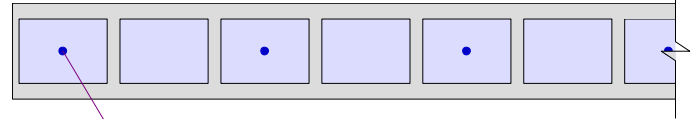
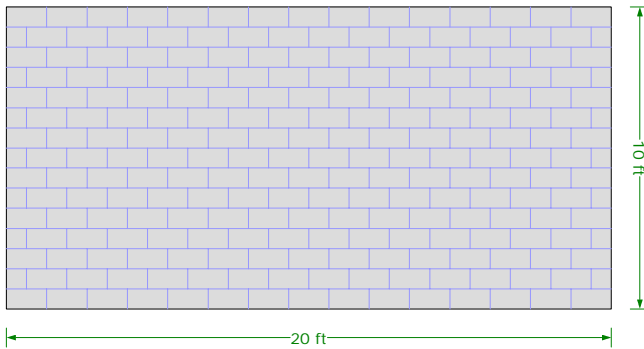




Design Detail

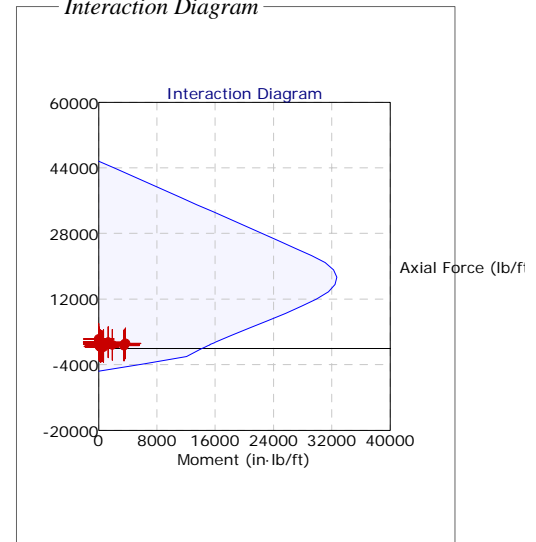


Vertical Bars: #5 @ 16 in

Check Summary

Ratio	Check	Provided	Required	Combination
<b>Strength Checks</b>				
✓ 0.076	Axial Compression	2.58 k	0.2 k	1.2D + 1.6L
✓ 0.000	Axial Tension	24 k	0 k	1.4D
✓ 0.094	Shear	38.73 psi	3.65 psi	0.9D + 1.6W
✓ 0.236	Axial+Flexure	15660 in-lb/ft	3697 in-lb/ft	1.2D + 0.5L + 1.6W

Interaction Diagram



Criteria

Building Code	MSCJ-02 (ASD)
Load Combination	IBC 2003 (Str)
Seismic R Value	1.00
Amplify Axial Stress For Slenderness	Yes
f'm	1500 psi
f <sub>y</sub>	60000 psi
Specify Wall Weight Manually	No
Block Weight	Normal weight
Design As Clay Masonry	No
Include Wall Self-Weight	Yes
Neglect Lateral Load on Parapet	No
Include Wall Wt In Virtual Eccentricity	No

Load Combinations

IBC 2003 (Str)
1.4D
1.2D + 1.6L
1.2D + 0.8W
1.2D + 1.6W
1.2D + 0.5L + 1.6W
1.2D
1.2D + 0.5L
0.9D
0.9D + 1.6W

Loads Summary

Load Set	Source	Axial Unifo...	Axial Pt Lo...	Pt Ld Eff W...	Eccentricity	Lateral Pre...	Top Lateral...	Parapet Pr...	Lateral Uni...	Lat Unif Ld...	Moment
Dead		305 lb/ft	0 k	1 ft	1 in	0 psf	0 psf	0 psf	0 lb/ft	1 ft	0 in-lb/ft
Live		610 lb/ft	0 k	1 ft	1 in	0 psf	0 psf	0 psf	0 lb/ft	1 ft	0 in-lb/ft
Wind		0 lb/ft	0 k	1 ft	0 in	-25 psf	-25 psf	-25 psf	0 lb/ft	1 ft	0 in-lb/ft

