STRUCTURAL CALCULATIONS

for

New Deck
Griffith Residence
2443 84th Ave SE
Mercer Island, WA

May 20, 2020

Seattle Structural

3131 Elliott Avenue, Suite 600A, Seattle, WA 98121
206-343-3000 phone 206-343-3013 fax

Seattle Structural Project No. P19031.00

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Seattle Structural

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Seattle Structural

PROJECT GRIFFITH DECK BY TDM DATE 5.19.20 PAGE

LOADS

DEAD LOAD

SELF WEIGHT OF FRAMING

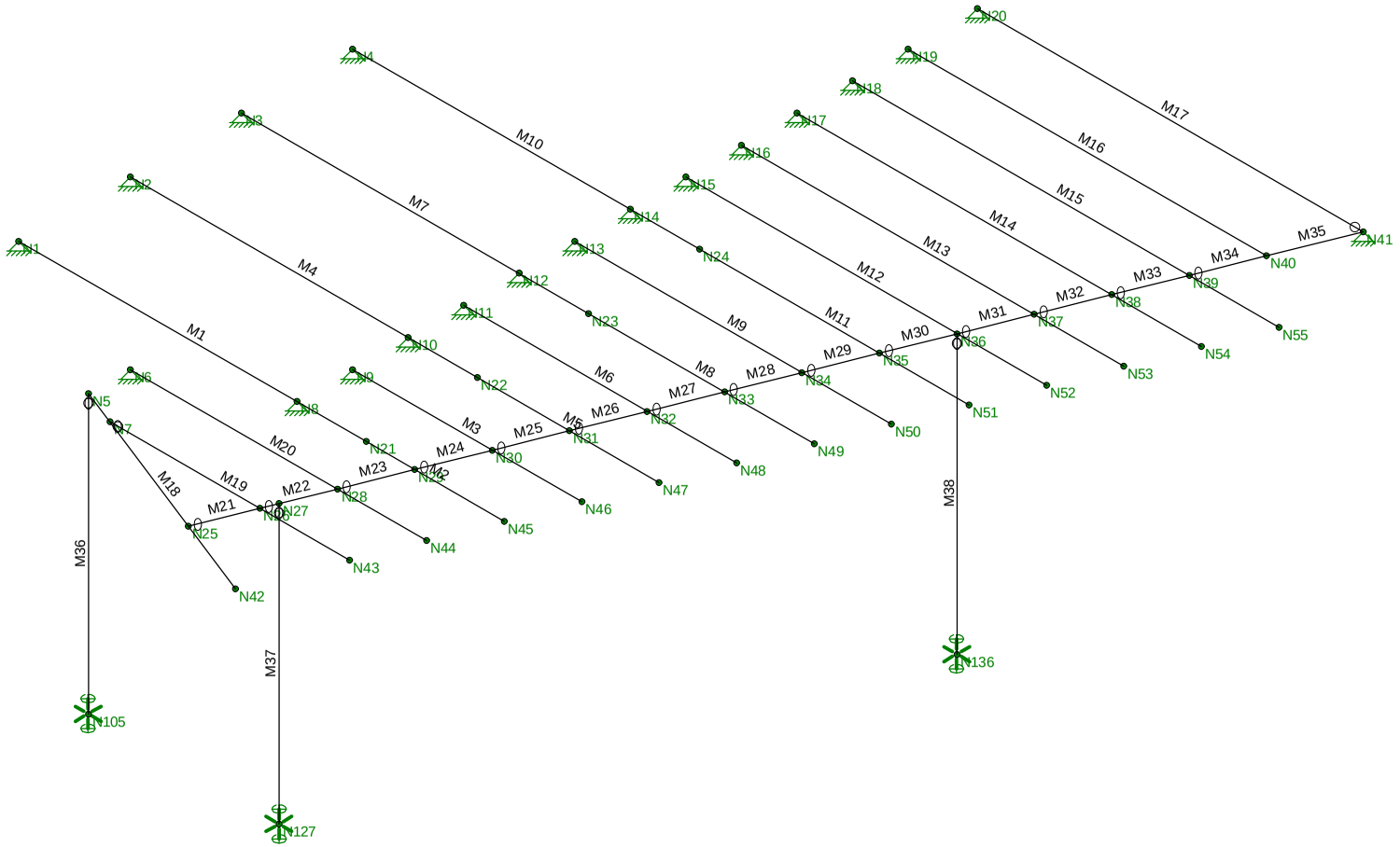
DECKING 1" DECKING $(1"/12"/ft)(40\ PCF) = 4\ PSF$

LIVE LOAD

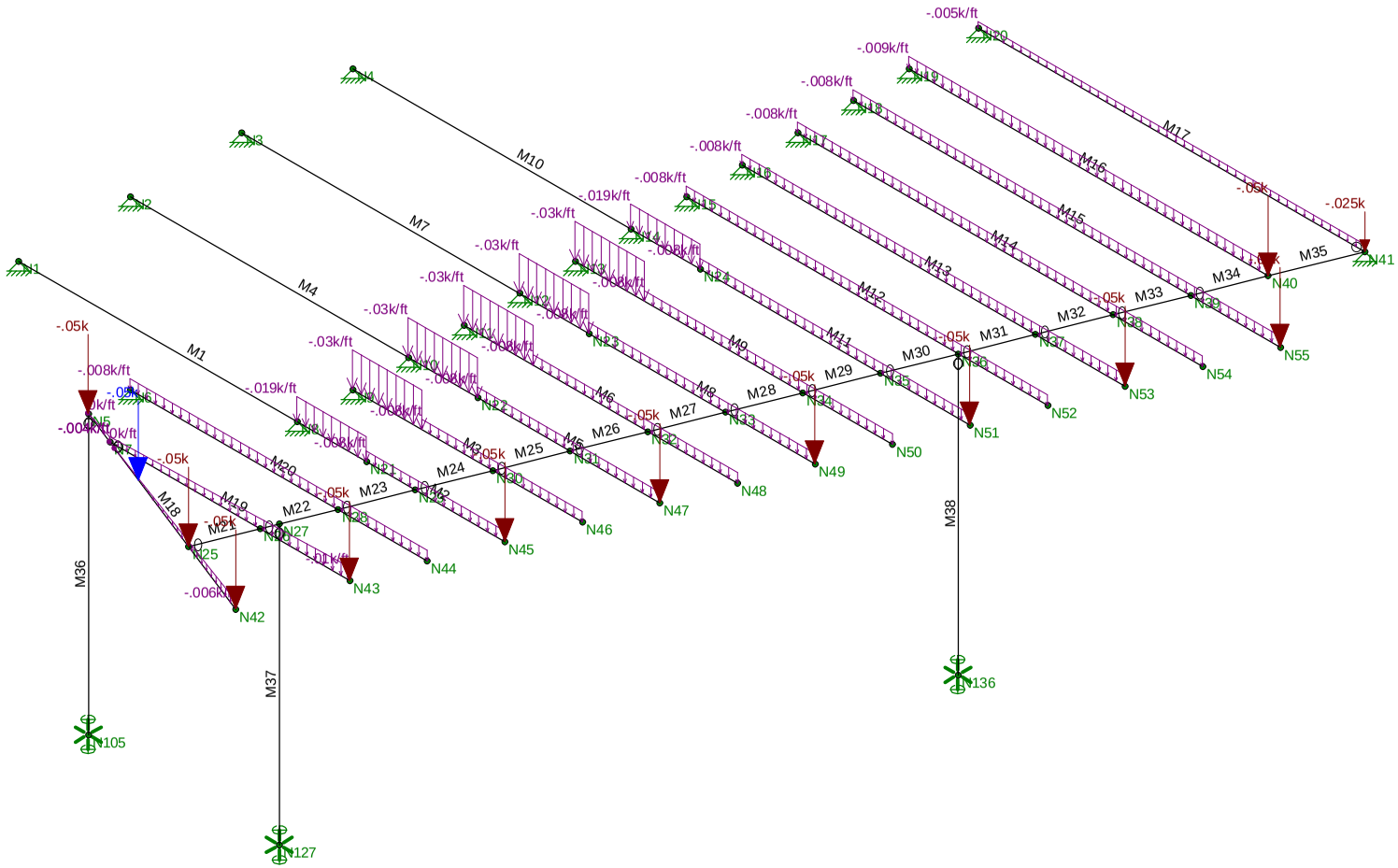
LL = 40 PSF

SNOW LOAD

SL = 25 PSF

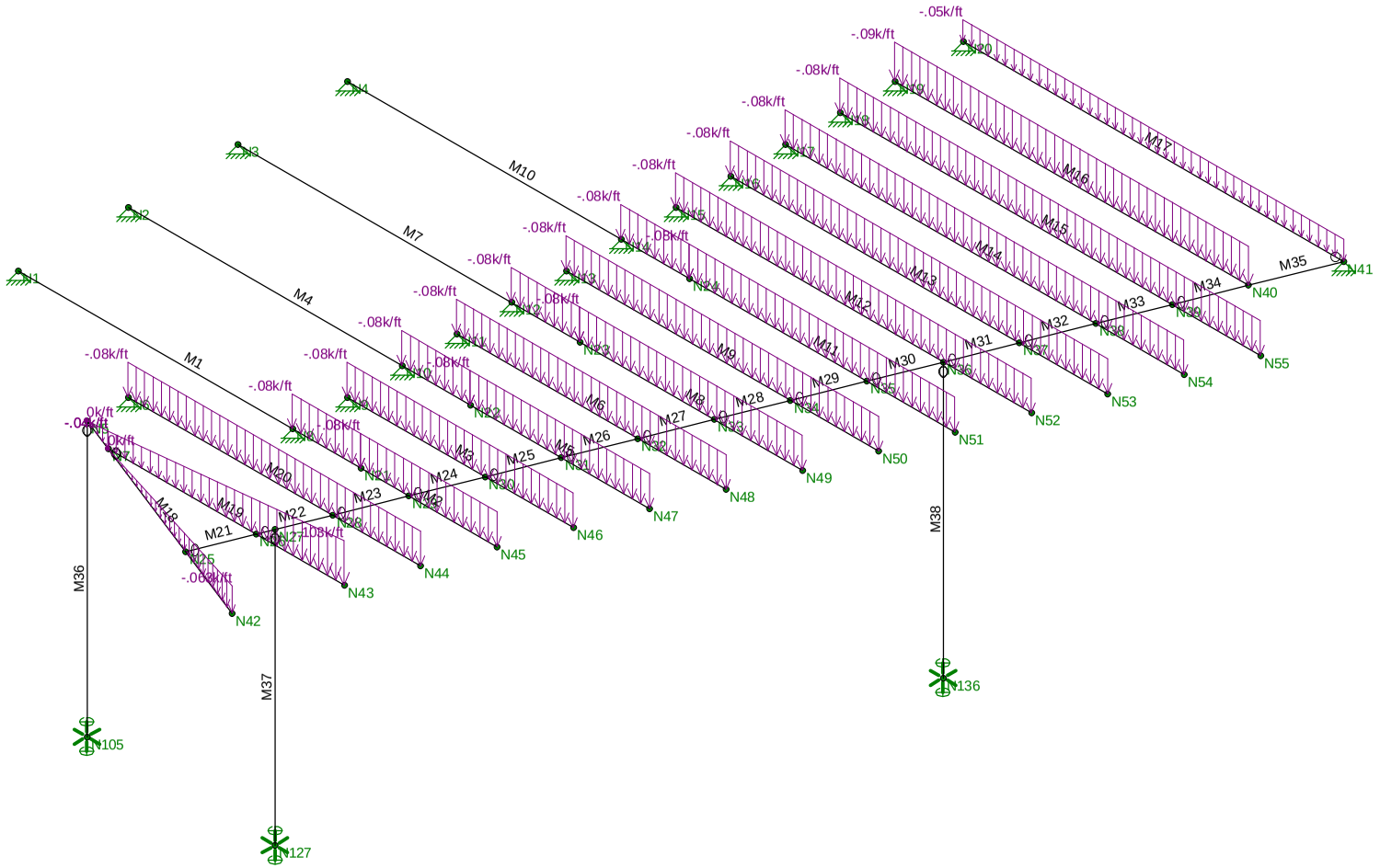


Seattle Structural	Kyle Grifith Deck	SK - 1
TDM		Sept 19, 2019 at 9:34 AM
P19031.00		Deck 3D.r3d



Loads: BLC 1, Dead

Seattle Structural	Kyle Grifith Deck	SK - 2
TDM		Sept 19, 2019 at 9:36 AM
P19031.00		Deck 3D.r3d



Loads: BLC 2, Live

Seattle Structural	Kyle Grifith Deck	SK - 3
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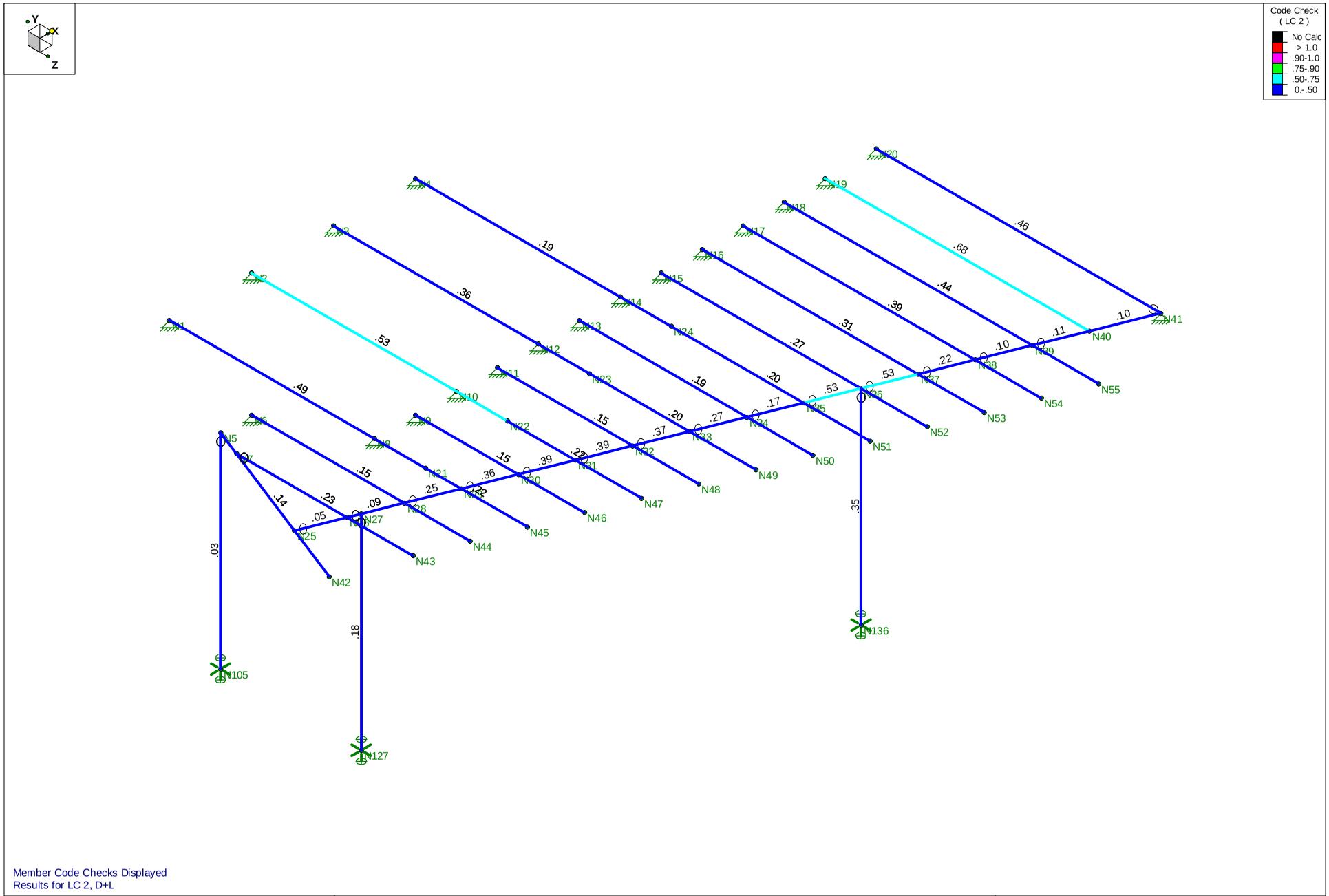
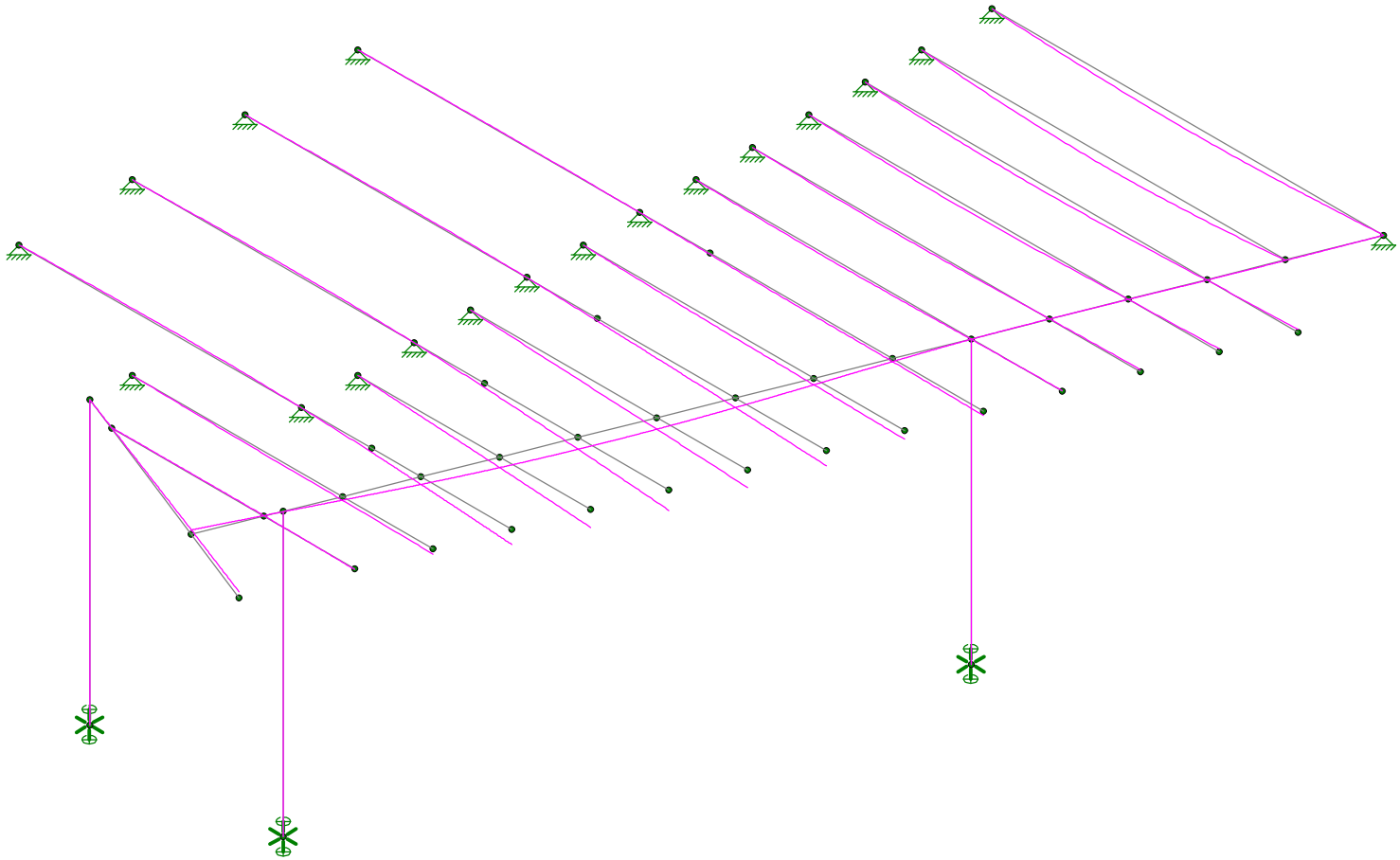
P19031.00		Deck 3D.r3d



Member Code Checks Displayed
Results for LC 2, D+L

Seattle Structural	Kyle Grifith Deck	SK - 4
TDM		Sept 19, 2019 at 9:37 AM
P19031.00		Deck 3D.r3d



