.81	158.57
Dsgn. L = 1.30 ft	2	0.044	0.025		-5.21	5.21	196.65	117.75	1.00	1.00	4.03	264.81	158.57

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0194	1.931
+D+S+H	2	0.0545	1.300		0.0000	1.931

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-27.463	98.301	
Overall MINimum	-1.505	5.652	
+D+H	-2.508	9.420	
+D+L+H	-2.508	9.420	
+D+Lr+H	-2.508	9.420	
+D+S+H	-27.463	98.301	
+D+0.750Lr+0.750L+H	-2.508	9.420	
+D+0.750L+0.750S+H	-21.224	76.081	
+D+W+H	-2.508	9.420	
+D+0.70E+H	-2.508	9.420	
+D+0.750Lr+0.750L+0.750W+H	-2.508	9.420	
+D+0.750L+0.750S+0.750W+H	-21.224	76.081	
+D+0.750L+0.750S+0.5250E+H	-21.224	76.081	
+0.60D+W+0.60H	-1.505	5.652	
+0.60D+0.70E+0.60H	-1.505	5.652	
D Only	-2.508	9.420	
Lr Only			
L Only			
S Only	-24.956	88.881	
W Only			
E Only			
H Only			

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   FB9 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF	Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.15) L(0.2)

3.125x13.5

Span = 7.750 ft

Applied Loads   Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.150, L = 0.20 , Tributary Width = 1.0 ft

DESIGN SUMMARY   Design OK

Maximum Bending Stress Ratio	=	**0.142 1**	Maximum Shear Stress Ratio	=	**0.134 : 1**	
Section used for this span		**3.125x13.5**	Section used for this span		**3.125x13.5**	
fb : Actual	=	340.87 psi	fv : Actual	=	35.40 psi	
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	3.875 ft	Location of maximum on span	=	6.647 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
  Max Downward Transient Deflection   0.014 in Ratio =   6568 >=480.
  Max Upward Transient Deflection   0.000 in Ratio =   0 <480.0
  Max Downward Total Deflection   0.025 in Ratio =   3657 >=240.
  Max Upward Total Deflection   0.000 in Ratio =   0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.070	0.066	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.19	151.05	2160.00	0.44	15.68	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.142	0.134	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.70	340.87	2400.00	1.00	35.40	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.050	0.047	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.19	151.05	3000.00	0.44	15.68	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.055	0.051	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.19	151.05	2760.00	0.44	15.68	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.098	0.092	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.32	293.42	3000.00	0.86	30.47	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   FB9 - 3 1/8 x 13 1/2 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 7.750 ft	1	0.106	0.100	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.32	293.42	2760.00	0.86	30.47	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.039	0.037	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.19	151.05	3840.00	0.44	15.68	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.039	0.037	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.19	151.05	3840.00	0.44	15.68	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.076	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.32	293.42	3840.00	0.86	30.47	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.076	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.32	293.42	3840.00	0.86	30.47	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.076	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.32	293.42	3840.00	0.86	30.47	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.024	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.72	90.63	3840.00	0.26	9.41	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.750 ft	1	0.024	0.022	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.72	90.63	3840.00	0.26	9.41	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0254	3.903		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.392	1.392
Overall MINimum	0.370	0.370
+D+H	0.617	0.617
+D+L+H	1.392	1.392
+D+Lr+H	0.617	0.617
+D+S+H	0.617	0.617
+D+0.750Lr+0.750L+H	1.198	1.198
+D+0.750L+0.750S+H	1.198	1.198
+D+W+H	0.617	0.617
+D+0.70E+H	0.617	0.617
+D+0.750Lr+0.750L+0.750W+H	1.198	1.198
+D+0.750L+0.750S+0.750W+H	1.198	1.198
+D+0.750L+0.750S+0.5250E+H	1.198	1.198
+0.60D+W+0.60H	0.370	0.370
+0.60D+0.70E+0.60H	0.370	0.370
D Only	0.617	0.617
Lr Only		
L Only	0.775	0.775
S Only		
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
of 251

FB10   SPAN = 13'-4"

$W_L = 1.33 (25 + 40) = 33_D + 53_L$

$W_R = 3.5 (\; '' \;) = 88_D + 140_L$

FB11   SPAN = 18'-1"

$W_L = 1.33 (25 + 40) = 33_D + 53_L$

$W_R = 4.33 (\; '' \;) = 108_D + 173_L$

FB12   SPAN = 17-0

$W_L = 1.0 (25 + 40) = 25_D + 40_L$

$W_R = 4.0 (\; '' \;) = 100_D + 160_L$

FB13   SPAN = 11'-8"

$W_1 = \frac{1}{2} (9.67)(25 + 40) = 452_D + 193_L \quad x = 0 \; TO \; 4'-11"$

$W_2 = \frac{1}{2} (19.75)(25 + 40) = 247_D + 395_L \quad x = 4-11 \; TO \; 10'-3"$

$P_1 = R_{TJ4} + R_{TBSL} = (143_D + 91_L + 80_{54}) + (2909_D + 1646_L + 1632_{LS})$
$\qquad = 4348_D + 2576_L + 2440_{LS} \quad @ \; x = 1'-7"$

$P_2 = R_{FB12R} = 745_D + 1020_L \qquad @ \; x = 4'-11"$

$P_3 = R_{FB11L} = 607_D + 341_L \qquad @ \; x = 10'-3"$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16
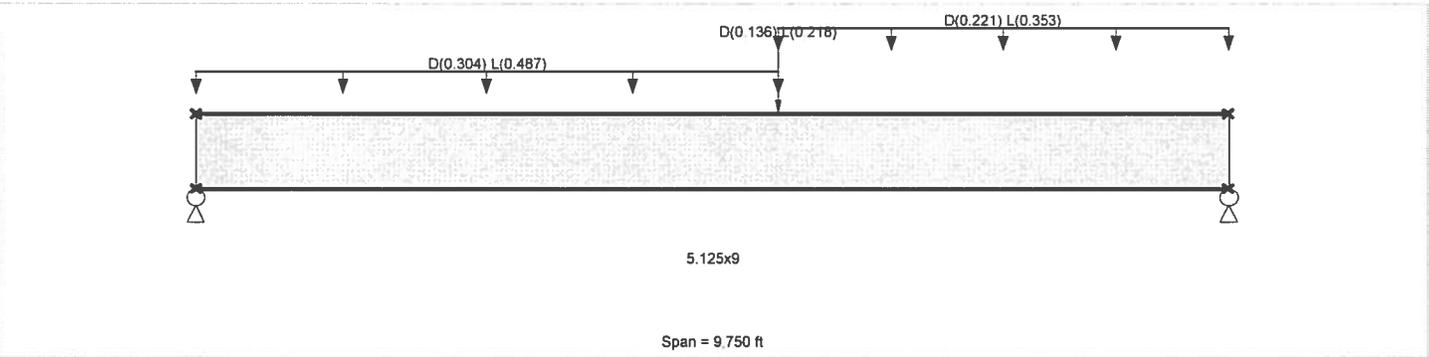
Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB10 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.033,0.088) L(0.053,0.14)

3.125x13.5

Span = 13.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.0330->0.0880, L(S,E) = 0.0530->0.140 k/ft, Extent = 0.0 --» 13.330 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.195 : 1	Maximum Shear Stress Ratio	=	0.135 : 1	
Section used for this span		3.125x13.5	Section used for this span		3.125x13.5	
fb : Actual	=	468.85 psi	fv : Actual	=	35.78 psi	
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	7.151 ft	Location of maximum on span	=	12.211 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection			
Max Downward Transient Deflection	0.060 in	Ratio =	2674 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.103 in	Ratio =	1553 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.091	0.062	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.55	196.39	2160.00	0.42	14.90	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.195	0.135	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.71	468.85	2400.00	1.01	35.78	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.065	0.045	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.55	196.39	3000.00	0.42	14.90	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.071	0.049	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.55	196.39	2760.00	0.42	14.90	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.134	0.092	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.17	400.73	3000.00	0.86	30.56	331.25

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Wood Beam

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Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB10 - 3 1/8 x 13 1/2 GLB

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.145	0.100	1.15	1.000	1.00	1.00	1.00	1.00	1.00		3.17	400.73	2760.00	0.86	30.56	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.051	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.55	196.39	3840.00	0.42	14.90	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.051	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.55	196.39	3840.00	0.42	14.90	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.104	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.17	400.73	3840.00	0.86	30.56	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.104	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.17	400.73	3840.00	0.86	30.56	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.104	0.072	1.60	1.000	1.00	1.00	1.00	1.00	1.00		3.17	400.73	3840.00	0.86	30.56	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.031	0.021	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.93	117.83	3840.00	0.25	8.94	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 13.330 ft	1	0.031	0.021	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.93	117.83	3840.00	0.25	8.94	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.1030	6.811		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.950	1.265
Overall MINimum	0.242	0.315
+D+H	0.403	0.525
+D+L+H	0.950	1.265
+D+Lr+H	0.403	0.525
+D+S+H	0.403	0.525
+D+0.750Lr+0.750L+H	0.813	1.080
+D+0.750L+0.750S+H	0.813	1.080
+D+W+H	0.403	0.525
+D+0.70E+H	0.403	0.525
+D+0.750Lr+0.750L+0.750W+H	0.813	1.080
+D+0.750L+0.750S+0.750W+H	0.813	1.080
+D+0.750L+0.750S+0.5250E+H	0.813	1.080
+0.60D+W+0.60H	0.242	0.315
+0.60D+0.70E+0.60H	0.242	0.315
D Only	0.403	0.525
Lr Only		
L Only	0.547	0.740
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY
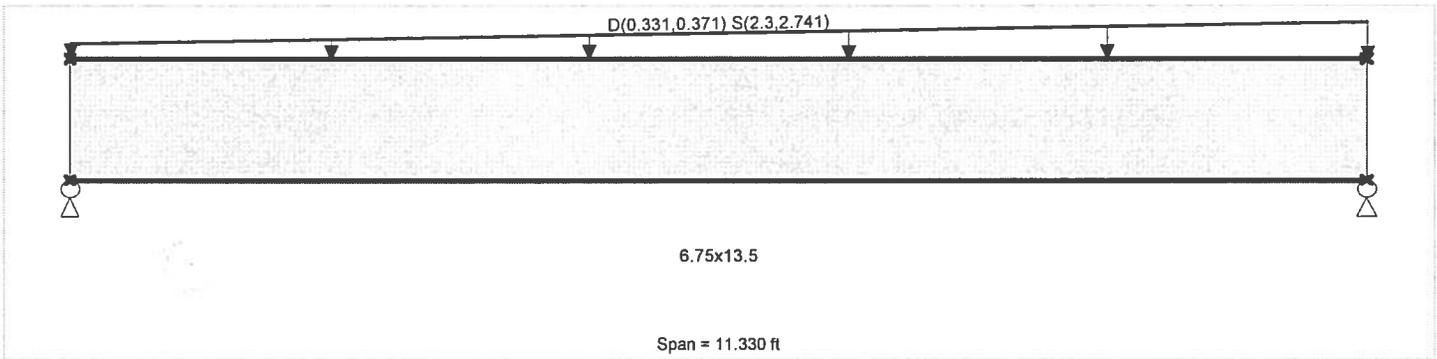
Description :   FB11 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.033,0.108) L(0.053,0.173)

3.125x13.5

Span = 18.080 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.0330->0.1080, L(S,E) = 0.0530->0.1730 k/ft, Extent = 0.0 --> 18.080 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.418 1	Maximum Shear Stress Ratio	=	0.230 : 1	
Section used for this span		3.125x13.5	Section used for this span		3.125x13.5	
fb : Actual	=	1,002.08 psi	fv : Actual	=	61.03 psi	
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi	
Load Combination		+D+L+H	Load Combination		+D+L+H	
Location of maximum on span	=	9.766 ft	Location of maximum on span	=	16.958 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.237 in	Ratio =	915 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.404 in	Ratio =	536 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+H														0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.192	0.105	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.27	413.89	2160.00	0.70	25.04	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.418	0.230	1.00	1.000	1.00	1.00	1.00	1.00	1.00		7.93	1,002.08	2400.00	1.72	61.03	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.138	0.076	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.27	413.89	3000.00	0.70	25.04	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.150	0.082	1.15	1.000	1.00	1.00	1.00	1.00	1.00		3.27	413.89	2760.00	0.70	25.04	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.285	0.157	1.25	1.000	1.00	1.00	1.00	1.00	1.00		6.76	855.04	3000.00	1.46	52.03	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357　　　　　　　　　　　　　　　　Licensee : RUDOW & BERRY

Description :　　FB11 - 3 1/8 x 13 1/2 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.310	0.171	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.76	855.04	2760.00	1.46	52.03	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.108	0.059	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.27	413.89	3840.00	0.70	25.04	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.108	0.059	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.27	413.89	3840.00	0.70	25.04	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.223	0.123	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.76	855.04	3840.00	1.46	52.03	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.223	0.123	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.76	855.04	3840.00	1.46	52.03	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.223	0.123	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.76	855.04	3840.00	1.46	52.03	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.065	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.96	248.33	3840.00	0.42	15.02	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.080 ft	1	0.065	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.96	248.33	3840.00	0.42	15.02	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.4040	9.238		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1　　　　　　Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.448	2.035
Overall MINimum	0.364	0.500
+D+H	0.607	0.833
+D+L+H	1.448	2.035
+D+Lr+H	0.607	0.833
+D+S+H	0.607	0.833
+D+0.750Lr+0.750L+H	1.237	1.735
+D+0.750L+0.750S+H	1.237	1.735
+D+W+H	0.607	0.833
+D+0.70E+H	0.607	0.833
+D+0.750Lr+0.750L+0.750W+H	1.237	1.735
+D+0.750L+0.750S+0.750W+H	1.237	1.735
+D+0.750L+0.750S+0.5250E+H	1.237	1.735
+0.60D+W+0.60H	0.364	0.500
+0.60D+0.70E+0.60H	0.364	0.500
D Only	0.607	0.833
Lr Only		
L Only	0.841	1.202
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

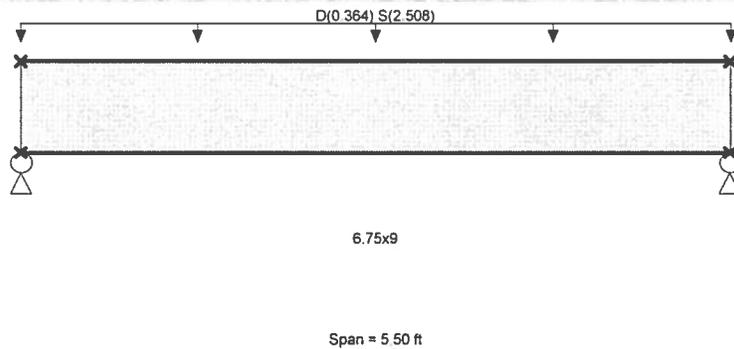Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description : FB12 - 3 1/8 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4		Fv	265.0 psi	Eminbend - yy 850.0 ksi
		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.025,0.1) L(0.04,0.16)

3.125x13.5

Span = 17.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Varying Uniform Load : D(S,E) = 0.0250->0.10, L(S,E) = 0.040->0.160 k/ft, Extent = 0.0 -->> 17.0 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.329: 1	Maximum Shear Stress Ratio	=	0.193 : 1
Section used for this span		3.125x13.5	Section used for this span		3.125x13.5
fb : Actual	=	790.77 psi	fv : Actual	=	51.26 psi
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	9.307 ft	Location of maximum on span	=	15.883 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.164 in	Ratio =	1244 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.281 in	Ratio =	724 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.153	0.089	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.61	329.63	2160.00	0.60	21.19	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.329	0.193	1.00	1.000	1.00	1.00	1.00	1.00	1.00	6.26	790.77	2400.00	1.44	51.26	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.110	0.064	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.61	329.63	3000.00	0.60	21.19	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.119	0.070	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.61	329.63	2760.00	0.60	21.19	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.225	0.132	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.34	675.47	3000.00	1.23	43.75	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB12 - 3 1/8 x 13 1/2 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.245	0.144	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.34	675.47	2760.00	1.23	43.75	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.086	0.050	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.61	329.63	3840.00	0.60	21.19	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.086	0.050	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.61	329.63	3840.00	0.60	21.19	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.176	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.34	675.47	3840.00	1.23	43.75	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.176	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.34	675.47	3840.00	1.23	43.75	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.176	0.103	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.34	675.47	3840.00	1.23	43.75	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.052	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.56	197.78	3840.00	0.36	12.72	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 17.0 ft	1	0.052	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.56	197.78	3840.00	0.36	12.72	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2814	8.748		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.183	1.735
Overall MINimum	0.302	0.429
+D+H	0.503	0.715
+D+L+H	1.183	1.735
+D+Lr+H	0.503	0.715
+D+S+H	0.503	0.715
+D+0.750Lr+0.750L+H	1.013	1.480
+D+0.750L+0.750S+H	1.013	1.480
+D+W+H	0.503	0.715
+D+0.70E+H	0.503	0.715
+D+0.750Lr+0.750L+0.750W+H	1.013	1.480
+D+0.750L+0.750S+0.750W+H	1.013	1.480
+D+0.750L+0.750S+0.5250E+H	1.013	1.480
+0.60D+W+0.60H	0.302	0.429
+0.60D+0.70E+0.60H	0.302	0.429
D Only	0.503	0.715
Lr Only		
L Only	0.680	1.020
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB13 - 6 3/4 x 13.5 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.715) L(1.02)   D(0.247) L(0.395)   D(0.607) L(0.841)

D(0.452) L(0.723)

6.75x13.5

Span = 15.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
  Uniform Load : D = 0.4520, L = 0.7230 k/ft, Extent = 0.0 –>> 8.250 ft, Tributary Width = 1.0 ft
  Uniform Load : D = 0.2470, L = 0.3950 k/ft, Extent = 8.250 --> 13.580 ft, Tributary Width = 1.0 ft
  Point Load : D = 0.7150, L = 1.020 k @ 8.250 ft
  Point Load : D = 0.6070, L = 0.8410 k @ 13.580 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.836 1	Maximum Shear Stress Ratio	=	0.479 : 1
Section used for this span		6.75x13.5	Section used for this span		6.75x13.5
fb : Actual	=	1,995.37 psi	fv : Actual	=	127.04 psi
FB : Allowable	=	2,386.43 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	7.555 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
  Max Downward Transient Deflection   0.326 in   Ratio =   551 >=360
  Max Upward Transient Deflection   0.000 in   Ratio =   0 <360
  Max Downward Total Deflection   0.544 in   Ratio =   330 >=180
  Max Upward Total Deflection   0.000 in   Ratio =   0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.372	0.212	0.90	0.994	1.00	1.00	1.00	1.00	1.00	13.66	799.20	2147.78	3.07	50.58	238.50
+D+L+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.836	0.479	1.00	0.994	1.00	1.00	1.00	1.00	1.00	34.09	1,995.37	2386.43	7.72	127.04	265.00
+D+Lr+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.268	0.153	1.25	0.994	1.00	1.00	1.00	1.00	1.00	13.66	799.20	2983.03	3.07	50.58	331.25
+D+S+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB13 - 6 3/4 x 13.5 GLB

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 15.0 ft	1	0.291	0.166	1.15	0.994	1.00	1.00	1.00	1.00	1.00	13.66	799.20	2744.39	3.07	50.58	304.75
+D+0.750Lr+0.750L+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.569	0.326	1.25	0.994	1.00	1.00	1.00	1.00	1.00	28.98	1,696.32	2983.03	6.56	107.93	331.25
+D+0.750L+0.750S+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.618	0.354	1.15	0.994	1.00	1.00	1.00	1.00	1.00	28.98	1,696.32	2744.39	6.56	107.93	304.75
+D+W+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.209	0.119	1.60	0.994	1.00	1.00	1.00	1.00	1.00	13.66	799.20	3818.28	3.07	50.58	424.00
+D+0.70E+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.209	0.119	1.60	0.994	1.00	1.00	1.00	1.00	1.00	13.66	799.20	3818.28	3.07	50.58	424.00
+D+0.750Lr+0.750L+0.750W+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.444	0.255	1.60	0.994	1.00	1.00	1.00	1.00	1.00	28.98	1,696.32	3818.28	6.56	107.93	424.00
+D+0.750L+0.750S+0.750W+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.444	0.255	1.60	0.994	1.00	1.00	1.00	1.00	1.00	28.98	1,696.32	3818.28	6.56	107.93	424.00
+D+0.750L+0.750S+0.5250E+H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.444	0.255	1.60	0.994	1.00	1.00	1.00	1.00	1.00	28.98	1,696.32	3818.28	6.56	107.93	424.00
+0.60D+W+0.60H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.126	0.072	1.60	0.994	1.00	1.00	1.00	1.00	1.00	8.19	479.52	3818.28	1.84	30.35	424.00
+0.60D+0.70E+0.60H					0.994	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 15.0 ft	1	0.126	0.072	1.60	0.994	1.00	1.00	1.00	1.00	1.00	8.19	479.52	3818.28	1.84	30.35	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5440	7.445		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.026	7.569
Overall MINimum	2.154	1.845
+D+H	3.589	3.074
+D+L+H	9.026	7.569
+D+Lr+H	3.589	3.074
+D+S+H	3.589	3.074
+D+0.750Lr+0.750L+H	7.667	6.445
+D+0.750L+0.750S+H	7.667	6.445
+D+W+H	3.589	3.074
+D+0.70E+H	3.589	3.074
+D+0.750Lr+0.750L+0.750W+H	7.667	6.445
+D+0.750L+0.750S+0.750W+H	7.667	6.445
+D+0.750L+0.750S+0.5250E+H	7.667	6.445
+0.60D+W+0.60H	2.154	1.845
+0.60D+0.70E+0.60H	2.154	1.845
D Only	3.589	3.074
Lr Only		
L Only	5.436	4.495
S Only		
W Only		
E Only		
H Only		

rudow + berry
structural engineering
scottsdale, arizona 85251
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
of 260

$\underline{FB14}$ SPAN = 5'-6"

$W = \frac{1}{2}(34.67)(25+40) =$ ~~1127D~~ + 1793L

$\underline{FB15}$ SPAN = 9'-9"

$W_1 = 12.17(25+40) = 304D + 487L$ $\ell = 0$ TO 5-6

$W_2 = 9.83(25+40) = 221D + 353L$ $x = 5-6$ TO 9-9

$P = \frac{1}{2}(3)(6.25)\frac{1}{2}(25+40) = 136D + 218L$ @ x = 5'-6"

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East
Engineer:	MAR
Project Descr:	

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   FB14 - 6x6 D.Fir #2

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	875.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	875.0 psi	Ebend- xx	1,300.0 ksi
	Fc - Prll	600.0 psi	Eminbend - xx	470.0 ksi
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi		
Wood Grade : No.2	Fv	170.0 psi		
	Ft	425.0 psi	Density	31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.433) L(0.693)

6x6

Span = 3.250 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.4330, L = 0.6930 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.735 : 1	Maximum Shear Stress Ratio	=	0.386 : 1
Section used for this span		6x6	Section used for this span		6x6
fb : Actual	=	643.37 psi	fv : Actual	=	65.57 psi
FB : Allowable	=	875.00 psi	Fv : Allowable	=	170.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	1.625 ft	Location of maximum on span	=	2.799 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.018 in	Ratio =	2209 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.029 in	Ratio =	1359 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.314	0.165	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.57	247.41	787.50	0.51	25.21	153.00
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.735	0.386	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.49	643.37	875.00	1.32	65.57	170.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.226	0.119	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.57	247.41	1093.75	0.51	25.21	212.50
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.246	0.129	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.57	247.41	1006.25	0.51	25.21	195.50
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.498	0.261	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.26	544.38	1093.75	1.12	55.48	212.50
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.541	0.284	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.26	544.38	1006.25	1.12	55.48	195.50

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : FB14 - 6x6 D.Fir #2

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L		M	fb	F'b	V	fv	F'v
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.177	0.093	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.57	247.41	1400.00	0.51	25.21	272.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.177	0.093	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.57	247.41	1400.00	0.51	25.21	272.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.389	0.204	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.26	544.38	1400.00	1.12	55.48	272.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.389	0.204	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.26	544.38	1400.00	1.12	55.48	272.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.389	0.204	1.60	1.000	1.00	1.00	1.00	1.00	1.00		1.26	544.38	1400.00	1.12	55.48	272.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.106	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.34	148.44	1400.00	0.31	15.13	272.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 3.250 ft	1	0.106	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00		0.34	148.44	1400.00	0.31	15.13	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0287	1.637		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.830	1.830
Overall MINimum	0.422	0.422
+D+H	0.704	0.704
+D+L+H	1.830	1.830
+D+Lr+H	0.704	0.704
+D+S+H	0.704	0.704
+D+0.750Lr+0.750L+H	1.548	1.548
+D+0.750L+0.750S+H	1.548	1.548
+D+W+H	0.704	0.704
+D+0.70E+H	0.704	0.704
+D+0.750Lr+0.750L+0.750W+H	1.548	1.548
+D+0.750L+0.750S+0.750W+H	1.548	1.548
+D+0.750L+0.750S+0.5250E+H	1.548	1.548
+0.60D+W+0.60H	0.422	0.422
+0.60D+0.70E+0.60H	0.422	0.422
D Only	0.704	0.704
Lr Only		
L Only	1.126	1.126
S Only		
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   FB15 - 5 1/8 x 9 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
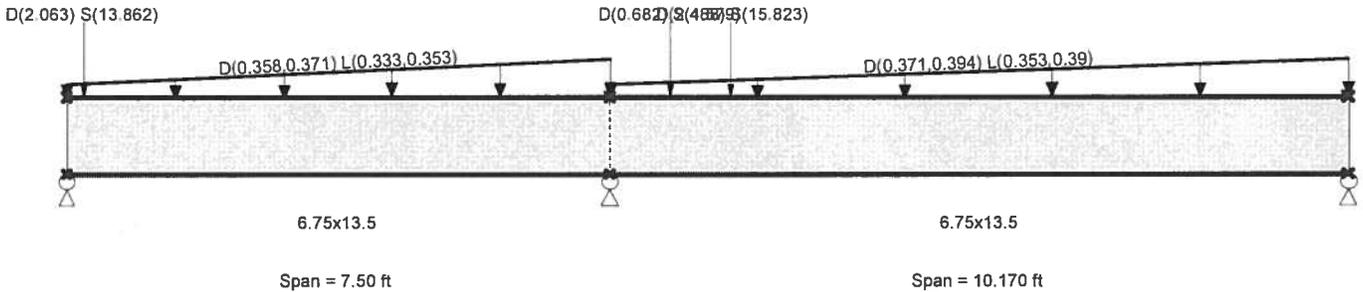Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			

D(0.304) L(0.487)   D(0.136) L(0.218)   D(0.221) L(0.353)

5.125x9

Span = 9.750 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Uniform Load : D = 0.3040, L = 0.4870 k/ft, Extent = 0.0 –>> 5.50 ft, Tributary Width = 1.0 ft
   Uniform Load : D = 0.2210, L = 0.3530 k/ft, Extent = 5.50 –>> 9.750 ft, Tributary Width = 1.0 ft
   Point Load : D = 0.1360, L = 0.2180 k @ 5.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.671 : 1**	Maximum Shear Stress Ratio	=	**0.400 : 1**
Section used for this span		**5.125x9**	Section used for this span		**5.125x9**
fb : Actual	=	1,611.57 psi	fv : Actual	=	106.00 psi
FB : Allowable	=	2,400.00 psi	Fv : Allowable	=	265.00 psi
Load Combination		+D+L+H	Load Combination		+D+L+H
Location of maximum on span	=	4.804 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
   Max Downward Transient Deflection   0.171 in   Ratio =   684 >=480.
   Max Upward Transient Deflection   0.000 in   Ratio =   0 <480.0
   Max Downward Total Deflection   0.282 in   Ratio =   415 >=240.
   Max Upward Total Deflection   0.000 in   Ratio =   0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.293	0.174	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.65	632.33	2160.00	1.28	41.58	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.671	0.400	1.00	1.000	1.00	1.00	1.00	1.00	1.00	9.29	1,611.57	2400.00	3.26	106.00	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.211	0.126	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.65	632.33	3000.00	1.28	41.58	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.229	0.136	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.65	632.33	2760.00	1.28	41.58	304.75

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

264

Wood Beam

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   FB15 - 5 1/8 x 9 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.456	0.271	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.88	1,366.76	3000.00	2.76	89.90	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.495	0.295	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.88	1,366.76	2760.00	2.76	89.90	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.165	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.65	632.33	3840.00	1.28	41.58	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.165	0.098	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.65	632.33	3840.00	1.28	41.58	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.356	0.212	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.88	1,366.76	3840.00	2.76	89.90	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.356	0.212	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.88	1,366.76	3840.00	2.76	89.90	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.356	0.212	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.88	1,366.76	3840.00	2.76	89.90	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.099	0.059	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.19	379.40	3840.00	0.77	24.95	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.750 ft	1	0.099	0.059	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.19	379.40	3840.00	0.77	24.95	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2815	4.839		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.858	3.383
Overall MINimum	0.908	0.799
+D+H	1.513	1.332
+D+L+H	3.858	3.383
+D+Lr+H	1.513	1.332
+D+S+H	1.513	1.332
+D+0.750Lr+0.750L+H	3.272	2.870
+D+0.750L+0.750S+H	3.272	2.870
+D+W+H	1.513	1.332
+D+0.70E+H	1.513	1.332
+D+0.750Lr+0.750L+0.750W+H	3.272	2.870
+D+0.750L+0.750S+0.750W+H	3.272	2.870
+D+0.750L+0.750S+0.5250E+H	3.272	2.870
+0.60D+W+0.60H	0.908	0.799
+0.60D+0.70E+0.60H	0.908	0.799
D Only	1.513	1.332
Lr Only		
L Only	2.345	2.052
S Only		
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg of 205

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$\underline{TH5}$ SPAN = 11'-1" CLR (11'-4" SPAN)

$W_L = 8.33(28 + 235) + \frac{16.67}{6}(123) + 6.5(15) = 3310 + 2300 \text{ SL}$

$W_R = 9.75(28 + 212) + \frac{18.5}{6}(87) + \quad " \quad = 3310 + 2741 \text{ SL}$

$\underline{TH6}$ SPAN = 5'-3" CLR (5'-6" SPAN)

$W = 9.5(28 + 217) + \frac{19}{6}(141) + 6.5(15) = 3640 + 2508 \text{ SL}$

$\underline{TH7}$ SPAN = 3'-4" CLR (3'-7" SPAN)

$W = 9.67(28 + 218) + \frac{19.33}{6}(140) + 6.5(15) = 3680 + 2556 \text{ SL}$

$\underline{TH8}$ SPAN = 12'-3 CLR (12'-6 SPAN)

$W_L = 9.5(28 + 217) + \frac{19}{6}(141) + 6.5(15) = 3640 + 2508 \text{ SL} \quad @ x = 0$

$W_R = 9(28 + 218) + \frac{18}{6}(130) + \quad " \quad = 3600 + 2412 \text{ SL} \quad @ x = 8'-0"$

$P = R_{TB2R} = 1011^{\#} D + 2285^{\#} SL \quad @ x = 8'-6"$

$W = 6.5(15) = 98 \text{ PLF DL} \quad x = 8' \text{ TO END}$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH5 - 6 3/4 x 13 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy 850.0 ksi
	Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(0.331,0.371) S(2.3,2.741)

6.75x13.5

Span = 11.330 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.3310->0.3710, S(S,E) = 2.30->2.741 k/ft, Extent = 0.0 -->> 11.330 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.984 :1**	Maximum Shear Stress Ratio	=	**0.722 : 1**	
Section used for this span		**6.75x13.5**	Section used for this span		**6.75x13.5**	
fb : Actual	=	2,715.81 psi	fv : Actual	=	219.97 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	5.748 ft	Location of maximum on span	=	10.214 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
   Max Downward Transient Deflection   0.377 in Ratio =   360 >=240.
   Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
   Max Downward Total Deflection   0.433 in Ratio =   314 >=180.
   Max Upward Total Deflection   0.000 in Ratio =   0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Span #	Max Stress Ratios		C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.161	0.118	0.90	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	2160.00	1.70	28.05	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.145	0.106	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	2400.00	1.70	28.05	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.116	0.085	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	3000.00	1.70	28.05	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.984	0.722	1.15	1.000	1.00	1.00	1.00	1.00	1.00	46.40	2,715.81	2760.00	13.36	219.97	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.116	0.085	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	3000.00	1.70	28.05	331.25

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH5 - 6 3/4 x 13 1/2 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.770	0.564	1.15	1.000	1.00	1.00	1.00	1.00	1.00	36.29	2,123.90	2760.00	10.45	171.99	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.091	0.066	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	3840.00	1.70	28.05	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.091	0.066	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	3840.00	1.70	28.05	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.091	0.066	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.95	348.21	3840.00	1.70	28.05	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.553	0.406	1.60	1.000	1.00	1.00	1.00	1.00	1.00	36.29	2,123.90	3840.00	10.45	171.99	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.553	0.406	1.60	1.000	1.00	1.00	1.00	1.00	1.00	36.29	2,123.90	3840.00	10.45	171.99	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.054	0.040	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.57	208.92	3840.00	1.02	16.83	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.330 ft	1	0.054	0.040	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.57	208.92	3840.00	1.02	16.83	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4328	5.706		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	15.925	16.833
Overall MINimum	1.237	1.283
+D+H	2.062	2.138
+D+L+H	2.062	2.138
+D+Lr+H	2.062	2.138
+D+S+H	15.925	16.833
+D+0.750Lr+0.750L+H	2.062	2.138
+D+0.750L+0.750S+H	12.459	13.159
+D+W+H	2.062	2.138
+D+0.70E+H	2.062	2.138
+D+0.750Lr+0.750L+0.750W+H	2.062	2.138
+D+0.750L+0.750S+0.750W+H	12.459	13.159
+D+0.750L+0.750S+0.5250E+H	12.459	13.159
+0.60D+W+0.60H	1.237	1.283
+0.60D+0.70E+0.60H	1.237	1.283
D Only	2.062	2.138
Lr Only		
L Only		
S Only	13.862	14.695
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH6 - 6 3/4 x 9 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension	2400 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr	1850 psi	Ebend- xx 1800 ksi
	Fc - Prll	1650 psi	Eminbend - xx 950 ksi
Wood Species : DF/DF	Fc - Perp	650 psi	Ebend- yy 1600 ksi
Wood Grade : 24F - V4	Fv	265 psi	Eminbend - yy 850 ksi
	Ft	1100 psi	Density 31.2 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.364) S(2.508)

6.75x9

Span = 5.50 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.3640, S = 2.508, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.521: 1**	Maximum Shear Stress Ratio	=	**0.469 : 1**
Section used for this span		**6.75x9**	Section used for this span		**6.75x9**
fb : Actual	=	1,436.64 psi	fv : Actual	=	143.00 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	2.750 ft	Location of maximum on span	=	4.757 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
Max Downward Transient Deflection	0.070 in	Ratio =	937 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.081 in	Ratio =	815 >=180.
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.087	0.078	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	2160.00	0.76	18.69	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.078	0.071	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	2400.00	0.76	18.69	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.063	0.056	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	3000.00	0.76	18.69	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.521	0.469	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.91	1,436.64	2760.00	5.79	143.00	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.063	0.056	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	3000.00	0.76	18.69	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : TH6 - 6 3/4 x 9 GLB

Load Combination	Span #	Max Stress Ratios		C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
Length = 5.50 ft	1	0.407	0.367	1.15	1.000	1.00	1.00	1.00	1.00	1.00	8.54	1,124.43	2760.00	4.53	111.92	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.049	0.044	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	3840.00	0.76	18.69	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.049	0.044	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	3840.00	0.76	18.69	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.049	0.044	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.43	187.81	3840.00	0.76	18.69	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.293	0.264	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.54	1,124.43	3840.00	4.53	111.92	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.293	0.264	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.54	1,124.43	3840.00	4.53	111.92	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.029	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.86	112.68	3840.00	0.45	11.22	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 5.50 ft	1	0.029	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.86	112.68	3840.00	0.45	11.22	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0809	2.770		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	7.934	7.934
Overall MINimum	0.622	0.622
+D+H	1.037	1.037
+D+L+H	1.037	1.037
+D+Lr+H	1.037	1.037
+D+S+H	7.934	7.934
+D+0.750Lr+0.750L+H	1.037	1.037
+D+0.750L+0.750S+H	6.210	6.210
+D+W+H	1.037	1.037
+D+0.70E+H	1.037	1.037
+D+0.750Lr+0.750L+0.750W+H	1.037	1.037
+D+0.750L+0.750S+0.750W+H	6.210	6.210
+D+0.750L+0.750S+0.5250E+H	6.210	6.210
+0.60D+W+0.60H	0.622	0.622
+0.60D+0.70E+0.60H	0.622	0.622
D Only	1.037	1.037
Lr Only		
L Only		
S Only	6.897	6.897
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH7 - 6 3/4 x 9 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx	1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy	850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density	31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.368) S(2.558)

6.75x9

Span = 3.580 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
  Uniform Load : D = 0.3680, S = 2.558 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.225 : 1	Maximum Shear Stress Ratio	=	0.249 : 1	
Section used for this span		6.75x9	Section used for this span		6.75x9	
fb : Actual	=	620.07 psi	fv : Actual	=	75.86 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	1.790 ft	Location of maximum on span	=	2.835 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.013 in	Ratio =	3334 >=240.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <240.0
Max Downward Total Deflection	0.015 in	Ratio =	2902 >=180.
Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.037	0.041	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	2160.00	0.40	9.84	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.034	0.037	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	2400.00	0.40	9.84	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.027	0.030	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	3000.00	0.40	9.84	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.225	0.249	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.71	620.07	2760.00	3.07	75.86	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.027	0.030	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	3000.00	0.40	9.84	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   TH7 - 6 3/4 x 9 GLB

Load Combination	Span #	Max Stress Ratios		C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
Segment Length		M	V								M	fb	F'b	V	fv	F'v
Length = 3.580 ft	1	0.176	0.195	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.68	485.16	2760.00	2.40	59.35	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.021	0.023	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	3840.00	0.40	9.84	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.021	0.023	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	3840.00	0.40	9.84	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.021	0.023	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.61	80.41	3840.00	0.40	9.84	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.126	0.140	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.68	485.16	3840.00	2.40	59.35	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.126	0.140	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.68	485.16	3840.00	2.40	59.35	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.37	48.25	3840.00	0.24	5.90	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.580 ft	1	0.013	0.014	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.37	48.25	3840.00	0.24	5.90	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0148	1.803		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.261	5.261
Overall MINimum	0.409	0.409
+D+H	0.682	0.682
+D+L+H	0.682	0.682
+D+Lr+H	0.682	0.682
+D+S+H	5.261	5.261
+D+0.750Lr+0.750L+H	0.682	0.682
+D+0.750L+0.750S+H	4.116	4.116
+D+W+H	0.682	0.682
+D+0.70E+H	0.682	0.682
+D+0.750Lr+0.750L+0.750W+H	0.682	0.682
+D+0.750L+0.750S+0.750W+H	4.116	4.116
+D+0.750L+0.750S+0.5250E+H	4.116	4.116
+0.60D+W+0.60H	0.409	0.409
+0.60D+0.70E+0.60H	0.409	0.409
D Only	0.682	0.682
Lr Only		
L Only		
S Only	4.579	4.579
W Only		
E Only		
H Only		

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East	
Engineer:	MAR	Project ID: 15105
Project Descr:		

Wood Beam

Description :   TH8 - 6 3/4 x 15 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design		Fb - Tension	2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind		Fb - Compr	1,850.0 psi	Ebend- xx 1,800.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx 950.0 ksi
		Fc - Perp	650.0 psi	Ebend- yy 1,600.0 ksi
Wood Species : DF/DF		Fv	265.0 psi	Eminbend - yy 850.0 ksi
Wood Grade : 24F - V4		Ft	1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(1.011) S(7.285)

D(0.098)

D(0.364,0.35) S(2.508,2.442)

6.75x15

Span = 12.50 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
    Varying Uniform Load : D(S,E) = 0.3640->0.350, S(S,E) = 2.508->2.442 k/ft, Extent = 0.0 ->> 8.0 ft, Trib Width = 1.0 ft
    Uniform Load : D = 0.0980 k/ft, Extent = 8.0 ->> 12.50 ft, Tributary Width = 1.0 ft
    Point Load : D = 1.011, S = 7.285 k @ 8.50 ft, (TB2R)

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.002 1	Maximum Shear Stress Ratio	=	0.717 : 1
Section used for this span		6.75x15	Section used for this span		6.75x15
fb : Actual	=	2,766.79 psi	fv : Actual	=	218.58 psi
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	6.387 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection
    Max Downward Transient Deflection   0.411 in Ratio =   365 >=240.
    Max Upward Transient Deflection   0.000 in Ratio =   0 <240.0
    Max Downward Total Deflection   0.477 in Ratio =   314 >=180.
    Max Upward Total Deflection   0.000 in Ratio =   0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.178	0.125	0.90	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	2160.00	2.01	29.84	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.160	0.113	1.00	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	2400.00	2.01	29.84	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.128	0.090	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	3000.00	2.01	29.84	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	1.002	0.717	1.15	1.000	1.00	1.00	1.00	1.00	1.00	58.36	2,766.79	2760.00	14.75	218.58	304.75

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH8 - 6 3/4 x 15 GLB

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.128	0.090	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	3000.00	2.01	29.84	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.787	0.562	1.15	1.000	1.00	1.00	1.00	1.00	1.00	45.80	2,171.04	2760.00	11.57	171.40	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.100	0.070	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	3840.00	2.01	29.84	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.100	0.070	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	3840.00	2.01	29.84	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.100	0.070	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.10	383.99	3840.00	2.01	29.84	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.565	0.404	1.60	1.000	1.00	1.00	1.00	1.00	1.00	45.80	2,171.04	3840.00	11.57	171.40	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.565	0.404	1.60	1.000	1.00	1.00	1.00	1.00	1.00	45.80	2,171.04	3840.00	11.57	171.40	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.060	0.042	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.86	230.40	3840.00	1.21	17.90	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1	0.060	0.042	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.86	230.40	3840.00	1.21	17.90	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4771	6.250		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	18.311	13.356
Overall MINimum	1.493	1.256
+D+H	2.488	2.094
+D+L+H	2.488	2.094
+D+Lr+H	2.488	2.094
+D+S+H	18.311	13.356
+D+0.750Lr+0.750L+H	2.488	2.094
+D+0.750L+0.750S+H	14.356	10.540
+D+W+H	2.488	2.094
+D+0.70E+H	2.488	2.094
+D+0.750Lr+0.750L+0.750W+H	2.488	2.094
+D+0.750L+0.750S+0.750W+H	14.356	10.540
+D+0.750L+0.750S+0.5250E+H	14.356	10.540
+0.60D+W+0.60H	1.493	1.256
+0.60D+0.70E+0.60H	1.493	1.256
D Only	2.488	2.094
Lr Only		
L Only		
S Only	15.823	11.262
W Only		
E Only		
H Only		

rudow + berry
structural engineering
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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
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TH9/TH10

$SPAN 1 = 7'-6''$
$SPAN 2 = 10'-2''$

$W_1 = 8.33(25+40) + 10(15) = 358_D + 335_L$
$W_2 = 8.83(\quad '' \quad) + \quad '' \quad = 371_D + 353_L$
$W_3 = 9.15(\quad '' \quad) + \quad '' \quad = 394_D + 390_L$

$P_1 = R_{TH5L} = 2003_D + 1386_{SL} @ x = 3'' \quad SPAN 1$

$P_2 = R_{TH5R} = 2138_D + 1416_{SL} @ x = 4'-0'' \quad SPAN 2$

$P_3 = R_{TH6L} = 1037_D + 689_{SL} @ x = 4'-10'' \quad SPAN 2$

$P_4 = R_{TH6R} = 1037_D + 689_{SL} @ x = 10'-0'' \quad SPAN 2$

TH11 $SPAN = 6'-0''$

$W = 9.33(25+40) + 10(15) = 383_D + 373_L$

$P_1 = R_{TH7R} = 682_D + 4579_{SL} @ x = 10''$

$P_2 = R_{TH8L} = 2488_D + 15823_{SL} @ x = 1'-8''$

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH9/TH10 - 6 3/4 x 13.5 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf

Beam Bracing   : Beam is Fully Braced against lateral-torsional buckling

D(2.063) S(13.862)   D(0.682)(2(4.5897)S(15.823)
D(0.358,0.371) L(0.333,0.353)   D(0.371,0.394) L(0.353,0.39)

6.75x13.5   6.75x13.5

Span = 7.50 ft   Span = 10.170 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
   Varying Uniform Load : D(S,E) = 0.3580->0.3710, L(S,E) = 0.3330->0.3530 k/ft, Extent = 0.0 –>> 7.50 ft, Trib Width = 1.0 ft
   Point Load : D = 2.063, S = 13.862 k @ 0.250 ft
Load for Span Number 2
   Varying Uniform Load : D(S,E) = 0.3710->0.3940, L(S,E) = 0.3530->0.390 k/ft, Extent = 0.0 –>> 10.170 ft, Trib Width = 1.0 ft
   Point Load : D = 0.6820, S = 4.579 k @ 0.830 ft
   Point Load : D = 2.488, S = 15.823 k @ 1.670 ft

DESIGN SUMMARY

						Design OK
Maximum Bending Stress Ratio	=	0.569: 1	Maximum Shear Stress Ratio	=	1.000 : 1	
Section used for this span		6.75x13.5	Section used for this span		6.75x13.5	
fb : Actual	=	1,211.26 psi	fv : Actual	=	304.73 psi	
FB : Allowable	=	2,127.50 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	7.500 ft	Location of maximum on span	=	7.500 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
   Max Downward Transient Deflection   0.069 in Ratio =   1774 >=240.
   Max Upward Transient Deflection   -0.028 in Ratio =   3170 >=240.
   Max Downward Total Deflection   0.099 in Ratio =   1232 >=180.
   Max Upward Total Deflection   -0.033 in Ratio =   2733 >=180.