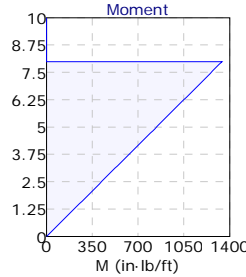
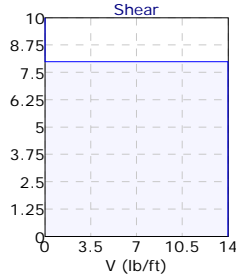
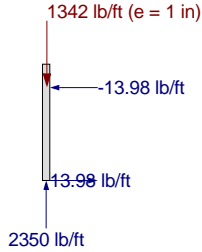


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Bearing Wall 1

Load Combination: 1.2D + 1.6L

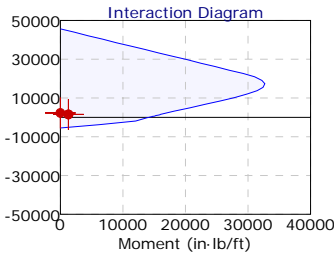
Design Forces



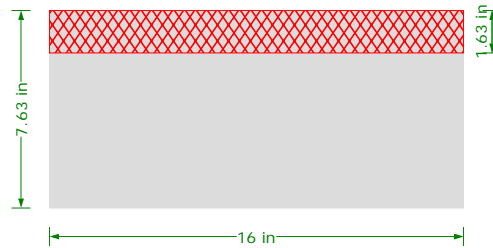
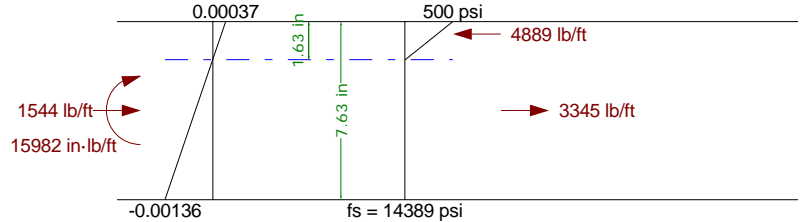
Factored Loads

Wall Weight	1008 lb/ft
Effective Eccentricity	1 in
Applied Eccentricity	1 in

Axial/Flexure Checks



Internal State at Max Moment Capacity for  $P = 1544$  lb/ft  
 COMPRESSION controlled ( $f_m = F_m = 500$  psi)  $k = 0.214$



Combined Axial Flexure (@ base) [MSJC-02 2.3.3.2.2, 2.3

$P = 2350$  lb / ft  
 $M_a = 17034$  in-lb / ft (from interaction diagram given P)  
 $M = 0$  in-lb / ft  $\leq M_a = 17034$  in-lb / ft ✓

Combined Axial Flexure (@ max M) [MSJC-02 2.3.3.2.2, 2

$P = 1544$  lb / ft  
 $M_a = 15982$  in-lb / ft (from interaction diagram given P)  
 $M = 1342$  in-lb / ft  $\leq M_a = 15982$  in-lb / ft ✓

Combined Axial Flexure (@ top) [MSJC-02 2.3.3.2.2, 2.3.1

$P = 1544$  lb / ft  
 $M_a = 15982$  in-lb / ft (from interaction diagram given P)  
 $M = 1342$  in-lb / ft  $\leq M_a = 15982$  in-lb / ft ✓