Results for LC 2, D+L

Seattle Structural	Kyle Grifith Deck	SK - 5
TDM		Sept 19, 2019 at 9:38 AM
P19031.00		Deck 3D.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Wood Material Properties

	Label	Type	Database	Species	Grade	Cm	Emod	Nu	Therm (...	Dens[k/ft...
1	DF	Solid Sawn	Visually G...	Douglas Fir-Larch	No.1	Yes	1	.3	.3	.035
2	SP	Solid Sawn	Visually G...	Southern Pine	No.1		1	.3	.3	.035
3	HF	Solid Sawn	Visually G...	Hem-Fir	No.1		1	.3	.3	.035
4	SPF	Solid Sawn	Visually G...	Spruce-Pine-fir	No.1		1	.3	.3	.035
5	24F-1.8E DF Balanced	Glulam	NDS Tabl...	24F-1.8E_DF_BAL	na	Yes	1	.3	.3	.035
6	24F-1.8E DF Unbalanced	Glulam	NDS Tabl...	24F-1.8E_DF_U...	na		1	.3	.3	.035
7	24F-1.8E SP Balanced	Glulam	NDS Tabl...	24F-1.8E_SP_BAL	na		1	.3	.3	.035
8	24F-1.8E SP Unbalanced	Glulam	NDS Tabl...	24F-1.8E_SP_U...	na		1	.3	.3	.035

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	4x8	4X8	Beam	None	DF	Typical	25.375	25.904	111.148	72.244
2	GLB	6.75X10.5FS	Beam	None	24F-1.8E DF Balanced	Typical	70.875	269.104	651.164	646.671
3	4x4 Post	4X4	Column	None	DF	Typical	12.25	12.505	12.505	21.134
4	6x6 Post	6X6	Column	None	DF	Typical	30.25	76.255	76.255	128.871
5	Rim	4X8	Beam	None	DF	Typical	25.375	25.904	111.148	72.244

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	-10	0	
2	N2	4	0	-10	0	
3	N3	8	0	-10	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
4	N4	12	0	-10	0	
5	N5	-3.5	0	-4	0	
6	N6	-2	0	-4	0	
7	N7	-4	0	-2.7307	0	
8	N8	0	0	0	0	
9	N9	2	0	0	0	
10	N10	4	0	0	0	
11	N11	6	0	0	0	
12	N12	8	0	0	0	
13	N13	10	0	0	0	
14	N14	12	0	0	0	
15	N15	14	0	0	0	
16	N16	16	0	0	0	
17	N17	18	0	0	0	
18	N18	20	0	0	0	
19	N19	22	0	0	0	
20	N20	24.5	0	0	0	
21	N21	0	0	2.5	0	
22	N22	4	0	2.5	0	
23	N23	8	0	2.5	0	
24	N24	12	0	2.5	0	
25	N25	-5.8431	0	1.9483	0	
26	N26	-4	0	2.674319	0	
27	N27	-3.5	0	2.871274	0	
28	N28	-2	0	3.462142	0	
29	N29	0	0	4.249965	0	
30	N30	2	0	5.037788	0	
31	N31	4	0	5.825612	0	
32	N32	6	0	6.613435	0	
33	N33	8	0	7.401258	0	
34	N34	10	0	8.189081	0	
35	N35	12	0	8.976905	0	
36	N36	14	0	9.764728	0	
37	N37	16	0	10.552551	0	
38	N38	18	0	11.340374	0	
39	N39	20	0	12.128198	0	
40	N40	22	0	12.916021	0	
41	N41	24.5	0	13.9008	0	
42	N42	-6.9426	0	4.7396	0	
43	N43	-4	0	5.898724	0	
44	N44	-2	0	6.686547	0	
45	N45	0	0	7.47437	0	
46	N46	2	0	8.262193	0	
47	N47	4	0	9.050016	0	
48	N48	6	0	9.837839	0	
49	N49	8	0	10.625662	0	
50	N50	10	0	11.413485	0	
51	N51	12	0	12.201308	0	
52	N52	14	0	12.989131	0	
53	N53	16	0	13.776954	0	
54	N54	18	0	14.564777	0	
55	N55	20	0	15.3526	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
56	N105	-3.5	-10	-4	0	
57	N127	-3.5	-10	2.8713	0	
58	N136	14	-10	9.7698	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction			
2	N2	Reaction	Reaction	Reaction			
3	N3	Reaction	Reaction	Reaction			
4	N4	Reaction	Reaction	Reaction			
5	N6	Reaction	Reaction	Reaction			
6	N8	Reaction	Reaction	Reaction			
7	N9	Reaction	Reaction	Reaction			
8	N10	Reaction	Reaction	Reaction			
9	N11	Reaction	Reaction	Reaction			
10	N12	Reaction	Reaction	Reaction			
11	N13	Reaction	Reaction	Reaction			
12	N14	Reaction	Reaction	Reaction			
13	N15	Reaction	Reaction	Reaction			
14	N16	Reaction	Reaction	Reaction			
15	N17	Reaction	Reaction	Reaction			
16	N18	Reaction	Reaction	Reaction			
17	N19	Reaction	Reaction	Reaction			
18	N20	Reaction	Reaction	Reaction			
19	N41	Reaction	Reaction	Reaction			
20	N105	Reaction	Reaction	Reaction		Fixed	
21	N127	Reaction	Reaction	Reaction		Fixed	
22	N136	Reaction	Reaction	Reaction		Fixed	

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N21			4x8	Beam	None	DF	Typical
2	M2	N21	N45			4x8	Beam	None	DF	Typical
3	M3	N9	N46			4x8	Beam	None	DF	Typical
4	M4	N2	N22			4x8	Beam	None	DF	Typical
5	M5	N22	N47			4x8	Beam	None	DF	Typical
6	M6	N11	N48			4x8	Beam	None	DF	Typical
7	M7	N3	N23			4x8	Beam	None	DF	Typical
8	M8	N23	N49			4x8	Beam	None	DF	Typical
9	M9	N13	N50			4x8	Beam	None	DF	Typical
10	M10	N4	N24			4x8	Beam	None	DF	Typical
11	M11	N24	N51			4x8	Beam	None	DF	Typical
12	M12	N15	N52			4x8	Beam	None	DF	Typical
13	M13	N16	N53			4x8	Beam	None	DF	Typical
14	M14	N17	N54			4x8	Beam	None	DF	Typical
15	M15	N18	N55			4x8	Beam	None	DF	Typical
16	M16	N19	N40			4x8	Beam	None	DF	Typical
17	M17	N20	N41			4x8	Beam	None	DF	Typical
18	M18	N5	N42			4x8	Beam	None	DF	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
19	M19	N7	N43			4x8	Beam	None	DF	Typical
20	M20	N6	N44			4x8	Beam	None	DF	Typical
21	M21	N25	N26			GLB	Beam	None	24F-1.8E DF Bal...	Typical
22	M22	N26	N28			GLB	Beam	None	24F-1.8E DF Bal...	Typical
23	M23	N28	N29			GLB	Beam	None	24F-1.8E DF Bal...	Typical
24	M24	N29	N30			GLB	Beam	None	24F-1.8E DF Bal...	Typical
25	M25	N30	N31			GLB	Beam	None	24F-1.8E DF Bal...	Typical
26	M26	N31	N32			GLB	Beam	None	24F-1.8E DF Bal...	Typical
27	M27	N32	N33			GLB	Beam	None	24F-1.8E DF Bal...	Typical
28	M28	N33	N34			GLB	Beam	None	24F-1.8E DF Bal...	Typical
29	M29	N34	N35			GLB	Beam	None	24F-1.8E DF Bal...	Typical
30	M30	N35	N36			GLB	Beam	None	24F-1.8E DF Bal...	Typical
31	M31	N36	N37			GLB	Beam	None	24F-1.8E DF Bal...	Typical
32	M32	N37	N38			GLB	Beam	None	24F-1.8E DF Bal...	Typical
33	M33	N38	N39			GLB	Beam	None	24F-1.8E DF Bal...	Typical
34	M34	N39	N40			GLB	Beam	None	24F-1.8E DF Bal...	Typical
35	M35	N40	N41			GLB	Beam	None	24F-1.8E DF Bal...	Typical
36	M36	N105	N5			4x4 Post	Column	None	DF	Typical
37	M37	N127	N27			6x6 Post	Column	None	DF	Typical
38	M38	N136	N36			6x6 Post	Column	None	DF	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Ra...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes				None
4	M4						Yes				None
5	M5						Yes				None
6	M6						Yes				None
7	M7						Yes				None
8	M8						Yes				None
9	M9						Yes				None
10	M10						Yes				None
11	M11						Yes				None
12	M12						Yes				None
13	M13						Yes				None
14	M14						Yes				None
15	M15						Yes				None
16	M16						Yes				None
17	M17		BenPIN				Yes				None
18	M18						Yes	Default			None
19	M19	AllPIN					Yes	Default			None
20	M20						Yes				None
21	M21	OOOXOO					Yes				None
22	M22	OOOXOO					Yes				None
23	M23	OOOXOO					Yes				None
24	M24	OOOXOO					Yes				None
25	M25	OOOXOO					Yes				None
26	M26	OOOXOO					Yes				None
27	M27	OOOXOO					Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Ra...	Analysis ...	Inactive	Seismic...
28	M28	OOOXOO					Yes				None
29	M29	OOOXOO					Yes				None
30	M30	OOOXOO					Yes				None
31	M31	OOOXOO					Yes				None
32	M32	OOOXOO					Yes				None
33	M33	OOOXOO					Yes				None
34	M34	OOOXOO					Yes				None
35	M35						Yes				None
36	M36		AllPIN				Yes	** NA **			None
37	M37		AllPIN				Yes	** NA **			None
38	M38		AllPIN				Yes	** NA **			None

Wood Design Parameters

	Label	Shape	Length[...	le2[ft]	le1[ft]	le-bend top[ft]	le-bend bo...	Kyy	Kzz	CV	Cr	y sway	z sway
1	M1	4x8	12.5	.25		Lbyy							
2	M2	4x8	4.974	.25		Lbyy					Yes		
3	M3	4x8	8.262	.25		Lbyy					Yes		
4	M4	4x8	12.5	.25		Lbyy							
5	M5	4x8	6.55	.25		Lbyy					Yes		
6	M6	4x8	9.838	.25		Lbyy					Yes		
7	M7	4x8	12.5	.25		Lbyy							
8	M8	4x8	8.126	.25		Lbyy					Yes		
9	M9	4x8	11.413	.25		.25					Yes		
10	M10	4x8	12.5	.25		.25							
11	M11	4x8	9.701	.25		.25					Yes		
12	M12	4x8	12.989	.25		.25					Yes		
13	M13	4x8	13.777	.25		.25					Yes		
14	M14	4x8	14.565	.25		.25					Yes		
15	M15	4x8	15.353	.25		.25					Yes		
16	M16	4x8	12.916	.25		.25					Yes		
17	M17	4x8	13.901	.25		.25					Yes		
18	M18	4x8	9.393	.25		.25					Yes		
19	M19	4x8	8.629	.25		.25					Yes		
20	M20	4x8	10.687	.25		.25					Yes		
21	M21	GLB	1.981	1.98	1.98	1.98	1.98						
22	M22	GLB	2.15	2.15	19.35	2.15	19.35						
23	M23	GLB	2.15	2.15	19.35	2.15	19.35						
24	M24	GLB	2.15	2.15	19.35	2.15	19.35						
25	M25	GLB	2.15	2.15	19.35	2.15	19.35						
26	M26	GLB	2.15	2.15	19.35	2.15	19.35						
27	M27	GLB	2.15	2.15	19.35	2.15	19.35						
28	M28	GLB	2.15	2.15	19.35	2.15	19.35						
29	M29	GLB	2.15	2.15	19.35	2.15	19.35						
30	M30	GLB	2.15	2.15	19.35	2.15	19.35						
31	M31	GLB	2.15	2.15	10.75	2.15	10.75						
32	M32	GLB	2.15	2.15	10.75	2.15	10.75						
33	M33	GLB	2.15	2.15	10.75	2.15	10.75						
34	M34	GLB	2.15	2.15	10.75	2.15	10.75						
35	M35	GLB	2.687	2.15	10.75	2.15	10.75						
36	M36	4x4 Post	10										

Wood Design Parameters (Continued)

	Label	Shape	Length[...	le2[ft]	le1[ft]	le-bend top[ft]	le-bend bo...	Kyy	Kzz	CV	Cr	y sway	z sway
37	M37	6x6 Post	10										
38	M38	6x6 Post	10										

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1		12	1	25		
2	Live	LL						22		

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	10	12.5
2	M2	Y	-.008	-.008	0	0
3	M3	Y	-.03	-.03	0	2.5
4	M3	Y	-.008	-.008	2.5	8.262
5	M4	Y	-.03	-.03	10	12.5
6	M5	Y	-.008	-.008	0	0
7	M6	Y	-.03	-.03	0	2.5
8	M6	Y	-.008	-.008	2.5	9.838
9	M7	Y	-.03	-.03	10	12.5
10	M8	Y	-.008	-.008	0	0
11	M9	Y	-.03	-.03	0	2.5
12	M9	Y	-.008	-.008	2.5	11.413
13	M10	Y	-.019	-.019	10	12.5
14	M11	Y	-.008	-.008	0	0
15	M12	Y	-.008	-.008	0	0
16	M13	Y	-.008	-.008	0	0
17	M14	Y	-.008	-.008	0	0
18	M15	Y	-.008	-.008	0	0
19	M16	Y	-.009	-.009	0	0
20	M17	Y	-.005	-.005	0	0
21	M18	Y	0	-.004	0	1.364
22	M18	Y	0	-.006	1.364	9.393
23	M19	Y	-.004	-.004	0	0
24	M19	Y	0	-.006	0	0
25	M20	Y	-.008	-.008	0	0

Member Distributed Loads (BLC 2 : Live)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.08	-.08	10	12.5
2	M2	Y	-.08	-.08	0	0
3	M3	Y	-.08	-.08	0	0
4	M4	Y	-.08	-.08	10	12.5
5	M5	Y	-.08	-.08	0	0
6	M6	Y	-.08	-.08	0	0
7	M7	Y	-.08	-.08	10	12.5
8	M8	Y	-.08	-.08	0	0
9	M9	Y	-.08	-.08	0	0
10	M10	Y	-.08	-.08	10	12.5

Member Distributed Loads (BLC 2 : Live) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
11	M11	Y	-.08	-.08	0	0
12	M12	Y	-.08	-.08	0	0
13	M13	Y	-.08	-.08	0	0
14	M14	Y	-.08	-.08	0	0
15	M15	Y	-.08	-.08	0	0
16	M16	Y	-.09	-.09	0	0
17	M17	Y	-.05	-.05	0	0
18	M18	Y	0	-.04	0	1.364
19	M18	Y	0	-.063	1.364	9.393
20	M19	Y	-.04	-.04	0	0
21	M19	Y	0	-.063	0	0
22	M20	Y	-.08	-.08	0	0

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2...
1	N5	L	Y	-.05
2	N25	L	Y	-.05
3	N42	L	Y	-.05
4	N43	L	Y	-.05
5	N45	L	Y	-.05
6	N47	L	Y	-.05
7	N49	L	Y	-.05
8	N51	L	Y	-.05
9	N53	L	Y	-.05
10	N55	L	Y	-.05
11	N40	L	Y	-.05
12	N41	L	Y	-.025

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M18	Y	-.05	3.197

Load Combinations

	Description	So...	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	D	Yes	Y		1	1																				
2	D+L	Yes	Y		1	1	2	1																		

Load Combination Design

	Description	ASIF	CD	Service	Hot Rol...	Cold Form...	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	D		.9				Yes					
2	D+L						Yes					

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	0	-.003	0	0	0	0
2	1	N2	0	-.006	0	0	0	0
3	1	N3	0	.006	0	0	0	0
4	1	N4	0	.02	0	0	0	0
5	1	N6	0	.043	0	0	0	0
6	1	N8	0	.139	0	0	0	0
7	1	N9	0	.062	0	0	0	0
8	1	N10	0	.174	0	0	0	0
9	1	N11	0	.08	0	0	0	0
10	1	N12	0	.155	0	0	0	0
11	1	N13	0	.096	0	0	0	0
12	1	N14	0	.115	0	0	0	0
13	1	N15	0	.062	0	0	0	0
14	1	N16	0	.052	0	0	0	0
15	1	N17	0	.074	0	0	0	0
16	1	N18	0	.067	0	0	0	0
17	1	N19	0	.098	0	0	0	0
18	1	N20	0	.078	0	0	0	0
19	1	N41	0	.301	0	0	0	0
20	1	N105	0	.087	0	0	NC	0
21	1	N127	0	1.066	0	0	NC	0
22	1	N136	0	1.654	0	0	NC	0
23	1	Totals:	0	4.42	0			
24	1	COG (ft):	X: 9.044	Y: -.2	Z: 5.136			
25	2	N1	0	-.106	0	0	0	0
26	2	N2	0	-.117	0	0	0	0
27	2	N3	0	-.07	0	0	0	0
28	2	N4	0	-.024	0	0	0	0
29	2	N6	0	.286	0	0	0	0
30	2	N8	0	.557	0	0	0	0
31	2	N9	0	.181	0	0	0	0
32	2	N10	0	.64	0	0	0	0
33	2	N11	0	.282	0	0	0	0
34	2	N12	0	.574	0	0	0	0
35	2	N13	0	.372	0	0	0	0
36	2	N14	0	.52	0	0	0	0
37	2	N15	0	.41	.002	0	0	0
38	2	N16	0	.435	0	0	0	0
39	2	N17	0	.491	0	0	0	0
40	2	N18	0	.517	0	0	0	0
41	2	N19	0	.679	0	0	0	0
42	2	N20	0	.425	0	0	0	0
43	2	N41	0	1.246	0	0	0	0
44	2	N105	0	.139	0	0	NC	0
45	2	N127	0	3.565	0	0	NC	0
46	2	N136	0	7.073	-.004	0	NC	0
47	2	Totals:	0	18.073	0			
48	2	COG (ft):	X: 10.573	Y: -.049	Z: 5.427			

Member Section Forces

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
1	1	M1	1	0	-.003	0	0	0	0
2			2	0	-.022	0	0	0	.04
3			3	0	-.042	0	0	0	.14
4			4	0	-.061	0	0	0	.3
5			5	0	.011	0	0	0	.233
6	1	M2	1	0	.011	0	0	0	.233
7			2	0	-.006	0	0	0	.23
8			3	0	.085	0	0	0	.168
9			4	0	.068	0	0	0	.073
10			5	0	.05	0	0	0	0
11	1	M3	1	0	.062	0	0	0	0
12			2	0	-.012	0	0	0	-.052
13			3	0	-.051	0	0	0	.021
14			4	0	.029	0	0	0	.03
15			5	0	0	0	0	0	0
16	1	M4	1	0	-.006	0	0	0	0
17			2	0	-.025	0	0	0	.048
18			3	0	-.044	0	0	0	.156
19			4	0	-.064	0	0	0	.325
20			5	0	.016	0	0	0	.211
21	1	M5	1	0	.016	0	0	0	.211
22			2	0	-.007	0	0	0	.203
23			3	0	-.03	0	0	0	.233
24			4	0	.073	0	0	0	.101
25			5	0	.05	0	0	0	0
26	1	M6	1	0	.08	0	0	0	0
27			2	0	-.009	0	0	0	-.088
28			3	0	-.044	0	0	0	-.022
29			4	0	.035	0	0	0	.043
30			5	0	0	0	0	0	0
31	1	M7	1	0	.006	0	0	0	0
32			2	0	-.013	0	0	0	.01
33			3	0	-.032	0	0	0	.081
34			4	0	-.051	0	0	0	.212
35			5	0	.009	0	0	0	.109
36	1	M8	1	0	.009	0	0	0	.109
37			2	0	-.02	0	0	0	.12
38			3	0	-.048	0	0	0	.189
39			4	0	.079	0	0	0	.131
40			5	0	.05	0	0	0	0
41	1	M9	1	0	.096	0	0	0	0
42			2	0	0	0	0	0	-.127
43			3	0	-.04	0	0	0	-.07
44			4	0	.04	0	0	0	.058
45			5	0	0	0	0	0	0
46	1	M10	1	0	.02	0	0	0	0
47			2	0	0	0	0	0	-.031
48			3	0	-.019	0	0	0	-.003
49			4	0	-.038	0	0	0	.086
50			5	0	.011	0	0	0	.006
51	1	M11	1	0	.011	0	0	0	.006

