STRUCTURAL CALCULATIONS

SS2000 PANEL

Zimmerman Metals, Inc.
Over 60 years of Quality Workmanship and Service

201 East 58th Avenue, Denver CO 80216
303/294-0180 fax:303/292-5013 800/247-4202

STRUCTURAL CALCULATIONS FOR:
12" WIDE X 24 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
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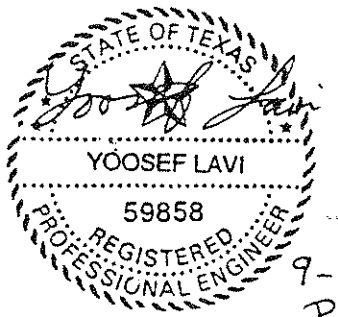

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P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	12 in.	1	348	278	231	198	154	121	98	81	67	57	49
		2	299	239	188	139	107	85	69	57	48	40	35
		3	327	262	217	161	124	98	80	66	55	47	40

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	12 in.	1	466	373	265	196	150	119	97	80	68	58	50
		2	400	320	267	229	198	159	130	108	92	79	68
		3	437	350	292	250	219	183	150	125	106	91	79

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

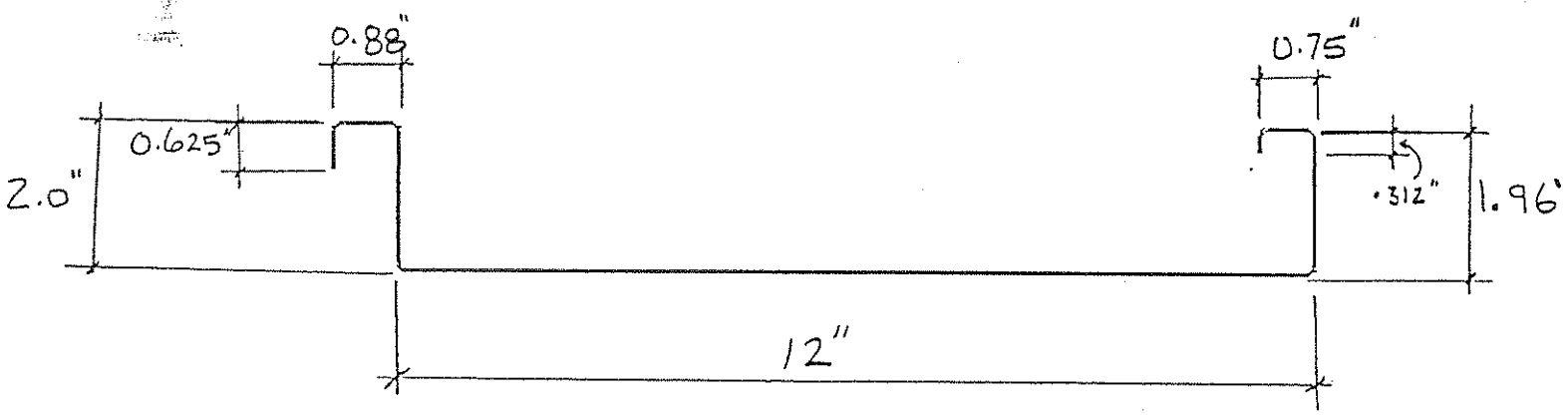
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 50 KSI

CFS Version 2.20

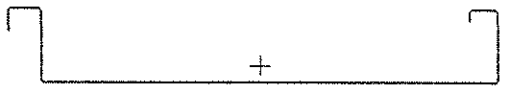
Section: SS21224
Rev. Date 08-25-1997
Rev. Time 17:58:51
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole	Distance
0.625	90.000	0.0720	No	0.00	0.000	0.312
0.880	0.000	0.0720	No	0.00	0.000	0.440
2.000	270.000	0.0720	Sgl	0.00	0.000	1.000
12.000	0.000	0.0720	Sgl	0.00	0.000	6.000
1.960	90.000	0.0720	Sgl	0.00	0.000	0.980
0.750	180.000	0.0720	No	0.00	0.000	0.375
0.312	270.000	0.0720	No	0.00	0.000	0.156



