UNITED STRUCTURAL DESIGN LLC

PRCTI20251520

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

These calculations must be on site and made available by the Permittee for all inspections.

GFS Booth U178152SD

Structural Calculations

PROJECT ADDRESS

Codel Door
1601 Industrial Way
Puyallup, WA 98371

ISSUE DATE

07/2025

ENGINEER

KG

PROJECT NUMBER

255161

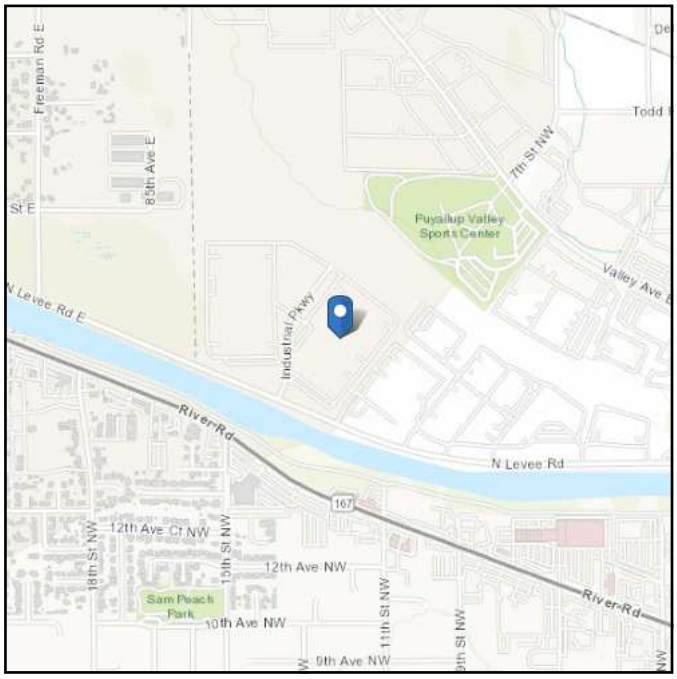
07/15/2025

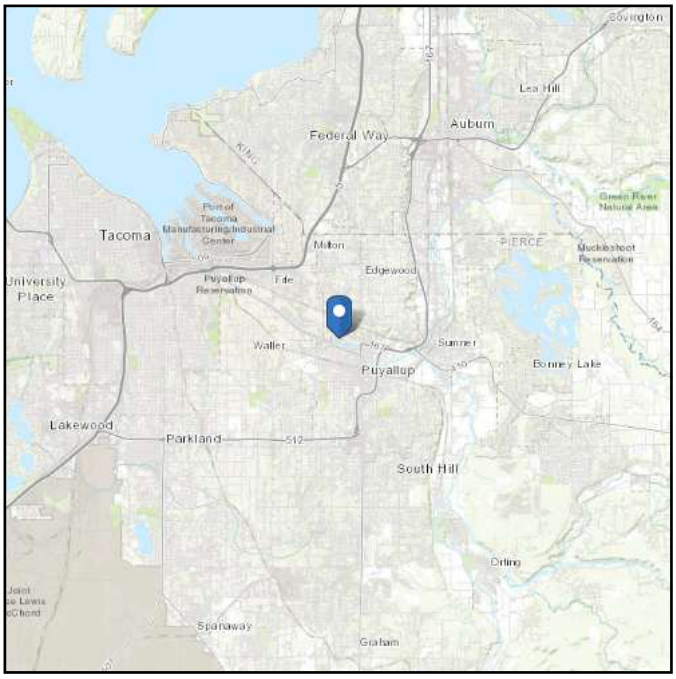
John B. Elder, P.E.
WA License No. 54612
2058 S Dobson Rd. Suite 10
Mesa, AZ 85202

ASCE Hazards Report

Address:
1601 Industrial Park Way
Puyallup, Washington
98371

Standard:	ASCE/SEI 7-16	**Latitude:**	47.206764
Risk Category:	II	**Longitude:**	-122.30984
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	33.896965451500755 ft (NAVD 88)





Wind

Results:

Wind Speed	97 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Tue Jun 17 2025

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.283	S_{D1} :	N/A
S_1 :	0.441	T_L :	6
F_a :	1.2	PGA :	0.5
F_v :	N/A	PGA_M :	0.6
S_{MS} :	1.539	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.026	C_v :	1.357

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Tue Jun 17 2025

Date Source: USGS Seismic Design Maps

Snow

Results:

Ground Snow Load, p_g :	18 lb/ft^2
Mapped Elevation:	33.9 ft
Data Source:	
Date Accessed:	Tue Jun 17 2025

Statutory requirements of the Authority Having Jurisdiction are not included.

Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported 'elevation' and 'mapped elevation' differ significantly from each other.

UNITED
STRUCTURAL DESIGN LLC

Booths A-C Design

Structural Calculations

David Grapsas, P.E.
Principal
John Elder, P.E.
Principal

Phoenix, AZ
480-454-6408
www.unitedstr.com

www.unitedstr.com

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Booth Information/Loading Criteria			Sheet:		of	

BOOTH CONSTRUCTION

Booth Width, W (N-S)	14.0	ft
Booth Length, D (E-W)	18.0	ft
Mean Roof Height	8.0	ft
Roof Area	252	ft^2
Total Wall Length	50	ft

LOADING CRITERIA

Roof Dead Load

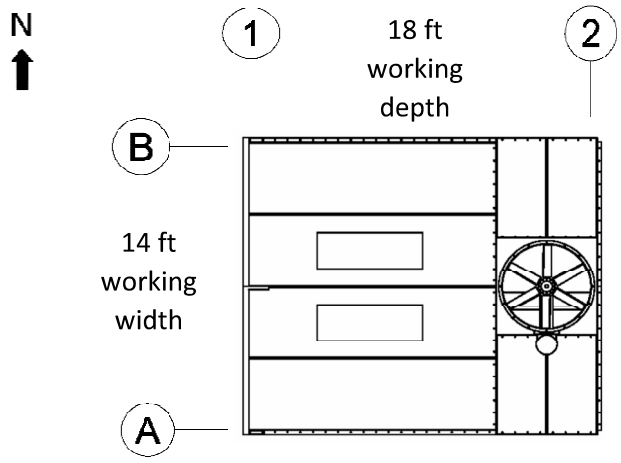
Panel	18 gauge		2.4 psf
Lights	Yes		
Number of Lights	8		0.8 psf
Fire Suppression	Yes	(Mains not Incl.)	1.5 psf
Misc.			0.3 psf
		RDL	**5.0 psf**

Wall Dead Load

Panel	18 gauge		2.4 psf
Lights	No		
Misc.			1.1 psf
		WDL	**3.5 psf**

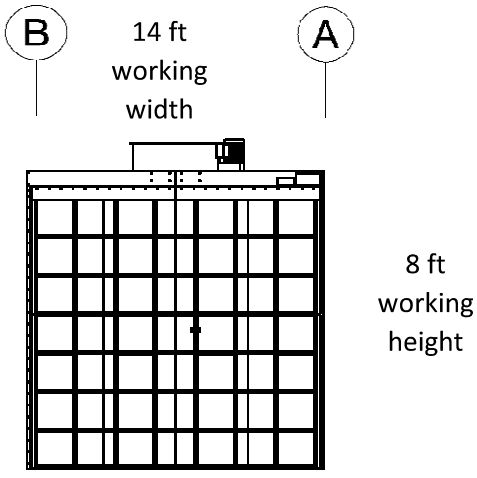
Mechanical Equipment

Make-up Air Unit	0 lbs
Exhaust Fan	317 lbs
Recirculation Fan	0 lbs
Duct	0 lbs



PLAN VIEW

(TOTAL WALL LENGTHS)



BOOTH FRONT ELEVATION

(BOOTH WIDTH & ROOF HEIGHT)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Seismic Analysis		Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

Soil Site Class		D	Table 20.3-1
Risk Category		II, Standard	Table 1.5-1
Mapped Accelerations	S_s	1.283	Hazard Tool
	S_1	0.441	Hazard Tool
Site Coefficients	F_a	1.200	Table 11.4-1
	F_v	1.859	Table 11.4-2
MCE_R Spectral Accelerations	$S_{ms} = F_a*S_s$	1.540	Eq. 11.4-1
	$S_{m1} = F_v*S_1$	0.820	Eq. 11.4-2
Design Spectral Accelerations	$S_{DS} = 2/3(S_{ms})$	1.027	Eq. 11.4-3
	$S_{D1} = 2/3(S_{m1})$	0.547	Eq. 11.4-4
Seismic Design Category (0.2 sec.)		D	Table 11.6-1
Seismic Design Category (1.0 sec.)		D	Table 11.6-2
Seismic Design Category		**D**	

Seismic Force Resisting System:		All other self-supporting structures, tanks, or vessels not covered elsewhere in Table 15.4-2	Table 15.4-2
Detailing Requirements		N/A	
Average Building Height	h (ft)	8	
Building Height Limit		50	Table 15.4-2
Long-Period Transition Period	T_L	6	Hazard Tool
Coefficient for Upper Limit on Period	C_u	1.40	Table 12.8-1
Approximate Period Parameters	C_t	0.02	Table 12.8-2
	x	0.75	Table 12.8-2
Approximate Fundamental Period	T_a	0.10	Eq. 12.8-7
Response Modification Coefficient	R	1.25	Table 15.4-2
System Overstrength Factor	Ω_o	2.00	Table 15.4-2
Deflection Amplification Factor	C_d	2.50	Table 15.4-2
Importance Factor	I_E	1.00	Table 11.5-2

Seismic Response Coefficient

C_s	0.822	Eq. 12.8-2
C_{s_max}	4.600	Eq. 12.8-3
C_{s_min}	0.045	Eq. 12.8-5
C_{s_min}	N/A	Eq. 12.8-6

C_s 0.822

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Seismic Analysis			Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

SEISMIC WEIGHT

Booth Weight (Trib to Roof)	1960	lbs

Mechanical Equipment

Make-up Air Unit	0	lbs
Exhaust Fan	317	lbs
Recirculation Fan	0	lbs
Duct	0	lbs
Total Weight, W_T	**2277**	lbs

BASE SHEAR (Eq. 12.8.1)

$C_s * W_T$, V = **1871** lbs (Ult.)

DIAPHRAGM DESIGN

$$F_P = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$

F_p= 1871 lbs Eq 12.10-1

Shall not be less than

$F_{p\,min}$= 468 lbs Eq 12.10-2

Need not exceed

$F_{p\,max}$= 935 lbs Eq 12.10-3

F_p= **935** lbs

East-West Direction

V_{EW}= 26 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 0.8:1

North-South Direction

V_{NS}= 67 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 1.3:1

USE 18 GA ROOF PANELS

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Lateral Loads			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A

Entire Wall Length	18.0	ft
Number of Piers	1	
Length of First Pier (AP1)	18.0	ft
Panel Height	8.0	ft

SEISMIC LOADING

Shear to Gridline	935	lbs (Ult.)
Shear to First Pier (AP1)	935	lbs (Ult.)

North-South lateral loads control design of Gridline A shear wall

SHEAR WALL DESIGN

GRID LINE B

Entire Wall Length	18.0	ft
Number of Piers	1	
Length of First Pier (BP1)	18.0	ft
Panel Height	8.0	ft

SEISMIC LOADING

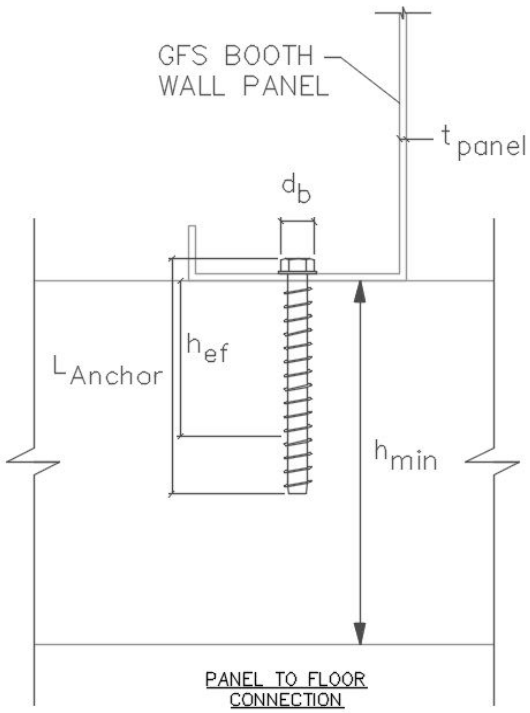
Shear to Gridline	935	lbs (Ult.)
Shear to First Pier (BP1)	935	lbs (Ult.)

North-South lateral loads control design of Gridline B shear wall

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	AP1	
Pier Length	18.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	935	lbs
Shear to Pier	935	lbs
Uniform Shear to Pier	52	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

Check Overturning

Overturning Moment	7483	lb-ft
Resisting Moment	5346	lb-ft
Uplift	**148**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**11**	
Anchors at 12" o.c.	**17**	
Anchors at 6" o.c.	**34**	
	11	anchors provided

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

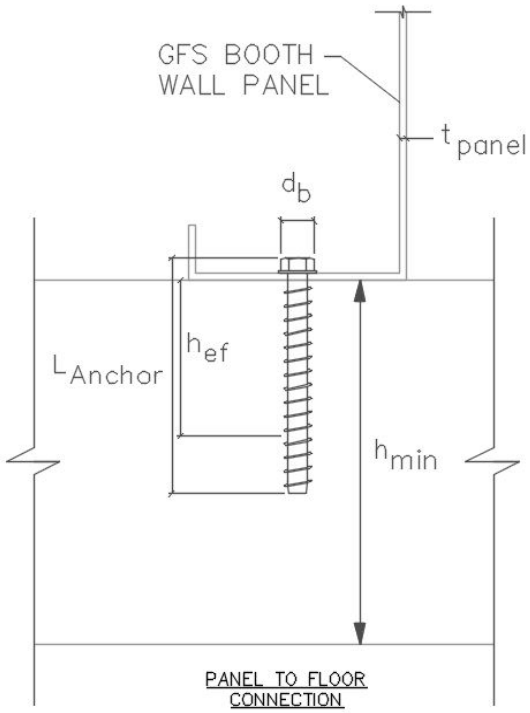
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	BP1	
Pier Length	18.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	935	lbs
Shear to Pier	935	lbs
Uniform Shear to Pier	52	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

Check Overturning

Overturning Moment	7483	lb-ft
Resisting Moment	5346	lb-ft
Uplift	**148**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**11**	
Anchors at 12" o.c.	**17**	
Anchors at 6" o.c.	**34**	
	11	anchors provided

DESIGN CONTROLLED BY NORTH-SOUTH LOADING

ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Lateral Loads			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 2

Entire Wall Length	14.0	ft
Number of Piers	1	
Length of First Pier (2P1)	14.0	ft
Panel Height	8.0	ft

SEISMIC LOADING

Shear to Gridline	1871	lbs (Ult.)
Shear to First Pier (2P1)	1871	lbs (Ult.)