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.224	0.294	0.90	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	1665.00	4.25	70.00	238.50
Length = 10.170 ft	2	0.224	0.294	0.90	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	1665.00	4.25	70.00	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

rudow + berry, inc.
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Project Title: Copper Crest East
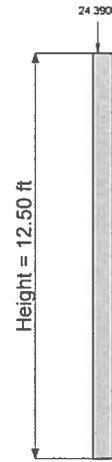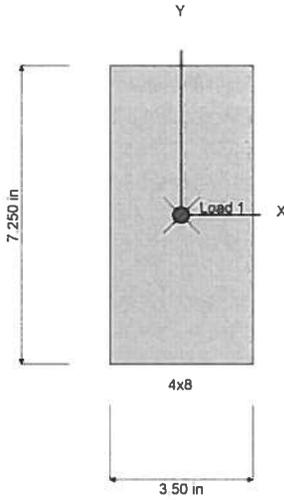Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357
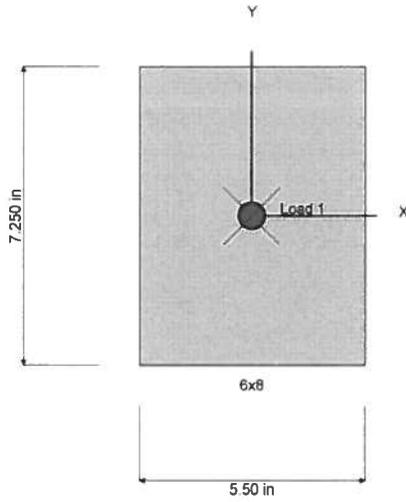
Licensee : RUDOW & BERRY

Description : TH9/TH10 - 6 3/4 x 13.5 GLB

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C_d	C_{FV}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 7.50 ft	1	0.321	0.379	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.15	593.89	1850.00	6.10	100.39	265.00
Length = 10.170 ft	2	0.321	0.379	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.15	593.89	1850.00	6.10	100.39	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.161	0.211	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2312.50	4.25	70.00	331.25
Length = 10.170 ft	2	0.161	0.211	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2312.50	4.25	70.00	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.569	1.000	1.15	1.000	1.00	1.00	1.00	1.00	1.00	20.70	1,211.26	2127.50	18.51	304.73	304.75
Length = 10.170 ft	2	0.569	1.000	1.15	1.000	1.00	1.00	1.00	1.00	1.00	20.70	1,211.26	2127.50	18.51	304.73	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.233	0.280	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.20	538.57	2312.50	5.64	92.80	331.25
Length = 10.170 ft	2	0.233	0.280	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.20	538.57	2312.50	5.64	92.80	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.549	0.882	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2127.50	16.33	268.84	304.75
Length = 10.170 ft	2	0.549	0.882	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2127.50	16.33	268.84	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.126	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2960.00	4.25	70.00	424.00
Length = 10.170 ft	2	0.126	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2960.00	4.25	70.00	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.126	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2960.00	4.25	70.00	424.00
Length = 10.170 ft	2	0.126	0.165	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.37	372.61	2960.00	4.25	70.00	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.182	0.219	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.20	538.57	2960.00	5.64	92.80	424.00
Length = 10.170 ft	2	0.182	0.219	1.60	1.000	1.00	1.00	1.00	1.00	1.00	9.20	538.57	2960.00	5.64	92.80	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.394	0.634	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2960.00	16.33	268.84	424.00
Length = 10.170 ft	2	0.394	0.634	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2960.00	16.33	268.84	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.394	0.634	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2960.00	16.33	268.84	424.00
Length = 10.170 ft	2	0.394	0.634	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.95	1,167.56	2960.00	16.33	268.84	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.076	0.099	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.82	223.57	2960.00	2.55	42.00	424.00
Length = 10.170 ft	2	0.076	0.099	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.82	223.57	2960.00	2.55	42.00	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 7.50 ft	1	0.076	0.099	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.82	223.57	2960.00	2.55	42.00	424.00
Length = 10.170 ft	2	0.076	0.099	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.82	223.57	2960.00	2.55	42.00	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0329	4.818
+D+S+H	2	0.0990	4.773		0.0000	4.818

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	14.068	28.936	4.237
Overall MINimum	0.770	4.032	1.142
+D+H	2.578	7.724	1.903
+D+L+H	3.348	11.757	3.452
+D+Lr+H	2.578	7.724	1.903
+D+S+H	14.068	28.936	3.466
+D+0.750Lr+0.750L+H	3.155	10.749	3.065
+D+0.750L+0.750S+H	11.772	26.657	4.237
+D+W+H	2.578	7.724	1.903
+D+0.70E+H	2.578	7.724	1.903
+D+0.750Lr+0.750L+0.750W+H	3.155	10.749	3.065
+D+0.750L+0.750S+0.750W+H	11.772	26.657	4.237
+D+0.750L+0.750S+0.5250E+H	11.772	26.657	4.237
+0.60D+W+0.60H	1.547	4.635	1.142
+0.60D+0.70E+0.60H	1.547	4.635	1.142
D Only	2.578	7.724	1.903
Lr Only			

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357

Description :   TH9/TH10 - 6 3/4 x 13.5 GLB

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2	Support 3
L Only	0.770	4.032	1.549
S Only	11.489	21.212	1.563
W Only			
E Only			
H Only			

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Wood Beam

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : TH11 - 6 3/4 x 10 1/2 GLB

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : ASCE 7-10 w/ ASD Wind

Material Properties

Analysis Method : Allowable Stress Design	Fb - Tension 2,400.0 psi	E : Modulus of Elasticity
Load Combination :ASCE 7-10 w/ ASD Wind	Fb - Compr 1,850.0 psi	Ebend- xx 1,800.0 ksi
	Fc - Prll 1,650.0 psi	Eminbend - xx 950.0 ksi
Wood Species : DF/DF	Fc - Perp 650.0 psi	Ebend- yy 1,600.0 ksi
Wood Grade : 24F - V4	Fv 265.0 psi	Eminbend - yy 850.0 ksi
	Ft 1,100.0 psi	Density 31.20 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

D(0.682) SD(2.488) S(15.823)

D(0.383) L(0.373)

6.75x10.5

Span = 6.0 ft

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
   Uniform Load : D = 0.3830, L = 0.3730 , Tributary Width = 1.0 ft
   Point Load : D = 0.6820, S = 4.579 k @ 0.830 ft
   Point Load : D = 2.488, S = 15.823 k @ 1.670 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.932 1**	Maximum Shear Stress Ratio	=	**0.927 : 1**	
Section used for this span		**6.75x10.5**	Section used for this span		**6.75x10.5**	
fb : Actual	=	2,572.05 psi	fv : Actual	=	282.36 psi	
FB : Allowable	=	2,760.00 psi	Fv : Allowable	=	304.75 psi	
Load Combination		+D+S+H	Load Combination		+D+S+H	
Location of maximum on span	=	1.664 ft	Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1	

Maximum Deflection
Max Downward Transient Deflection	0.093 in Ratio =	774 >=240.
Max Upward Transient Deflection	0.000 in Ratio =	0 <240.0
Max Downward Total Deflection	0.117 in Ratio =	614 >=180.
Max Upward Total Deflection	0.000 in Ratio =	0 <180.0

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.217	0.227	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.84	468.57	2160.00	2.56	54.10	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.251	0.268	1.00	1.000	1.00	1.00	1.00	1.00	1.00	6.23	603.03	2400.00	3.36	71.04	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.156	0.163	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.84	468.57	3000.00	2.56	54.10	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.932	0.927	1.15	1.000	1.00	1.00	1.00	1.00	1.00	26.58	2,572.05	2760.00	13.34	282.36	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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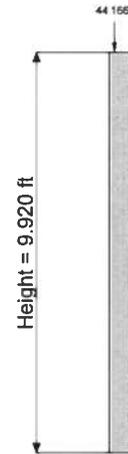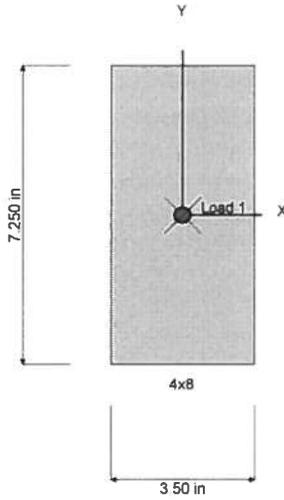Engineer: MAR
Project Descr:

Project ID: 15105

Wood Beam

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   TH11 - 6 3/4 x 10 1/2 GLB

| Load Combination | | Max Stress Ratios | | | | | | | | | | Moment Values | | | Shear Values | | |
Segment Length	Span #	M	V	C_d	C_{FN}	C_i	C_r	C_m	C_t	C_L	M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.189	0.202	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.87	567.78	3000.00	3.16	66.80	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.777	0.781	1.15	1.000	1.00	1.00	1.00	1.00	1.00	22.16	2,143.86	2760.00	11.25	238.00	304.75
+D+W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.122	0.128	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.84	468.57	3840.00	2.56	54.10	424.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.122	0.128	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.84	468.57	3840.00	2.56	54.10	424.00
+D+0.750Lr+0.750L+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.148	0.158	1.60	1.000	1.00	1.00	1.00	1.00	1.00	5.87	567.78	3840.00	3.16	66.80	424.00
+D+0.750L+0.750S+0.750W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.558	0.561	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.16	2,143.86	3840.00	11.25	238.00	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.558	0.561	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.16	2,143.86	3840.00	11.25	238.00	424.00
+0.60D+W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.073	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	281.14	3840.00	1.53	32.46	424.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.073	0.077	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.91	281.14	3840.00	1.53	32.46	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1172	2.693		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1   Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	18.943	7.019
Overall MINimum	1.119	1.119
+D+H	3.578	1.982
+D+L+H	4.697	3.101
+D+Lr+H	3.578	1.982
+D+S+H	18.943	7.019
+D+0.750Lr+0.750L+H	4.417	2.821
+D+0.750L+0.750S+H	15.941	6.599
+D+W+H	3.578	1.982
+D+0.70E+H	3.578	1.982
+D+0.750Lr+0.750L+0.750W+H	4.417	2.821
+D+0.750L+0.750S+0.750W+H	15.941	6.599
+D+0.750L+0.750S+0.5250E+H	15.941	6.599
+0.60D+W+0.60H	2.147	1.189
+0.60D+0.70E+0.60H	2.147	1.189
D Only	3.578	1.982
Lr Only		
L Only	1.119	1.119
S Only	15.365	5.037
W Only		
E Only		
H Only		

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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SEISMIC SHEAR DISTRIBUTION — (TYPICAL 20' UNIT)

$$\text{ROOF DL} = 56(20)(30 + 0.2(203)) = 79.07^k$$

$$\text{G+1.0 DL} = 22(20)(30) = 11.00^k$$

$$\text{G+0.5 DL} = 1883(20)(71) + 25(20)(30) = 26.74^k + 15.0^k = 41.74^k$$
(T)

$$\text{G+0.0 DL} = 0 \quad (\text{S.O.G.})$$

$$\text{G-0.5 DL} = 4375(20)(30) = 26.25^k$$

Level	w_i	h_i	$w_i h_i$	$\Sigma w_i h_i$	C_{vx}
ROOF	79.07	35.00'	2767	2767	0.67
G+1.0	11.00	24.50'	270	3037	0.07
G+0.5	41.74	19.83'	828	3865	0.20
G-0.5	26.25	9.92'	260	4125	0.06
	158.06				

$$V_{TOTAL} = 0.0684(158.06) = 10.81^k \quad (\text{NOT INCLUDING } \rho)$$
12.40

$$V_{ROOF} = 10.81 (.67) = 7242^\#$$

$$V_{G+1.0} = 11 (.07) = 757^\#$$

$$V_{G+0.5} = 11 (.20) = 2162^\# \quad (1385^\# + 777^\#)$$
(T)

$$V_{G-0.5} = 11 (.06) = 649^\#$$
_____
10810^\#

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SEISMIC LOADS — 20' UNITS

Ⓐ Ⓑ Ⓒ

SW6

SW2

SW1

SW7

7242#

7242#

ROOF LEVEL

Ⓐ Ⓑ Ⓒ Ⓓ

SW6

SW2 $(G+1.0)$ SW4 SW5 SW3 SW1 $(G+0.5)$

SW7

797#   777#   1385#

2919#

LEVEL 2

Ⓐ Ⓑ Ⓒ Ⓓ

SW6

SW2 $(G+0)$ SW4 SW5 SW3 SW1 $(G-0.5)$

SW7

649#

649#

LEVEL 1

WIND LOADS (AT NORTH 20' UNIT FOR N-S WIND)
(AT ALL 20' UNITS FOR E-W WIND)

ROOF LEVEL

LEVEL 2

LEVEL 1

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checked by: date:

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WIND LOADS (CONT'D) — NOTE! WINDWARD ONLY USED
FOR N-S WIND.

$\left(\text{SUCTION FACTOR EQUALS } \dfrac{5.6}{14.8} = 0.38\right)$

$W_1 = 3.67(14.8) = 54 \text{ PLF}$

$W_{1A} = 8.79(14.8) = 130 \text{ PLF}$

$W_{1B} = 10.08(\text{''}) = 149 \text{ PLF}$

$W_{1C} = 12.41(\text{''}) = 184 \text{ PLF}$

$W_{1D} = 11.12(\text{''}) = 165 \text{ PLF}$

$W_2 = 13.71(14.8) + 11.37(11.8) = 337 \text{ PLF} \ (203 + 134)$

$W_3 = 9.46(14.8) = 140 \text{ PLF}$

$W_4 = 10.75(14.8) = 159 \text{ PLF}$

$W_5 = 12.83(14.8) = 190 \text{ PLF}$

$W_6 = 11.54(14.8) = 171 \text{ PLF}$

$W_7 = 5.58(14.8) + 8(41.5) = 415 \text{ PLF}$

$W_8 = 5.58(14.8) + 5(41.5) = 208 \text{ PLF}$

$W_9 = 11.54(14.8) + 9.46(11.8) = 282 \text{ PLF} \ (171 + 111)$

$W_{10} = 4.33(14.8) = 64 \text{ PLF}$

$W_{11} = 9.92(14.8) = 147 \text{ PLF}$

$W_{12} = W_{11} = 147 \text{ PLF}$

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SHEAR WALL FORCES — 20' UNITS $\begin{cases} \text{EQ \& E/W WIND ARE} \\ \text{PER UNIT} \\ \text{N-S WIND IS FR @} \\ \text{NORTH UNIT ONLY} \end{cases}$

<u>ROOF LEVEL</u>

$V_{SW1} = \frac{1}{2}(7242)(1.3) = 4707^{\#}$ EQ.
$\qquad = 4095^{\#}$ WIND

$V_{SW2} = 4707^{\#}$ EQ
$\qquad = 3759^{\#}$ WIND

$V_{SW6} = V_{SW7} = 4707^{\#}$ EQ.
$\qquad\qquad = \frac{1}{2}(20)(337) = 3370^{\#}$ WIND

<u>Level 2</u>

$V_{SW1} = \left[1385 + 777\left(\dfrac{\frac{12.33}{2}}{24.67}\right)\right](1.3) = \text{'' } 2053^{\#}$ EQ.
$\qquad = 1093^{\#} + 10(415) + 7.16(208) = 6712^{\#}$ WIND

$V_{SW2} = \frac{1}{2}(757)(1.3) = 492^{\#}$ EQ
$\qquad\qquad = 1734^{\#}$ WIND

$V_{SW3} = 777(1.3)\left(\dfrac{10.63}{24.67}\right) = 435^{\#}$ EQ
$\qquad = (813 + 1091) = 1904^{\#}$ WIND

$V_{SW4} = 777(1.3)\frac{1}{2}\left(\dfrac{3.42}{24.67}\right) + \frac{1}{2}(757)(1.3) = 562^{\#}$ EQ
$\qquad = (1683 + 323) = 2006^{\#}$ WIND

$V_{SW6} = V_{SW7} = 1.3(2919^{\#})(\frac{1}{2}) = 1897^{\#}$ EQ.
$\qquad\qquad = \frac{1}{2}(20)(282) = 2820^{\#}$ WIND

$V_{SW5} = 777(1.3)\left(\dfrac{\frac{12.33}{2}}{24.67}\right) = 252^{\#}$ EQ.
$\qquad = 824 + 322 \qquad = 1146^{\#}$ WIND

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(20' UNIT CONT'D)

<u>LEVEL 1</u>

$$V_{SW1} = 690(1.3)\frac{\left(19+\frac{12.33}{2}\right)}{40.42} = 558^{\#} \, EQ.$$
$$= 672 + 2383 \doteq 3055^{\#} \, WIND$$

$$V_{SW2} = N/A$$

$$V_{SW3} = 690(1.3)\left(\frac{\frac{21.16}{2}}{40.42}\right) = 235^{\#} \, EQ.$$
$$= 617 + 378 = 995^{\#} \, WIND$$

$$V_{SW4} = 0 \quad EQ.$$
$$= 117^{\#} \, WIND$$

$$V_{SW5} = 690(1.3)\left(\frac{4.67}{40.42}\right) = 104^{\#} \, EQ.$$
$$= 121 + 349 = 470^{\#} \, WIND$$

$$V_{SW6} = V_{SW7} = 649(1.3)\tfrac{1}{2} \doteq 422^{\#} \, EQ.$$
$$= 147(20)\tfrac{1}{2} = 1470^{\#} \, WIND$$

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UNIT
62R

SEISMIC
LOADS

ROOF LEVEL

LEVEL 2

LEVEL 1

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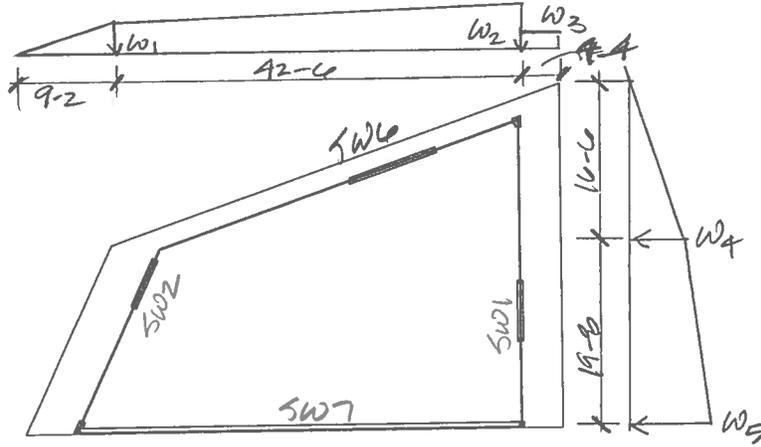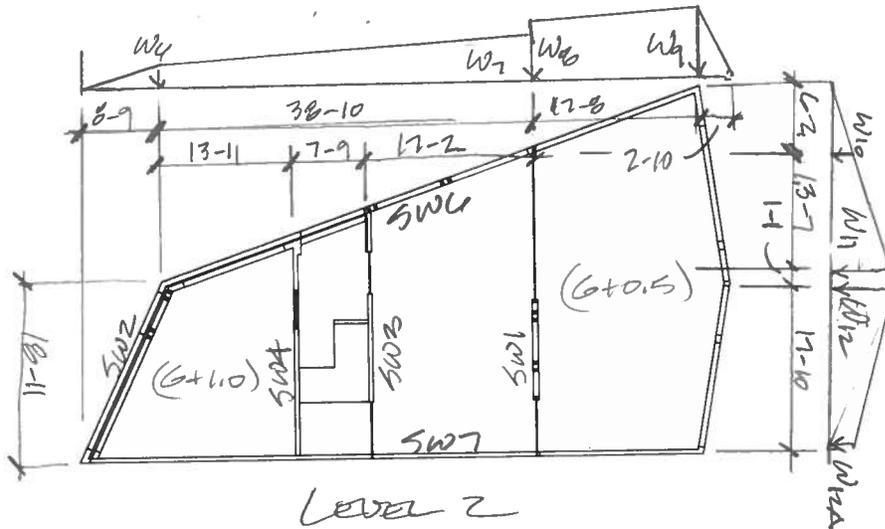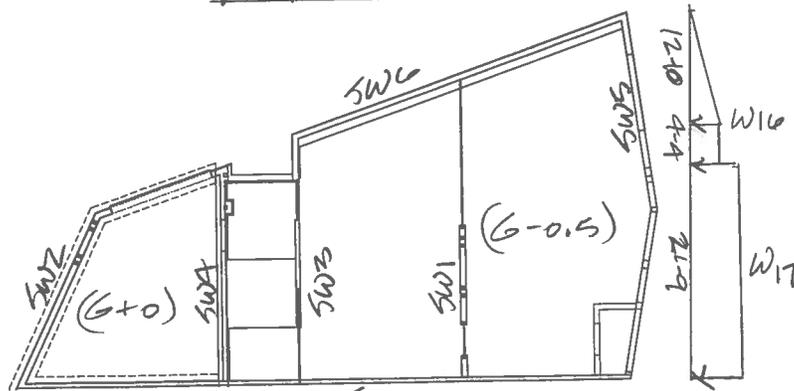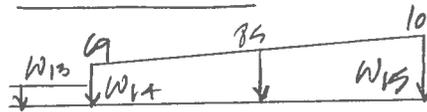
SEISMIC LOADS

$W_1 = .0684(1.3)(19.67)(30 + .2(203)) = 124$ PLF

$W_2 = \;''\;\;(\;''\;)(34.67)(\;\;\;''\;\;\;) = 218$ PLF

$W_3 = \;''\;\;(\;''\;)(35.42)(\;\;\;''\;\;\;) = 222$ PLF

$W_4 = \;''\;\;(\;''\;)(46.83)(\;\;\;''\;\;\;) = 294$ PLF

$W_5 = \;''\;\;(\;''\;)(56.0)(\;\;\;''\;\;\;) = 352$ PLF

$V_{ROOF} = .0684(1.3)(30 + .2(203))\left[19.67(46.83) + \tfrac{1}{2}\left(9.17(19.67) + 16.15(46.83)\right)\right]$

$= 8774^\#$

$W_6 = .0684(1.3)(18.92)(30) = 50$ PLF

$W_7 = \;''\;\;(\;''\;)(32.5)(30) = 87$ PLF

$W_8 = \;''\;\;(\;''\;)(\;''\;)(30 + .2(203)) = 204$ PLF

$W_9 = \;''\;\;(\;''\;)(38.67)(\;\;\;''\;\;\;) = 243$ PLF

$W_{10} = \;''\;\;(\;''\;)(18.5)(\;\;\;''\;\;\;) = 116$ PLF

$W_{11} = .0684(1.3)\left[20.33(30 + .2(203)) + 38.83(30)\right] = 236$ PLF

$W_{12} = \;''\;\;(\;''\;)\left[20.5(30 + .2(203)) + 39.33(30)\right] = 234$ PLF

$W_{12A} = \;''\;\;(\;''\;)\left[17.5(\;\;''\;\;) + 41.67(30)\right] = 237$ PLF

$V_{G+1.0} = .0684(1.3)(30)\left[17.8(18.92) + \tfrac{1}{2}\left(8.75(18.92) + 17.8(6.2)\right)\right]$

$= 1266^\#$

$V_{G+0.5} = .0684(1.3)\left[\left[25.12(21.04) + \tfrac{1}{2}(1.33)(21.04)\right](30)\right.$

$\left. + \left(32.5(17.67) + \tfrac{1}{2}(6.17)(17.67) + \tfrac{1}{2}(38.67)(2.83)\right)(70.6)\right] =$

$= 1617^\# + 4291^\# = 5908^\#$
(T)

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$$W_{13} = .0084(1.3)(21.67)(30) = 58 \text{ PLF}$$

$$W_{14} = \text{"} \ (\text{"})(26.0)(30) = 69 \text{ PLF}$$

$$W_{15} = \text{"} \ (\text{"})(38.0)(30) = 101 \text{ PLF}$$

$$W_{16} = \text{"} \ (\text{"})(36.67)(30) = 97 \text{ PLF}$$

$$W_{17} = \text{"} \ (\text{"})(43.67)(30) = 116 \text{ PLF}$$

$$V_{G-015} = .0084(1.3)(30)\left(7.67(21.67) + 36(26) + \tfrac{1}{2}(36)(38)\right)$$

$$= 4764^{\#}$$

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UNIT 62R SEISMIC FORCE DISTRIBUTION

Level	W_i	h_i	$W_i h_i$	$\Sigma W_i h_i$	C_{vx}	ADJUSTMENT FACTOR
Roof	8714#	35.0'	301090	301090	0.61	1.44
G+1.0	1266#	24.5'	31017	338107	0.06	0.98
G+0.5	5908#	19.83'	117156	455263	0.23	0.81
G-0.5	4164#	9.92'	41259	502522	0.10	0.43
					1.00	

$V_{TOTAL} = 20112\#$ (INCLUDES ρ)

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SHEAR WALL SEISMIC FORCES

ROOF LEVEL

$$V_{SW1} = 4605^{\#}(1.44) = 6631^{\#}$$

$$V_{SW2} = 4184^{\#}(1.44) = 6025^{\#}$$

$$V_{SW6} = 4384^{\#}(1.44) = 6313^{\#}$$

$$V_{SW7} = 4395^{\#}(1.44) = 6329^{\#}$$

LEVEL 2

$$V_{SW1} = \left[2.83\left(\tfrac{1}{2}\right)(243) + 17.67\left(\tfrac{204+243}{2}\right) + 8.58\left(\tfrac{87+79}{2}\right)\right](.81) = 4054^{\#}$$

$$V_{SW2} = \left[8.75\left(\tfrac{50}{2}\right) + 7\left(\tfrac{50+64}{2}\right)\right](.98) = 410^{\#}$$

$$V_{SW3} = \left[8.58\left(\tfrac{71+79}{2}\right)(.81) + 3.88\left(\tfrac{61+71}{2}\right)\left(\tfrac{.81+.98}{2}\right)\right] = 761^{\#}$$

$$V_{SW4} = 6.96\left(\tfrac{57+63}{2}\right)(.98) + 3.88\left(\tfrac{63+67}{2}\right)\left(\tfrac{.81+.98}{2}\right) = 522^{\#}$$

$$V_{SW6} = 4077^{\#}\left(.98\left(\tfrac{1}{3}\right) + .81\left(\tfrac{2}{3}\right)\right) = \begin{matrix} 1332^{\#} @ \; 6+1.10 \\ 2202^{\#} @ \; 6+0.5 \end{matrix} \Big\} \; 3534^{\#} \; \text{TOT.}$$

$$V_{SW7} = 3088^{\#}\left(\qquad '' \qquad \right) = \begin{matrix} 1008^{\#} @ \; 6+1.10 \\ 1468^{\#} @ \; 6+0.5 \end{matrix} \Big\} \; 2476^{\#} \; \text{TOT.}$$

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LEVEL 1

$$V_{SW1} = \left[\frac{1}{2}(17.67)\left(\frac{85+93}{2}\right) + \frac{1}{2}(17.17)\left(\frac{77+75}{2}\right)\right](.43) = 637^{\#}$$

$$V_{SW3} = \left[\frac{1}{2}(17.17)\left(\frac{69+77}{2}\right) + \frac{1}{2}(7.75)(58)\right].43 = 366^{\#}$$

$$V_{SW4} = \frac{1}{2}(7.75)(58)(.43) = 97^{\#}$$

$$V_{SW6} = \left[\frac{1}{2}(12.93)(97) + 1437\right].43 = 885^{\#}$$

$$V_{SW7} = 1506(.43) = 648^{\#}$$

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UNIT C2R WIND LOADS

Roof Level

Level 2

Level 1

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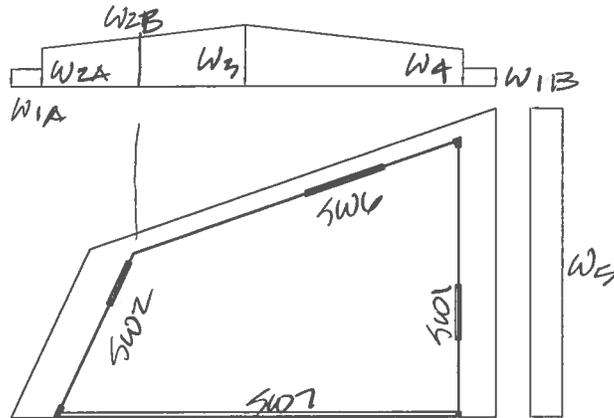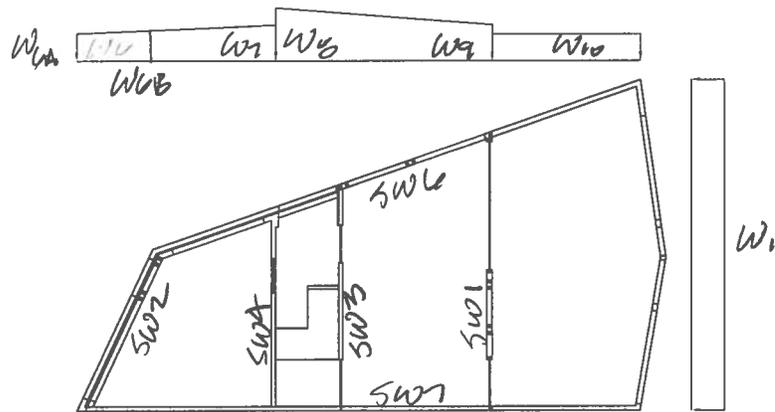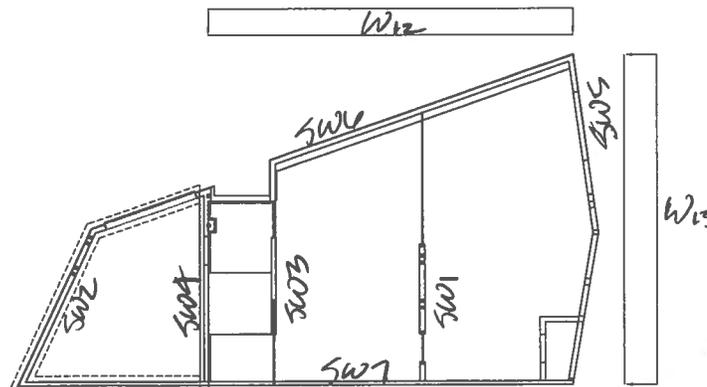
SHEAR WALL WIND FORCES

NOTE: MAX PRESSURE USED FOR N-S WIND

FACTOR FOR SUCTION LOAD $= \dfrac{5.6}{14.8} = 0.38$

FULL PR + SUCT USED FOR E-W WIND

$W_{1A} = 1.67(14.8) = 245$ PLF

$W_{2A} = 7.92(14.8) = 117$ PLF

$W_{2B} = 9.54 (") = 141$ PLF

$W_{3L} = W_{2B} = \qquad 141$ PLF

$W_{3R} = 11.08 (14.8) = 164$ PLF

$W_4 = 9.04 (") = 134$ PLF

$W_{1B} = 4.17 (14.8) = 62$ PLF

$W_5 = 9.04 (14.8) + 7.0(5.6) = 173$ PLF

$W_{6A} = 9.25(14.8) = 137$ PLF

$W_{6B} = 8.83 (") = 131$ PLF

$W_7 = 10.92 (") = 162$ PLF

$W_8 = 13.25 (") = 196$ PLF

$W_9 = 12.88 (") = 191$ PLF

$W_{10} = 3.39 (41.5) + 7.08(14.8) = 243$ PLF

$W_{11} = 12.88(14.8) + 9.25(5.6) = 243$ PLF $\left(191_{GHORS} + 52_{C+110} \right)$

$W_{12} = 4(14.8) = \qquad 59$ PLF

$W_{13} = 9.88 (14.8) = 146$ PLF

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<u>SHEAR WALL WIND FORCES</u>

<u>ROOF LEVEL</u>

$V_{SW1} = 3021^{\#}$

$V_{SW2} = 2775^{\#} + 3.58(25) + 10.58(129) = 4220^{\#}$

$V_{SW6} = 23.58(173) = 4079^{\#}$

$V_{SW7} = 12.58(173) = 2176^{\#}$

<u>UPPER LEVEL 2</u>

$V_{SW1} = 17.25(243) + \frac{1}{2}(17.5)(193) = 5881^{\#}$

$V_{SW2} = 9.5(134) + 6.75(131) + \frac{1}{6}(6.75)(31) = 2192^{\#}$

$V_{SW3} = \frac{1}{2}(17.5)(193) + \frac{1}{2}(15)(195) = 2438^{\#}$

$V_{SW4} = \frac{1}{2}(15)(195) + 6.75(131) + \frac{1}{3}(6.75)(31) = 1485^{\#}$

$V_{SW6} = 23.58(242) = 5706^{\#}$

$V_{SW7} = 12.58(243) = 3057^{\#}$ $\left(2402^{\#}_{640.5} + 655^{\#}_{640.5} \right)$
$\qquad\qquad\qquad\qquad\qquad\qquad (PR) \qquad\qquad (SUCT)$

<u>LEVEL 1</u>

$V_{SW1} = 17.42(59) = 1027^{\#}$

$V_{SW3} = 12.33(59) = 727^{\#}$

$V_{SW4} = 3.75(59) = 221^{\#}$

$V_{SW5} = 8.83(59) = 521^{\#}$

$V_{SW6} = 23.58(146) = 3443^{\#}$

$V_{SW7} = 12.58(146) = 1837^{\#}$

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SHEAR WALL DESIGN

SW1 – WALLS ON LINE C

ALL WALLS ARE TIED TOGETHER AT ROOF & LO2.
UNITS ARE INDEPENDENT AT LO1

At ROOF

$$V_{TOT} = 4(4707) + 6631 = 25459^\# \; EQ$$
$$= 4095 + 3021(.38) = 5243^\# \; WIND$$

$$L_{WALL} = 4(4.5) + 6.33 = 24.33'$$

$$V_{TYP \; UNIT} = \frac{25459}{\substack{OR \\ 5243}} \left(\frac{4.5}{24.33}\right) = 4709^\# \; EQ. , \; 970^\# \; WIND$$

$$V_{C2R} = \qquad '' \qquad \left(\frac{6.33}{24.33}\right) = 6624^\# \; EQ. , \; 1364^\# \; WIND$$

At LO2

$$V_{TOT} = 4(2053) + 4054 = 12266^\# \; EQ.$$
$$= 6712 + 5881(.38) = 8947^\# \; WIND$$

$$L_{WALL} = 4(10.92) + 10.5 = 54.18 \; FT$$

$$V_{TYP \; UNIT} = \frac{12266}{\substack{OR \\ 8947}} \left(\frac{10.92}{54.18}\right) = 2472^\# \; EQ, \; 1803^\# \; W.$$

$$V_{C2R} = \qquad '' \qquad \left(\frac{10.5}{54.18}\right) = 2377^\# \; EQ, \; 1734^\# \; W.$$

At LO1

$$V_{TYP \; UNIT} = 558^\# \; EQ, \; 3055^\# \; WIND \; (N. \; UNIT \; ONLY)$$

$$V_{C2R} = 637^\# \; EQ, \; 1027^\# \; WIND$$

STRAP FORCE BTWN UNITS:
$$T_{ROOF} = 6712(.38) - 1699 = 852^\#$$
$$T_{LO2} = 4054 - 2377 = 1677^\#$$

USE SIMPSON
MSTA30 STRAP

$$T_{ALLOW} = 2050^\#$$

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SHEAR WALL DESIGN

SW2

FOR WALLS ON LINE A, ALL WALLS ARE
TIED TOGETHER AT L02 & ROOF.
ASSUME SHEAR DISTR. IS PROPORTIONAL
TO WALL LENGTH.

$L_{WALL} = 4(4.67') + 5.5 = 24.18$ FT

At ROOF: $V_{TOT} = 4(4707) + 6025 = 24853^{\#}$ EQ.

$= 3759(0.38) + 4229 = 5657^{\#}$ WIND

↗ (N.UPLIFT)   (SHR)

FOR SUCTION

$V_{TYP\ UNIT} = \dfrac{24853}{OR} \left(\dfrac{4.67}{24.18}\right) = 4800^{\#}$ EQ, $1093^{\#}$ W
$\qquad\qquad 5657$

$V_{CTR} = \quad '' \quad \left(\dfrac{5.5}{24.18}\right) = 5653^{\#}$ EQ, $1287^{\#}$ W

At L02 $V_{TOT} = 4(492) + 410 = 2378^{\#}$ EQ.

$= 1734(.38) + 2192 = 2851^{\#}$ WIND

$L_{WALL} = 4(4.67) + 5.5 = 24.18$

$V_{TYP\ UNIT} = \dfrac{2378}{OR} \left(\dfrac{4.67}{24.18}\right) = 459^{\#}$ EQ, $551^{\#}$ WIND
$\qquad\qquad 2851$

$V_{CTR} = \quad '' \quad \left(\dfrac{5.5}{24.18}\right) = 541^{\#}$ EQ, $648^{\#}$ WIND

MAX STRAP FORCE BTWN UNITS:

$T_{ROOF} = 6025 - 5653 = 372^{\#}$ ⎫ USE SIMPSON
$T_{L02} = 541 - 410 = 131^{\#}$ ⎬ LSTA24 MIN $(T_{ALLOW} = 1235^{\#})$
$\qquad\qquad\qquad\qquad\qquad\qquad$⎭   OK

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TYPICAL UNIT SHEAR WALLS

WALL SW1

HEAD CONN'S
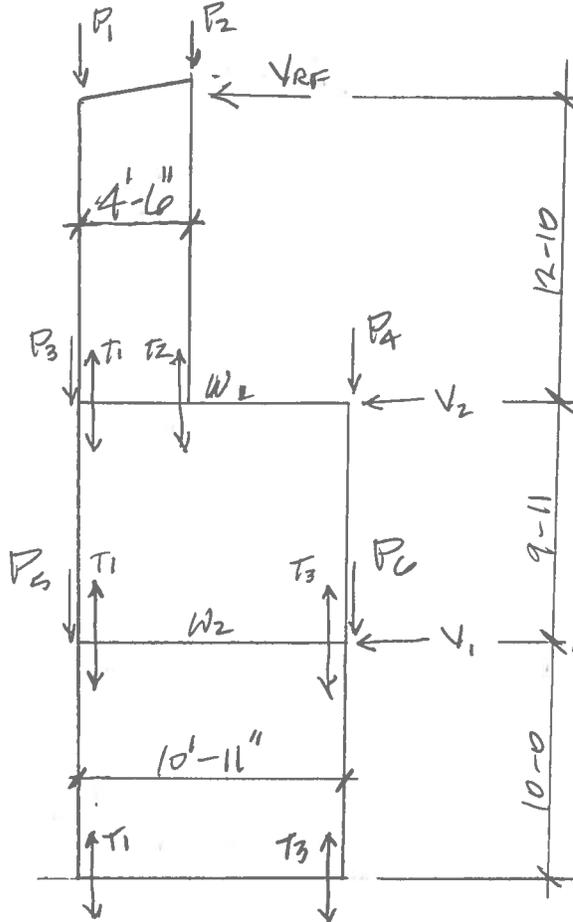
$N_{LPT} = \frac{4709}{670} = 7.0$ ⟶ USE (8) SIMPSON LPT4

$N_{LAG} = \frac{4709}{1.6(640)} = 4.6$ ⟶ USE (5) 5/8"⌀ LAGS

$V_{RF} = 4709^{\#}$ EQ
       $970^{\#}$ WIND

$P_1 = 330^{\#} D + 8300^{\#} S3C8 + 3098^{\#} S240$

$P_2 = 2520^{\#} D + 19890^{\#} S3C8 + 23697^{\#} S240$

$V_2 = 2472^{\#}$ EQ.
       $1803^{\#}$ WIND

$P_3 = P_4 = 1164^{\#} D + 5892^{\#} S$
$W_1 = 390 D + 3006 S$, PLF

$V_1 = 558^{\#}$ EQ.
      $3055^{\#}$ WIND (H. UNIT ONLY)

$P_5 = P_6 = 636^{\#} D + 882^{\#} L$

$W_2 = 305 D + 423 L$, PLF

WALL BTWN L02 & ROOF

$U = 1046$ PLF EQ , 216 PLF WIND

$H/b = 2.85 > 2$

USE 5/8" SHT'G B.S. OF WALL W/ 10d @ 2" O.C.

$U_{ALLOW (EQ)} = 2(1740)\frac{1}{2.0}\left(\frac{2}{2.85}\right) = 1221$ ok.

$U_{ALLOW (WIND)} = 2(2435)\frac{1}{2.0}\left(\frac{2}{2.85}\right) = 1709$ ok

SILL CONN.

5/8"⌀ BOLTS @ 16" O.C. ; $U_{ALLOW} = 1.6(1007)\frac{12}{16} = 1208$ PLF ok (3 BOLTS MIN.)

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$OTM @ L02 = 4.709(12.83) = \pm 60.42^{1k} \text{ EQ.}$, $F_T = \pm \dfrac{60.42}{3.83'} = \pm 15.72^{k}$

TIE AT T1:

$P = 330_D + \dfrac{8300 \text{ MAX}}{3098 \text{ MIN}} \leq \pm 15760 \text{ EQ.}$

$= 18315^{\#} \text{ MAX}$ (SEE NEXT SHT FOR POST DESIGN)

$= .6(330 + 12.83(\frac{5}{2})(6)) - 15760 = -15320^{\#}$ (MAX TENSION)

SIMPSON MST37 EA. SIDE
OF EA. POST
$T_{ALLOW} = 4(5080) = 20320^{\#}$ ok

TIE AT T2:

$P = 2526_D + \dfrac{23697 \text{ MAX}}{19890 \text{ MIN}} \leq \pm 15760 \text{ EQ.}$

$= 32118^{\#} \text{ MAX}$ (SEE NEXT SHTS FOR POST DESIGN)

$= .6(2526 + 321) - 15760 = -14052^{\#}$ (MAX TENSION)

SIMPSON HDU14-SDS2.5
$T_{ALLOW} = 14445^{\#}$ ok

WALL B/W L01 & L02

$V = 7181^{\#} \text{ EQ.}, 2773^{\#} \text{ WIND}$

$U = 658 \text{ EQ.}, 254 \text{ WIND, PLF}$

$H/b_s = 0.91 < 2$ ok

USE $\frac{5}{8}''$ SHT'G BOTH SIDES
OF WALL w/ 10d @ 6" O.C. (MIN)

$V_{ALLOW} = \dfrac{2(680)}{2.0} = 680 \text{ EQ.}$

$= \dfrac{2(950)}{2.0} = 950 \text{ WIND}$
ok

SILL CONN.