Full Section Properties

Area	0.43421	Wt.	1.47632	Width	18.16791
Ix	0.22668	rx	0.72253	Ixy	-0.13308
Sx(t)	0.14752	y(t)	1.53661	Alpha	89.1152
Sx(b)	0.48918	y(b)	0.46339		
Iy	8.84111	ry	4.51234	Xo	0.36179
Sy(l)	1.33458	x(l)	6.62463	Yo	-1.23734
Sy(r)	1.41878	x(r)	6.23147	jx	-0.36280
				jy	8.73342
I1	8.84316	r1	4.51286		
I2	0.22463	r2	0.71925		
Ic	9.06779	rc	4.56982	Cw	5.49279
Io	9.78940	ro	4.74817	J	0.00008268

CFS Version 2.20

Section: SS21224
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Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	3.2309	Maxo	3.7235	Mayo	21.5444
Ae	0.12385	Ixe	0.19710	Iye	5.80675
		Sxe(t)	0.12412	Sye(l)	1.21726
Tension		Sxe(b)	0.47847	Sye(r)	0.71815
Ta	13.0264				
		Negative Moment		Negative Moment	
		Maxo	2.6745	Mayo	19.7640
Shear		Ixe	0.09926	Iye	5.63154
Vay	1.2049	Sxe(t)	0.11195	Sye(l)	0.65880
Vax	0.0965	Sxe(b)	0.08915	Sye(r)	1.30725

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.476 \cdot psf$	Panel Weight
$M_{tc} := 3723 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2674 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	619·lb·ft^{-2}	$1.2 \cdot 10^3$·lb·ft^{-2}	347.5·lb·ft^{-2}
2.5·ft	395.6·lb·ft^{-2}	962.5·lb·ft^{-2}	277.7·lb·ft^{-2}
3·ft	274.3·lb·ft^{-2}	801.9·lb·ft^{-2}	231.2·lb·ft^{-2}
3.5·ft	201.1·lb·ft^{-2}	687.1·lb·ft^{-2}	198·lb·ft^{-2}
4·ft	153.6·lb·ft^{-2}	601·lb·ft^{-2}	173·lb·ft^{-2}
4.5·ft	121.1·lb·ft^{-2}	534.1·lb·ft^{-2}	153.6·lb·ft^{-2}
5·ft	97.8·lb·ft^{-2}	480.5·lb·ft^{-2}	138.1·lb·ft^{-2}
5.5·ft	80.6·lb·ft^{-2}	436.7·lb·ft^{-2}	125.4·lb·ft^{-2}
6·ft	67.5·lb·ft^{-2}	400.2·lb·ft^{-2}	114.9·lb·ft^{-2}
6.5·ft	57.3·lb·ft^{-2}	369.3·lb·ft^{-2}	105.9·lb·ft^{-2}
7·ft	49.2·lb·ft^{-2}	342.8·lb·ft^{-2}	98.2·lb·ft^{-2}

L_i	WLL_i
2·ft	348·lb·ft^{-2}
2.5·ft	278·lb·ft^{-2}
3·ft	231·lb·ft^{-2}
3.5·ft	198·lb·ft^{-2}
4·ft	154·lb·ft^{-2}
4.5·ft	121·lb·ft^{-2}
5·ft	98·lb·ft^{-2}
5.5·ft	81·lb·ft^{-2}
6·ft	67·lb·ft^{-2}
6.5·ft	57·lb·ft^{-2}
7·ft	49·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.476 \cdot psf$	Panel Weight
$M_{tc} := 3723 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2674 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	444.2·lb·ft^{-2}	403.3·lb·ft^{-2}	299.4·lb·ft^{-2}	962.8·lb·ft^{-2}
2.5·ft	283.8·lb·ft^{-2}	266.2·lb·ft^{-2}	239.4·lb·ft^{-2}	770·lb·ft^{-2}
3·ft	196.6·lb·ft^{-2}	188·lb·ft^{-2}	199.4·lb·ft^{-2}	641.5·lb·ft^{-2}
3.5·ft	144·lb·ft^{-2}	139.3·lb·ft^{-2}	170.8·lb·ft^{-2}	549.7·lb·ft^{-2}
4·ft	109.9·lb·ft^{-2}	107.2·lb·ft^{-2}	149.4·lb·ft^{-2}	480.8·lb·ft^{-2}
4.5·ft	86.6·lb·ft^{-2}	84.8·lb·ft^{-2}	132.7·lb·ft^{-2}	427.3·lb·ft^{-2}
5·ft	69.8·lb·ft^{-2}	68.7·lb·ft^{-2}	119.4·lb·ft^{-2}	384.4·lb·ft^{-2}
5.5·ft	57.5·lb·ft^{-2}	56.7·lb·ft^{-2}	108.5·lb·ft^{-2}	349.4·lb·ft^{-2}
6·ft	48·lb·ft^{-2}	47.5·lb·ft^{-2}	99.4·lb·ft^{-2}	320.2·lb·ft^{-2}
6.5·ft	40.7·lb·ft^{-2}	40.3·lb·ft^{-2}	91.7·lb·ft^{-2}	295.4·lb·ft^{-2}
7·ft	34.9·lb·ft^{-2}	34.6·lb·ft^{-2}	85.1·lb·ft^{-2}	274.2·lb·ft^{-2}