SHEAR WALL DESIGN

GRID LINE A

Shear to Gridline	1203	lbs (Ult.)
Shear to First Pier (AP1)	1203	lbs (Ult.)

North-South lateral loads control design of Gridline A shear wall

GRID LINE B

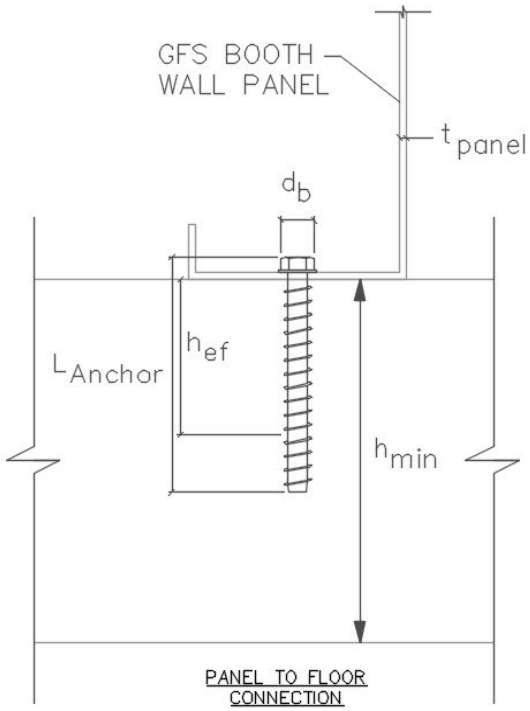
Shear to Gridline	1203	lbs (Ult.)
Shear to First Pier (BP1)	1203	lbs (Ult.)

North-South lateral loads control design of Gridline B shear wall

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall 1 Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 2



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	2P1	
Pier Length	14.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	1871	lbs
Shear to Pier	1871	lbs
Uniform Shear to Pier	134	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	14966	lb-ft
Resisting Moment	3234	lb-ft
Uplift	**861**	lbs
Capacity of Anchor (Tension)	1507	lbs
Number of holdown anchors required	2	

LOCATE FIRST HOLDOWN ANCHOR 3 IN. FROM END OF THE PIER AND THE REMAINING (1) HOLDOWN ANCHOR AT 3 IN. O.C. FROM FIRST HOLDOWN ANCHOR

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**2**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**8**	
Anchors at 18" o.c.	**8**	
Anchors at 12" o.c.	**12**	
Anchors at 6" o.c.	**25**	
	8	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

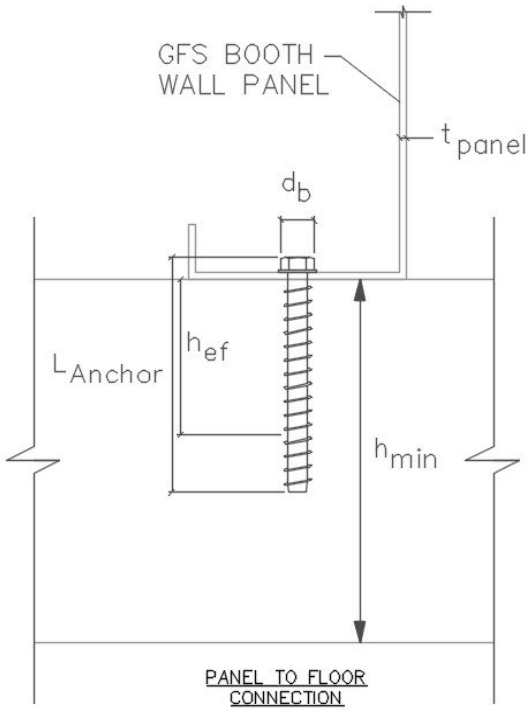
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	AP1	
Pier Length	18.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	1203	lbs
Shear to Pier	1203	lbs
Uniform Shear to Pier	67	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	9621	lb-ft
Resisting Moment	5346	lb-ft
Uplift	**267**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**5**	
Anchors at 18" o.c.	**11**	
Anchors at 12" o.c.	**17**	
Anchors at 6" o.c.	**34**	

11 anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

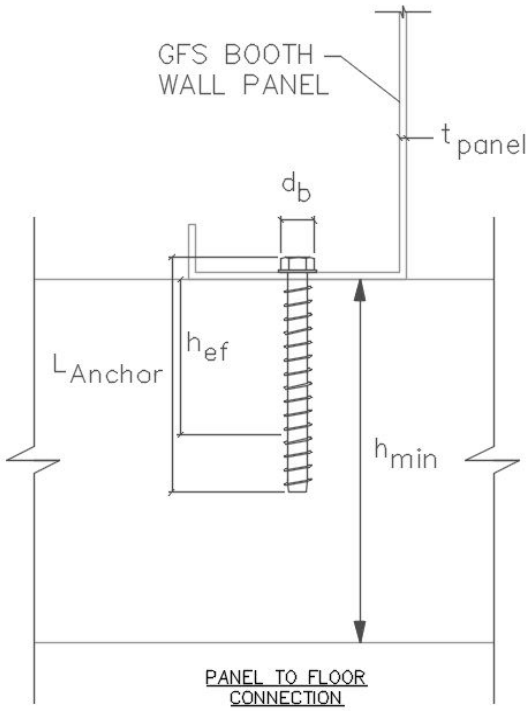
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	BP1	
Pier Length	18.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	1203	lbs
Shear to Pier	1203	lbs
Uniform Shear to Pier	67	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	9621	lb-ft
Resisting Moment	5346	lb-ft
Uplift	**267**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**5**	
Anchors at 18" o.c.	**11**	
Anchors at 12" o.c.	**17**	
Anchors at 6" o.c.	**34**	

11 anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

UNITED
STRUCTURAL DESIGN LLC

Booth D Design

Structural Calculations

David Grapsas, P.E.
Principal
John Elder, P.E.
Principal

Phoenix, AZ
480-454-6408
www.unitedstr.com

www.unitedstr.com

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Booth Information/Loading Criteria			Sheet:		of	

BOOTH CONSTRUCTION

Booth Width, W (N-S)	9.0	ft
Booth Length, D (E-W)	15.0	ft
Mean Roof Height	8.0	ft
Roof Area	135	ft^2
Total Wall Length	48	ft

LOADING CRITERIA

Roof Dead Load

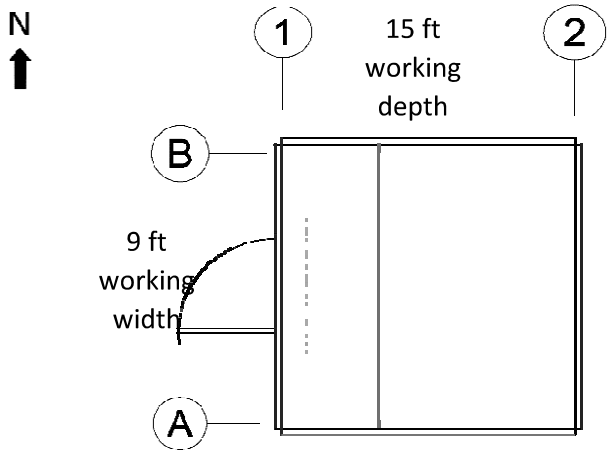
Panel	18 gauge		2.4 psf
Lights	Yes		
Number of Lights	4		0.8 psf
Fire Suppression	Yes	(Mains not Incl.)	1.5 psf
Misc.			0.3 psf
		RDL	**5.0 psf**

Wall Dead Load

Panel	18 gauge		2.4 psf
Lights	No		
Misc.			1.1 psf
		WDL	**3.5 psf**

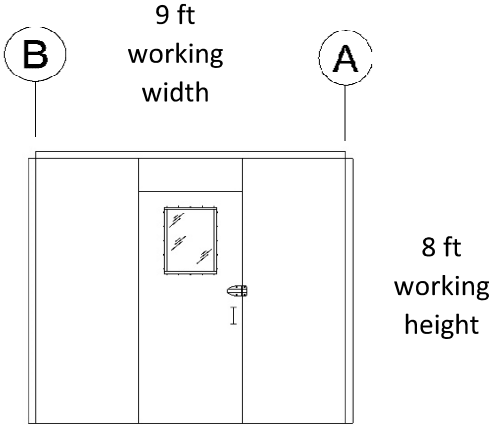
Mechanical Equipment

Make-up Air Unit	0 lbs
Exhaust Fan	150 lbs
Recirculation Fan	0 lbs
Duct	0 lbs



PLAN VIEW

(TOTAL WALL LENGTHS)



BOOTH FRONT ELEVATION

(BOOTH WIDTH & ROOF HEIGHT)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Seismic Analysis		Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

	Soil Site Class	D	Table 20.3-1
	Risk Category	II, Standard	Table 1.5-1
Mapped Accelerations	S_s	1.283	Hazard Tool
	S_1	0.441	
Site Coefficients	F_a	1.200	Table 11.4-1
	F_v	1.859	Table 11.4-2
MCE_R Spectral Accelerations	$S_{ms} = F_a * S_s$	1.540	Eq. 11.4-1
	$S_{m1} = F_v * S_1$	0.820	Eq. 11.4-2
Design Spectral Accelerations	$S_{DS} = 2/3(S_{ms})$	1.027	Eq. 11.4-3
	$S_{D1} = 2/3(S_{m1})$	0.547	Eq. 11.4-4
	Seismic Design Category (0.2 sec.)	D	Table 11.6-1
	Seismic Design Category (1.0 sec.)	D	Table 11.6-2
	Seismic Design Category	**D**	

Seismic Force Resisting System:	All other self-supporting structures, tanks, or vessels not covered elsewhere in Table 15.4-2		Table 15.4-2
Detailing Requirements		N/A	
Average Building Height	h (ft)	8	
Building Height Limit		50	Table 15.4-2
Long-Period Transition Period	T_L	4	Hazard Tool
Coefficient for Upper Limit on Period	C_u	1.40	Table 12.8-1
Approximate Period Parameters	C_t	0.02	Table 12.8-2
	x	0.75	
Approximate Fundamental Period	T_a	0.10	Eq. 12.8-7
Response Modification Coefficient	R	1.25	Table 15.4-2
System Overstrength Factor	Ω_o	2.00	
Deflection Amplification Factor	C_d	2.50	
Importance Factor	I_E	1.00	Table 11.5-2

Seismic Response Coefficient

C_s	0.822	Eq. 12.8-2
C_{s_max}	4.600	Eq. 12.8-3
C_{s_min}	0.045	Eq. 12.8-5
C_{s_min}	N/A	Eq. 12.8-6

C_s 0.822

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Seismic Analysis			Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

SEISMIC WEIGHT

Booth Weight (Trib to Roof)	1347	lbs

Mechanical Equipment

Make-up Air Unit	0	lbs
Exhaust Fan	150	lbs
Recirculation Fan	0	lbs
Duct	0	lbs
Total Weight, W_T	**1497**	lbs

BASE SHEAR (Eq. 12.8.1)

$C_s * W_T$, V = **1230** lbs (Ult.)

DIAPHRAGM DESIGN

$$F_P = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$

F_p= 1230 lbs Eq 12.10-1

Shall not be less than

$F_{p\,min}$= 307 lbs Eq 12.10-2

Need not exceed

$F_{p\,max}$= 615 lbs Eq 12.10-3

F_p= **615** lbs

East-West Direction

V_{EW}= 20 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 0.6:1

North-South Direction

V_{NS}= 34 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 1.7:1

USE 18 GA ROOF PANELS

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Lateral Loads			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A

Entire Wall Length	15.0	ft
Number of Piers	1	
Length of First Pier (AP1)	15.0	ft
Panel Height	8.0	ft

SEISMIC LOADING

Shear to Gridline	615	lbs (Ult.)
Shear to First Pier (AP1)	615	lbs (Ult.)