$N = \dfrac{7181}{1007(6.0)} = 4.45$

USE (5) $\frac{5}{8}''\phi$ BOLTS

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Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		

Project ID: 15105

Wood Column

Description :   Typ Unit - SW1 - T1 Post from L02 to Roof - 4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**4x8**
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber
Overall Column Height		12.50 ft	Wood Member Type	Sawn

(Used for non-slender calculations)

					Exact Width	**3.50** in	Allow Stress Modification Factors
					Exact Depth	**7.250** in	Cf or Cv for Bending	1.30
Wood Species	Douglas Fir - Larch				Area	25.375 in^2	Cf or Cv for Compression	1.050
Wood Grade	No.1				Ix	111.148 in^4	Cf or Cv for Tension	1.20
Fb - Tension	1,200.0 psi	Fv	170.0 psi		Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi				Ct : Temperature Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf				Cfu : Flat Use Factor	1.0
Fc - Perp	625.0 psi						Kf : Built-up columns	1.0 NDS 15.3.2

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial	
Basic	1,600.0	1,600.0	1,600.0 ksi	Use Cr : Repetitive ?	No
Minimum	580.0	580.0		

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 12.50 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 12.50 ft, D = 0.330, S = 8.30, E = 15.760 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.8015 : 1**
	Load Combination	+D+0.750L+0.750S+0.750E+H
	Governing NDS Forumla	Comp Only, fc/Fc'
	Location of max.above base	0.0 ft
	At maximum location values are . . .	
	Applied Axial	18.375 k
	Applied Mx	0.0 k-ft
	Applied My	0.0 k-ft
	Fc : Allowable	903.51 psi

PASS	Maximum Shear Stress Ratio =	**0.0 : 1**
	Load Combination	+0.60D+E+0.60H
	Location of max.above base	12.50 ft
	Applied Design Shear	0.0 psi
	Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

360

Wood Column

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   Typ Unit - SW1 - T1 Post from L02 to Roof - 4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title:	Copper Crest East
Engineer:	MAR
Project Descr:	

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW1 - T2 Post from L02 to Roof - 6x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x8**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		13.170 ft		Wood Member Type	Sawn	
(Used for non-slender calculations)				Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**7.250** in	Cf or Cv for Bending	1.0
Wood Grade	No.1			Area	39.875 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	174.661 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	100.518 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial	
Basic	1,600.0	1,600.0	1,600.0 ksi	
Minimum	580.0	580.0		

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 13.170 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
     Axial Load at 13.170 ft, D = 2.526, S = 23.697, E = 15.760 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.9744 : 1**
	Load Combination	+D+0.750L+0.750S+0.750E+H
	Governing NDS Forumla	Comp Only, fc/Fc'
	Location of max.above base	0.0 ft
	At maximum location values are ...	
	Applied Axial	32.119 k
	Applied Mx	0.0 k-ft
	Applied My	0.0 k-ft
	Fc : Allowable	826.62 psi

PASS	Maximum Shear Stress Ratio =	**0.0 : 1**
	Load Combination	+0.60D+E+0.60H
	Location of max.above base	13.170 ft
	Applied Design Shear	0.0 psi
	Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections ...

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses ...

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW1 - T2 Post from L02 to Roof - 6x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$OTM @ LOI = 7.181(9.92) = 71.23^h \, EQ \qquad F_T = \pm 7.12^k \, EQ.$

$\qquad\qquad = 2.773(9.92) = 27.51^h \, W \qquad F_T = \pm 2.75^k \, W.$

$CUMULATIVE \; T @ T1 = 15.76 + 7.12 = 22.88^k \, EQ.$

$\qquad\qquad\qquad = 3.25 + 2.75 = 6.00^k \, WIND$

TIE AT T1

$P = 1094_D + \dfrac{14192 \, MAX}{7990 \, MIN} \, S \pm \dfrac{22880 \, EQ.}{6000 \, W.}$

$= 28898^\# \, MAX \; (SEE \, NEXT \, SHT \, FOR \, POST)$

$= .6\left(1094 + 642 + \dfrac{10.92(9.92)}{2}(10)\right) - 22880 = -21513^\# \, MAX. \, TENS.$

TIE AT T3

$P = 164_D + 5892_S \pm \dfrac{7120 \, EQ}{2750 \, W}$

$= 110923^\# \, MAX \; (SEE \, NEXT \, SHT \, FOR \, POST)$

$= .6\left(164 + \dfrac{10.92(9.92)}{2}(10)\right) - 7120 = -6337^\# \, MAX \, TENSION$

(SIMPSON MST37
EA SIDE OF EACH POST
$T_{ALLOW} = 20320^\#$ ok

WALL BTWN GND & LOI

$V = 7139^\# \, EQ, \; 5828^\# \, WIND$

$U = 709 \, EQ, \; 534 \, WIND, \, PLF$

(USE $\frac{5}{8}"$ SHTG BOTH SIDES
OF WALL W/ 10d @ 4" O.C. (MIN)
$U_{ALLOW} = 1020 \, EQ, \; 1430 \, WIND$ ok

SILL CONN

$N = \dfrac{7139}{1.6(1540)} = 3.14$

(USE (4) $\frac{3}{4}"\phi$ AB'S TO STEM

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Project ID: 15105

Wood Column

Lic. # : KW-06002357
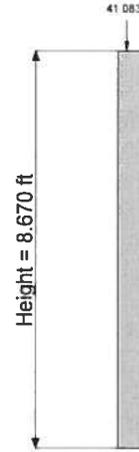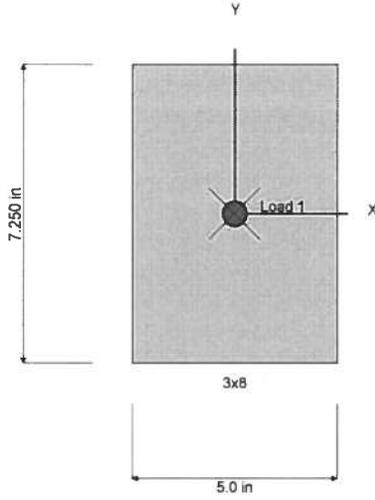Licensee : RUDOW & BERRY

Description : Typ Unit - SW1 - T1 Post from L01 to L02 - (2)4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**4x8**
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber
Overall Column Height		9.920 ft		Wood Member Type	Sawn

(Used for non-slender calculations)

				Exact Width	**3.50** in Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**7.250** in Cf or Cv for Bending 1.30
Wood Grade	No.1			Area	25.375 in^2 Cf or Cv for Compression 1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	111.148 in^4 Cf or Cv for Tension 1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	25.904 in^4 Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf		Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi				Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial	
Basic	1,600.0	1,600.0	1,600.0 ksi	Kf : Built-up columns 1.0 *NDS 15.3.2*
Minimum	580.0	580.0		Use Cr : Repetitive ? No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.920 ft, D = 1.094, S = 14.192, W = 6.0, E = 22.880 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.9569 : 1**

Load Combination	+D+0.750L+0.750S+0.750E+H
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	9.920 ft

At maximum location values are . . .

Applied Axial	28.898 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	1,190.14 psi

PASS Maximum Shear Stress Ratio =   **0.0 : 1**

Load Combination	+0.60D+E+0.60H
Location of max.above base	9.920 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

305

Wood Column

Lic. # : KW-06002357

Description :   Typ Unit - SW1 - T1 Post from L01 to L02 - (2)4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description : Typ Unit - SW1 - T3 Post from L01 to L02 - (2)4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design				Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned				Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.920 ft			Wood Member Type	Sawn	
(Used for non-slender calculations)					Exact Width	**3.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch				Exact Depth	**7.250** in	Cf or Cv for Bending	1.30
Wood Grade	No.1				Area	25.375 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi		Ix	111.148 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi		Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf				Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi						Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Kf : Built-up columns 1.0 *NDS 15.3.2*
Use Cr : Repetitive ? No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 9.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
    Axial Load at 9.920 ft, D = 0.7640, S = 5.892, W = 2.750, E = 7.120 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.3484 : 1**
	Load Combination	+D+0.750L+0.750S+0.750E+H
	Governing NDS Forumla	Comp Only, fc/Fc'
	Location of max.above base	0.0 ft
	At maximum location values are . . .	
	Applied Axial	10.523 k
	Applied Mx	0.0 k-ft
	Applied My	0.0 k-ft
	Fc : Allowable	1,190.14 psi

PASS	Maximum Shear Stress Ratio =	**0.0 : 1**
	Load Combination	+0.60D+E+0.60H
	Location of max.above base	9.920 ft
	Applied Design Shear	0.0 psi
	Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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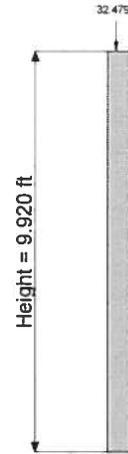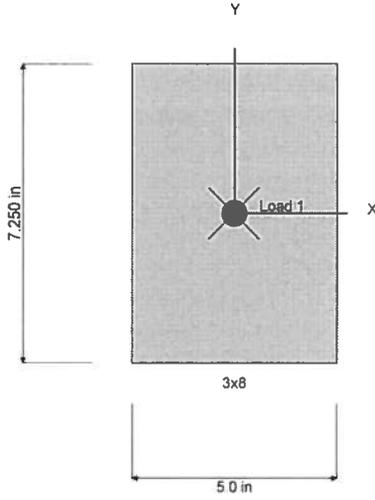Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description : Typ Unit - SW1 - T3 Post from L01 to L02 - (2)4x8 D.Fir#1

Sketches

Y

7.250 in

Load 1   X

4x8

3.50 in

16.526k

Height = 9.920 ft

Loads are total entered value. Arrows do not reflect absolute direction.

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f (480) 946-9480

job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$OTM @ GRD = 71.23 + 7.739(10) = 148.62^{1k} EQ.$ $F_T = \pm 14.86^{k} EQ.$

$= 27.51 + 5.828(10) = 85.79^{1k} W.$ $F_T = \pm 8.58^{k} W.$

$CUMULATIVE\ AT\ T1 = 15.76 + 14.86 = 30.62^{k} EQ$

$= 15.76 + 8.58 = 24.34^{k}\ WIND$

TIE AT T1:

$P = 1730^{\#} D + \frac{14192\ max}{8990\ min} S + 882 L \pm \frac{30620\ EQ}{24340\ WIND}$

$P_{max} = 36000^{\#}\ MAX\ COMPR.\ (SEE\ NEXT\ SHT\ FOR\ POST\ DESIGN)$

$P_{min} = .6\left[1730 + 642 + \frac{10.92(19.92)}{2}(10)\right] - 30620$

$= -28544^{\#}\ Max\ TENSION$

TIE AT T3

$P = 1400 D + 5892 S + 882 L \pm \frac{14860\ EQ.}{8580\ WIND}$

$P_{max} = 17626^{\#}\ MAX\ COMPR.\ (SEE\ NEXT\ SHT\ FOR\ POST\ DES.)$

$P_{min} = .6\left(1400 + \frac{10.92(19.92)}{2}(10)\right) - 14860$

$= -13367^{\#}\ Max\ TENSION$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

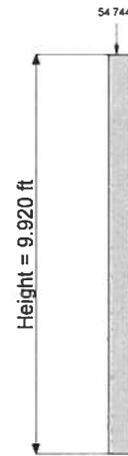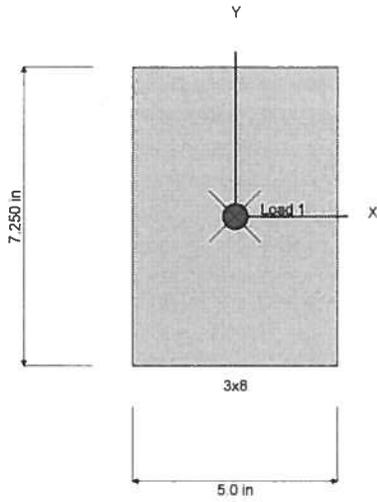# Wood Column

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW1 - T1 Post from GND to L01 - (2)4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		10.0 ft	Wood Member Type	Sawn	

(Used for non-slender calculations)

				Exact Width	**3.50** in	Allow Stress Modification Factors	
Wood Species	Douglas Fir - Larch			Exact Depth	**7.250** in	C_f or C_v for Bending	1.30
Wood Grade	No.1			Area	25.375 in^2	C_f or C_v for Compression	1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	111.148 in^4	C_f or C_v for Tension	1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0 *NDS 15.3.2*
Basic	1,600.0	1,600.0	1,600.0 ksi		Use Cr : Repetitive ?	No
Minimum	580.0	580.0				

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 10.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 10.0 ft, D = 1.730, L = 0.8820, S = 14.192, W = 24.340, E = 30.620 k

DESIGN SUMMARY

Bending & Shear Check Results

FAIL	Max. Axial+Bending Stress Ratio =	**1.201** : 1	
	Load Combination	+D+0.750L+0.750S+0.750E+H	
	Governing NDS Forumla	Comp Only, fc/Fc'	
	Location of max.above base	0.0 ft	

At maximum location values are . . .
Applied Axial	36.001 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	1,181.08 psi

PASS	Maximum Shear Stress Ratio =	**0.0** : 1	
	Load Combination	+0.60D+E+0.60H	
	Location of max.above base	10.0 ft	
	Applied Design Shear	0.0 psi	
	Allowable Shear	272.0 psi	

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C_D	C_P	Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Description :   Typ Unit - SW1 - T1 Post from GND to L01 - (2)4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Description :   Typ Unit - SW1 - T3 Post from GND to L01 - (2)4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		10.0 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**3.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in	Cf or Cv for Bending	1.30
Wood Grade	No.1		Area	25.375 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	111.148 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

	x-x Bending	y-y Bending	Axial		
E : Modulus of Elasticity . . .				Cfu : Flat Use Factor	1.0
Basic	1,600.0	1,600.0	1,600.0 ksi	Kf : Built-up columns	1.0 NDS 15.3.2
Minimum	580.0	580.0		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
  X-X (width) axis :   Fully braced against buckling along X-X Axis
  Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 10.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
  Axial Load at 10.0 ft, D = 1.40, L = 0.8820, S = 5.892, W = 8.580, E = 14.860 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.5881 : 1**
  Load Combination   +D+0.750L+0.750S+0.750E+H
  Governing NDS Forumla   Comp Only, fc/Fc'
  Location of max.above base   0.0 ft
  At maximum location values are . . .
    Applied Axial   17.626 k
    Applied Mx   0.0 k-ft
    Applied My   0.0 k-ft
    Fc : Allowable   1,181.08 psi

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
  Load Combination   +0.60D+E+0.60H
  Location of max.above base   10.0 ft
  Applied Design Shear   0.0 psi
  Allowable Shear   272.0 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in   at   ft   above base
  for load combination :
Along X-X   in   at   ft   above base
  for load combination :

Other Factors used to calculate allowable stresses . . .
	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105   312

Wood Column

Description :   Typ Unit - SW1 - T3 Post from GND to L01 - (2)4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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rbinc@rbise.com

job name: Copper Crest East
job number: 15105

designed by:MAR   date: 1/17
checked by: date:

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FOOTING

OTM @ B.O. FTG = 148.62 + 7.139(2.74) = 166.03^k EQ.

P_{DL} = 330 + 2526 + 764 + 764 + 636 + 636 + 4.5(126) + 10.92(199)
　　　　　　　　　　　　　　　　　　　　　　576　　　　2173

　　+ 10.92(390 + 305) = 15994#
　　　　　　　1589

W_{DL} = $\frac{15994}{10.92}$ = 1465 PLF

M_{DL} = (330 + 764 + 636)(5.46) + 576(3.21) + 2526(.96) − (764 + 636)(5.46)
　　　= 6.08^{1k} CCW

P_L = 882 + 882 + 10.92(413) = 6602#, W_L = 605 PLF

M_L = 0

P_{SL} = 8300 + 19890 + 5892 + 5892 + 10.92(3006) = 72,800#
　　　　　　　　　　　　　　　　32826

　　W_{SL} = 4667 PLF

　　M_{SL} = (8.3 + 5.892)(5.46) + 19.99(.96) − 5,892(5.46)
　　　　= 64.41^{1k} CCW

　　　−SEE NEXT SHT FOR FTG−

rudow + berry
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project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA : Typical Unit Wall SW1

Allow. Soil Pr. =	2.400	ksf	DL OTM =	6.08	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	3000	psi	RF LL OTM =	64.41	f t - kips
Wall DL =	1.47	klf	SEISMIC OTM =	166.03	f t - kips
Roof LL =	6.67	klf	Footing Length :	16.67	feet
Floor LL =	0.61	klf	Footing Width :	4.33	feet
Wall Length =	10.92	feet	Footing Thkness:	18	inches
Wall Thickness =	8	inches	Footing DL :	1.649	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	103.0 kips	P_{ult} =	147.5 kips	
OTM =	54.39 ft-kips	OTM_{ult} =	84.59 ft-kips	
e =	0.53 feet	X bar =	N/A feet	
Soil Pr. =	1.70 ksf, max.,	2.43 ksf, ult.		Required Width = 3.06 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	103.0 kips	P_{ULT} =	147.5 kips	
OTM =	178.9 ft-kips	OTM_{ULT} =	283.82 ft-kips	
e =	1.74 feet	X bar =	N/A feet	
Soil Pr. =	2.32 ksf, max.,	3.32 ksf, ult.		Required Width = 4.19 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	26.1 kips	P (ult) =	31.3 kips	
OTM =	169.7 ft-kips	OTM_{ULT} =	190.33 ft-kips	
e =	6.50 feet	X bar =	1.83 feet	
Soil Pr. =	2.19 ksf, max.,	2.63 ksf, ult.		Required Width = 3.96 feet

Resisting Moment = 362.43 ft-kips   Factor of Safety =   3.02

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	32	inches			
Moment = 16.40 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 109	psi
Shear = 0.69 kips/ft		Fv(allow)= 71 psi		fv(act.)= 3	psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	20	inches			
Moment = 6.84 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 127	psi
Shear = 0.54 kips/ft		Fv(allow)= 71 psi		fv(act.)= 3	psi

Reinf. Thickness (if used) =	18	inches			
Longitudinal Steel Required =	0.26	sq.in./ft.		v(longit.) = 31	psi
Transverse Steel Required =	0.11	sq.in./ft.		v(transv.)= 11	psi
				V(allow) = 93.1	psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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WALL SW-2
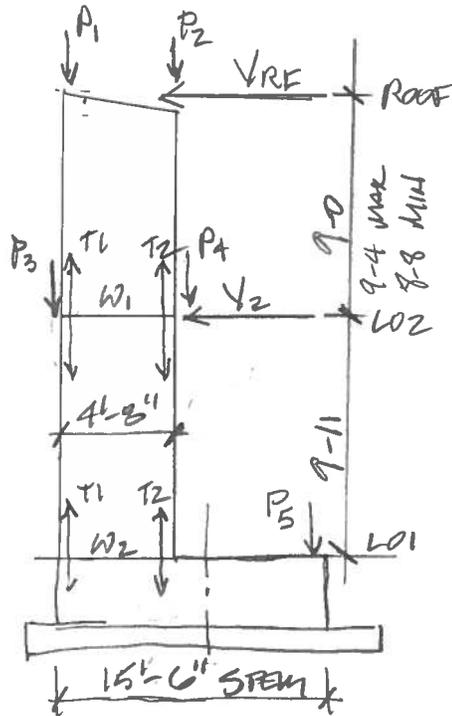
$V_{RF} = 4800^{\#}$ EQ., $1093^{\#}$ WIND

$P_1 = 717^{\#}D + 1227^{\#}_{S3+S} + 1205^{\#}_{S2+S}$

$P_2 = 2591^{\#}D + 29412_{S3+S} + 24037^{\#}_{S2+S}$

$V_2 = 459^{\#}$ EQ., $551^{\#}$ WIND

$P_3 = \frac{1}{2}(4.67)(1.17)(25+40)$
$= 68^{\#}D + 109^{\#}L$

$P_4 = \frac{1}{2}(9.5)(1.17)(25+40)$
$= 139^{\#}D + 222^{\#}L$

$W_1 = 9(10) = 90$ PLF $+L$, PLF

$W_2 = 9.92(10) + 1.17(25+40)$
$= 128D + 47L$, PLF

$P_5 = 1669D + \frac{16706}{15478} S$

WALL BTWN LO2 & ROOF

$V = 1028$ PLF EQ., 234 PLF WIND

$H/b = 1.933 < 2$

USE $\frac{5}{8}''$ SHTG B.S. W/
10d @ 2" O.C.

$V_{ALLOW} = \frac{2(1740)}{2.0} = 1740$ EQ.
$= \frac{2(2435)}{2.0} = 2435$ W.
∴ ok

SILL CONN.

$M = \frac{4800}{1.6(1001)} = 2.98$

USE MIN (3) $\frac{5}{8}''\phi$ BOLTS @ LO2

HEAD CONN

$N_{LPT} = \frac{4800}{670} = 7.2$ USE (8) SIMPSON LPT4

$N_{LAG} = \frac{4800}{1.6(640)} = 4.68$ USE MIN (5) $\frac{5}{8}''\phi$ LAGS

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$OTM @ LO2 = 4.80 (9) = 43.2^{1k}$ EQ. $F_T = \frac{43.2}{3.92} = 11.02^k$ EQ

$= 1.093 (9) = 9.8^{1k}$ WIND $F_T = 2.51^{\,k}$ WIND

TIE AT T1:

$P = 777_D + \begin{smallmatrix}1205 \text{ MAX} \\ 1271 \text{ MIN}\end{smallmatrix} S \pm \begin{smallmatrix}11020 \text{ EQ} \\ 2510 \text{ W.}\end{smallmatrix}$

$P_{MAX} = 14446^{\#}$ — SEE NEXT SHT FOR POST DESIGN

$P_{MIN} = .6 (777 + \frac{4.67}{2}(90)) - 11020 = -10423^{\#}$ MAX TENSION

USE SIMPSON MST37
EA SIDE OF EA POST

$T_{ALLOW} = 4(5080) = 20160^{\#}$ ok

TIE AT T2

$P = 2591_D + \begin{smallmatrix}27472 \text{ MAX} \\ 24037 \text{ MIN}\end{smallmatrix} S \pm \begin{smallmatrix}11020 \text{ EQ.} \\ 2510 \text{ W.}\end{smallmatrix}$

$P_{MAX} = 31460.^{\#}$ — SEE NEXT SHTS FOR POST DESIGN

$P_{MIN} = .6 (2591 + \frac{4.67}{2}(90)) - 11020 = -9179^{\#}$ MAX TENS.

USE SAME AS T1

WALL BTWN LO1 & LO2

$V = 5259^{\#}$ EQ , $1644^{\#}$ WIND

$U = 1126$ PLF EQ , 352 PLF WIND

$H/b_s = 2.12$

USE $\frac{5}{8}''$ SHT'G B.S
w/ 8d @ 2" O.C.

$U_{ALLOW} = 1740$ EQ
2435 WIND ok

SILL CONN'T

$N = \frac{5259}{1.6(1540)} = 2.13$

USE (3) $\frac{3}{4}''\varnothing$ AB's TO STEM

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4021 north 75th street, #101
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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW2 - T1 Post from L02 to Roof - (2)3x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**3x8**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.330 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.0** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in	Cf or Cv for Bending	1.20
Wood Grade	No.1		Area	36.250 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	158.783 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	75.521 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

	x-x Bending	y-y Bending	Axial	
E : Modulus of Elasticity . . .				Kf : Built-up columns	1.0 *NDS 15.3.2*
Basic	1,600.0	1,600.0	1,600.0 ksi	Use Cr : Repetitive ?	No
Minimum	580.0	580.0		

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.330 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.330 ft, D = 0.7770, S = 7.205, E = 11.020 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.3173 : 1**
   Load Combination   +D+0.750L+0.750S+0.750E+H
   Governing NDS Forumla   Comp Only, fc/Fc'
   Location of max.above base   0.0 ft
   At maximum location values are . . .
      Applied Axial   14.446 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   1,255.76 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in   at   ft   above base
   for load combination :
Along X-X   in   at   ft   above base
   for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
   Load Combination   +0.60D+E+0.60H
   Location of max.above base   9.330 ft
   Applied Design Shear   0.0 psi
   Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description :   Typ Unit - SW2 - T1 Post from L02 to Roof - (2)3x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW2 - T2 Post from L02 to Roof - (2)3x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**3x8**
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber
Overall Column Height	8.670 ft		Wood Member Type	Sawn

(Used for non-slender calculations)

			Exact Width	**5.0** in
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in
Wood Grade	No.1		Area	36.250 in^2
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	158.783 in^4
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	75.521 in^4
Fc - Prll	1,000.0 psi	Density	31.20 pcf	
Fc - Perp	625.0 psi		

Allow Stress Modification Factors
- Cf or Cv for Bending   1.20
- Cf or Cv for Compression   1.050
- Cf or Cv for Tension   1.20
- Cm : Wet Use Factor   1.0
- Ct : Temperature Factor   1.0
- Cfu : Flat Use Factor   1.0
- Kf : Built-up columns   1.0 *NDS 15.3.2*
- Use Cr : Repetitive ?   No

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 8.670 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS ...
   Axial Load at 8.670 ft, D = 2.591, S = 27.472, E = 11.020 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.7986 : 1**
Load Combination   +D+S+H
Governing NDS Forumla   Comp Only, fc/Fc'
Location of max.above base   8.670 ft
At maximum location values are ...
- Applied Axial   30.063 k
- Applied Mx   0.0 k-ft
- Applied My   0.0 k-ft
- Fc : Allowable   1,038.53 psi

Maximum SERVICE Lateral Load Reactions ..
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections ...
Along Y-Y   0.0 in   at   ft   above base
   for load combination :
Along X-X   in   at   ft   above base
   for load combination :

Other Factors used to calculate allowable stresses ...
	Bending	Compression	Tension

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**
Load Combination   +0.60D+E+0.60H
Location of max.above base   8.670 ft
Applied Design Shear   0.0 psi
Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

320

Project ID: 15105

Wood Column

Description : Typ Unit - SW2 - T2 Post from L02 to Roof - (2)3x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$OTM @ LO1/GRID = 43.2 + 5.259(9.92) = 95.37^{1k}$ EQ.
$= 9.8 + 1.644 (\text{ " }) = 26.11^{k}$ WIND

$F_T = \pm \dfrac{95.37}{7.92} = \pm 24.32^k$

TIE AT T1

$P = 845 D + 109 L + \dfrac{1205 \text{ MAX}}{1271 \text{ MIN}} \lessgtr \pm 24320$ EQ.

$P_{MAX} = 25,165^{\#}$ MAX - SEE NEXT SHT FOR POST DESIGN

$P_{MIN} = .6 \left(845 + \dfrac{4.17}{2}(90 + 128) \right) - 24320 = -23508^{\#}$ MAX T.

TIE AT T2

$P = 2730 D + 222 L + \dfrac{27412 \text{ MAX}}{24637 \text{ MIN}} \lessgtr \pm 24320$ EQ

$P_{MAX} = 41,740^{\#}$ - SEE NEXT SHTS FOR POST DESIGN

$P_{MIN} = .6 \left(2730 + \dfrac{4.17}{2}(218) \right) - 24320 = 22316^{\#}$ MAX T.

USE STRONG-BAR SYSTEM @ T1 & T2

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Description :   Typ Unit - SW2 - T1 Post from L01 to L02 - (2)3x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design				Wood Section Name	**3x8**	
End Fixities	Top & Bottom Pinned				Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.920 ft			Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.0** in Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in Cf or Cv for Bending 1.20
Wood Grade	No.1		Area	36.25 in^2 Cf or Cv for Compression 1.050
Fb - Tension	1,200.0 psi Fv 170.0 psi		Ix	158.783 in^4 Cf or Cv for Tension 1.20
Fb - Compr	1,200.0 psi Ft 825.0 psi		Iy	75.521 in^4 Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi Density 31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi			Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity . . .   x-x Bending   y-y Bending   Axial
                         Basic   1,600.0   1,600.0   1,600.0 ksi
                         Minimum   580.0   580.0

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
  X-X (width) axis :   Fully braced against buckling along X-X Axis
  Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
   Axial Load at 9.920 ft, D = 0.8450, L = 0.1090, S = 7.205, E = 24.320 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.5833 : 1**
      Load Combination   +D+E+H
      Governing NDS Forumla   Comp Only, fc/Fc'
      Location of max.above base   0.0 ft
      At maximum location values are . . .
         Applied Axial   25.165 k
         Applied Mx   0.0 k-ft
         Applied My   0.0 k-ft
         Fc : Allowable   1,190.14 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y   0.0 k   Bottom along Y-Y   0.0 k
Top along X-X   0.0 k   Bottom along X-X   0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in   at   ft   above base
   for load combination :
Along X-X   in   at   ft   above base
   for load combination :

Other Factors used to calculate allowable stresses . . .
                              Bending   Compression   Tension

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**
      Load Combination   +0.60D+E+0.60H
      Location of max.above base   9.920 ft
      Applied Design Shear   0.0 psi
      Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction	
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base	

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

323

Wood Column

Lic. # : KW-06002357

Description :   Typ Unit - SW2 - T1 Post from L01 to L02 - (2)3x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Typ Unit - SW2 - T2 Post from L01 to L02 - (2)3x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**3x8**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.920 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

				Exact Width	**5.0** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**7.250** in	Cf or Cv for Bending	1.20
Wood Grade	No.1			Area	36.25 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	158.783 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	75.521 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0 NDS 15.3.2
Basic	1,600.0	1,600.0	1,600.0 ksi		Use Cr : Repetitive ?	No
Minimum	580.0	580.0				

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.920 ft, D = 2.730, L = 0.2220, S = 27.472, E = 24.320 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.9675 : 1**
	Load Combination	+D+0.750L+0.750S+0.750E+H
	Governing NDS Forumla	Comp Only, fc/Fc'
	Location of max.above base	0.0 ft
	At maximum location values are . . .	
	Applied Axial	41.741 k
	Applied Mx	0.0 k-ft
	Applied My	0.0 k-ft
	Fc : Allowable	1,190.14 psi

PASS	Maximum Shear Stress Ratio =	**0.0 : 1**
	Load Combination	+0.60D+E+0.60H
	Location of max.above base	9.920 ft
	Applied Design Shear	0.0 psi
	Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base	
for load combination :						
Along X-X		in	at		ft	above base
for load combination :						

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Typ Unit - SW2 - T2 Post from L01 to L02 - (2)3x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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OTM @ B.O. FTG = 95.37 + 5.259(4) = 116.41$^{'k}$

STEM L = 15'-0"

P_{DL} = 777 + 2591 + 68 + 139 + 4.67(218) + 1669 = 6262$^{\#}$
   1018

   W_{DL} = 404 PLF

   M_{DL} = (777+68)(7.67) + (2591+139)(2.92) + 1.018(5.3) + 1.669(-6.92)
        = 8.30$^{'k}$

P_L = 109 + 222 + 4.67(47) = 550$^{\#}$
              219

   W_L = 35 PLF

   M_L = 109(7.67) + 222(2.92) + 219(5.3) = 2.065$^{'k}$

P_S = 1.205 + 24.037 + 16706$^{\#}$ = 41948$^{\#}$

   W_S = 3093 PLF

   M_S = 1.205(7.67) + 24.037(2.92) + 16.706(-6.92)
        = 9.84$^{'k}$

OR

P_S = 1271 + 27472 + 15478 = 44221$^{\#}$

   W_S = 2853 PLF

   M_S = 1.271(7.67) + 27.472(2.92) + 15.478(-6.92)
        = -17.14$^{'k}$

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project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Typical Unit Wall SW2

Allow. Soil Pr. =	2.400 ksf		DL OTM =	8.30 f t - kips
Fy =	60 ksi		FLR LL OTM =	2.65 f t - kips
f 'c =	3000 psi		RF LL OTM =	9.84 f t - kips
Wall DL =	0.40 klf		SEISMIC OTM =	116.41 f t - kips
Roof LL =	3.09 klf		Footing Length :	17.50 feet
Floor LL =	0.04 klf		Footing Width :	2.67 feet
Wall Length =	15.50 feet		Footing Thkness:	12 inches
Wall Thickness =	8 inches		Footing DL :	1.422 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	67.5 kips	P_{ult} =	95.6 kips
OTM =	17.67 ft-kips	OTM_{ult} =	24.95 ft-kips
e =	0.26 feet	X bar =	N/A feet
Soil Pr. =	1.57 ksf, max.,	2.23 ksf, ult.	

Required Width =   1.75 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)
P =	67.5 kips	P_{ULT} =	95.6 kips
OTM =	105.0 ft-kips	OTM_{ULT} =	164.64 ft-kips
e =	1.56 feet	X bar =	N/A feet
Soil Pr. =	2.22 ksf, max.,	3.14 ksf, ult.	

Required Width =   2.46 feet

EQ'N 16-16: 0.6DL + 0.7E
P =	18.7 kips	P (ult) =	22.4 kips
OTM =	121.4 ft-kips	OTM_{ULT} =	136.36 ft-kips
e =	6.50 feet	X bar =	2.25 feet
Soil Pr. =	2.07 ksf, max.,	2.48 ksf, ult.	

Required Width =   2.30 feet

Resisting Moment =   272.49 ft-kips   Factor of Safety =   3.15

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =	32 inches			
Moment =	2.74 ft-kips/ft	Fb(allow)= 178 psi	fb(act.)=	18 psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi	fv(act.)=	0 psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =	20 inches			
Moment =	2.66 ft-kips/ft	Fb(allow)= 178 psi	fb(act.)=	49 psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi	fv(act.)=	0 psi

Reinf. Thickness (if used) =	12 inches			
Longitudinal Steel Required =	0.07 sq.in./ft.		v(longit.) =	9 psi
Transverse Steel Required =	0.07 sq.in./ft.		v(transv.)=	9 psi
			V(allow) =	93.1 psi

Wall SW3

$$V_{LO2} = 435^\# \ EQ, \ 1904^\# \ WIND$$
$$V_{LO1} = \underline{235^\# \ EQ, \ 995^\# \ WIND}$$
$$\overline{670^\# \ EQ.} \quad \overline{2899^\# \ WIND}$$

$$L_{WALL} = 10'-10'' \pm \qquad V_{max} = 112 \ PLF \ EQ$$
$$= 268 \ PLF \ WIND$$

$\boxed{\underline{\text{Use } \tfrac{1}{2}'' \text{ Wood Sht'g w/ 8d @ 6'' o.c.}}}$

$$V_{ALLOW} = 260 \ EQ, \ 365 \ WIND, \ \underline{ok}$$

$$OTM @ LO1 = 1.904(9.92) = 18.89^{1k}$$
$$WALL \ DL = 1.33(25) + 9.92(8) = 113 \ PLF$$
$$F_T = \frac{18.89}{10.83'} - 0.6\left(\frac{10.92}{2}(.113) + 2(1.33)(.025)\right)$$
$$= 1419^\#$$

$\boxed{\underline{\text{Use Simpson MST27}}}$
$$T_{ALLOW} = 3700^\# \ ok$$

$$OTM @ GND = 18.89 + 2.899(10) = 47.88^{1k}$$
$$WALL \ DL = 2(113) = 226 \ PLF$$
$$F_T = \frac{47.88}{10.83} - 0.6\left(\frac{10.92}{2}(.226) + .133\right) = 3.815^k$$

$\boxed{\begin{array}{l}\underline{\text{Use Simpson HDU4-SDS2.5}} \\ \underline{\text{to DBLE STUD Min}}\end{array}}$
$$T_{ALLOW} = 4565^\# \ ok$$

$$OTM @ B.O. FTG = 47.88 + 2.899(2.21') = 54.28^{1k}$$
$$WALL \ DL = 226 \ PLF$$
$$FLR \ LL = 2(1.33)(40) = 106 \ PLF$$

$\boxed{\begin{array}{l}\text{See Next Sht} \\ \text{for FTG}\end{array}}$

project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-3

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	2500	psi	RF LL OTM =	0	f t - kips
Wall DL =	0.23	klf	WIND OTM =	54.28	f t - kips
Roof LL =	0.00	klf	Footing Length :	13.90	feet
Floor LL =	0.11	klf	Footing Width :	3.00	feet
Wall Length =	10.90	feet	Footing Thkness:	12	inches
Wall Thickness =	6	inches	Footing DL :	0.888	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	15.7 kips	P_{ult} =	19.1 kips		
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips		
e =	0.00 feet	X bar =	N/A feet		
Soil Pr. =	0.38 ksf, max.,	0.46 ksf, ult.		Required Width =	0.47 feet

EQ'N 16-13: DL + .75(FL + RL + W)

P =	15.7 kips	P_{ULT} =	19.1 kips		
OTM =	40.7 ft-kips	OTM_{ULT} =	65.136 ft-kips		
e =	2.60 feet	X bar =	4.35 feet		
Soil Pr. =	0.80 ksf, max.,	0.98 ksf, ult.		Required Width =	1.00 feet

EQ'N 16-15: 0.6DL + W

P =	8.9 kips	P (ult) =	10.7 kips		
OTM =	54.3 ft-kips	OTM_{ULT} =	86.848 ft-kips		
e =	6.11 feet	X bar =	0.84 feet		
Soil Pr. =	2.36 ksf, max.,	2.83 ksf, ult.		Required Width =	2.95 feet

Resisting Moment =	102.86 ft-kips	Factor of Safety =	2.71

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	16	inches			
Moment =	4.75 ft-kips/ft	Fb(allow)= 163 psi		fb(act.)=	145 psi
Shear =	0.47 kips/ft	Fv(allow)= 65 psi		fv(act.)=	4 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	14	inches			
Moment =	3.55 ft-kips/ft	Fb(allow)= 163 psi		fb(act.)=	148 psi
Shear =	0.24 kips/ft	Fv(allow)= 65 psi		fv(act.)=	2 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.13	sq.in./ft.		v(longit.) =	22 psi
Transverse Steel Required =	0.09	sq.in./ft.		v(transv.)=	15 psi
				V(allow) =	85 psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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WALL SW-4

$V_{L02} = 562^{\#}$ EQ , $2006^{\#}$ WIND
$V_{L01} = 0$ EQ , $117^{\#}$ WIND

WALL FROM L01 TO L02

$L_{WALL} = 12'-3''$
$V_{MAX} = 164$ PLF WIND

USE ½" SHT'G w/
8d @ 6" O.C.
$V_{ALLOW} = 260$ EQ , 365 WIND

OTM @ L01 = 2,006 (9.92) = 19.90$^{'k}$
WALL DL = 13 (8) = 104 PLF

$F_T = \dfrac{19.90}{11.83} = 1.68^k$

SIMPSON HDU4-SDS2.5
to DBLE STUD
$T_{ALLOW} = 4565^{\#}$

OTM @ B.O. FTG = 2,006 (26.75) + 0.117 (16.83) = 55.63$^{'k}$

WALL DL = 104 + 15.83 (150) = 2479 PLF
FLR LL = 1.61 (40) = 67 PLF
$L_{WALL} = 18'-0'' \pm$ — SEE NEXT SHT FOR FTG —

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-4

Allow. Soil Pr. =	2.400 ksf	DL OTM =	0.00 f t - kips
Fy =	60 ksi	FLR LL OTM =	0 f t - kips
f 'c =	2500 psi	RF LL OTM =	0 f t - kips
Wall DL =	2.48 klf	WIND OTM =	55.63 f t - kips
Roof LL =	0.00 klf	Footing Length :	18.00 feet
Floor LL =	0.07 klf	Footing Width :	2.00 feet
Wall Length =	18.00 feet	Footing Thkness:	12 inches
Wall Thickness =	12 inches	Footing DL :	0.615 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	56.6 kips	P_{ult} =	68.3 kips
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips
e =	0.00 feet	X bar =	N/A feet
Soil Pr. =	1.57 ksf, max.,	1.90 ksf, ult.	Required Width = 1.31 feet

EQ'N 16-13: DL + .75(FL + RL + W)

P =	56.6 kips	P_{ULT} =	68.3 kips
OTM =	41.7 ft-kips	OTM_{ULT} = 66.756 ft-kips	
e =	0.74 feet	X bar =	N/A feet
Soil Pr. =	1.96 ksf, max.,	2.36 ksf, ult.	Required Width = 1.63 feet

EQ'N 16-15: 0.6DL + W

P =	33.4 kips	P (ult) =	40.1 kips
OTM =	55.6 ft-kips	OTM_{ULT} = 89.008 ft-kips	
e =	1.66 feet	X bar =	N/A feet
Soil Pr. =	1.44 ksf, max.,	1.73 ksf, ult.	Required Width = 1.20 feet

Resisting Moment = 501.23 ft-kips   Factor of Safety = 12.87

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	0.13 ft-kips/ft	Fb(allow)= 163 psi		fb(act.)=	8 psi
Shear =	0.00 kips/ft	Fv(allow)= 65 psi		fv(act.)=	0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	0.81 ft-kips/ft	Fb(allow)= 163 psi		fb(act.)=	49 psi
Shear =	0.00 kips/ft	Fv(allow)= 65 psi		fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.00	sq.in./ft.	v(longit.) =	0	psi
Transverse Steel Required =	0.02	sq.in./ft.	v(transv.)=	0	psi
			V(allow) =	85	psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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<u>WALL SW5</u>

$V_{LO2} = 252^{\#}$ EQ , $1146^{\#}$ WIND
$V_{LO1} = \dfrac{104^{\#}}{356^{\#}}$ EQ , $\dfrac{470^{\#}}{1616^{\#}}$ WIND
$356^{\#}$ EQ , $1616^{\#}$ WIND

$L_{WALL} = 9'\text{-}2''$
$V_{MAX} = 176$ PLF

$\boxed{\tfrac{1}{2}'' \text{ SHTG w/ 8d @ 6'' OC}}$
$V_{ALLOW} = 365$ WIND ok

OTM @ LO1 = $1.146(9.92) = 11.37^{'k}$
WALL DL = $9.92(8) + 2(25) = 129$ PLF

$F_T = \dfrac{11.37}{8.75} - 0.6\left(\dfrac{9.17}{2}(.129)\right) = 945^{\#}$

$\boxed{\text{SIMPSON MST27}}$
$T_{ALLOW} = 3700^{\#}$

OTM @ GND = $11.37 + 1.616(10)$
$= 27.53^{'k}$

WALL DL = $129 + 10(8) + 2(25) = 259$ PLF
FLR LL = $4(40) = 160$ PLF

$F_T = \dfrac{27.53}{8.75} - 0.6\left(\dfrac{9.17}{2}(.259)\right) = 2.43^{k}$

$\boxed{\text{SIMPSON HDU4-SDS25}}$
$T_{ALLOW} = 4.57^{k}$

OTM @ B.O. FTG = $27.53 + 1.616(2.25)$
$= 31.17^{'k}$

— SEE NEXT SHT FOR FTG —

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

	project no.
	15105

SHEAR WALL FOOTING DESIGN

INPUT DATA : |Wall SW-5

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	2500	psi	RF LL OTM =	0	f t - kips
Wall DL =	0.26	klf	WIND OTM =	55.63	f t - kips
Roof LL =	0.00	klf	Footing Length :	12.83	feet
Floor LL =	0.16	klf	Footing Width :	3.67	feet
Wall Length =	9.17	feet	Footing Thkness:	12	inches
Wall Thickness =	12	inches	Footing DL :	1.099	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =   17.6 kips P_{ult} =   21.5 kips
OTM =   0.00 ft-kips OTM_{ult} =   0 ft-kips
e =   0.00 feet   X bar =   N/A feet
Soil Pr. =   0.37 ksf, max.,   0.46 ksf, ult.   Required Width =   0.57 feet

EQ'N 16-13: DL + .75(FL + RL + W)
P =   17.6 kips P_{ULT} =   21.5 kips
OTM =   41.7 ft-kips OTM_{ULT} = 66.756 ft-kips
e =   2.37 feet   X bar =   4.04 feet
Soil Pr. =   0.79 ksf, max.,   0.97 ksf, ult.   Required Width =   1.21 feet

EQ'N 16-15: 0.6DL + W
P =   9.9 kips   P (ult) =   11.9 kips
OTM =   55.6 ft-kips OTM_{ULT} = 89.008 ft-kips
e =   5.63 feet   X bar =   0.79 feet
Soil Pr. =   2.28 ksf, max.,   2.73 ksf, ult.   Required Width =   3.48 feet