L_i	WLL_i
2·ft	299·lb·ft^{-2}
2.5·ft	239·lb·ft^{-2}
3·ft	188·lb·ft^{-2}
3.5·ft	139·lb·ft^{-2}
4·ft	107·lb·ft^{-2}
4.5·ft	85·lb·ft^{-2}
5·ft	69·lb·ft^{-2}
5.5·ft	57·lb·ft^{-2}
6·ft	48·lb·ft^{-2}
6.5·ft	40·lb·ft^{-2}
7·ft	35·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.476 \cdot psf$	Panel Weight
$M_{tc} := 3723 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2674 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} = \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	518.6·lb·ft^{-2}	459.4·lb·ft^{-2}	327.4·lb·ft^{-2}	991.4·lb·ft^{-2}
2.5·ft	331.3·lb·ft^{-2}	305.6·lb·ft^{-2}	261.8·lb·ft^{-2}	792.9·lb·ft^{-2}
3·ft	229.5·lb·ft^{-2}	216.7·lb·ft^{-2}	218.1·lb·ft^{-2}	660.5·lb·ft^{-2}
3.5·ft	168.2·lb·ft^{-2}	161.2·lb·ft^{-2}	186.8·lb·ft^{-2}	566·lb·ft^{-2}
4·ft	128.4·lb·ft^{-2}	124.2·lb·ft^{-2}	163.4·lb·ft^{-2}	495.1·lb·ft^{-2}
4.5·ft	101.1·lb·ft^{-2}	98.5·lb·ft^{-2}	145.2·lb·ft^{-2}	439.9·lb·ft^{-2}
5·ft	81.5·lb·ft^{-2}	79.8·lb·ft^{-2}	130.6·lb·ft^{-2}	395.8·lb·ft^{-2}
5.5·ft	67.1·lb·ft^{-2}	65.9·lb·ft^{-2}	118.7·lb·ft^{-2}	359.7·lb·ft^{-2}
6·ft	56.1·lb·ft^{-2}	55.3·lb·ft^{-2}	108.7·lb·ft^{-2}	329.6·lb·ft^{-2}
6.5·ft	47.5·lb·ft^{-2}	47·lb·ft^{-2}	100.3·lb·ft^{-2}	304.2·lb·ft^{-2}
7·ft	40.8·lb·ft^{-2}	40.3·lb·ft^{-2}	93.1·lb·ft^{-2}	282.4·lb·ft^{-2}

L_i	WLL_i
2·ft	327·lb·ft^{-2}
2.5·ft	262·lb·ft^{-2}
3·ft	217·lb·ft^{-2}
3.5·ft	161·lb·ft^{-2}
4·ft	124·lb·ft^{-2}
4.5·ft	98·lb·ft^{-2}
5·ft	80·lb·ft^{-2}
5.5·ft	66·lb·ft^{-2}
6·ft	55·lb·ft^{-2}
6.5·ft	47·lb·ft^{-2}
7·ft	40·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$ Panel Width