SHEAR WALL DESIGN

GRID LINE B

Entire Wall Length	15.0	ft
Number of Piers	1	
Length of First Pier (BP1)	12.0	ft
Panel Height	8.0	ft

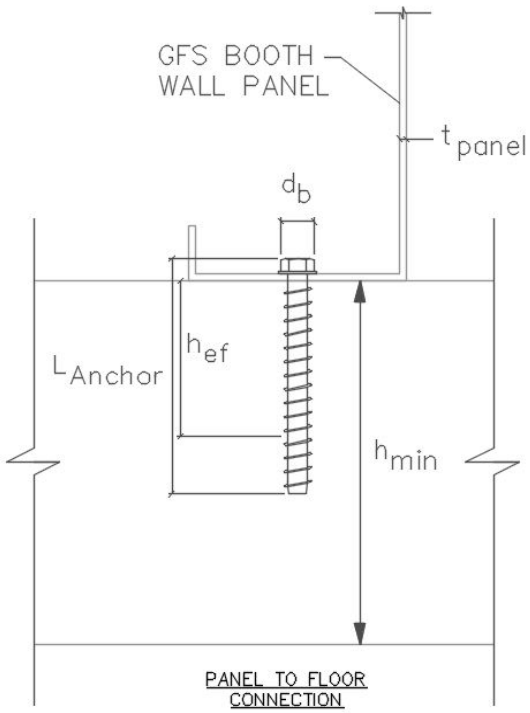
SEISMIC LOADING

Shear to Gridline	615	lbs (Ult.)
Shear to First Pier (BP1)	615	lbs (Ult.)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	AP1	
Pier Length	15.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	615	lbs
Shear to Pier	615	lbs
Uniform Shear to Pier	41	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	4920	lb-ft
Resisting Moment	3713	lb-ft
Uplift	**105**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**3**	
Anchors at 18" o.c.	**9**	
Anchors at 12" o.c.	**14**	
Anchors at 6" o.c.	**28**	

9 anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

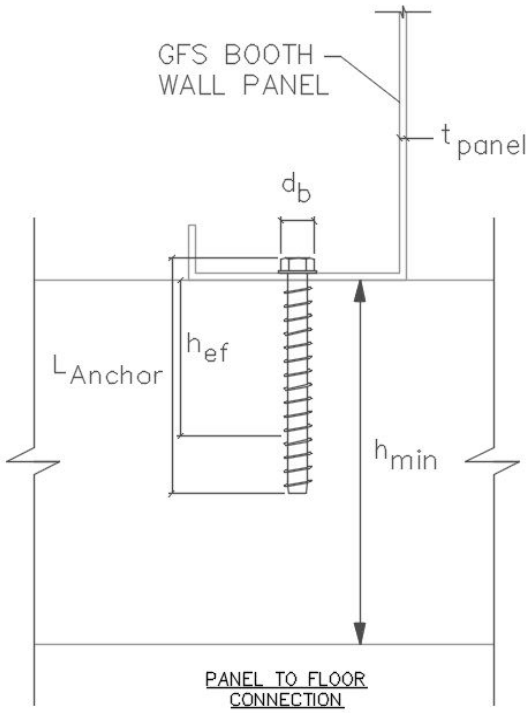
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	BP1	
Pier Length	12.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	615	lbs
Shear to Pier	615	lbs
Uniform Shear to Pier	51	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	4920	lb-ft
Resisting Moment	2376	lb-ft
Uplift	**232**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**3**	
Anchors at 18" o.c.	**7**	
Anchors at 12" o.c.	**11**	
Anchors at 6" o.c.	**22**	

7 anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Lateral Loads			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 1

Entire Wall Length	9.0	ft
Number of Piers	2	
Length of First Pier (1P1)	3.0	ft
Length of Second Pier (1P2)	3.0	ft
Panel Height	8.0	ft

SEISMIC LOADING

Shear to Gridline	615	lbs (Ult.)
Shear to First Pier (1P1)	307	lbs (Ult.)
Shear to Second Pier (1P2)	307	lbs (Ult.)

SHEAR WALL DESIGN

GRID LINE 2

Entire Wall Length	9.0	ft
Number of Piers	1	
Length of First Pier (2P1)	9.0	ft
Panel Height	8.0	ft

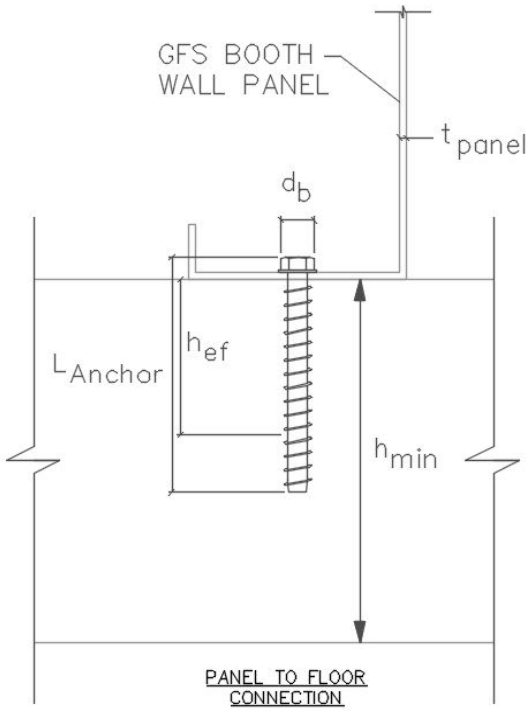
SEISMIC LOADING

Shear to Gridline	615	lbs (Ult.)
Shear to First Pier (2P1)	615	lbs (Ult.)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall 1 Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 1



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	1P1	
Pier Length	3.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	615	lbs
Shear to Pier	307	lbs
Uniform Shear to Pier	102	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	2460	lb-ft
Resisting Moment	149	lb-ft
Uplift	**775**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**1**	
Anchors at 12" o.c.	**2**	
Anchors at 6" o.c.	**4**	

2 anchors provided

SPACE ANCHORS AT 12 IN. O.C. BETWEEN HOLDOWN ANCHORS

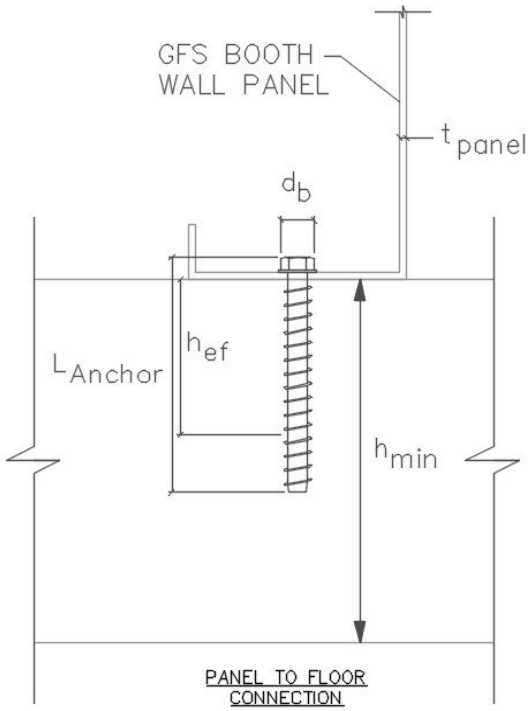
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall 1 Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 1



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	1P2	
Pier Length	3.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	615	lbs
Shear to Pier	307	lbs
Uniform Shear to Pier	102	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	2460	lb-ft
Resisting Moment	149	lb-ft
Uplift	**775**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**1**	
Anchors at 12" o.c.	**2**	
Anchors at 6" o.c.	**4**	

2 anchors provided

SPACE ANCHORS AT 12 IN. O.C. BETWEEN HOLDOWN ANCHORS

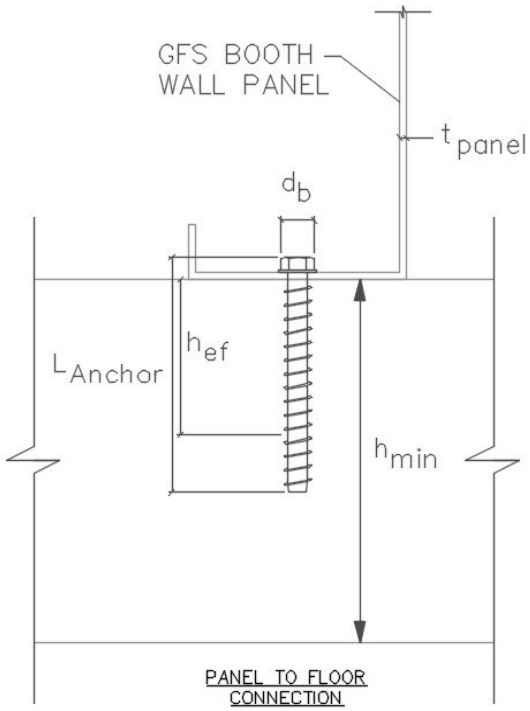
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	North-South Shear Wall 2 Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 2



3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Shear Wall Dimensions

Pier Number	2P1	
Pier Length	9.0	ft
Panel Height	8.0	ft

Shear at Wall/Pier

Shear to Gridline	615	lbs
Shear to Pier	615	lbs
Uniform Shear to Pier	68	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Wall Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	4920	lb-ft
Resisting Moment	1337	lb-ft
Uplift	**413**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**3**	
Anchors at 18" o.c.	**5**	
Anchors at 12" o.c.	**8**	
Anchors at 6" o.c.	**16**	

5 anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

UNITED
STRUCTURAL DESIGN LLC

Booth E Design

Structural Calculations

David Grapsas, P.E.
Principal
John Elder, P.E.
Principal

Phoenix, AZ
480-454-6408
www.unitedstr.com

www.unitedstr.com

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Stand Information/Loading Criteria			Sheet:		of	

STAND CONSTRUCTION

Stand Width, W (N-S)	5.83	ft
Stand Length, D (E-W)	9.33	ft
Stand Height	5.5	ft
Stand Horizontal Surface Area	54.3939	ft^2
Total Wall Length	30.32	ft

Beams	MC12x10.6	
Total Length of Bms	18.67	ft
Columns	HSS2.5x2.5x1/4	
Number of Cols	4	
Total Length of Cols	22	ft

Maintenance Platform

0	ft^2	
0	psf	0 lbs

Mechanical Equipment

Make-up Air Unit	4256	lbs
Fans (Exhaust & Recirculation)	0	lbs
Duct	0	lbs

EQUIPMENT INFORMATION

Equipment Width, W (N-S)	5.83	ft
Equipment Length, D (E-W)	9.33	ft
Equipment Height	10.67	ft
Center of Gravity Height	10.835	ft

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Seismic Analysis		Sheet:		of	

ASCE 7-16 EARTHQUAKE LOADS (Ch. 12)

Code		ASCE 7-16	
Soil Site Class		D	Table 20.3-1
Risk Category		II, Standard	Table 1.5-1
Mapped Accelerations	S_s	1.283	From Hazard Tool
	S_1	0.441	
Site Coefficients	F_a	1.200	Table 11.4-1
	F_v	1.859	Table 11.4-2
MCE_R Spectral Accelerations	$S_{ms} = F_a*S_s$	1.540	Eq. 11.4-1
	$S_{m1} = F_v*S_1$	0.820	Eq. 11.4-2
Design Spectral Accelerations	$S_{DS} = 2/3(S_{ms})$	1.027	Eq. 11.4-3
	$S_{D1} = 2/3(S_{m1})$	0.547	Eq. 11.4-4
Seismic Design Category (0.2 sec.)		D	Table 11.6-1
Seismic Design Category (1.0 sec.)		D	Table 11.6-2
Seismic Design Category		**D**	

Seismic Force Resisting System:		All other self-supporting structures, tanks, or vessels not covered elsewhere in Table 15.4-2	Table 15.4-2
Detailing Requirements		N/A	
Average Building Height	h (ft)	5.5	
Building Height Limit		50	Table 15.4-2
Long-Period Transition Period	T_L	6	Figures 22-14 - 22-17
Coefficient for Upper Limit on Period	C_u	1.40	Table 12.8-1
Approximate Period Parameters	C_t	0.02	Table 12.8-2
	x	0.75	
Approximate Fundamental Period	T_a	0.07	Eq. 12.8-7
Response Modification Coefficient	R	1.25	Table 15.4-2
System Overstrength Factor	Ω_o	2.00	
Deflection Amplification Factor	C_d	2.50	
Importance Factor	I_E	1.00	Table 11.5-2

Seismic Response Coefficient

C_s	0.822	Eq. 12.8-2
C_{s_max}	6.092	Eq. 12.8-3
C_{s_min}	0.045	Eq. 12.8-5
C_{s_min}	N/A	Eq. 12.8-6

C_s 0.822

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Seismic Analysis		Sheet:		of	

SEISMIC DESIGN

SEISMIC WEIGHT

Weight of structure trib to top of stand	276	lbs
Maintenance Platform	0	lbs
Mechanical Equipment		
Make-up Air Unit	4256	lbs
Fans (Exhaust & Recirculation)	0	lbs
Duct	0	lbs
Total Weight, W_P	4532	lbs

Horizontal Force (ASCE 7-10 13.3)

Air-side HVACR, fans, air handlers, air conditioning units, cabinet heaters, air distribution boxes, and other components constructed of sheet metal framing

ap=	2.5		
Rp=	6		
Ω_o=	2		
I_p=	1		
z=	5.5		
h=	5.5		
F_p=	2327	lbs	Eq 13.3-1
Not required to be greater than			
F_p=	7447.166	lbs	Eq 13.3-2
Shall not be taken as less than			
F_p=	1396	lbs	Eq 13.3-3
F_p=	**2327**	lbs	at C.M., 10.835ft above finish grade

Vertical Force (ASCE 7-10 13.3.1.2)

	±93.1	lbs
	±1.8	psf

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Wind Analysis		Sheet:		of	

WIND DESIGN

Structure Type: Solid Freestanding Walls, Roof Top Equipment, and Solid Freestanding and Attached Signs