Other Checks

Shear [MSJC-02 2.3.5]

$$f_v = \frac{V}{d} = \frac{(13.98 \text{ lb/ft})}{(3.81 \text{ in})} = 0.31 \text{ psi}$$

$$F_v = \sqrt{f'_m} = \sqrt{(1500 \text{ psi})} = 38.73 \text{ psi} \quad (\leq 50 \text{ psi})$$

$$f_v = 0.31 \text{ psi} \leq F_v = 38.73 \text{ psi} \quad \checkmark$$

Axial Compression (@ base) [MSJC-02 2.3.3.2.1]

$$F_s = 24000 \text{ psi} \quad (\text{Grade 60 reinf})$$

$$A_{st} = 0 \text{ in}^2 / \text{in} \quad (\text{bars are not tied})$$

$$h / r = (8 \text{ ft}) / (2.2 \text{ in}) = 43.6136 \leq 99$$

$$P_a = [0.25 f'_m A_n + 0.65 A_{st} F_s] \left[ 1 - \left[ \frac{h}{140 r} \right]^2 \right]$$

$$= [0.25 (1500 \text{ psi}) (0.64 \text{ ft}^2 / \text{ft}) + 0.65 (0 \text{ in}^2 / \text{in}) (24000 \text{ psi})] \left[ 1 - \left[ \frac{(8 \text{ ft})}{140 (2.2 \text{ in})} \right]^2 \right]$$

$$= 30983 \text{ lb / ft}$$

$$P = 2350 \text{ lb / ft} \leq P_a = 30983 \text{ lb / ft} \quad \checkmark$$

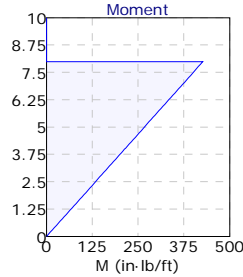
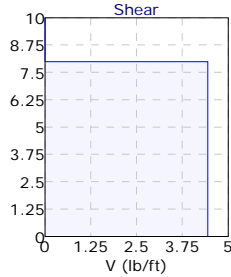
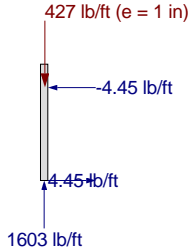


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### Bearing Wall 1

## Load Combination: 1.4D

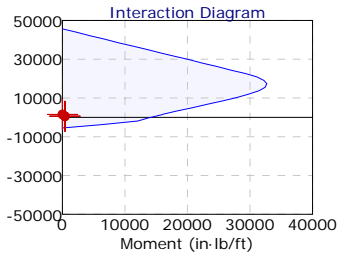
### Design Forces



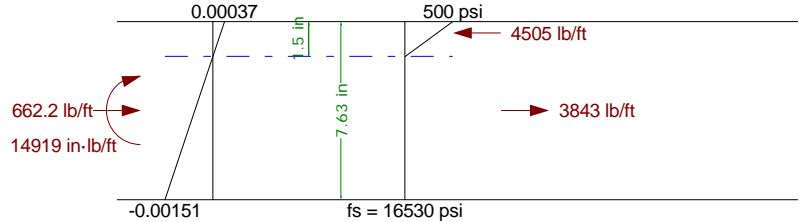
### Factored Loads

Wall Weight	1176 lb/ft
Effective Eccentricity	1 in
Applied Eccentricity	1 in

### Axial/Flexure Checks



Internal State at Max Moment Capacity for  $P = 662.2 \text{ lb/ft}$   
 COMPRESSION controlled ( $f_m = F_m = 500 \text{ psi}$ )  $k = 0.197$



#### Combined Axial\_Flexure (@ base) [MSJC-02 2.3.3.2.2, 2.3

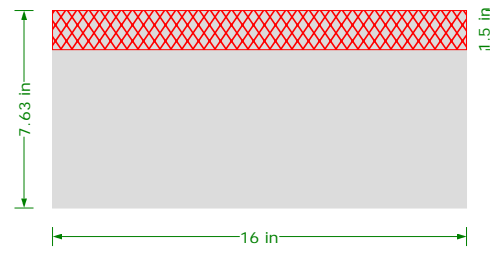
$P = 1603 \text{ lb / ft}$   
 $M_a = 16060 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 0 \text{ in-lb / ft} \leq M_a = 16060 \text{ in-lb / ft}$  ✓

#### Combined Axial\_Flexure (@ max M) [MSJC-02 2.3.3.2.2, 2

$P = 662.2 \text{ lb / ft}$   
 $M_a = 14919 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 427 \text{ in-lb / ft} \leq M_a = 14919 \text{ in-lb / ft}$  ✓