Resisting Moment =   105.71 ft-kips   Factor of Safety =   2.71

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =   18   inches
Moment =   6.39 ft-kips/ft   Fb(allow)= 163 psi   fb(act.)=   150   psi
Shear   =   0.90 kips/ft   Fv(allow)= 65 psi   fv(act.)=   6   psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =   14   inches
Moment =   3.80 ft-kips/ft   Fb(allow)= 163 psi   fb(act.)=   158   psi
Shear   =   0.46 kips/ft   Fv(allow)= 65 psi   fv(act.)=   4   psi

Reinf. Thickness (if used) =   12   inches
Longitudinal Steel Required =   0.17   sq.in./ft.   v(longit.) =   30   psi
Transverse Steel Required =   0.10   sq.in./ft.   v(transv.)=   17   psi
                                                                                            V(allow) =   85   psi

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WALL SW6 & SW7

CASE 1: TYPICAL INTERIOR DEMISING WALL

$$V_{RF} = 9414^\# \; EQ. \quad 6140^\# \; WIND$$
$$V_{LO2} = 3794^\# \; EQ. \quad 5640^\# \; WIND$$
$$V_{LO1} = \underline{844^\# \; EQ. \quad 2940^\# \; WIND}$$
$$14052^\# \; EQ. \quad 15026^\# \; WIND$$

$$\pm 9414^\# \; EQ$$
$$\pm 6140^\# \; W$$

$$\pm 984^\# \; EQ$$
$$+ 2800^\# \; W.$$

$$\pm 2810^\# \; EQ$$
$$+ 3420^\# \; W$$

$$\pm 844^\# \; EQ$$
$$+ 2940^\# \; W$$

Dimensions: 12'-8", 13'-4" AVG, 19'-8", 17'-4", 9'-11", 15'-0" AVG, 9'-11", 10'-0", 37'-0"

6+10, 6+15, 6-0.5

(A), (B)

<u>ROOF</u> $V_A = 4584^\# \; EQ, \; 3282^\# \; W$
$\quad\quad V_B = 4830^\# \; EQ, \; 3458^\# \; W$

<u>LO2</u> $V_A = 984^\# \; EQ, \; 2800^\# \; W$
$\quad\quad V_B = 2810^\# \; EQ, \; 3420^\# \; W$

<u>LO1</u> $V_A = N/A$
$\quad\quad V_B = 844^\# \; EQ, \; 2940^\# \; W$

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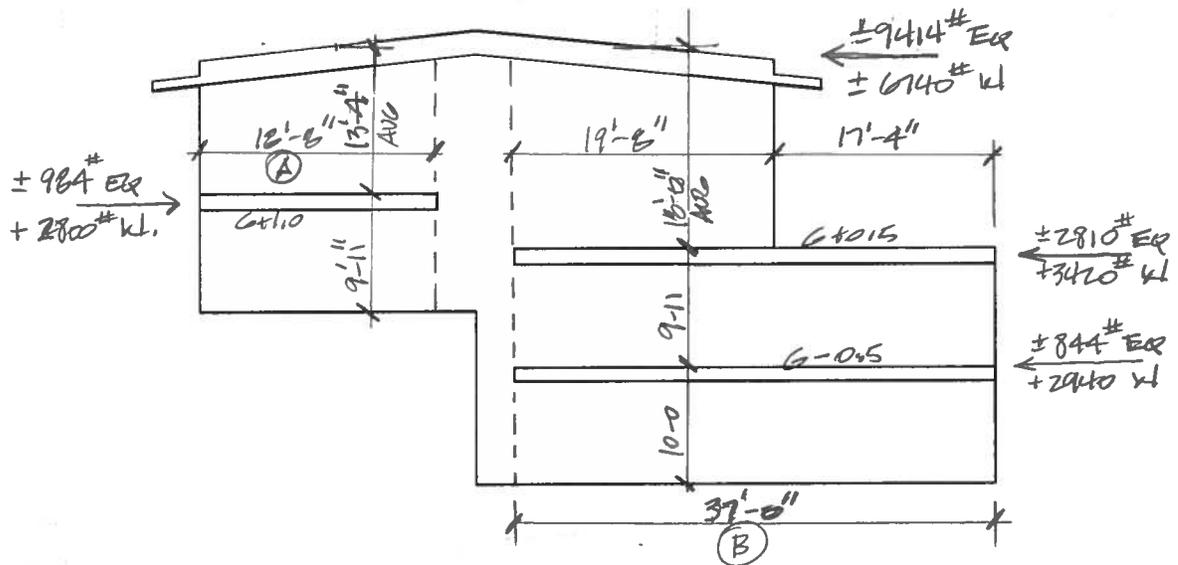
Wall Segment A L_{wall} = 18'-8"

From Roof To LO2

V = 4584 EQ, 3282 W

v = 246 PLF EQ, 176 PLF WIND

$\boxed{\frac{1}{2}" \text{SHT'G w/ } 8d @ 6" OC}$

v_{ALLOW} = 2(260) = 520 EQ
            = 2(365) = 730 W

OTM @ LO2 = 4.584(13.33) = 61.10^{1k} EQ
          = 3.282(") = 43.75^{1k} W

WALL DL = 13.33(16) + 20(24) = 693 PLF

20% SNOW = .2(203)(20)   = 812 PLF (Use w/ EQ. OTM)
                         ─────────
                          1505 PLF

$F_T(EQ) = \frac{61.10^{1k}}{18.17'} - 0.6\left[\frac{18.67}{2}(1505)\right]$ = 0 - No Uplift

$F_T(WIND) = \frac{43.75}{18.16} - 0.6\left[\frac{18.67}{2}(.693)\right]$ = 0 - No Uplift

SILL CONN: $S = \frac{1.6(141)}{.246}(12)$ = 11.0"

               $S = \frac{455}{.246}(12)$ = 22.2"

Use 16d @ 8" o.c. Max
Use A34 @ 16" oc Max

From LO1 To LO2

V = 5568# EQ, 6082# WIND

v = 298 EQ, 326 WIND, PLF

$\boxed{\frac{1}{2}" \text{SHT'G w/ } 8d @ 6" o.c.}$

v_{ALLOW} = 520 EQ, 730 W

OTM @ LO1 = 61.10 + 5.568(9.92) = 116.33^{1k} EQ.
          = 43.75 + 6.082(9.92) = 104.08^{1k} WIND

WALL DL = 693 + 9.92(16) + 7(24) = 1020 PLF

20% SL = 812 PLF

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$$F_T (EQ) = \frac{116.33}{18.17} - 0.6 \left(\frac{18.67}{2} (1.832) \right) = 0 \quad \text{NO UPLIFT}$$

$$F_T (WIND) = \frac{104.08}{18.17} - 0.6 \left(\frac{18.67}{2} (1.02) \right) = 0 \quad \text{NO UPLIFT}$$

$$\underline{\text{SILL CONN:}} \quad S = \frac{650(1.6)}{326} (12) = 38'' \quad \boxed{\begin{array}{l} \text{USE } \frac{1}{2}'' \phi \text{ J-BOLTS} \\ @ \text{ 16'' O.C. MAX} \end{array}}$$

$$\text{OTM @ B.O. FTG} = 116.33 + 5.568(4) = 138.60^k \text{ EQ.}$$
$$= 104.08 + 6.082(4) = 128.41^k \text{ WIND}$$

WALL DL = 1020 PLF + 812 SNOW = 1832 PLF (FOR EQ.)
ROOF SL = 812(4) = 3248 PLF (4060 FOR WIND)
FLR LL = .7(40) = 280 PLF

$-$ SEE NEXT SHEET
FOR FOOTING $-$

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SHEAR WALL FOOTING DESIGN

INPUT DATA :   Typ. Unit - Wall SW6A or SW7A

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00 ft - kips
Fy =	60	ksi	FLR LL OTM =	0 ft - kips
f 'c =	3000	psi	RF LL OTM =	0 ft - kips
Wall DL =	1.83	klf	SEISMIC OTM =	138.6 ft - kips
Roof LL =	3.25	klf	Footing Length :	19.67 feet
Floor LL =	0.28	klf	Footing Width :	3.33 feet
Wall Length =	18.67	feet	Footing Thkness:	12 inches
Wall Thickness =	16	inches	Footing DL :	1.818 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	119.4 kips	P_{ult} =	163.0 kips
OTM =	0.00 ft-kips	OTM_{ult} =	0.00 ft-kips
e =	0.00 feet	X bar =	N/A feet
Soil Pr. =	1.82 ksf, max.,	2.49 ksf, ult.	

Required Width =   2.53 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)
P =	119.4 kips	P_{ULT} =	163.0 kips
OTM =	104.0 ft-kips	OTM_{ULT} =	166.32 ft-kips
e =	0.87 feet	X bar =	N/A feet
Soil Pr. =	2.31 ksf, max.,	3.15 ksf, ult.	

Required Width =   3.20 feet

EQ'N 16-16: 0.6DL + 0.7E
P =	42.0 kips	P (ult) =	50.4 kips
OTM =	138.6 ft-kips	OTM_{ULT} =	155.23 ft-kips
e =	3.30 feet	X bar =	6.53 feet
Soil Pr. =	1.29 ksf, max.,	1.54 ksf, ult.	

Required Width =   1.78 feet

Resisting Moment =   688.15 ft-kips

Factor of Safety =   7.09

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =	32	inches		
Moment =	1.09 ft-kips/ft	Fb(allow)= 178 psi	fb(act.)=	7 psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi	fv(act.)=	0 psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =	20	inches		
Moment =	2.74 ft-kips/ft	Fb(allow)= 178 psi	fb(act.)=	51 psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi	fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches		
Longitudinal Steel Required =	0.03	sq.in./ft.	v(longit.) =	0 psi
Transverse Steel Required =	0.07	sq.in./ft.	v(transv.)=	9 psi
			V(allow) =	93.1 psi

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SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-6A or SW-7A - Wind

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	3000	psi	RF LL OTM =	0	f t - kips
Wall DL =	1.02	klf	WIND OTM =	128.41	f t - kips
Roof LL =	4.06	klf	Footing Length :	19.67	feet
Floor LL =	0.28	klf	Footing Width :	3.33	feet
Wall Length =	18.67	feet	Footing Thkness:	12	inches
Wall Thickness =	16	inches	Footing DL :	1.818	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	115.6 kips	P_{ult} =	163.0 kips	
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips	
e =	0.00 feet	X bar =	N/A feet	
Soil Pr. =	1.76 ksf, max.,	2.49 ksf, ult.		Required Width = 2.45 feet

EQ'N 16-13: DL + .75(FL + RL + W)

P =	115.6 kips	P_{ULT} =	163.0 kips	
OTM =	96.3 ft-kips	OTM_{ULT} =	154.09 ft-kips	
e =	0.83 feet	X bar =	N/A feet	
Soil Pr. =	2.21 ksf, max.,	3.12 ksf, ult.		Required Width = 3.07 feet

EQ'N 16-15: 0.6DL + W

P =	32.9 kips	P (ult) =	39.5 kips	
OTM =	128.4 ft-kips	OTM_{ULT} =	205.46 ft-kips	
e =	3.90 feet	X bar =	5.93 feet	
Soil Pr. =	1.11 ksf, max.,	1.33 ksf, ult.		Required Width = 1.54 feet

Resisting Moment = 539.05 ft-kips	Factor of Safety = 6.00

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	12	inches		
Moment = 1.08 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)=	65 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)=	0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	12	inches		
Moment = 2.71 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)=	163 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches		
Longitudinal Steel Required =	0.03	sq.in./ft.	v(longit.) =	0 psi
Transverse Steel Required =	0.07	sq.in./ft.	v(transv.)=	9 psi
			V(allow) =	93.1 psi

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<u>WALL SEGMENT Ⓑ</u>

<u>ROOF TO LO2</u>

$V = 4830$ EQ, 3458 W
$U = 246$ EQ, 176 W

| $\frac{1}{2}"$ SHTG w/ 8dc 6" O.C. (2 WALLS) |
| $U_{ALLOW} = 520$ EQ, 730 W |

OTM @ LO2 $= 4.83(18.0) = 86.94^{1k}$ EQ
$\quad\quad\quad = 3.458(18) = 62.24^{1k}$ WIND

WALL DL $= 693$ PLF (FOR WIND)
20% SNOW $= \underline{812}$ PLF
$\quad\quad\quad\quad 1505$ PLF (FOR EQ)

$F_T(EQ) = \dfrac{86.94}{19.17} - 0.6\left[\dfrac{19.17}{2}(1.505)\right] = 0$ NO UPLIFT

$F_T(WIND) = \dfrac{62.24}{19.17} - 0.6\left[\dfrac{19.17}{2}(.693)\right] = 0$ NO UPLIFT

← SILL CONN SAME AS FOR SEGMENT A

<u>FROM LO1 TO LO2</u> ($L_{WALL} = 37'$)

$V = 7640^{\#}$ EQ, 6878$^{\#}$ W
$U = 388$ EQ, 186 W

| $\frac{1}{2}"$ SHTG w/ 8d @ 6" (2 WALLS) |
| $U_{ALLOW} = 520$ EQ, 730 W |

OTM @ LO1 $= \quad\quad 7.64(9.92) = 75.79^{1k}$ EQ
$\quad\quad\quad = \quad\quad 6.878(9.92) = 68.23^{1k}$ WIND

MAX WALL DL $= (693+812) + 20(24) + 9.92(16) = 2064$ PLF (1252 W)
MIN WALL DL $= 14(16) + 4(28) = 336$ PLF

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EAST EDGE OF WALL

$$F_T(EQ) = \left(\frac{86.94}{19.17} + \frac{25.19}{36.5}\right) - 0.6\left[\frac{37}{2}(2.064)\right] = 0 \quad \text{No UPLIFT}$$

$$F_T(W) = \left(\frac{62.24}{19.17} + \frac{61.13}{36.5}\right) - 0.6\left[\frac{37}{2}(1.252)\right] = 0 \quad \text{No UPLIFT}$$

WEST EDGE OF WALL

$$F_T(EQ) = \frac{25.19}{36.5} - 0.6\left[17.33(.336) + 1.17(2.064)\right] = 0 \quad \text{No UPLIFT}$$

$$= \frac{68.23}{36.5} - 0.6\left[17.33(.336) + 1.17(1.252)\right] = 0 \quad \text{No UPLIFT}$$

SILL CONN

$$S = \frac{1.6(141)}{388}(12) = 7"$$ (Use 16d @ 6" O.C.

$$S = \frac{455}{388}(12) = 14.1"$$ ⎣ Use A34 @ 12" O.C. MAR

FROM GRID TO L01

V = 8484# EQ, 9818# W   ⎡ ½" SHTG w/ 8d @ 6"

U = 229 EQ, 265 W, PLF U_{ALLOW} = 520 EQ, 730 W

OTM @ GRID = 25.19 + 8.484(16) = 160.63 'k EQ
           = 68.23 + 9.818(10) = 166.41 'k WIND

MAX WALL DL = (2064/1252) + 20(24) + 10(16) = 2704 (1892 W)

MIN WALL DL = 336 + 10(16) + 4(24) = 592

EAST EDGE OF WALL

$$F_T(EQ) = \left(\frac{86.94}{19.17} + \frac{160.63}{36.5}\right) - .6\left[\frac{37}{2}(2.704)\right] = 0 \quad \text{No UPLIFT}$$

$$F_T(WIND) = \left(\frac{62.24}{19.17} + \frac{166.41}{36.5}\right) - .6\left[\frac{37}{2}(1.892)\right] = 0 \quad \text{No UPLIFT}$$

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WEST EDGE OF WALL

$$F_T (EQ) = \frac{160.03}{36.5} - 0.6 \left[17.33(.592) + 1.17(2.704) \right] = 0 \quad \text{No UPLIFT}$$

$$F_T (WIND) = \frac{166.41}{36.5} - 0.6 \left[17.33(.592) + 1.17(1.992) \right] = 0 \quad \text{No UPLIFT}$$

SILL CONN: $\quad S = \frac{650(1.6)}{265}(12) = 47"$ $\boxed{\frac{1}{2}"\phi \text{ J-BOLTS} \\ @ 16" O.C. MAX}$

ASM @ B.O. FTG = $247.57 + 8.49(4') = 281.51^{lb}$ EQ.
                = $227.65 + 9.818(4') = 267.92^{lb}$ WIND

WALL DL = 1892 PLF $x = 0$ TO 19-8
          592 PLF $x = 19-8$ TO 37-0

$$M_{DL} = (1.892 - .592)(19.67)(7.67') = 196.13^{lb}$$

$$W_{DL}(AVG) = 1283 \, PLF$$

FLR LL = $2(20)(40) = 1600 \, PLF$ 0 TO 19-8
       = $4(40) = 160 \, PLF$ 19-8 TO 37-0

$$M_{LL} = (1.6 - .16)(19.67)(7.67) = 217.25^{lb}$$

$$W_{LL}(AVG) = 922 \, PLF$$

SNOW = 4060 PLF $x = 0$ TO 19-8
     = $4(359) = 1436$ @ $x = 19-8$
     = $4(208) = 832$ @ $x = 37-0$

$$M_{SL} = 4.06(19.67)(7.67) - .832(17.33)(9.83) - .604\left(\frac{17.33}{2}\right)(6.95')$$
$$= 434.42^{lb}$$

$$W_{SL}(AVG) = 2690 \, PLF$$

$\boxed{\text{SEE KLERS SHTS} \\ \text{FOR FOOTING}}$

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SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-6B or SW-7B - Seismic

Allow. Soil Pr. =	2.400	ksf	DL OTM =	196.13 f t - kips
Fy =	60	ksi	FLR LL OTM =	217.25 f t - kips
f 'c =	3000	psi	RF LL OTM =	434.42 f t - kips
Wall DL =	1.28	klf	SEISMIC OTM =	281.51 f t - kips
Roof LL =	2.69	klf	Footing Length :	39.00 feet
Floor LL =	0.93	klf	Footing Width :	4.00 feet
Wall Length =	37.00	feet	Footing Thkness:	12 inches
Wall Thickness =	16	inches	Footing DL :	2.160 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	232.1 kips	P_{ult} =	318.6 kips	
OTM =	684.88 ft-kips	OTM_{ult} =	##### ft-kips	
e =	2.95 feet	X bar =	N/A feet	
Soil Pr. =	2.16 ksf, max.,	2.97 ksf, ult.		Required Width = 3.60 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	232.1 kips	P_{ULT} =	318.6 kips	
OTM =	896.0 ft-kips	OTM_{ULT} =	1355.2 ft-kips	
e =	3.86 feet	X bar =	N/A feet	
Soil Pr. =	2.37 ksf, max.,	3.26 ksf, ult.		Required Width = 3.95 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	79.0 kips	P (ult) =	94.8 kips	
OTM =	399.2 ft-kips	OTM_{ULT} =	456.5 ft-kips	
e =	5.05 feet	X bar =	N/A feet	
Soil Pr. =	0.90 ksf, max.,	1.08 ksf, ult.		Required Width = 1.50 feet

Resisting Moment = 2568.36 ft-kips   Factor of Safety =   8.16

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	32	inches				
Moment =	2.87 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)=	19 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)=	0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	20	inches				
Moment =	4.42 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)=	82 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.08	sq.in./ft.		v(longit.) =	9 psi
Transverse Steel Required =	0.12	sq.in./ft.		v(transv.)=	20 psi
				V(allow) =	93.1 psi

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SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-6B or SW-7B - Wind

Allow. Soil Pr. =	2.400 ksf	
Fy =	60 ksi	
f 'c =	3000 psi	
Wall DL =	1.28 klf	
Roof LL =	2.69 klf	
Floor LL =	0.93 klf	
Wall Length =	37.00 feet	
Wall Thickness =	16 inches	

DL OTM =	196.13 f t - kips
FLR LL OTM =	217.25 f t - kips
RF LL OTM =	434.42 f t - kips
WIND OTM =	267.92 f t - kips
Footing Length :	39.00 feet
Footing Width :	4.00 feet
Footing Thkness:	12 inches
Footing DL :	2.160 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =   232.1 kips P_{ult} =   318.6 kips
OTM =   684.88 ft-kips OTM_{ult} = 1017.4 ft-kips
e =   2.95 feet   X bar =   N/A feet
Soil Pr. =   2.16 ksf, max.,   2.97 ksf, ult.   Required Width =   3.60 feet

EQ'N 16-13: DL + .75(FL + RL + W)
P =   232.1 kips P_{ULT} =   318.6 kips
OTM =   885.8 ft-kips OTM_{ULT} = 1338.9 ft-kips
e =   3.82 feet   X bar =   N/A feet
Soil Pr. =   2.36 ksf, max.,   3.24 ksf, ult.   Required Width =   3.94 feet

EQ'N 16-15: 0.6DL + W
P =   79.0 kips   P (ult) =   94.8 kips
OTM =   385.6 ft-kips OTM_{ULT} = 569.89 ft-kips
e =   4.88 feet   X bar =   N/A feet
Soil Pr. =   0.89 ksf, max.,   1.06 ksf, ult.   Required Width =   1.48 feet

Resisting Moment = 2568.36 ft-kips   Factor of Safety =   8.41

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =   12   inches
Moment =   2.86 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)= 172 psi
Shear   =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =   16   inches
Moment =   4.40 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)= 135 psi
Shear   =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

Reinf. Thickness (if used) =   12   inches
Longitudinal Steel Required =   0.08   sq.in./ft.   v(longit.) =   9   psi
Transverse Steel Required =   0.12   sq.in./ft.   v(transv.)=   20   psi
                                                                V(allow) = 93.1 psi

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CASE 2: WALLS BTWN THP UNIT & GZR (SEE CASE 1 FOR DIAGRAM)

FOR SH'T AT GZR

$V_{RF} = 6329^{\#} EQ$, $2176^{\#} W$ $\begin{cases} V_A = 3082^{\#} EQ, 1060^{\#} W \\ V_B = 3247^{\#} EQ, 1116^{\#} W \end{cases}$

$V_{G+L0} = 1008^{\#} EQ$, $655\left(\frac{.8}{.5}\right) = 1048^{\#}$ WIND (MAX)

$V_{G+0.5} = 1668^{\#} EQ$, $2402^{\#}$ WIND (MAX)

$V_{G-0.5} = 648^{\#} EQ$, $1837^{\#}$ WIND

WALL SEGMENT (A)

FROM ROOF TO L02

$V = 3082 EQ, 1060 W$
$U = 165 EQ, 57 W, PLF$

$\boxed{\frac{1}{2}'' \, SHT'G \, w/ \, 8d @ 6''}$

$U_{ALLOW} = 260 \, EQ, 365 \, W$

OTM @ L02 $= 3.082(13.33) = 41.08^{1k} EQ$
$= 14.13^{1k} W$

WALL DL $= 13.33(8) + 10(24) = 347 \}$
$20\% \, SNOW = .2(203)(10) = 406 \}$ $753 \, PLF \, DL$

$F_T(EQ) = \frac{41.08}{18.17} - 0.6\left[\frac{18.67}{2}(.753)\right] = 0 - NO \, UPLIFT$

$F_T(WIND) = \frac{14.13}{18.17} - 0.6\left[\frac{18.67}{2}(.347)\right] = 0 - NO \, UPLIFT$

SILL CONN: USE SAME AS CASE 1

FROM L01 TO L02

$V = 4090^{\#} EQ, 2108^{\#} W$
$U = 219 EQ, 113 W, PLF$

$\boxed{\frac{1}{2}'' \, SHT'G \, w/ \, 8d @ 6''}$

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job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$$OTM @ L01 = 41.08 + 4.09(9.92) = 81.65^{k} \; Eq$$
$$= 14.13 + 2.108(11) = 35.04^{k} \; w$$

$$WALL \; DL = 347 + 9.92(8) + 1(24) = 450 \Big\} \; 856 \; PLF$$
$$20\% \; SL = \qquad\qquad\qquad 406$$

$$F_T(Eq) = \frac{81.65}{18.17} - 0.6\left[\frac{18.67}{2}(.856)\right] = 0 \quad No \; UPLIFT$$

$$F_T(w) = \frac{35.04}{18.17} - 0.6\left[\frac{18.67}{2}(.45)\right] = 0 \quad No \; UPLIFT$$

SILL CONN's   USE SAME AS CASE I

$$OTM @ B.O. FTG = \frac{138.6}{2} + 81.65 + 4.09(4) = 161.31^{k} \; Eq$$
$$= \frac{128.41}{2} + 35.04 + 2.108(4) = 107.68^{k} \; w$$
TYP UNIT

$$WALL \; DL = (510 + 406 SL) + (450 + 406 SL) = 960 + 812 SL$$
$$= 1772 \; (FOR \; Eq.)$$

$$ROOF \; SL = 3248 \; PLF \; (4060 \; FOR \; WIND)$$

$$FLR \; LL = \tfrac{1}{2}(280) + 1(40) = 180 \; PLF$$

— SEE NEXT SHT
FOR FTG —

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project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Between Typ Unit & 62R - Wall SW6A/SW7A

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	3000	psi	RF LL OTM =	0	f t - kips
Wall DL =	1.77	klf	SEISMIC OTM =	167.31	f t - kips
Roof LL =	3.25	klf	Footing Length :	19.67	feet
Floor LL =	0.18	klf	Footing Width :	3.33	feet
Wall Length =	18.67	feet	Footing Thkness:	12	inches
Wall Thickness =	16	inches	Footing DL :	1.818	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	116.8 kips		P_{ult} =	159.4 kips	
OTM =	0.00 ft-kips		OTM_{ult} =	0.00 ft-kips	
e =	0.00 feet		X bar =	N/A feet	
Soil Pr. =	1.78 ksf, max.,		2.43 ksf, ult.		Required Width = 2.48 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	116.8 kips		P_{ULT} =	159.4 kips	
OTM =	125.5 ft-kips		OTM_{ULT} =	200.77 ft-kips	
e =	1.07 feet		X bar =	N/A feet	
Soil Pr. =	2.37 ksf, max.,		3.23 ksf, ult.		Required Width = 3.29 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	41.3 kips		P (ult) =	49.6 kips	
OTM =	167.3 ft-kips		OTM_{ULT} =	187.39 ft-kips	
e =	4.05 feet		X bar =	5.78 feet	
Soil Pr. =	1.43 ksf, max.,		1.72 ksf, ult.		Required Width = 1.98 feet

Resisting Moment =	677.13 ft-kips	Factor of Safety = 5.78

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	32	inches		
Moment = 1.11 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 7 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)= 0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	20	inches		
Moment = 2.80 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 52 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)= 0 psi

Reinf. Thickness (if used) =	12	inches		
Longitudinal Steel Required =	0.03	sq.in./ft.	v(longit.) =	0 psi
Transverse Steel Required =	0.07	sq.in./ft.	v(transv.)=	9 psi
			V(allow) =	93.1 psi

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project name: CCE

designed by: MAR
checked by:

date: Jan-17
date:

SHEAR WALL FOOTING DESIGN

INPUT DATA : Btwn Typ Unit & 62R, Wall SW-7A - Wind

Allow. Soil Pr. =	2.400 ksf	DL OTM =	0.00 f t - kips
Fy =	60 ksi	FLR LL OTM =	0 f t - kips
f 'c =	3000 psi	RF LL OTM =	0 f t - kips
Wall DL =	0.96 klf	WIND OTM =	107.68 f t - kips
Roof LL =	4.06 klf	Footing Length :	19.67 feet
Floor LL =	0.18 klf	Footing Width :	3.33 feet
Wall Length =	18.67 feet	Footing Thkness:	12 inches
Wall Thickness =	16 inches	Footing DL :	1.818 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	113.1 kips	P_{ult} =	159.4 kips
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips
e =	0.00 feet	X bar =	N/A feet
Soil Pr. =	1.73 ksf, max.,	2.43 ksf, ult.	Required Width = 2.39 feet

EQ'N 16-13: DL + .75(FL + RL + W)
P =	113.1 kips	P_{ULT} =	159.4 kips
OTM =	80.8 ft-kips	OTM_{ULT} =	129.22 ft-kips
e =	0.71 feet	X bar =	N/A feet
Soil Pr. =	2.10 ksf, max.,	2.96 ksf, ult.	Required Width = 2.92 feet

EQ'N 16-15: 0.6DL + W
P =	32.2 kips	P (ult) =	38.7 kips
OTM =	107.7 ft-kips	OTM_{ULT} =	172.29 ft-kips
e =	3.34 feet	X bar =	6.49 feet
Soil Pr. =	0.99 ksf, max.,	1.19 ksf, ult.	Required Width = 1.38 feet

Resisting Moment = 528.03 ft-kips   Factor of Safety = 7.01

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =	12	inches			
Moment =	1.02 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)=	61 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)=	0 psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =	12	inches			
Moment =	2.58 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)=	155 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.03	sq.in./ft.		v(longit.) =	0 psi
Transverse Steel Required =	0.07	sq.in./ft.		v(transv.)=	8 psi
				V(allow) =	93.1 psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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WALL SEGMENT (B)

ROOF TO L02   L = 19'-8"

$V = 3247$ EQ , 1116 W $\frac{1}{2}$" SHTG w/ 8d @ 6"

$U = 165$ EQ , 57 W $U_{ALLOW} = 260$ EQ , 365 W

$OTM @ L02 = 3,247 (18) = 58.45^k$ EQ.
$= 1,116 (18) = 20.09^k$ WIND

WALL DC = 347 + 406 = 753

$F_T (EQ) = \frac{58.45}{19.17} - 0.6 \left[\frac{19.67}{2} (.753) \right] = 0$ NO UPLIFT

$F_T (WIND) = \frac{20.09}{19.17} - 0.6 \left[\frac{19.67}{2} (.347) \right] = 0$ NO UPLIFT

SILL CONN.:   SAME AS CASE 1

FROM L02 TO L01   L = 37'

$V = 4915^{\#}$ EQ , $3518^{\#}$ W $\frac{1}{2}$" SHTG w/ 8d @ 6"

$U = 133$ EQ 95 WIND, PLF

$OTM @ L01 = 4,915 (9.92) = 48,716^k$ EQ
$3,518 (9.92) = 34.90^k$ WIND

MAX WALL DC = (347 + 406) + 10 (2A) + 9.92 (B) = 1072 (CCC WIND)
MIN WALL DC = 14 (B) + 2 (28) = 168 (@ WEST END)

EAST EDGE OF WALL
$F_T (EQ) = \left(\frac{58.45}{19.17} + \frac{48716}{36.5} \right) - 0.6 \left[\frac{37}{2} (1.072) \right] = 0$ NO UPLIFT

$F_T (W) = \left(\frac{20.09}{19.17} + \frac{34.90}{36.5} \right) - 0.6 \left[\frac{37}{2} (.666) \right] = 0$ NO UPLIFT

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WEST EDGE OF WALL

$$F_T(EQ) = \frac{48.76}{76.5} - 0.6\left[\frac{37}{2}(.168)\right] = 0 \quad \text{NO UPLIFT}$$

$$F_T(WIND) = \frac{34.90}{76.5} - 0.6\left[\quad '' \quad\right] = 0 \quad \text{NO UPLIFT}$$

SILL CONN'N : USE SAME AS CASE I

FROM LOI TO GND

V = 5563# EQ, 5355# W

U = 150 EQ, 145 W

$\boxed{\frac{1}{2}'' \, SHTG \, w/ \, 8d @ 6''}$

OTM @ GND = 48.76 + 5.563(10) = 104.39 ft-lb

34.90 + 5.355(10) = 88.45 ft-lb

MAX WALL DL = (10#/ft²) + 10(24) + 10(8) = 1392 (986 kl WIND)

MIN WALL DL = 168 + 10(8) + 2(24) = 296

EAST EDGE OF WALL

$$F_T(EQ) = \left(\frac{58.45}{19.17} + \frac{104.39}{36.5}\right) - 0.6\left[\frac{37}{2}(1.392)\right] = 0 \quad \text{NO UPLIFT}$$

$$F_T(WIND) = \left(\frac{20.09}{19.17} + \frac{88.45}{36.5}\right) - 0.6\left[\frac{37}{2}(.986)\right] = 0 \quad \text{NO UPLIFT}$$

WEST EDGE OF WALL

$$F_T(EQ) = \frac{104.39}{76.5} - 0.6\left[\frac{37}{2}(.296)\right] = 0 \quad \text{NO UPLIFT}$$

$$F_T(WIND) = \frac{88.45}{76.5} - 0.6\left[\quad '' \quad\right] = 0 \quad \text{NO UPLIFT}$$

SILL CONN'N : USE SAME AS CASE I

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FOR UNIT CLR WALL:

OTM @ B.O. FTG = 58.45 + 104.39 + 5.563(2.25) = 175.36^{lk} EQ

= 20.09 + 88.45 + 5.355(2.25) = 120.59^{lk} WIND

FOR TOTAL WALL:

OTM @ B.O. FTG = $\frac{281.51}{2}$ + 175.36 = 316.12^{lk} EQ.

= $\frac{261.92}{2}$ + 120.59 = 254.55^{lk} WIND

WALL DL = $\frac{1892}{2}$ + 986 = 1932   x = 0 to 19'-8"

= $\frac{592}{2}$ + 296 = 592   x = 19'-8" to 37'-0"

M_{DL} = (1.932 - .592)(19.61)(8.67) = 228.52^{lk}

W_{DL} (AVG) = 1304 PLF

FLR LL = $\frac{1600}{2}$ + 1(40) = 840 PLF   x = 0 to 19-8

= $\frac{160}{2}$ + 1(40) = 120 PLF   x = 19-8 to 37'

M_{LL} = (.84 - .12)(19.61)(8.61) = 122.79^{lk}

W_{LL} = 503 PLF AVG

ROOF SL = SAME AS CASE I

M_{SL} = 434.42^{lk}

W_{SL} = 2090 PLF AVG

— SEE NEXT SHTS FOR FTG —

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project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA : Between Typ Unit & 62R - Wall SW6B/SW7B

Allow. Soil Pr. =	2.400	ksf	DL OTM =	228.52	f t - kips
Fy =	60	ksi	FLR LL OTM =	172.79	f t - kips
f 'c =	3000	psi	RF LL OTM =	434.42	f t - kips
Wall DL =	1.30	klf	SEISMIC OTM =	316.12	f t - kips
Roof LL =	2.69	klf	Footing Length :	39.00	feet
Floor LL =	0.50	klf	Footing Width :	4.00	feet
Wall Length =	37.00	feet	Footing Thkness:	12	inches
Wall Thickness =	16	inches	Footing DL :	2.160	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	221.1 kips	P_{ult} =	300.8 kips
OTM =	683.93 ft-kips	OTM_{ult} =	##### ft-kips
e =	3.09 feet	X bar =	N/A feet
Soil Pr. =	2.09 ksf, max.,	2.85 ksf, ult.	Required Width = 3.49 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	221.1 kips	P_{ULT} =	300.8 kips
OTM =	921.0 ft-kips	OTM_{ULT} =	1382.2 ft-kips
e =	4.17 feet	X bar =	N/A feet
Soil Pr. =	2.33 ksf, max.,	3.16 ksf, ult.	Required Width = 3.88 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	79.5 kips	P (ult) =	95.4 kips
OTM =	453.2 ft-kips	OTM_{ULT} =	518.59 ft-kips
e =	5.70 feet	X bar =	N/A feet
Soil Pr. =	0.96 ksf, max.,	1.15 ksf, ult.	Required Width = 1.59 feet

Resisting Moment = 2583.52 ft-kips   Factor of Safety =   7.21

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	32	inches	
Moment = 2.79 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)= 19 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)= 0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	20	inches	
Moment = 4.29 ft-kips/ft		Fb(allow)= 178 psi	fb(act.)= 79 psi
Shear = 0.00 kips/ft		Fv(allow)= 71 psi	fv(act.)= 0 psi

Reinf. Thickness (if used) =	12	inches	
Longitudinal Steel Required =	0.07	sq.in./ft.	v(longit.) = 9 psi
Transverse Steel Required =	0.11	sq.in./ft.	v(transv.)= 19 psi
			V(allow) = 93.1 psi

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Btwn Typ Unit & 62R, Wall SW-7A - Wind

Allow. Soil Pr. =	2.400	ksf	DL OTM =	228.52	f t - kips
Fy =	60	ksi	FLR LL OTM =	122.79	f t - kips
f 'c =	3000	psi	RF LL OTM =	434.42	f t - kips
Wall DL =	1.30	klf	WIND OTM =	254.55	f t - kips
Roof LL =	2.69	klf	Footing Length :	39.00	feet
Floor LL =	0.50	klf	Footing Width :	4.00	feet
Wall Length =	37.00	feet	Footing Thkness:	12	inches
Wall Thickness =	16	inches	Footing DL :	2.160	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	221.1 kips	P_{ult} =	300.8 kips	
OTM =	646.43 ft-kips	OTM_{ult} =	942.88 ft-kips	
e =	2.92 feet	X bar =	N/A feet	
Soil Pr. =	2.05 ksf, max.,	2.80 ksf, ult.		Required Width = 3.42 feet

EQ'N 16-13: DL + .75(FL + RL + W)

P =	221.1 kips	P_{ULT} =	300.8 kips	
OTM =	837.3 ft-kips	OTM_{ULT} =	1248.3 ft-kips	
e =	3.79 feet	X bar =	N/A feet	
Soil Pr. =	2.24 ksf, max.,	3.05 ksf, ult.		Required Width = 3.74 feet

EQ'N 16-15: 0.6DL + W

P =	79.5 kips	P (ult) =	95.4 kips	
OTM =	391.7 ft-kips	OTM_{ULT} =	571.81 ft-kips	
e =	4.93 feet	X bar =	N/A feet	
Soil Pr. =	0.90 ksf, max.,	1.07 ksf, ult.		Required Width = 1.49 feet

Resisting Moment = 2583.52 ft-kips   Factor of Safety =   8.19

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	2.69 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)=	161 psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi		fv(act.)=	0 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	14	inches			
Moment =	4.14 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)=	172 psi
Shear =	0.51 kips/ft	Fv(allow)= 71 psi		fv(act.)=	5 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.07	sq.in./ft.		v(longit.) =	9 psi
Transverse Steel Required =	0.11	sq.in./ft.		v(transv.)=	19 psi
				V(allow) =	93.1 psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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CASE 3: WALL AT NORTH END — GRID 7

SIMILAR DIAG TO CASE 1, EXCEPT T+O CONC.
WALL @ SEGMENT (B) = -4'-8"

V_{ROOF} = 4707# EQ, 3370# WIND $\begin{cases} V_A = 2292\text{# EQ}, 1641\text{# W} \\ V_B = 2415\text{# EQ}, 1729\text{# W} \end{cases}$

$V_{G+1.0}$ = 492# EQ, 1400# WIND

$V_{G+0.5}$ = 1405# EQ, 1710# WIND

$V_{G-0.5}$ = 402# EQ, 1470# WIND

WALL SEGMENT (A)

WALL DESIGN IS SAME AS CASE I.