Building Enclosure: Open

Basic Wind Speed: 97 mph

Exposure Category: D

K_d= 0.85

K_{zt}= 1.00

K_e= 1.00

K_z= 1.03

q_z= 21.09 psf

G= 0.85

Positive (GC_{pi})= 0.00

Negative (GC_{pi})= 0.00

Directional Procedure

Design Pressures for MWFRS

Wind direction parallel to long sides

L = 9 B = 6 h = 11 L/B= 1.60

	Windward	Leeward			
C_p=	0.80	-0.34			
	14.3	-6.1	=>	20.4	OK
	14.3	-6.1	=>	20.4	

Design Wind Pressure = 20.4 psf => Wind = 1271 lbs

Seisimc = 2327 lbs

Seismic governs design in the East-West direction

Wind direction parallel to short sides

L = 6 B = 9 h = 11 L/B= 0.62

	Windward	Leeward			
C_p=	0.80	-0.50			
	14.3	-9.0	=>	23.3	OK
	14.3	-9.0	=>	23.3	

Design Wind Pressure = 23.3 psf => Wind = 2320 lbs

Seisimc = 2327 lbs

Seismic governs design in the North-South direction

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Wind Analysis		Sheet:		of	

WIND DESIGN

Directional Procedure

Vertical Wind Load to top of AMU

Wind direction parallel to long sides

L = 9 B = 6 h = 11

h/L= 1.14

	HORIZONTAL DISTANCE FROM WINDWARD ROOF EDGE			
	0' to 6'	> 6'		
C_p	-1.30	-0.70		
p (psf)	-23.3	-12.5		

Wind direction parallel to short sides

L = 6 B = 9 h = 11

h/L= 1.83

Assume roof slope < 10°

	HORIZONTAL DISTANCE FROM WINDWARD ROOF EDGE			
	0' to 6'	> 6'		
C_p	-1.30	-0.70		
p (psf)	-23.3	-12.5		

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Snow Load		Sheet:		of	

SNOW LOAD

Ground Snow Load

p_g= 18 psf

Flat Roof Snow Load

Surface Roughness Category= Urban and suburban areas, wooded areas

Exposure of Roof= Sheltered

C_e= 1.2

Thermal Condition= Unheated and open air structure

C_t= 1.2

Risk Category= II

I_s= 1.0

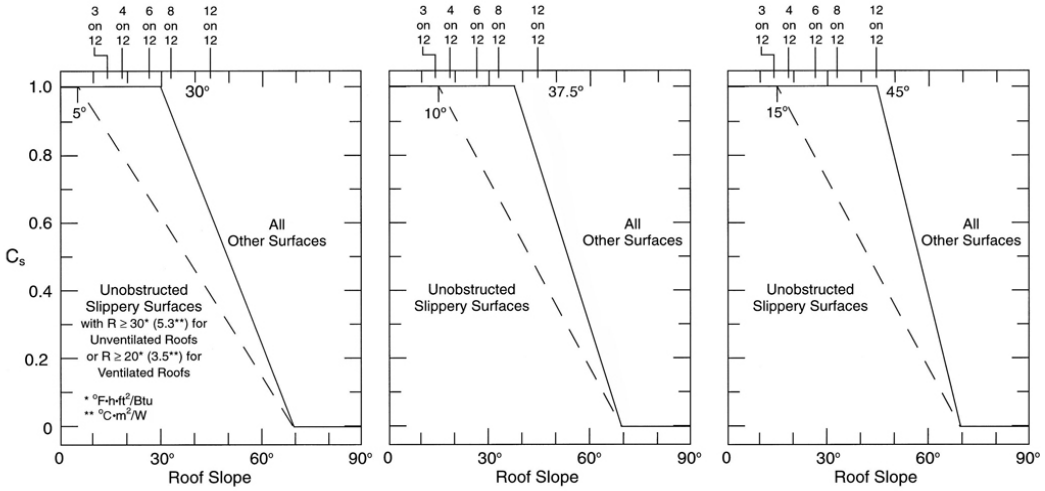
p_f= **18.1** psf

Minimum Snow Load for Low-Slope Roofs

p_m= **18.0** psf

Separate uniform load case
Do not use with drift, sliding, unbalanced, or partial loads

Sloped Roof Snow Load



7-2a: Warm roofs with $C_t \leq 1.0$ 7-2b: Cold roofs with C_t=1.1 7-2c: Cold roofs with C_t=1.2

Figure 7-2. Graphs for Determining Roof Slope Factor C_s, for Warm and Cold Roofs (See Table 7-3 for C_t definitions)

C_s= 1

p_s= **18.1** psf

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:			Snow Load	Sheet:		of	

SNOW LOAD

Drifts on lower roofs

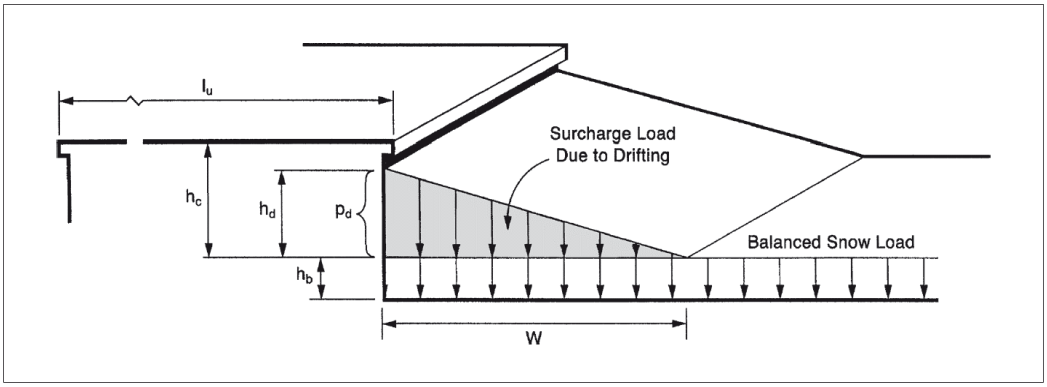
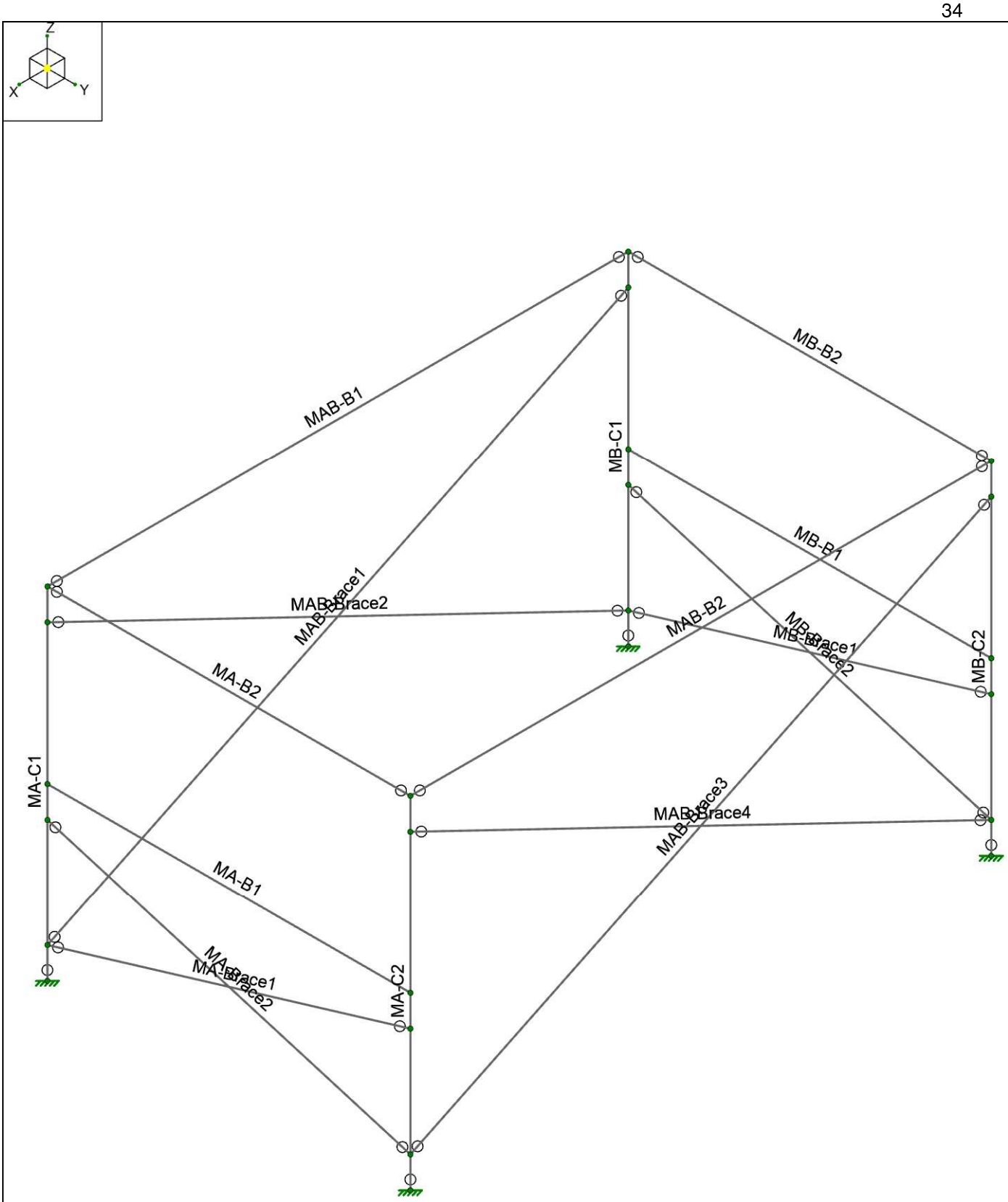


FIGURE 7-8 Configuration of Snow Drifts on Lower Roofs.

Separation Distance=	0	ft	
Building Height=	35	ft	
Building Length=	150	ft	Dimension parallel to wind direction
γ=	16.3	pcf	
h_b=	1.1	ft	
h_c=	28.4	ft	
Leeward h_d=	3.8	ft	
Windward h_d=	0.5	ft	
Use h_d=	**3.8**	ft	
W=	9.3	ft	
p_d=	61.4	psf	
p_d+p_f=	**79.5**	psf	
p_f=	**18.1**	psf	



Envelope Only Solution

RISA A NEMETSCHEK COMPANY	Global Finishing Solutions		SK-1
	KG		Jul 15, 2025 at 01:49 PM
	U178512		U178152-E Non-Enclosed Si…

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	A1	0	0	0	
2	B1	-9.33	0	0	
3	B7	-9.33	5.83	0	
4	A7	0	5.83	0	
5	B2	-9.33	0	0.5	
6	A8	0	5.83	0.5	
7	B8	-9.33	5.83	0.5	
8	A2	0	0	0.5	
9	A9	0	5.83	2.25	
10	A3	0	0	2.25	
11	B3	-9.33	0	2.25	
12	B9	-9.33	5.83	2.25	
13	A4	0	0	2.75	
14	B4	-9.33	0	2.75	
15	B10	-9.33	5.83	2.75	
16	A10	0	5.83	2.75	
17	A5	0	0	5	
18	A11	0	5.83	5	
19	B11	-9.33	5.83	5	
20	B5	-9.33	0	5	
21	A12	0	5.83	5.5	
22	A6	0	0	5.5	
23	B6	-9.33	0	5.5	
24	B12	-9.33	5.83	5.5	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Column	HSS2.5X2.5X4	Column	Tube	A500 Gr.B Rect	Typical	1.97	1.63	1.63	2.79
2	Beam	HSS2.5X2.5X4	Beam	Tube	A500 Gr.B Rect	Typical	1.97	1.63	1.63	2.79
3	Angle Beam	L2.5X2.5X3	Beam	Single Angle	A36 Gr.36	Typical	0.901	0.535	0.535	0.011
4	Channel Beam	MC12X10.6	Beam	Channel	A36 Gr.36	Typical	3.1	0.378	55.3	0.06
5	Brace	L2X2X3	HBrace	Single Angle	A36 Gr.36	Typical	0.722	0.271	0.271	0.009

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	MA-B1	A4	A10		Beam	Beam	Tube	A500 Gr.B Rect	Typical
2	MA-B2	A6	A12	270	Angle Beam	Beam	Single Angle	A36 Gr.36	Typical
3	MA-Brace1	A2	A9		Brace	HBrace	Single Angle	A36 Gr.36	Typical
4	MA-Brace2	A3	A8		Brace	HBrace	Single Angle	A36 Gr.36	Typical
5	MA-C1	A1	A6		Column	Column	Tube	A500 Gr.B Rect	Typical
6	MA-C2	A7	A12		Column	Column	Tube	A500 Gr.B Rect	Typical
7	MAB-B1	A6	B6		Channel Beam	Beam	Channel	A36 Gr.36	Typical
8	MAB-B2	A12	B12		Channel Beam	Beam	Channel	A36 Gr.36	Typical
9	MAB-Brace1	A2	B5		Brace	HBrace	Single Angle	A36 Gr.36	Typical
10	MAB-Brace2	A5	B2		Brace	HBrace	Single Angle	A36 Gr.36	Typical
11	MAB-Brace3	A8	B11		Brace	HBrace	Single Angle	A36 Gr.36	Typical
12	MAB-Brace4	A11	B8		Brace	HBrace	Single Angle	A36 Gr.36	Typical
13	MB-B1	B4	B10		Beam	Beam	Tube	A500 Gr.B Rect	Typical
14	MB-B2	B6	B12		Angle Beam	Beam	Single Angle	A36 Gr.36	Typical
15	MB-Brace1	B2	B9		Brace	HBrace	Single Angle	A36 Gr.36	Typical
16	MB-Brace2	B3	B8		Brace	HBrace	Single Angle	A36 Gr.36	Typical
17	MB-C1	B1	B6		Column	Column	Tube	A500 Gr.B Rect	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
18	MB-C2	B7	B12		Column	Column	Tube	A500 Gr.B Rect	Typical

Member Area Loads (BLC 3 : Seismic Load (X))

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	A6	B6	B12	A12	Z	Two Way	-1.8	-1.8	-1.8	-1.8	Yes

Member Area Loads (BLC 4 : Seismic Load (Y))

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	A6	B6	B12	A12	Z	Two Way	-1.8	-1.8	-1.8	-1.8	Yes

Member Distributed Loads (BLC 1 : Dead Load)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B1	Z	-228	-228	0	%100
2	MAB-B2	Z	-228	-228	0	%100

Member Distributed Loads (BLC 2 : Snow Load)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B1	Z	-52.7	-52.7	0	%100
2	MAB-B2	Z	-52.7	-52.7	0	%100

Member Distributed Loads (BLC 3 : Seismic Load (X))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B2	X	124.7	124.7	0	%100
2	MAB-B1	X	124.7	124.7	0	%100

Member Distributed Loads (BLC 4 : Seismic Load (Y))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MB-B2	Y	199.6	199.6	0	%100
2	MA-B2	Y	199.6	199.6	0	%100

Member Distributed Loads (BLC 5 : Wind Load (+X))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B1	X	68.1	68.1	0	%100
2	MAB-B2	X	68.1	68.1	0	%100

Member Distributed Loads (BLC 6 : Wind Load (-X))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B1	X	-68.1	-68.1	0	%100
2	MAB-B2	X	-68.1	-68.1	0	%100

Member Distributed Loads (BLC 7 : Wind Load (+Y))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MA-B2	Y	199	199	0	%100
2	MB-B2	Y	199	199	0	%100

Member Distributed Loads (BLC 8 : Wind Load (-Y))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MA-B2	Y	-199	-199	0	%100
2	MB-B2	Y	-199	-199	0	%100