#### Combined Axial\_Flexure (@ top) [MSJC-02 2.3.3.2.2, 2.3.2

$P = 662.2 \text{ lb / ft}$   
 $M_a = 14919 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 427 \text{ in-lb / ft} \leq M_a = 14919 \text{ in-lb / ft}$  ✓



### Other Checks

#### Shear [MSJC-02 2.3.5]

$$f_v = \frac{V}{d} = \frac{(4.45 \text{ lb / ft})}{(3.81 \text{ in})} = 0.1 \text{ psi}$$

$$F_v = \sqrt{f'_m} = \sqrt{(1500 \text{ psi})} = 38.73 \text{ psi} \quad (\leq 50 \text{ psi})$$

$$f_v = 0.1 \text{ psi} \leq F_v = 38.73 \text{ psi} \quad \checkmark$$

#### Axial Compression (@ base) [MSJC-02 2.3.3.2.1]

$$F_s = 24000 \text{ psi} \quad (\text{Grade 60 reinf})$$

$$A_{st} = 0 \text{ in}^2 / \text{in} \quad (\text{bars are not tied})$$

$$h / r = (8 \text{ ft}) / (2.2 \text{ in}) = 43.6136 \leq 99$$

$$P_a = [0.25 f'_m A_n + 0.65 A_{st} F_s] \left[ 1 - \left[ \frac{h}{140 r} \right]^2 \right]$$

$$= [0.25 (1500 \text{ psi}) (0.64 \text{ ft}^2 / \text{ft}) + 0.65 (0 \text{ in}^2 / \text{in}) (24000 \text{ psi})] \left[ 1 - \left[ \frac{(8 \text{ ft})}{140 (2.2 \text{ in})} \right]^2 \right]$$

$$= 30983 \text{ lb / ft}$$

$$P = 1603 \text{ lb / ft} \leq P_a = 30983 \text{ lb / ft} \quad \checkmark$$

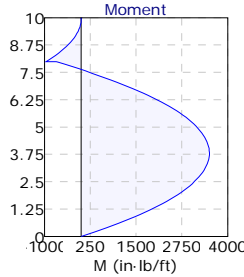
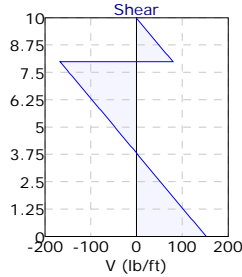
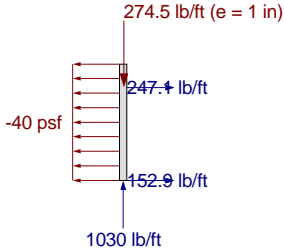


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Bearing Wall 1

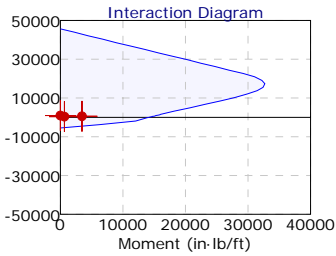
Load Combination: 0.9D + 1.6W

Design Forces

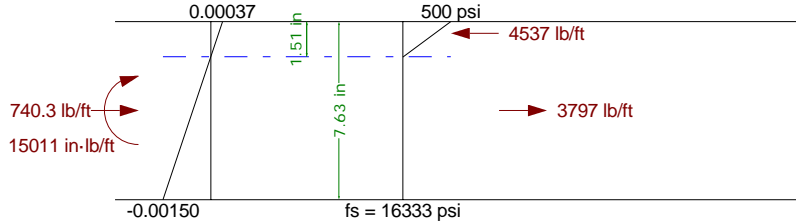


Factored Loads	
Wall Weight	756 lb/ft
Effective Eccentricity	1 in
Applied Eccentricity	1 in

Axial/Flexure Checks



Internal State at Max Moment Capacity for  $P = 740.3 \text{ lb/ft}$   
 COMPRESSION controlled ( $f_m = F_m = 500 \text{ psi}$ )  $k = 0.198$