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
52			2	0	-.024	0	0	0	.022
53			3	0	-.058	0	0	0	.122
54			4	0	.084	0	0	0	.163
55			5	0	.05	0	0	0	0
56	1	M12	1	0	.062	0	0	0	0
57			2	0	.016	0	0	0	-.125
58			3	0	-.03	0	0	0	-.101
59			4	0	-.076	0	0	0	.072
60			5	0	0	0	0	0	0
61	1	M13	1	0	.052	0	0	0	0
62			2	0	.004	0	0	0	-.097
63			3	0	-.045	0	0	0	-.025
64			4	0	-.094	0	0	0	.214
65			5	0	.05	0	0	0	0
66	1	M14	1	0	.074	0	0	0	0
67			2	0	.022	0	0	0	-.175
68			3	0	-.029	0	0	0	-.162
69			4	0	-.081	0	0	0	.039
70			5	0	0	0	0	0	0
71	1	M15	1	0	.067	0	0	0	0
72			2	0	.012	0	0	0	-.151
73			3	0	-.042	0	0	0	-.093
74			4	0	-.097	0	0	0	.173
75			5	0	.05	0	0	0	0
76	1	M16	1	0	.098	0	0	0	0
77			2	0	.049	0	0	0	-.237
78			3	0	0	0	0	0	-.316
79			4	0	-.049	0	0	0	-.237
80			5	0	-.098	0	0	0	0
81	1	M17	1	0	.078	0	0	0	0
82			2	0	.039	0	0	0	-.202
83			3	0	0	0	0	0	-.27
84			4	0	-.039	0	0	0	-.202
85			5	0	-.078	0	0	0	0
86	1	M18	1	0	.007	0	0	0	0
87			2	0	.003	0	0	0	-.009
88			3	0	-.065	0	0	0	.078
89			4	0	.077	0	0	0	.149
90			5	0	.05	0	0	0	0
91	1	M19	1	0	-.014	0	0	0	0
92			2	0	-.037	0	0	0	.055
93			3	0	-.064	0	0	0	.163
94			4	0	.083	0	0	0	.144
95			5	0	.05	0	0	0	0
96	1	M20	1	0	.043	0	0	0	0
97			2	0	.005	0	0	0	-.064
98			3	0	-.033	0	0	0	-.027
99			4	0	.038	0	0	0	.051
100			5	0	0	0	0	0	0
101	1	M21	1	0	-.214	0	0	0	0
102			2	0	-.222	0	0	0	.108
103			3	0	-.231	0	0	0	.22

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
104			4	0	-.239	0	0	0	.337
105			5	0	-.248	0	0	0	.457
106	1	M22	1	0	-.425	0	0	0	.457
107			2	0	.558	0	0	0	.688
108			3	0	.548	0	0	0	.391
109			4	0	.539	0	0	0	.099
110			5	0	.53	0	0	0	-.188
111	1	M23	1	0	.421	0	0	0	-.188
112			2	0	.412	0	0	0	-.412
113			3	0	.403	0	0	0	-.631
114			4	0	.394	0	0	0	-.846
115			5	0	.384	0	0	0	-1.055
116	1	M24	1	0	.275	0	0	0	-1.055
117			2	0	.266	0	0	0	-1.2
118			3	0	.257	0	0	0	-1.341
119			4	0	.247	0	0	0	-1.476
120			5	0	.238	0	0	0	-1.607
121	1	M25	1	0	.129	0	0	0	-1.607
122			2	0	.119	0	0	0	-1.673
123			3	0	.11	0	0	0	-1.735
124			4	0	.101	0	0	0	-1.791
125			5	0	.092	0	0	0	-1.843
126	1	M26	1	0	-.035	0	0	0	-1.843
127			2	0	-.044	0	0	0	-1.822
128			3	0	-.053	0	0	0	-1.796
129			4	0	-.063	0	0	0	-1.765
130			5	0	-.072	0	0	0	-1.729
131	1	M27	1	0	-.186	0	0	0	-1.729
132			2	0	-.195	0	0	0	-1.626
133			3	0	-.204	0	0	0	-1.519
134			4	0	-.214	0	0	0	-1.407
135			5	0	-.223	0	0	0	-1.289
136	1	M28	1	0	-.379	0	0	0	-1.289
137			2	0	-.388	0	0	0	-1.083
138			3	0	-.397	0	0	0	-.872
139			4	0	-.407	0	0	0	-.656
140			5	0	-.416	0	0	0	-.435
141	1	M29	1	0	-.537	0	0	0	-.435
142			2	0	-.546	0	0	0	-.144
143			3	0	-.556	0	0	0	.152
144			4	0	-.565	0	0	0	.453
145			5	0	-.574	0	0	0	.759
146	1	M30	1	0	-.751	0	0	0	.759
147			2	0	-.76	0	0	0	1.165
148			3	0	-.769	0	0	0	1.576
149			4	0	-.779	0	0	0	1.992
150			5	0	-.788	0	0	0	2.413
151	1	M31	1	0	.67	0	0	0	2.413
152			2	0	.661	0	0	0	2.055
153			3	0	.652	0	0	0	1.702
154			4	0	.643	0	0	0	1.355
155			5	0	.633	0	0	0	1.012

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
156	1	M32	1	0	.441	0	0	0	1.012
157			2	0	.431	0	0	0	.777
158			3	0	.422	0	0	0	.548
159			4	0	.413	0	0	0	.324
160			5	0	.404	0	0	0	.104
161	1	M33	1	0	.271	0	0	0	.104
162			2	0	.262	0	0	0	-.039
163			3	0	.253	0	0	0	-.177
164			4	0	.243	0	0	0	-.31
165			5	0	.234	0	0	0	-.439
166	1	M34	1	0	.033	0	0	0	-.439
167			2	0	.024	0	0	0	-.454
168			3	0	.015	0	0	0	-.464
169			4	0	.005	0	0	0	-.47
170			5	0	-.004	0	0	0	-.47
171	1	M35	1	0	-.152	0	0	0	-.47
172			2	0	-.163	0	0	0	-.364
173			3	0	-.175	0	0	0	-.251
174			4	0	-.187	0	0	0	-.129
175			5	0	-.198	0	0	0	0
176	1	M36	1	.087	0	0	0	0	0
177			2	.08	0	0	0	0	0
178			3	.072	0	0	0	0	0
179			4	.065	0	0	0	0	0
180			5	.057	0	0	0	0	0
181	1	M37	1	1.066	0	0	0	0	0
182			2	1.047	0	0	0	0	0
183			3	1.029	0	0	0	0	0
184			4	1.011	0	0	0	0	0
185			5	.992	0	0	0	0	0
186	1	M38	1	1.654	0	0	0	0	0
187			2	1.636	0	0	0	0	0
188			3	1.617	0	0	0	0	0
189			4	1.599	0	0	0	0	0
190			5	1.581	0	0	0	0	0
191	2	M1	1	0	-.106	0	0	0	0
192			2	0	-.126	0	0	0	.363
193			3	0	-.145	0	0	0	.785
194			4	0	-.164	0	0	0	1.268
195			5	0	.126	0	0	0	.728
196	2	M2	1	0	.126	0	0	0	.728
197			2	0	.009	0	0	0	.643
198			3	0	.284	0	0	0	.416
199			4	0	.167	0	0	0	.135
200			5	0	.05	0	0	0	0
201	2	M3	1	0	.181	0	0	0	0
202			2	0	-.059	0	0	0	-.127
203			3	0	-.263	0	0	0	.213
204			4	0	.195	0	0	0	.201
205			5	0	0	0	0	0	0
206	2	M4	1	0	-.117	0	0	0	0
207			2	0	-.137	0	0	0	.397

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
208			3	0	-.156	0	0	0	.855
209			4	0	-.175	0	0	0	1.372
210			5	0	.17	0	0	0	.695
211	2	M5	1	0	.17	0	0	0	.695
212			2	0	.016	0	0	0	.543
213			3	0	-.138	0	0	0	.644
214			4	0	.204	0	0	0	.208
215			5	0	.05	0	0	0	0
216	2	M6	1	0	.282	0	0	0	0
217			2	0	-.004	0	0	0	-.342
218			3	0	-.236	0	0	0	-.046
219			4	0	.232	0	0	0	.285
220			5	0	0	0	0	0	0
221	2	M7	1	0	-.07	0	0	0	0
222			2	0	-.089	0	0	0	.249
223			3	0	-.109	0	0	0	.558
224			4	0	-.128	0	0	0	.927
225			5	0	.152	0	0	0	.265
226	2	M8	1	0	.152	0	0	0	.265
227			2	0	-.039	0	0	0	.15
228			3	0	-.231	0	0	0	.424
229			4	0	.241	0	0	0	.296
230			5	0	.05	0	0	0	0
231	2	M9	1	0	.372	0	0	0	0
232			2	0	.049	0	0	0	-.591
233			3	0	-.22	0	0	0	-.347
234			4	0	.269	0	0	0	.383
235			5	0	0	0	0	0	0
236	2	M10	1	0	-.024	0	0	0	0
237			2	0	-.043	0	0	0	.104
238			3	0	-.062	0	0	0	.268
239			4	0	-.081	0	0	0	.492
240			5	0	.172	0	0	0	-.213
241	2	M11	1	0	.172	0	0	0	-.213
242			2	0	-.057	0	0	0	-.352
243			3	0	-.285	0	0	0	.062
244			4	0	.278	0	0	0	.398
245			5	0	.05	0	0	0	0
246	2	M12	1	.002	.41	0	0	0	0
247			2	.002	.104	0	0	0	-.834
248			3	.002	-.202	0	0	0	-.674
249			4	.002	-.508	0	0	0	.478
250			5	0	0	0	0	0	0
251	2	M13	1	0	.435	0	0	0	0
252			2	0	.111	0	0	0	-.94
253			3	0	-.213	0	0	0	-.763
254			4	0	-.538	0	0	0	.53
255			5	0	.05	0	0	0	0
256	2	M14	1	0	.491	0	0	0	0
257			2	0	.148	0	0	0	-1.163
258			3	0	-.195	0	0	0	-1.077
259			4	0	-.538	0	0	0	.257

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
260			5	0	0	0	0	0	0
261	2	M15	1	0	.517	0	0	0	0
262			2	0	.156	0	0	0	-1.292
263			3	0	-.205	0	0	0	-1.197
264			4	0	-.567	0	0	0	.285
265			5	0	.05	0	0	0	0
266	2	M16	1	0	.679	0	0	0	0
267			2	0	.34	0	0	0	-1.645
268			3	0	0	0	0	0	-2.193
269			4	0	-.34	0	0	0	-1.645
270			5	0	-.679	0	0	0	0
271	2	M17	1	0	.425	0	0	0	0
272			2	0	.213	0	0	0	-1.108
273			3	0	0	0	0	0	-1.477
274			4	0	-.213	0	0	0	-1.108
275			5	0	-.425	0	0	0	0
276	2	M18	1	0	.059	0	0	0	0
277			2	0	-.028	0	0	0	-.039
278			3	0	-.136	0	0	0	.161
279			4	0	.203	0	0	0	.306
280			5	0	.05	0	0	0	0
281	2	M19	1	0	.038	0	0	0	0
282			2	0	-.089	0	0	0	.047
283			3	0	-.253	0	0	0	.409
284			4	0	.288	0	0	0	.372
285			5	0	.05	0	0	0	0
286	2	M20	1	0	.286	0	0	0	0
287			2	0	.034	0	0	0	-.427
288			3	0	-.217	0	0	0	-.182
289			4	0	.252	0	0	0	.336
290			5	0	0	0	0	0	0
291	2	M21	1	0	-.494	0	0	0	0
292			2	0	-.503	0	0	0	.247
293			3	0	-.512	0	0	0	.498
294			4	0	-.52	0	0	0	.754
295			5	0	-.529	0	0	0	1.013
296	2	M22	1	0	-1.271	0	0	0	1.013
297			2	0	2.211	0	0	0	1.699
298			3	0	2.202	0	0	0	.513
299			4	0	2.192	0	0	0	-.667
300			5	0	2.183	0	0	0	-1.843
301	2	M23	1	0	1.463	0	0	0	-1.843
302			2	0	1.453	0	0	0	-2.627
303			3	0	1.444	0	0	0	-3.405
304			4	0	1.435	0	0	0	-4.179
305			5	0	1.426	0	0	0	-4.947
306	2	M24	1	0	1.033	0	0	0	-4.947
307			2	0	1.024	0	0	0	-5.5
308			3	0	1.015	0	0	0	-6.048
309			4	0	1.006	0	0	0	-6.591
310			5	0	.996	0	0	0	-7.129
311	2	M25	1	0	.345	0	0	0	-7.129

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
312			2	0	.335	0	0	0	-7.311
313			3	0	.326	0	0	0	-7.489
314			4	0	.317	0	0	0	-7.662
315			5	0	.308	0	0	0	-7.83
316	2	M26	1	0	-.189	0	0	0	-7.83
317			2	0	-.198	0	0	0	-7.726
318			3	0	-.208	0	0	0	-7.617
319			4	0	-.217	0	0	0	-7.503
320			5	0	-.226	0	0	0	-7.384
321	2	M27	1	0	-.926	0	0	0	-7.384
322			2	0	-.935	0	0	0	-6.884
323			3	0	-.944	0	0	0	-6.379
324			4	0	-.953	0	0	0	-5.869
325			5	0	-.963	0	0	0	-5.354
326	2	M28	1	0	-1.626	0	0	0	-5.354
327			2	0	-1.635	0	0	0	-4.478
328			3	0	-1.644	0	0	0	-3.597
329			4	0	-1.654	0	0	0	-2.711
330			5	0	-1.663	0	0	0	-1.82
331	2	M29	1	0	-2.42	0	0	0	-1.82
332			2	0	-2.429	0	0	0	-.517
333			3	0	-2.439	0	0	0	.791
334			4	0	-2.448	0	0	0	2.104
335			5	0	-2.457	0	0	0	3.422
336	2	M30	1	0	-3.249	0	0	0	3.422
337			2	0	-3.258	0	0	0	5.171
338			3	0	-3.268	0	0	0	6.924
339			4	0	-3.277	0	0	0	8.683
340			5	0	-3.286	0	0	0	10.446
341	2	M31	1	0	2.899	0	0	0	10.446
342			2	0	2.89	0	0	0	8.891
343			3	0	2.881	0	0	0	7.34
344			4	0	2.872	0	0	0	5.794
345			5	0	2.862	0	0	0	4.254
346	2	M32	1	0	1.95	0	0	0	4.254
347			2	0	1.941	0	0	0	3.208
348			3	0	1.932	0	0	0	2.168
349			4	0	1.922	0	0	0	1.132
350			5	0	1.913	0	0	0	.101
351	2	M33	1	0	1.032	0	0	0	.101
352			2	0	1.023	0	0	0	-.451
353			3	0	1.014	0	0	0	-.998
354			4	0	1.005	0	0	0	-1.541
355			5	0	.995	0	0	0	-2.078
356	2	M34	1	0	.017	0	0	0	-2.078
357			2	0	.008	0	0	0	-2.085
358			3	0	-.001	0	0	0	-2.087
359			4	0	-.011	0	0	0	-2.083
360			5	0	-.02	0	0	0	-2.075
361	2	M35	1	0	-.749	0	0	0	-2.075
362			2	0	-.761	0	0	0	-1.568
363			3	0	-.772	0	0	0	-1.053

Member Section Forces (Continued)

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-ft]	y-y Moment[...	z-z Moment[k-ft]
364			4	0	-.784	0	0	0	-.53
365			5	0	-.795	0	0	0	0
366	2	M36	1	.139	0	0	0	0	0
367			2	.131	0	0	0	0	0
368			3	.124	0	0	0	0	0
369			4	.116	0	0	0	0	0
370			5	.109	0	0	0	0	0
371	2	M37	1	3.565	0	0	0	0	0
372			2	3.546	0	0	0	0	0
373			3	3.528	0	0	0	0	0
374			4	3.509	0	0	0	0	0
375			5	3.491	0	0	0	0	0
376	2	M38	1	7.073	0	0	0	0	0
377			2	7.054	0	0	0	0	0
378			3	7.036	0	0	0	0	0
379			4	7.017	0	0	0	0	0
380			5	6.999	0	0	0	0	0

Beam Deflections

	LC	Member Label	Span	Location [ft]	y' [in]	(n) L'/y' Ratio
1	1	M1	1	6.25	.014	8358
2			2	12.5	-.032	1895
3	1	M2	1	0	0	NC
4	1	M3	1	0	0	NC
5	1	M4	1	6.25	.016	7488
6			2	12.5	-.034	1762
7	1	M5	1	3.07	.01	7862
8	1	M6	1	0	0	NC
9	1	M7	1	0	0	NC
10			2	12.5	-.02	2978
11	1	M8	1	4.232	.013	7359
12	1	M9	1	11.413	.047	5875
13	1	M10	1	0	0	NC
14			2	10.026	0	NC
15	1	M11	1	5.76	.014	8556
16	1	M12	1	4.6	-.013	9293
17			2	12.989	.008	9535
18	1	M13	1	0	0	NC
19	1	M14	1	14.565	.124	2820
20	1	M15	1	15.353	.086	4284
21	1	M16	1	12.916	.179	1734
22	1	M17	1	6.95	-.055	3023
23	1	M18	1	0	0	NC
24	1	M19	1	4.854	.013	8114
25	1	M20	1	0	0	NC
26	1	M21	1	0	0	NC
27	1	M22	1	0	0	NC
28			2	.56	0	NC
29	1	M23	1	0	0	NC
30	1	M24	1	0	0	NC

Beam Deflections (Continued)

	LC	Member Label	Span	Location [ft]	y' [in]	(n) L'/y' Ratio
31	1	M25	1	0	0	NC
32	1	M26	1	0	0	NC
33	1	M27	1	0	0	NC
34	1	M28	1	0	0	NC
35	1	M29	1	0	0	NC
36	1	M30	1	0	-.008	6324
37	1	M31	1	2.15	-.008	6131
38	1	M32	1	0	0	NC
39	1	M33	1	0	0	NC
40	1	M34	1	0	0	NC
41	1	M35	1	0	0	NC
42	2	M1	1	5.859	.082	1471
43			2	12.5	-.146	412
44	2	M2	1	2.021	.014	4418
45	2	M3	1	0	0	NC
46	2	M4	1	5.859	.089	1351
47			2	12.5	-.157	382
48	2	M5	1	3.002	.026	3015
49	2	M6	1	9.838	.061	3889
50	2	M7	1	5.859	.058	2075
51			2	12.5	-.102	588
52	2	M8	1	4.486	.028	3427
53	2	M9	1	11.413	.205	1336
54	2	M10	1	5.99	.028	4343
55			2	12.5	-.048	1251
56	2	M11	1	6.67	.016	7486
57	2	M12	1	4.6	-.084	1398
58			2	12.989	.054	1434
59	2	M13	1	13.777	.543	609
60	2	M14	1	14.565	.824	424
61	2	M15	1	15.353	1.011	364
62	2	M16	1	12.916	1.239	250
63	2	M17	1	6.95	-.302	552
64	2	M18	1	9.393	-.027	8444
65	2	M19	1	4.944	.032	3266
66	2	M20	1	10.687	.112	2299
67	2	M21	1	0	0	NC
68	2	M22	1	0	0	NC
69			2	.56	0	NC
70	2	M23	1	1.164	-.003	7372
71	2	M24	1	1.097	-.006	4170
72	2	M25	1	1.075	-.008	3370
73	2	M26	1	1.075	-.008	3313
74	2	M27	1	1.052	-.007	3954
75	2	M28	1	.985	-.004	6972
76	2	M29	1	0	0	NC
77	2	M30	1	0	-.036	1451
78	2	M31	1	2.15	-.036	1417
79	2	M32	1	0	0	NC
80	2	M33	1	0	0	NC
81	2	M34	1	2.15	.009	6054
82	2	M35	1	.84	0	NC

Member Wood Code Checks (By Combination)