Member Distributed Loads (BLC 9 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B2	Z	-4.482	-5.356	2.799	3.732
2	MAB-B2	Z	-5.356	-5.356	3.732	4.665
3	MAB-B2	Z	-5.356	-5.356	4.665	5.598
4	MAB-B2	Z	-5.356	-4.482	5.598	6.531
5	MAB-B2	Z	-4.482	-2.733	6.531	7.464
6	MAB-B2	Z	-2.733	-0.984	7.464	8.397
7	MB-B2	Z	-0.98	-2.659	1.665e-16	0.972
8	MB-B2	Z	-2.659	-4.338	0.972	1.943
9	MB-B2	Z	-4.338	-5.178	1.943	2.915
10	MB-B2	Z	-5.178	-4.338	2.915	3.887
11	MB-B2	Z	-4.338	-2.659	3.887	4.858
12	MB-B2	Z	-2.659	-0.98	4.858	5.83
13	MA-B2	Z	-0.98	-2.659	1.665e-16	0.972
14	MA-B2	Z	-2.659	-4.338	0.972	1.943
15	MA-B2	Z	-4.338	-5.178	1.943	2.915
16	MA-B2	Z	-5.178	-4.338	2.915	3.887
17	MA-B2	Z	-4.338	-2.659	3.887	4.858
18	MA-B2	Z	-2.659	-0.98	4.858	5.83
19	MAB-B1	Z	-0.984	-2.733	0.933	1.866
20	MAB-B1	Z	-2.733	-4.482	1.866	2.799
21	MAB-B1	Z	-4.482	-5.356	2.799	3.732
22	MAB-B1	Z	-5.356	-5.356	3.732	4.665
23	MAB-B1	Z	-5.356	-5.356	4.665	5.598
24	MAB-B1	Z	-5.356	-4.482	5.598	6.531
25	MAB-B1	Z	-4.482	-2.733	6.531	7.464
26	MAB-B1	Z	-2.733	-0.984	7.464	8.397
27	MAB-B2	Z	-0.984	-2.733	0.933	1.866
28	MAB-B2	Z	-2.733	-4.482	1.866	2.799

Member Distributed Loads (BLC 10 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	MAB-B2	Z	-4.482	-2.733	6.531	7.464
2	MAB-B2	Z	-2.733	-0.984	7.464	8.397
3	MB-B2	Z	-0.98	-2.659	1.665e-16	0.972
4	MB-B2	Z	-2.659	-4.338	0.972	1.943
5	MB-B2	Z	-4.338	-5.178	1.943	2.915
6	MB-B2	Z	-5.178	-4.338	2.915	3.887
7	MB-B2	Z	-4.338	-2.659	3.887	4.858
8	MB-B2	Z	-2.659	-0.98	4.858	5.83
9	MA-B2	Z	-0.98	-2.659	1.665e-16	0.972
10	MA-B2	Z	-2.659	-4.338	0.972	1.943

Member Distributed Loads (BLC 10 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
11	MA-B2	Z	-4.338	-5.178	1.943	2.915
12	MA-B2	Z	-5.178	-4.338	2.915	3.887
13	MA-B2	Z	-4.338	-2.659	3.887	4.858
14	MA-B2	Z	-2.659	-0.98	4.858	5.83
15	MAB-B1	Z	-0.984	-2.733	0.933	1.866
16	MAB-B1	Z	-2.733	-4.482	1.866	2.799
17	MAB-B1	Z	-4.482	-5.356	2.799	3.732
18	MAB-B1	Z	-5.356	-5.356	3.732	4.665
19	MAB-B1	Z	-5.356	-5.356	4.665	5.598
20	MAB-B1	Z	-5.356	-4.482	5.598	6.531
21	MAB-B1	Z	-4.482	-2.733	6.531	7.464
22	MAB-B1	Z	-2.733	-0.984	7.464	8.397
23	MAB-B2	Z	-0.984	-2.733	0.933	1.866
24	MAB-B2	Z	-2.733	-4.482	1.866	2.799
25	MAB-B2	Z	-4.482	-5.356	2.799	3.732
26	MAB-B2	Z	-5.356	-5.356	3.732	4.665
27	MAB-B2	Z	-5.356	-5.356	4.665	5.598
28	MAB-B2	Z	-5.356	-4.482	5.598	6.531

Basic Load Cases

	BLC Description	Category	Z Gravity	Distributed	Area(Member)
1	Dead Load	DL	-1	2	
2	Snow Load	SL		2	
3	Seismic Load (X)	ELX		2	1
4	Seismic Load (Y)	ELY		2	1
5	Wind Load (+X)	WL+X		2	
6	Wind Load (-X)	WL-X		2	
7	Wind Load (+Y)	WL+Y		2	
8	Wind Load (-Y)	WL-Y		2	
9	BLC 3 Transient Area Loads	None		28	
10	BLC 4 Transient Area Loads	None		28	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DL		Y	DL	1						
2	SL		Y	SL	1						
3	ELX		Y	ELX	1						
4	ELY		Y	ELY	1						
5	WL+X		Y	WL+X	1						
6	WL-X		Y	WL-X	1						
7	WL+Y		Y	WL+Y	1						
8	WL-Y		Y	WL-Y	1						
9	EQ 16-1										
10	1.4DL	Yes	Y	DL	1.4						
11	EQ 16-3										
12	1.2DL+1.6SL+0.5(WL+X)	Yes	Y	DL	1.2	SL	1.6	WL+X	0.5		
13	1.2DL+1.6SL+0.5(WL-X)	Yes	Y	DL	1.2	SL	1.6	WL-X	0.5		
14	1.2DL+1.6SL+0.5(WL+Y)	Yes	Y	DL	1.2	SL	1.6	WL+Y	0.5		
15	1.2DL+1.6SL+0.5(WL-Y)	Yes	Y	DL	1.2	SL	1.6	WL-Y	0.5		
16	EQ 16-4										
17	1.2DL+(WL+X)+0.5SL	Yes	Y	DL	1.2	WL+X	1	SL	0.5		
18	1.2DL+(WL-X)+0.5SL+0.5SL	Yes	Y	DL	1.2	WL-X	1	SL	0.5		
19	1.2DL+1(WL-Y)+0.5SL+0.5SL	Yes	Y	DL	1.2	WL-Y	1	SL	0.5		

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
20	1.2DL+(WL-Y)+0.5SL+0.5SL	Yes	Y	DL	1.2	WL-Y	1	SL	0.5		
21	EQ 16-5										
22	1.2DL+ELX+ELZ+0.7SL	Yes	Y	DL	1.2	Rho*ELX	1	Sds*DL	0.2	SL	0.7
23	1.2DL-ELX+ELZ+0.7SL	Yes	Y	DL	1.2	Rho*ELX	-1	Sds*DL	0.2	SL	0.7
24	1.2DL+ELY+ELZ+0.7SL	Yes	Y	DL	1.2	Rho*ELY	1	Sds*DL	0.2	SL	0.7
25	1.2DL-ELY+ELZ+0.7SL	Yes	Y	DL	1.2	Rho*ELY	-1	Sds*DL	0.2	SL	0.7
26	1.2DL+ELX+ELZ+0.7SL	Yes	Y	DL	1.2	Om*ELX	1	Sds*DL	0.2	SL	0.7
27	1.2DL-ELX+ELZ+0.7SL	Yes	Y	DL	1.2	Om*ELX	-1	Sds*DL	0.2	SL	0.7
28	1.2DL+ELY+ELZ+0.7SL	Yes	Y	DL	1.2	Om*ELY	1	Sds*DL	0.2	SL	0.7
29	1.2DL-ELY+ELZ+0.7SL	Yes	Y	DL	1.2	Om*ELY	-1	Sds*DL	0.2	SL	0.7
30	EQ 16-6										
31	0.9DL+(WL+X)	Yes	Y	DL	0.9	WL+X	1				
32	0.9DL+(WL-X)	Yes	Y	DL	0.9	WL-X	1				
33	0.9DL+(WL+Y)	Yes	Y	DL	0.9	WL+Y	1				
34	0.9DL+(WL-Y)	Yes	Y	DL	0.9	WL-Y	1				
35	EQ 16-7										
36	0.9DL+ELX-ELZ	Yes	Y	DL	0.9	Rho*ELX	1	Sds*DL	-0.2		
37	0.9DL-ELX-ELZ	Yes	Y	DL	0.9	Rho*ELX	-1	Sds*DL	-0.2		
38	0.9DL+ELY-ELZ	Yes	Y	DL	0.9	Rho*ELY	1	Sds*DL	-0.2		
39	0.9DL-ELY-ELZ	Yes	Y	DL	0.9	Rho*ELY	-1	Sds*DL	-0.2		
40	0.9DL+ELX-ELZ	Yes	Y	DL	0.9	Om*ELX	1	Sds*DL	-0.2		
41	0.9DL-ELX-ELZ	Yes	Y	DL	0.9	Om*ELX	-1	Sds*DL	-0.2		
42	0.9DL+ELY-ELZ	Yes	Y	DL	0.9	Om*ELY	1	Sds*DL	-0.2		
43	0.9DL-ELY-ELZ	Yes	Y	DL	0.9	Om*ELY	-1	Sds*DL	-0.2		

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	MA-B1	HSS2.5X2.5X4	0.179	5.83	24	0.018	5.83	y	24	54784.284	81558	5623.5	5623.5	2.274	H1-1b
2	MA-B2	L2.5X2.5X3	0.065	4.858	24	0.002	5.83	z	24	9661.824	29192.4	872.574	1550.223	1.149	H2-1
3	MA-Brace1	L2X2X3	0.058	6.087	24	0.003	6.087	y	22	4626.037	23392.8	557.717	966.546	1.136	H2-1*
4	MA-Brace2	L2X2X3	0.058	0	25	0.003	6.087	y	22	4626.037	23392.8	557.717	966.546	1.136	H2-1*
5	MA-C1	HSS2.5X2.5X4	0.308	2.75	25	0.034	2.234	y	24	81319.647	81558	5623.5	5623.5	1.732	H1-1b
6	MA-C2	HSS2.5X2.5X4	0.308	2.75	24	0.034	2.234	y	25	81319.647	81558	5623.5	5623.5	1.732	H1-1b
7	MAB-B1	MC12X10.6	0.536	4.665	22	0.04	9.33	y	22	6812.49	100440	1326.531	7648.288	1.137	H1-1b
8	MAB-B2	MC12X10.6	0.536	4.665	24	0.04	9.33	y	22	6812.49	100440	1326.531	7648.288	1.137	H1-1b
9	MAB-Brace1	L2X2X3	0.034	10.359	37	0.008	10.359	y	24	1597.418	23392.8	557.717	777.827	1.136	H2-1*
10	MAB-Brace2	L2X2X3	0.034	0	36	0.008	10.359	y	24	1597.418	23392.8	557.717	777.827	1.136	H2-1*
11	MAB-Brace3	L2X2X3	0.034	10.359	37	0.008	10.359	y	24	1597.418	23392.8	557.717	777.827	1.136	H2-1*
12	MAB-Brace4	L2X2X3	0.034	0	36	0.008	10.359	y	24	1597.418	23392.8	557.717	777.827	1.136	H2-1*
13	MB-B1	HSS2.5X2.5X4	0.179	5.83	24	0.018	5.83	y	24	54784.284	81558	5623.5	5623.5	2.274	H1-1b
14	MB-B2	L2.5X2.5X3	0.065	4.858	24	0.002	5.83	y	24	9661.824	29192.4	872.574	1550.223	1.149	H2-1
15	MB-Brace1	L2X2X3	0.058	6.087	24	0.003	6.087	y	23	4626.037	23392.8	557.717	966.546	1.136	H2-1*
16	MB-Brace2	L2X2X3	0.058	0	25	0.003	6.087	y	23	4626.037	23392.8	557.717	966.546	1.136	H2-1*
17	MB-C1	HSS2.5X2.5X4	0.308	2.75	25	0.034	2.234	y	24	81319.647	81558	5623.5	5623.5	1.732	H1-1b
18	MB-C2	HSS2.5X2.5X4	0.308	2.75	24	0.034	2.234	y	25	81319.647	81558	5623.5	5623.5	1.732	H1-1b

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	A1	max	575.441	37	583.534	25	2977.547	25	0	39	0	39	0.063	24
2		min	-596.824	22	-581.3	38	-230.193	38	0	10	0	10	-0.06	39
3	A7	max	575.441	37	581.565	39	3026.888	24	0	39	0	39	0.06	38
4		min	-596.824	22	-583.798	24	-278.77	39	0	10	0	10	-0.063	25
5	B1	max	596.416	23	583.534	25	2977.547	25	0	39	0	39	0.06	39

Envelope Node Reactions (Continued)