Combined Axial Flexure (@ base) [MSJC-02 2.3.3.2.2, 2.3

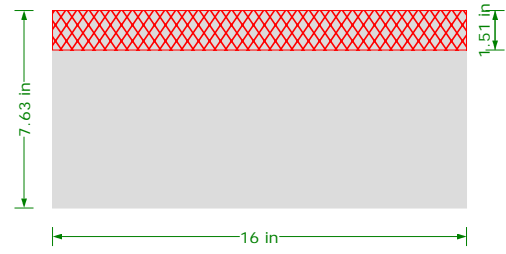
$P = 1030 \text{ lb / ft}$   
 $M_a = 15357 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 0 \text{ in-lb / ft} \leq M_a = 15357 \text{ in-lb / ft}$  ✓

Combined Axial Flexure (@ max M) [MSJC-02 2.3.3.2.2, 2

$P = 740.3 \text{ lb / ft}$   
 $M_a = 15011 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 3505 \text{ in-lb / ft} \leq M_a = 15011 \text{ in-lb / ft}$  ✓

Combined Axial Flexure (@ top) [MSJC-02 2.3.3.2.2, 2.3.2

$P = 425.7 \text{ lb / ft}$   
 $M_a = 14646 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 685.5 \text{ in-lb / ft} \leq M_a = 14646 \text{ in-lb / ft}$  ✓



Other Checks

Shear [MSJC-02 2.3.5]

$$f_v = \frac{V}{d} = \frac{(167.1 \text{ lb / ft})}{(3.81 \text{ in})} = 3.65 \text{ psi}$$

$$F_v = \sqrt{f_m} = \sqrt{(1500 \text{ psi})} = 38.73 \text{ psi} \quad (\leq 50 \text{ psi})$$

$$f_v = 3.65 \text{ psi} \leq F_v = 38.73 \text{ psi} \quad \checkmark$$

Axial Compression (@ base) [MSJC-02 2.3.3.2.1]

$$F_s = 24000 \text{ psi} \quad (\text{Grade 60 reinf})$$

$$A_{st} = 0 \text{ in}^2 / \text{in} \quad (\text{bars are not tied})$$

$$h / r = (8 \text{ ft}) / (2.2 \text{ in}) = 43.6136 \leq 99$$

$$P_a = [0.25 f_m A_n + 0.65 A_{st} F_s] \left[ 1 - \left[ \frac{h}{140 r} \right]^2 \right]$$

$$= [0.25 (1500 \text{ psi}) (0.64 \text{ ft}^2 / \text{ft}) + 0.65 (0 \text{ in}^2 / \text{in}) (24000 \text{ psi})] \left[ 1 - \left[ \frac{(8 \text{ ft})}{140 (2.2 \text{ in})} \right]^2 \right]$$

$$= 30983 \text{ lb / ft}$$

$$P = 1030 \text{ lb / ft} \leq P_a = 30983 \text{ lb / ft} \quad \checkmark$$

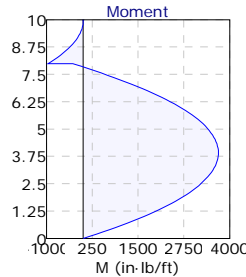
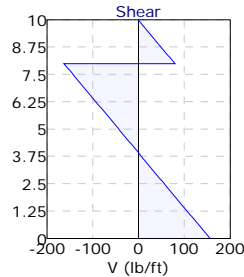
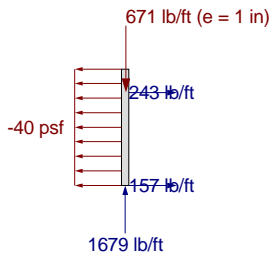