$w_{dlp} := 1.476 \cdot psf$ Panel Weight

$M_{tc} := 3723 \cdot in \cdot lb$ Allowable Moment Top Compression

$M_{bc} := 2674 \cdot in \cdot lb$ Allowable Moment Bottom Compression

$V := 1205 \cdot lb$ Allowable Shear

$P_{ae} := 349 \cdot lb$ Allowable Web Crippling Exterior Condition

$P_{ai} := 750 \cdot lb$ Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	466·lb·ft^{-2}
2.5·ft	373·lb·ft^{-2}
3·ft	265·lb·ft^{-2}
3.5·ft	196·lb·ft^{-2}
4·ft	150·lb·ft^{-2}
4.5·ft	119·lb·ft^{-2}
5·ft	97·lb·ft^{-2}
5.5·ft	80·lb·ft^{-2}
6·ft	68·lb·ft^{-2}
6.5·ft	58·lb·ft^{-2}
7·ft	50·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$ Panel Width

$w_{dlp} := 1.476 \cdot psf$ Panel Weight

$M_{tc} := 3723 \cdot in \cdot lb$ Allowable Moment Top Compression

$M_{bc} := 2674 \cdot in \cdot lb$ Allowable Moment Bottom Compression

$V := 1205 \cdot lb$ Allowable Shear

$P_{ae} := 349 \cdot lb$ Allowable Web Crippling Exterior Condition

$P_{ai} := 750 \cdot lb$ Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	622·lb·ft^{-2}	522.8·lb·ft^{-2}	300.6·lb·ft^{-2}	965.2·lb·ft^{-2}
2.5·ft	398.6·lb·ft^{-2}	354.2·lb·ft^{-2}	240.6·lb·ft^{-2}	772.4·lb·ft^{-2}
3·ft	277.3·lb·ft^{-2}	254.6·lb·ft^{-2}	200.6·lb·ft^{-2}	643.8·lb·ft^{-2}
3.5·ft	204.1·lb·ft^{-2}	191.4·lb·ft^{-2}	172·lb·ft^{-2}	552·lb·ft^{-2}
4·ft	156.6·lb·ft^{-2}	149·lb·ft^{-2}	150.6·lb·ft^{-2}	483.2·lb·ft^{-2}
4.5·ft	124·lb·ft^{-2}	119.2·lb·ft^{-2}	133.9·lb·ft^{-2}	429.6·lb·ft^{-2}
5·ft	100.8·lb·ft^{-2}	97.5·lb·ft^{-2}	120.6·lb·ft^{-2}	386.8·lb·ft^{-2}
5.5·ft	83.5·lb·ft^{-2}	81.3·lb·ft^{-2}	109.7·lb·ft^{-2}	351.7·lb·ft^{-2}
6·ft	70.4·lb·ft^{-2}	68.8·lb·ft^{-2}	100.6·lb·ft^{-2}	322.5·lb·ft^{-2}
6.5·ft	60.2·lb·ft^{-2}	59·lb·ft^{-2}	92.9·lb·ft^{-2}	297.8·lb·ft^{-2}
7·ft	52.1·lb·ft^{-2}	51.2·lb·ft^{-2}	86.3·lb·ft^{-2}	276.6·lb·ft^{-2}

