

Cantilevered Retaining Wall Design

RetainPro Professional 5.0.7, 8-Jul-99, (c) 1989-99

Criteria

Retained Height	=	13.00 ft
Wall height above soil	=	2.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	36.00 in
Soil Density	=	125.00 pcf
Wind on Stem	=	15.0 psf

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	30.0 psf/ft
Toe Active Pressure	=	30.0 psf/ft
Passive Pressure	=	330.0 psf/ft
Water height over heel	=	0.0 ft
Footings Soil Frictior	=	0.450
Soil height to ignore for passive pressure	=	6.00 in

Footing Strengths & Dimensions

f _c	=	3,500 psi	F _y	=	60,000 psi
Min. As %	=	0.0018			
Toe Width	=	2.00 ft			
Heel Width	=	6.92			
Total Footing Width	=	8.92			
Footing Thickness	=	18.00 in			
Key Width	=	12.00 in			
Key Depth	=	18.00 in			
Key Distance from Toe	=	2.00 ft			
Cover @ Top	=	2.00 in	@ Btm.	=	3.00 in

Surcharge Loads

Surcharge Over Heel	=	250.0 psf
Used To Resist Sliding & Overturning		

Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Design Summary

Total Bearing Load	=	15,980 lbs
...resultant ecc.	=	8.78 in
Soil Pressure @ Toe	=	2,675 psf OK
Soil Pressure @ Heel	=	910 psf OK
Allowable	=	3,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	3,744 psf
ACI Factored @ Heel	=	1,274 psf
Footing Shear @ Toe	=	12.7 psi OK
Footing Shear @ Heel	=	98.6 psi OK
Allowable	=	100.6 psi

Wall Stability Ratios

Overturning	=	3.76 OK
Sliding	=	3.23 OK

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	3,750.0 lbs
less 100% Passive Force	=	- 5,898.8 lbs
less 100% Friction Force	=	- 7,190.9 lbs
Added Force Req'd	=	0.0 lbs OK
...for 1.5 : 1 Stability	=	0.0 lbs OK

Footing Design Results

	Toe	Heel	
Factored Pressure	=	3,744	1,274 psf
Mu' : Upward	=	7,119	0 ft-#
Mu' : Downward	=	1,680	0 ft-#
Mu: Design	=	5,439	17,049 ft-#
Actual 1-Way Shear	=	12.72	98.60 psi
Allow 1-Way Shear	=	100.57	100.57 psi
Toe Reinforcing	=	# 4 @ 18.00 in	
Heel Reinforcing	=	# 4 @ 4.50 in	
Key Reinforcing	=	None Spec'd	

Stem Construction

Design height	ft =	15.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	10.00
Rebar Size	=	# 6
Rebar Spacing	=	12.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	0.000	0.564	0.441
Total Force @ Section	lbs =	0.0	3,774.0	4,080.0
Moment.....Actual	ft-# =	0.0	15,085.4	17,048.9
Moment.....Allowable	ft-# =	14,240.8	26,768.3	38,671.8
Shear.....Actual	psi =	0.0	41.2	45.3
Shear.....Allowable	psi =	93.1	93.1	93.1
Bar Develop ABOVE Ht.	in =	25.63	12.00	42.72
Bar Lap/Hook BELOW Ht.	in =	25.63	25.63	14.20
Wall Weight	psf =	125.0	125.0	125.0
Rebar Depth 'd'	in =	7.63	7.63	7.50

Masonry Data

f _m	psi =	
F _s	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Medium Weight

Concrete Data

f _c	psi =	3,000.0	3,000.0	3,000.0
F _y	psi =	60,000.0	60,000.0	60,000.0

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
 Heel: #4@ 7.25 in, #5@ 11.25 in, #6@ 16.00 in, #7@ 21.75 in, #8@ 28.50 in, #9@ 36
 Key: #4@ 12.50 in, #5@ 19.25 in, #6@ 27.25 in, #7@ 37.25 in,

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Summary of Overturning & Resisting Forces & Moments

ItemOVERTURNING.....			RESISTING.....			
	Force lbs	Distance ft	Moment ft-#		Force lbs	Distance ft	Moment ft-#	
Heel Active Pressure =	4,023.8	5.36	21,550.6		9,884.3	5.87	58,067.2	
Toe Active Pressure =	-303.8	1.50	-455.6		Sloped Soil Over Heel =			
Surcharge Over Toe =					Surcharge Over Heel =	1,520.7	5.87	8,933.4
Adjacent Footing Load =					Adjacent Footing Load =			
Added Lateral Load =					Axial Dead Load on Stem =		0.00	
Load @ Stem Above Soil =	30.0	15.50	465.0		Soil Over Toe =	750.0	1.00	750.0
					Surcharge Over Toe =			
					Stem Weight(s) =	1,593.8	2.42	3,851.6
					Earth @ Stem Transitions =			
					Footing Weight =	2,006.1	4.46	8,943.1
					Key Weight =	225.0	2.50	562.5
					Vert. Component =			
Total	= 3,750.0	O.T.M.	= 21,560.0		Total =	15,979.8 lbs	R.M.=	81,107.8
Resisting/Overturning Ratio		=		3.76				
Vertical Loads used for Soil Pressure =		15,979.8 lbs						
Vertical component of active pressure NOT used for soil pressure								