Job ID :
Job Description : Designed By :

DESIGN METHOD : ACI 530-11: Working Stress Design
MASONRY MATERIAL : Hollow Core Concrete Masonry Units
MORTAR TYPE : Type S
MORTAR MATERIAL : Portland Cement Lime Mortar
BLOCK PLACEMENT : Running Bond

MASONRY WALL DATA:

Wall Height	=	18.00 ft.
Nominal Wall Thickness	=	8.00 in.
Depth to c.g. Steel, Wall	=	3.81 in.
Parapet Height	=	0.00 ft.
Nominal Parapet Thickness	=	0.00 in.
Depth to c.g. Steel, Parapet	=	0.00 in.
Design Strip Width	=	12.00 in.

Main Wall Reinf. Layers = One Layer
Wall Grout Spacing = Partially Grouted

Support Type at Base = Pinned Support
Span Type = Supported Top and Bottom

WALL LOADS:

Wall Weight	=	50.00 psf.
Floor or Roof Load: Dead	=	400.0 Lb
Live	=	400.0 Lb
Eccentricity	=	3.00 in.
Additional Vertical Load: Dead	=	0.0 Lb
Live	=	0.0 Lb
Eccentricity	=	0.00 in.
Vertical Distance (y)	=	18.00 ft.
Equivalent Fluid Pressure	=	0.00 pcf.
Vertical Distance (x)	=	0.00 ft.

SEISMIC LOADS:

Site Class (A to F)	=	Class A
Seismic Use Group	=	I
Short Period Spectral Acceleration, Ss	=	0.00 %
One Second Spectral Acceleration, S1	=	< 0.75 g
(Computed) Design Category,	=	Category A
Parapet Component Importance Factor, Ip	=	1
Parapet Height/Roof Height Ratio z/h	=	0
Veneer Weight	=	0.00 psf.
Seismic Load on Main Wall*	=	5.00 psf.

* Minimum Code Required Value

Seismic Load on Parapet Wall	=	0.00 psf.

WIND LOADS:

	Load W or H	Magnitude (plf, lb)	Distance From Base of Wall (ft) Start	End
1	W	-20.00	0.00	18.00
2				
3				
4				
5				

Notes: 1. "W" designates a uniform distributed wind load.
"H" designates a concentrated horizontal wind load.
2. Horizontal loads are positive to the right.

MASONRY DATA:

Masonry Unit Strength = 1900.00 psi.

Masonry Compressive Strength, f'm = 1500.00 psi.
Allowable Flexural Stress, Fb = 675.00 psi.
Allowable Shear Stress, Fv = 77.46 psi.
Allowable Masonry Shear Stress Fvm = 47.00 psi.
Allowable Tension: No Grout, Ft = 33.00 psi.
Solid Grout, Ft = 86.00 psi.

Modulus of Elasticity, Em = 1,350 ksi.
Modular Ratio, Es/Em = n = 21.48

Single Grouted Cell + Web Width = 8.30 in.
Nominal Length of Masonry Unit = 16.00 in.
Block Face Shell Thickness = 1.25 in.
Nominal Minus Actual Thickness = 0.38 in.