OTM @ B.O. FTG = $\frac{1}{2}$(138.6) = 69.3^{lk} EQ.
$\frac{1}{2}$(128.41) = 64.21^{lk} WIND

WALL DL = 10(24+25) + 23(12) + 10(203)(0.2)
= 766 + 406 SL = 1172 (FOR EQ. CASE)

ROOF SL = 10(203)(0.8) = 1624 (2030 FOR WIND CASE)

FLR LL = 3.5(40) = 140 PLF

— SEE NEXT SHT FOR FTG —

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project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Typ. Unit at Grid 7 - Wall SW6A

Allow. Soil Pr. =	2.400 ksf	DL OTM =	0.00 f t - kips
Fy =	60 ksi	FLR LL OTM =	0 f t - kips
f 'c =	3000 psi	RF LL OTM =	0 f t - kips
Wall DL =	1.17 klf	SEISMIC OTM =	69.3 f t - kips
Roof LL =	1.62 klf	Footing Length :	19.67 feet
Floor LL =	0.14 klf	Footing Width :	2.00 feet
Wall Length =	18.67 feet	Footing Thkness:	12 inches
Wall Thickness =	16 inches	Footing DL :	1.240 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	71.0 kips	P_{ult} =	95.0 kips
OTM =	0.00 ft-kips	OTM_{ult} =	0.00 ft-kips
e =	0.00 feet	X bar =	N/A feet
Soil Pr. =	1.80 ksf, max.,	2.42 ksf, ult.	Required Width = 1.50 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)
P =	71.0 kips	P_{ULT} =	95.0 kips
OTM =	52.0 ft-kips	OTM_{ULT} =	83.16 ft-kips
e =	0.73 feet	X bar =	N/A feet
Soil Pr. =	2.21 ksf, max.,	2.96 ksf, ult.	Required Width = 1.84 feet

EQ'N 16-16: 0.6DL + 0.7E
P =	27.8 kips	P (ult) =	33.3 kips
OTM =	69.3 ft-kips	OTM_{ULT} =	77.616 ft-kips
e =	2.50 feet	X bar =	N/A feet
Soil Pr. =	1.24 ksf, max.,	1.49 ksf, ult.	Required Width = 1.04 feet

Resisting Moment = 455.09 ft-kips   Factor of Safety = 9.38

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =   32   inches
Moment =   1.02 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)=   7   psi
Shear   =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =   20   inches
Moment =   0.64 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)= 12   psi
Shear   =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

Reinf. Thickness (if used) =   12   inches
Longitudinal Steel Required =   0.03   sq.in./ft.   v(longit.) =   0   psi
Transverse Steel Required =   0.02   sq.in./ft.   v(transv.)=   0   psi
                                                          V(allow) = 93.1 psi

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Typ Unit at Grid 7 - Wall SW-6A - Wind

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
Fy =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	3000	psi	RF LL OTM =	0	f t - kips
Wall DL =	0.77	klf	WIND OTM =	64.21	f t - kips
Roof LL =	2.03	klf	Footing Length :	19.67	feet
Floor LL =	0.14	klf	Footing Width :	2.00	feet
Wall Length =	18.67	feet	Footing Thkness:	12	inches
Wall Thickness =	16	inches	Footing DL :	1.240	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	69.1 kips	P_{ult} =	95.0 kips		
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips		
e =	0.00 feet	X bar =	N/A feet		
Soil Pr. =	1.76 ksf, max.,	2.42 ksf, ult.		Required Width =	1.46 feet

EQ'N 16-13: DL + .75(FL + RL + W)

P =	69.1 kips	P_{ULT} =	95.0 kips		
OTM =	48.2 ft-kips	OTM_{ULT} =	77.052 ft-kips		
e =	0.70 feet	X bar =	N/A feet		
Soil Pr. =	2.13 ksf, max.,	2.93 ksf, ult.		Required Width =	1.77 feet

EQ'N 16-15: 0.6DL + W

P =	23.2 kips	P (ult) =	27.9 kips		
OTM =	64.2 ft-kips	OTM_{ULT} =	102.74 ft-kips		
e =	2.77 feet	X bar =	N/A feet		
Soil Pr. =	1.09 ksf, max.,	1.31 ksf, ult.		Required Width =	0.91 feet

Resisting Moment = 380.54 ft-kips   Factor of Safety = 8.47

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	1.01 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)= 61	psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi		fv(act.)= 0	psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	0.64 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)= 38	psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi		fv(act.)= 0	psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.03	sq.in./ft.		v(longit.) = 0	psi
Transverse Steel Required =	0.02	sq.in./ft.		v(transv.)= 0	psi
				V(allow) = 93.1	psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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WALL SEGMENT (B)

— SAME AS CASE I FROM L01 TO ROOF

FROM GRD TO L01

$$V = 4242^{\#} \text{ EQ}, \quad 4909^{\#} \text{ WIND}$$

$$OTM @ B.O.FTG = \tfrac{1}{2}(75.79 + 86.94) + 4.242(12.75)$$
$$= 133.32^{1k} \text{ EQ}$$
$$= \tfrac{1}{2}(61.24 + 68.73) + 4.909(12.75)$$
$$= 125.37^{1k} \text{ WIND}$$

$$W_{WALL} = 10(24 + 203) + 29(12) + 3(25 + 40) + 14.67(150)$$
$$= 2863 D + 120 L + 2030 SL \quad (40 L_D + 1624 SL @ EQ)$$
$$\text{FOR } x = 0' \text{ TO } 5'$$

$$W_{WALL} = 10(24 + 203) + 29(12) + 20(25 + 40) + 10(150)$$
$$= 2588 D + 800 L + 2030 SL \quad (40 L_D + 1624 SL @ EQ.)$$
$$\text{FOR } x = 5' \text{ TO } 26'$$

$$W_{WALL} = 10(24 + 203) + 27(12) + 2(284 \cdot 284) + 2(25 + 40) + 10(150)$$
$$= 2170 D + 80 L + 2598 SL \quad (40 L_D + 2192 SL \text{ FOR EQ})$$
$$\text{FOR } x = 26' \text{ TO } 40'$$

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FOR EQ. CASE

$$P_{DL} = 3269(5) + 2994(21) + 2576(14) =$$
$$= 16.345 + 62.874 + 36.064 = 115.28^k$$

$$W_{DL} = 2882 \text{ PLF}$$

$$M_{DL} = 16.345(1.5) + 62.874(4.5) - 36.064(13) = 100.14^{1k}$$

$$P_{LL} = 5(.12) + 21(.8) + 14(.08)$$
$$= 0.6 + 16.8 + 1.12 = 18.52^k$$

$$W_{LL} = 463 \text{ PLF}$$
$$M_{LL} = 21.5^{1k}$$

$$P_{SL} = 1.624(5) + 1.624(21) + 2.192(14)$$
$$= 8.12 + 34.10 + 30.69 = 72.91^k$$

$$W_{SL} = 1822 \text{ PLF}$$
$$M_{SL} = -103.4^{1k} \text{ — IGNORE TO BE CONSERVATIVE}$$

— SEE NEXT SHT FOR FDC —

FOR WIND CASE

$$P_{DL} = 14.32 + 54.35 + 30.38 = 99.04^k \quad W_{DL} = 2476 \text{ PLF}$$
$$M_{DL} = 14.32(1.5) + 54.35(4.5) + 30.38(-13) = 100.24^{1k}$$
$$W_{LL} = 463 \text{ PLF}, \quad M_{LL} = 21.5^{1k}$$
$$P_{SL} = 10.15 + 42.63 + 36.36 = 89.15^k \quad W_{SL} = 2.2291 \text{ PLF}$$
$$M_{SL} = -103.22^{1k} \text{ — IGNORE TO BE CONSERVATIVE}$$

— SEE NEXT SHTS FOR FDC —

project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

project no.
15105

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Typ. Unit at Grid 7 - Wall SW6B - EQ

Allow. Soil Pr. =	2.400	ksf	DL OTM =	100.14	f t - kips
Fy =	60	ksi	FLR LL OTM =	18.52	f t - kips
f 'c =	3000	psi	RF LL OTM =	-103.4	f t - kips
Wall DL =	2.88	klf	SEISMIC OTM =	133.32	f t - kips
Roof LL =	1.82	klf	Footing Length :	42.00	feet
Floor LL =	0.46	klf	Footing Width :	2.33	feet
Wall Length =	40.00	feet	Footing Thkness:	12	inches
Wall Thickness =	12	inches	Footing DL :	0.737	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	214.8 kips	P_{ult} =	285.1 kips	
OTM =	36.48 ft-kips	OTM_{ult} =	18.31 ft-kips	
e =	0.17 feet	X bar =	N/A feet	
Soil Pr. =	2.25 ksf, max.,	2.98 ksf, ult.		Required Width = 2.18 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	214.8 kips	P_{ULT} =	285.1 kips	
OTM =	136.5 ft-kips	OTM_{ULT} =	178.3 ft-kips	
e =	0.64 feet	X bar =	N/A feet	
Soil Pr. =	2.39 ksf, max.,	3.18 ksf, ult.		Required Width = 2.32 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	87.7 kips	P (ult) =	105.3 kips	
OTM =	193.4 ft-kips	OTM_{ULT} =	221.42 ft-kips	
e =	2.20 feet	X bar =	N/A feet	
Soil Pr. =	1.18 ksf, max.,	1.41 ksf, ult.		Required Width = 1.14 feet

Resisting Moment = 3070.47 ft-kips   Factor of Safety = 20.02

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	2.81 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)= 169	psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi		fv(act.)= 0	psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	12	inches			
Moment =	1.56 ft-kips/ft	Fb(allow)= 178 psi		fb(act.)= 94	psi
Shear =	0.00 kips/ft	Fv(allow)= 71 psi		fv(act.)= 0	psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.07	sq.in./ft.		v(longit.) = 9	psi
Transverse Steel Required =	0.04	sq.in./ft.		v(transv.)= 0	psi
				V(allow) = 93.1	psi

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA : Typ Unit at Grid 7 - Wall SW-6B - Wind

Allow. Soil Pr. =	2.400 ksf	DL OTM =	100.24 ft - kips
Fy =	60 ksi	FLR LL OTM =	71.5 ft - kips
f 'c =	3000 psi	RF LL OTM =	-103.22 ft - kips
Wall DL =	2.48 klf	WIND OTM =	125.37 ft - kips
Roof LL =	2.23 klf	Footing Length :	42.00 feet
Floor LL =	0.46 klf	Footing Width :	2.33 feet
Wall Length =	40.00 feet	Footing Thkness:	12 inches
Wall Thickness =	12 inches	Footing DL :	0.737 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =   210.7 kips P_{ult} =   285.2 kips
OTM =   76.45 ft-kips OTM_{ult} = 82.224 ft-kips
e =   0.36 feet   X bar =   N/A feet
Soil Pr. =   2.27 ksf, max.,   3.07 ksf, ult.   Required Width =   2.20 feet

EQ'N 16-13: DL + .75(FL + RL + W)
P =   210.7 kips P_{ULT} =   285.2 kips
OTM =   170.5 ft-kips OTM_{ULT} = 232.67 ft-kips
e =   0.81 feet   X bar =   N/A feet
Soil Pr. =   2.40 ksf, max.,   3.25 ksf, ult.   Required Width =   2.33 feet

EQ'N 16-15: 0.6DL + W
P =   78.0 kips   P (ult) =   93.6 kips
OTM =   185.5 ft-kips OTM_{ULT} = 272.76 ft-kips
e =   2.38 feet   X bar =   N/A feet
Soil Pr. =   1.07 ksf, max.,   1.28 ksf, ult.   Required Width =   1.04 feet

Resisting Moment = 2729.43 ft-kips   Factor of Safety = 18.45

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =   12   inches
Moment =   2.88 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)= 173 psi
Shear =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =   12   inches
Moment =   1.60 ft-kips/ft   Fb(allow)= 178 psi   fb(act.)=   96 psi
Shear =   0.00 kips/ft   Fv(allow)= 71 psi   fv(act.)=   0   psi

Reinf. Thickness (if used) =   12   inches
Longitudinal Steel Required =   0.08   sq.in./ft.   v(longit.) =   9   psi
Transverse Steel Required =   0.04   sq.in./ft.   v(transv.)=   0   psi
                                                                            V(allow) = 93.1 psi

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checked by: date:

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WALLS AT UNIT 62R

WALL SW1

$V_{ROOF} = 6624^{\#}$ EQ, $1364^{\#}$ WIND
$V_{L02} = 2377^{\#}$ EQ, $1734^{\#}$ WIND
$V_{L01} = \underline{637^{\#}}$ EQ, $\underline{1027^{\#}}$ WIND
$V_{TOT} = 9638^{\#}$ EQ, $4125^{\#}$ WIND ——— EQ CONTROLS DESIGN BY INSPECTION

ROOF TO L02

$H = 11'-11''$
$L = 6'-4''$

$U_{MAR} = 1046$ EQ, 215 W
$H/L = 1.88 < 2$ ok

USE 5/8" SHT'G B's
w/ 10d @ 2" O.C.

$V_{ALLOW} = 1740$ EQ   ok
$= 2435$ W

HEAD CONN's:

$N_{A34} = \dfrac{6624}{515} = 12.9$

USE MIN 14 SIMPSON A34
(OR LPT4 w/ $V_{ALLOW} = 670^{\#}$ EQ)

$N_{1/2"\phi} = \dfrac{6624}{1.6(650)} = 6.38$

USE MIN (8) 1/2"ϕ BOLTS TO W10 BM

$N_{LAG} = \dfrac{6624}{1.6(640)} = 6.47$

USE MIN (7) 5/8"ϕ LAGS TO BLK'G

SILL CONN

$N_{5/8"\phi} = \dfrac{6624}{1.6(1007)} = 4.11$

USE (4) 5/8"ϕ BOLTS

$\Delta = 2.8\% $ ok

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date: 1/17
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Wall SW1 (cont'd)

$P_1 = -497_D - 8245_{S368} - 308_{S240}$
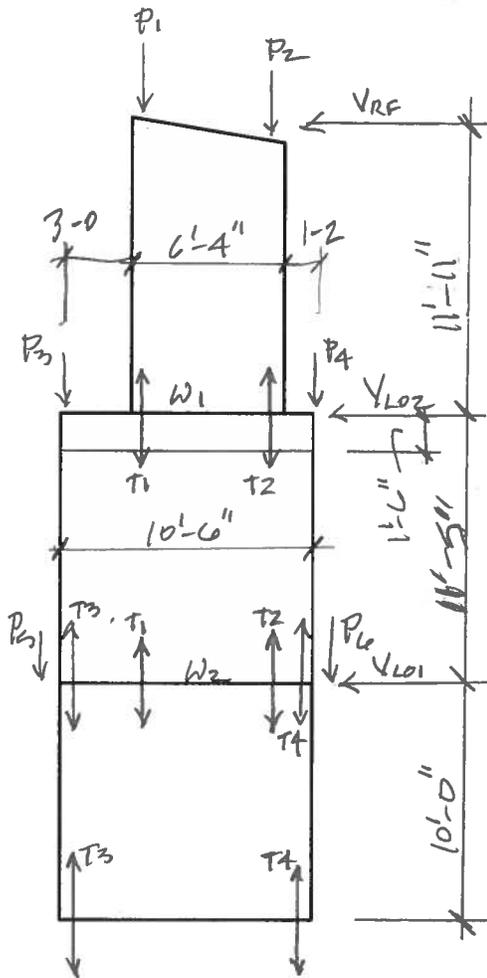
$P_2 = 9398_D + 8142_{MAX~S}$
$ 6245_{MIN}$

$P_3 = 1451_D + 912_L + 7836_S$

$P_4 = 4639_D + 2043_L + 24565_S$

$W_1 = 5165_D + 3453_L + 2897_S, PLF$

$P_5 = 704_D + 1126_L$

$P_6 = 3589_D + 5436_L$

$W_2 = 443_D + 708_L$

Roof To LO2 (cont'd)

$OTM @ LO2 = 6.624 (11.92) = 78,876^{th} \cdot ft$

$F_T = \dfrac{18.96^{th}}{5.71'} = \pm 13.83^{h} \, ea.$

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<u>ROOF TO L02 (CONT'D)</u>

<u>TIE AT T1:</u>

$$P = -497_D - \frac{8215 \text{ MAX}}{308 \text{ MIN}} \leq \pm 13830 \text{ EQ}$$

$P_{MAX} = 13313^{\#}$ — SEE NEXT SHT FOR POST DESIGN

$$P_{MIN} = \left(-497 + \frac{633(12)(10)}{2}\right) - .75(-8215 - 13830)$$

$$= -16650^{\#} \text{ MAX TENSION}$$

$$\boxed{\text{USE HSS POST FULL HT}}$$

<u>TIE AT T2:</u>

$$P = 9398_D + \frac{87412 \text{ MAX}}{6145 \text{ MIN}} \leq \pm 13830 \text{ EQ.}$$

$P_{MAX} = 96810^{\#}$ — SEE NEXT SHT FOR POST DESIGN

$$P_{MIN} = .6\left(9398 + \frac{633(12)(10)}{2}\right) - 13830 = -7960^{\#} \text{ MAX. T.}$$

$$\boxed{\text{USE HSS POST FULL HT}}$$

<u>WALL FROM L02 TO L01</u>

$$\left.\begin{array}{l} V = 9001^{\#} \text{ EQ} \\ L_{WALL} = 10'-6'' \end{array}\right\} \ \nu = 857 \text{ PLF}$$

$$\boxed{\begin{array}{l} 5/8'' \text{ SHT'G B.S. w/} \\ 10d @ 2'' \text{ O.C.} \end{array}}$$

$$\nu_{ALLOW} = 1740 \text{ EQ, OK}$$

<u>SILL CONN'S</u>

$$N_{5/8''\phi} = \frac{9001}{1.6(1007)} = 5.59$$

$$\boxed{\text{USE MIN } (6) 5/8'' \phi \text{ BOLTS}}$$

$$OTM @ TERRACE = 9.001(1.5) = 13.50^{1k}$$

$$F_T(MAX) = 13.5\left(\frac{1}{10'}\right) = 1.35^k$$

$$\boxed{\text{SIMPSON LSTA24 B.S.}}$$

$$T_{ALLOW} = 2(1.235) = 2.47^k$$

OK

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Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		

Project ID: 15105

Steel Column

Licensee : RUDOW & BERRY

Description :   62R SW1 T1 & T2 Post from L02 to Rf - HSS6x3x3/8

Code References

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind

General Information

Steel Section Name :	**HSS6x3x3/8**	Overall Column Height	11.50 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity **Top & Bottom Pinned**	
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	46.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Fully braced against buckling along X-X Axis	
		Y-Y (depth) axis :	
		Unbraced Length for Y-Y Axis buckling = 11.50 ft, K = 1.0	

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 227.930 lbs * Dead Load Factor
AXIAL LOADS . . .
   Axial Load at 11.50 ft, D = 9.398, S = 87.412, E = 13.830 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.8746** : 1	**Maximum SERVICE Load Reactions ..**	
Load Combination	+D+S+H	Top along X-X	0.0 k
Location of max.above base	0.0 ft	Bottom along X-X	0.0 k
At maximum location values are . . .		Top along Y-Y	0.0 k
Pa : Axial	97.038 k	Bottom along Y-Y	0.0 k
Pn / Omega : Allowable	110.952 k	**Maximum SERVICE Load Deflections ...**	
Ma-x : Applied	0.0 k-ft		
Mn-x / Omega : Allowable	22.725 k-ft	Along Y-Y 0.0 in at 0.0ft above base	
Ma-y : Applied	0.0 k-ft	for load combination :	
Mn-y / Omega : Allowable	13.841 k-ft	Along X-X 0.0 in at 0.0ft above base	
		for load combination :	
PASS Maximum Shear Stress Ratio =	**0.0** : 1		
Load Combination	0.0		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	0.0 k		
Vn / Omega : Allowable	0.0 k		

Load Combination Results

	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+L+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+S+H	0.875	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.678	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+W+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.70E+H	0.174	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+0.750W+H	0.087	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.750W+H	0.678	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.743	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+W+0.60H	0.052	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.139	PASS	0.00 ft	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base
+D+H		k		k	9.626 k

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Column

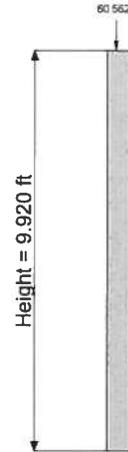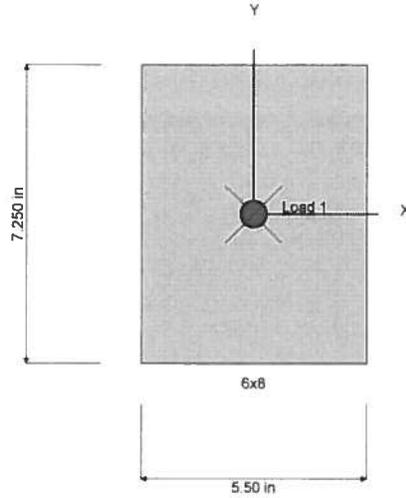Description : 62R SW1 T1 & T2 Post from L02 to Rf - HSS6x3x3/8

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base
+D+L+H		k		k	9.626 k
+D+Lr+H		k		k	9.626 k
+D+S+H		k		k	97.038 k
+D+0.750Lr+0.750L+H		k		k	9.626 k
+D+0.750L+0.750S+H		k		k	75.185 k
+D+W+H		k		k	9.626 k
+D+0.70E+H		k		k	19.307 k
+D+0.750Lr+0.750L+0.750W+H		k		k	9.626 k
+D+0.750L+0.750S+0.750W+H		k		k	75.185 k
+D+0.750L+0.750S+0.5250E+H		k		k	82.446 k
+0.60D+W+0.60H		k		k	5.776 k
+0.60D+0.70E+0.60H		k		k	15.457 k
D Only		k		k	9.626 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	87.412 k
W Only		k		k	k
E Only		k		k	13.830 k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.70E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.750W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.750W+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+W+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.70E+0.60H	0.0000	in	0.000	ft	0.000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

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Steel Column

Description : 62R SW1 T1 & T2 Post from L02 to Rf - HSS6x3x3/8

Steel Section Properties : HSS6x3x3/8

Depth	=	6.000 in	I xx	=	22.70 in^4	J	=	19.300 in^4
Design Thick	=	0.349 in	S xx	=	7.57 in^3	Cw	=	10.30 in^6
Width	=	3.000 in	R xx	=	2.040 in			
Wall Thick	=	0.375 in	Zx	=	9.900 in^3			
Area	=	5.480 in^2	I yy	=	7.480 in^4	C	=	10.300 in^3
Weight	=	19.820 plf	S yy	=	4.990 in^3			
			R yy	=	1.170 in			
			Zy	=	6.030 in^3			

Ycg = 0.000 in
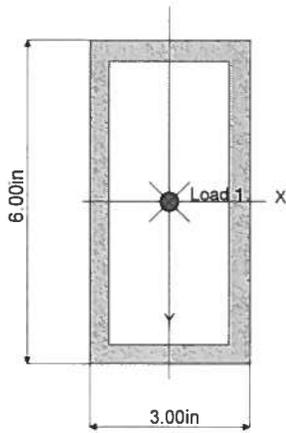
Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$$OTM @ LOI = 9.001(11.42) = 102.79^{ft\text{-}k}$$

$$F_T = \pm \frac{102.79}{10.124'} = \pm 10.07^k$$

TIE AT T3:

$$P = 1451_D + 912_L + 7836_S \pm 10007 \; EQ$$

$$P_{MAX} = 15517^{\#} \; - \; \text{SEE T4 FOR POST DESIGN}$$

$$P_{MIN} = .6\left(1451 + \frac{10.5}{2}(515)\right) - 10007$$

$$= -7514^{\#} \; \text{MAX TENSION}$$

$$\boxed{\text{SIMPSON HGT37 B.S. OF POST}}$$
$$T_{ALLOW} = (2 \times 5080) = 10160^{\#} \; OK$$

TIE AT T4

$$P = 4539_D + 2073_L + 24566_S \pm 10007 \; EQ$$

$$P_{MAX} = 32473^{\#} \; - \; \text{SEE NEXT SHT FOR POST DESIGN}$$

$$P_{MIN} = .6\left(4539 + \frac{10.5}{2}(515)\right) - 10007$$

$$= -5661^{\#} \; \text{MAX TENSION}$$

$$\boxed{\text{SIMPSON HGT37 B.S. OF POST}}$$
$$T_{ALLOW} = 10160^{\#} \; \underline{OK}$$

WALL FROM LOI TO GND

$$\left. \begin{array}{l} V = 9638^{\#} \; EQ \\ L = 10'\text{-}6'' \end{array} \right\} \; \nu = 918 \; PLF$$

$$\boxed{\begin{array}{l} 5/8'' \; SHT'G \; B.S. \; W/ \\ 10d @ 2'' O.C. \end{array}}$$

$$\nu_{ALLOW} = 1740 \; EQ. \quad OK$$

SILL CONN

$$N_{3/4''\phi} = \frac{9638}{1.6(1540)} = 3.91$$

$$\boxed{\begin{array}{l} \text{USE MIN (4) } 3/4''\phi \\ \text{BOLTS TO STEM} \end{array}}$$

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : 62R - SW1 - T3 Post from L01 to L02 - 6x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x8**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.830 ft	Wood Member Type	Sawn	

(Used for non-slender calculations)

				Exact Width	**5.50** in	Allow Stress Modification Factors
				Exact Depth	**7.250** in	Cf or Cv for Bending 1.0
Wood Species	Douglas Fir - Larch			Area	39.875 in^2	Cf or Cv for Compression 1.0
Wood Grade	No.1			Ix	174.661 in^4	Cf or Cv for Tension 1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Iy	100.518 in^4	Cm : Wet Use Factor 1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi			Ct : Temperature Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Cfu : Flat Use Factor 1.0
Fc - Perp	625.0 psi					Kf : Built-up columns 1.0 *NDS 15.3.2*

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.830 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.830 ft, D = 1.451, L = 0.9120, S = 7.836, E = 10.007 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.3331 : 1**
Load Combination   +D+0.750L+0.750S+0.750E+H
Governing NDS Forumla   Comp Only, fc/Fc'
Location of max.above base   0.0 ft
At maximum location values are . . .
Applied Axial   15.517 k
Applied Mx   0.0 k-ft
Applied My   0.0 k-ft
Fc : Allowable   1,168.39 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at	ft	above base
for load combination :				
Along X-X	in	at	ft	above base
for load combination :				

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
Load Combination   +0.60D+E+0.60H
Location of max.above base   9.830 ft
Applied Design Shear   0.0 psi
Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Descr:

Project ID: 15105

Wood Column

Description :   62R - SW1 - T3 Post from L01 to L02 - 6x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Column

Description : 62R - SW1 - T4 Post from L01 to L02 - 6x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x8**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		9.830 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

				Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**7.250** in	Cf or Cv for Bending 1.0
Wood Grade	No.1			Area	39.875 in^2	Cf or Cv for Compression 1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	174.661 in^4	Cf or Cv for Tension 1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	100.518 in^4	Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 9.830 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.830 ft, D = 4.539, L = 2.673, S = 24.565, E = 10.007 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.7741 : 1**
Load Combination   +D+S+H
Governing NDS Forumla   Comp Only, fc/Fc'
Location of max.above base   0.0 ft
At maximum location values are . . .
Applied Axial   29.104 k
Applied Mx   0.0 k-ft
Applied My   0.0 k-ft
Fc : Allowable   942.83 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in at   ft above base
for load combination :
Along X-X   in at   ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination   +0.60D+E+0.60H
Location of max.above base   9.830 ft
Applied Design Shear   0.0 psi
Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction	
	@ Base	@ Top	@ Base	@ Top	@ Base	

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

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Wood Column

Description :   62R - SW1 - T4 Post from L01 to L02 - 6x8 D.Fir#1

Sketches

Y

7.250 in

Load 1

X

6x8

5.50 in

41.784k

Height = 9.830 ft

Loads are total entered value. Arrows do not reflect absolute direction.

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job number: 15105

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checked by: date:

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STRAPS AT HSS/PL's

$$T_{max} = 2377 \left(\frac{12}{32} \right) = \ldots$$

SIMPSON LSTA 18
EA. SIDE OF WALL

$$T_{allow} = 2(1235)\left(\frac{2}{3}\right) = 1647^{\#} \quad ok$$

DRAG AT ENDS @ E.O. WALL

$$T_{max} = 2377 \left(\frac{15.5}{32} \right) \left(\frac{4.}{1.3} \right) = 3543^{\#}$$

SIMPSON MST37
$$T_{allow} = 5080^{\#}$$

OTM @ GRID $= 102.79 + 9.638(10) = 199.17^{1k}$

$$F_T = \pm \frac{199.17}{10.08'} = \pm 19.76^{k}$$

TIE AT T3

$$P = 2155_D + 2098_L + 1836_S \pm 19760$$

$$P_{max} = 24425^{\#} - \text{SEE T4 FOR POST DESIGN}$$

$$P_{min} = .6\left(2155 + \frac{10.5}{2}(515 + 443 + 2142(10))\right) - 19760$$

$$= -14775^{\#} \text{ Max } T.$$

SIMPSON HDU14-SDS2.5
$$T_{allow} = 14445^{\#}$$
$$\Delta = 2.3\% \text{ ok}$$

TIE AT T4

$$P = 8128_D + 8109_L + 2456_S \pm 19760$$

$$P_{max} = 41453^{\#} - \text{SEE NEXT SHT FOR POST DESIGN}$$

$$P_{min} = .6\left(8128 + \frac{10.5}{2}(515 + 443 + 214)\right) - 19760$$

$$= 11191^{\#} \text{ Max } T.$$

SIMPSON HDU14-SDS2.5
$$T_{allow} = 14445^{\#} \text{ ok}$$

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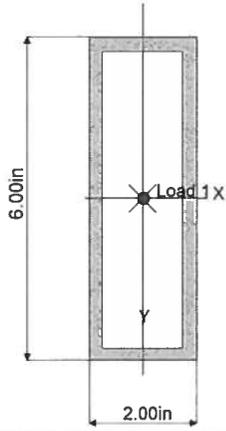Engineer: MAR
Project Descr:
Project ID: 15105

Wood Column

Licensee : RUDOW & BERRY

Description : 62R - SW1 - T3 & T4 Post from Gnd to L01 - 6x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design	Wood Section Name	**6x8**
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Graded Lumber
Overall Column Height	9.920 ft	Wood Member Type	Sawn

(Used for non-slender calculations)

Exact Width	**5.50** in	Allow Stress Modification Factors	
Wood Species	Douglas Fir - Larch	Exact Depth	**7.250** in

Wood Species	Douglas Fir - Larch		
Wood Grade	No.1	Area	39.875 in^2
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	174.661 in^4
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	100.518 in^4
Fc - Prll	1,000.0 psi	Density	31.20 pcf
Fc - Perp	625.0 psi	

Allow Stress Modification Factors
Cf or Cv for Bending 1.0
Cf or Cv for Compression 1.0
Cf or Cv for Tension 1.0
Cm : Wet Use Factor 1.0
Ct : Temperature Factor 1.0
Cfu : Flat Use Factor 1.0
Kf : Built-up columns 1.0 NDS 15.3.2
Use Cr : Repetitive ? No

E : Modulus of Elasticity . . .
	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Fully braced against buckling along X-X Axis
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 9.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 9.920 ft, D = 8.128, L = 8.109, S = 24.565, E = 19.760 k

DESIGN SUMMARY

Bending & Shear Check Results

FAIL Max. Axial+Bending Stress Ratio = **1.027 : 1**
Load Combination +D+0.750L+0.750S+0.750E+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 47.454 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 1,159.07 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination +0.60D+E+0.60H
Location of max.above base 9.920 ft
Applied Design Shear 0.0 psi
Allowable Shear 272.0 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .
	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.
Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   62R - SW1 - T3 & T4 Post from Gnd to L01 - 6x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$$OTM @ B.O.Ftg = 78.96 + 9.001(11.42) + 9.638(10+2.25)$$
$$= 299.82^{'k}$$

$$L_{WALL} = 10'-6", \quad C_{TR} @ 5'-3"$$

$$P_{DL} = -497 + 9398 + 1451 + 4539 + 6338(120)$$
$$\qquad\qquad\qquad\qquad\qquad (760)$$
$$\quad + 204 + 3589 + 10.5(515 + 443 + 215)$$
$$\qquad\qquad\qquad\qquad (12317)$$
$$= 32260^{\#}$$

$$W_{DL} = \frac{32260}{10.92} = 2954 \; PLF$$

$$M_{DL} = -.497(2.25) + 9.398(4.08) + 1.451(5.25) + 4.539(5.25)$$
$$\quad + 0.76(.92) + 0.204(-5.25) + 3.589(5.25) = 71.672^{'k}$$

$$P_L = 972 + 2613 + 1126 + 5436 + 10.5(343 + 708) = 21243^{\#}$$

$$A_W = \frac{21243}{40} = 531 \; FT^2 \qquad LL = 28 \; PSF$$

$$W_L = \frac{21243}{10.5}\left(\frac{28}{40}\right) = 1416 \; PLF$$

$$M_L = \left[(972 + 1126)(-5.25) + (2613 + 5436)(5.25)\right]\frac{28}{40} = 22.09^{'k}$$

$$P_S = -8215 + 87412 + 1836 + 24565 + 10.5(2897) = 111.63^{k}$$

$$W_S = 10631 \; PLF$$

$$M_S = -8.215(-2.25) + 87.412(4.08) + 1.836(-5.25) + 24.565(5.25)$$
$$= 462.95^{'k}$$

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project name: CCE

designed by: MAR
checked by:

date: Jun-15
date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Unit 62R Wall SW1

Allow. Soil Pr. =	2.400	ksf	DL OTM =	71.52	f t - kips
Fy =	60	ksi	FLR LL OTM =	22.09	f t - kips
f 'c =	3000	psi	RF LL OTM =	462.95	f t - kips
Wall DL =	2.95	klf	SEISMIC OTM =	304.64	f t - kips
Roof LL =	10.63	klf	Footing Length :	20.50	feet
Floor LL =	1.42	klf	Footing Width :	8.00	feet
Wall Length =	10.50	feet	Footing Thkness:	18	inches
Wall Thickness =	8	inches	Footing DL :	2.950	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):

P =	186.4 kips	P_{ult} =	261.6 kips	
OTM =	435.30 ft-kips	OTM_{ult} =	667.87 ft-kips	
e =	2.34 feet	X bar =	N/A feet	
Soil Pr. =	1.91 ksf, max.,	2.69 ksf, ult.		Required Width = 6.38 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)

P =	186.4 kips	P_{ULT} =	261.6 kips	
OTM =	663.8 ft-kips	OTM_{ULT} =	1033.4 ft-kips	
e =	3.56 feet	X bar =	6.69 feet	
Soil Pr. =	2.32 ksf, max.,	3.26 ksf, ult.		Required Width = 7.74 feet

EQ'N 16-16: 0.6DL + 0.7E

P =	54.9 kips	P (ult) =	65.9 kips	
OTM =	347.6 ft-kips	OTM_{ULT} =	392.69 ft-kips	
e =	6.33 feet	X bar =	3.92 feet	
Soil Pr. =	1.17 ksf, max.,	1.40 ksf, ult.		Required Width = 3.89 feet

Resisting Moment = 937.88 ft-kips   Factor of Safety = 3.66

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:

Req'd Unreinf Thickness =	40	inches		
Moment = 42.25 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 176 psi
Shear = 5.21 kips/ft		Fv(allow)= 71 psi		fv(act.)= 16 psi

TRANSVERSE DIRECTION:

Req'd Unreinf Thickness =	28	inches		
Moment = 19.14 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)= 170 psi
Shear = 3.98 kips/ft		Fv(allow)= 71 psi		fv(act.)= 18 psi

Reinf. Thickness (if used) =	18	inches		
Longitudinal Steel Required =	0.68	sq.in./ft.		v(longit.) = 64 psi
Transverse Steel Required =	0.30	sq.in./ft.		v(transv.)= 37 psi
				V(allow) = 93.1 psi

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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UNIT G2R - WALL SW2
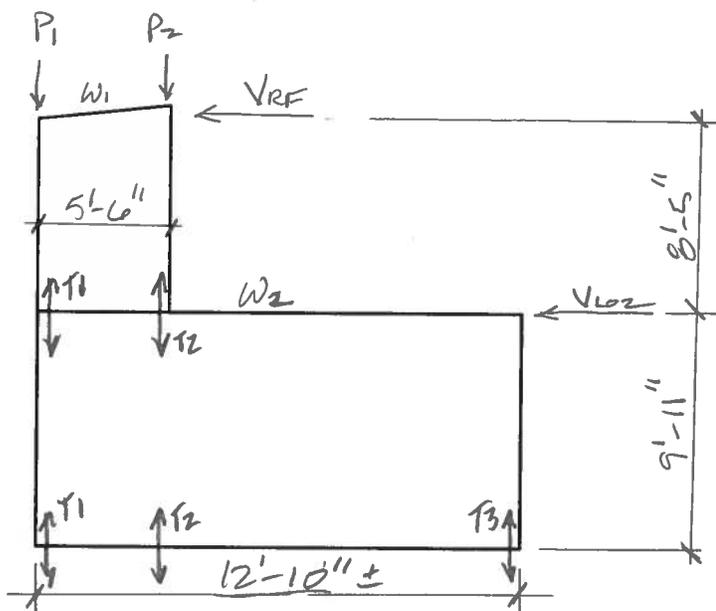
$V_{RF} = 5653^{\#}$ EQ
$= 1287^{\#}$ W.

$P_1 = 204^{\#}$ D $+ \dfrac{17868 \text{ MAX}}{15542 \text{ MIN}}$ S

$P_2 = 3963^{\#}$ D $+ \dfrac{33660 \text{ MAX}}{34213 \text{ MIN}}$ S

$W_1 = 270$ D $+ 2506$ S

$V_{LO2} = 541^{\#}$ EQ
$= 648^{\#}$ WIND

$W_2 = 9.5(25 + 40)$
$= 237$ D $+ 380$ L

WALL B/TWN LO2 & ROOF

$V = 5653^{\#}$ EQ $\left.\vphantom{\begin{array}{c}a\\b\end{array}}\right\}$ $v = 1028$ PLF
$L = 5'-6''$

$\boxed{\dfrac{5}{8}'' \text{ SHT'G B.S. w/}\\ 10d @ 2'' \text{ O.C.}}$

$V_{ALLOW} = 1740$ ok

HEAD CONN'S

$N_{A34} = \dfrac{5653}{(585 + 620)} = 4.8$ [USE MIN (5) SIMPSON A34 + LPT4]

$N_{\frac{1''}{2}\phi} = \dfrac{5653}{1.6(650)} = 5.44$ [USE MIN (6) $\frac{1}{2}''\phi$ BOLTS TO W10 BM]

$N_{LAG} = \dfrac{5653}{1.6(640)} = 5.52$ [USE MIN (6) $\frac{5}{8}''\phi$ LAGS TO BLK'G]

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checked by: date:

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<u>SILL CONN</u>

$$N_{\frac{5}{8}"\phi} = \frac{5653}{1.6(1007)} = 3.51 \qquad \boxed{\text{USE (4) } \frac{5}{8}"\phi \text{ THRU-BOLTS}}$$

$$OTM @ LOZ = 5653(8.42") = 41.60^{"k}$$

$$F_T = \frac{41.6^{"k}}{5.21'} = \pm 9.14^{k}$$

<u>TIE AT T1</u>

$$P = 204_D + \frac{17868}{1554_2} \leq \pm 9140$$

$$P_{MAX} = 20,146^{k} - \text{SEE NEXT SHT FOR POST DES.}$$

$$P_{MIN} = .6\left(204 + \frac{5.5}{2}(290) + \frac{5.5}{2}(85)(10)\right) - 9140$$

$$= -8432^{\#} \text{ MAX } T.$$

$$\longleftarrow \text{ STEEL POST OK .B9 INSP}$$

<u>TIE AT T2</u>

$$P = 3963_D + 33660_S \pm 9140$$

$$P_{MAX} = 37,623^{\#} - \text{SEE NEXT SHTS FOR POST DESIGN}$$

$$P_{MIN} = .6\left(3963 + 143 + 234\right) - 9140$$

$$= 6176^{\#} \text{ MAX } t.$$

$$\longleftarrow \text{ STL POST OK B9 INSP.}$$

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Project ID: 15105

Steel Column

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

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Licensee : RUDOW & BERRY

Description : 62R SW2 T1 & T2 Post from L02 to Roof - HSS6x2x1/4

Code References

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind

General Information

Steel Section Name :	**HSS6x2x1/4**	Overall Column Height	9.670 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	**Top & Bottom Pinned**
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	

Fy : Steel Yield   46.0 ksi
E : Elastic Bending Modulus   29,000.0 ksi

X-X (width) axis :
  Fully braced against buckling along X-X Axis
Y-Y (depth) axis :
  Unbraced Length for Y-Y Axis buckling = 9.670 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
  Axial Load at 9.670 ft, D = 3.963, S = 33.660, E = 9.140 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.5119** : 1
     Load Combination   +D+S+H
     Location of max.above base   0.0 ft
     At maximum location values are . . .

Pa : Axial	37.623	k
Pn / Omega : Allowable	73.504	k
Ma-x : Applied	0.0	k-ft
Mn-x / Omega : Allowable	13.405	k-ft
Ma-y : Applied	0.0	k-ft
Mn-y / Omega : Allowable	5.991	k-ft

Maximum SERVICE Load Reactions ..
  Top along X-X   0.0 k
  Bottom along X-X   0.0 k
  Top along Y-Y   0.0 k
  Bottom along Y-Y   0.0 k

Maximum SERVICE Load Deflections . . .

Along Y-Y   0.0 in   at   0.0 ft   above base
  for load combination :

Along X-X   0.0 in   at   0.0 ft   above base
  for load combination :

PASS   Maximum Shear Stress Ratio =   **0.0** : 1
     Load Combination   0.0
     Location of max.above base   0.0 ft
     At maximum location values are . . .
       Va : Applied   0.0 k
       Vn / Omega : Allowable   0.0 k

Load Combination Results

	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+L+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+Lr+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+S+H	0.512	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+H	0.397	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+W+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+0.70E+H	0.141	PASS	0.00 ft	0.000	PASS	0.00 ft
+D+0.750Lr+0.750L+0.750W+H	0.054	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.750W+H	0.397	PASS	9.67 ft	0.000	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.463	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+W+0.60H	0.032	PASS	0.00 ft	0.000	PASS	0.00 ft
+0.60D+0.70E+0.60H	0.119	PASS	0.00 ft	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base
+D+H		k		k	3.963 k
+D+L+H		k		k	3.963 k

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Steel Column

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   62R SW2 T1 & T2 Post from L02 to Roof - HSS6x2x1/4

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base
+D+Lr+H		k		k	3.963 k
+D+S+H		k		k	37.623 k
+D+0.750Lr+0.750L+H		k		k	3.963 k
+D+0.750L+0.750S+H		k		k	29.208 k
+D+W+H		k		k	3.963 k
+D+0.70E+H		k		k	10.361 k
+D+0.750Lr+0.750L+0.750W+H		k		k	3.963 k
+D+0.750L+0.750S+0.750W+H		k		k	29.208 k
+D+0.750L+0.750S+0.5250E+H		k		k	34.007 k
+0.60D+W+0.60H		k		k	2.378 k
+0.60D+0.70E+0.60H		k		k	8.776 k
D Only		k		k	3.963 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	33.660 k
W Only		k		k	k
E Only		k		k	9.140 k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance	
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.750Lr+0.750L+0.750W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.750L+0.750S+0.750W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+0.60D+W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft	
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft	

Steel Section Properties :   HSS6x2x1/4

Depth	=	6.000 in	I xx	=	13.10 in^4	J	=	6.550 in^4
Design Thick	=	0.233 in	S xx	=	4.37 in^3	Cw	=	4.70 in^6
Width	=	2.000 in	R xx	=	1.970 in			
Wall Thick	=	0.250 in	Zx	=	5.840 in^3			
Area	=	3.370 in^2	I yy	=	2.210 in^4	C	=	4.700 in^3
Weight	=	12.210 plf	S yy	=	2.210 in^3			
			R yy	=	0.810 in			
			Zy	=	2.610 in^3			

Ycg	=	0.000 in

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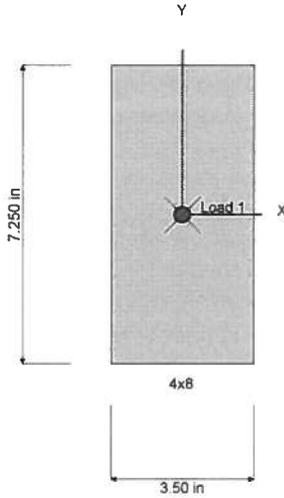Engineer: MAR
Project Descr:

Project ID: 15105

Steel Column

Lic. # : KW-06002357

Description :   62R SW2 T1 & T2 Post from L02 to Roof - HSS6x2x1/4

Loads are total entered value. Arrows do not reflect absolute direction.

