

IBC 2018		Heel Soil	EFP	Toe Soil	EFP
f'c	3,000.0 psi	Height ATOF	10'-0"	Height ATOF	2'-0"
Concrete Weight	150.0 pcf	Slope	0.00°	Ignore For Sliding	0'-0"
f'm	1,500.0 psi	Density (γ)	110.0 pcf	Density (γ)	110.0 pcf
Block Weight	Normal	Water Height ATOF	0'-0"	EFP	300.0 psf/ft
fy	60,000.0 psi	Sat. Soil Density (γ)	110.0 pcf		
Fs	24,000.0 psi	EFP	30.0 psf/ft		
Allowable Soil Bearing	2,000.0 psf				
Coefficient of Friction	0.40				
Neglect Heel Bearing For Heel Analysis					

<p>Vertical Point Loads - VP</p> <p>Dead 0.0 lb/ft ↓</p> <p>Live 0.0 lb/ft ↓</p> <p>Snow 0.0 lb/ft ↓</p> <p>Wind 0.0 lb/ft ↓</p> <p>Seismic 0.0 lb/ft ↓</p> <p>Ecc From CL 0" ←</p> <p>Moment Loads - M</p> <p>Dead 0.0 lb-ft/ft ↷</p> <p>Live 0.0 lb-ft/ft ↷</p> <p>Snow 0.0 lb-ft/ft ↷</p> <p>Wind 0.0 lb-ft/ft ↷</p> <p>Seismic 0.0 lb-ft/ft ↷</p> <p>Horizontal Point Loads - HP</p> <p>Wind 0.0 lb/ft ←</p> <p>Seismic 0.0 lb/ft ←</p> <p>Horizontal Distributed Loads - HD</p> <p>Wind 0.0 psf ←</p> <p>Seismic 0.0 psf ←</p> <p>Top Location 10'-0"</p> <p>Base Location 2'-0"</p> <p>Heel Surcharge Loads - HS</p> <p>Dead 0.0 psf</p> <p>Live 0.0 psf</p> <p>Snow 0.0 psf</p> <p>Toe Surcharge Loads - TS</p> <p>Dead 0.0 psf</p> <p>Live 0.0 psf</p> <p>Snow 0.0 psf</p>	<p>VP ↓</p> <p>HP ←</p> <p>HD ←</p> <p>HS ↷</p> <p>TS ↷</p> <p>M ↷</p> <p>5'-0"</p> <p>5'-0"</p> <p>12"</p> <p>1'-0"</p> <p>3 1/2"</p> <p>3 1/2"</p> <p>3'-0"</p> <p>3'-0"</p> <p>3'-0"</p> <p>3 1/2"</p> <p>12"</p> <p>3'-0"</p> <p>12"</p> <p>t = 12"</p> <p>Rebar CL = 5 13/16"</p> <p>Calc@8.00"</p> <p>Top t = 12"</p> <p>Base t = 24"</p> <p>Rebar CL = 3 1/2"</p> <p>Calc@Calc</p> <p>Heel Calc@Calc</p> <p>Toe Calc@Calc</p> <p>Key Calc@Calc</p>
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Controlling Stability Load Combination - D + H

Overturning Moment About Toe			Resisting Moment About Toe			Results			
	Force (lb/ft)	Arm (feet)	OTM (lb-ft/ft)		Force (lb/ft)	Arm (feet)	RM (lb-ft/ft)		
Active Press.	1,815.0	3.67	6,655.0	Stem Wt(s).	1,785.0	3.67	6,549.7	Horiz. React. @ Ftg. Base	1,815.0 lb/ft
				Footing Wt.	1,200.0	4.00	4,800.0	Sliding Resist	5,574.9 lb/ft
Total	1,815.0		6,655.0	Key Wt.	150.0	3.50	525.0	SF Sliding	3.1 ≥ 1.5
				Heel Soil Wt.	4,142.2	6.10	25,276.8	OTM	6,655.0 lb-ft/ft
				Toe Soil Wt	660.0	1.50	990.0	RM	38,141.5 lb-ft/ft
				Total	7,937.2		38,141.5	SF Overturn	5.7 ≥ 1.5
								Ecc. Ftg. CL	0.03'
								Toe Bearing	1,016.7 psf
								Heel Bearing	967.6 psf
								Allow. Bearing	2,000.0 psf