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
6		min	-575.028	36	-581.3	38	-230.193	38	0	10	0	10	-0.063	24
7	B7	max	596.416	23	581.565	39	3026.888	24	0	39	0	39	0.063	25
8		min	-575.028	36	-583.798	24	-278.77	39	0	10	0	10	-0.06	38
9	Totals:	max	2326.902	23	2327.336	25	7660.588	24						
10		min	-2326.902	22	-2327.336	38	3299.627	39						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	A1	max	0	22	0	38	0	38	0	39	0	39	0	39
2		min	0	37	0	25	0	25	0	10	0	10	0	24
3	B1	max	0	36	0	38	0	38	0	39	0	39	0	24
4		min	0	23	0	25	0	25	0	10	0	10	0	39
5	B7	max	0	36	0	24	0	39	0	39	0	39	0	38
6		min	0	23	0	39	0	24	0	10	0	10	0	25
7	A7	max	0	22	0	24	0	39	0	39	0	39	0	25
8		min	0	37	0	39	0	24	0	10	0	10	0	38
9	B2	max	0.006	36	0.001	38	0	38	3.058e-5	24	7.53e-4	36	1.457e-7	24
10		min	-0.006	23	-0.001	25	0	25	-5.391e-6	25	-8.328e-4	23	-1.381e-7	39
11	A8	max	0.006	22	0.001	24	0	39	5.471e-6	24	8.343e-4	22	1.455e-7	25
12		min	-0.006	37	-0.001	39	0	24	-2.993e-5	25	-7.544e-4	37	-1.381e-7	38
13	B8	max	0.006	36	0.001	24	0	39	5.471e-6	24	7.53e-4	36	1.381e-7	38
14		min	-0.006	23	-0.001	39	0	24	-2.993e-5	25	-8.328e-4	23	-1.455e-7	25
15	A2	max	0.006	22	0.001	38	0	38	3.058e-5	24	8.343e-4	22	1.381e-7	39
16		min	-0.006	37	-0.001	25	0	25	-5.391e-6	25	-7.544e-4	37	-1.457e-7	24
17	A9	max	0.011	22	0.006	24	0	39	1.745e-3	25	1.829e-4	23	2.741e-6	25
18		min	-0.009	37	-0.006	39	-0.001	24	-1.715e-3	24	-1.656e-4	36	-2.725e-6	24
19	A3	max	0.011	22	0.006	38	0	38	1.714e-3	25	1.829e-4	23	2.723e-6	25
20		min	-0.009	37	-0.006	25	-0.001	25	-1.746e-3	24	-1.656e-4	36	-2.743e-6	24
21	B3	max	0.009	36	0.006	38	0	38	1.714e-3	25	1.659e-4	37	2.743e-6	24
22		min	-0.011	23	-0.006	25	-0.001	25	-1.746e-3	24	-1.833e-4	22	-2.723e-6	25
23	B9	max	0.009	36	0.006	24	0	39	1.745e-3	25	1.659e-4	37	2.725e-6	24
24		min	-0.011	23	-0.006	39	-0.001	24	-1.715e-3	24	-1.833e-4	22	-2.741e-6	25
25	A4	max	0.01	22	0.021	24	0	38	2.916e-3	25	2.208e-4	23	3.464e-6	25
26		min	-0.008	37	-0.021	25	-0.001	25	-2.984e-3	24	-2.212e-4	22	-3.481e-6	24
27	B4	max	0.008	36	0.021	24	0	38	2.916e-3	25	2.211e-4	23	3.481e-6	24
28		min	-0.01	23	-0.021	25	-0.001	25	-2.984e-3	24	-2.209e-4	22	-3.464e-6	25
29	B10	max	0.008	36	0.021	24	0	39	2.982e-3	25	2.211e-4	23	3.466e-6	24
30		min	-0.01	23	-0.021	25	-0.001	24	-2.918e-3	24	-2.209e-4	22	-3.479e-6	25
31	A10	max	0.01	22	0.021	24	0	39	2.982e-3	25	2.208e-4	23	3.479e-6	25
32		min	-0.008	37	-0.021	25	-0.001	24	-2.918e-3	24	-2.212e-4	22	-3.466e-6	24
33	A5	max	0.012	22	0.212	24	0	37	9.594e-3	25	7.534e-4	36	7.711e-7	25
34		min	-0.011	37	-0.212	25	-0.002	22	-9.572e-3	24	-8.307e-4	23	-7.867e-7	24
35	A11	max	0.012	22	0.212	24	0	39	9.566e-3	25	7.534e-4	36	7.864e-7	25
36		min	-0.011	37	-0.212	25	-0.002	24	-9.6e-3	24	-8.307e-4	23	-7.712e-7	24
37	B11	max	0.011	36	0.212	24	0	39	9.566e-3	25	8.322e-4	22	7.712e-7	24
38		min	-0.012	23	-0.212	25	-0.002	24	-9.6e-3	24	-7.547e-4	37	-7.864e-7	25
39	B5	max	0.011	36	0.212	24	0	38	9.594e-3	25	8.322e-4	22	7.867e-7	24
40		min	-0.012	23	-0.212	25	-0.002	25	-9.572e-3	24	-7.547e-4	37	-7.711e-7	25
41	A12	max	0.017	22	0.271	24	0	39	9.792e-3	25	9.726e-4	36	7.864e-7	25
42		min	-0.017	23	-0.271	25	-0.003	24	-9.83e-3	24	-1.059e-3	23	-7.712e-7	24
43	A6	max	0.017	22	0.271	24	-0.001	37	9.823e-3	25	9.726e-4	36	7.711e-7	25
44		min	-0.017	23	-0.271	25	-0.003	22	-9.798e-3	24	-1.059e-3	23	-7.867e-7	24
45	B6	max	0.017	22	0.271	24	-0.001	38	9.823e-3	25	1.06e-3	22	7.867e-7	24
46		min	-0.017	23	-0.271	25	-0.002	25	-9.798e-3	24	-9.741e-4	37	-7.711e-7	25
47	B12	max	0.017	22	0.271	24	0	39	9.792e-3	25	1.06e-3	22	7.712e-7	24

Envelope Node Displacements (Continued)

Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
48	min	-0.017	23	-0.271	25	-0.003	24	-9.83e-3	24	-9.741e-4	37	-7.864e-7	25

UNITED
STRUCTURAL DESIGN LLC

Booth G Design

Structural Calculations

David Grapsas, P.E.
Principal
John Elder, P.E.
Principal

Phoenix, AZ
480-454-6408
www.unitedstr.com

www.unitedstr.com

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Booth Information/Loading Criteria			Sheet:		of	

BOOTH CONSTRUCTION

Booth Width, W (N-S)	14.0	ft
Booth Length, D (E-W)	32.0	ft
Mean Roof Height	9.0	ft
Frames are Lateral Elements	Yes	
Number of Structural Frames	5	
Number of Columns per frame	2	
Frame at front wall	Yes	
Frame at back wall	Yes	
Tributary to Frame 1	3	ft
Tributary to Frame 2	8	ft
Tributary to Frame 3	10	ft
Tributary to Frame 4	8	ft
Tributary to Frame 5	3	ft
Roof Area	448	ft^2
Total Wall Length	92	ft

Beams	W8x10
Columns	W8x10
Knee-brace	*
Plenum Beam	*

LOADING CRITERIA

Roof Dead Load

Panel	18 gauge	2.4	psf
Steel Beams		1.6	psf
Lights	Yes		
Number of Lights	8	0.5	psf
Fire Suppression	Yes (Mains not Incl.)	1.5	psf
Misc.		0.6	psf
RDL		**6.6**	**psf**

Plenum Dead Load

Steel Beams		0.0	psf
Plenum	No	0.0	psf
PDL		**0.0**	**psf**

Wall Dead Load

Panel	18 gauge	2.4	psf
Steel Columns		1.1	psf
Lights	Yes		
Number of Lights	8	0.3	psf
Misc.		0.8	psf
WDL		**4.6**	**psf**

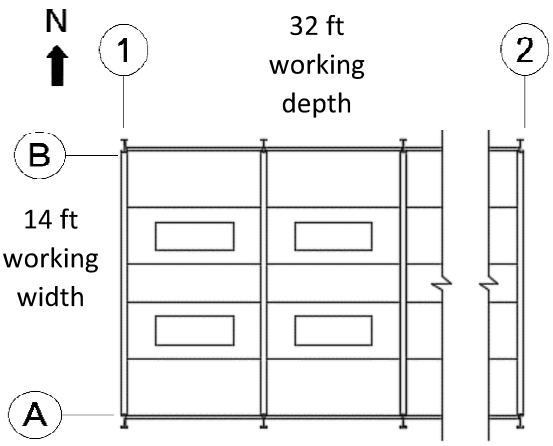
Maintenance Platform

0 ft^2

0 psf — 0.0 lbs

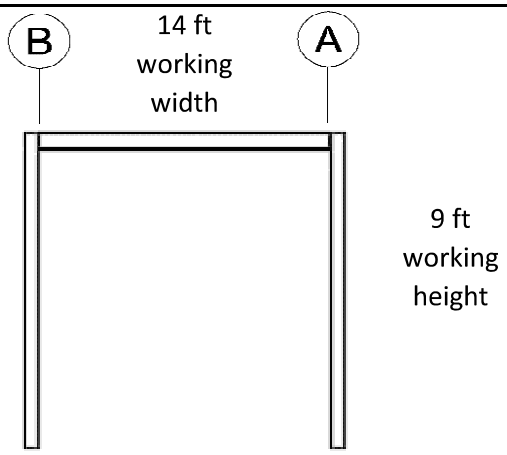
Mechanical Equipment

Make-up Air Unit	0	lbs
Fans (Exhaust & Recirculation)	1272	lbs
Duct	0	lbs



PLAN VIEW

(TOTAL WALL LENGTHS)



BOOTH SECTION

(BOOTH WIDTH & ROOF HEIGHT)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Seismic Analysis		Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

Soil Site Class		D	Table 20.3-1
Risk Category		II, Standard	Table 1.5-1
Mapped Accelerations	S_s	1.283	Hazard Tool
	S_1	0.441	Hazard Tool
Site Coefficients	F_a	1.200	Table 11.4-1
	F_v	1.859	Table 11.4-2
MCE_R Spectral Accelerations	$S_{ms} = F_a*S_s$	1.540	Eq. 11.4-1
	$S_{m1} = F_v*S_1$	0.820	Eq. 11.4-2
Design Spectral Accelerations	$S_{DS} = 2/3(S_{ms})$	1.027	Eq. 11.4-3
	$S_{D1} = 2/3(S_{m1})$	0.547	Eq. 11.4-4
Seismic Design Category (0.2 sec.)		D	Table 11.6-1
Seismic Design Category (1.0 sec.)		D	Table 11.6-2
Seismic Design Category		**D**	

Seismic Force Resisting System:		All other self-supporting structures, tanks, or vessels not covered elsewhere in Table 15.4-2	Table 15.4-2
Detailing Requirements		N/A	
Average Building Height	h (ft)	9	
Building Height Limit		50	Table 15.4-2
Long-Period Transition Period	T_L	6	Hazard Tool
Coefficient for Upper Limit on Period	C_u	1.40	Table 12.8-1
Approximate Period Parameters	C_t	0.02	Table 12.8-2
	x	0.75	Table 12.8-2
Approximate Fundamental Period	T_a	0.10	Eq. 12.8-7
Response Modification Coefficient	R	1.25	Table 15.4-2
System Overstrength Factor	Ω_o	2.00	Table 15.4-2
Deflection Amplification Factor	C_d	2.50	Table 15.4-2
Importance Factor	I_E	1.00	Table 11.5-2

Seismic Response Coefficient

C_s	0.822	Eq. 12.8-2
C_{s_max}	4.211	Eq. 12.8-3
C_{s_min}	0.045	Eq. 12.8-5
C_{s_min}	N/A	Eq. 12.8-6

C_s 0.822

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	Seismic Analysis			Sheet:		of	

SEISMIC ANALYSIS - ASCE/SEI 7-16

SEISMIC WEIGHT

Booth Weight (Trib to Roof)	4839	lbs
Maintenance Platform	0	lbs
Mechanical Equipment		
Make-up Air Unit	0	lbs
Fans (Exhaust & Recirculation)	1272	lbs
Duct	0	lbs
Total Weight, W_T	**6111**	lbs

BASE SHEAR (Eq. 12.8.1)

$C_s * W_T$, V **5021** lbs (Ult.)

DIAPHRAGM DESIGN

$$F_P = \frac{\sum_{i=x}^{n} F_i}{\sum_{i=x}^{n} w_i} w_{px}$$

F_p= 5021 lbs Eq 12.10-1

Shall not be less than

$F_{p\,min}$= 1255 lbs Eq 12.10-2

Need not exceed

$F_{p\,max}$= 2510 lbs Eq 12.10-3

F_p= **2510** lbs

East-West Direction

V_{EW}= 39 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 0.4:1

North-South Direction

V_{NS}= 28 plf

V_{allow}= 190 plf

Actual < Allowable therefore OK

Diaphragm Ratio = 0.7:1

USE 18 GA ROOF PANELS

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Lateral Loads			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A

Entire Wall Length	32.0	ft
Number of Piers	4	
Length of First Pier (AP1)	6.0	ft
Length of Second Pier (AP2)	10.0	ft
Length of Third Pier (AP3)	10.0	ft
Length of Fourth Pier (AP4)	6.0	ft
Panel Height	9.0	ft

SEISMIC LOADING

Shear to Gridline	2510	lbs (Ult.)
Shear to First Pier (AP1)	381	lbs (Ult.)
Shear to Second Pier (AP2)	874	lbs (Ult.)
Shear to Third Pier (AP3)	874	lbs (Ult.)
Shear to Fourth Pier (AP4)	381	lbs (Ult.)

SHEAR WALL DESIGN

GRID LINE B

Entire Wall Length	32.0	ft
Number of Piers	4	
Length of First Pier (BP1)	6.0	ft
Length of Second Pier (BP2)	10.0	ft
Length of Third Pier (BP3)	10.0	ft
Length of Fourth Pier (BP4)	6.0	ft
Panel Height	9.0	ft

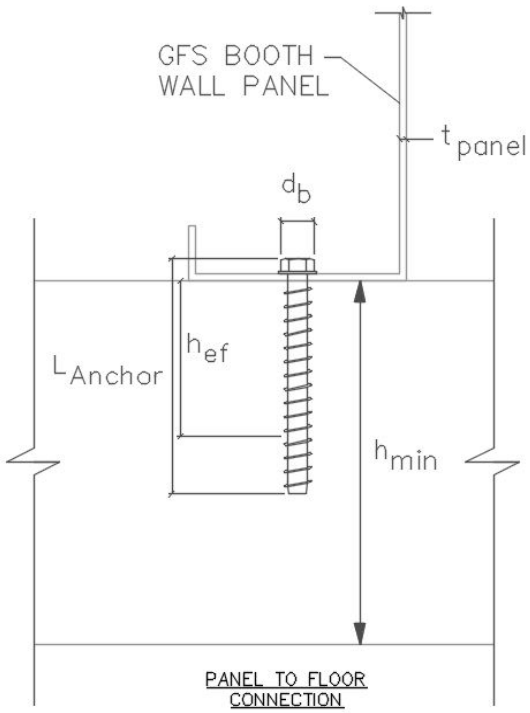
SEISMIC LOADING

Shear to Gridline	2510	lbs (Ult.)
Shear to First Pier (BP1)	381	lbs (Ult.)
Shear to Second Pier (BP2)	874	lbs (Ult.)
Shear to Third Pier (BP3)	874	lbs (Ult.)
Shear to Fourth Pier (BP4)	381	lbs (Ult.)