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### Bearing Wall 1

### Load Combination: 1.2D + 0.5L + 1.6W

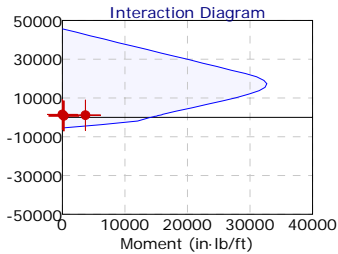
#### Design Forces



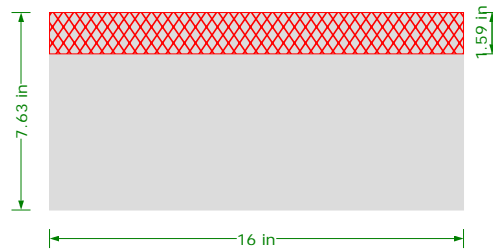
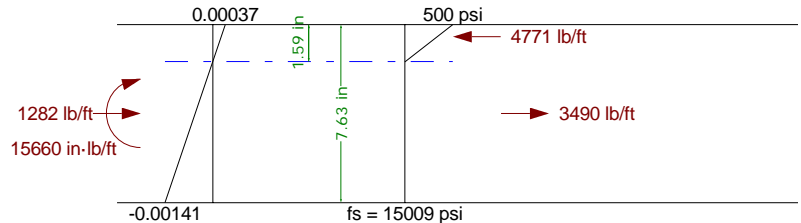
#### Factored Loads

Wall Weight	1008 lb/ft
Effective Eccentricity	1 in
Applied Eccentricity	1 in

#### Axial/Flexure Checks



Internal State at Max Moment Capacity for  $P = 1282 \text{ lb/ft}$   
 COMPRESSION controlled ( $f_m = F_m = 500 \text{ psi}$ )  $k = 0.209$



#### Combined Axial Flexure (@ base) [MSJC-02 2.3.3.2.2, 2.3

$P = 1679 \text{ lb / ft}$   
 $M_a = 16159 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 0 \text{ in-lb / ft} \leq M_a = 16159 \text{ in-lb / ft}$  ✓

#### Combined Axial Flexure (@ max M) [MSJC-02 2.3.3.2.2, 2

$P = 1282 \text{ lb / ft}$   
 $M_a = 15660 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 3697 \text{ in-lb / ft} \leq M_a = 15660 \text{ in-lb / ft}$  ✓

#### Combined Axial Flexure (@ top) [MSJC-02 2.3.3.2.2, 2.3.1

$P = 872.6 \text{ lb / ft}$   
 $M_a = 15169 \text{ in-lb / ft}$  (from interaction diagram given P)  
 $M = 289 \text{ in-lb / ft} \leq M_a = 15169 \text{ in-lb / ft}$  ✓

#### Other Checks

#### Shear [MSJC-02 2.3.5]

$$f_v = \frac{V}{d} = \frac{(163 \text{ lb / ft})}{(3.81 \text{ in})} = 3.56 \text{ psi}$$

$$F_v = \sqrt{f_m} = \sqrt{(1500 \text{ psi})} = 38.73 \text{ psi} \quad (\leq 50 \text{ psi})$$

$$f_v = 3.56 \text{ psi} \leq F_v = 38.73 \text{ psi} \quad \checkmark$$

#### Axial Compression (@ base) [MSJC-02 2.3.3.2.1]

$$F_s = 24000 \text{ psi} \quad (\text{Grade 60 reinf})$$

$$A_{st} = 0 \text{ in}^2 / \text{in} \quad (\text{bars are not tied})$$

$$h / r = (8 \text{ ft}) / (2.2 \text{ in}) = 43.6136 \leq 99$$

$$P_a = [0.25 f_m A_n + 0.65 A_{st} F_s] \left[ 1 - \left[ \frac{h}{140 r} \right]^2 \right]$$

$$= [0.25 (1500 \text{ psi}) (0.64 \text{ ft}^2 / \text{ft}) + 0.65 (0 \text{ in}^2 / \text{in}) (24000 \text{ psi})] \left[ 1 - \left[ \frac{(8 \text{ ft})}{140 (2.2 \text{ in})} \right]^2 \right]$$

$$= 30983 \text{ lb / ft}$$

$$P = 1679 \text{ lb / ft} \leq P_a = 30983 \text{ lb / ft} \quad \checkmark$$