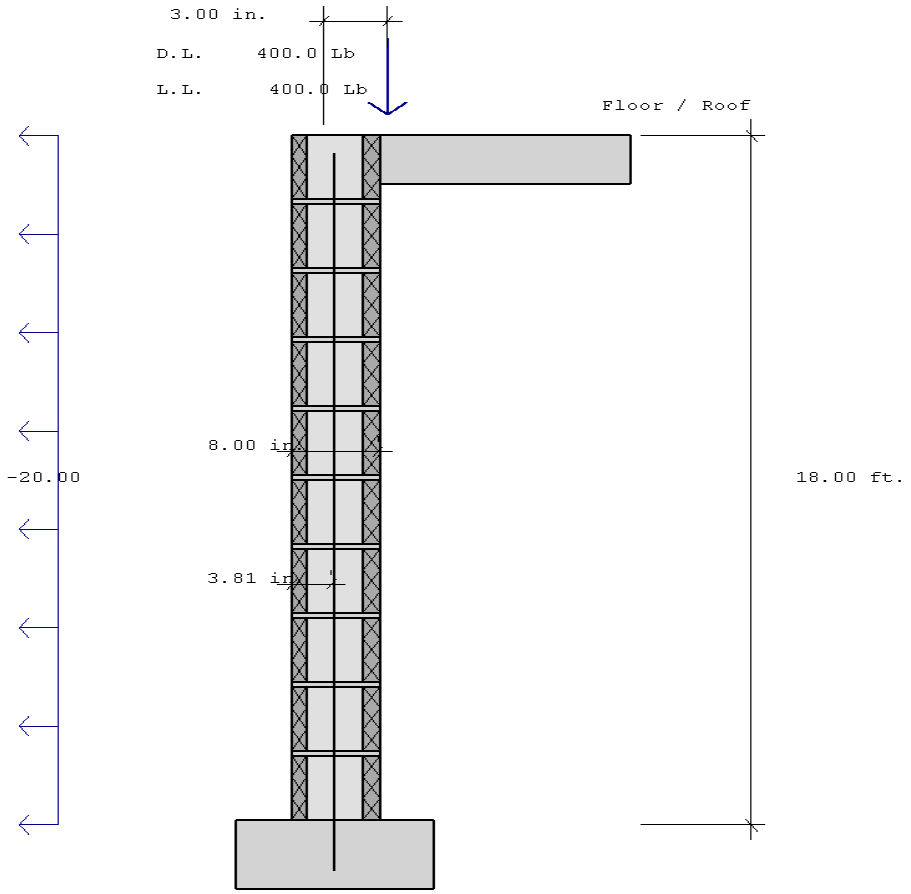
MATERIAL DATA:

Steel Yield Strength, Fy = 60.00 ksi.
Allowable Steel Stress, Fs = 24.00 ksi.
Modulus of Elasticity, Es = 29,000 ksi.

REINFORCED WALL DATA:

Minimum Steel Ratio, As/bt = 0.0007

GRAPHIC SUMMARY OF MASONRY WALL DATA



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S U M M A R Y O F R E S U L T S
F O R M A I N W A L L
****

DESIGN LOADS:

Moment, Ms = -536.0 ft-lb / 12.00 in.
Axial Load, Ps = 850.0 Lb / 12.00 in.
Load Combination = 1*DL+0.6*WL
Eccentricity at Moment, e = M/P = 7.57 in.

NOTE: Max. moment is located in Zone C, (e > 2d/3)
Wall is cracked, steel is stressed in tension.

Max. Shear, Vs = 113.6 Lb / 12.00 in.
Load Combination = 1*DL+0.6*WL

ANALYSIS RESULTS:

Design Strip Width = 12.00 in.
Actual Wall Thickness, t = 7.63 in.
Effective Height, h' = 18.00 ft.
Seismic Force, (ASCE 7-10 12.11.1) Fp = 5.00 plf. / 12.00 in.

Minimum Area of Steel, Vertical Reinf. = 0.06405 in.^2 / 12.00 in.
Minimum Area of Steel, Horiz. Reinf. = Not Required