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	AP1	
Pier Length	6.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	381	lbs
Uniform Shear to Pier	63	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	3427	lb-ft
Resisting Moment	861	lb-ft
Uplift	**442**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**3**	
Anchors at 12" o.c.	**5**	
Anchors at 6" o.c.	**10**	
	3	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

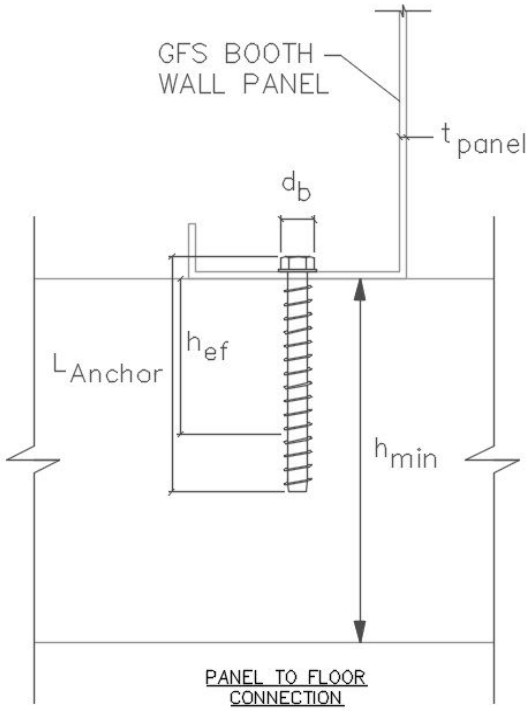
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	AP2	
Pier Length	10.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	874	lbs
Uniform Shear to Pier	87	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	7870	lb-ft
Resisting Moment	2392	lb-ft
Uplift	**572**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**6**	
Anchors at 12" o.c.	**9**	
Anchors at 6" o.c.	**18**	
	6	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

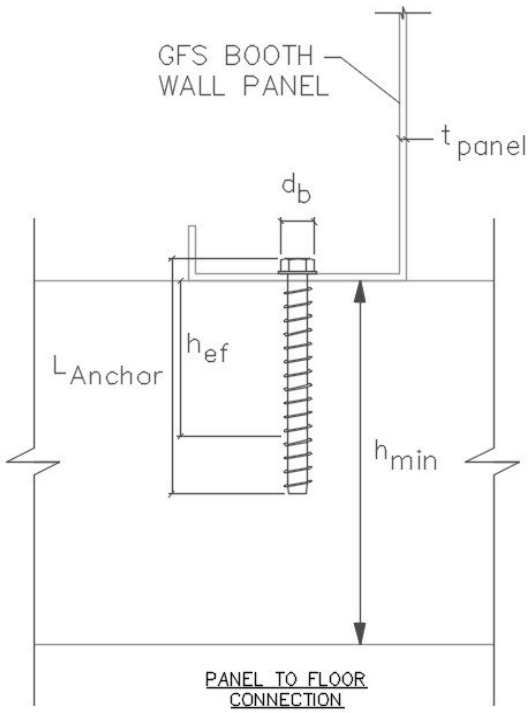
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	AP3	
Pier Length	10.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	874	lbs
Uniform Shear to Pier	87	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	7870	lb-ft
Resisting Moment	2392	lb-ft
Uplift	**572**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**6**	
Anchors at 12" o.c.	**9**	
Anchors at 6" o.c.	**18**	
	6	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

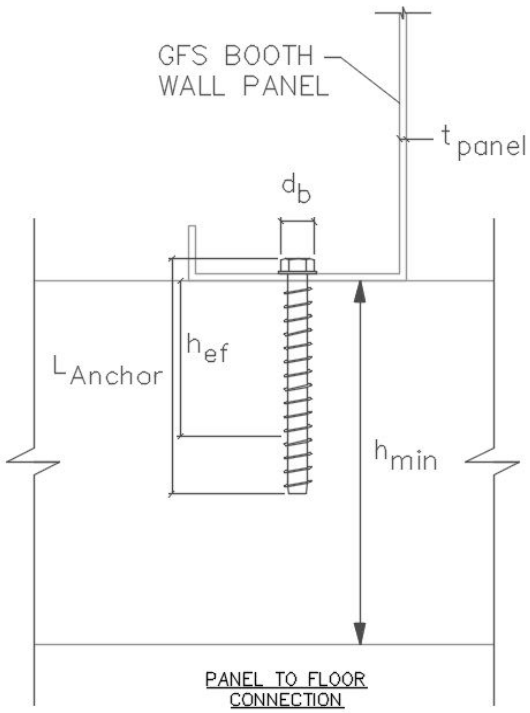
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall A Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE A



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	AP4	
Pier Length	6.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	381	lbs
Uniform Shear to Pier	63	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	3427	lb-ft
Resisting Moment	861	lb-ft
Uplift	**442**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**3**	
Anchors at 12" o.c.	**5**	
Anchors at 6" o.c.	**10**	
	3	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

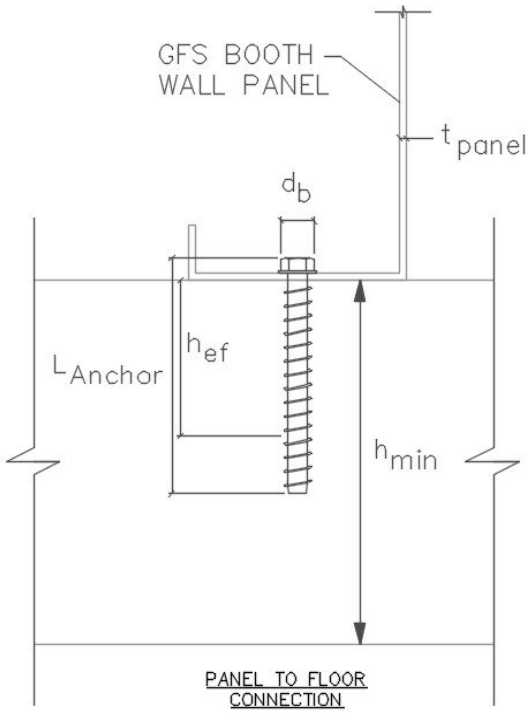
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	BP1	
Pier Length	6.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	381	lbs
Uniform Shear to Pier	63	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	3427	lb-ft
Resisting Moment	861	lb-ft
Uplift	**442**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**3**	
Anchors at 12" o.c.	**5**	
Anchors at 6" o.c.	**10**	
	3	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

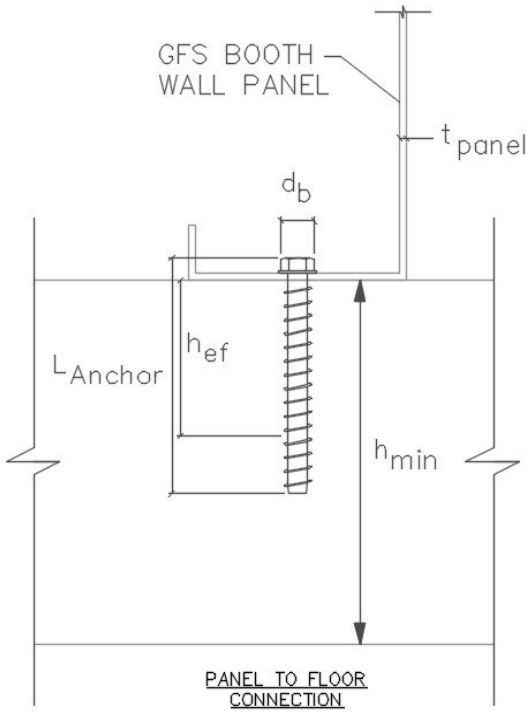
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	BP2	
Pier Length	10.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	874	lbs
Uniform Shear to Pier	87	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	7870	lb-ft
Resisting Moment	2392	lb-ft
Uplift	**572**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**6**	
Anchors at 12" o.c.	**9**	
Anchors at 6" o.c.	**18**	
	6	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

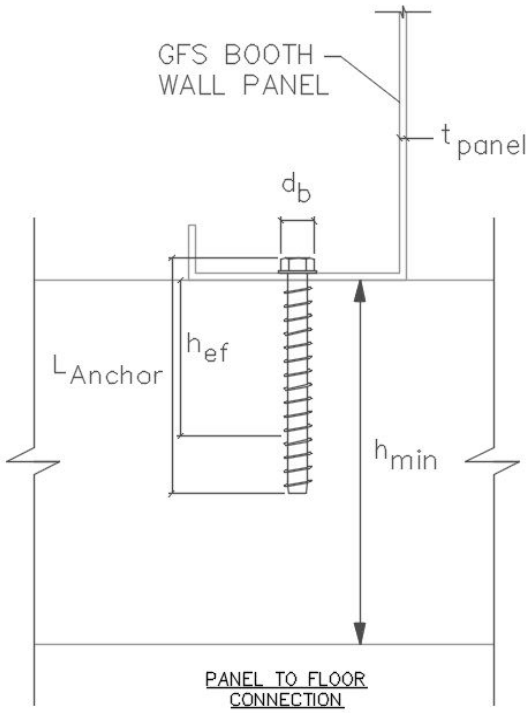
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	BP3	
Pier Length	10.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	874	lbs
Uniform Shear to Pier	87	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	7870	lb-ft
Resisting Moment	2392	lb-ft
Uplift	**572**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**4**	
Anchors at 18" o.c.	**6**	
Anchors at 12" o.c.	**9**	
Anchors at 6" o.c.	**18**	
	6	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

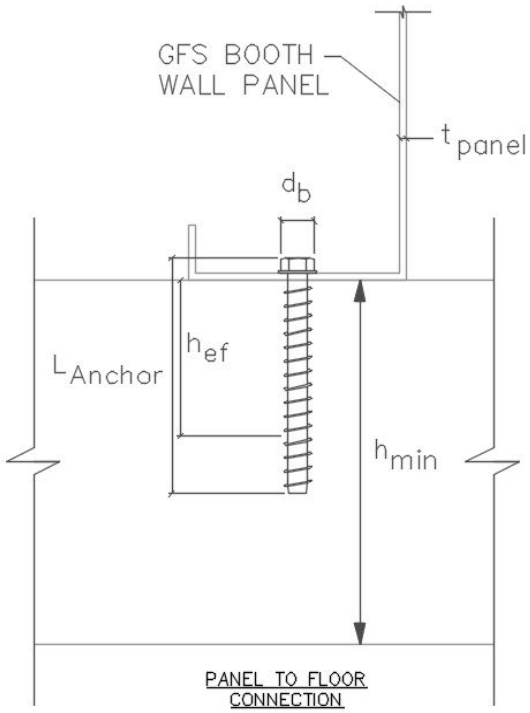
ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:	East-West Shear Wall B Check			Sheet:		of	

SHEAR WALL DESIGN

GRID LINE B



Panel Anchorage

3/8"Ø DeWalt Screw-Bolt+ Embedded 2 1/2" Minimum

Reference Report: ESR-3889

Effective Embed. Depth, h_{ef}	1.75	in
Min. Anchor Spacing, s_{min}	2	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.3	in

Column Anchorage

3/8"Ø DeWalt Power-Stud+ SD1 Embedded 2" Minimum

Reference Report: ESR-2818

Effective Embed. Depth, h_{ef}	2	in
Min. Anchor Spacing, s_{min}	3.75	in
Min. Slab Thickness, h_{min}	4	in
Critical Edge Distance, c_{ac}	6.5	in

Shear Wall Dimensions

Pier Number	BP4	
Pier Length	6.0	ft
Panel Height	9.0	ft

Shear at Wall/Pier

Shear to Gridline	2510	lbs
Shear to Pier	381	lbs
Uniform Shear to Pier	63	plf

Check 18 GA wall panel

Panel Thickness	0.048	in
Allowable Pier Shear	190	plf

18 GA WALL PANELS OK

Check Overturning

Overturning Moment	3427	lb-ft
Resisting Moment	861	lb-ft
Uplift	**442**	lbs
Capacity of Anchor (Tension)	802	lbs
Number of holdown anchors required	1	
Number of anchors provided at column	**4**	

LOCATE HOLDOWN ANCHOR 3 IN. FROM EACH END OF THE PIER OR RELY ON COLUMN ANCHORS

Check Shear Anchors

Capacity of Anchor (Shear)	1377	lbs
Number of bolts required	**1**	
Yield Strength of Sheet Steel	32	ksi
Ω	2	
Steel Bearing Capacity	258	lbs
Number of bolts required	**2**	
Anchors at 18" o.c.	**3**	
Anchors at 12" o.c.	**5**	
Anchors at 6" o.c.	**10**	
	3	anchors provided

SPACE ANCHORS AT 18 IN. O.C. BETWEEN HOLDOWN ANCHORS

ANCHORAGE VALUES ARE BASED ON AN EDGE DISTANCE GREATER THAN THE CRITICAL EDGE DISTANCE REPORTED IN ESR-3889 AND ESR-2818 AS APPLIES

This spreadsheet assumes concrete is NOT reinforced per ACI 318 and therefore uses all *Condition B* values on the ICC-ES report for the chosen anchor.