	LC	Member	Shape	UC Max	Loc[ft]	Shear ...	Loc[ft]	Dir	Fc' [ksi]	Ft' [ksi]	Fb1' [k...	Fb2' [k...	Fv' [ksi]	RB	CL	CP	Eqn
1	1	M1	4X8	.134	10.026	.028	10.026	y	.762	.729	.987	1.044	.157	9.422	.993	.672	3.9-3
2	1	M2	4X8	.080	1.71	.036	1.762	y	1.092	.729	1.14	1.201	.157	5.944	.997	.963	3.9-3
3	1	M3	4X8	.025	5.078	.024	4.992	y	.998	.729	1.137	1.201	.157	7.66	.995	.88	3.9-3
4	1	M4	4X8	.144	10.026	.040	10.026	y	.762	.729	.987	1.044	.157	9.422	.993	.672	3.9-3
5	1	M5	4X8	.080	3.275	.036	3.343	y	1.056	.729	1.139	1.201	.157	6.82	.996	.931	3.9-3
6	1	M6	4X8	.031	2.255	.030	0	y	.923	.729	1.144	1.201	.157	1.332	1	.814	3.9-3
7	1	M7	4X8	.096	10.026	.037	10.026	y	.762	.729	.987	1.044	.157	9.422	.993	.672	3.9-3
8	1	M8	4X8	.081	4.909	.036	4.909	y	1.003	.729	1.138	1.201	.157	7.597	.995	.885	3.9-3
9	1	M9	4X8	.043	2.853	.036	0	y	.831	.729	1.144	1.201	.157	1.332	1	.733	3.9-3
10	1	M10	4X8	.043	10.026	.027	10.026	y	.762	.729	.987	1.044	.157	9.422	.993	.672	3.9-3
11	1	M11	4X8	.081	6.468	.036	6.569	y	.931	.729	1.136	1.201	.157	8.301	.993	.821	3.9-3
12	1	M12	4X8	.046	4.33	.029	9.742	y	.73	.729	1.144	1.201	.157	1.332	1	.644	3.9-3
13	1	M13	4X8	.079	10.62	.036	10.476	y	.68	.729	1.132	1.201	.157	9.892	.99	.6	3.9-3
14	1	M14	4X8	.066	5.158	.032	11.227	y	.632	.729	1.144	1.201	.157	1.332	1	.557	3.9-3
15	1	M15	4X8	.080	12.154	.039	11.994	y	.586	.729	1.131	1.201	.157	10.442	.989	.517	3.9-3
16	1	M16	4X8	.108	6.458	.037	0	y	.735	.729	1.144	1.201	.157	1.332	1	.648	3.9-3
17	1	M17	4X8	.092	6.95	.029	0	y	.672	.729	1.144	1.201	.157	1.332	1	.593	3.9-3
18	1	M18	4X8	.068	6.36	.031	6.458	y	.946	.729	1.136	1.201	.157	8.168	.994	.835	3.9-3
19	1	M19	4X8	.083	5.393	.037	5.483	y	.982	.729	1.137	1.201	.157	7.829	.994	.866	3.9-3
20	1	M20	4X8	.025	7.458	.024	7.458	y	.875	.729	1.135	1.201	.157	8.712	.993	.772	3.9-3
21	1	M21	6.75X10....	.026	1.981	.025	1.981	y	1.049	.792	1.727	1.117	.209	2.34	.999	.998	3.9-3
22	1	M22	6.75X10....	.039	.537	.057	.537	y	.88	.792	1.718	1.117	.209	7.315	.994	.837	3.9-3
23	1	M23	6.75X10....	.059	2.15	.043	0	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
24	1	M24	6.75X10....	.090	2.15	.028	0	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
25	1	M25	6.75X10....	.103	2.15	.013	0	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
26	1	M26	6.75X10....	.103	0	.007	2.15	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
27	1	M27	6.75X10....	.097	0	.023	2.15	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
28	1	M28	6.75X10....	.072	0	.042	2.15	y	.88	.792	1.727	1.117	.209	2.438	.999	.837	3.9-3
29	1	M29	6.75X10....	.043	2.15	.058	2.15	y	.88	.792	1.718	1.117	.209	7.315	.994	.837	3.9-3
30	1	M30	6.75X10....	.136	2.15	.080	2.15	y	.88	.792	1.718	1.117	.209	7.315	.994	.837	3.9-3
31	1	M31	6.75X10....	.136	0	.068	0	y	1.02	.792	1.722	1.117	.209	5.452	.997	.97	3.9-3
32	1	M32	6.75X10....	.057	0	.045	0	y	1.02	.792	1.722	1.117	.209	5.452	.997	.97	3.9-3
33	1	M33	6.75X10....	.025	2.15	.027	0	y	1.02	.792	1.727	1.117	.209	2.438	.999	.97	3.9-3
34	1	M34	6.75X10....	.026	1.926	.003	0	y	1.02	.792	1.727	1.117	.209	2.438	.999	.97	3.9-3
35	1	M35	6.75X10....	.026	0	.020	2.687	y	1.02	.792	1.727	1.117	.209	2.438	.999	.97	3.9-3
36	1	M36	4X4	.020	0	.000	0	z	.361	.911	1.147	1.147	.157	5.855	1	.291	3.6.3
37	1	M37	6X6	.057	0	.000	0	z	.621	.743	1.08	1.08	.153	4.671	1	.758	3.6.3
38	1	M38	6X6	.088	0	.000	0	y	.621	.743	1.08	1.08	.153	4.671	1	.758	3.6.3
39	2	M1	4X8	.486	10.026	.131	10.026	y	.798	.81	1.096	1.16	.175	9.422	.992	.633	3.9-3
40	2	M2	4X8	.225	0	.119	1.762	y	1.208	.81	1.266	1.334	.175	5.944	.996	.958	3.9-3
41	2	M3	4X8	.148	5.078	.116	4.992	y	1.087	.81	1.263	1.334	.175	7.66	.994	.863	3.9-3
42	2	M4	4X8	.526	10.026	.155	10.026	y	.798	.81	1.096	1.16	.175	9.422	.992	.633	3.9-3
43	2	M5	4X8	.215	0	.119	3.343	y	1.162	.81	1.265	1.334	.175	6.82	.995	.922	3.9-3
44	2	M6	4X8	.147	6.661	.132	6.559	y	.993	.81	1.261	1.334	.175	8.359	.992	.788	3.9-3
45	2	M7	4X8	.356	10.026	.149	10.026	y	.798	.81	1.096	1.16	.175	9.422	.992	.633	3.9-3
46	2	M8	4X8	.201	4.909	.119	4.909	y	1.094	.81	1.263	1.334	.175	7.597	.994	.869	3.9-3
47	2	M9	4X8	.186	3.329	.150	8.085	y	.88	.81	1.271	1.334	.175	1.332	1	.698	3.9-3
48	2	M10	4X8	.191	9.896	.146	10.026	y	.798	.81	1.096	1.16	.175	9.422	.992	.633	3.9-3
49	2	M11	4X8	.201	6.468	.148	6.468	y	1.002	.81	1.261	1.334	.175	8.301	.993	.795	3.9-3
50	2	M12	4X8	.274	4.33	.172	9.742	y	.761	.81	1.271	1.334	.175	1.332	1	.604	3.9-3
51	2	M13	4X8	.310	4.592	.187	10.476	y	.705	.81	1.271	1.334	.175	1.332	1	.559	3.9-3

Member Wood Code Checks (By Combination) (Continued)

	LC	Member	Shape	UC Max	Loc[ft]	Shear ...	Loc[ft]	Dir	Fc' [ksi]	Ft' [ksi]	Fb1' [k..	Fb2' [k..	Fv' [ksi]	RB	CL	CP	Eqn
52	2	M14	4X8	.394	5.158	.192	11.227	y	.651	.81	1.271	1.334	.175	1.332	1	.517	3.9-3
53	2	M15	4X8	.438	5.437	.207	11.994	y	.602	.81	1.271	1.334	.175	1.332	1	.477	3.9-3
54	2	M16	4X8	.676	6.458	.230	0	y	.767	.81	1.271	1.334	.175	1.332	1	.609	3.9-3
55	2	M17	4X8	.455	6.95	.144	0	y	.696	.81	1.271	1.334	.175	1.332	1	.552	3.9-3
56	2	M18	4X8	.137	6.36	.079	6.458	y	1.022	.81	1.262	1.334	.175	8.168	.993	.811	3.9-3
57	2	M19	4X8	.227	5.393	.130	5.483	y	1.068	.81	1.263	1.334	.175	7.829	.994	.847	3.9-3
58	2	M20	4X8	.152	7.458	.141	7.458	y	.934	.81	1.26	1.334	.175	8.712	.992	.741	3.9-3
59	2	M21	6.75X10....	.051	1.981	.048	1.981	y	1.165	.88	1.919	1.241	.232	2.34	.999	.997	3.9-3
60	2	M22	6.75X10....	.093	2.15	.202	.537	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
61	2	M23	6.75X10....	.249	2.15	.133	0	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
62	2	M24	6.75X10....	.359	2.15	.094	0	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
63	2	M25	6.75X10....	.395	2.15	.031	0	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
64	2	M26	6.75X10....	.395	0	.021	2.15	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
65	2	M27	6.75X10....	.372	0	.088	2.15	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
66	2	M28	6.75X10....	.270	0	.152	2.15	y	.941	.88	1.919	1.241	.232	2.438	.999	.806	3.9-3
67	2	M29	6.75X10....	.174	2.15	.224	2.15	y	.941	.88	1.907	1.241	.232	7.315	.993	.806	3.9-3
68	2	M30	6.75X10....	.530	2.15	.300	2.15	y	.941	.88	1.907	1.241	.232	7.315	.993	.806	3.9-3
69	2	M31	6.75X10....	.528	0	.265	0	y	1.128	.88	1.913	1.241	.232	5.452	.996	.966	3.9-3
70	2	M32	6.75X10....	.215	0	.178	0	y	1.128	.88	1.913	1.241	.232	5.452	.996	.966	3.9-3
71	2	M33	6.75X10....	.105	2.15	.094	0	y	1.128	.88	1.919	1.241	.232	2.438	.999	.966	3.9-3
72	2	M34	6.75X10....	.105	.985	.002	2.15	y	1.128	.88	1.919	1.241	.232	2.438	.999	.966	3.9-3
73	2	M35	6.75X10....	.105	0	.073	2.687	y	1.128	.88	1.919	1.241	.232	2.438	.999	.966	3.9-3
74	2	M36	4X4	.031	0	.000	0	z	.365	1.013	1.275	1.275	.175	5.855	1	.264	3.6.3
75	2	M37	6X6	.178	0	.000	0	z	.66	.825	1.2	1.2	.17	4.671	1	.726	3.6.3
76	2	M38	6X6	.354	0	.000	10	y	.66	.825	1.2	1.2	.17	4.671	1	.726	3.6.3

Seattle Structural

PROJECT GRIFFITH DECK BY TDM DATE 5.11.20 PAGE

CONNECTIONS

JOIST - 4x8
V = 488# MAX
V_{ALLOW} = 1030#, SIMPSON LUS46
1,030# > 488# OK

GLB - 5½" WIDE
COLUMN CAP, TYPICAL
P = 6687# MAX
V_{ALLOW} = 33,275#, SIMPSON CC.66
33,275# > 6687# OK
COLUMN CAP AT END OF BEAM
P = 1,565#
P_{ALLOW} = 18,905#, SIMPSON ECC.66
18,905# > 1565# OK

BEAM AT WALL
5½ x 12 GLB
P = 2,084#, MAX
P_{ALLOW} = 5,635#, SIMPSON HHUS5.50/10
5,635# > 2,084# OK

FASTENERS TO CONC. WALL
0.157"Ø x 1" POWDER DRIVEN FASTENERS
USE (16) PINS
V_A = (16)(190#) = 3,040# > 2,084# OK

POST BASE
AT NEW FOOTINGS
P = 6,687# MAX
P_A = 14,420#, SIMPSON PBS66
14,420# > 6,732# OK
AT EXISTING CONC. WALL
P_A = 12,920#, SIMPSON ABU66
12,920# > 6,687# OK

LUS/HUS/HHUS/HGUS

Double-Shear Face-Mount Joist Hangers

This product is preferable to similar connectors because of (a) easier installation, (b) higher loads, (c) lower installed cost, or a combination of these features.

All hangers in this series have double-shear nailing. This innovation distributes the load through two points on each joist nail for greater strength. It also allows the use of fewer nails, faster installation and the use of standard nails for all connections. (Do not bend or remove tabs.)

Material: See tables, pp. 104–113

Finish: Galvanized. Some products available in stainless steel or ZMAX® coating; see Corrosion Information, pp. 13–15.

Installation:

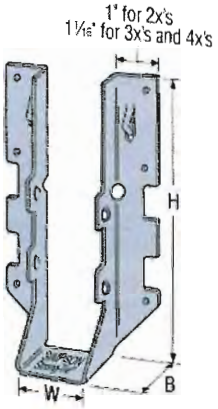
- Use all specified fasteners; see General Notes.
- Nails must be driven at an angle through the joist or truss into the header to achieve the table loads.
- Not designed for welded or nailer applications.
- 0.148" x 3¼" nails may be used where 0.148" x 3" nails are specified with no reduction in load. Where 0.162" x 3½" nails are specified, 0.148" x 3" or 0.148" x 3¼" nails may be used at 0.85 of the table load.
- With 3x carrying members, use 0.162" x 2½" nails into the header and 0.162" x 3½" nails into the joist with no load reduction.
- With 2x carrying members, use 0.148" x 1½" nails into the header and 0.148" x 3" nails into the joist, reduce the load to 0.64 of the table value.

Allowable Loads:

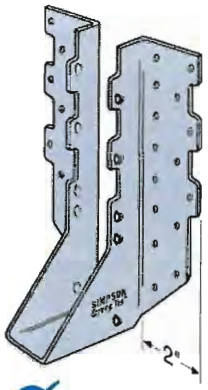
- See table on pp. 104–113 for loads.

Options:

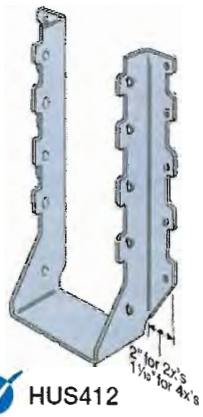
- LUS/HUS hangers cannot be modified.
- See next page for HHUS/HGUS modifications.



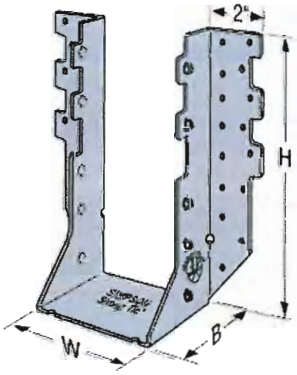
LUS28



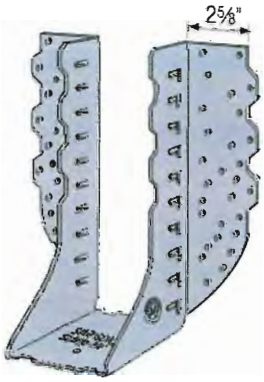
HUS210
(HUS26 and HUS28 similar)



HUS412

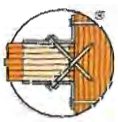


HHUS410



HGUS3.25/12

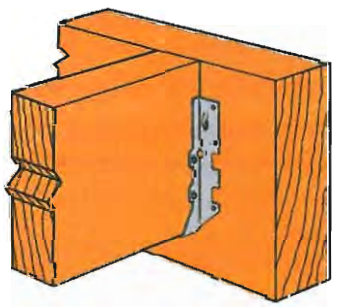
Double-Shear Nailing



Double-Shear Nailing Top View

Double-Shear Nailing Side View — Do not bend tab

Dome Double-Shear Nailing Side View *(Available on some models)*



Typical LUS28 Installation
use 0.148" x 3" nail or
0.148" x 3¼" nail

	Joist Size	Model No.	Ga.	Dimensions (in.) W	H	B	Min./ Max.	Fasteners (in.) Header	Joist	DF/SP Allowable Loads Uplift (160)	Floor (100)	Snow (115)	Roof (125)	Installed Cost Index (ICI)
	Sawn Lumber Sizes													
	3x14	U314	16	2⁹⁄₁₆	10½	2	—	(16) 0.162 x 3½	(6) 0.148 x 1½	990	2,305	2,610	2,815	•
■		HU314 / HUC314	14	2⁹⁄₁₆	12¹³⁄₃₂	2½	—	(18) 0.162 x 3½	(8) 0.148 x 1½	1,510	2,680	3,025	3,240	•
SS		HUCQ310-SDS	14	2⁹⁄₁₆	9	3	—	(8) ¼ x 2½ SDS	(4) ¼ x 2½ SDS	1,350	3,120	3,590	3,860	•
	3x16	U314	16	2⁹⁄₁₆	10½	2	—	(16) 0.162 x 3½	(6) 0.148 x 1½	990	2,305	2,610	2,815	•
■		HU316 / HUC316	14	2⁹⁄₁₆	14⁵⁄₃₂	2½	—	(20) 0.162 x 3½	(8) 0.148 x 1½	1,510	2,980	3,360	3,600	•
	4x4	LUS44	18	3⁹⁄₁₆	3	2	—	(4) 0.162 x 3½	(2) 0.162 x 3½	410	800	905	980	Lowest
		U44	16	3⁹⁄₁₆	2⅞	2	—	(4) 0.162 x 3½	(2) 0.148 x 3	240	575	650	705	20%
■		HU44 / HUC44	14	3⁹⁄₁₆	2⅞	2½	—	(4) 0.162 x 3½	(2) 0.148 x 3	380	595	670	720	161%
■	4x6	LUS46	18	3⁹⁄₁₆	4¾	2	—	(4) 0.162 x 3½	(4) 0.162 x 3½	1,060	1,030	1,170	1,265	Lowest
		U46	16	3⁹⁄₁₆	4⅞	2	—	(8) 0.162 x 3½	(4) 0.148 x 3	535	1,150	1,305	1,410	37%
		HUS46	14	3⁹⁄₁₆	5	2	—	(4) 0.162 x 3½	(4) 0.162 x 3½	1,765	1,055	1,195	1,290	152%
■		HU46 / HUC46	14	3⁹⁄₁₆	4²³⁄₃₂	2½	Min.	(8) 0.162 x 3½	(4) 0.148 x 3	755	1,190	1,345	1,440	163%
			14	3⁹⁄₁₆	4²³⁄₃₂	2½	Max.	(12) 0.162 x 3½	(6) 0.148 x 3	1,135	1,785	2,015	2,165	185%
■		LUS46	18	3⁹⁄₁₆	4¾	2	—	(4) 0.162 x 3½	(4) 0.162 x 3½	1,060	1,030	1,170	1,265	Lowest
	4x8	U46	16	3⁹⁄₁₆	4⅞	2	—	(8) 0.162 x 3½	(4) 0.148 x 3	535	1,150	1,305	1,410	37%
■		LUS48	18	3⁹⁄₁₆	6¾	2	—	(6) 0.162 x 3½	(4) 0.162 x 3½	1,060	1,315	1,490	1,610	40%
		HUS48	14	3⁹⁄₁₆	6⁵⁄₁₆	2	—	(6) 0.162 x 3½	(6) 0.162 x 3½	1,320	1,580	1,790	1,930	203%
■		HU48 / HUC48	14	3⁹⁄₁₆	6³⁄₃₂	2½	Min.	(10) 0.162 x 3½	(4) 0.148 x 3	755	1,490	1,680	1,800	213%
			14	3⁹⁄₁₆	6³⁄₃₂	2½	Max.	(14) 0.162 x 3½	(6) 0.148 x 3	1,135	2,085	2,350	2,530	235%
■	4x10	LUS48	18	3⁹⁄₁₆	6¾	2	—	(6) 0.162 x 3½	(4) 0.162 x 3½	1,060	1,315	1,490	1,610	Lowest
■		LUS410	18	3⁹⁄₁₆	8¾	2	—	(8) 0.162 x 3½	(6) 0.162 x 3½	1,445	1,830	2,075	2,245	19%
		U410	16	3⁹⁄₁₆	8⅜	2	—	(14) 0.162 x 3½	(6) 0.148 x 3	990	2,015	2,280	2,465	74%
		HUS410	14	3⁹⁄₁₆	8⁵⁄₁₆	2	—	(8) 0.162 x 3½	(8) 0.162 x 3½	3,220	2,110	2,385	2,575	154%
■		HU410 / HUC410	14	3⁹⁄₁₆	8⅜	2½	Min.	(14) 0.162 x 3½	(6) 0.148 x 3	1,135	2,085	2,350	2,520	232%
			14	3⁹⁄₁₆	8⅜	2½	Max.	(18) 0.162 x 3½	(10) 0.148 x 3	1,795	2,680	3,020	3,250	253%
SS		HUCQ410-SDS	14	3⁹⁄₁₆	9	3	—	(12) ¼ x 2½ SDS	(6) ¼ x 2½ SDS	2,265	4,500	4,500	4,500	•
■	4x12	LUS410	18	3⁹⁄₁₆	8¾	2	—	(8) 0.162 x 3½	(6) 0.162 x 3½	1,445	1,830	2,075	2,245	Lowest
■		LUS414	18	3⁹⁄₁₆	10¾	2	—	(10) 0.162 x 3½	(6) 0.162 x 3½	1,445	2,110	2,395	2,590	33%
		U410	16	3⁹⁄₁₆	8⅜	2	—	(14) 0.162 x 3½	(6) 0.148 x 3	990	2,015	2,280	2,465	46%
		HUS410	14	3⁹⁄₁₆	8⁵⁄₁₆	2	—	(8) 0.162 x 3½	(8) 0.162 x 3½	3,220	2,110	2,385	2,575	114%
		HUS412	14	3⁹⁄₁₆	10½	2	—	(10) 0.162 x 3½	(10) 0.162 x 3½	3,435	2,635	2,985	3,220	129%
■		HU412 / HUC412	14	3⁹⁄₁₆	10¹³⁄₃₂	2½	Min.	(16) 0.162 x 3½	(6) 0.148 x 3	1,135	2,385	2,690	2,880	268%
			14	3⁹⁄₁₆	10¹³⁄₃₂	2½	Max.	(22) 0.162 x 3½	(10) 0.148 x 3	1,895	3,275	3,695	3,970	290%
SS		HUCQ410-SDS	14	3⁹⁄₁₆	9	3	—	(12) ¼ x 2½ SDS	(6) ¼ x 2½ SDS	2,265	4,500	4,500	4,500	•
SS		HUCQ412-SDS	14	3⁹⁄₁₆	11	3	—	(14) ¼ x 2½ SDS	(6) ¼ x 2½ SDS	2,265	5,045	5,045	5,045	•
■	4x14	LUS410	18	3⁹⁄₁₆	8¾	2	—	(8) 0.162 x 3½	(6) 0.162 x 3½	1,445	1,830	2,075	2,245	Lowest
■		LUS414	18	3⁹⁄₁₆	10¾	2	—	(10) 0.162 x 3½	(6) 0.162 x 3½	1,445	2,110	2,395	2,590	33%
		U414	16	3⁹⁄₁₆	10	2	—	(16) 0.162 x 3½	(6) 0.148 x 3	990	2,305	2,610	2,815	93%
		HUS412	14	3⁹⁄₁₆	10½	2	—	(10) 0.162 x 3½	(10) 0.162 x 3½	3,435	2,635	2,985	3,220	129%
■		HU414 / HUC414	14	3⁹⁄₁₆	11²³⁄₃₂	2½	Min.	(18) 0.162 x 3½	(8) 0.148 x 3	1,510	2,680	3,025	3,240	333%
			14	3⁹⁄₁₆	11²³⁄₃₂	2½	Max.	(24) 0.162 x 3½	(12) 0.148 x 3	2,015	3,570	4,030	4,335	355%
SS		HUCQ412-SDS	14	3⁹⁄₁₆	11	3	—	(14) ¼ x 2½ SDS	(6) ¼ x 2½ SDS	2,265	5,045	5,045	5,045	•