Concrete

		d (inch)	Mu (lb-ft/ft)	Vu (lb/ft)	Ru (psi)	As Req'd (inch ² /ft)	As Max. (inch ² /ft)	vu (psi)	vc (psi)
Toe	1.2D + 1.6L + 0.5S + 1.6H	8.50	4,301.4	2,167.2	66.2	0.204	1.579	28.3	109.5
Heel	1.2D + 1.6L + 0.5S + 1.6H	8.50	6,750.0	4,500.0	103.8	0.240	1.579	58.8	109.5
Key	1.2D + 1.6L + 0.5S + 1.6H	8.50	880.0	510.4	13.5	0.204	1.579	6.7	109.5
Bot. Stem	1.2D + 1.6L + 0.5S + 1.6H	20.50	8,000.0	2,400.0	21.2	0.369	3.809	13.0	109.5

Masonry

		d (inch)	P (lb/ft)	M (lb-ft/ft)	V (lb/ft)	fa (psi)	Fa (psi)	fb (psi)	Fb (psi)	csr	fs (psi)	Fs (psi)	fv (psi)	Fv (psi)
Top Stem	D + H	5.81	1,785.0	625.0	375.0	12.8	350.5	149.6	675.0	0.3	8,599.9	24,000.0	2.7	46.8

Suggested Rebar Spacing

	Rebar	As (inch ² /ft)	T & S Rebar
Toe	# 3@6"	0.220	# 3@4 1/2"
	# 4@11 1/2"	0.209	# 4@8"
	# 5@18"	0.207	# 5@12 1/2" # 6@18"
Heel	# 3@5"	0.264	# 3@4 1/2"
	# 4@9 1/2"	0.253	# 4@8"
	# 5@15"	0.248	# 5@12 1/2"
	# 6@18"	0.293	# 6@18"
Key	# 3@6"	0.220	
	# 4@11 1/2"	0.209	
	# 5@18"	0.207	

Suggested Rebar Spacing Continued

	Rebar	As (inch ² /ft)	T & S Rebar
Bot. Stem	# 3@3 1/2" # 4@6 1/2" # 5@10" # 6@14" # 7@18"	0.377 0.369 0.372 0.377 0.400	# 3@1 1/2" # 4@3" # 5@5" # 6@7" # 7@10"
Top Stem	# 3@8"	0.165	0.49 inch ²

Embedment

	Embedment	Embedment Into Element Above	Embedment Into Element Below
Toe	# 3 - 12" ld # 4 - 13 1/8" ld # 5 - 16 7/16" ld	# 3 - 12" ld # 4 - 13 1/8" ld # 5 - 16 7/16" ld	
Heel	# 3 - 12" ld # 4 - 13 1/8" ld # 5 - 16 7/16" ld # 6 - 19 11/16" ld		
Key	# 3 - 12" ld or 6" ldh # 4 - 13 1/8" ld or 7 11/16" ldh # 5 - 16 7/16" ld or 9 9/16" ldh	# 3 - 12" ld or 6" ldh # 4 - 13 1/8" ld or 7 11/16" ldh # 5 - 16 7/16" ld or 9 9/16" ldh	
Bot. Stem		# 3 - 12" ld # 4 - 12" ld # 5 - 14" ld # 6 - 21 13/16" ld # 7 - 25 7/16" ld	# 3 - 12 13/16" ld or 6" ldh # 4 - 17 1/16" ld or 7 11/16" ldh # 5 - 21 3/8" ld or 9 9/16" ldh # 6 - 25 5/8" ld or 11 1/2" ldh # 7 - 37 3/8" ld or 13 7/16" ldh
Top Stem			# 3 - 12" ld

Verify that required embedment lengths are available.

Load Combinations

Stability	Concrete	Masonry
D + H	1.2D + 1.6L + 0.5S + 1.6H	D + H
D + L + H	1.2D + 1.6S + L + 1.6H	D + L + H
D + S + H	1.2D + 1.6L + 0.5W + 1.6H	D + S + H
D + 0.6W + H	1.2D + 1.6S + 0.5W + 1.6H	D + 0.6W + H
D + 0.7E + H	1.2D + W + L + 0.5S + 1.6H	D + 0.75(L + S) + H
	1.2D + E + L + 0.7S + 1.6H	D + 0.75(0.6W + L + S) + H
	0.9D + W + 1.6H	D + 0.75(0.7E + L + S) + H
	0.9D + E + 1.6H	D + 0.7E + H
		0.6D + 0.7E + H
		0.6D + 0.6W + H