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checked by: date:

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WALL BTWN L01 & L02

$$V = 6194^\# \ EQ \\ L = 12'-10''$$ } $V = 483 \ PLF \ EQ.$

$\boxed{\begin{array}{l} 5/8'' \ SHT'G \ B.S. \\ W/ \ 10d @ 2'' \ O.C. \end{array}}$
$V_{ALLOW} = 1740, EQ$

STRAP @ POST @ TOP DE:

$$T_{MAX} = 6194 \left(\frac{7.58}{12.83} \right) = 3659^\#$$

$\boxed{\begin{array}{l} SIMPSON \ MST27 \ EA. \ SIDE \\ OF \ DE \end{array}}$
$$T_{ALLOW} = 2(3700) = 7400^\#$$

STRAP @ WALL END:

$$T_{MAX} = 541 \left(\frac{7.0}{19.142} \right) \left(\frac{4}{1.3} \right) = 585^\#$$

$\boxed{\begin{array}{l} SIMPSON \ CS22 \ STRAP \\ W/ \ (12) \ 10d @ END \end{array}}$
$$T_{ALLOW} = 845^\#$$

SILL CONNECT:

$$S = \frac{1.6(1540)}{483} (12) = 61'' \ O.C.$$

$\boxed{\begin{array}{l} USE \ 3/4'' \phi \ J-BOLTS \\ @ \ 32'' \ OC \ MAX \end{array}}$
$(3 \ MIN \ REQ'D)$

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$$OTM @ GRD = 6.194(9.92) = 61.44^{1k}$$

$$F_T = \pm \frac{61.44}{12.25'} = \pm 5016^{\#}$$

TIE AT T1

$$P = 204_D + \frac{17868}{15542} S \pm (5016 + 9140)$$

$$14156$$

$$P_{MAX} = 24222^{\#} \quad - \quad HSS6x2x\tfrac{1}{4} \text{ OK BY INSP}$$

$$P_{MIN} = 0.6\left(204 + 210(5.5)\right) + 5.5(8.5)(10) + \frac{12.83}{2}(238 + 100)\right)$$

$$\quad\quad - 14156$$

$$= 11561^{\#} \text{ Max } T$$

STL POST OK BY INSP

TIE AT T3

$$P = \pm 5016^{\#}$$

$$P_{MAX} = 5016^{\#} \quad\quad 3x8 \text{ STUD OK BY INSP.}$$

$$P_{MIN} = .6\left(\frac{12.83}{2}(238 + 100)\right) - 5016 = 3715^{\#}$$

SIMPSON HDU4-SDS25
TO 4x8 POST

$$T_{ALLOW} = 4565^{\#} \underline{ok}$$

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$OTM @ B.O. FTG = 41.60 + 41.44 + 6.194(4) = 133.82^{1k}$

$L_{wall} = 12'10"$, $\text{\textcent} @ 6'-5"$

$P_{DC} = 204 + 3693 + 5.5(270 + 85) + 12.83(238 + 100) = 10186^{\#}$
$\phantom{P_{DC} = 204 + 3693 + 5.5}\underset{1952}{} \underset{4339}{}$

$\quad W_{DC} = 794 \text{ PLF}$

$\quad M_{DC} = 204(1.42) + 3693(.92) + 1952(3.61) = 11187^{1k}$

$\quad W_{LL} = 380 \text{ PLF}$

$\quad M_{LL} = 0$

$P_{S} = 17868 + 33660 = 51528^{\#}$

$\quad W_{SL} = 4016 \text{ PLF}$

$\quad M_{SL} = 17.868(6.42) + 33.66(.92) = 145.68^{1k}$

— SEE NEXT SHT FOR FTG —

project name: CCE

designed by: MAR   date: Jun-15
checked by: date:

project no.
15105

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Unit 62R Wall SW2

Allow. Soil Pr. =	2.400	ksf	DL OTM =	0.00	f t - kips
F_y =	60	ksi	FLR LL OTM =	0	f t - kips
f 'c =	3000	psi	RF LL OTM =	0	f t - kips
Wall DL =	0.79	klf	SEISMIC OTM =	133.82	f t - kips
Roof LL =	4.02	klf	Footing Length :	17.17	feet
Floor LL =	0.38	klf	Footing Width :	3.00	feet
Wall Length =	12.83	feet	Footing Thkness:	12	inches
Wall Thickness =	8	inches	Footing DL :	1.590	klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	79.8 kips		P_{ult} =	112.7 kips		
OTM =	0.00 ft-kips		OTM_{ult} =	0.00 ft-kips		
e =	0.00 feet		X bar =	N/A feet		
Soil Pr. =	1.55 ksf, max.,	2.19 ksf, ult.			Required Width =	1.94 feet

EQ'N 16-14: DL + .75(FL + RL + .7E)
P =	79.8 kips		P_{ULT} =	112.7 kips		
OTM =	100.4 ft-kips		OTM_{ULT} =	160.58 ft-kips		
e =	1.26 feet		X bar =	N/A feet		
Soil Pr. =	2.23 ksf, max.,	3.15 ksf, ult.			Required Width =	2.79 feet

EQ'N 16-16: 0.6DL + 0.7E
P =	22.5 kips		P (ult) =	27.0 kips		
OTM =	133.8 ft-kips		OTM_{ULT} =	149.88 ft-kips		
e =	5.95 feet		X bar =	2.64 feet		
Soil Pr. =	1.90 ksf, max.,	2.28 ksf, ult.			Required Width =	2.37 feet

Resisting Moment = 321.83 ft-kips   Factor of Safety = 3.44

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =	32	inches				
Moment =	9.60 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)=	64 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)=	0 psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =	20	inches				
Moment =	3.25 ft-kips/ft		Fb(allow)= 178 psi		fb(act.)=	60 psi
Shear =	0.00 kips/ft		Fv(allow)= 71 psi		fv(act.)=	0 psi

Reinf. Thickness (if used) =	12	inches			
Longitudinal Steel Required =	0.26	sq.in./ft.		v(longit.) =	44 psi
Transverse Steel Required =	0.09	sq.in./ft.		v(transv.)=	13 psi
				V(allow) =	93.1 psi

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job number: 15105

designed by: MAR date: 1/17
checked by: date:

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WALL SW3

$V_{LO2} = 761^{\#}$ EQ. , $2438^{\#}$ WIND $(1689 @ +9.11, 749 @ 6.9)$
$V_{LO1} = \dfrac{366^{\#}}{1127^{\#}}$ EQ. , $\dfrac{727^{\#}}{3165^{\#}}$ WIND $(@ -4'-8'')$ WIND CONTROLS

$L_{WALL} = 7'-4''$

FROM LO1 TO LO2

$U = 333$ PLF WIND $\boxed{\tfrac{1}{2}'' \text{ SHT'G } w/ 8d @ 6'' O.C.}$

$U_{ALLOW} = 365$ PLF WIND

OTM @ +6'-9'' FLR $= 1.689(3.17') = 5.35^{1k}$

WALL DL $= 6.17(10) = 62$ PLF

$F_T = \tfrac{1}{2}(6.75)(62)(0.6) - \dfrac{5350}{7'} = 639^{\#}$ TENS

$\boxed{\text{SIMPSON MST37}}$
$T_{ALLOW} = 2465^{\#}$

OTM @ -4'-8'' $= 5.35 + 2.438(11.42) = 33.19^{1k}$

WALL DL $= 8.33(24) + 11.75(10) = 318$ PLF

$F_T = 8.67(318)(.6) - \dfrac{33190}{7} = 2833^{\#}$ TENS

$\boxed{\text{SIMPSON MST48}}$
$T_{ALLOW} = 3960^{\#}$

FROM GND TO LO1

$U = 432$ PLF $\boxed{\tfrac{1}{2}'' \text{ SHT'G } w/ 8d @ 4'' O.C.}$

$U_{ALLOW} = 533$ PLF OK

SILL CONNS

$S = \dfrac{1.6(141)}{432}(12) = 6.3''$ $\boxed{\text{USE 16d @ 6'' O.C.}}$

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SILL CONN'S CONT'D

$$S_{A35} = \frac{620}{432}(12) = 18.6''$$ $\boxed{\text{USE A35's @ 16'' O.C.}}$

OTM @ GRD = 33.19 + 3.165(10) = 64.84^{k}

WALL DL = $\left(2(12.33)(24) + 12.15(20)\right)\frac{11.33}{7.33}$ = 1344 PLF

LL = $2(12.33)(40)\left(\frac{11.33}{7.33}\right)$ = 1525 PLF

$$F_T = .6\left(\frac{7.33}{2}\right)(1344) - \frac{64840}{6.83'} = 6538^{\#} \text{ TENSION}$$

$\left| \begin{array}{l} \text{SIMPSON HDU8-SDS2.5} \\ \text{W/ } \frac{7}{8}''\phi \text{ AB, TO 4x POST} \end{array} \right.$

$T_{ALLOW} = 6970^{\#}$ ok

OTM @ B.O.FTG = 64.84 + 3.165(2.25) = 71.96^{k}

—SEE NEXT SHT FOR FTG—

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project name: CCE

designed by: MAR   date: Jan-17
checked by: date:

SHEAR WALL FOOTING DESIGN

INPUT DATA :   Wall SW-3 - 62R

Allow. Soil Pr. =	2.400 ksf	DL OTM =	0.00 ft - kips
Fy =	60 ksi	FLR LL OTM =	0 ft - kips
f 'c =	2500 psi	RF LL OTM =	0 ft - kips
Wall DL =	1.34 klf	WIND OTM =	71.96 ft - kips
Roof LL =	0.00 klf	Footing Length :	13.33 feet
Floor LL =	1.53 klf	Footing Width :	3.33 feet
Wall Length =	7.33 feet	Footing Thkness:	12 inches
Wall Thickness =	6 inches	Footing DL :	0.983 klf

OUTPUT DATA :

EQ'N 16-11 : DL + .75(FL + RL):
P =	31.3 kips	P_{ult} =	41.0 kips
OTM =	0.00 ft-kips	OTM_{ult} =	0 ft-kips
e =	0.00 feet	X bar =	N/A feet
Soil Pr. =	0.71 ksf, max.,	0.92 ksf, ult.	Required Width = 0.98 feet

EQ'N 16-13: DL + .75(FL + RL + W)
P =	31.3 kips	P_{ULT} =	41.0 kips
OTM =	54.0 ft-kips	OTM_{ULT} =	86.352 ft-kips
e =	1.72 feet	X bar =	N/A feet
Soil Pr. =	1.25 ksf, max.,	1.64 ksf, ult.	Required Width = 1.74 feet

EQ'N 16-15: 0.6DL + W
P =	13.8 kips	P (ult) =	16.5 kips
OTM =	72.0 ft-kips	OTM_{ULT} =	115.14 ft-kips
e =	5.22 feet	X bar =	1.44 feet
Soil Pr. =	1.91 ksf, max.,	2.30 ksf, ult.	Required Width = 2.66 feet

Resisting Moment = 153.01 ft-kips   Factor of Safety = 3.04

FOOTING REINFORCING:

LONGITUDINAL DIRECTION:
Req'd Unreinf Thickness =   24   inches
Moment =   12.76 ft-kips/ft   Fb(allow)= 163 psi   fb(act.)= 158 psi
Shear   =   2.30 kips/ft   Fv(allow)= 65 psi   fv(act.)= 12 psi

TRANSVERSE DIRECTION:
Req'd Unreinf Thickness =   14   inches
Moment =   3.51 ft-kips/ft   Fb(allow)= 163 psi   fb(act.)= 146 psi
Shear   =   0.57 kips/ft   Fv(allow)= 65 psi   fv(act.)= 5 psi

Reinf. Thickness (if used) =   12   inches
Longitudinal Steel Required =   0.35   sq.in./ft.   v(longit.) = 52 psi
Transverse Steel Required =   0.09   sq.in./ft.   v(transv.)= 16 psi
                                                          V(allow) = 85 psi

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job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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WALL SW4

$$V_{LO2} = 522^\# \text{ EQ}, \ 1685^\# \text{ WIND}$$

$$V_{LO1} = 97^\# \text{ EQ}, \ 221^\# \text{ WIND}$$

$$\overline{619^\#} \qquad \overline{1906^\#} \qquad \text{WIND CONTROLS}$$

$$L_{WALL} = 14'2''$$

$$U = \frac{1685}{14.17} = 119 \ PLF \qquad \boxed{\frac{1}{2}'' \ \text{SHT'G w/ 8d @ 6''}}$$

$$\underline{U_{ALLOW} = 365}$$

$$OTM @ LO1 = 1.685(9.92) = 16.72^{k}$$

$$WALL \ DL = 12.5(24) + 9.92(10) = 399 \ PLF$$

$$F_T = .6\left(\frac{14.17}{2}(.399)\right) - \frac{16.72}{13.67} = 0 \quad \text{No UPLIFT}$$

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WALL SW6 - 62R

$P_1 = 868_D + \begin{matrix} 1170 \\ 1384 \end{matrix}_S$

$P_2 = 1575_D + \begin{matrix} 1085 \\ 1119 \end{matrix}_S$

$W_1 = 2(24 + 40) = 48_D + 80_L$

$V_{RF} = 6313^\# \; EQ., \quad 4019^\# \; W.$

$V_{L02} = 3533^\# \; EQ., \quad 5106^\# \; W.$
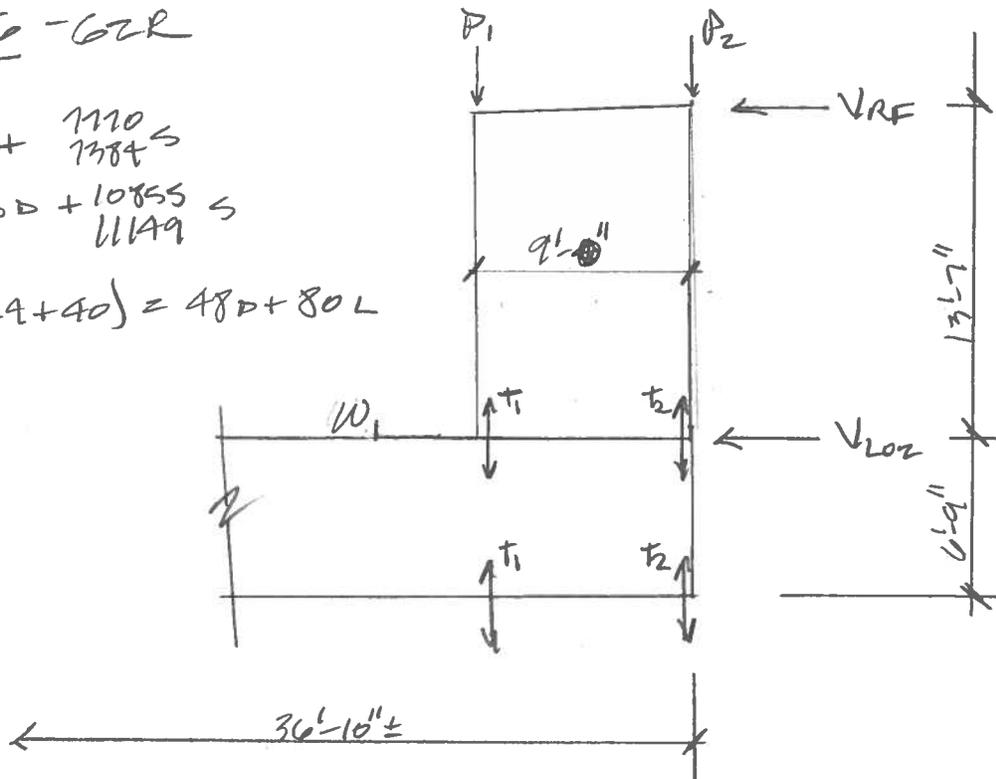
$\overline{9846^\#} \qquad \overline{9185^\#}$

— SEISMIC CONTROLS

WALL BTWN LO2 & ROOF

$L_{WALL} = 9'-0''$
$V = 6313^\#$ } $v = 701 \; PLF$

$\boxed{\begin{matrix} 5/8'' \; SHTG \; B.S. \; N \\ 10d @ 2'' \; O.C. \end{matrix}}$

$V_{ALLOW} = 1240 \; PLF \quad ok$

HEAD CONN'S

$N_{A34} = \dfrac{6313}{515} = 12.3$

USE (14) SIMPSON A34

SILL CONN

$N_{5/8''\phi} = \dfrac{6313}{1.6(1007)} = 3.92$

USE MIN (4) 5/8''ϕ BOLTS

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$$OTM @ L02 = 6.313(13.58) = 85.73^{k}$$

$$F_T = \pm \frac{85.73}{8.5'} = \pm 10.09^{k}$$

TIE AT T1

$$P = 868_D + \frac{7778}{1384}_S \pm 10090$$

$$P_{MAX} = 14203^{\#} - \text{SEE NEXT SHT FOR POST DESIGN}$$

$$P_{MIN} = .6(868 + 4.5(13.58)(10)) - 10090$$
$$= -9202^{\#} \text{ MAX T.}$$

SIMPSON MST37 EA SIDE
$$T_{ALLOW} = 10160^{\#}$$

TIE AT T2

$$P = 1575_D + 1149_S \pm 10090 \text{ EQ.}$$

$$P_{MAX} = 11504^{\#} - \text{SEE NEXT SHT FOR POST DES.}$$

$$P_{MIN} = 0.6(1575 + 4.5(13.58)(10)) - 10090$$
$$= -8778^{\#}$$

SIMPSON MST37 EA SIDE @ FLR
SIMPSON HDU14-SDS2.5
$$T_{ALLOW} = 10770^{\#}$$

WALL BTWN L01 & L02

$$V = 9846^{\#} \text{ EQ}$$
$$L_{WALL} = 36'-10''$$ $$\Big\}$$ $$V = 267 \text{ PLF}$$

$$\boxed{\begin{array}{l} \tfrac{5}{8}'' \text{ SHTG B.S.} \\ 10d @ 6'' OC. \end{array}}$$
$$V_{ALLOW} = 680 \text{ EQ OK}$$

SILL CONN

$$S = \frac{1.6(1540)}{267}(12) = 111''$$

USE 3/4''⌀ AB'S @ 32'' OC MAX

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   62R - SW6 - T1 Post from L02 to Roof - 4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	14.420 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**3.50** in Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in
Wood Grade	No.1			

				Area	25.375 in^2	Cf or Cv for Bending 1.30
Fb - Tension	1,000.0 psi	Fv	180.0 psi	Ix	111.148 in^4	Cf or Cv for Compression 1.050
Fb - Compr	1,000.0 psi	Ft	675.0 psi	Iy	25.904 in^4	Cf or Cv for Tension 1.20
Fc - Prll	1,500.0 psi	Density	31.20 pcf			Cm : Wet Use Factor 1.0
Fc - Perp	625.0 psi					Ct : Temperature Factor 1.0

				Cfu : Flat Use Factor 1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Kf : Built-up columns 1.0 *NDS 15.3.2*
Basic	1,700.0	1,700.0	1,700.0 ksi	Use Cr : Repetitive ? No
Minimum	620.0	620.0		

Brace condition for deflection (buckling) along columns :
  X-X (width) axis :   Fully braced against buckling along X-X Axis
  Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 14.420 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
   Axial Load at 14.420 ft, D = 0.8680, S = 7.770, E = 10.090 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.6885 : 1**
    Load Combination   +D+0.750L+0.750S+0.750E+H
    Governing NDS Forumla   Comp Only, fc/Fc'
    Location of max.above base   0.0 ft
    At maximum location values are . . .
      Applied Axial   14.263 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   816.39 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in at   ft above base
    for load combination :
Along X-X   in at   ft above base
    for load combination :

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
    Load Combination   +0.60D+E+0.60H
    Location of max.above base   14.420 ft
    Applied Design Shear   0.0 psi
    Allowable Shear   288.0 psi

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C D	C P	Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   62R - SW6 - T1 Post from L02 to Roof - 4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project Title: Copper Crest East
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Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   62R - SW6 - T2 Post from L02 to Roof - 4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	14.420 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**3.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in	Cf or Cv for Bending	1.30
Wood Grade	No.1		Area	25.375 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1000 psi	Fv	180 psi	Ix	111.148 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1000 psi	Ft	675 psi	Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1500 psi	Density	31.2 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Kf : Built-up columns	1.0 *NDS 15.3.2*
Basic	1700	1700	1700 ksi	Use Cr : Repetitive ?	No
Minimum	620	620			

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Fully braced against buckling along X-X Axis
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 14.420 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 14.420 ft, D = 1.575, S = 11.149, E = 10.090 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.8450 : 1**
    Load Combination   +D+0.750L+0.750S+0.750E+H
    Governing NDS Forumla   Comp Only, fc/Fc'
    Location of max.above base   0.0 ft
    At maximum location values are . . .
        Applied Axial   17.504 k
        Applied Mx   0.0 k-ft
        Applied My   0.0 k-ft
        Fc : Allowable   816.39 psi

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
    Load Combination   +0.60D+E+0.60H
    Location of max.above base   14.420 ft
    Applied Design Shear   0.0 psi
    Allowable Shear   288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y   0.0 in   at   ft   above base
    for load combination :

Along X-X   in   at   ft   above base
    for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Wood Column

Lic. # : KW-06002357
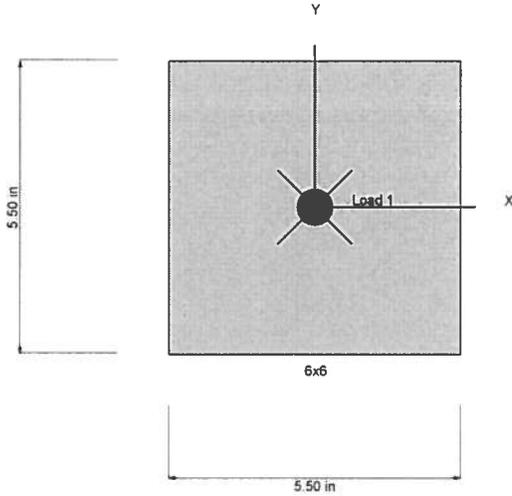
Licensee : RUDOW & BERRY

Description :   62R - SW6 - T2 Post from L02 to Roof - 4x8 D.Fir#1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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$OTM @ T.O. CONC WALL = 9.846(6.75) = 66.46^{1k}$

$$F_T = \frac{66.46^{1k}}{36.33'} = \pm 1829^{\#}$$

TIE AT T2

$P = 15754 + 11149 \pm 11919^{\#}$

$P_{MAX} = 18876^{\#}$ — SEE NEXT SHT FOR POST

$P_{MIN} = .6(15754 + 4.5(1368)(10) + 18.5(6.75)(10)) - 11919$

$= 9858^{\#}$ MAX T

(Use Simpson HDU14-SDS2.5

$T_{ALLOW} = 10770^{\#}$ ok

TIE AT WEST END

$P_{MIN} = .6(\frac{36.83}{2}(1075(10) + 46)) - 1829$

$= -110^{\#} \Rightarrow$ — NO UPLIFT DUE
TO CORNER RETURN

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Project ID: 15105

Wood Column

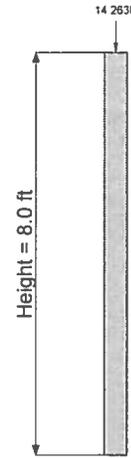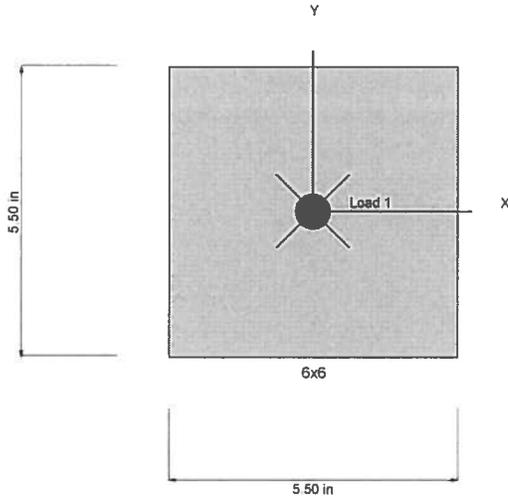Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   62R - SW6 - T2 Post from L01 to L02 - 4x8 D.Fir#1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**4x8**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	6.750 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**3.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**7.250** in	Cf or Cv for Bending	1.30
Wood Grade	No.1		Area	25.375 in^2	Cf or Cv for Compression	1.050
Fb - Tension	1,000.0 psi	Fv	180.0 psi	Ix	111.148 in^4	Cf or Cv for Tension	1.20
Fb - Compr	1,000.0 psi	Ft	675.0 psi	Iy	25.904 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,500.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .   x-x Bending   y-y Bending   Axial   Kf : Built-up columns   1.0 *NDS 15.3.2*
         Basic   1,700.0   1,700.0   1,700.0 ksi   Use Cr : Repetitive ?   No
         Minimum   620.0   620.0

Brace condition for deflection (buckling) along columns :
   X-X (width) axis :   Fully braced against buckling along X-X Axis
   Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 6.750 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
   Axial Load at 6.750 ft, D = 1.575, S = 11.149, E = 11.919 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3568** : 1
   Load Combination   +D+0.750L+0.750S+0.750E+H
   Governing NDS Forumla   Comp Only, fc/Fc'
   Location of max.above base   0.0 ft
   At maximum location values are . . .
      Applied Axial   18.876 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   2,084.89 psi

Maximum SERVICE Lateral Load Reactions . .
   Top along Y-Y   0.0 k   Bottom along Y-Y   0.0 k
   Top along X-X   0.0 k   Bottom along X-X   0.0 k

Maximum SERVICE Load Lateral Deflections . . .
   Along Y-Y   0.0 in   at   0.0 ft   above base
      for load combination : n/a
   Along X-X   0.0 in   at   0.0 ft   above base
      for load combination : n/a

Other Factors used to calculate allowable stresses . . .
                        Bending   Compression   Tension

PASS Maximum Shear Stress Ratio = **0.0** : 1
   Load Combination   +0.60D+E+0.60H
   Location of max.above base   6.750 ft
   Applied Design Shear   0.0 psi
   Allowable Shear   288.0 psi

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	0.900	0.915	0.04786	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+L+H	1.000	0.903	0.04363	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+Lr+H	1.250	0.873	0.03611	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+S+H	1.150	0.885	0.3127	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+0.750Lr+0.750L+H	1.250	0.873	0.03611	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+0.750L+0.750S+H	1.150	0.885	0.2442	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+W+H	1.600	0.827	0.02977	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+E+H	1.600	0.827	0.2551	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+0.750Lr+0.750L+0.750W+H	1.600	0.827	0.02977	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+0.750L+0.750S+0.750W+H	1.600	0.827	0.1878	PASS	0.0 ft	0.0	PASS	6.750 ft
+D+0.750L+0.750S+0.750E+H	1.600	0.827	0.3568	PASS	0.0 ft	0.0	PASS	6.750 ft
+0.60D+W+0.60H	1.600	0.827	0.01786	PASS	0.0 ft	0.0	PASS	6.750 ft
+0.60D+E+0.60H	1.600	0.827	0.2432	PASS	0.0 ft	0.0	PASS	6.750 ft

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Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357
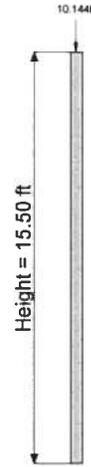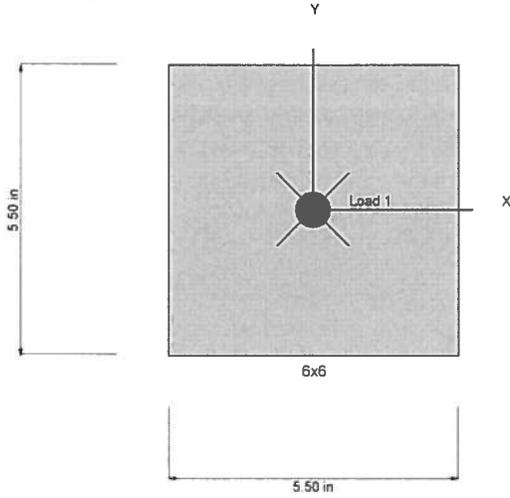
Licensee : RUDOW & BERRY

Description :   62R - SW6 - T2 Post from L01 to L02 - 4x8 D.Fir#1

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Axial Reaction @ Base
+D+H		k		k	1.575 k
+D+L+H		k		k	1.575 k
+D+Lr+H		k		k	1.575 k
+D+S+H		k		k	12.724 k
+D+0.750Lr+0.750L+H		k		k	1.575 k
+D+0.750L+0.750S+H		k		k	9.937 k
+D+W+H		k		k	1.575 k
+D+E+H		k		k	13.494 k
+D+0.750Lr+0.750L+0.750W+H		k		k	1.575 k
+D+0.750L+0.750S+0.750W+H		k		k	9.937 k
+D+0.750L+0.750S+0.750E+H		k		k	18.876 k
+0.60D+W+0.60H		k		k	0.945 k
+0.60D+E+0.60H		k		k	12.864 k
D Only		k		k	1.575 k
Lr Only		k		k	k
L Only		k		k	k
S Only		k		k	11.149 k
W Only		k		k	k
E Only		k		k	11.919 k
H Only		k		k	k

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.750W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.750W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.750E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

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Project Title: Copper Crest East
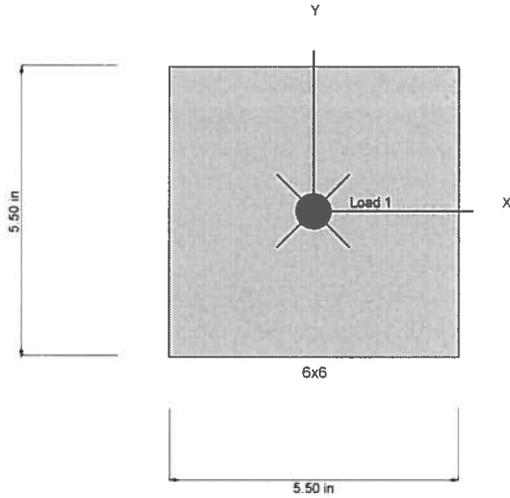Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description :   62R - SW6 - T2 Post from L01 to L02 - 4x8 D.Fir#1

Sketches
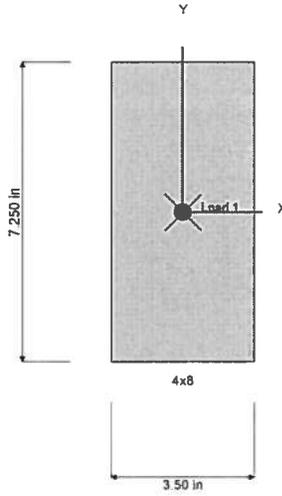
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job name: Copper Crest East
job number: 15105

designed by: MAR
checked by:

date: 1/17
date:

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HOLDDOWN BOLT EMBED. REQUIREMENTS

UNIT	WALL	TIE #	T (ASD)	T (ULT)	INTO
TYP.	SW1	T1	28544#	46501#	FTG. (18")
	SW1	T2	14052#	23166#	FTG. (18")
	SW1	T3	13367#	21984#	FTG. (18")
	SW2	T1	23508#	37938#	8" WALL
	SW2	T2	22376#	36579#	8" WALL
62R	SW1	T1	16650#	26595#	REBAR TO FTG
		T2	7963#	15088#	REBAR TO FTG
		T3	14775#	25634#	FTG (18")
		T4	11191#	21733#	FTG (18")
	SW2	T1	11561#	19530#	REBAR TO STEM
		T2	6176#	11067#	REBAR TO STEM
		T3	3715#	6464#	8" WALL
	SW6	T1	9202#	15078#	8" WALL
		T2	9858#	16597#	8" WALL

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designed by: MAR   date: 1/17
checked by: date:

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TYPE 1: BOLT EMBED IN 18" THK FTG

$P_u (MAX) = 46.50^k$

MAX EMBED = 15"

$A_{NCO} = 9(15)^2 = 2025 \ IN^2$

$A_{NC} = A_{NCO}$

$N_b = 24(3000)^{\frac{1}{2}}(15)^{1.5} = 76.37^k$

$N_{cb} = N_b = 76.37^k$

$\phi N_{cb} = 0.75(76.37) = 57.28^k > 46.50^k$ ✓

[USE 15" MIN EMBED]

TYPE 2: BOLT EMBED IN 8" WALL (12" WALL SIMILAR)

$P_u (MAX) = 37938^\#$

$A_s (REQ'D) = \dfrac{37.938}{0.9(60)} = 0.70 \ IN^2$

[USE (4) #5 VERTS]

TENS. DEV. LENGTH = 20.7"   } ok
HOOK DEV. LENGTH = 8"

TYPE 3: STEEL POST TO EMBED

$P_u (MAX) = 26595^\#$

$A_s (REQ'D) = 0.49 \ IN^2$ [USE (4) #6 TO EMBED]

TENS. DEV. LENGTH = 12" MIN

HOOK DEV. LENGTH = 6" MIN

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designed by: MAR
checked by:

date: 1/17
date:

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of 401

MPE.4 BOLT EMBED IN 12" THK FTG

EMBED = $8\frac{1}{2}$"

$\phi N_b = 24(3000)^{\frac{1}{2}}(8.5)^{1.5}(0.75) = 24.43^k$

OK FOR ALL OTHER
HOLDOWNS BY INSP.

rudow + berry
structural engineering
scottsdale, arizona 85251

job name: Copper Crest East
job number: 15105

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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of 404

<u>WALL STUDS</u>

WIND p = 21.5 PSF @ Z4
      = 25.8 PSF @ Z5 (a = 7.0 FT)

INTERIOR PR = 5 PSF MIN

1) WALLS ON GRID 7 (NORTH WALL @ THP UNIT)

   A) WALL BTWN LO2 & ROOF

   MAX HT @ Z5 = 15'-3"
   $W = 2(24 + 203) + 9.61(12) = 164_D + 406_{SL}$, PLF
   $P_{STUD} = 219^\#_D + 541^\#_{SL}$

   MAX HT @ Z4 = 17'-2"
   $W = 10(24 + 203) + 10.67(12) = 362_D + 2030_{SL}$, PLF
   $P_{STUD} = 491^\#_D + 2706^\#_{SL}$

   B) WALL BTWN LO1 & LO2

   MAX HT = 8'-8"
   $W = 10(24 + 203 + 25 + 40) + 18(12) = 706_D + 400_L + 2030_{SL}$
   $P_{STUD} = 941^\#_D + 533^\#_L + 2706^\#_{SL}$

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Wall Studs (01) - Exterior Walls - On Grid 7

Grade: D. Fir/Larch #2
Fc = 1350 psi
Fb = 900 psi
E = 1600 ksi
E_{min}' = 580 ksi
RLL C_D = 1.25
Wind C_D = 1.33

Location	Load Case	Size	t (in)	d (in)	d(Fc) (in)	kL_e (ft)	C_F (Fc)	C_F (Fb)	C_D	C_r	P_{STUD} (kips)	Wind (psf)	Trib.W (ft)	kL_e/d (ft)	F_c^* (psi)	F_{CE} (psi)	C_p	P_{allow} (kips)	Wind (plf)	M_{max} (ft-k)	Defl. (in)	f_b (psi)	F_b (psi)	Unity Eq'n
On Grid 7 L02-Roof Zone 5	TL	2x8	1.50	7.25	7.25	15.25	1.05	1.20	1.15	1.15	0.76	0.0	1.33	25.24	1630	748	0.40	7.17	0.0	0.00		0	N/A	0.11
	D + W	2x8	1.50	7.25	7.25	15.25	1.05	1.20	1.15	1.15	0.22	25.8	1.33	25.24	1630	748	0.40	7.17	34.3	1.00	0.55	911	1428	0.66
	TL + W	2x8	1.50	7.25	7.25	15.25	1.05	1.20	1.15	1.15	0.63	19.4	1.33	25.24	1630	748	0.40	7.17	25.7	0.75	0.41	683	1428	0.53
On Grid 7 L02-Roof Zone 4	TL	2x8	1.50	7.25	7.25	17.25	1.05	1.20	1.15	1.15	3.20	0.0	1.33	28.55	1630	585	0.33	5.80	0.0	0.00		0	N/A	0.55
	D + W	2x8	1.50	7.25	7.25	17.25	1.05	1.20	1.15	1.15	0.49	21.5	1.33	28.55	1630	585	0.33	5.80	28.6	1.06	0.75	971	1428	0.74
	TL + W	2x8	1.50	7.25	7.25	17.25	1.05	1.20	1.15	1.15	2.52	16.1	1.33	28.55	1630	585	0.33	5.80	21.4	0.80	0.56	728	1428	1.03
On Grid 7 L01-L02 Zone 5	TL	2x8	1.50	7.25	7.25	8.67	1.05	1.20	1.15	1.15	4.18	0.0	1.33	14.35	1630	2315	0.80	14.12	0.0	0.00		0	N/A	0.30
	D + W	2x8	1.50	7.25	7.25	8.67	1.05	1.20	1.15	1.15	0.94	25.8	1.33	14.35	1630	2315	0.80	14.12	34.3	0.32	0.06	294	1428	0.22
	TL + W	2x8	1.50	7.25	7.25	8.67	1.05	1.20	1.15	1.15	3.37	19.4	1.33	14.35	1630	2315	0.80	14.12	25.7	0.24	0.04	221	1428	0.24

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2) TYPICAL DEMISING WALLS (PR = 5 PSF MIN)

A) WALL BTWN LO2 & ROOF

$M_{AX} H_T = 17'\text{-}2''$

$W = 10(24 + 203) + 10.67(8) = 3250_D + 2030_{SL}$, PLF

$P_{STUD} = 433^{\#}_D + 2700^{\#}_{SL}$

B) WALL BTWN GND & LO1 (LO1-LO2 SIMILAR)

$M_{AX} H_T = 8'\text{-}8''$

$W = 10(24 + 203 + 50 + 80) + 34(8)$

$= 1012_D + 800_L + 2030_{SL}$, PLF

$P_{STUD} = 1349^{\#}_D + 1067^{\#}_L + 2700^{\#}_{SL}$

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Project Name: CC East
Job Number: 15105

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Wall Studs (02) - Typical Demising Walls

Grade: D. Fir/Larch #2
Fc = 1350 psi
Fb = 900 psi
E = 1600 ksi
RLL C_D = 1.25
E_{min}' = 580 ksi
Wind C_D = 1.33

Location	Load Case	Size	t (in)	d (in)	d(Fc) (in)	kL_e (ft)	C_F (Fc)	C_F (Fb)	C_D	Cr	P_{STUD} (kips)	Wind (psf)	Trib.W (ft)	kL_e/d (ft)	F_c^* (psi)	F_{CE} (psi)	Cp	P_{allow} (kips)	Wind (plf)	M_{max} (ft-k)	Defl. (in)	f_b (psi)	F_b (psi)	Unity Eq'n
Demising L02-Roof 5 psf	TL	2x6	1.50	5.50	5.50	15.33	1.10	1.30	1.15	1.15	3.14	0.0	1.33	33.45	1708	426	0.24	3.31	0.0	0.00		0	N/A	0.95
	D + W	2x6	1.50	5.50	5.50	15.33	1.10	1.30	1.15	1.15	0.43	5.0	1.33	33.45	1708	426	0.24	3.31	6.7	0.20	0.25	310	1547	0.25
	TL + W	2x6	1.50	5.50	5.50	15.33	1.10	1.30	1.15	1.15	2.46	3.8	1.33	33.45	1708	426	0.24	3.31	5.0	0.15	0.19	232	1547	1.05
Demising L02-Roof 5 psf	TL	(2)2x6	3.00	5.50	5.50	17.25	1.10	1.30	1.15	1.15	3.14	0.0	1.33	37.64	1708	337	0.19	5.31	0.0	0.00		0	N/A	0.59
	D + W	(2)2x6	3.00	5.50	5.50	17.25	1.10	1.30	1.15	1.15	0.43	5.0	1.33	37.64	1708	337	0.19	5.31	6.7	0.25	0.20	196	1547	0.14
	TL + W	(2)2x6	3.00	5.50	5.50	17.25	1.10	1.30	1.15	1.15	2.46	3.8	1.33	37.64	1708	337	0.19	5.31	5.0	0.19	0.15	147	1547	0.39
Demising Gnd -L02 5 psf	TL	2x6	1.50	5.50	5.50	8.67	1.10	1.30	1.15	1.15	5.12	0.0	1.33	18.92	1708	1332	0.60	8.45	0.0	0.00		0	N/A	0.61
	D + W	2x6	1.50	5.50	5.50	8.67	1.10	1.30	1.15	1.15	1.35	5.0	1.33	18.92	1708	1332	0.60	8.45	6.7	0.06	0.03	99	1547	0.10
	TL + W	2x6	1.50	5.50	5.50	8.67	1.10	1.30	1.15	1.15	4.18	3.8	1.33	18.92	1708	1332	0.60	8.45	5.0	0.05	0.02	74	1547	0.32

P9

P12

ROOF LEVEL

P17 P16 P13 P11 P10

P9

P12
P14
P15

UPPER LEVEL

P17 P16 P13 P11 P10

P9

ENTRY LEVEL

P17 P16 P13 P11 P10

LOWER LEVEL

P11 P10

POST/COLUMN KEY PLAN

407

ROOF LEVEL

UPPER LEVEL

ENTRY LEVEL

LOWER LEVEL

POST/COLUMN KEY PLAN

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job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

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Posts / Columns

20' Typical Unit

1) P1, P2, P3 & P4

$$R_{P1} = 622^\#_D + 5160^\#_{SL} \qquad L_u = 11'-0''$$

$$R_{P2} = 1047^\#_D + 13240^\#_{SL} \qquad L_u = 8'-0''$$

$$R_{P3} = 917^\#_D + 9160^\#_{SL} \qquad L_u = 15'-6''$$

$$R_{P4} = 511^\#_D + 6215^\#_{SL} \qquad L_u = 12'-6''$$

2) Posts P5 - P8

$$R_{P5} = 555^\#_D + 3609^\#_{SL} \qquad L_u = 11'-8''$$

$$R_{PC} = 555^\#_D + 4200^\#_{SL} \qquad L_u = 8'-8''$$

$$R_{P7} = 622^\#_D + 4074^\#_{SL} \qquad L_u = 16'-2''$$

$$R_{P8} = 622^\#_D + 4960^\#_{SL} \qquad L_u = 13'-2''$$

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Project Title:	Copper Crest East	
Engineer:	MAR	
Project Descr:		Project ID: 15105

Wood Column

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357 | Licensee : RUDOW & BERRY

Description :   Post P1 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		11.0 ft	Wood Member Type	Sawn	
(Used for non-slender calculations)			Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in	Cf or Cv for Bending 1.0
Wood Grade	No.1		Area	30.250 in^2	Cf or Cv for Compression 1.0
Fb - Tension	1,200.0 psi	Fv 170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fb - Compr	1,200.0 psi	Ft 825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density 31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi				Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 11.0 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 11.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 11.0 ft, D = 0.6220, S = 5.767 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.3226 : 1**
    Load Combination   +D+S+H
    Governing NDS Forumla   Comp Only, fc/Fc'
    Location of max.above base   0.0 ft
    At maximum location values are . . .
      Applied Axial   6.389 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   654.66 psi

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
    Load Combination   +0.60D+E+0.60H
    Location of max.above base   11.0 ft
    Applied Design Shear   0.0 psi
    Allowable Shear   272.0 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in   at   ft   above base
    for load combination :
Along X-X   in   at   ft   above base
    for load combination :

Other Factors used to calculate allowable stresses . . .
	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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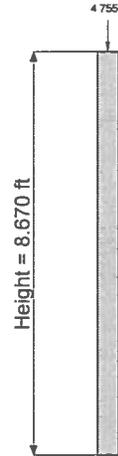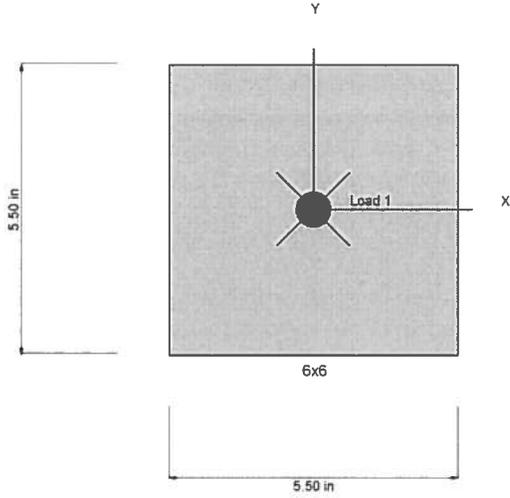Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description : Post P1 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Post P2 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		8.0 ft		Wood Member Type	Sawn	

(*Used for non-slender calculations*)

				Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**5.50** in	Cf or Cv for Bending 1.0
Wood Grade	No.1			Area	30.25 in^2	Cf or Cv for Compression 1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor 1.0

	x-x Bending	y-y Bending	Axial			
E : Modulus of Elasticity . . .						Cfu : Flat Use Factor 1.0
Basic	1,600.0	1,600.0	1,600.0 ksi			Kf : Built-up columns 1.0 NDS 15.3.2
Minimum	580.0	580.0				Use Cr : Repetitive ? No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 8.0 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 8.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 8.0 ft, D = 1.047, S = 13.216 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	**0.5220 : 1**	
Load Combination	+D+S+H	
Governing NDS Forumla	Comp Only, fc/Fc'	
Location of max.above base	0.0 ft	

At maximum location values are . . .
Applied Axial	14.263 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	903.32 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio =	**0.0 : 1**	
Load Combination	+0.60D+E+0.60H	
Location of max.above base	8.0 ft	
Applied Design Shear	0.0 psi	
Allowable Shear	272.0 psi	

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
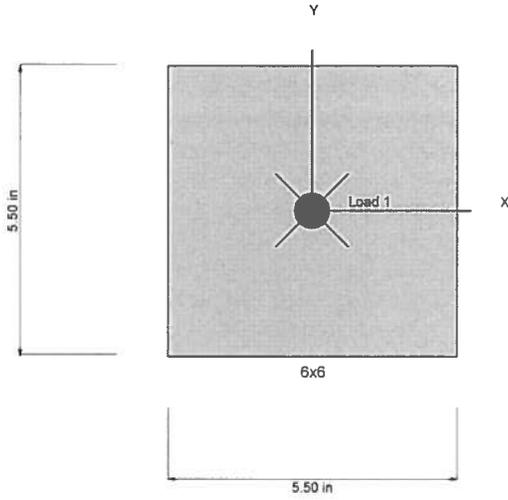Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description :   Post P2 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Post P3 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		15.50 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

				Exact Width	5.50 in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	5.50 in	Cf or Cv for Bending 1.0
Wood Grade	No.1			Area	30.25 in^2	Cf or Cv for Compression 1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial	
				Kf : Built-up columns 1.0 *NDS 15.3.2*
Basic	1,600.0	1,600.0	1,600.0 ksi	Use Cr : Repetitive ? No
Minimum	580.0	580.0		

Brace condition for deflection (buckling) along columns :
   X-X (width) axis :   Unbraced Length for X-X Axis buckling = 15.50 ft, K = 1.0
   Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 15.50 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
   Axial Load at 15.50 ft, D = 0.9770, S = 9.167 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.8837 : 1**

Load Combination	+D+S+H		
Governing NDS Forumla	Comp Only, fc/Fc'		
Location of max.above base	0.0 ft		

At maximum location values are . . .
Applied Axial	10.144 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	379.488 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections ...

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**

Load Combination	+0.60D+E+0.60H
Location of max.above base	15.50 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Other Factors used to calculate allowable stresses ...