HHUS to AT CONC WALL TYP JOIST

See footnotes.

Home

Face-Mount Hangers: Load Tables for I-Joists, Glulam and SCL, 5 1/4" x 9 1/2" – 5 1/2" Glulam

These products are available with **additional corrosion protection**.

SS For stainless-steel fasteners, see **Connector Fastener Types and Sizes Specified for Simpson Strong-Tie Connectors**.

Codes: See **Code Reference Key Chart**.

Actual Joist Size (in.)	Model No.	Carried Member: Glulam	Carried Member: SCL	Carried Member: I-joist	Carried Member: Web Stiff Reqd.	Dimensions (in.): W	Dimensions (in.): H	Dimensions (in.): B	Min./ Max.	Fasteners (in.): Face	Fasteners (in.): Joist	Allowable Loads: DF/SP Species Header: Uplift (160)	DF/SP: Floor (100)	DF/SP: Snow (115)	DF/SP: Roof (125)	SPF/HF Species Header: Floor (100)	SPF/HF: Snow (115)	SPF/HF: Roof (125)
5¼ x 9½	HU610 / HUC610	•		—	5½	7⅜	2½	Min.	(14) 0.162 x 3½	(6) 0.162 x 3½	1,345	2,085	2,350	2,530	1,795	2,025	2,180
					5½	7⅜	2½	Max.	(18) 0.162 x 3½	(8) 0.162 x 3½	1,795	2,680	3,020	3,250	2,305	2,605	2,800
	HGUS5.50/10	•		—	5½	8⅛	4	—	(46) 0.162 x 3½	(16) 0.162 x 3½	4,095	9,100	9,100	9,100	7,825	7,825	7,825
	HHUS5.50/10	•		—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
	HUC0610-SDS	•		—	5½	9	3	—	(12) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	4,680	5,185	5,185	3,370	3,735	3,735
	MGU5.50-SDS	•		—	5½	9¼ to 30	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
5¼ x 11⅞	HHUS5.50/10	•		—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
	MGU5.50-SDS			—	5½	9¼ to 30	4½		(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
	HU612 / HUC612	•		—	5½	9⅜	2½	Min.	(16) 0.162 x 3½	(6) 0.162 x 3½	1,345	2,380	2,685	2,890	2,050	2,315	2,490
					5½	9⅜	2½	Max.	(22) 0.162 x 3½	(8) 0.162 x 3½	1,795	3,275	3,695	3,970	2,820	3,180	3,425
	HGUS5.50/12	•		—	5½	10½	4	—	(56) 0.162 x 3½	(20) 0.162 x 3½	5,040	9,400	9,400	9,400	8,085	8,085	8,085
SS	HUC0612-SDS	•		—	5½	11	3	—	(14) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	5,185	5,185	5,185	3,735	3,735	3,735
5¼ x 14	HHUS5.50/10	•		—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
	MGU5.50-SDS			—	5½	9¼ to 30	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
SS	HUC0612-SDS	•		—	5½	11	3	—	(14) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	5,185	5,185	5,185	3,735	3,735	3,735
	HGU5.50-SDS			—	5½	11 to 30	5¼	—	(36) ¼" x 2½" SDS	(24) ¼" x 2½" SDS	9,460	13,160	13,160	13,160	9,475	9,475	9,475
	HGUS5.50/14	•		—	5½	12½	4	—	(66) 0.162 x 3½	(22) 0.162 x 3½	5,515	9,695	9,695	9,695	8,340	8,340	8,340
	HU616 / HUC616	•		—	5½	12 1⅛	2½	Min.	(20) 0.162 x 3½	(8) 0.162 x 3½	1,795	2,975	3,360	3,610	2,565	2,895	3,110
					5½	12 1⅛	2½	Max.	(26) 0.162 x 3½	(12) 0.162 x 3½	2,695	3,870	4,365	4,695	3,330	3,760	4,045
	HHGU5.50-SDS			—	5½	13 to 30	5¼	—	(44) ¼" x 2½" SDS	(28) ¼" x 2½" SDS	14,145	17,345	17,345	17,345	12,490	12,490	12,490
5¼ x 16	HHUS5.50/10	•		—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
	MGU5.50-SDS			—	5½	9¼ to 30	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
SS	HUC0612-SDS	•		—	5½	11	3	—	(14) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	5,185	5,185	5,185	3,735	3,735	3,735
	HGU5.50-SDS			—	5½	11 to 30	5¼	—	(36) ¼" x 2½" SDS	(24) ¼" x 2½" SDS	9,460	13,160	13,160	13,160	9,475	9,475	9,475
	HGUS5.50/14	•		—	5½	12½	4	—	(66) 0.162 x 3½	(22) 0.162 x 3½	5,515	9,695	9,695	9,695	8,340	8,340	8,340
	HU616 / HUC616	•		—	5½	12 1⅛	2½	Min.	(20) 0.162 x 3½	(8) 0.162 x 3½	1,795	2,975	3,360	3,610	2,565	2,895	3,110
					5½	12 1⅛	2½	Max.	(26) 0.162 x 3½	(12) 0.162 x 3½	2,695	3,870	4,365	4,695	3,330	3,760	4,045
	HHGU5.50-SDS	•		—	5½	13 to 30	5¼	—	(44) ¼" x 2½" SDS	(28) ¼" x 2½" SDS	14,145	17,345	17,345	17,345	12,490	12,490	12,490
5¼ x 18	HHUS5.50/10	•		—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
SS	HUC0612-SDS	•		—	5½	11	3	—	(14) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	5,185	5,185	5,185	3,735	3,735	3,735
	HGUS5.50/14	•		—	5½	12½	4	—	(66) 0.162 x 3½	(22) 0.162 x 3½	5,515	9,695	9,695	9,695	8,340	8,340	8,340
	HU616 / HUC616	•		—	5½	12 1⅛	2½	Min.	(20) 0.162 x 3½	(8) 0.162 x 3½	1,795	2,975	3,360	3,610	2,565	2,895	3,110
					5½	12 1⅛	2½	Max.	(26) 0.162 x 3½	(12) 0.162 x 3½	2,695	3,870	4,365	4,695	3,330	3,760	4,045
	HGU5.50-SDS	•		—	5½	16 to 17⅞	5¼	—	(36) ¼" x 2½" SDS	(24) ¼" x 2½" SDS	9,460	13,160	13,160	13,160	9,475	9,475	9,475
	MGU5.50-SDS	•		—	5½	16 to 17⅞	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
	HHGU5.50-SDS	•		—	5½	16 to 17⅞	5¼	—	(44) ¼" x 2½" SDS	(28) ¼" x 2½" SDS	14,145	17,345	17,345	17,345	12,490	12,490	12,490
5¼ x 20 to 30	MGU5.50-SDS	•		—	5½	18 to 30	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
	HGU5.50-SDS	•		—	5½	18 to 30	5¼	—	(36) ¼" x 2½" SDS	(24) ¼" x 2½" SDS	9,460	13,160	13,160	13,160	9,475	9,475	9,475
	HHGU5.50-SDS	•		—	5½	18 to 30	5¼	—	(44) ¼" x 2½" SDS	(28) ¼" x 2½" SDS	14,145	17,345	17,345	17,345	12,490	12,490	12,490
5½ glulam	HU610 / HUC610		•		—	5½	7⅜	2½	Max.	(18) 0.162 x 3½	(8) 0.162 x 3½	1,795	2,680	3,020	3,250	2,305	2,605	2,800
	HGUS5.50/10	•			—	5½	8⅛	4	—	(46) 0.162 x 3½	(16) 0.162 x 3½	4,095	9,100	9,100	9,100	7,825	7,825	7,825
	HUC0610-SDS	•			—	5½	9	3	—	(12) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	4,680	5,185	5,185	3,370	3,735	3,735
	HHUS5.50/10	•			—	5½	9	3	—	(30) 0.162 x 3½	(10) 0.162 x 3½	3,565	5,635	6,380	6,880	4,845	5,490	5,915
	MGU5.62-SDS	•			—	5⅝	9¼ to 30	4½	—	(24) ¼" x 2½" SDS	(16) ¼" x 2½" SDS	7,260	9,450	9,450	9,450	6,805	6,805	6,805
	HU612 / HUC612		•		—	5½	9⅜	2½	Max.	(22) 0.162 x 3½	(8) 0.162 x 3½	1,795	3,275	3,695	3,970	2,820	3,180	3,425
	HUC0612-SDS	•			—	5½	11	3	—	(14) ¼" x 2½" SDS	(6) ¼" x 2½" SDS	2,325	5,185	5,185	5,185	3,735	3,735	3,735
	HGU5.62-SDS	•			—	5⅝	11 to 30	5¼	—	(36) ¼" x 2½" SDS	(24) ¼" x 2½" SDS	9,460	13,160	13,160	13,160	9,475	9,475	9,475
	HGUS5.50/14	•			—	5½	12½	4	—	(66) 0.162 x 3½	(22) 0.162 x 3½	5,515	9,695	9,695	9,695	8,340	8,340	8,340
	HU616 / HUC616		•		—	5½	12 1⅛	2½	Max.	(26) 0.162 x 3½	(12) 0.162 x 3½	2,695	3,870	4,365	4,695	3,330	3,760	4,045
	HHGU5.62-SDS	•			—	5⅝	13 to 30	5¼	—	(44) ¼" x 2½" SDS	(28) ¼" x 2½" SDS	14,145	17,345	17,345	17,345	12,490	12,490	12,490

1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern.
2. Uplift loads are based on DF/SP. For SPF/HF, use 0.86 x DF/SP Uplift Load for products requiring nails and 0.72 x DF/SP Uplift Load for products requiring screws.

CC/ECC/ECCU

Column Caps

Column caps provide a strong connection for column-beam combinations.

Material: CC3¼, CC44, CC46, CC48, CC4.62, CC64, CC66, CC68, CC6-7⅛, ECC3¼, ECC44, ECC46, ECC48, ECC4.62, ECC64, ECC66, ECC68, ECC6-7⅛ — 7 gauge; all others — 3 gauge

Finish: Simpson Strong-Tie gray paint. Some products available in HDG, stainless steel or black powder coat; CCO, ECCO — no coating.

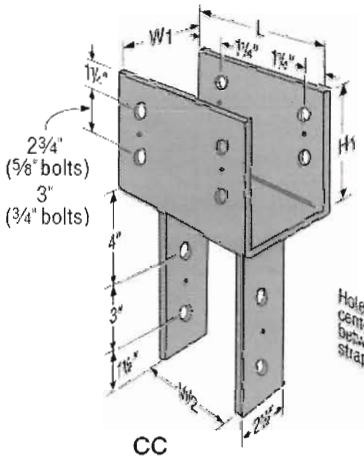
Installation:

- Use all specified fasteners; see General Notes
- Bolt holes shall be a minimum of 1/32" to a maximum of 1/16" larger than the bolt diameter (per 2015 NDS, section 12.1.3.2)
- Contact engineered wood manufacturers for connections that are not through the wide face

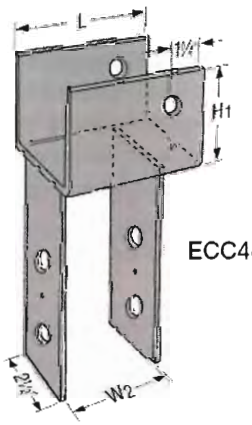
Options:

- Straps may be rotated 90° where $W_1 \geq W_2$ (see illustration) and for CC5¼-6.
- For special, custom or rough-cut lumber sizes, provide dimensions. An optional W_2 dimension may be specified. (The W_2 dimension on straps rotated 90° is limited by the W_1 dimension.)
- CCO/ECCO — Column cap only (no straps) may be ordered for field-welding to pipe or other columns. CCO/ECCO dimensions are the same as CC/ECC. Weld by Designer.
- CCOB — Any two CCOs may be specified for back-to-back welding to create a cross beam connector. Use the table loads; the load is no greater than the lesser element employed.

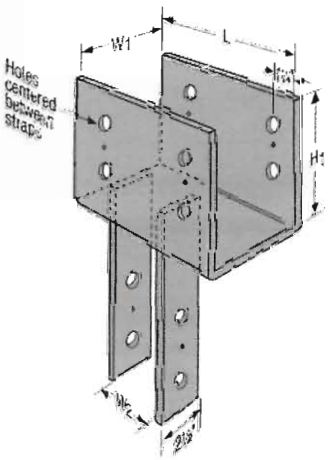
Codes: See p. 12 for Code Reference Key Chart



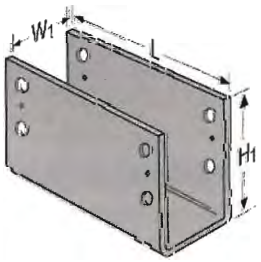
CC



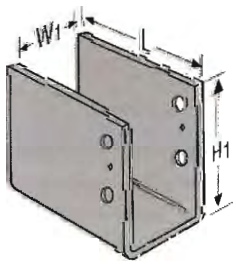
ECC44



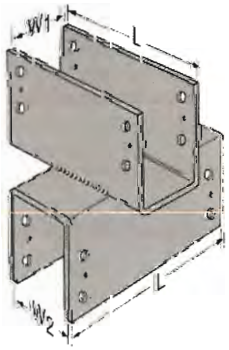
ECCU
(ECCU44 has only 2 bolts to beam)



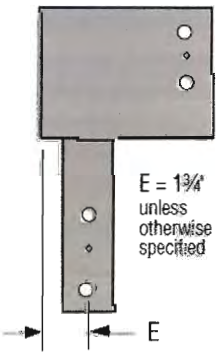
CCO



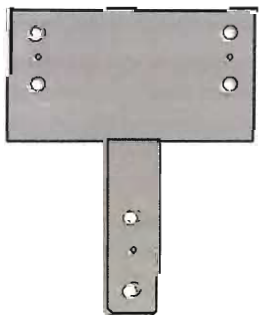
ECCO



CCOB



Optional ECC with Straps Rotated 90°



Optional CC with Straps Rotated 90°

CC/ECC/ECCU

Column Caps (cont.)

These products are available with additional corrosion protection. For more information, see p. 15.

SS For stainless-steel fasteners, see p. 21.