L_i	WLL_i
2·ft	400·lb·ft^{-2}
2.5·ft	320·lb·ft^{-2}
3·ft	267·lb·ft^{-2}
3.5·ft	229·lb·ft^{-2}
4·ft	198·lb·ft^{-2}
4.5·ft	159·lb·ft^{-2}
5·ft	130·lb·ft^{-2}
5.5·ft	108·lb·ft^{-2}
6·ft	92·lb·ft^{-2}
6.5·ft	79·lb·ft^{-2}
7·ft	68·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.476 \cdot psf$	Panel Weight
$M_{tc} := 3723 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2674 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ac} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	726.2·lb·ft^{-2}	586.2·lb·ft^{-2}	328.7·lb·ft^{-2}	993.8·lb·ft^{-2}
2.5·ft	465.4·lb·ft^{-2}	401.6·lb·ft^{-2}	263.1·lb·ft^{-2}	795.3·lb·ft^{-2}
3·ft	323.7·lb·ft^{-2}	290.8·lb·ft^{-2}	219.4·lb·ft^{-2}	662.9·lb·ft^{-2}
3.5·ft	238.3·lb·ft^{-2}	219.7·lb·ft^{-2}	188.1·lb·ft^{-2}	568.4·lb·ft^{-2}
4·ft	182.8·lb·ft^{-2}	171.6·lb·ft^{-2}	164.7·lb·ft^{-2}	497.5·lb·ft^{-2}
4.5·ft	144.8·lb·ft^{-2}	137.6·lb·ft^{-2}	146.5·lb·ft^{-2}	442.4·lb·ft^{-2}
5·ft	117.6·lb·ft^{-2}	112.8·lb·ft^{-2}	131.9·lb·ft^{-2}	398.3·lb·ft^{-2}
5.5·ft	97.5·lb·ft^{-2}	94.1·lb·ft^{-2}	119.9·lb·ft^{-2}	362.2·lb·ft^{-2}
6·ft	82.2·lb·ft^{-2}	79.8·lb·ft^{-2}	110·lb·ft^{-2}	332.1·lb·ft^{-2}
6.5·ft	70.3·lb·ft^{-2}	68.5·lb·ft^{-2}	101.6·lb·ft^{-2}	306.6·lb·ft^{-2}
7·ft	60.9·lb·ft^{-2}	59.5·lb·ft^{-2}	94.4·lb·ft^{-2}	284.8·lb·ft^{-2}

L_i	WLL_i
2·ft	437·lb·ft^{-2}
2.5·ft	350·lb·ft^{-2}
3·ft	292·lb·ft^{-2}
3.5·ft	250·lb·ft^{-2}
4·ft	219·lb·ft^{-2}
4.5·ft	183·lb·ft^{-2}
5·ft	150·lb·ft^{-2}
5.5·ft	125·lb·ft^{-2}
6·ft	106·lb·ft^{-2}
6.5·ft	91·lb·ft^{-2}
7·ft	79·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
12" WIDE X 22 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
Denver, Colorado 80216

Prepared By:

YOOSEF LAVI, P.E.
Consulting Engineer
9550 Forest Lane, Suite 108
Dallas, Texas 75243
(214)-340-0049

9-10-97

P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	12 in.	1	501	401	333	265	202	159	129	106	89	75	65
		2	418	335	264	195	150	119	96	79	66	56	48
		3	458	366	305	226	174	138	112	92	77	66	56

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	12 in.	1	671	530	369	272	209	165	134	111	94	80	70
		2	559	447	373	320	264	211	172	143	121	104	90
		3	611	489	408	349	305	244	199	166	141	121	105

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

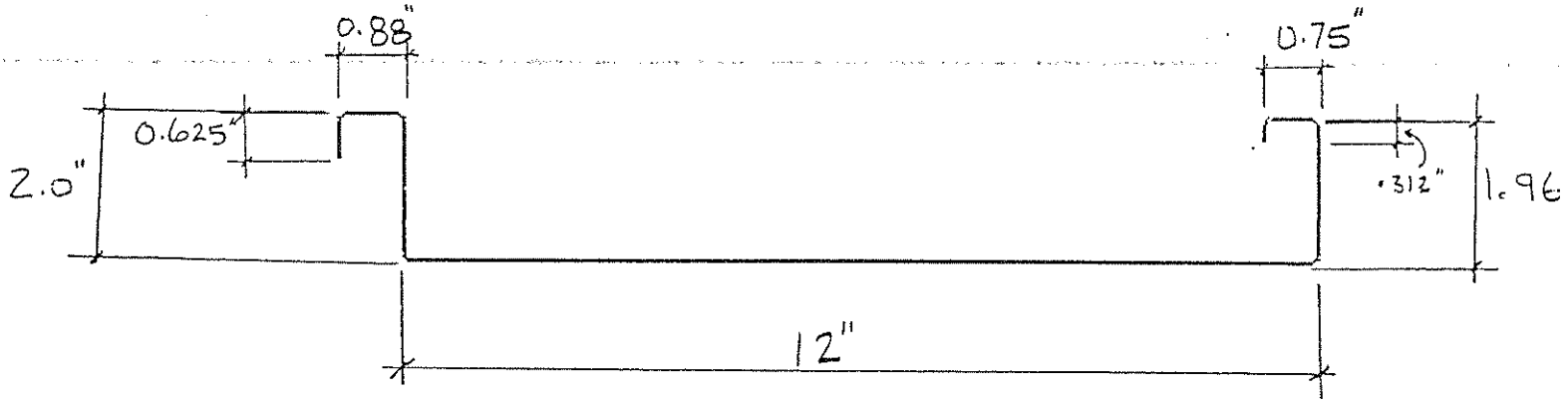
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 22 GA. (0.0299")