Ref. ACI 530-11 1.11

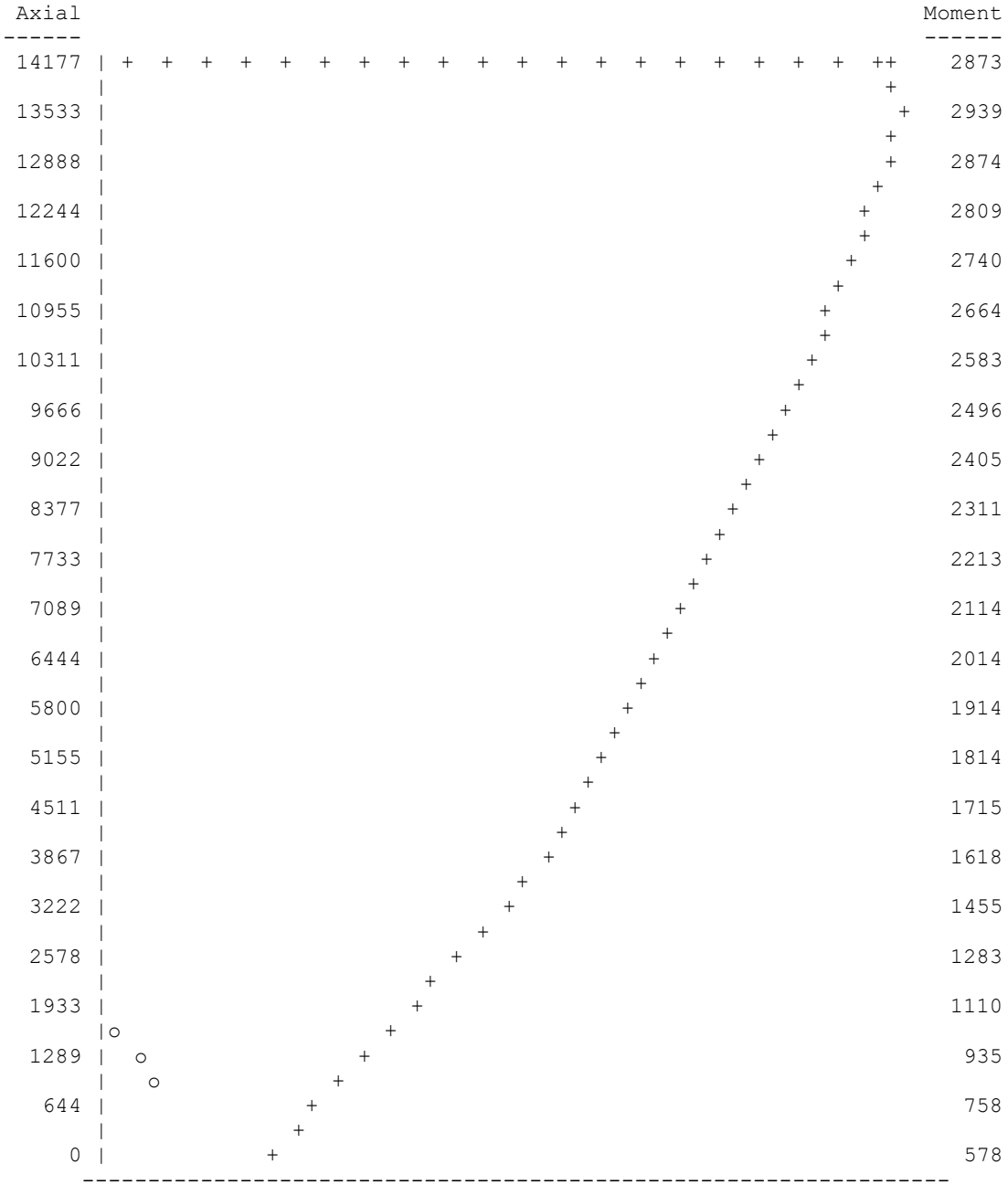
DESIGN RESULTS:

Bar Size	Fa, psi (1.0*.25*f'm*R)	fv, psi (V/b'd)	All. Moment @ Axial Load (P= 850.0 lb)	Bar Spa. (in. o.c.)
#3	229.02	4.78	814.7	16.00
#4	255.63	9.57	765.0	32.00
#5	265.74	16.74	703.4	56.00
#6	265.74	21.53	740.2	72.00
#7	265.74	21.53	912.3	72.00
#8	265.74	21.53	1,083.6	72.00
#9	265.74	21.53	1,149.4	72.00

Max. vertical bar spacing is 72 inch per ACI 530-11 1.9.6 (commentary)

MASONRY WALL INTERACTION DIAGRAM: (DEAD + LIVE LOAD ONLY)

Effective Wall Height = 18.00 ft. Solid Masonry Area, Ae = 61.90 in^2
Actual Wall Thickness = 7.63 in. All. Axial Stress, Fa = 229.02 psi.
Depth to c.g. Steel = 3.81 in. All. Bending Stress, Fb = 675.00 psi.
Design Width = 12.00 in. All. Steel Stress, Fs = 24.00 ksi.
Reinforcing Design = #3 @16 in. o.c.