	Model No.	Beam Width (in.)	Dimensions (in.)						Machine Bolts					Allowable Loads (DF/SP)					Code Ref.	CCO/ECCO Model No. (No Legs)
			W_1	W_2	L			H_1	Size	Beam			Post	CC		ECC	ECCU			
					CC	ECC	ECCU			CC	ECC	ECCU		Uplift (160)	Down (100)	Down (100)	Uplift (160)	Down (100)		
SS	CC3 1/4-4	3⅛	3¼	3⅝	11	7½	9½	6½	⅝	4	2	4	2	3,150	16,980	6,835	3,150	6,835	IBC, FL, LA	CCO3 1/4 ECCO3 1/4
	CC3 1/4-6	3⅛	3¼	5½	11	7½	9½	6½	⅝	4	2	4	2	3,150	21,485	10,740	3,150	10,740		
SS	CC44	3½	3⅝	3⅝	7	5½	6½	4	⅝	2	1	2	2	1,850	19,020	7,655	1,850	7,655		CCO4 ECCO4
	CC46	3½	3⅝	5½	11	8½	9½	6½	⅝	4	2	4	2	3,530	24,065	12,030	3,530	12,030		CCO4/6 ECCO4/6
	CC48	3½	3⅝	7½	11	8½	9½	6½	⅝	4	2	4	2	3,530	24,065	16,405	3,530	16,405		
	CC4.62-3.62	4½	4⅝	3⅝	11	8½	9½	6½	⅝	4	2	4	2	4,535	23,390	9,845	4,535	9,845		CCO4.62 ECCO4.62
	CC4.62-4.62	4½	4⅝	4⅝	11	8½	9½	6½	⅝	4	2	4	2	4,535	30,070	12,655	4,535	12,655		
	CC4.62-5.50	4½	4⅝	5½	11	8½	9½	6½	⅝	4	2	4	2	4,535	30,940	15,470	4,535	15,470		
	CC5 1/4-4	5⅛	5¼	3⅝	13	9½	10½	8	¾	4	2	4	2	6,300	26,635	11,210	6,300	11,210		CCO5 1/4 ECCO5 1/4
	CC5 1/4-6	5⅛	5¼	5½	13	9½	10½	8	¾	4	2	4	2	6,500	28,190	17,615	6,500	17,615		
	CC5 1/4-8	5⅛	5¼	7½	13	9½	10½	8	¾	4	2	4	2	6,645	35,235	24,025	6,645	24,025		
	CC64	5¼, 5½	5½	3⅝	11	7½	9½	6½	⅝	4	2	4	2	5,545	28,585	12,030	5,545	12,030		CCO6 ECCO6
SS	CC66	5¼, 5½	5½	5½	11	7½	9½	6½	⅝	4	2	4	2	5,545	33,275	18,905	5,545	18,905		
	CC68	5¼, 5½	5½	7½	11	9½	9½	6½	⅝	4	2	4	2	5,545	37,815	25,780	5,545	25,780		ECCO68
	CC6-7 1/8	5¼, 5½	5½	7⅛	11	9½	9½	6½	⅝	4	2	4	2	5,545	37,815	24,490	5,545	24,490		
	CC74	6¾	6⅞	3⅝	13	10½	10½	8	¾	4	2	4	2	6,330	33,490	15,355	6,330	15,355		CCO7 ECCO7
	CC76	6¾	6⅞	5½	13	10½	10½	8	¾	4	2	4	2	6,790	37,125	24,130	6,790	24,130		
	CC77	6¾	6⅞	6⅞	13	10½	10½	8	¾	4	2	4	2	7,020	48,265	29,615	7,020	29,615		
	CC78	6¾	6⅞	7½	13	10½	10½	8	¾	4	2	4	2	7,145	48,265	32,090	7,145	32,905		
	CC7 1/8-4	7	7⅛	3⅝	13	10½	10½	8	¾	4	2	4	2	6,360	34,730	18,375	6,360	18,375		CCO7 1/8 ECCO7 1/8
	CC7 1/8-6	7	7⅛	5½	13	10½	10½	8	¾	4	2	4	2	6,825	38,500	28,875	6,825	28,875		
	CC7 1/8-7 1/8	7	7⅛	7⅛	13	10½	10½	8	¾	4	2	4	2	7,105	57,750	36,750	7,105	36,750		
	CC7 1/8-8	7	7⅛	7½	13	10½	10½	8	¾	4	2	4	2	7,190	52,500	39,375	7,190	39,375		
	CC84	7½	7½	3⅝	13	10½	10½	8	¾	4	2	4	2	6,410	37,210	16,405	6,410	16,405		CCO8 ECCO8
	CC86	7½	7½	5½	13	10½	10½	8	¾	4	2	4	2	6,885	41,250	25,780	6,885	25,780		
	CC88	7½	7½	7½	13	10½	10½	8	¾	4	2	4	2	7,250	51,565	35,155	7,250	35,155		
	CC94	8¾	8⅞	3⅝	13	10½	10½	8	¾	4	4	4	2	6,580	47,545	19,905	6,580	19,905		CCO9 ECCO9
	CC96	8¾	8⅞	5½	13	10½	10½	8	¾	4	4	4	2	7,080	48,125	31,280	7,080	31,280		
	CC98	8¾	8⅞	7½	13	10½	10½	8	¾	4	4	4	2	7,455	62,565	42,655	7,455	42,655		
	CC106	9¼	9½	5½	13	10½	10½	8	¾	4	4	4	2	7,160	52,250	32,655	7,160	32,655		CCO10 ECCO10

1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern.
2. Downloads shall be reduced where limited by allowable loads of the post.
3. CC uplift loads do not apply to splice conditions.
4. Splice conditions with CCs must be detailed by the Designer to transfer tension loads between spliced members by means other than the column cap.
5. Column sides are assumed to be aligned in the same vertical plane as the beam sides. CC4.62 models assume a minimum 3½"-wide post.
6. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers known as the narrow face. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for load reductions resulting from narrow-face installations.
7. Beam depth must be at least as tall as H_1.
8. CCO and ECCO welded to a steel column will achieve maximum load listed as CC and ECC. The steel column width shall match the beam width. Weld by Designer.

3.2.6 X-P PREMIUM CONCRETE FASTENERS X-U UNIVERSAL KNURLED SHANK FASTENERS

3.2.6.1 PRODUCT DESCRIPTION

The Hilti X-P Premium concrete fastener is a hardened fastener with 0.157" shank, optimized for performance in concrete applications, including high strength concrete.

The Hilti X-U universal knurled shank fastener is also a 0.157" shank fastener, designed to cover a wide range of application conditions in steel and concrete. With a fully knurled shank, the X-U fastener is particularly well-suited for steel applications.

To help ensure reliable fastenings, the X-P and X-U fasteners have matched tolerance to all Hilti powder-actuated tools using 8 mm fastener guides and drive pistons through an 8 mm nail head diameter and an 8 mm plastic guidance washer set near the nail tip. The X-U program also includes fasteners with pre-mounted steel washers of 15 mm or 36 mm.

X-U X-P

Product features: X-P Fasteners

- Conical point, optimized for penetration in standard and tough concretes
- 0.157" shank for optimal tension and shear loads and stick rate
- Comes in 4 lengths, optimized for fastening of sheet metal (up to 16 ga.) to concrete
- Available in single or collated configurations for optimal productivity

Product features: X-U Fasteners

- Unique knurling design offering higher pullout strength and anchorage in steel
- A 0.157" shank diameter for high performance in both tension and shear applications
- Full range of fasteners in single or collated configurations to maximize productivity
- Recognized for horizontal wood deck diaphragms subjected to wind or seismic forces (Reference ICC-ES ESR-2269)

Listings/Approvals

ICC-ES (International Code Council)
ESR-2269

COLA (City of Los Angeles)
RR 25675

3.2.6.2 MATERIAL SPECIFICATIONS

Fastener designation	Fastener material	Fastener plating	Fastener hardness
X-U	Carbon Steel	5 µm Zinc[1]	57.5 HRC
X-P	Carbon Steel	5 um Zinc[1]	59 HRC

1 ASTM B633, SC 1, Type III.

3.2.6.3 TECHNICAL DATA

Ultimate loads in normal weight concrete[1, 2]

Fastener	Shank diameter in. (mm)	Minimum embedment in. (mm)	Concrete compressive strength							
			2000 psi		4000 psi		6000 psi		8000 psi	
			Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
X-U Universal Fastener	0.157 (4.0)	3/4 (19)	570 (2.5)	840 (3.7)	705 (3.1)	765 (3.4)	790 (3.5)	1020 (4.5)	-	-
		1 (25)	855 (3.8)	1060 (4.7)	995 (4.4)	1380 (6.1)	1135 (5.1)	1630 (7.3)	-	-
		1-1/4 (32)	1225 (5.5)	1865 (8.3)	1500 (6.7)	2020 (9.0)	1300 (5.8)	2325 (10.3)	-	-
		1-1/2 (38)	1765 (7.9)	2480 (11.0)	1965 (8.7)	2250 (10.0)	-	-	-	-
X-P Premium Concrete Fastener	0.157 (4.0)	3/4 (19)	535 (2.4)	980 (4.4)	800 (3.6)	1430 (6.4)	735 (3.3)	1575 (7.0)	875 (3.9)	1475 (6.6)
		1 (25)	880 (3.9)	1395 (6.2)	1345 (6.0)	1710 (7.6)	1320 (5.9)	2040 (9.1)	1400 (6.2)	1820 (8.1)
		1-1/4 (32)	1535 (6.8)	2060 (9.2)	1865 (8.3)	2210 (9.8)	1650 (7.3)	2350 (10.5)	-	-
		1-1/2 (38)	2005 (8.9)	2280 (10.1)	-	-	-	-	-	-

Allowable loads in normal weight concrete[1, 2]

Fastener	Shank diameter in. (mm)	Minimum embedment in. (mm)	Concrete compressive strength							
			2000 psi		4000 psi		6000 psi		8000 psi	
			Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
X-U Universal Fastener	0.157 (4.0)	3/4 (19)	100 (0.4)	125 (0.6)	100 (0.4)	125 (0.6)	105 (0.5)	205 (0.9)	-	-
		1 (25)	165 (0.7)	190 (0.8)	170 (0.8)	225 (1.0)	110[3] (0.5)	280[3] (1.2)	-	-
		1-1/4 (32)	240 (1.1)	310 (1.4)	280 (1.2)	310 (1.4)	180 (0.8)	425 (1.9)	-	-
		1-1/2 (38)	275 (1.2)	420 (1.9)	325 (1.4)	420 (1.9)	-	-	-	-
X-P Premium Concrete Fastener	0.157 (4.0)	3/4 (19)	100 (0.4)	155 (0.7)	100 (0.4)	175 (0.8)	105 (0.5)	205 (0.9)	135 (0.6)	205 (0.9)
		1 (25)	165 (0.7)	220 (1.0)	180 (0.8)	225 (1.0)	150 (0.7)	300 (1.3)	150 (0.7)	215 (1.0)
		1-1/4 (32)	240 (1.1)	310 (1.4)	280 (1.2)	310 (1.4)	180 (0.8)	425 (1.9)	-	-
		1-1/2 (38)	310 (1.4)	420 (1.9)	-	-	-	-	-	-

1 The tabulated load values are for the low-velocity fasteners only based on testing in accordance with ICC-ES AC 70 and ASTM E1190. Allowable loads are calculated based on a safety factor of at least 5.0. Some conditions like high wind loads, shock or fatigue may require a different safety factor. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
2 Multiple fasteners are recommended for any attachment.
3 This allowable load value for the X-U fastener also applies to normal weight hollow core concrete slabs with f'c of 6600 psi and minimum face shell thickness of 1-3/8 in.

Ultimate and allowable loads in normal weight concrete using DX Kwik[1, 2,3]

Fastener	Shank diameter in. (mm)	Minimum embedment in. (mm)	Load type	Concrete compressive strength			
				4000 psi		6000 psi	
				Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
X-U 47 P8 with DX Kwik	0.157 (4.0)	1-1/2 (38)	Ultimate	1973 (8.8)	2235 (9.9)	2101 (9.3)	2859 (12.7)
			Allowable	395 (1.8)	405 (1.8)	360 (1.6)	570 (2.5)

1 The tabulated ultimate load values are for the low-velocity fasteners only based on testing in accordance with ICC-ES AC 70 and ASTM E1190. Allowable loads are calculated based on a safety factor of at least 5.0. Some conditions like high wind loads, shock or fatigue may require a different safety factor. Wood or steel members connected to the substrate must be investigated in accordance with accepted design criteria.
2 Multiple fasteners are recommended for any attachment
3 X-U Fastener is installed using the DX Kwik drilled pilot hole installation procedure shown in section 3.2.1.10 of the North American Product Technical Guide, Volume 1, Edition 2018.

PB/PBS

Regular and Standoff Post Bases

The PBS features a 1" standoff height. It reduces the potential for decay at post and column ends.

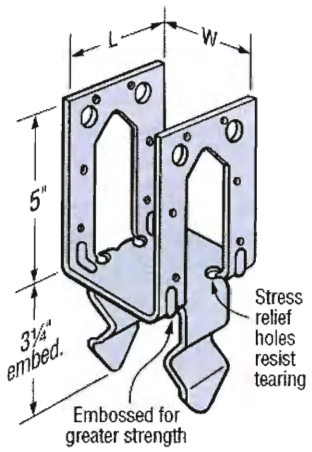
Material: PB — 12 gauge; PBS — see table

Finish: Galvanized. Some products available in ZMAX® or HDG coating; see Corrosion Information, pp. 13–15.

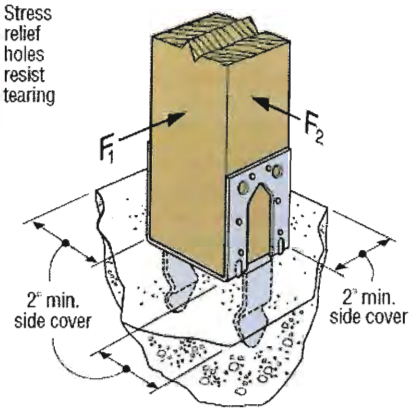
Installation:

- Use all specified fasteners; see General Notes.
- Install either nails or bolts.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non-top-supported installations (such as fences or unbraced carports).
- PB — Holes are provided for installation with either 0.162" x 3½" nails or ½" bolts for PB66 and PB66R; all other models use 0.162" x 3½" nails only. A 2" minimum sidecover is required to obtain the full load.
- PBS — Embed into wet concrete up to the bottom of the 1" standoff base plate. A 2" minimum side cover is required to obtain the full load. Holes in the bottom of the straps allow for free concrete flow.

Codes: See p. 12 for Code Reference Key Chart



PB

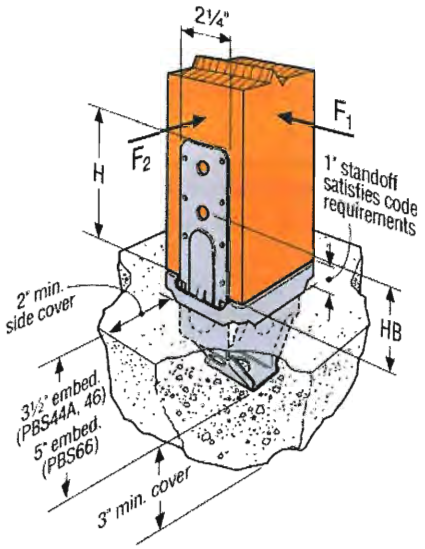


Typical PB Installation

These products are available with additional corrosion protection. For more information, see p. 15.

Model No.	Dimensions (in.) W	L	Fasteners Nails (in.)	Machine Bolts	Allowable Loads (160) Uncracked Uplift	Cracked Uplift	Download (100)	Code Ref.
Wind and Seismic Design Category A&B								
PB44	3⁹⁄₁₆	3¼	(12) 0.162 x 3½	N/A	850	850	12,685	IBC, FL, LA
PB44R	4	3¼	(12) 0.162 x 3½	N/A	850	850	12,685	
PB46	5½	3¼	(12) 0.162 x 3½	N/A	850	850	22,445	
PB66	5½	5¼	(12) 0.162 x 3½	(2) ½" dia.	850	850	25,270	
PB66R	6	5¼	(12) 0.162 x 3½	(2) ½" dia.	850	850	25,270	
Seismic Design Category C–F								
PB44	3⁹⁄₁₆	3¼	(12) 0.162 x 3½	N/A	850	850	12,685	IBC, FL, LA
PB44R	4	3¼	(12) 0.162 x 3½	N/A	850	850	12,685	
PB46	5½	3¼	(12) 0.162 x 3½	N/A	850	850	22,445	
PB66	5½	5¼	(12) 0.162 x 3½	(2) ½" dia.	850	850	25,270	
PB66R	5½	5¼	(12) 0.162 x 3½	(2) ½" dia.	850	850	25,270	

1. Loads may not be increased for duration of load.
2. Concrete shall have a minimum compressive strength of f'_c = 2,500 psi.
3. Multiply Seismic and Wind ASD load values by 1.4 or 1.67 respectively to obtain LRFD capacities.
4. In accordance with IBC, Section 1613.1, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
5. Downloads shall be reduced where limited by capacity of the post.
6. For lateral loads for all PB models: F_1 allowable = 765 lb. F_2 allowable = 1,325 lb.
7. Designer is responsible for concrete design.
8. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers known as the narrow face. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for load reductions resulting from narrow-face installations.
9. **Fasteners:** Nail dimensions in the table are listed diameter by length. See pp. 21–22 for fastener information.



Typical PBS44A Installation

PB/PBS

Regular and Standoff Post Bases (cont.)

These products are available with additional corrosion protection. For more information, see p. 15.

SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 335–337 for more information.

Model No.	Nominal Post Size	Material (ga.) Base	Material (ga.) Strap	Dimensions (in.) W	L	H	HB	Fasteners (in.) Nails	Fasteners (in.) Machine Bolts	Allowable Loads Uncracked Uplift	Allowable Loads Cracked Uplift	Allowable Loads Download	Code Ref.
Wind and Seismic Design Category A&B													
PBS44A	4x4	12	14	3⁹⁄₁₆	3½	6¼	3⁷⁄₁₆	(14) 0.162 x 3½	(2) ½ dia.	1,235	865	10,975	IBC, FL, LA
PBS46	4x6	12	14	3⁹⁄₁₆	5⁷⁄₁₆	6⁹⁄₁₆	3⅜	(14) 0.162 x 3½	(2) ½ dia.	1,235	865	14,420	
PBS66	6x6	12	12	5½	5⅜	6½	3¹¹⁄₁₆	(14) 0.162 x 3½	(2) ½ dia.	2,165	2,165	14,420	
Seismic Design Category C–F													
PBS44A	4x4	12	14	3⁹⁄₁₆	3½	6¼	3⁷⁄₁₆	(14) 0.162 x 3½	(2) ½ dia.	1,080	755	10,975	IBC, FL, LA
PBS46	4x6	12	14	3⁹⁄₁₆	5⁷⁄₁₆	6⁹⁄₁₆	3⅜	(14) 0.162 x 3½	(2) ½ dia.	1,080	755	14,420	
PBS66	6x6	12	12	5½	5⅜	6½	3¹¹⁄₁₆	(14) 0.162 x 3½	(2) ½ dia.	2,165	2,165	14,420	

1. For higher downloads, pack grout solid under 1" standoff plate before installation. Base download on column or concrete, according to the code.
2. Concrete shall have a minimum compressive strength of f'_c = 2,500 psi.
3. Multiply Seismic and Wind ASD load values by 1.4 or 1.67 respectively to obtain LRFD capacities.
4. In accordance with IBC, Section 1613.1, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
5. Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for installations that lack top support (such as fences or unbraced carports).
6. Downloads shall be reduced where limited by capacity of the post.
7. Designer is responsible for concrete design.
8. For lateral loads for all PBS models: F_1 allowable = 1,165 lb. when using nails and 230 lb. when using bolts. F_2 allowable = 835 lb. when using either nails or bolts.
9. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers known as the narrow face. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for load reductions resulting from narrow-face installations.
10. **Fasteners:** Nail dimensions in the table are listed diameter by length. See pp. 21–22 for fastener information.

ABA/ABU/ABW

Adjustable and Standoff Post Bases

Additional standoff bases are on p. 321.

The AB series of retrofit adjustable post bases provide a 1" standoff for the post, are slotted for adjustability and can be installed with nails, Strong-Drive® SD Connector screws or bolts (ABU). Depending on the application needs, these adjustable standoff post bases are designed for versatility, cost-effectiveness and maximum uplift performance.

Features:

- The slot in the base enables flexible positioning around the anchor bolt, making precise post placement easier
- The 1" standoff helps prevent rot at the end of the post and meets code requirements for structural posts installed in basements or exposed to weather or water splash

Material: Varies (see table)

Finish: ZMAX® and some in stainless steel; see Corrosion Information, pp. 13–15

Installation:

- Use all specified fasteners; see General Notes.
- See our *Anchoring and Fastening Systems for Concrete and Masonry* catalog, or visit **strongtie.com** for retrofit anchor options.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non-top-supported installations (such as fences or unbraced carports).
- Place the base, cut washer(s) or load transfer plate(s) and nut(s) on the anchor bolt(s). Make any necessary adjustments to post placement and tighten the nut securely on the anchor bolt.
- See **strongtie.com** for information on hollow column installation.

