Tuttle, Mike

From: R Douglas Jones [sdaincpc@gmail.com]
Sent: Thursday, August 23, 2012 8:45 AM
To: Tuttle, Mike
Subject: Fwd: 12' Wall Calcs
Attachments: 12'ConcWall.pdf

---------- Forwarded message ----------
From: **R Douglas Jones** <sdaincpc@gmail.com>
Date: Thu, Aug 23, 2012 at 7:54 AM
Subject: 12' Wall Calcs
To: Michael Tuttle <....>
Cc: Ashley Page <ashley@cwtconstruction.com>, wolffb@bellsouth.net, wolffhofh@hotmail.com

Hi Mike,

I have attached the calculations for the 12' tall wall using the 83 pcf load specified by the geotech. Most of the wall will be out of the ground and we may adjust the rebar matt after excavation to save cost.

The home owner, general contractor and myself, got together and discussed the problem with the tall house walls. After reviewing the first set of plans, the general contractor thought we could re arrange the house on the lot a bit and keep the walls around the house less than 9'. 9' walls permit use of the state rebar amendment. So that is what I have done.

I spoke to Chris Kimball about this a few months ago and he said they are working on coming up with a more rational approach. It is unreasonable that walls below 9' have much lower load requirements. Like I said in our earlier conversation, if there were concrete wall failures then I would be the first to specify much higher steel requirements. But we have been building walls with much less steel for years and not having any problems whatsoever.

Call if you need to discuss. Otherwise if you would please approve this building permit it would be greatly appreciated. The owners are way behind schedule and would like to begin construction.

Thanks for checking over my calculations and raising relevant concerns. I appreciate your help!!

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Footing/Foundation Calculations

	Exterior	
Concrete Specs		
Concrete fc' (psi)	3000	
Concrete Density (pcf)	150	
Rebar (psi)	60000	
Foundation Specs		
Overall Height (in), (ft)	144	12
Wall Thickness (in)	10	0.67
Area (alf)	10	
Weight (plf)	1500	
Footing Specs		
Width (ft), (in)	2.50	30
Height (ft), (in)	0.83	10
Area (alf)	2.08	
Weight (plf)	0	
Roof Load		
Dead (psf)	15	
Live (psf)	50	
Span (ft)	40	
1/2 Total Roof Load (plf)	1300	
Floor Load		
Dead (psf)	50	
Live (psf)	50	
Span (ft)	2	
1/2 Total Floor Load (plf)	100	
Wall Load		
Wall Load (psf)	55	
Height (ft)	9	
Total Wall Load (plf)	495	
Calculations		
Total Building Loads (plf)	1895	
Surcharge Load (plf)	1500	
Total Weight on Soil (plf)	3395	
Allowable Soil Increase (psf)	1	
Allowable Bearing Pressure (psf)	1500	
Footing Width (in)	27	

Reinforced Concrete Walls

	12' Wall	
Soil Properties		
Fill Density (pcf)	110	
Phi (Deg)	30	
Lateral Force Coefficient	0.33	
Equivalent Fluid Pressure (pcf)	83.0	
Wall Geometry		
Height (ft)	12	
Thickness (in)	10	
Load Height (ft)	11.5	
Loads		
Dead Load Factor	1.4	
Live Load Factor	1.6	
w (psf)	1527	
Total Wall Load (plf)	8781	
Max Moment (ft-lbs)	13520	
Max Reaction (lbs)	5976	
Shear Capacity (lbs)	10516	OK
Axial Loads		
Dead (lbs)	795	
Live (lbs)	1000	
Total Axial (lbs)	1795	
Total Factored Axial Load (plf)	2713	
Capacities		
Axial		
Gross Concrete Area (in^2)	120	
Wall Length, lc (in)	144	
Phi	0.55	
Capacity (lbs)	172339	
Moment		
Vertical Steel (size, in^2)	#5	0.31
Rebar Distance (in)	8	
Phi	0.9	
An	4.01	
As (in^2/ft)	0.42	0.42
Spacing (O.C. in)	**8.8**	
b (in)	12	
a (in)	0.82	
Capacity, PhiMn (ft-lbs)	14342	OK
Sum of Ratios < 1 ?	0.96	OK

Horizontal Steel		
ACI Minimum .002		
Area/ft	120	
Steel Area (in^2/ft)	0.24	
Rebar Size	#5	0.31
Spacing	15.3	
Top of wall load	1868	