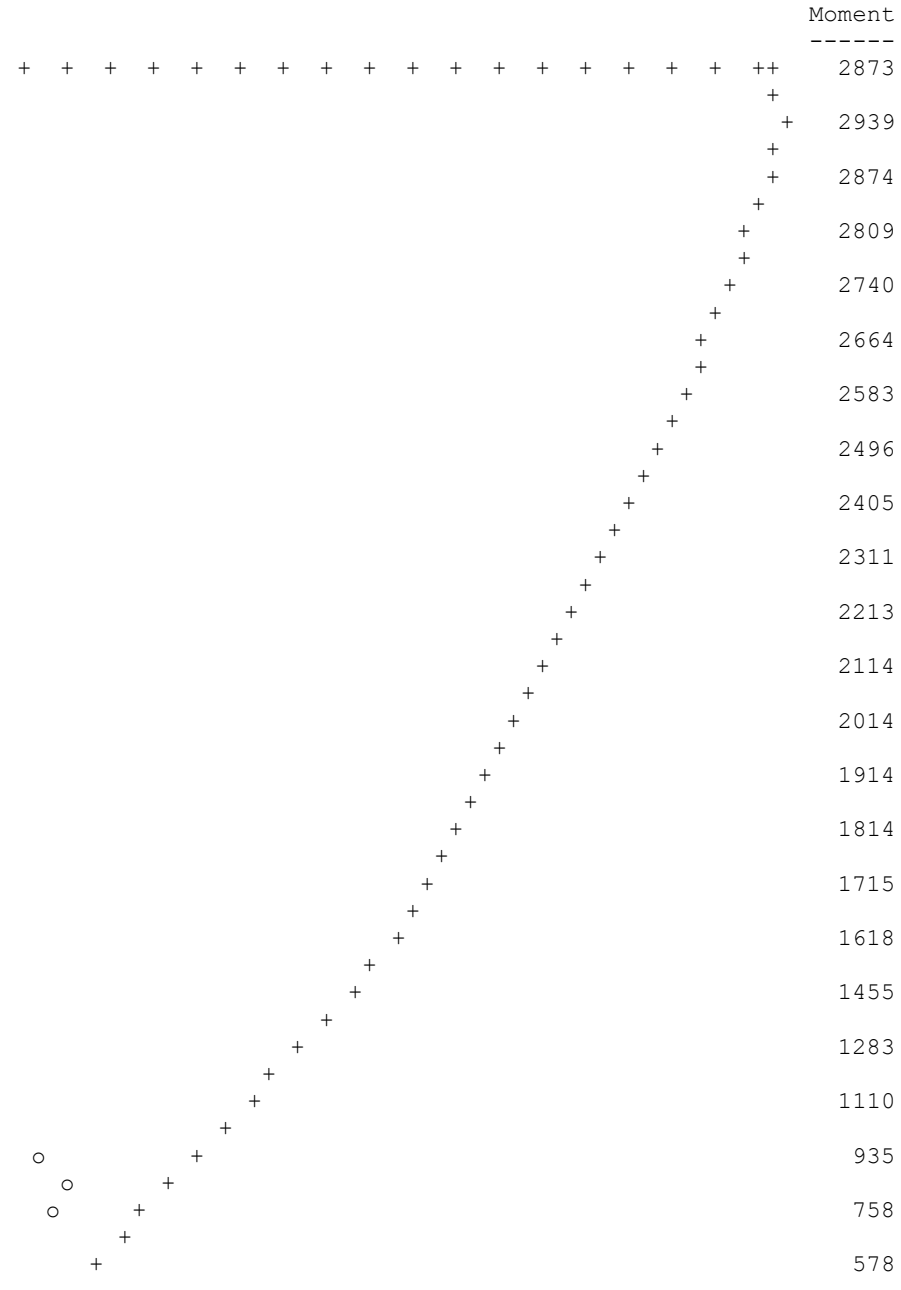


NOTES: Axial Load = Lb, Moment = ft-lb
+ = Moment Capacity
o = Applied Moment

Positive moment is defined as moment which causes compression on the outside face of wall.

MASONRY WALL INTERACTION DIAGRAM: (WIND / SEISMIC LOADS)

Effective Wall Height =	18.00 ft.	Solid Masonry Area, Ae =	61.90 in^2
Actual Wall Thickness =	7.63 in.	All. Axial Stress, Fa =	229.02 psi.
Depth to c.g. Steel =	3.81 in.	All. Bending Stress, Fb =	675.00 psi.
Design Width =	12.00 in.	All. Steel Stress, Fs =	24.00 ksi.
Reinforcing Design =	#3 @16 in. o.c.		



NOTES: Axial Load = Lb, Moment = ft-lb
+ = Moment Capacity
o = Applied Moment

Positive moment is defined as moment which causes compression on the outside face of wall.