ABW

Place the standoff base and then the post in the ABW and fasten on three vertical sides, using nails or Strong-Drive SD Connector screws

– Bend up the fourth side of the ABW and fasten using the correct fasteners

ABU

Place the standoff base and then the post in the ABU

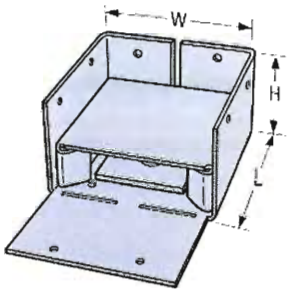
– Fasten using nails or Strong-Drive SD Connector screws or bolts (ABU88Z, ABU1010Z, ABU1212Z – SDS optional)

ABA

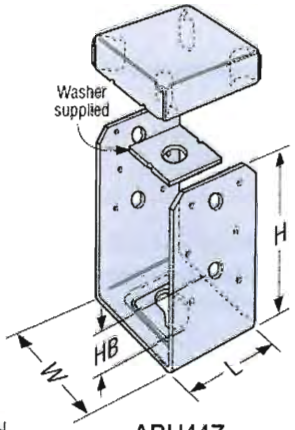
Place the post in the ABA

– Fasten using nails or Strong-Drive SD Connector screws

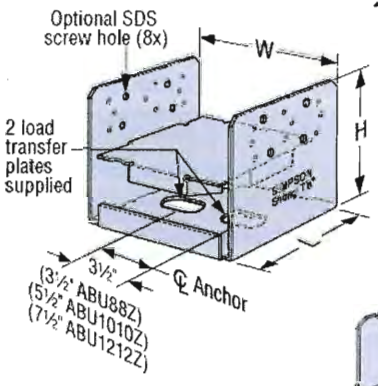
Codes: See p. 12 for Code Reference Key Chart



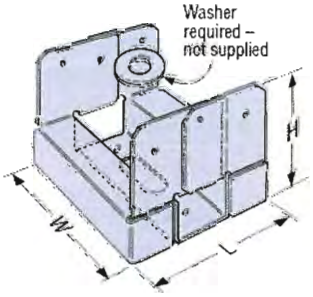
ABWZ



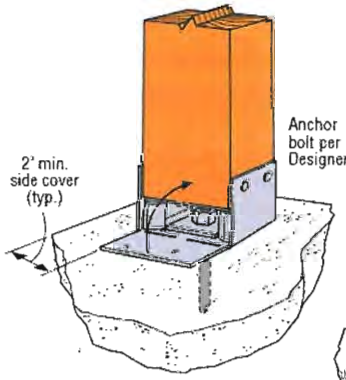
ABU44Z
(other sizes similar)



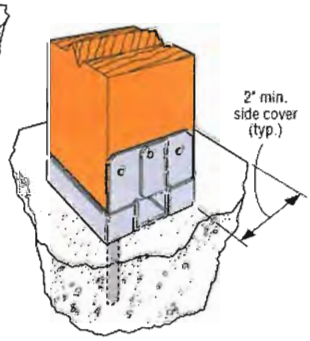
ABU88Z
(other sizes similar)



ABA44Z
(other sizes similar)



Typical ABWZ Installation

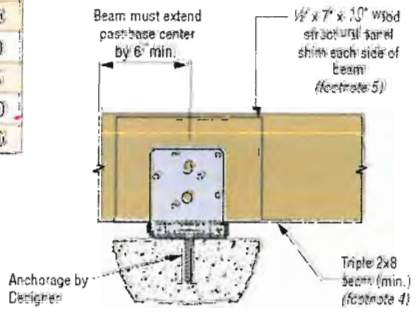


Typical ABA44Z Installation

Allowable Loads — Beam Installation

Model No.	Nominal Beam Size	Material (ga.)		Dimensions (in.)			Fasteners (in.)		DF/SP Allowable Loads		SPF/HF Allowable Loads	
		Base	Strap	W	L	H	Anchor Dia.	Nails	Uplift (160)	Down (100)	Uplift (160)	Down (100)
ABU46Z	Double 2x	12	12	3⅜	5	7	⅝	(12) 0.162 x 3½	2,030	8,475	1,820	6,075
ABU46Z	4x	12	12	3⅜	5	7	⅝	(12) 0.162 x 3½	2,155	9,890	1,850	7,090
ABU46RZ	Rough 4x	12	12	4	6	6¾	⅝	(12) 0.162 x 3½	2,155	9,890	1,850	7,090
ABU66Z	Triple 2x	12	10	5½	5	6⅛	⅝	(12) 0.162 x 3½	1,405	12,715	1,165	9,115
ABU66Z	6x	12	10	5½	5	6⅛	⅝	(12) 0.162 x 3½	1,905	12,920	1,640	11,110
ABU66RZ	Rough 6x	12	10	6	6	5⅞	⅝	(12) 0.162 x 3½	1,905	12,920	1,640	11,110

1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern.
2. Downloads may not be increased for short-term loading.
3. Specifier is to design concrete and anchorage for uplift capacity.
4. Beam depth must be a minimum of 7¼".
5. Shims are required for double 2x (1 shim) and triple 2x (2 shims) installations as shown in the illustration. Additional fastening of shim to beam is not required.
6. **Fasteners:** Nail dimensions in the table are listed diameter by length. See pp. 21–22 for fastener information.



ABU66Z Beam Installation

ABA/ABU/ABW

Adjustable and Standoff Post Bases (cont.)

These products are available with additional corrosion protection. For more information, see p. 15.

SS For stainless-steel fasteners, see p. 21.

SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 335–337 for more information.

Allowable Loads – Post Installation

Model No.	Nominal Post Size	Material (ga.)		Dimensions (in.)				Fasteners				Allowable Loads (DF/SP)			Code Ref.
		Base	Strap	W	L	H	HB	Anchor Dia. (in.)	Nails (in.)	Bolts Qty.	Bolts Dia. (in.)	Uplift Nails	Uplift Bolts	Down (100)	
ABA44Z	4x4	16	16	3 9/16	3 3/8	3 1/16	—	½	(6) 0.148 x 3	—	—	690	—	5,925	
ABW44Z	4x4	16	16	3 9/16	3 9/16	2 ¼	—	½	(8) 0.148 x 3	—	—	1,005	—	7,180	
SS ABU44Z	4x4	16	12	3 9/16	3	5 ½	1 ¾	⅝	(12) 0.162 x 3½	2	½	1,900	2,300	7,570	
ABU44RZ	Rough 4x4	16	12	4 1/16	3	5 ¼	1 ½	⅝	(12) 0.162 x 3½	2	½	1,900	2,300	7,570	
ABA44RZ	Rough 4x4	16	16	4 1/16	3 1/8	2 13/16	—	½	(6) 0.148 x 3	—	—	655	—	7,215	
ABW44RZ	Rough 4x4	16	16	4	4 1/16	1 15/16	—	½	(8) 0.148 x 3	—	—	835	—	7,180	
ABW46Z	4x6	12	16	3 9/16	5 9/16	3	—	½	(10) 0.148 x 3	—	—	845	—	4,590	
ABA46Z	4x6	14	14	3 9/16	5 3/16	3 1/8	—	⅝	(8) 0.162 x 3½	—	—	870	—	10,500	
SS ABU46Z	4x6	12	12	3 9/16	5	7	2 ⅝	⅝	(12) 0.162 x 3½	2	½	2,405	2,265	12,520	
ABU46RZ	Rough 4x6	12	12	4 1/16	5	6 ¾	2 ⅜	⅝	(12) 0.162 x 3½	2	½	2,405	2,265	12,520	
ABW46RZ	Rough 4x6	12	16	4	6	2 13/16	—	½	(10) 0.148 x 3	—	—	780	—	4,590	IBC, FL, LA
ABA46RZ	Rough 4x6	14	14	4 1/16	5 3/16	2 ⅞	—	⅝	(8) 0.162 x 3½	—	—	870	—	10,695	
ABU5-5Z	5⅛ x 5⅛	12	10	5 ¼	5	6 1/16	1 ¾	⅝	(12) 0.162 x 3½	2	½	2,235	2,235	10,570	
ABU5-6Z	5⅛ x 6	12	10	6 ⅛	5	6 1/16	1 ¾	⅝	(12) 0.162 x 3½	2	½	2,235	2,235	10,570	
ABA66Z	6x6	14	14	5 ½	5 3/8	3 1/8	—	⅝	(8) 0.162 x 3½	—	—	850	—	10,245	
ABW66Z	6x6	12	14	5 ½	5 9/16	3	—	½	(12) 0.148 x 3	—	—	1,190	—	12,935	
SS ABU66Z	6x6	12	10	5 ½	5	6 1/16	1 ¾	⅝	(12) 0.162 x 3½	2	½	2,475	2,190	18,205	
ABU66RZ	Rough 6x6	12	10	6 1/16	5	5 13/16	1 ½	⅝	(12) 0.162 x 3½	2	½	2,475	2,190	18,205	
ABA66RZ	Rough 6x6	14	14	6	5 3/16	2 ⅞	—	⅝	(8) 0.162 x 3½	—	—	850	—	11,500	
ABW66RZ	Rough 6x6	12	14	6	6	2 13/16	—	½	(12) 0.148 x 3	—	—	1,190	—	12,935	
ABW7-7Z	7⅛ x 7⅛	12	14	7 1/16	7 1/16	3	—	½	(12) 0.148 x 3	—	—	840	—	14,530	
SS ABU88Z	8x8	14	12	7 ½	7	7	—	(2) ⅝	(18) 0.162 x 3½	—	—	2,570	—	22,405	IBC, FL
ABU88RZ	Rough 8x8	14	12	8	7	7	—	(2) ⅝	(18) 0.162 x 3½	—	—	2,450	—	19,870	
ABU1010Z	10x10	14	14	9 ½	9	7 ¼	—	(2) ⅝	(22) 0.162 x 3½	—	—	2,270	—	32,020	
ABU1010RZ	Rough 10x10	14	14	10	9	7	—	(2) ⅝	(22) 0.162 x 3½	—	—	1,830	—	31,650	IBC, FL, LA
ABU1212Z	12x12	12	12	11 ½	11	7 ¼	—	(2) ⅝	(22) 0.162 x 3½	—	—	3,000	—	34,745	
ABU1212RZ	Rough 12x12	12	12	12	11	7	—	(2) ⅝	(22) 0.162 x 3½	—	—	3,000	—	34,745	

1. Uplift loads have been increased for earthquake or wind loading with no further increase allowed. Reduce where other loads govern
2. Downloads may not be increased for short-term loading.
3. Specifier is to design concrete and anchorage for uplift loads.
4. ABU products may be installed with either bolts or nails (not both) to achieve table loads. ABU88Z, ABU88RZ, ABU1010Z, ABU1010RZ, and ABU1212Z/RZ may be installed with (8) ¼" x 3" Strong-Drive® SDS Heavy-Duty Connector screws (sold separately) for the same table load.
5. For higher downloads, pack grout solid under 1" standoff plate before installation. Base download on column or concrete, according to the code.
6. HB dimension is the distance from the bottom of the post up to the first bolt hole.
7. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers. For SCL columns, the fasteners for these products should always be installed in the wide face.
8. Downloads shall be reduced where limited by allowable loads of the post.
9. **Fasteners:** Nail dimensions in the table are listed diameter by length. See pp. 21–22 for fastener information.

Seattle Structural

PROJECT GRIFFITH DECK BY TDM DATE 5.11.20 PAGE

LEDGER CONNECTION

$V = 488\#/2' = 244\#/ft$

ASSUME EXIST. RIM JOIST IS 1½" THICK

SIMPSON SDWS22400DB SCREWS

$V_R = (385\#/\text{SCREW})(1.5"/2.375")(.7) = 170\#/\text{SCREW}$

C_M

$S = \frac{170\#/\text{SCREW}}{244\#/ft}(12"/ft) = 8.36"/\text{SCREW}$

USE (2) ROWS SDWS22400DB SCREWS @ 16" OC

Structural and General Fastening

Strong-Drive®
SDWS TIMBER Screw

Structural Wood-to-Wood Connections Including Ledgers, Indoor/Outdoor Projects

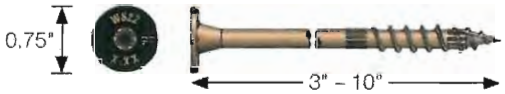
Designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. The Strong-Drive SDWS Timber screws are ideal for the contractor and do-it-yourselfer alike.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-192, State of Florida FL13975

US Patent 9,523,383

For more information, see p. 53, C-F-2019 Fastening Systems Catalog



SDWS Timber Screw — Allowable Shear Loads — Douglas Fir–Larch and Southern Pine Lumber

Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.) Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	255	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	405	405	305	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	405	360	360	325	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	405	405	405	365	365	355	—	—
0.22 x 8	SDWS22800DB	2¾	405	405	405	405	395	395	395	395	—
0.22 x 10	SDWS221000DB	2¾	405	405	405	405	395	395	395	395	395

See footnotes below.

SDWS Timber Screw — Allowable Shear Loads — Spruce-Pine-Fir and Hem-Fir Lumber

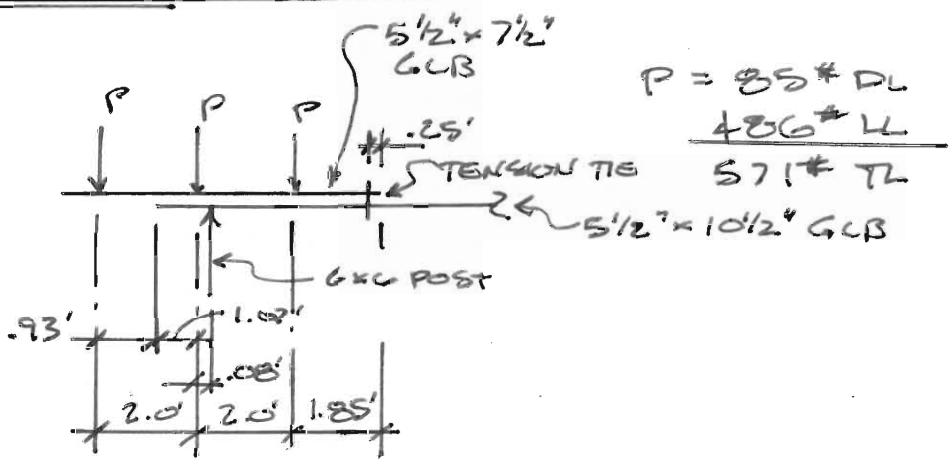
Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.) Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	190	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	385	285	215	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	290	290	290	195	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	365	365	365	310	310	210	—	—
0.22 x 8	SDWS22800DB	2¾	405	365	365	365	310	310	280	280	—
0.22 x 10	SDWS221000DB	2¾	405	365	365	365	310	310	280	280	280

1. All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. Minimum fastener spacing requirements to achieve table loads. 6" end distance, 1⅞" edge distance, ⅜" between staggered rows of fasteners, 4" between non-staggered rows of fasteners and 8" between fasteners in a row.
4. For in-service moisture content greater than 19%, use C_M = 0.7.
5. Loads are based on installation into the side grain of the wood with the screw axis perpendicular to the face of the member.

Seattle Structural

PROJECT GRIFFITH DECK BY TDM DATE 5.18.20 PAGE

GLB "EXTENSION"



P = 85# DL
486# LL
571# TL

$M = (571\#)(.93') = 531\#' = 6372\#''$

$f_b = \frac{6372\#''}{51.56 in^3} = 124 psi$ OK

$f_v = \frac{(1.5)(571\#)}{41.25 in^2} = 20.8 psi$ OK

OVERTURNING

$M_{OT} = 531\#'$

$M_R = (85\#)(1.07' + 3.07') = 2600\#' < 531\#'$ ← DL ONLY

USE TENSION TIE NEAR END OF BEAM

$T = \frac{531\#' - 200\#'}{4.67'} = 59\#$

USE SIMPSON LSTA9, $P_A = 715\#$
W/ (18) 0.148"Ø x 2½" NAILS

HRS/ST/HTP/LSTA/LSTI/MST/MSTA/MSTC/MSTI

Strap Ties

Straps are designed to transfer tension loads in a wide variety of applications.

HRS — Heavy strap designed for installation on the edge of 2x members. The HRS416Z installs with Strong-Drive® SDS Heavy-Duty Connector screws.

HTP — Heavy tie plate designed for installation on the side of 2x4 or larger members.

LSTA and MSTA — Designed for use on the edge of 2x members, with a nailing pattern that reduces the potential for splitting.

LSTI and MSTI — Light and medium straps that are suitable where pneumatic-nailing is necessary through diaphragm decking and wood chord open-web trusses.

MST — High-capacity strap that can be installed with either nails or bolts. Suitable for double 2x member connections or greater.

MSTC — High-capacity strap that utilizes a staggered nail pattern to help minimize wood splitting. Nail slots have been countersunk to provide a lower nail head profile.

Finish: Galvanized. Some products are available in stainless steel, ZMAX® coating or black powder coat (add PC to sku); contact Simpson Strong-Tie. See Corrosion Information, pp. 13–15.

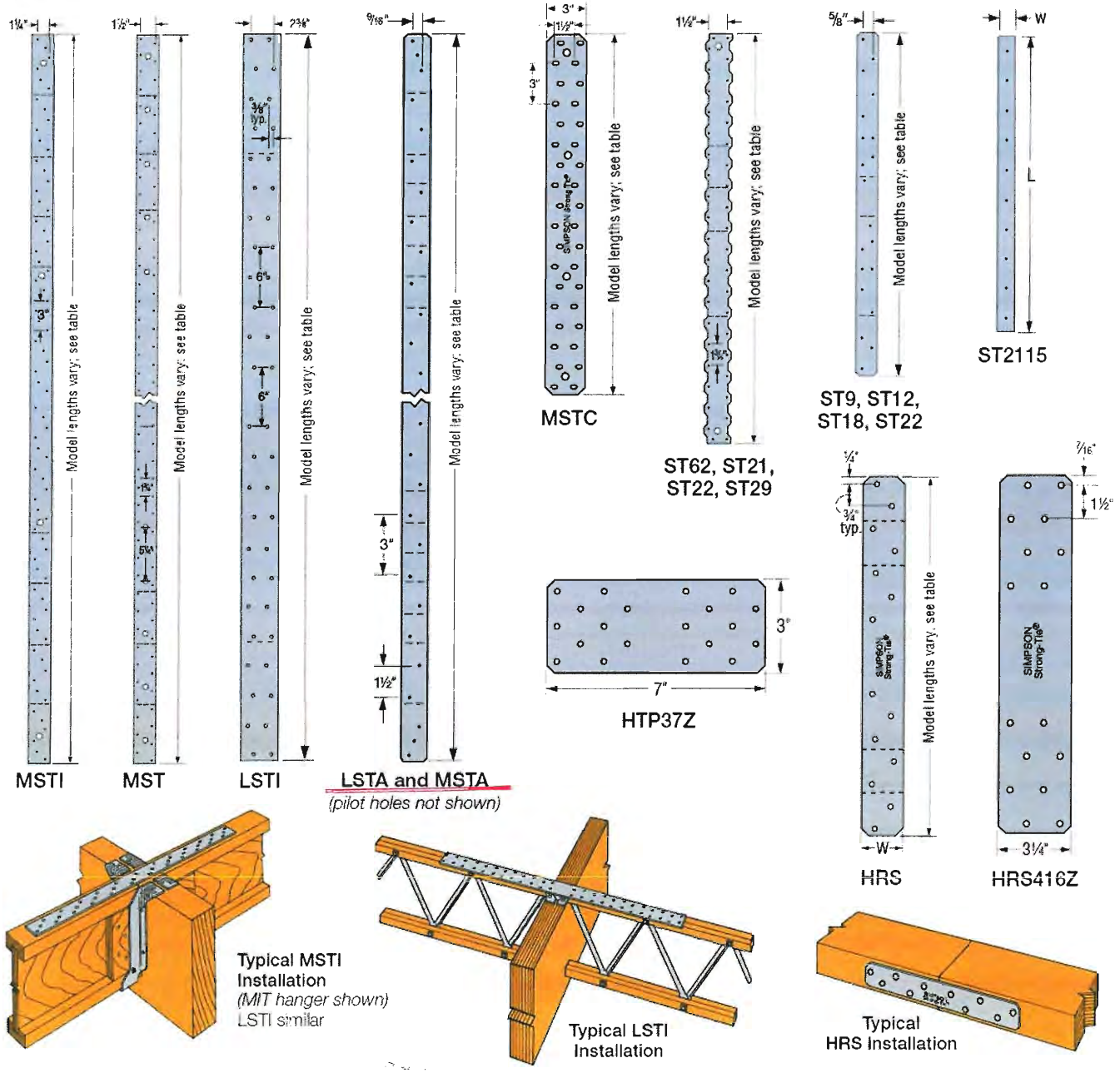
Installation: Use all specified fasteners; see General Notes

Options: Special sizes can be made to order; contact Simpson Strong-Tie

Codes: See p. 12 for Code Reference Key Chart

MSTC and RPS meet code requirements for reinforcing cut members (16 gauge) at top plate and RPS at sill plate. International Residential Code® — 2012/2015/2018 R602.6.1 International Building Code® — 2012/2015/2018 2308.9.8

(For RPS, refer to p. 303.)



HRS/ST/HTP/LSTA/LSTI/MST/MSTA/MSTC/MSTI

Strap Ties (cont.)

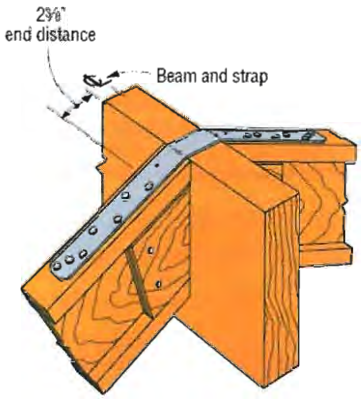
Codes: See p. 12 for Code Reference Key Chart

These products are available with additional corrosion protection. For more information, see p. 15.