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
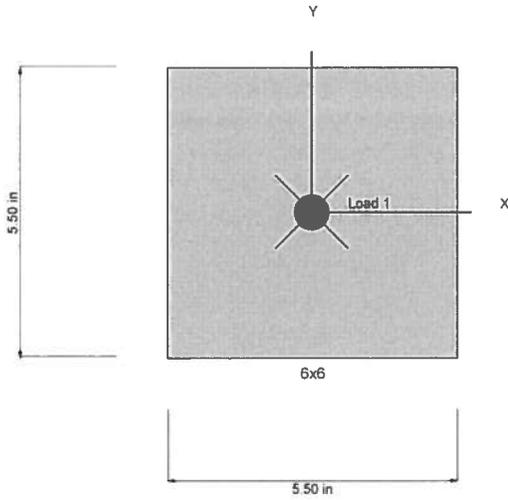Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Description : Post P3 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

415

Wood Column

Description :   Post P4 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		12.50 ft		Wood Member Type	Sawn	

(*Used for non-slender calculations*)

				Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch			Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Wood Grade	No.1			Area	30.25 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .   x-x Bending   y-y Bending   Axial

	Basic	1,600.0	1,600.0	1,600.0 ksi
	Minimum	580.0	580.0	

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 12.50 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 12.50 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 12.50 ft, D = 0.5110, S = 6.215 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	**0.4091 : 1**	
	Load Combination	+D+S+H	
	Governing NDS Forumla	Comp Only, fc/Fc'	
	Location of max.above base	0.0 ft	
	At maximum location values are . . .		
	Applied Axial	6.726 k	
	Applied Mx	0.0 k-ft	
	Applied My	0.0 k-ft	
	Fc : Allowable	543.55 psi	

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y   0.0 in   at   ft   above base
for load combination :

Along X-X   in   at   ft   above base
for load combination :

Other Factors used to calculate allowable stresses . . .
                        Bending   Compression   Tension

PASS	Maximum Shear Stress Ratio =	**0.0 : 1**	
	Load Combination	+0.60D+E+0.60H	
	Location of max.above base	12.50 ft	
	Applied Design Shear	0.0 psi	
	Allowable Shear	272.0 psi	

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description :   Post P4 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357　　　　　　　　　　　　　　　　　　　　Licensee : RUDOW & BERRY

Description :　　Post P5 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		11.670 ft	Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in
Wood Grade	No.1		Area	30.25 in^2
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4
Fc - Prll	1,000.0 psi	Density	31.20 pcf	
Fc - Perp	625.0 psi		

Allow Stress Modification Factors

Cf or Cv for Bending	1.0
Cf or Cv for Compression	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Brace condition for deflection (buckling) along columns :
　X-X (width) axis :　Unbraced Length for X-X Axis buckling = 11.670 ft, K = 1.0
　Y-Y (depth) axis :　Unbraced Length for X-X Axis buckling = 11.670 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
　Axial Load at 11.670 ft, D = 0.5550, S = 3.609 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS　Max. Axial+Bending Stress Ratio =　　**0.2284 : 1**
　Load Combination　　+D+S+H
　Governing NDS Forumla　　Comp Only, fc/Fc'
　Location of max.above base　　0.0 ft
　At maximum location values are . . .
　　Applied Axial　　4.164 k
　　Applied Mx　　0.0 k-ft
　　Applied My　　0.0 k-ft
　　Fc : Allowable　　602.67 psi

PASS　Maximum Shear Stress Ratio =　　**0.0 : 1**
　Load Combination　　+0.60D+E+0.60H
　Location of max.above base　　11.670 ft
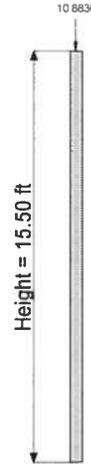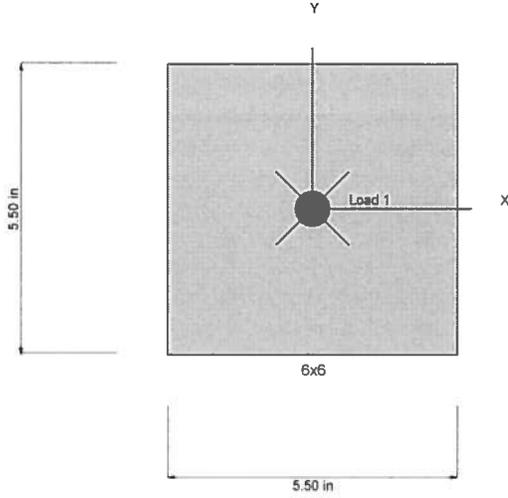　Applied Design Shear　　0.0 psi
　Allowable Shear　　272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
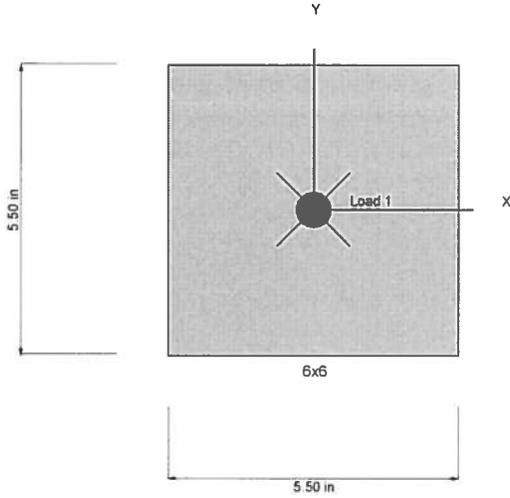Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357
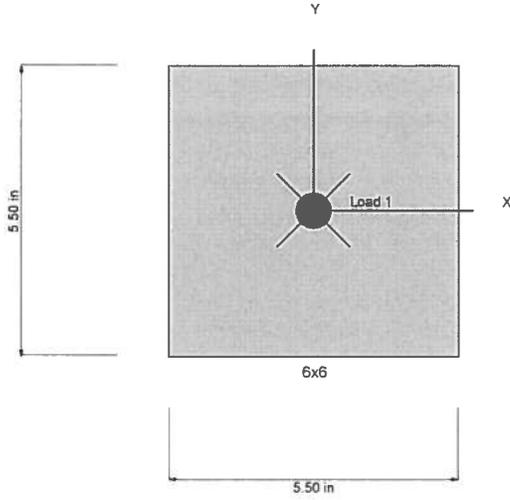
Licensee : RUDOW & BERRY

Description : Post P5 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Post P6 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	8.670 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Wood Grade	No.1		Area	30.25 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	
				Kf : Built-up columns	1.0 NDS 15.3.2
Basic	1,600.0	1,600.0	1,600.0 ksi	Use Cr : Repetitive ?	No
Minimum	580.0	580.0		

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 8.670 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 8.670 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 8.670 ft, D = 0.5550, S = 4.20 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.1849 : 1**
    Load Combination   +D+S+H
    Governing NDS Forumla   Comp Only, fc/Fc'
    Location of max.above base   0.0 ft
    At maximum location values are . . .
      Applied Axial   4.755 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   850.19 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
    Load Combination   +0.60D+E+0.60H
    Location of max.above base   8.670 ft
    Applied Design Shear   0.0 psi
    Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction	
	@ Base	@ Top	@ Base	@ Top	@ Base	

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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480.946.8171

Project Title: Copper Crest East
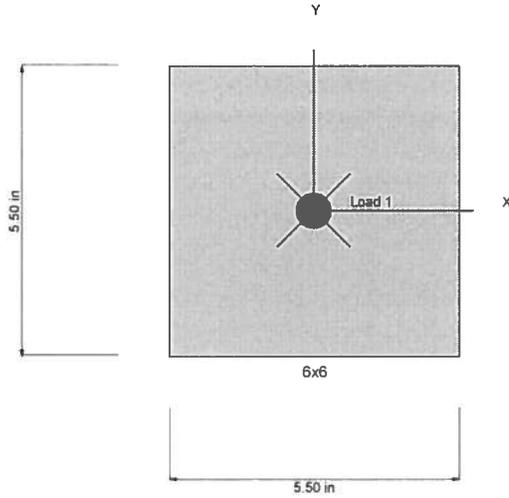Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   **Licensee : RUDOW & BERRY**

Description :   Post P6 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

File = C:_jobs\15105C~1\ENG\cce-2017.ec6
ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description :   Post P7 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	6x6	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	16.170 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in	Cf or Cv for Bending 1.0
Wood Grade	No.1		Area	30.25 in^2	Cf or Cv for Compression 1.0
Fb - Tension	1,200.0 psi	Fv 170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fb - Compr	1,200.0 psi	Ft 825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fc - Prll	1,000.0 psi	Density 31.20 pcf			Ct : Temperature Factor 1.0
Fc - Perp	625.0 psi				Cfu : Flat Use Factor 1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Kf : Built-up columns 1.0 *NDS 15.3.2*
Use Cr : Repetitive ? No

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 16.170 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 16.170 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 16.170 ft, D = 0.6220, S = 4.274 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =   **0.4598 : 1**
Load Combination   +D+S+H
Governing NDS Forumla   Comp Only, fc/Fc'
Location of max.above base   0.0 ft
At maximum location values are . . .
Applied Axial   4.896 k
Applied Mx   0.0 k-ft
Applied My   0.0 k-ft
Fc : Allowable   351.988 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y   0.0 in   at   ft above base
for load combination :
Along X-X   in   at   ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio =   **0.0 : 1**
Load Combination   +0.60D+E+0.60H
Location of max.above base   16.170 ft
Applied Design Shear   0.0 psi
Allowable Shear   272.0 psi

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

422

Wood Column

Lic. # : KW-06002357

Description : Post P7 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357 | Licensee : RUDOW & BERRY

Description : Post P8 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	13.170 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Wood Grade	No.1		Area	30.25 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity ...	x-x Bending	y-y Bending	Axial		Kf : Built-up columns	1.0 *NDS 15.3.2*
Basic	1,600.0	1,600.0	1,600.0 ksi		Use Cr : Repetitive ?	No
Minimum	580.0	580.0				

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 13.170 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 13.170 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 13.170 ft, D = 0.6220, S = 4.967 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3693 : 1**
Load Combination +D+S+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 5.589 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 500.35 psi

Maximum SERVICE Lateral Load Reactions . .
Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .
	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination +0.60D+E+0.60H
Location of max.above base 13.170 ft
Applied Design Shear 0.0 psi
Allowable Shear 272.0 psi

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C_D	C_P	Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Post P8 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

rudow + berry
structural engineering
scottsdale, arizona 85251
t (480) 946-8171
f (480) 946-9480

job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
of 435

UNIT 62R

1) P9

$R_{MAX} = 2909^{\#}_D + 18675^{\#}_{SL} = 21.58^k$

$L_u = 14'-2'' \pm$

$\boxed{\text{USE HSS 4x4x}^3/_8}$

$P_{ALLOW} = 54.4^k$ ok

$R @ FLR = 3854^{\#}_D + 1453^{\#}_L + 24884^{\#}_{SL}$

$R_{TOT} @ FLR = 6763^{\#}_D + 1453^{\#}_L + 43559^{\#}_{SL}$

$R_{MAX} = 50.32^k$

$L_u = 5'-3'' \pm$

$\boxed{HSS 4x4x^3/_8}$

$R_{ALLOW} = 118^k$ ok

2) P10

$R_{ROOF} = 1222^{\#}_D + 9661^{\#}_{SL} = 10.88^k$

$L_u = 15'-6''$

3) P11

$R_{ROOF} = 571^{\#}_D + 4669^{\#}_{SL} =$

$L_u = 16'-2''$

4) P13

$R = 2286^{\#}_D + 14619^{\#}_{SL} = 16.91^k$

$L_u = 22'-10'' \pm$

$\boxed{HSS 5x5x^3/_8}$

$R_{ALLOW} = 43^k$ ok

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4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

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ENERCALC, INC. 1983-2017, Build:6.17.1.16, Ver:6.17.1.16

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Post P10 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	6x6		
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber		
Overall Column Height		15.50 ft		Wood Member Type	Sawn		

(Used for non-slender calculations)

				Exact Width	5.50 in	Allow Stress Modification Factors	
Wood Species	Douglas Fir - Larch			Exact Depth	5.50 in	Cf or Cv for Bending	1.0
Wood Grade	No.1			Area	30.25 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	
Basic	1,600.0	1,600.0	1,600.0 ksi	
Minimum	580.0	580.0		

Kf : Built-up columns   1.0 *NDS 15.3.2*
Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
   X-X (width) axis :   Unbraced Length for X-X Axis buckling = 15.50 ft, K = 1.0
   Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 15.50 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
   Axial Load at 15.50 ft, D = 1.222, S = 9.661 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.9480 : 1**
   Load Combination   +D+S+H
   Governing NDS Forumla   Comp Only, fc/Fc'
   Location of max.above base   0.0 ft
   At maximum location values are . . .
     Applied Axial   10.883 k
     Applied Mx   0.0 k-ft
     Applied My   0.0 k-ft
     Fc : Allowable   379.488 psi

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**
   Load Combination   +0.60D+E+0.60H
   Location of max.above base   15.50 ft
   Applied Design Shear   0.0 psi
   Allowable Shear   272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y   0.0 in   at   ft   above base
   for load combination :
Along X-X   in   at   ft   above base
   for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Post P10 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Post P11 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	16.170 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in	Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Wood Grade	No.1		Area	30.25 in^2	Cf or Cv for Compression	1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix	76.255 in^4	Cf or Cv for Tension	1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor	1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Ct : Temperature Factor	1.0
Fc - Perp	625.0 psi					Cfu : Flat Use Factor	1.0

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial		
Basic	1,600.0	1,600.0	1,600.0 ksi	Kf : Built-up columns	1.0 *NDS 15.3.2*
Minimum	580.0	580.0		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for X-X Axis buckling = 16.170 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for X-X Axis buckling = 16.170 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 16.170 ft, D = 0.5710, S = 4.559 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4818 : 1**
Load Combination +D+S+H
Governing NDS Forumla Comp Only, fc/Fc'
Location of max.above base 0.0 ft
At maximum location values are . . .
Applied Axial 5.130 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 351.988 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y 0.0 in at ft above base
for load combination :
Along X-X in at ft above base
for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination +0.60D+E+0.60H
Location of max.above base 16.170 ft
Applied Design Shear 0.0 psi
Allowable Shear 272.0 psi

Load Combination Results

			Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
Load Combination	C_D	C_P	Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction	
Load Combination	@ Base	@ Top	@ Base	@ Top	@ Base	

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description :   Post P11 - L02-RF - 6x6 D.Fir #1

Sketches

6x6

5.50 in

Height = 16.170 ft

5 130k

Loads are total entered value. Arrows do not reflect absolute direction.

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Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : Post P13 - L02-RF - 6x6 D.Fir #1 - NO GOOD

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height		12.920 ft		Wood Member Type	Sawn	
(Used for non-slender calculations)				Exact Width	**5.50** in	Allow Stress Modification Factors
				Exact Depth	**5.50** in	Cf or Cv for Bending 1.0
Wood Species	Douglas Fir - Larch			Area	30.25 in^2	Cf or Cv for Compression 1.0
Wood Grade	No.1			Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fb - Compr	1,200.0 psi	Ft	825.0 psi			Ct : Temperature Factor 1.0
Fc - Prll	1,000.0 psi	Density	31.20 pcf			Cfu : Flat Use Factor 1.0
Fc - Perp	625.0 psi					Kf : Built-up columns 1.0 NDS 15.3.2

E : Modulus of Elasticity . . .

	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Use Cr : Repetitive ?   No

Brace condition for deflection (buckling) along columns :
  X-X (width) axis :   Unbraced Length for X-X Axis buckling = 12.920 ft, K = 1.0
  Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 12.920 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
  Axial Load at 12.920 ft, D = 2.286, S = 14.619 k

DESIGN SUMMARY

Bending & Shear Check Results

FAIL   Max. Axial+Bending Stress Ratio =   **1.083 : 1**
  Load Combination   +D+S+H
  Governing NDS Forumla   Comp Only, fc/Fc'
  Location of max.above base   0.0 ft
  At maximum location values are . . .
    Applied Axial   16.905 k
    Applied Mx   0.0 k-ft
    Applied My   0.0 k-ft
    Fc : Allowable   515.99 psi

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**
  Load Combination   +0.60D+E+0.60H
  Location of max.above base   12.920 ft
  Applied Design Shear   0.0 psi
  Allowable Shear   272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at		ft	above base
for load combination :					
Along X-X		in	at	ft	above base
for load combination :					

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Engineer: MAR
Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357

Description : Post P13 - L02-RF - 6x6 D.Fir #1 - NO GOOD

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job number: 15105

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checked by:

date: 1/17
date:

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5.) COLUMN ON $\overline{B}$ AT S. WALL FROM LO2 TO ROOF

$R_{MAX} = R_{RB10R} + R_{RB13L} + R_{B14R}$

$\quad = (92_D + 9589_S) + (235_D + 2051_S) + (5477_D + 45641_S)$

$\quad = 6638_D + 57287_S = 63925^{\#} MAX$

$L_u = 11'-6''$ \qquad $\boxed{HSS \, 4 \times 4 \times \frac{3}{8}}$ \quad $\widehat{P12}$

$\qquad\qquad\qquad\qquad\qquad P_{ALLOW} = 72.75^k \underline{ok}$

6.) COLUMN ON $\overline{B}$ AT S. WALL FROM LO1 TO LO2

S. COLUMN: $R_{MAX} = 9.42^k{}_D + 88.88^k{}_S = 98.30^k TL$

$\qquad\qquad L_u = 9'-0''$ \quad $\boxed{HSS \, 4 \times 4 \times \frac{1}{2}}$ \quad $\widehat{P4}$

$\qquad\qquad\qquad\qquad P_{ALLOW} = 112^k \underline{ok}$

No. COLUMN: $R_{MAX} = -2.51^k{}_D - 24.96^k{}_S = -27.47^k TENS.$

$\qquad\qquad\qquad\qquad\qquad\qquad (42.95^k \, ULT)$

$\qquad A_{REQ'D} = \dfrac{27.46 \, (1.67)}{46} = 1.00 \, IN^2$

$\qquad\qquad \boxed{HSS \, 4 \times 4 \times \frac{3}{8}}$ \quad $\widehat{P15}$

$\qquad\qquad\qquad A = 4.78 \, IN^2$

$P_{WELD(ALLOW)} = 3(4)(5)(.928) = 55.68^k \underline{ok}$

$\qquad\qquad\qquad\qquad \boxed{USE \, {}_{5/16}\!\diagdown\!\!\diagdown \!\! \bigcirc}$

$A_S(REQ'D) = \dfrac{42.95}{0.9(60)} = 0.80 \, IN^2$

$\qquad\qquad\qquad\qquad \boxed{USE \, (4) \#7 \, VERTS}$
$\qquad\qquad\qquad\qquad \boxed{TO \, EMBED \, PL}$

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BRG PL @ S. Column:

$$P_{MAX} = 98.3^k \; TL \; (153.5^k \; ULT)$$

$$A_2 = 20(16) = 320 \; in^2$$

TRY $A_1 = 100 \; in^2$

$$P_{ALLOW} = .85(3)(100)\left(\frac{320}{100}\right)^{\frac{1}{2}}\left(\frac{1}{2.31}\right) = 197.47^k \; ASD$$
$$= 296.5^k \; ULT$$

USE 10" SQ PL

$$f_p = 0.983 \; ksi$$

$$M_{PL} = \frac{1}{2}(3)^2(.983) = 4.42^{\#in}/in$$

$$S_{REQ} = 0.16 \; in^3 \le \frac{t}{6}(1)t^2$$

$$t \ge 0.99"$$

USE $1\frac{1}{2}" \times 10"$ SQ PL

7) P16 $R = 420^\# \; D + 2511^\# \; SL$ OR $-2639^\# \; SL$

$= 2981^\# \; MAX$, $-2169^\# \; MIN$

CLC POST
OR BM IN SP.

SIMPSON MST37
SIMPSON HDU4-SDS2.5

8) P17 $R = 1724^\# \; D + 14453^\# \; SV$

$L_u = 11'-0"$

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Project ID: 15105   434

Wood Column

Description :   Post P17 - L02-RF - 6x6 D.Fir #1

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10 w/ ASD Wind & EQ

General Information

Analysis Method :	Allowable Stress Design		Wood Section Name	**6x6**	
End Fixities	Top & Bottom Pinned		Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	11.0 ft		Wood Member Type	Sawn	

(Used for non-slender calculations)

			Exact Width	**5.50** in Allow Stress Modification Factors
Wood Species	Douglas Fir - Larch		Exact Depth	**5.50** in
Wood Grade	No.1		Area	30.25 in^2
Fb - Tension	1,200.0 psi	Fv	170.0 psi	Ix 76.255 in^4
Fb - Compr	1,200.0 psi	Ft	825.0 psi	Iy 76.255 in^4
Fc - Prll	1,000.0 psi	Density	31.20 pcf	
Fc - Perp	625.0 psi			

Allow Stress Modification Factors

Cf or Cv for Bending	1.0
Cf or Cv for Compression	1.0
Cf or Cv for Tension	1.0
Cm : Wet Use Factor	1.0
Ct : Temperature Factor	1.0
Cfu : Flat Use Factor	1.0
Kf : Built-up columns	1.0 *NDS 15.3.2*
Use Cr : Repetitive ?	No

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,600.0	1,600.0	1,600.0 ksi
Minimum	580.0	580.0	

Brace condition for deflection (buckling) along columns :
X-X (width) axis :   Unbraced Length for X-X Axis buckling = 11.0 ft, K = 1.0
Y-Y (depth) axis :   Unbraced Length for X-X Axis buckling = 11.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

AXIAL LOADS . . .
Axial Load at 11.0 ft, D = 1.724, S = 14.453 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS   Max. Axial+Bending Stress Ratio =   **0.8169 : 1**
    Load Combination   +D+S+H
    Governing NDS Forumla   Comp Only, fc/Fc'
    Location of max.above base   0.0 ft
    At maximum location values are . . .
      Applied Axial   16.177 k
      Applied Mx   0.0 k-ft
      Applied My   0.0 k-ft
      Fc : Allowable   654.66 psi

PASS   Maximum Shear Stress Ratio =   **0.0 : 1**
    Load Combination   +0.60D+E+0.60H
    Location of max.above base   11.0 ft
    Applied Design Shear   0.0 psi
    Allowable Shear   272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y   0.0 in   at   ft   above base
    for load combination :

Along X-X   in   at   ft   above base
    for load combination :

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C D	C P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance

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Project Descr:

Project ID: 15105

Wood Column

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   Post P17 - L02-RF - 6x6 D.Fir #1

Sketches

Loads are total entered value. Arrows do not reflect absolute direction.

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job number: 15105

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TERRACE SCREEN WALLS

$P_{WIND} = 25.8$ PSF MAX

WALL HT = $6'-6''$ MAX + $1'-6''$ @ PEDESTAL SYSTEM

TRY POSTS @ $4'$ O.C.

$M_{MAX} = 3(6.5)(.0258)(4.75') = 2.39^{1k}/POST$

$S_{REQ} = 0.94 IN^3$

$\boxed{HSS 3x3x\frac{1}{4}}$
$S_S = 2.01 IN^3$

BASE CONN':

$F_T = \dfrac{2.39(12)}{11''} = 2607^{\#}$

$\boxed{\text{SIMPSON LTT20B EA.}\atop\text{SIDE OF 4x STUD}}$
$T_{ALLOW} = 2(1355) = 2710^{\#} \text{ ok}$

$\boxed{\text{SIMPSON HDU4-SDS2.5}\atop\text{TO 4x STUD @ FDN}}$
$T_{ALLOW} = 4565^{\#}$

$\boxed{\text{SIMPSON MST37 AT FLR}}$
$T_{ALLOW} = 5080^{\#}$

$M_{PL} = 2.607(3'') = 7.82^{1k\cdot k}$
$S_{REQ} = \dfrac{7.82}{27} = 0.29 IN^3 \leq \frac{1}{6}(9.5)t^2$
$t \geq 0.43''$

$\boxed{\text{USE } \frac{1}{2}'' \times 12'' \times 10'' \text{ PL}}$

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date:

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RETAINING WALLS

ALLOWABLE SP = 2400 PSF (NET)
ACTIVE PR = 35 PCF
AT-REST PR = 55 PCF
PASSIVE PR = 320 PCF   (160 PCF WITH FRICTION)
$K_{FRICTION}$ = 0.45 (ALONE)

1.) BASEMENT WALLS @ 4HP GARAGE

HT = 14'-8"

SP_1 = 0.33 (50 PSF) = 17 PCF FULL HT (26 ULT)

SP_2 = 14.67 (55) = 807 PCF (1291 ULT)

M_n^+ (MAX) = 8.60^{1k}/FT

$b = 12$ $d = 10$ $f'_c = 3$ $F_y = 60$

$\rho = .0016$ $A_s = 0.26 IN^2$/FT MIN (#5 $\downarrow$ @ 14" O.C.

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2) SOUTH RETAINING WALL (UNIT GLR)

EXT. GRADE ≃ 0'-0"
BASEMENT SLAB = -14'-8"
USE 250 PSF SURCHARGE LOAD (FOR ROAD)

WALL IS 18" THK UP TO -6'-1 $\frac{5}{8}$"
    8" THK UP TO T.O.W. AT 0'-0"

— SEE NEXT SHTS —

3) SW CORNER RET. WALL AT WEST SIDE

EXT GRADE = 8'-0" MAX ABOVE BASEMENT
NO SURCHARGE DUE TO STEEP SLOPE
WALL HT = 14'-8"
$SP_{MAX} = 8(55) = 440 \ PLF/FT \ (704 \ ULT)$

$M^+_{MAX}(ULT) = 4,518^{lb}$

b = 12   d = 4
$\rho = .0056$ $A_s = 0.27 \ IN^2/FT$ #5 √ @ 12" O.C.

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Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Cantilevered Retaining Wall

Lic. # : KW-06002357

Licensee : RUDOW & BERRY

Description : South Ret. Wall w/ 250 psf surcharge with Basement Slab in place

Calculations per ACI 318-11, ACI 530-11, IBC 2012, CBC 2013, ASCE 7-10

Criteria

Retained Height	=	14.67 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	15.00 in
Water height over heel	=	0.0 ft

Vertical component of active
Lateral soil pressure options:
  NOT USED for Soil Pressure.
  NOT USED for Sliding Resistance.
  NOT USED for Overturning Resistance.

Surcharge Loads

Surcharge Over Heel	=	250.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Soil Data

Allow Soil Bearing	=	2,400.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	320.0 psf/ft
Soil Density, Heel	=	106.00 pcf
Soil Density, Toe	=	0.00 pcf
Friction Coeff btwn Ftg & Soil	=	0.000
Soil height to ignore for passive pressure	=	0.00 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 plf
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios
Overturning	=	1.87	OK
Sliding	=	0.21	OK
Slab Resists All Sliding !			
Total Bearing Load	=	8,935 lbs	
...resultant ecc.	=	18.87 in	
Soil Pressure @ Toe	=	1,737 psf	OK
Soil Pressure @ Heel	=	50 psf	OK
Allowable	=	2,400 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,957 psf	
ACI Factored @ Heel	=	57 psf	
Footing Shear @ Toe	=	29.6 psi	OK
Footing Shear @ Heel	=	26.3 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs Slab Resists All Sliding !
Lateral Sliding Force	=	5,778.1 lbs

Stem Construction

		Top Stem	2nd
		Stem OK	Stem OK
Design Height Above Ftg	ft =	8.50	0.00
Wall Material Above "Ht"	=	Concrete	Concrete
Thickness	in =	8.00	18.00
Rebar Size	=	# 6	# 8
Rebar Spacing	in =	14.00	14.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	0.519	0.955
Total Force @ Section	lbs =	1,880.8	7,919.6
Moment....Actual	ft-l =	4,706.2	43,660.1
Moment.....Allowable	ft-l =	9,074.4	45,709.0
Shear.....Actual	psi =	27.9	42.6
Shear.....Allowable	psi =	94.9	94.9
Wall Weight	psf =	100.0	225.0
Rebar Depth 'd'	in =	5.63	15.50
Lap splice if above	in =	22.20	37.19
Lap splice if below	in =	22.20	8.77
Hook embed into footing	in =	22.20	8.77
Concrete Data			
f'c	psi =	4,000.0	4,000.0
Fy	psi =	60,000.0	60,000.0

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

440

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Cantilevered Retaining Wall

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description :   South Ret. Wall w/ 250 psf surcharge with Basement Slab in place

Footing Dimensions & Strengths

Toe Width	=	6.50 ft
Heel Width	=	3.50
Total Footing Width	=	10.00
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi   Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 3.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,957	57 psf
Mu' : Upward	=	32,639	367 ft-lb
Mu' : Downward	=	9,063	5,072 ft-lb
Mu: Design	=	23,577	4,705 ft-lb
Actual 1-Way Shear	=	29.56	26.31 psi
Allow 1-Way Shear	=	82.16	82.16 psi
Toe Reinforcing	=	# 8 @ 14.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	# 5 @ 16.00 in	

Other Acceptable Sizes & Spacings

Toe: #4@ 5.00 in, #5@ 7.75 in, #6@ 10.75 in, #7@ 14.75 in, #8@ 19.25 in, #9@ 24.
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-lb			.....RESISTING..... Force lbs	Distance ft	Moment ft-lb
Heel Active Pressure	=	4,575.7	5.39	24,663.1	Soil Over Heel	=	3,110.0	9.00	27,990.4
Surcharge over Heel	=	1,334.8	8.09	10,791.8	Sloped Soil Over Heel	=			
Toe Active Pressure	=	-132.3	0.92	-121.3	Surcharge Over Heel	=	500.0	9.00	4,500.0
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Stem	=			
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=		3.25	
					Surcharge Over Toe	=			
					Stem Weight(s)	=	2,529.5	7.15	18,081.8
					Earth @ Stem Transitions	=	545.0	7.58	4,133.0
Total	=	5,778.1	O.T.M. =	35,333.5	Footing Weight	=	2,250.0	5.00	11,250.0
Resisting/Overturning Ratio			=	1.87	Key Weight	=			
Vertical Loads used for Soil Pressure =			8,934.6 lbs		Vert. Component	=			
					Total =		8,934.6 lbs	R.M. =	65,955.2

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

rudow + berry
structural engineering
scottsdale, arizona 85251
t (480) 946-8171
f (480) 946-9480

job name: Copper Crest East
job number: 15105

designed by: MAR   date: 1/17
checked by: date:

pg
of 441

445

4) NORTH RETAINING WALL

   SOIL HT VARIES — 10'-0" MAX
            — 5'-6" @ LANDING OF EXT STAIR

   USE 12" CONC WALL, TYP.
   SURCHARGE = 100 PSF

rudow + berry, inc.
4021 north 75th street, #101
scottsdale, arizona 85251
480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Cantilevered Retaining Wall

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : North Ret. Wall @ 10" Soil w/ Basement Slab in place

Calculations per ACI 318-11, ACI 530-11, IBC 2012, CBC 2013, ASCE 7-10

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	4.67 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	15.00 in
Water height over heel	=	0.0 ft

Vertical component of active
Lateral soil pressure options:
    NOT USED for Soil Pressure.
    NOT USED for Sliding Resistance.
    NOT USED for Overturning Resistance.

Soil Data

Allow Soil Bearing	=	2,400.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	320.0 psf/ft
Soil Density, Heel	=	106.00 pcf
Soil Density, Toe	=	0.00 pcf
Friction Coeff btwn Ftg & Soil	=	0.000
Soil height to ignore for passive pressure	=	0.00 in

Surcharge Loads

Surcharge Over Heel	=	100.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 plf
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Wind on Exposed Stem = 0.0 psf

Design Summary

Wall Stability Ratios

Overturning	=	1.76 OK
Sliding	=	0.34 OK
Slab Resists All Sliding !		
Total Bearing Load	=	3,681 lbs
...resultant ecc.	=	12.06 in
Soil Pressure @ Toe	=	1,230 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	2,400 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,476 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	22.9 psi OK
Footing Shear @ Heel	=	7.6 psi OK
Allowable	=	82.2 psi

Sliding Calcs   Slab Resists All Sliding !

Lateral Sliding Force	=	2,392.1 lbs

Stem Construction

		Top Stem
		Stem OK
Design Height Above Ftg ft =		0.00
Wall Material Above "Ht"	=	Concrete
Thickness	in =	12.00
Rebar Size	=	# 6
Rebar Spacing	in =	14.00
Rebar Placed at	=	User Spec

Design Data

fb/FB + fa/Fa	=	0.725
Total Force @ Section	lbs =	3,284.6
Moment....Actual	ft-l =	11,956.6
Moment.....Allowable	ft-l =	16,499.4
Shear.....Actual	psi =	27.4
Shear.....Allowable	psi =	94.9
Wall Weight	psf =	150.0
Rebar Depth 'd'	in =	10.00
Lap splice if above	in =	22.20
Lap splice if below	in =	8.27
Hook embed into footing	in =	8.27

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

443/
445

Cantilevered Retaining Wall

Lic. # : KW-06002357   Licensee : RUDOW & BERRY

Description : North Ret. Wall @ 10" Soil w/ Basement Slab in place

Footing Dimensions & Strengths

Toe Width	=	4.50 ft
Heel Width	=	1.50
Total Footing Width	=	6.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi	Fy =	60,000 psi
Footing Concrete Density	=	150.00 pcf
Min. As %	=	0.0018
Cover @ Top 3.00	@ Btm.=	3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,476	0	psf
Mu' : Upward	=	11,199	5	ft-lb
Mu' : Downward	=	3,432	202	ft-lb
Mu: Design	=	7,766	197	ft-lb
Actual 1-Way Shear	=	22.91	7.62	psi
Allow 1-Way Shear	=	82.16	82.16	psi
Toe Reinforcing	=	# 6 @ 14.00 in		
Heel Reinforcing	=	None Spec'd		
Key Reinforcing	=	# 5 @ 16.00 in		

Other Acceptable Sizes & Spacings

Toe: #4@ 8.75 in, #5@ 13.50 in, #6@ 19.25 in, #7@ 26.25 in, #8@ 34.50 in, #9@ 43
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....						.....RESISTING.....		
Item		Force lbs	Distance ft	Moment ft-lb				Force lbs	Distance ft	Moment ft-lb
Heel Active Pressure	=	2,117.5	3.67	7,764.2		Soil Over Heel	=	530.0	5.75	3,047.5
Surcharge over Heel	=	363.2	5.50	1,997.6		Sloped Soil Over Heel	=			
Toe Active Pressure	=	-88.6	0.75	-66.4		Surcharge Over Heel	=	50.0	5.75	287.5
Surcharge Over Toe	=					Adjacent Footing Load	=			
Adjacent Footing Load	=					Axial Dead Load on Stem	=			
Added Lateral Load	=					* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=					Soil Over Toe	=		2.25	
						Surcharge Over Toe	=			
						Stem Weight(s)	=	2,200.5	5.00	11,002.5
						Earth @ Stem Transitions	=			
Total	=	2,392.1	O.T.M. =	9,695.4		Footing Weight	=	900.0	3.00	2,700.0
Resisting/Overturning Ratio			=	1.76		Key Weight	=			
Vertical Loads used for Soil Pressure =		3,680.5	lbs			Vert. Component	=			
						Total =		3,680.5 lbs	R.M. =	17,037.5

* Axial live load NOT included in total displayed, or used for overturning
resistance, but is included for soil pressure calculation.

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105 444/

445

Cantilevered Retaining Wall

Lic. # : KW-06002357 Licensee : RUDOW & BERRY

Description : North Ret. Wall @ 5'-6" Soil w/ Basement Slab in place

Calculations per ACI 318-11, ACI 530-11, IBC 2012,
CBC 2013, ASCE 7-10

Criteria

Retained Height	=	5.50 ft
Wall height above soil	=	4.50 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	15.00 in
Water height over heel	=	0.0 ft

Vertical component of active
Lateral soil pressure options:
  NOT USED for Soil Pressure.
  NOT USED for Sliding Resistance.
  NOT USED for Overturning Resistance.

Surcharge Loads

Surcharge Over Heel	=	100.0 psf

  Used To Resist Sliding & Overturning

Surcharge Over Toe	=	0.0 psf

  Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.07	OK
Sliding	=	0.94	OK

  Slab Resists All Sliding !

Total Bearing Load	=	2,292 lbs
...resultant ecc.	=	5.53 in

Soil Pressure @ Toe	=	1,468 psf	OK
Soil Pressure @ Heel	=	60 psf	OK
Allowable	=	2,400 psf	

  Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,762 psf
ACI Factored @ Heel	=	72 psf

Footing Shear @ Toe	=	8.9 psi	OK
Footing Shear @ Heel	=	4.1 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs   Slab Resists All Sliding !

Lateral Sliding Force	=	865.4 lbs

Soil Data

Allow Soil Bearing	=	2,400.0 psf

Equivalent Fluid Pressure Method

Heel Active Pressure	=	35.0 psf/ft
Toe Active Pressure	=	35.0 psf/ft
Passive Pressure	=	320.0 psf/ft
Soil Density, Heel	=	106.00 pcf
Soil Density, Toe	=	0.00 pcf
Friction Coeff btwn Ftg & Soil	=	0.000

Soil height to ignore for passive pressure	=	0.00 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 plf
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Stem Construction

Top Stem

			Stem OK
Design Height Above Ftg	ft =	0.00	
Wall Material Above "Ht"	=	Concrete	
Thickness	in =	12.00	
Rebar Size	=	# 5	
Rebar Spacing	in =	16.00	
Rebar Placed at	=	User Spec	

Design Data

fb/FB + fa/Fa	=	0.227
Total Force @ Section	lbs =	1,093.8
Moment....Actual	ft-l =	2,333.7
Moment.....Allowable	ft-l =	10,283.1
Shear.....Actual	psi =	9.1
Shear.....Allowable	psi =	94.9
Wall Weight	psf =	150.0
Rebar Depth 'd'	in =	10.00
Lap splice if above	in =	18.50
Lap splice if below	in =	6.00
Hook embed into footing	in =	6.00

Concrete Data

f'c	psi =	4,000.0
Fy	psi =	

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

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480.946.8171

Project Title: Copper Crest East
Engineer: MAR
Project Descr:

Project ID: 15105

Cantilevered Retaining Wall

Lic. # : KW-06002357 **Licensee : RUDOW & BERRY**

Description : North Ret. Wall @ 5'-6" Soil w/ Basement Slab in place

Footing Dimensions & Strengths

Toe Width	=	1.50 ft
Heel Width	=	1.50
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c =	3,000 psi	Fy =	60,000 psi	
Footing Concrete Density		=	150.00 pcf	
Min. As %		=	0.0018	
Cover @ Top	3.00	@ Btm.=	3.00 in	

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,762	72 psf
Mu' : Upward	=	1,665	21 ft-lb
Mu' : Downward	=	381	130 ft-lb
Mu: Design	=	1,284	109 ft-lb
Actual 1-Way Shear	=	8.90	4.05 psi
Allow 1-Way Shear	=	82.16	82.16 psi
Toe Reinforcing	=	# 5 @ 16.00 in	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	# 5 @ 16.00 in	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING.....						.....RESISTING.....		
Item		Force lbs	Distance ft	Moment ft-lb			Force lbs	Distance ft	Moment ft-lb
Heel Active Pressure	=	739.4	2.17	1,602.0	Soil Over Heel	=	291.5	2.75	801.6
Surcharge over Heel	=	214.6	3.25	697.5	Sloped Soil Over Heel	=			
Toe Active Pressure	=	-88.6	0.75	-66.4	Surcharge Over Heel	=	50.0	2.75	137.5
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Stem	=			
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=				Soil Over Toe	=		0.75	
					Surcharge Over Toe	=			
					Stem Weight(s)	=	1,500.0	2.00	3,000.0
					Earth @ Stem Transitions	=			
Total	=	865.4	**O.T.M.** =	2,233.1	Footing Weight	=	450.0	1.50	675.0
Resisting/Overturning Ratio			=	**2.07**	Key Weight	=			
Vertical Loads used for Soil Pressure =		2,291.5 lbs			Vert. Component	=			
						Total =	2,291.5 lbs	**R.M. =**	4,614.1

* Axial live load NOT included in total displayed, or used for overturning
resistance, but is included for soil pressure calculation.

APPENDIX

Geotechnical Investigation Report

By

Intermountain GeoEnvironmental Services, Inc.
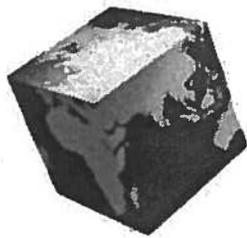
IGES®

Intermountain GeoEnvironmental Services, Inc.
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Phone (801) 748-4044 ~ F: (801) 748-4045
www.igesinc.com

GEOTECHNICAL INVESTIGATION
Copper Crest - East
Powder Mountain Resort
Weber County, Utah

IGES Project No. 01628-010

November 12, 2014

Prepared for:

Summit, LLC

Prepared for:

Summit, LLC
3632 North Wolf Creek Drive
Eden, Utah 84310
Attn: Mr. Sam Arthur

Geotechnical Investigation
Copper Crest - East
Powder Mountain Resort
Weber County, Utah

IGES Project No. 01628-010

Prepared by:

David A. Glass, P.E.
Senior Geotechnical Engineer

Reviewed by:

Kent A. Hartley, P.E.
Principal

IGES, Inc.
12429 South 300 East, Suite 100
Draper, Utah 84120
(801) 748-4044

November 12, 2014

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APPENDICES

Appendix A   Figure A-1   Site Vicinity Map

                      Figure A-2   Geotechnical Map

                      Figures A-3 to A-4   Test Pit Logs

                      Figure A-5   Key to Soil Symbols and Terminology

Appendix B   Laboratory Test Results

Appendix C   Design Response Spectra (*Design Maps* Output)

R01628-010

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical investigation conducted for the *Copper Crest – East t*ownhome development, a part of the currently on-going expansion at the Powder Mountain Ski Resort in Weber County. The purposes of our investigation was to assess the nature and engineering properties of the subsurface soils at the proposed townhome site and to provide recommendations for the design and construction of foundations, grading, and drainage. The scope of work completed for this study included subsurface exploration, literature review, engineering analyses, and preparation of this report.

Our services were performed in accordance with our proposal to Summit, LLC (Client), dated October 6, 2014. The recommendations presented in this report are subject to the limitations presented in the "Limitations" section of this report (Section 6.1).

1.2 PROJECT DESCRIPTION

Our understanding of the project is based primarily on our previous involvement with the Powder Mountain resort project, which included two geotechnical investigations for the greater 200-acre Powder Mountain Resort expansion project (IGES, 2012a and 2012b) and subsequent geotechnical consulting for several other aspects of the project.

The Powder Mountain Resort expansion project is located southeast of SR-158 (Powder Mountain Road), south of previously developed portions of Powder Mountain Resort, in unincorporated Weber County, Utah. The project is accessed by Powder Ridge Road. The *Copper Crest - East* townhomes will be located within the sub-development *The Village* (see *Site Vicinity Map*, Figure A-1 in Appendix A). The approximately ½-acre *Copper Crest - East* project will consist of nine residential units, presumably intended to be vacation homes. The entire townhome structure is expected to have a structural footprint on the order of 15,000 square feet. The units will have three levels – the south-end of the townhomes will have, in effect, a walk-out basement (the portion of the building adjacent to the street will be subterranean). Individual units will have a single-car garage, with a possible storage space below the garage floor.

2.0   METHOD OF STUDY

2.1   LITERATURE REVIEW

The earliest geotechnical report for the area is by AMEC (2001), which was a reconnaissance-level geotechnical and geologic hazard study. IGES later completed a geotechnical investigation for the Powder Mountain Resort expansion in 2012 (2012a, 2012b). Our previous work included twenty-two test pits and one soil boring excavated at various locations across the 200-acre development; as a part of this current study, the logs from relevant nearby test pits and other data from our reports were reviewed. In addition, Western Geologic (2012) completed a geologic hazard study for the greater 200-acre Powder Mountain expansion project – this report was reviewed to assess the potential impact of geologic hazards on the *Copper Crest – East* townhomes.

2.2   FIELD INVESTIGATION

Subsurface soils were investigated by excavating two test pits at representative locations. The approximate location of the test pits are illustrated on the *Geotechnical Map* (Figure A-2 in Appendix A). The soil types were visually logged at the time of our field work in general accordance with the *Unified Soil Classification System* (USCS). Soil classifications and descriptions are included on the test pit logs, Figures A-3 and A-4 in Appendix A. A key to USCS symbols and terminology is included as Figure A-5.

2.3   LABORATORY TESTING

Samples retrieved during the subsurface investigation were transported to the laboratory for evaluation of engineering properties. Specific laboratory tests include:

- Atterberg Limits
- Grain-Size Distribution
- Insitu Moisture Content
- Soluble Sulfate, Soluble Chloride, pH and Resistivity

Results of the laboratory testing are discussed in this report and presented in Appendix B. Some test results, including moisture content and Atterberg Limits, have been incorporated into the test pit logs (Figures A-3 and A-4).

3.0   GEOLOGIC CONDITIONS

3.1   GEOLOGY AND GEOLOGIC HAZARDS

Geology and geologic hazards have been previously addressed by Western Geologic in a separate submittal (Western Geologic, 2012). This work has also been referenced in our previous geotechnical report for the project (IGES, 2012b). The report by Western Geologic indicates that the townhome site is located outside of known geologically unstable areas. The Western Geologic report also includes a large-scale geologic map that shows the development is in an area mapped as "Wasatch Formation". The Wasatch Formation is a bedrock unit that typically consist of reddish-brown conglomerate with less common sandstone, siltstone, and mudstone. Earth materials observed during our subsurface investigation consisted of colluvium (clayey gravel); however, it is conceivable that the earth materials observed consisted of highly weathered/decomposed Wasatch Formation, which can be indistinguishable from soil.

During our subsurface investigation, potentially adverse geologic structures (e.g., evidence of faulting or landslides) were not evident in the test pits. Also, geomorphic expressions of shallow, surficial landslides were not observed within the site. Based on currently available data and our observations, the potential for geologic hazards such as landslides, liquefaction, or surface fault rupture impacting the site is considered low.