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		North-South Lateral Loads		Sheet:		of	

SHEAR WALL DESIGN

GRID LINE 1 FRAME USED

SHEAR WALL DESIGN

GRID LINE 2 FRAME USED

Job No.:	U178152	Job Title:	Codel Door	Design By:	KG	Date:	07/15/25
Subject:		Booth Frame		Sheet:		of	

Seismic Force Resisting System:	Steel Ordinary Moment Frames (Single Story and DL Tributary to roof is less than 20 psf)		Table 12.2-1
Detailing Requirements		§ 12.2.5.6 & 14.1	
Building Height Limit		65	Table 12.2-1
Coefficient for Upper Limit on Period	C_u	1.40	Table 12.8-1
Approximate Period Parameters	C_t	0.028	Table 12.8-2
	x	0.8	
Approximate Fundamental Period	T_a	0.16	Eq 12.8-7
Response Modification Coefficient	R	3.50	Table 12.2-1
System Overstrength Factor	Ω_o	3.00	
Deflection Amplification Factor	C_d	3.00	
Importance Factor	I_E	1.00	Table 11.5-2

Seismic Response Coefficient

C_s	0.293	Eq 12.8-2
C_{s_max}	0.962	Eq 12.8-3
C_{s_min}	0.045	Eq 12.8-5
C_{s_min}	N/A	Eq 12.8-6

Booth Weight (Trib to Roof) 6111 lbs

C_s	**0.293**	
C_s*W_T, V	**1793**	lbs (Ult.)
	4.0	psf

	$W_{DL\text{-}ROOF}$	$W_{LL\text{-}ROOF}$	$W_{seismic}$	$W_{DL\text{-}WALL}$
	5.0	0.0	4.0	3.5 psf
Frame 1	**15.0**	**0.0**	**12.0**	**10.5**
Frame 2	**40.0**	**0.0**	**32.0**	**28.0**
Frame 3	**50.0**	**0.0**	**40.0**	**35.0**
Frame 4	**40.0**	**0.0**	**32.0**	**28.0**
Frame 5	**15.0**	**0.0**	**12.0**	**10.5**
	plf (to beam)	plf (to beam)	plf (to beam)	plf (to column)

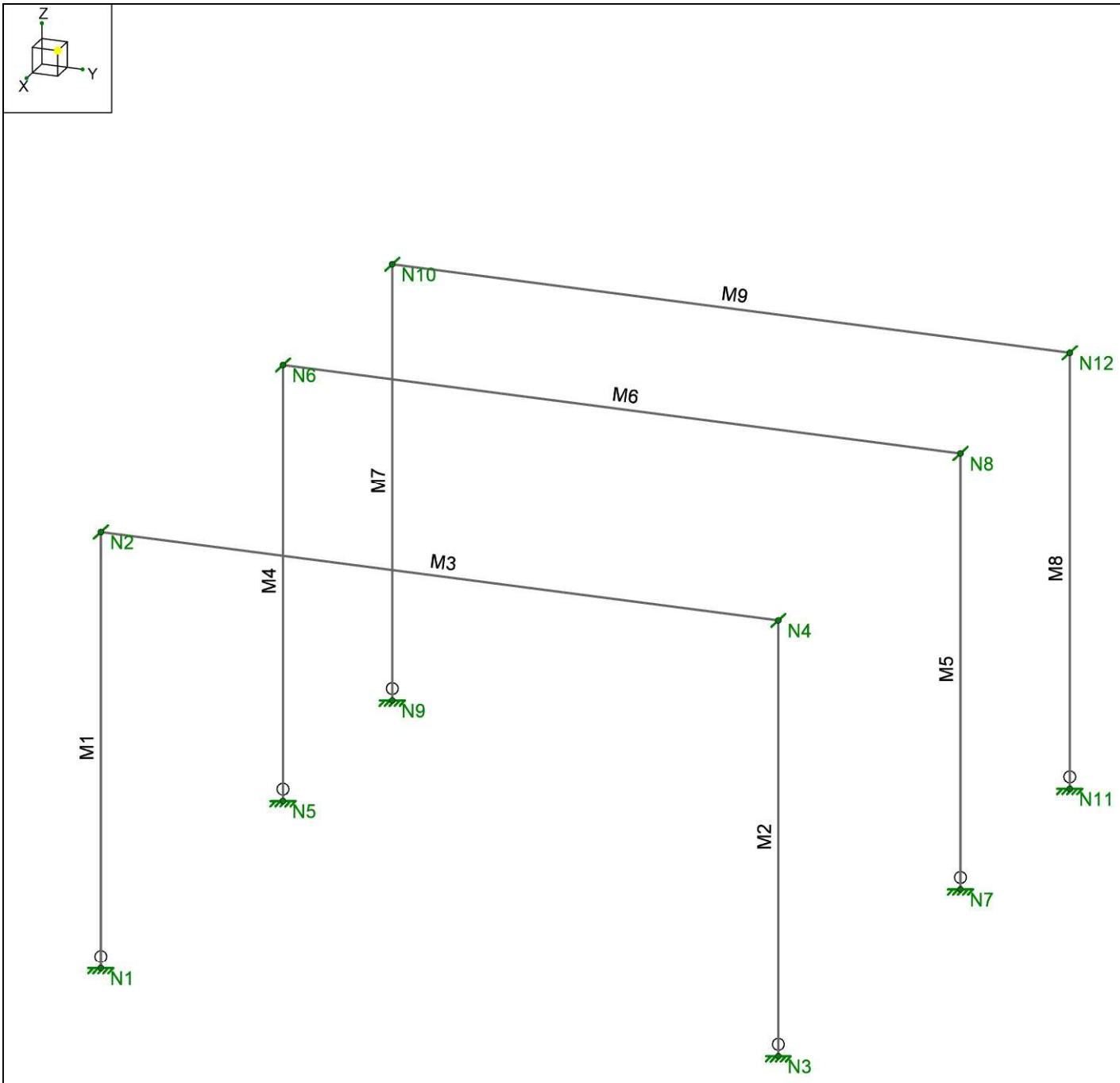
AMU Weight= 0 lbs

P_{UNIT}= 0 lbs/corner

F.S. Devices per Rail= 0

P_{LL}= 300 lbs at midspan of booth roof beam

$P_{Fall\ Safety}$= 0



Envelope Only Solution

RISA A NEMETSCHEK COMPANY	Global Finishing Solutions		SK-1
	KG		Jul 15, 2025 at 01:59 PM
	U178152		U178152-G (ASCE 7-16) Mo…

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	0	9	
3	N3	0	14	0	
4	N4	0	14	9	
5	N5	-10	0	0	
6	N6	-10	0	9	
7	N7	-10	14	0	
8	N8	-10	14	9	
9	N9	-16	0	0	
10	N10	-16	0	9	
11	N11	-16	14	0	
12	N12	-16	14	9	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Column	W8X10	Column	Wide Flange	A992	Typical	2.96	2.09	30.8	0.043
2	Beam	W8X10	Beam	Wide Flange	A992	Typical	2.96	2.09	30.8	0.043

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	Column	Column	Wide Flange	A992	Typical
2	M2	N3	N4	Column	Column	Wide Flange	A992	Typical
3	M3	N2	N4	Beam	Beam	Wide Flange	A992	Typical
4	M4	N5	N6	Column	Column	Wide Flange	A992	Typical
5	M5	N7	N8	Column	Column	Wide Flange	A992	Typical
6	M6	N6	N8	Beam	Beam	Wide Flange	A992	Typical
7	M7	N9	N10	Column	Column	Wide Flange	A992	Typical
8	M8	N11	N12	Column	Column	Wide Flange	A992	Typical
9	M9	N10	N12	Beam	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Load)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	-35	-35	0	%100
2	M2	Z	-35	-35	0	%100
3	M3	Z	-50	-50	0	%100
4	M4	Z	-28	-28	0	%100
5	M5	Z	-28	-28	0	%100
6	M6	Z	-40	-40	0	%100
7	M7	Z	-10.5	-10.5	0	%100
8	M8	Z	-10.5	-10.5	0	%100
9	M9	Z	-15	-15	0	%100

Member Distributed Loads (BLC 3 : Seismic Load (Y))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, lb-ft/ft]	End Magnitude [lb/ft, F, psf, lb-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M3	Y	43.8	43.8	0	%100
2	M6	Y	35	35	0	%100
3	M9	Y	13.1	13.1	0	%100

Member Point Loads (BLC 1 : Dead Load)

	Member Label	Direction	Magnitude [lb, lb-ft]	Location [(ft, %)]
1	M9	Z	-1115	%50

Member Point Loads (BLC 2 : Roof Live Load)

	Member Label	Direction	Magnitude [lb, lb-ft]	Location [(ft, %)]
1	M3	Z	-300	%50
2	M6	Z	-300	%50
3	M9	Z	-300	%50

Basic Load Cases

	BLC Description	Category	Z Gravity	Point	Distributed
1	Dead Load	DL	-1	1	9
2	Roof Live Load	RLL		3	
3	Seismic Load (Y)	ELY			3

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor
1	DL		Y	DL	1				
2	RLL		Y	RLL	1				
3	ELY		Y	ELY	1				
4	EQ 16-1								
5	1.4DL	Yes	Y	DL	1.4				
6	EQ 16-3								
7	1.2DL+1.6RLL	Yes	Y	DL	1.2	RLL	1.6		
8	EQ 16-5								
9	1.2DL+ELY+ELZ	Yes	Y	DL	1.2	Rho*ELY	1	Sds*DL	0.2
10	1.2DL-ELY+ELZ	Yes	Y	DL	1.2	Rho*ELY	-1	Sds*DL	0.2
11	1.2DL+ELY+ELZ	Yes	Y	DL	1.2	Om*ELY	1	Sds*DL	0.2
12	1.2DL-ELY+ELZ	Yes	Y	DL	1.2	Om*ELY	-1	Sds*DL	0.2
13	EQ 16-7								
14	0.9DL+ELY-ELZ	Yes	Y	DL	0.9	Rho*ELY	1	Sds*DL	-0.2
15	0.9DL-ELY-ELZ	Yes	Y	DL	0.9	Rho*ELY	-1	Sds*DL	-0.2
16	0.9DL+ELY-ELZ	Yes	Y	DL	0.9	Om*ELY	1	Sds*DL	-0.2
17	0.9DL-ELY-ELZ	Yes	Y	DL	0.9	Om*ELY	-1	Sds*DL	-0.2

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	M1	W8X10	0.126	9	10	0.01	9	y	10	40479.825	133200	6119.448	32870.734	1	H1-1b
2	M2	W8X10	0.126	9	9	0.01	9	y	9	40479.825	133200	6119.448	32870.734	1	H1-1b
3	M3	W8X10	0.152	7	7	0.025	0	y	10	16728.907	133200	6119.448	13886.651	1.432	H1-1b
4	M4	W8X10	0.102	9	10	0.008	9	y	10	40479.825	133200	6119.448	32870.734	1	H1-1b
5	M5	W8X10	0.102	9	9	0.008	9	y	9	40479.825	133200	6119.448	32870.734	1	H1-1b
6	M6	W8X10	0.139	7	7	0.02	0	y	10	16728.907	133200	6119.448	14016.461	1.445	H1-1b
7	M7	W8X10	0.11	9	10	0.009	9	y	10	40479.825	133200	6119.448	32870.734	1	H1-1b
8	M8	W8X10	0.11	9	9	0.009	9	y	9	40479.825	133200	6119.448	32870.734	1	H1-1b
9	M9	W8X10	0.31	7	7	0.029	0	y	10	16728.907	133200	6119.448	15057.345	1.552	H1-1b

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	0	15	412.159	10	1558.713	10	0	15	0	15	0	15
2		min	0	5	-255.031	14	177.958	14	0	5	0	5	0	5
3	N3	max	0	15	255.031	15	1558.713	9	0	15	0	15	0	15
4		min	0	5	-412.159	9	177.958	15	0	5	0	5	0	5
5	N2	max	0	15	0	15	0	15	0	15	0	15	0	15
6		min	0	5	0	5	0	5	0	5	0	5	0	5
7	N4	max	0	15	0	15	0	15	0	15	0	15	0	15
8		min	0	5	0	5	0	5	0	5	0	5	0	5
9	N5	max	0	15	333.225	10	1291.455	10	0	15	0	15	0	15
10		min	0	5	-201.781	14	165.336	14	0	5	0	5	0	5
11	N6	max	0	15	0	15	0	15	0	15	0	15	0	15
12		min	0	5	0	5	0	5	0	5	0	5	0	5
13	N7	max	0	15	201.781	15	1291.455	9	0	15	0	15	0	15
14		min	0	5	-333.225	9	165.336	15	0	5	0	5	0	5
15	N8	max	0	15	0	15	0	15	0	15	0	15	0	15
16		min	0	5	0	5	0	5	0	5	0	5	0	5
17	N9	max	0	15	348.486	10	1409.64	10	0	15	0	15	0	15
18		min	0	5	35.158	14	519.181	14	0	5	0	5	0	5
19	N10	max	0	15	0	15	0	15	0	15	0	15	0	15
20		min	0	5	0	5	0	5	0	5	0	5	0	5
21	N11	max	0	15	-35.158	15	1409.64	9	0	15	0	15	0	15
22		min	0	5	-348.486	9	519.181	15	0	5	0	5	0	5
23	N12	max	0	15	0	15	0	15	0	15	0	15	0	15
24		min	0	5	0	5	0	5	0	5	0	5	0	5
25	Totals:	max	0	15	1286.6	15	7289.921	7						
26		min	0	5	-1286.6	9	3386.129	14						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	15	0	14	0	14	0	15	0	15	0	15
2		min	0	5	0	10	0	10	0	5	0	5	0	5
3	N2	max	0	15	0.329	9	0	14	1.047e-3	15	0	15	0	15
4		min	0	5	-0.329	10	-0.002	10	-1.934e-3	9	0	5	0	5
5	N3	max	0	15	0	9	0	15	0	15	0	15	0	15
6		min	0	5	0	15	0	9	0	5	0	5	0	5
7	N4	max	0	15	0.329	9	0	15	1.934e-3	10	0	15	0	15
8		min	0	5	-0.329	10	-0.002	9	-1.047e-3	14	0	5	0	5
9	N5	max	0	15	0	14	0	14	0	15	0	15	0	15
10		min	0	5	0	10	0	10	0	5	0	5	0	5
11	N6	max	0	15	0.263	9	0	14	8.259e-4	15	0	15	0	15
12		min	0	5	-0.263	10	-0.002	10	-1.564e-3	9	0	5	0	5
13	N7	max	0	15	0	9	0	15	0	15	0	15	0	15
14		min	0	5	0	15	0	9	0	5	0	5	0	5
15	N8	max	0	15	0.263	9	0	15	1.564e-3	10	0	15	0	15
16		min	0	5	-0.263	10	-0.002	9	-8.259e-4	14	0	5	0	5
17	N9	max	0	15	0	14	0	14	0	15	0	15	0	15
18		min	0	5	0	10	0	10	0	5	0	5	0	5
19	N10	max	0	15	0.099	9	-0.001	14	-3.004e-4	15	0	15	0	15
20		min	0	5	-0.098	10	-0.002	10	-1.822e-3	9	0	5	0	5
21	N11	max	0	15	0	9	0	15	0	15	0	15	0	15
22		min	0	5	0	15	0	9	0	5	0	5	0	5
23	N12	max	0	15	0.098	9	-0.001	15	1.822e-3	10	0	15	0	15
24		min	0	5	-0.099	10	-0.002	9	3.004e-4	14	0	5	0	5