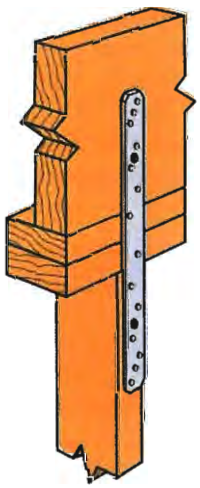
SS For stainless-steel fasteners, see p. 21.

SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 335–337 for more information.

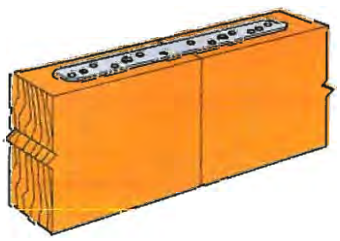
Model No.	Ga.	Dimensions (in.) W	Dimensions (in.) L	Fasteners (Total) (in.)	Allowable Tension Loads (DF/SP) (160)	Allowable Tension Loads (SPF/HF) (160)	Code Ref.
ST2115		¾	16⁵⁄₁₆	(10) 0.162 x 2½	660	660	
LSTA9		1¼	9	(8) 0.148 x 2½	740	635	
LSTA12		1¼	12	(10) 0.148 x 2½	925	795	
LSTA15	20	1¼	15	(12) 0.148 x 2½	1,110	955	
LSTA18		1¼	18	(14) 0.148 x 2½	1,235	1,115	
LSTA21		1¼	21	(16) 0.148 x 2½	1,235	1,235	
LSTA24		1¼	24	(18) 0.148 x 2½	1,235	1,235	
LSTA30		1¼	30	(22) 0.148 x 2½	1,640	1,640	
LSTA36		1¼	36	(24) 0.148 x 2½	1,640	1,640	IBC, FL, LA
MSTA9		1¼	9	(8) 0.148 x 2½	750	650	
SS MSTA12	18	1¼	12	(10) 0.148 x 2½	940	810	
MSTA15		1¼	15	(12) 0.148 x 2½	1,130	970	
SS MSTA18		1¼	18	(14) 0.148 x 2½	1,315	1,135	
MSTA21		1¼	21	(16) 0.148 x 2½	1,505	1,295	
SS MSTA24		1¼	24	(18) 0.148 x 2½	1,640	1,460	
MSTA30		1¼	30	(22) 0.148 x 2½	2,050	1,825	
SS MSTA36		1¼	36	(26) 0.148 x 2½	2,050	2,050	
MSTA49		1¼	49	(26) 0.148 x 2½	2,020	2,020	FL, LA
ST9		1¼	9	(8) 0.162 x 2½	885	765	
ST12	16	1¼	11⅝	(10) 0.162 x 2½	1,105	955	IBC, FL, LA
ST18		1¼	17¾	(14) 0.162 x 2½	1,420	1,335	
ST22		1¼	21⅝	(18) 0.162 x 2½	1,420	1,420	
HRS6		1⅜	6	(6) 0.148 x 2½	605	530	
HRS8	12	1⅜	8	(10) 0.148 x 2½	1,010	880	FL, LA
HRS12		1⅜	12	(14) 0.148 x 2½	1,415	1,230	
ST292		2⁹⁄₁₆	9⅝	(12) 0.162 x 2½	1,260	1,120	
ST2122	20	2⁹⁄₁₆	12¹³⁄₁₆	(16) 0.162 x 2½	1,530	1,510	
ST2215		2⁹⁄₁₆	16⁵⁄₁₆	(20) 0.162 x 2½	1,875	1,875	
ST6215	16	2⁹⁄₁₆	16⁵⁄₁₆	(20) 0.162 x 2½	2,090	1,910	
ST6224		2⁹⁄₁₆	23⅝	(28) 0.162 x 2½	2,535	2,535	
ST6236	14	2⁹⁄₁₆	33¹³⁄₁₆	(40) 0.162 x 2½	3,845	3,845	IBC, FL, LA
MSTI26		2⁹⁄₁₆	26	(26) 0.148 x 1½	2,745	2,380	
MSTI36		2⁹⁄₁₆	36	(36) 0.148 x 1½	3,800	3,295	
MSTI48	12	2⁹⁄₁₆	48	(48) 0.148 x 1½	5,070	4,390	
MSTI60		2⁹⁄₁₆	60	(60) 0.148 x 1½	5,070	5,070	
MSTI72		2⁹⁄₁₆	72	(72) 0.148 x 1½	5,070	5,070	
HTP37Z		3	7	(20) 0.148 x 1½	1,850	1,600	LA
MSTC28		3	28¼	(36) 0.148 x 3¼	3,460	2,990	
MSTC40	16	3	40¼	(52) 0.148 x 3¼	4,735	4,315	
MSTC52		3	52¼	(62) 0.148 x 3¼	4,735	4,735	IBC, FL, LA
MSTC66	14	3	65¾	(76) 0.148 x 3½	5,850	5,850	
MSTC78		3	77¾	(76) 0.148 x 3½	5,850	5,850	
HRS416Z	12	3¼	16	(16) ¼ x 1½ SDS	2,835	2,305	—
LSTI49	18	3¾	49	(32) 0.148 x 1½	2,970	2,560	IBC, FL, LA
LSTI73		3¾	73	(48) 0.148 x 1½	4,205	3,840	



Typical LSTA Installation
(hanger not shown)
Bend strap one time only, max. 12/12 joist pitch.



Typical LSTA18 Installation



Typical MSTA15 Installation

1. See pp. 260–261 for Straps and Ties General Notes.
2. **Fasteners:** Nail dimensions in the table are listed diameter by length. See pp. 21–22 for fastener information.

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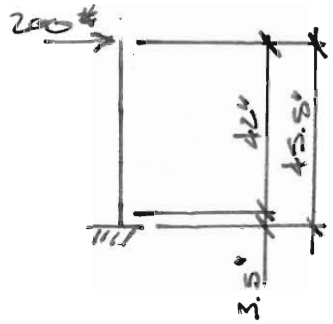
RAILING POST



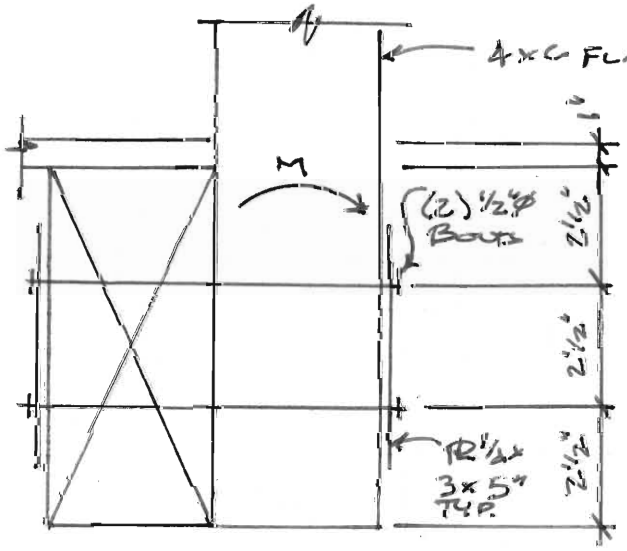
$M = (200\#)(45.5") = 9100\#"$

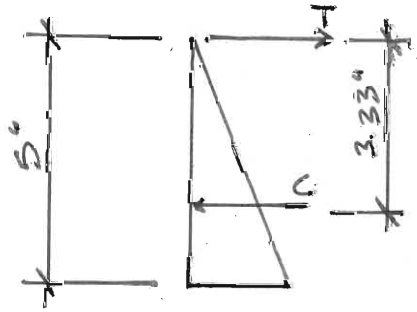
4x6 POST (FLAT) DF #2

$F_b' = (900PSI)(1.0)(.85)(1.0)(1.3)(1.05) \times (.8) = 835 PSI$

(C_D C_M C_L C_F C_{fu} C_i)

$M_A = (835PSI)(17.65IN^3) = 14,738\#" > M = 9100\#"$ OK





$T = C = \frac{9100\#"}{3.33"} = 3030\#$

1/2"ø A 307 $T_A = 4420\#/BOLT > 3030\#$ OK

BRG ON WOOD

$A = (3")(5\frac{1}{2}") = 7.5 IN^2$ (HALF OF STEEL PL)

$F_{c\perp}' = (625PSI)(.67)(1.0) = 419PSI$

(C_M C_i)

$P_A = (419PSI)(7.5IN^2) = 3140\# > 3030\#$ OK

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FOUNDATIONS

NEW FOUNDATIONS

2'-0" x 2'-0" x 0'-8" DEEP

$P = 4{,}305^{\#}$ - JOINT 607 IN RISA MODEL

$A = (2.0')^2 = 4\ SF$

$P = \frac{+305^{K}}{4\ SF} = 1076\ PSF$ OK

$\frac{24"}{8"} = 3$ - RATIO OF DEPTH TO WIDTH - SHEAR OK BY INSPECTION

$\frac{(1.2)(4\ PSF) + (1.6)(40\ PSF)}{44\ PSF} = 1.56$

$P_u = (1.56)(1076\ PSF) = 1682\ PSF$

$L = (2' - .5')/2 = .75'$

$M_u = \frac{(2')(1.682\ KSF)(.25')^2}{2} = .95^{K'}$

$m = \frac{60\ KSI}{(.85)(2.5\ KSI)} = 28.2$

$d = 8" - 3" - 1.5(.5") = 4.25"$

$R_n = \frac{(.75^{K'})(12"/ft)}{(.7)(24")(4.25")^2} = .0292$

$\rho_{REQ'D} = \frac{1}{28.2}\left(1 - \left(1 - \frac{2(28.2)(.0292)}{60}\right)^{1/2}\right) = .00049$

$.00049 < .0018$ (TEMP & SHRINKAGE)

$A_{ST} = (8")(24")(.0018) = .346\ IN^2$

USE (3) #4, $A_{ST} = (3)(.20\ IN^2) = .6\ IN^2 > .346\ IN^2$ OK

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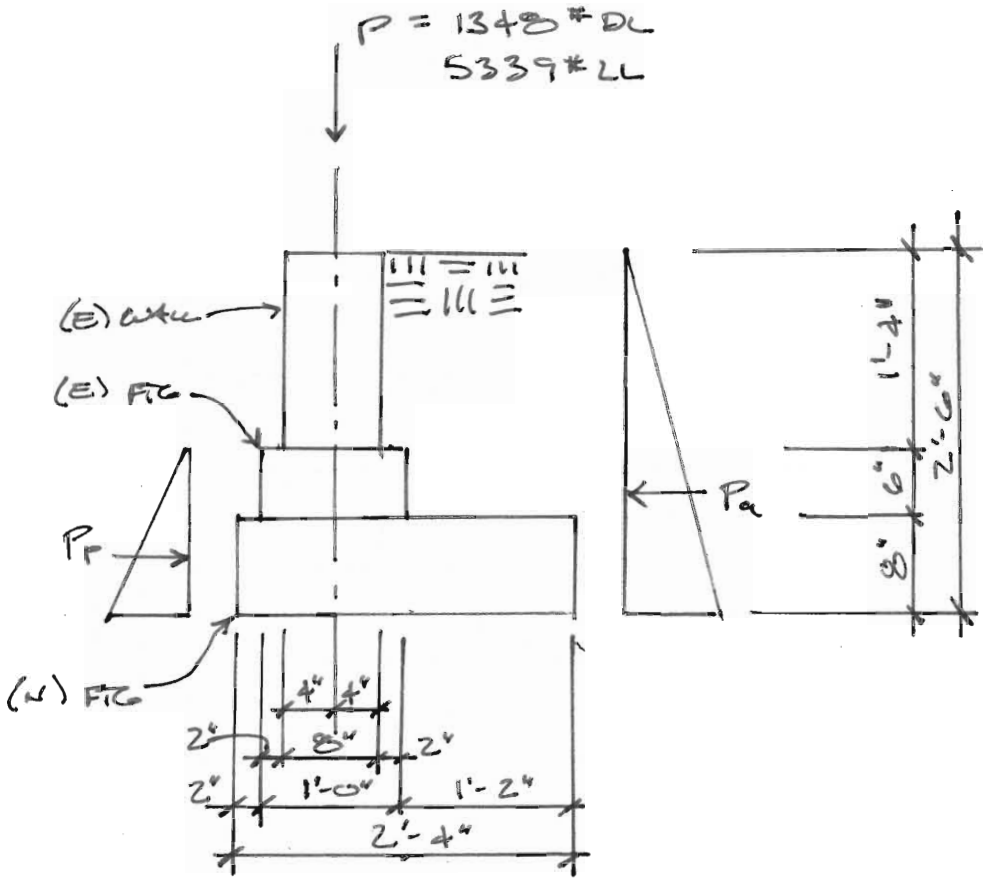
FOUNDATIONS

DECK POSTS ON (E) RETAINING WALL
4' FOOTING DIMENSION PARALLEL TO WALL



35 PCF ACTIVE PRESSURE
150 PCF PASSIVE PRESSURE
110 PCF SOIL WEIGHT

$P_a = (4')(35\,PCF)(2.5')^2/2 = 438\#$ $h = 2.5'/3 = .833'$
$P_P = (4')(150\,PCF)(1.17')^2/2 = 411\#$ $h = 1.17'/3 = .39'$

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FOUNDATIONS

VERTICAL LOADS & MOMENT ABOUT TOE OF FOOTING

POST (DL ONLY)		(1348#)(.67') =	903#'
(E) WALL	(4')(1.17')(.67')(150PCF)	= (470#)(.67') =	315
(E) FOOTING	(4')(.5')(1.0')(150PCF)	= (300#)(.67') =	200
(N) FOOTING	(4')(.67')(2.33')(150PCF)	= (937#)(1.17') =	1096
SOIL	(4')(1.83')(1.17')(110PCF)	= (942#)(1.75) =	1648
	DL =	3997#	4162#'
	LL =	(5339#)(.67') =	3577#'
	D+L =	9336#	7739#'

HORIZONTAL LOADS & MOMENTS

ACTIVE	$P_a = (438\#)(.833') =$	365#'
PASSIVE	$P_p = \underset{27\#}{(-411\#)(.390')} =$	$\underset{205\#'}{-1600\#'}$

SLIDING OK BY INSPECTION: NET LATERAL FORCE = 27# OK

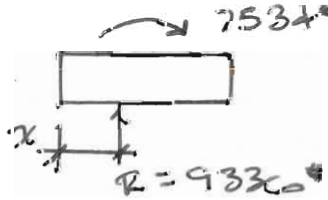
STABILITY

$$\frac{M_R}{M_{OT}} = \frac{4162\#'}{205\#'} = 20.3 > 1.5 \text{ OK}$$

SOIL PRESSURE

MOMENTS ABOUT TOE = 7739#' (D+L) − 205#' = 7534#'

R = 9336#



$9336\# \cdot x = 7534\#'$

$x = \frac{7534\#'}{9336\#} = .780' \sim b/3$

FULL LENGTH IN BEARING

TRIANG. PROFILE

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FOUNDATIONS

SOIL PRESSURE

$$P = \frac{(2)(9336\#)}{(4')(2.33')} = 2003 \text{ PSF} \sim 2000 \text{ PSF} \quad \text{OK}$$

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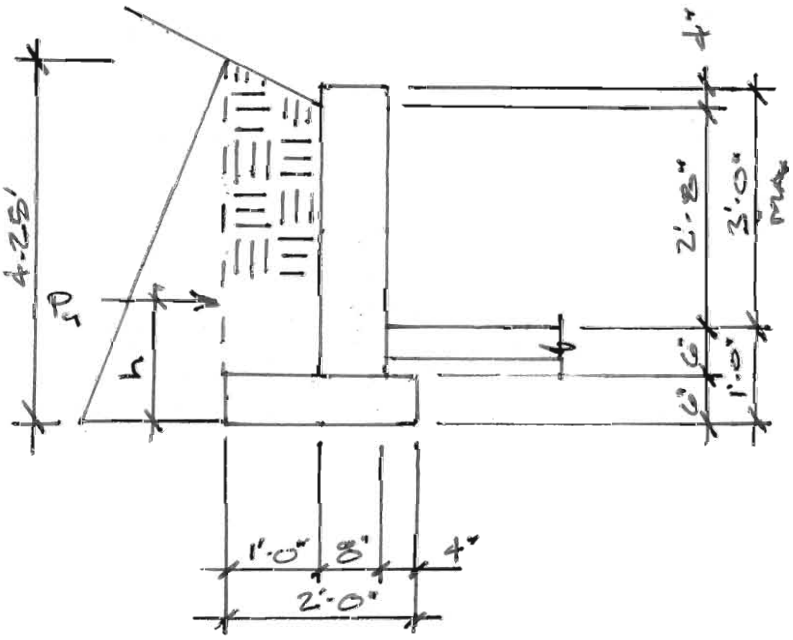
FOUNDATIONS

RETAINING WALL



P_a = 35 PCF

$P_a = \frac{1}{2}(35\ PCF)(4.25')^2 = 316\ PLF$

$h = 4.25'/3 = 1.42'$

SLIDING IS RESISTED BY DRIVEWAY SLAB (OK BY INSPECTION)

VERTICAL LOADS & RESISTING MOMENT				DIST FROM TOE	
WALL	(.67')(3.5')(150 PCF) =	352 PLF	× .67' =	236 #'	
FTG	(2.0')(.50')(150 PCF) =	150 PLF	× 1.00' =	150 #'	
SOIL	(1.0')(3.33')(110 PCF) =	372 PLF	× 1.5' =	558 #'	
		874 PLF		944 #'/ft	

$M_{OT} = (316\ \#/ft)(1.42') = 448\ \#'/ft$

$\frac{M_r}{M_{OT}} = \frac{944\ \#'/ft}{448\ \#'/ft} = 2.10 > 1.5$ OK

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FOUNDATIONS

RETAINING WALL

SOIL PRESSURE

$M = 944\#'/ft - 448\#'/ft = 496\#'/ft$ ABOUT TOE

$R = 874\#/ft$

$e = \frac{496\#'/ft}{874\#/ft} = .568'$ (FROM TOE)

$3e = (3)(.568') = 1.704' < 2'$ TRIANGULAR BEARING PROFILE

$P = \frac{(2)(874\#/ft)}{(1.704')} = 1026\ PSF < 2000\ PSF$ OK

REINFORCING

$M_u = (1.6)(448\#'/ft) = 717\#'/ft$

$d = 4" - $ REINF @ ∠ WALL

$R_n = \frac{(.717k/ft)(12"/ft)}{(.9)(12"/ft)(4")^2} = .04979\ ksi$ $\quad m = 28.2$

$\rho_{REQ'D} = \frac{1}{28.2}\left(1 - \left(1 - \frac{2(28.2)(.04979)}{60}\right)^{1/2}\right) = .0008398$

USE $\rho = .0012$

$A_{s\,req} = (.0012)(12"/ft)(8") = .115\ in^2/ft$

#4, $A = .2\ in^2$ $\quad \frac{.20\ in^2/BAR}{.115\ in^2/ft} = 1.73 \rightarrow$ #4 @ 20" VERT

HORIZ ← 3' MAX +6"

$A_s = (.0020)(42")(8") = .672\ in^2$ (4) #4 $A_s = .80\ in^2$

(2) #4 ROD @ 16" OC

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FOUNDATIONS

RETAINING WALL

FOOTING REINF

$M_u = [(1.2)(.5')(1.0')(.150\ kcf) + (1.6)(.372\ klf)](.5')$

$M_u = .343\ k'/ft = 4.11\ k''/ft$

$d = 3''$ · REINF @ MID DEPTH

$R_n = \frac{(4.11\ k''/ft)}{(.9)(12''/ft)(3'')^2} = .0+230\ ksi$

$\rho_{REQ'D} = \frac{1}{28.2}\left(1 - \left(1 - \frac{2(28.2)(.0+230)}{60}\right)^{1/2}\right)$

$\rho_{REQ'D} = .000712$

$A_{sf} = (4/3)(.000712)(12''/ft)(3'') = .034\ in^2/ft$

#4 @ 20" OC TO MATCH WALL

$\frac{.2\ in^2}{1.67} = .1198\ in^2/ft > .034\ in^2/ft$ OK

CONT. REINF.

$(.0018)(6'')(24'') = .454\ in^2 \sim (2)\ \#4$