3.2   SEISMICITY

Following the criteria outlined in the 2012 International Building Code (IBC, 2012), spectral response at the site was evaluated for the *Maximum Considered Earthquake* (MCE) which equates to a probabilistic seismic event having a two percent probability of exceedance in 50 years (2PE50). Spectral accelerations were determined based on the location of the site using the *U.S. Seismic "DesignMaps" Web Application* (USGS, 2012); this software incorporates seismic hazard maps depicting probabilistic ground motions and spectral response data developed for the United States by the U. S. Geological Survey as part of NEHRP/NSHMP (Frankel et al., 1996). These maps have been incorporated into both *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures* (FEMA, 1997) and the *International Building Code* (IBC) (International Code Council, 2012).

To account for site effects, site coefficients that vary with the magnitude of spectral acceleration and *Site Class* are used. Site Class is a parameter that accounts for site amplification effects of soft soils and is based on the average shear wave velocity of the upper 100 feet; based on our field exploration and our understanding of the geology in this area, the subject site is appropriately classified as Site Class D (*stiff soil*). Based on IBC criteria, the short-period (F_a) coefficient is 1.176 and long-period (F_v) site coefficient is 1.863. Based on the design spectral response accelerations for a *Building Risk Category* of I, II or III, the site's *Seismic Design Category* is D. The short- and long-period *Design Spectral Response Accelerations* are presented in Table 3.2; a

summary of the *Design Maps* analysis is presented in Appendix B. The *peak ground acceleration* (PGA) may be taken as $0.4 \cdot S_{MS}$.

Table 3.2
Short- and Long-Period Spectral Accelerations for MCE

Parameter	Short Period (0.2 sec)	Long Period (1.0 sec)
MCE Spectral Response Acceleration (g)	$S_S = 0.810$	$S_1 = 0.269$
MCE Spectral Response Acceleration Site Class B (g)	$S_{MS} = S_s F_a = 0.953$	$S_{M1} = S_1 F_v = 0.500$
Design Spectral Response Acceleration (g)	$S_{DS} = S_{MS} \cdot {}^2/_3 = 0.635$	$S_{D1} = S_{M1} \cdot {}^2/_3 = 0.334$

4.0   GENERALIZED SITE CONDITIONS

4.1   SURFACE CONDITIONS

At the time of our field work the site was in a relatively natural state and was covered with a variety of vegetation including several mature aspens, native grasses and shrubs. Signs indicating lot number, silt fencing, and a damaged observation deck were the only man-made improvements evident.

4.2   SUBSURFACE CONDITIONS

The subsurface soil conditions were explored at the subject property by excavating two test pits at the north and south ends of the proposed townhome building. Subsurface soil conditions were logged during our field investigation and are included in the exploration logs in Appendix A at the end of this report (Figures A-3 and A-4). The soil and moisture conditions encountered during our investigation are discussed in the following paragraphs.

4.2.1   Earth Materials

Topsoil: Topsoil was encountered in both test pits – where observed, topsoil thickness generally ranged from 2 to 2½ feet, and was observed to be as thick as 3 feet locally. When queried, construction personnel from Geneva indicated that the topsoil conditions observed were 'common' in the immediate vicinity. The topsoil generally consisted of a well-developed "A Horizon" and was generally well-rooted (including tree roots) and had a *loamy* appearance.

Colluvium: Underlying the topsoil, the soils consisted of coarse colluvium, likely derived from the Wasatch Formation (conglomerate). The colluvium generally consisted of loose to medium dense clayey gravel with cobbles to 6 inches. A few boulder-size constituents to 3 feet in diameter were observed. The colluvium did not appear to be particularly difficult to excavate with the equipment used (CAT 320C tracked excavator).

Detailed descriptions of earth materials encountered are presented on the test pit logs, Figures A-3 and A-4, in Appendix A. Due to the nature and depositional characteristics of the native earth materials, care should be taken in interpolating subsurface conditions between and beyond the exploration locations.

4.2.2   Groundwater

Groundwater was not encountered in the test pit excavations. Based on our observations, groundwater is not anticipated to adversely impact the proposed development. However, groundwater levels could rise at any time based on several factors including recent precipitation, on- or off-site runoff, irrigation, time of year (e.g., spring run-off), or modifications to existing natural grade. Should the groundwater become a concern during the proposed construction, IGES should be contacted so that dewatering recommendations may be provided.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL CONCLUSIONS

Based on the results of the field observations, literature review, and previously completed geotechnical investigation (IGES, 2012a), the subsurface conditions are considered suitable for the proposed development provided that the recommendations presented in this report are incorporated into the design and construction of the project.

Supporting data upon which the following recommendations are based have been presented in the previous sections of this report. The recommendations presented herein are governed by the physical properties of the earth materials encountered in the subsurface explorations. If subsurface conditions other than those described herein are encountered in conjunction with construction, and/or if design and layout changes are initiated, IGES must be informed so that our recommendations can be reviewed and revised as deemed necessary.

5.2 EARTHWORK

5.2.1 General Site Preparation and Grading

Below proposed structures, fills, and man-made improvements, all vegetation, topsoil, debris and undocumented fill (if any) should be removed. Any existing utilities should be re-routed or protected in place. The exposed native soils should then be proof-rolled with heavy rubber-tired equipment such as a scraper or loader*. Any soft/loose areas identified during proof-rolling should be removed and replaced with structural fill. All excavation bottoms should be observed by an IGES representative during proof rolling or otherwise prior to placement of engineered fill to evaluate whether soft, loose, or otherwise deleterious earth materials have been removed and to assess compliance with the recommendations presented in this report.

*not required where bedrock is exposed in the foundation subgrade

5.2.2 Excavations

Soft, loose, or otherwise unsuitable soils beneath structural elements, hardscape or pavements may need to be over-excavated and replaced with structural fill. If over-excavation is required, the excavations should extend one foot laterally for every foot of depth of over-excavation. Excavations should extend laterally at least two feet beyond flatwork, pavements, and slabs-on-grade. Structural fill should consist of granular materials and should be placed and compacted in accordance with the recommendations presented in this report.

Prior to placing engineered fill, all excavation bottoms should be scarified to at least 6 inches, moisture conditioned as necessary at or slightly above optimum moisture content (OMC), and compacted to at least 90 percent of the maximum dry density (MDD) as determined by ASTM D-1557 (Modified Proctor). Scarification is not required where bedrock is exposed.

5.2.3 Excavation Stability

The contractor is responsible for site safety, including all temporary trenches excavated at the site and the design of any required temporary shoring. The contractor is responsible for providing the "competent person" required by Occupational Safety and Health (OSHA) standards to evaluate soil conditions. For planning purposes, Soil Type C is expected to predominate at the site (sands and gravels). Close coordination between the competent person and IGES should be maintained to facilitate construction while providing safe excavations.

Based on OSHA guidelines for excavation safety, trenches with vertical walls up to 5 feet in depth may be occupied. Where very moist soil conditions or groundwater is encountered, or when the trench is deeper than 5 feet, we recommend a trench-shield or shoring be used as a protective system to workers in the trench. As an alternative to shoring or shielding, trench walls may be laid back at one and one half horizontal to one vertical (1½H:1V) (34 degrees) in accordance with OSHA Type C soils. Trench walls may need to be laid back at a steeper grade pending evaluation of soil conditions by the geotechnical engineer. Soil conditions should be evaluated in the field on a case-by-case basis. Large rocks exposed on excavation walls should be removed (scaled) to minimize rock fall hazards.

5.2.4 Structural Fill and Compaction

All fill placed for the support of structures, flatwork or pavements should consist of structural fill. Structural fill should consist of granular native soils, which may be defined as soils with less than 25% fines, 10-60% sand, and contain no rock larger than 4 inches in nominal size (6 inches in greatest dimension). Structural fill should also be free of vegetation and debris. All structural fill should be 1 inch minus material when within 1 foot of any base coarse material. Soils not meeting these criteria may be suitable for use as structural fill; however, such soils should be evaluated on a case by case basis and should be approved by IGES prior to use.

All structural fill should be placed in maximum 4-inch loose lifts if compacted by small hand-operated compaction equipment, maximum 6-inch loose lifts if compacted by light-duty rollers, and maximum 8-inch loose lifts if compacted by heavy duty compaction equipment that is capable of efficiently compacting the entire thickness of the lift. Additional lift thickness may be allowed by IGES provided the Contractor can demonstrate sufficient compaction can be achieved with a given lift thickness with the equipment in use. We recommend that all structural fill be compacted on a horizontal plane, unless otherwise approved by IGES. Structural fill underlying all shallow footings and pavements should be compacted to at least 95 percent of the MDD as determined by ASTM D-1557. **The moisture content should be at, or slightly above, the OMC for all structural fill.** Any imported fill materials should be approved prior to importing. Also, prior to placing any fill, the excavations should be observed by IGES to confirm that unsuitable materials have been removed. In addition, proper grading should precede placement of fill, as described in the General Site Preparation and Grading subsection of this report.

Specifications from governing authorities such as Weber County and/or special service districts having their own precedence for backfill and compaction should be followed where more stringent.

5.2.5 Oversize Material

Based on our observations there is a significant potential for the presence of oversize materials (larger than 6 inches in greatest dimension). Large rocks, particularly boulders (>12 inches), may require special handling, such as segregation from structural fill, and disposal. Particularly large boulders may require special equipment for removal during excavation of western half of the townhomes.

5.2.6 Utility Trench Backfill

Utility trenches should be backfilled with structural fill in accordance with Section 6.2.4 of this report. Utility trenches can be backfilled with the onsite soils free of debris, organic and oversized material. Prior to backfilling the trench, pipes should be bedded in and shaded with a uniform granular material that has a Sand Equivalent (SE) of 30 or greater. Pipe bedding may be water-densified in-place (jetting). Alternatively, pipe bedding and shading may consist of clean ¾-inch gravel, which generally does not require densification. Native earth materials can be used as backfill over the pipe bedding zone. All utility trenches backfilled below pavement sections, curb and gutter, and hardscape, should be backfilled with structural fill compacted to at least 95 percent of the MDD as determined by ASTM D-1557. All other trenches should be backfilled and compacted to approximately 90 percent of the MDD (ASTM D-1557). However, in all cases the pipe bedding and shading should meet the design criteria of the pipe manufacturer. Specifications from governing authorities having their own precedence for backfill and compaction should be followed where they are more stringent.

5.3 FOUNDATION RECOMMENDATIONS

Based on our field observations and considering the presence of relatively competent native earth materials, we recommend that the footings for proposed townhome structure be founded either *entirely* on competent native soils or *entirely* on structural fill. Native/fill transition zones are not allowed. If soft, loose, or otherwise deleterious earth materials are exposed in the footing excavations, then all footings must be deepened such that all footings bear on relatively uniform, competent native earth materials. Alternatively, the foundation excavation may be over-excavated a minimum of 2 feet below the bottom of proposed footings and replaced with structural fill, such that the footings bear entirely on a uniform fill blanket. We recommend that IGES assess the bottom of the foundation excavation prior to the placement of steel or concrete to identify the competent native earth materials as well as any unsuitable soils or transition zones. Additional over-excavation may be required based on the actual subsurface conditions observed.

Shallow spread or continuous wall footings constructed entirely on competent, uniform native earth materials or on a minimum of 2 feet of *structural fill* may be proportioned utilizing a maximum net allowable bearing pressure of **2,400 pounds per square foot (psf)** for dead load plus live load conditions. The net allowable bearing value presented above is for dead load plus live load conditions. The minimum recommended footing width is 20 inches for continuous wall footings and 30 inches for isolated spread footings.

All conventional foundations exposed to the full effects of frost should be established at a minimum depth of 42 inches below the lowest adjacent final grade. Interior footings, not subjected to the full effects of frost (i.e., *a continuously heated structure*), may be established at higher elevations, however, a minimum depth of embedment of 12 inches is recommended for confinement purposes.

Foundation drains should be installed around below-ground foundations (e.g., basement walls) to minimize the potential for flooding from shallow groundwater, which may be present at various times during the year, particularly spring run-off.

5.4   SETTLEMENT

5.4.1   Static Settlement

Static settlements of properly designed and constructed conventional foundations, founded as described in Section 5.3, are anticipated to be on the order of 1 inch or less. Differential settlement is expected to be half of total settlement over a distance of 30 feet.

5.4.2   Dynamic Settlement

Dynamic settlement (or seismically-induced settlement) consists of dry dynamic settlement of unsaturated soils (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically-induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during, and shortly after, an earthquake event. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

Based on the subsurface conditions encountered, dynamic settlement arising from a MCE seismic event is expected to be on the low; for design purposes, settlement on the order of ½ inch over 40 feet may be assumed.

5.5   EARTH PRESSURES AND LATERAL RESISTANCE

Lateral forces imposed upon conventional foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footing and the supporting soils. In determining the frictional resistance against concrete, a coefficient of friction of 0.45 for sandy native soils or structural fill should be used.

Table 5.5
Lateral Earth Pressure Coefficients

Condition	Level Backfill		2H:1V Backfill	
	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)	Lateral Pressure Coefficient	Equivalent Fluid Density (pcf)
Active (Ka)	0.33	35	0.53	56
At-rest (Ko)	0.50	55	0.80	85
Passive (Kp)	3.0	320	—	—

Ultimate lateral earth pressures from *granular* backfill acting against retaining walls, temporary shoring, or buried structures may be computed from the lateral pressure coefficients or equivalent fluid densities presented in Table 5.5. These lateral pressures should be assumed even if the backfill is placed in a relatively narrow gap between a vertical bedrock cut and the foundation wall. These coefficients and densities assume no buildup of hydrostatic pressures. The force of water should be added to the presented values if hydrostatic pressures are anticipated.

Clayey soils drain poorly and may swell upon wetting, thereby greatly increasing lateral pressures acting on earth retaining structures; therefore, clayey soils should not be used as retaining wall backfill. Backfill should consist of native granular soil with an Expansion Index (EI) less than 20.

Walls and structures allowed to rotate slightly should use the active condition. If the element is to be constrained against rotation (i.e., a basement wall), the at-rest condition should be used. These values should be used with an appropriate factor of safety against overturning and sliding. A value of 1.5 is typically used. Additionally, if passive resistance is calculated in conjunction with frictional resistance, the passive resistance should be reduced by ½.

5.6   CONCRETE SLAB-ON-GRADE CONSTRUCTION

To minimize settlement and cracking of slabs, and to aid in drainage beneath the concrete floor slabs, all concrete slabs should be founded on a minimum 4-inch layer of compacted gravel overlying properly prepared subgrade. The gravel should consist of free-draining gravel or road base with a 3/4-inch maximum particle size and no more than 5 percent passing the No. 200 mesh sieve. The layer should be compacted to at least 95 percent of the MDD as determined by ASTM D-1557.

All concrete slabs should be designed to minimize cracking as a result of shrinkage. Consideration should be given to reinforcing the slab with a welded wire fabric, re-bar, or fibermesh. Slab reinforcement should be designed by the structural engineer; however, as a minimum, slab reinforcement should consist of 4"×4" W4.0×W4.0 welded wire mesh within the middle third of the slab. We recommend that concrete be tested to assess that the slump and/or air content is in

compliance with the plans and specifications. We recommend that concrete be placed in general accordance with the requirements of the American Concrete Institute (ACI). A Modulus of Subgrade Reaction of **250 psi/inch** may be used for design.

A moisture barrier (vapor retarder) consisting of 10-mil thick Visqueen (or equivalent) plastic sheeting should be placed below slabs-on-grade where moisture-sensitive floor coverings or equipment is planned. Prior to placing this moisture barrier, any objects that could puncture it, such as protruding gravel or rocks, should be removed from the building pad. Alternatively, the subgrade may be covered with 2 inches of clean sand.

5.7   MOISTURE PROTECTION AND SURFACE DRAINAGE

Moisture should not be allowed to infiltrate into the soils in the vicinity of the foundations. As such, design strategies to minimize ponding and infiltration near the townhome structure should be implemented.

We recommend roof runoff devices be installed to direct all runoff a minimum of 10 feet away from the townhome foundations. The builder should be responsible for compacting the exterior backfill soils around the foundation, particularly around basement walls. Additionally, the ground surface within 10 feet of the structure should be constructed so as to slope a minimum of **five** percent away. Pavement sections should be constructed to divert surface water off the pavement into storm drains, curb/gutter, or another suitable location.

For the subterranean portion of the townhome, IGES recommends a perimeter foundation drain be constructed in accordance with the International Residential Code (IRC).

5.8   SOIL CORROSION POTENTIAL

Laboratory testing of a representative soil sample obtained from the Test Pit 1 indicated that the soil sample tested had a sulfate content of 18 ppm. Accordingly, the soils are classified as having a 'low' potential for deterioration of concrete due to the presence of soluble sulfate. As such, conventional Type I/II Portland cement may be used for all concrete in contact with site soils.

To evaluate the corrosion potential of ferrous metal in contact with onsite native soil a sample was tested for soil resistivity, soluble chloride and pH. The test indicated that the onsite soil tested has a minimum soil resistivity of 7,330 OHM-cm, soluble chloride content of 5.4 ppm and a pH of 5.4. Based on this result, the onsite native soil is considered to be *moderately corrosive* to ferrous metal. Consideration should be given to retaining the services of a qualified corrosion engineer to provide an assessment of any metal that may be associated with construction of ancillary water lines and reinforcing steel, valves etc.

5.9 CONSTRUCTION CONSIDERATIONS

5.9.1 Temporary Shoring

Temporary shoring may be required during excavation of the lower floors, particularly below the planned garage level, if the earth material below the garage will be left in-place. If a temporary storage area is constructed below the garages, temporary shoring may also be required to protect the street, particularly if utilities have been installed that preclude the possibility of laying-back the slope.

If the area below the garage is laid-back during construction of the foundation wall, the entire garage slab should be underlain by a minimum of 3 feet of structural fill (to minimize excessive differential fill thicknesses below the structure).

5.9.2 Over-Size Material

Several large boulders (up to 36 inches) were observed within the test pits; as such, excavation of the basement may generate an abundance of over-size material that may require special handling, processing, or disposal.

R01628-010

6.0   CLOSURE

6.1   LIMITATIONS

The recommendations presented in this report are based on limited field exploration, review of existing hazard studies and other geotechnical data, and our understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the explorations made for this investigation. It is possible that variations in the soil and groundwater conditions could exist between and beyond the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, IGES should also be notified.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, expressed or implied, is made.

It is the Client's responsibility to see that all parties to the project including the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

6.2   ADDITIONAL SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction. IGES staff or other qualified personnel should be on site to verify compliance with these recommendations. These tests and observations should include at a minimum the following:

- Observations and testing during site preparation, earthwork and structural fill placement.
- Consultation as may be required during construction.
- Quality control on concrete placement to verify slump, air content, and strength.
- Quality control and testing during placement and compaction of asphalt.

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding the report or wish to discuss additional services, please do not hesitate to contact us at your convenience (801) 748-4044.

7.0   REFERENCES

AMEC, 2001. Report Engineering Geologic Reconnaissance/Geotechnical Study Powder Mountain Resort.

Federal Emergency Management Agency [FEMA], 1997, *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures,* FEMA 302, Washington, D.C.

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U.S. Geological Survey, 2012, U.S. *Seismic "Design Maps" Web Application*, site: https://geohazards.usgs.gov/secure/designmaps/us/application.php, site accessed on July 20, 2012.

Western Geologic, 2012, Report: Geologic Hazards Reconnaissance, Proposed Area 1 Mixed-Use Development, Powder Mountain Resort, Weber County, Utah, dated August 28, 2012.

APPENDIX A
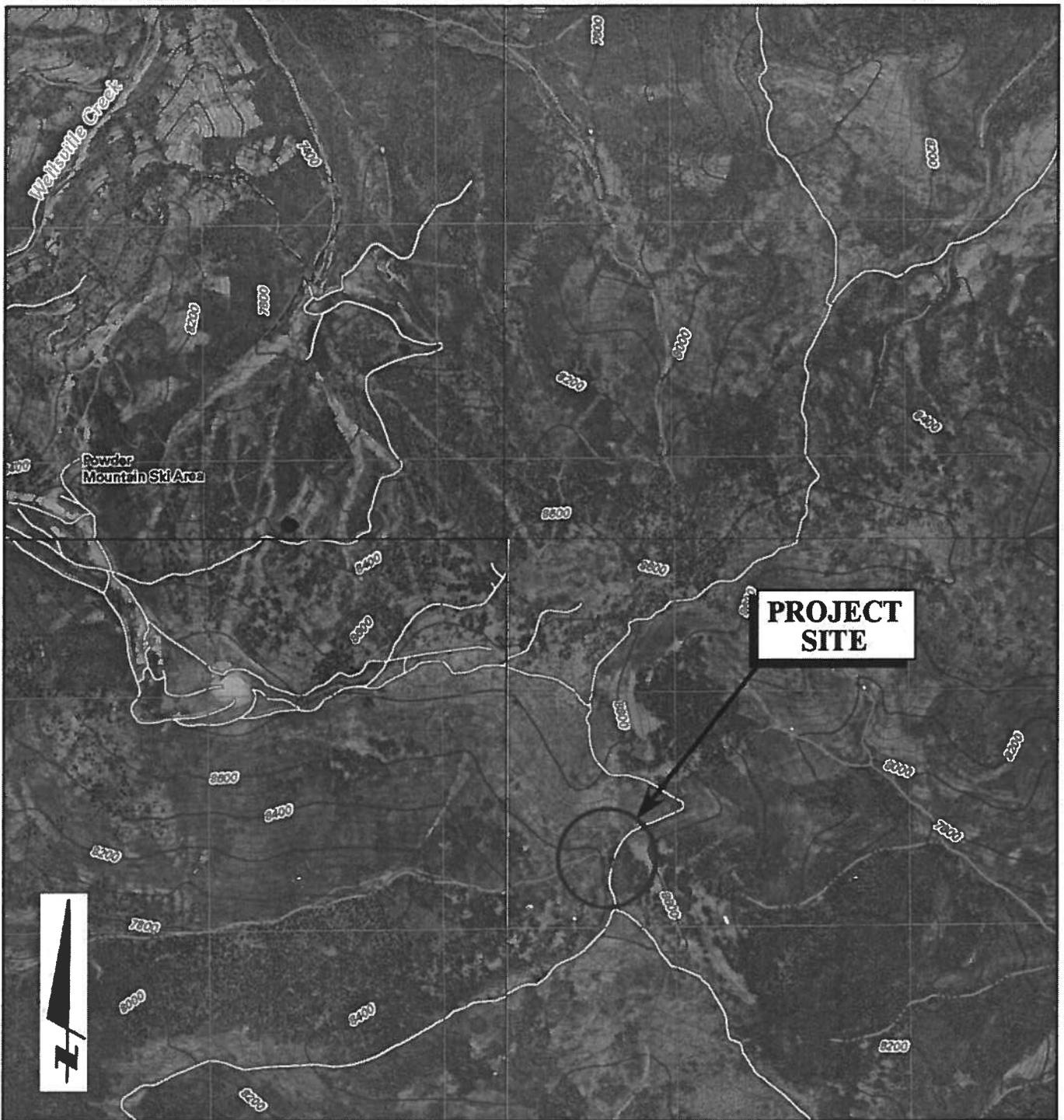
MAP LOCATION

0   1000'   2000'

SCALE 1:24,000
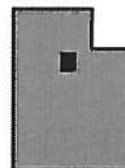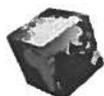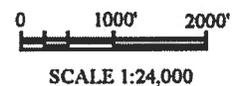
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Geotechnical Investigation
Copper Crest East
Powder Mountain Resort
Weber County, Utah

SITE VICINITY MAP

Figure

A-1

SCALE 1"=40'

LEGEND

TP-1 Approximate test pit location

PROJECT SITE

TP-1

TP-2

CC-EAST
Siteplan

IGES
Project No. 01628-010

Geotechnical Investigation
Copper Crest East
Powder Mountain Resort
Weber County, Utah   GEOTECHNICAL MAP

Figure
A-2

DATE						
STARTED:	11/6/14					
COMPLETED:	11/6/14					
BACKFILLED:	11/6/14					

Geotechnical Investigation
Copper Crest - East
Powder Mountain Resort
Weber County, Utah   Project Number 01628-010

IGES Rep: DAG
Rig Type: 320C

TEST PIT NO:
TP-1
Sheet 1 of 1

LOCATION
LATITUDE   LONGITUDE   ELEVATION 8,612
Approx. 57A

MATERIAL DESCRIPTION

DEPTH					Moisture Content and Atterberg Limits

Moisture Content and Atterberg Limits

Dry Density(pcf)	Moisture Content %	Percent minus 200	Liquid Limit	Plasticity Index	Plastic Limit — Moisture Content ● — Liquid Limit
					10 20 30 40 50 60 70 80 90

Topsoil - Silty CLAY, moist, dark brown, well-rooted with several tree roots, loamy appearance, soft, low plasticity, well-developed topsoil

@ 2½' Colluvium (Qc)
Clayey GRAVEL, loose to medium dense, coarse, subrounded gravel and cobble to 4 inches, some rounded boulders to 3 feet, light brown, slightly moist, trace roots, low plasticity (clayey matrix is below plastic limit), clast-supported

GC

Dry Density	Moisture	% -200	LL	PI
3.4	22.1	37	14	● ⊢—⊣

Total depth 9½ feet
No groundwater
No caving

Bottom of Test Pit @ 9.5 Feet

Elevation markers: 8610, 8605, 8600
Feet markers: 0, 5, 10

SAMPLE TYPE
▯ - GRAB SAMPLE
▨ - 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
▼ - MEASURED
▽ - ESTIMATED

NOTES:

FIGURE
A - 3

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DATE						
STARTED:	11/6/14	Geotechnical Investigation	IGES Rep:	DAG	TEST PIT NO:
COMPLETED:	11/6/14	Copper Crest - East			**TP-2**
BACKFILLED:	11/6/14	Powder Mountain Resort Weber County, Utah Project Number 01628-010	Rig Type:	320C	Sheet 1 of 1

LOCATION

LATITUDE   LONGITUDE   ELEVATION 8,605

Approx. 61

MATERIAL DESCRIPTION

@ 0' Topsoil - Silty CLAY, low plasticity, moist, dark brown, loamy
appearance, well-rooted, soft, up to 3 feet thick locally

@ 2½' **Colluvium (Qc)**
Clayey GRAVEL, medium dense, coarse, light brown, moist,
subrounded gravel and cobble within a clayey matrix,
clast-supported, occasional boulders to 3 feet, most cobble-size
constituents are <6 inches, trace roots, well-cemented

Unified Soil Classification: GC

Depth / Elevation:
- Elevation 8600 at 5 feet
- Elevation 8595 at 10 feet

Percent minus 200: 19.6

Moisture Content and Atterberg Limits chart (scale 10 20 30 40 50 60 70 80 90):
Plastic Limit — Moisture Content ● — Liquid Limit

Total depth 9 feet
No groundwater
No caving

Bottom of Test Pit @ 9 Feet

SAMPLE TYPE
▯ - GRAB SAMPLE
� - 3" O.D. THIN-WALLED HAND SAMPLER

WATER LEVEL
▼ - MEASURED
▽ - ESTIMATED

NOTES:

FIGURE

A - 4

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

LOG KEY SYMBOLS

BORING SAMPLE LOCATION

TEST-PIT SAMPLE LOCATION

WATER LEVEL (level after completion)

WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKLY	CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE
MODERATELY	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONGLY	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

OTHER TESTS KEY

C	CONSOLIDATION	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	DS	DIRECT SHEAR
UC	UNCONFINED COMPRESSION	T	TRIAXIAL
S	SOLUBILITY	R	RESISTIVITY
O	ORGANIC CONTENT	RV	R-VALUE
CBR	CALIFORNIA BEARING RATIO	SU	SOLUBLE SULFATES
COMP	MOISTURE/DENSITY RELATIONSHIP	PM	PERMEABILITY
CI	CALIFORNIA IMPACT	-200	% FINER THAN #200
COL	COLLAPSE POTENTIAL	Gs	SPECIFIC GRAVITY
SS	SHRINK SWELL	SL	SWELL LOAD

MODIFIERS

DESCRIPTION	%
TRACE	<5
SOME	5 - 12
WITH	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

STRATIFICATION

DESCRIPTION	THICKNESS	DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2"	OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
LAYER	1/2 - 12"	FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.

2. No warranty is provided as to the continuity of soil conditions between individual sample locations.

3. Logs represent general soil conditions observed at the point of exploration on the date indicated.

4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	MODIFIED CA. SAMPLER (blows/ft)	CALIFORNIA SAMPLER (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
VERY LOOSE	<4	<4	<5	0 - 15	EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
LOOSE	4 - 10	5 - 12	5 - 15	15 - 35	DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	10 - 30	12 - 35	15 - 40	35 - 65	EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	30 - 50	35 - 60	40 - 70	65 - 85	DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>70	85 - 100	PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	TORVANE UNTRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
VERY SOFT	<2	<0.125	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND.
SOFT	2 - 4	0.125 - 0.25	0.25 - 0.5	EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE.
MEDIUM STIFF	4 - 8	0.25 - 0.5	0.5 - 1.0	PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE.
STIFF	8 - 15	0.5 - 1.0	1.0 - 2.0	INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT.
VERY STIFF	15 - 30	1.0 - 2.0	2.0 - 4.0	READILY INDENTED BY THUMBNAIL.
HARD	>30	>2.0	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL.

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Key to Soil Symbols and Terminology

Figure A-5

IGES, Inc. Project No.: 01628-010

APPENDIX B

Water Content and Unit Weight of Soil

(In General Accordance with ASTM D7263 Method B and D2216)

Project: Summit/Copper

No: 01628-010

Location: Weber County, Utah

Date: 11/10/2014

By: NB

Sample Info.	Boring No.	TP-1										
	Sample											
	Depth	4 to 5'										
	Split	Yes										
	Split sieve	3/4"										
	Total sample (g)	23072.40										
	Moist coarse fraction (g)	10412.70										
	Moist split fraction (g)	12659.70										
	Sample height, H (in)											
	Sample diameter, D (in)											
	Mass rings + wet soil (g)											
	Mass rings/tare (g)											
	Moist unit wt., γ_m (pcf)											
Coarse Fraction	Wet soil + tare (g)	10840.40										
	Dry soil + tare (g)	10768.60										
	Tare (g)	698.38										
	Water content (%)	0.7										
Split Fraction	Wet soil + tare (g)	1629.25										
	Dry soil + tare (g)	1563.24										
	Tare (g)	408.83										
	Water content (%)	5.7										
	Water Content, w (%)	3.4										
	Dry Unit Wt., γ_d (pcf)											

Entered by:_____

Reviewed:_____

# Liquid Limit, Plastic Limit, and Plasticity Index of Soils
(ASTM D4318)

Project: **Summit/Copper**
No: **01628-010**
Location: Weber County, Utah
Date: 11/10/2014
By: BRR

Boring No.: **TP-1**
Sample:
Depth: **4 to 5'**
Description: Brown lean clay

Preparation method: Wet
Liquid limit test method: Multipoint

Plastic Limit

Determination No	1	2				
Wet Soil + Tare (g)	28.04	28.30				
Dry Soil + Tare (g)	26.89	27.08				
Water Loss (g)	1.15	1.22				
Tare (g)	21.97	21.77				
Dry Soil (g)	4.92	5.31				
Water Content, w (%)	23.37	22.98				

Liquid Limit

Determination No	1	2	3			
Number of Drops, N	31	25	17			
Wet Soil + Tare (g)	30.59	30.75	30.70			
Dry Soil + Tare (g)	28.32	28.41	28.32			
Water Loss (g)	2.27	2.34	2.38			
Tare (g)	22.01	22.11	22.18			
Dry Soil (g)	6.31	6.30	6.14			
Water Content, w (%)	35.97	37.14	38.76			
One-Point LL (%)		37				

Liquid Limit, LL (%)	**37**
Plastic Limit, PL (%)	**23**
Plasticity Index, PI (%)	**14**

Flow Curve

LL = 37

Plasticity Chart

Entered by: _____
Reviewed: _____

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

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Project: Summit/Copper
No: 01628-010
Location: Weber County, Utah
Date: 11/10/2014
By: NB

Boring No.: TP-1
Sample:
Depth: 4 to 5'
Description: Brown clayey gravel

		Moist	Dry
Split:	Yes		
Split sieve:	3/4"		
		Moist	Dry
Total sample wt. (g):		23072.40	22301.25
+3/4" Coarse fraction (g):		10142.70	10070.90
-3/4" Split fraction (g):		1242.38	1175.18
Split fraction:	0.548		

Water content data	C.F.(+3/4")	S.F.(-3/4")
Moist soil + tare (g):	10840.40	1629.25
Dry soil + tare (g):	10768.60	1563.24
Tare (g):	698.38	408.83
Water content (%):	0.7	5.7

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
8"	-	200	-	
6"	-	150	-	
4"	-	100	100.0	
3"	1936.59	75	91.3	
1.5"	6427.37	37.5	71.2	
3/4"	10338.98	19	53.6	←Split
3/8"	253.99	9.5	43.0	
No.4	435.05	4.75	34.5	
No.10	551.86	2	29.1	
No.20	603.25	0.85	26.7	
No.40	636.27	0.425	25.1	
No.60	657.14	0.25	24.2	
No.100	672.66	0.15	23.5	
No.140	683.25	0.106	23.0	
No.200	701.42	0.075	22.1	

Gravel (%): 65.5
Sand (%): 12.4
Fines (%): 22.1

Entered by:_____
Reviewed:_____

Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

(ASTM D6913)

Project: Summit/Copper
No: 01628-010
Location: Weber County, Utah
Date: 11/10/2014
By: NB

Boring No.: TP-2
Sample:
Depth: 3 to 4'
Description: Light brown clayey gravel with sand

		Moist	Dry
Split:	Yes		
Split sieve:	3/4"		
Total sample wt. (g):		19391.80	18742.90
+3/4" Coarse fraction (g):		8380.30	8251.78
-3/4" Split fraction (g):		2262.44	2155.52
Split fraction:	0.560		

Water content data	C.F.(+3/4")	S.F.(-3/4")
Moist soil + tare (g):	9062.80	3312.86
Dry soil + tare (g):	8934.60	3171.74
Tare (g):	703.20	326.70
Water content (%):	1.6	5.0

Sieve	Accum. Wt. Ret. (g)	Grain Size (mm)	Percent Finer	
8"	-	200	-	
6"	-	150	100.0	
4"	1945.20	100	89.6	
3"	1945.20	75	89.6	
1.5"	5736.75	37.5	69.4	
3/4"	8251.78	19	56.0	←Split
3/8"	404.25	9.5	45.5	
No.4	641.46	4.75	39.3	
No.10	828.22	2	34.5	
No.20	949.48	0.85	31.3	
No.40	1071.24	0.425	28.2	
No.60	1182.14	0.25	25.3	
No.100	1271.81	0.15	22.9	
No.140	1325.93	0.106	21.5	
No.200	1401.83	0.075	19.6	

Gravel (%): 60.7
Sand (%): 19.7
Fines (%): 19.6
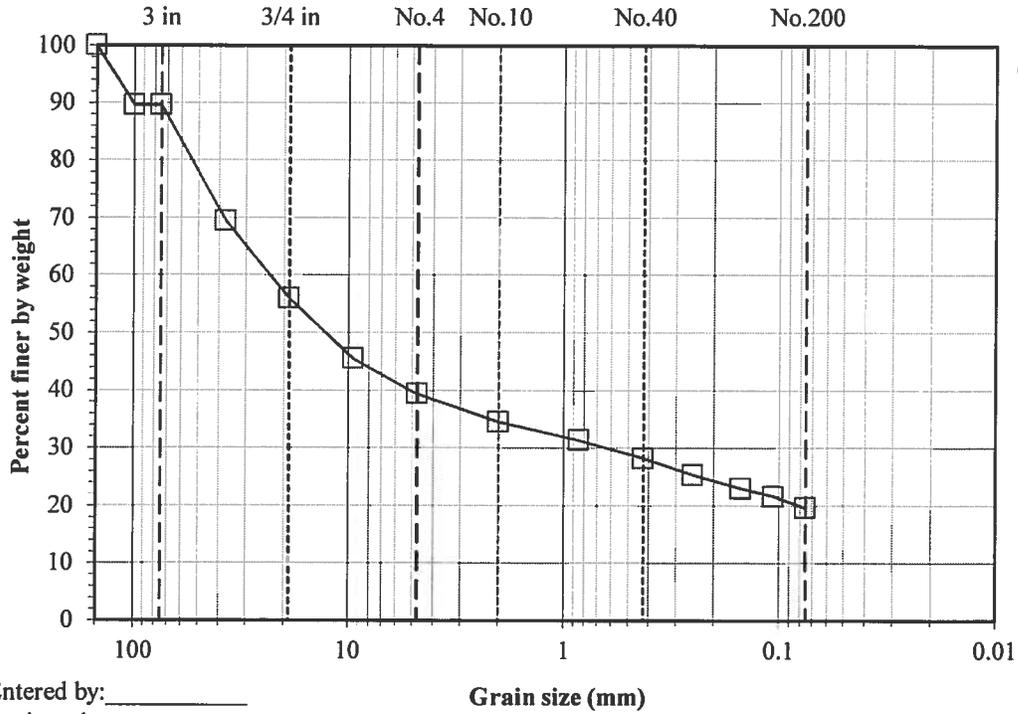
Entered by:_____
Reviewed:_____

Minimum Laboratory Soil Resistivity, pH of Soil for Use in Corrosion Testing, and Ions in Water by Chemically Suppressed Ion Chromatography (AASHTO T 288, T 289, ASTM D4327, and C1580)

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Project: **Summit/Copper**
No: **01628-010**
Location: Weber County, Utah
Date: 11/10/2014
By: JDF

Sample info.	Boring No.	TP-1							
	Sample								
	Depth	4 to 5'							
Water content data	Wet soil + tare (g)	171.02							
	Dry soil + tare (g)	165.74							
	Tare (g)	123.57							
	Water content (%)	12.5							
Chem. data	pH	5.63							
	Soluble chloride* (ppm)	< 5.38							
	Soluble sulfate** (ppm)	18.1							
Resistivity data	Pin method	2							
	Soil box	Miller Small							
		Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)	Approximate Soil condition (%)	Resistance Reading (Ω)	Soil Box Multiplier (cm)	Resistivity (Ω-cm)
		As is	33600	0.67	22512				
		+3	19740	0.67	13226				
		+6	14000	0.67	9380				
		+9	11840	0.67	7933				
		+12	10940	0.67	7330				
		+15	10970	0.67	7350				
	Minimum resistivity (Ω-cm)	7330							

* Performed by AWAL using EPA 300.0

** Performed by AWAL using ASTM C1580

Entered by:_____
Reviewed:_____

APPENDIX C

≈USGS Design Maps Detailed Report

2012 International Building Code (41.3627°N, 111.7445°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 1613.3.1 — Mapped acceleration parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2012 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.3.3.

From Figure 1613.3.1(1) [1]	$S_S = 0.810$ g
From Figure 1613.3.1(2) [2]	$S_1 = 0.269$ g

Section 1613.3.2 — Site class definitions

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Section 1613.

2010 ASCE-7 Standard – Table 20.3-1
SITE CLASS DEFINITIONS

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: - Plasticity index $PI > 20$, - Moisture content $w \geq 40\%$, and - Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT F_a

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 0.810 g, F_a = 1.176

TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT F_v

Site Class	Mapped Spectral Response Acceleration at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.269 g, F_v = 1.863

Equation (16-37): $S_{MS} = F_a S_S = 1.176 \times 0.810 = 0.953$ g

Equation (16-38): $S_{M1} = F_v S_1 = 1.863 \times 0.269 = 0.500$ g

Section 1613.3.4 — Design spectral response acceleration parameters

Equation (16-39): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 0.953 = 0.635$ g

Equation (16-40): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.500 = 0.334$ g

Section 1613.3.5 — Determination of seismic design category

TABLE 1613.3.5(1)

SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.635 g, Seismic Design Category = D

TABLE 1613.3.5(2)

SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.334 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 1613.3.5(1) or 1613.3.5(2)" = D

Note: See Section 1613.3.5.1 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 1613.3.1(1)*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(1).pdf
2. *Figure 1613.3.1(2)*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(2).pdf

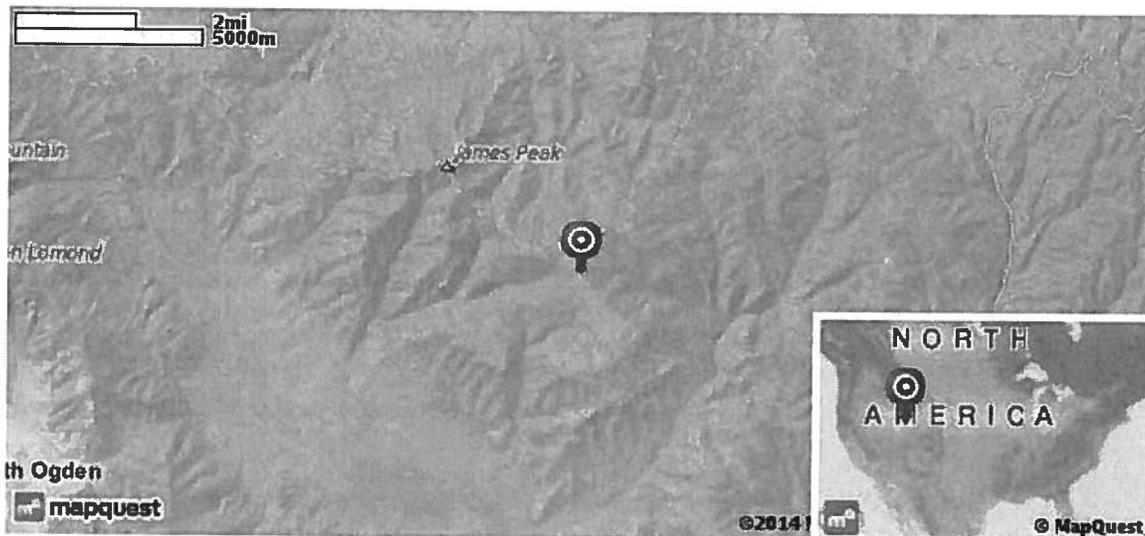# ≋USGS **Design Maps Summary Report**

User–Specified Input

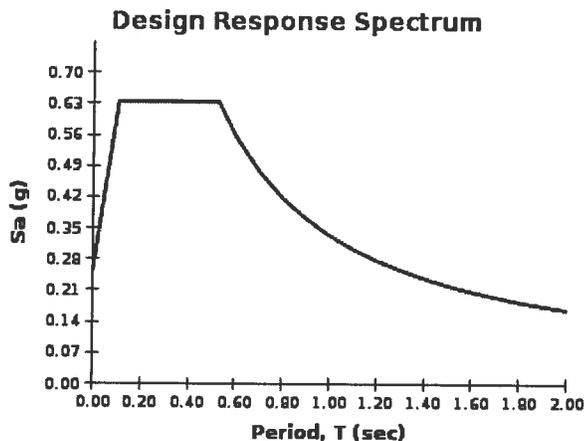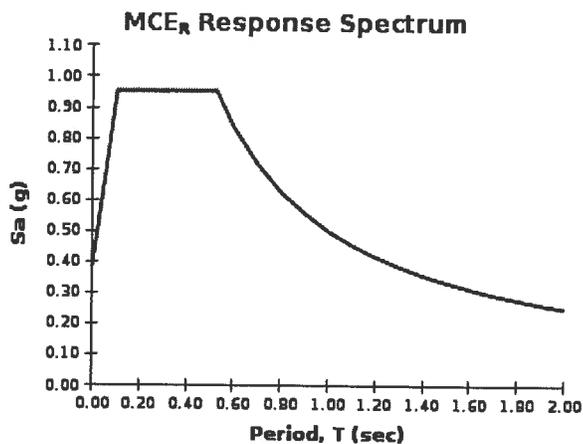|	
Report Title	Copper Crest - East
	Wed November 12, 2014 01:02:55 UTC
Building Code Reference Document	2012 International Building Code
	(which utilizes USGS hazard data available in 2008)
Site Coordinates	41.3627°N, 111.7445°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

$S_S = $ 0.810 g	$S_{MS} = $ 0.953 g	$S_{DS} = $ 0.635 g
$S_1 = $ 0.269 g	$S_{M1} = $ 0.500 g	$S_{D1} = $ 0.334 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

11/11/2014 6:03 PM