DETAILED RESULTS FOR MAIN WALL:

LOAD COMBINATION : 1*DL+1*LL
REBAR DESIGN : #3 @16 in. o.c.
FURNISHED AREA OF STEEL : 0.082 in^2 / 12.00 in.
MINIMUM AREA OF STEEL : 0.064 in^2 / 12.00 in.

No.	Dist From Bot (ft)	Mom. (ft-lb)	Axial (lbs)	Shear (lbs)
0	18.00	-200.0	800.0	-11.1
1	16.20	-180.0	890.0	-11.1
2	14.40	-160.0	980.0	-11.1
3	12.60	-140.0	1,070.0	-11.1
4	10.80	-120.0	1,160.0	-11.1
5	9.00	-100.0	1,250.0	-11.1
6	7.20	-80.0	1,340.0	-11.1
7	5.40	-60.0	1,430.0	-11.1
8	3.60	-40.0	1,520.0	-11.1
9	1.80	-20.0	1,610.0	-11.1
10	0.00	0.0	1,700.0	-11.1

WALL PROPERTIES:

Effective Flange Width bf = 12.00 in. / 12.00 in.
Effective Grouted Core Width, b' = 6.23 in. / 12.00 in.

Solid Masonry Area, Ae = 61.90 in.^2 / 12.00 in.
Gross Moment of Inertia, Ig = 378.54 in.^4 / 12.00 in.
Section Modulus, S = 2*Ig/t = 99.29 in.^3 / 12.00 in.
Radius of Gyration, r = 2.473 in. / 12.00 in.
Slenderness Factor, h'/r = 87.35

ALLOWABLE STRESSES:

Allowable Axial Stress, Fa = 229.02 psi.
Allowable Bending Stress, Fb = 675.00 psi.
Allowable Shear Stress, Fv = 77.46 psi.
Allowable Steel Stress, Fs = 24000.00 psi.

DETAILED RESULTS FOR MAIN WALL:

LOAD COMBINATION : 1*DL+0.75*LL+0.45*WL
REBAR DESIGN : #3 @16 in. o.c.
FURNISHED AREA OF STEEL : 0.082 in^2 / 12.00 in.
MINIMUM AREA OF STEEL : 0.064 in^2 / 12.00 in.

No.	Dist From Bot (ft)	Mom. (ft-lb)	Axial (lbs)	Shear (lbs)
0	18.00	-175.0	700.0	71.3
1	16.20	-288.7	790.0	55.1
2	14.40	-373.3	880.0	38.9
3	12.60	-428.7	970.0	22.7
4	10.80	-454.9	1,060.0	6.5
5	9.00	-452.0	1,150.0	-9.7
6	7.20	-419.9	1,240.0	-25.9
7	5.40	-358.7	1,330.0	-42.1
8	3.60	-268.3	1,420.0	-58.3
9	1.80	-148.7	1,510.0	-74.5
10	0.00	0.0	1,600.0	-90.7

WALL PROPERTIES:

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ALLOWABLE STRESSES:

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Allowable Bending Stress, Fb = 675.00 psi.
Allowable Shear Stress, Fv = 77.46 psi.
Allowable Steel Stress, Fs = 24000.00 psi.

DETAILED RESULTS FOR MAIN WALL:

LOAD COMBINATION : 1*DL+0.6*WL
REBAR DESIGN : #3 @16 in. o.c.
FURNISHED AREA OF STEEL : 0.082 in^2 / 12.00 in.
MINIMUM AREA OF STEEL : 0.064 in^2 / 12.00 in.

No.	Dist From Bot (ft)	Mom. (ft-lb)	Axial (lbs)	Shear (lbs)
0	18.00	-100.0	400.0	102.4
1	16.20	-265.0	490.0	80.8
2	14.40	-391.0	580.0	59.2
3	12.60	-478.2	670.0	37.6
4	10.80	-526.6	760.0	16.0
5	9.00	-536.0	850.0	-5.6
6	7.20	-506.6	940.0	-27.2
7	5.40	-438.2	1,030.0	-48.8
8	3.60	-331.0	1,120.0	-70.4
9	1.80	-185.0	1,210.0	-92.0
10	0.00	0.0	1,300.0	-113.6

WALL PROPERTIES:

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