FY: 50 KSI

CFS Version 2.20

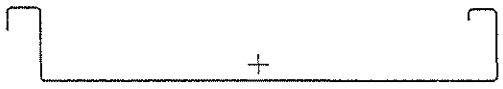
Section: SS21222
Rev. Date 08-25-1997
Rev. Time 18:05:57
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0299 22 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0900	No	0.00	0.000	0.312
0.880	0.000	0.0900	No	0.00	0.000	0.440
2.000	270.000	0.0900	Sgl	0.00	0.000	1.000
12.000	0.000	0.0900	Sgl	0.00	0.000	6.000
1.960	90.000	0.0900	Sgl	0.00	0.000	0.980
0.750	180.000	0.0900	No	0.00	0.000	0.375
0.312	270.000	0.0900	No	0.00	0.000	0.156



Full Section Properties

Area	0.5405	Wt.	1.8378	Width	18.0778
Ix	0.2779	rx	0.7170	Ixy	-0.1649
Sx(t)	0.1806	y(t)	1.5391	Alpha	89.1152
Sx(b)	0.6030	y(b)	0.4609		
Iy	10.9551	ry	4.5019	Xo	0.3468
Sy(l)	1.6550	x(l)	6.6194	Yo	-1.2246
Sy(r)	1.7583	x(r)	6.2307	jx	-0.3467
				jy	8.7663
I1	10.9577	r1	4.5025		
I2	0.2754	r2	0.7137		
Ic	11.2331	rc	4.5587	Cw	6.7226
Io	12.1087	ro	4.7330	J	0.0001611

CFS Version 2.20

Section: SS21222
Rev. Date 08-25-1997
Rev. Time 18:05:57
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	4.7284	Maxo	4.8944	Mayo	30.4021
Ae	0.1813	Ixe	0.2559	Iye	7.8740
		Sxe(t)	0.1631	Sye(l)	1.5499
Tension		Sxe(b)	0.5930	Sye(r)	1.0134
Ta	16.2158				
		Negative Moment		Negative Moment	
		Maxo	3.7194	Mayo	29.7272
Shear		Ixe	0.1321	Iye	7.9951
Vay	1.8852	Sxe(t)	0.1414	Sye(l)	0.9909
Vax	0.1898	Sxe(b)	0.1240	Sye(r)	1.6720

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.838 \cdot psf$	Panel Weight
$M_{tc} := 4894 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	813.8·lb·ft^{-2}	1.9·10^3·lb·ft^{-2}	501.2·lb·ft^{-2}
2.5·ft	520.2·lb·ft^{-2}	1.5·10^3·lb·ft^{-2}	400.6·lb·ft^{-2}
3·ft	360.7·lb·ft^{-2}	1.3·10^3·lb·ft^{-2}	333.5·lb·ft^{-2}
3.5·ft	264.5·lb·ft^{-2}	1.1·10^3·lb·ft^{-2}	285.6·lb·ft^{-2}
4·ft	202.1·lb·ft^{-2}	940.7·lb·ft^{-2}	249.7·lb·ft^{-2}
4.5·ft	159.3·lb·ft^{-2}	835.9·lb·ft^{-2}	221.7·lb·ft^{-2}
5·ft	128.7·lb·ft^{-2}	752.2·lb·ft^{-2}	199.4·lb·ft^{-2}
5.5·ft	106·lb·ft^{-2}	683.6·lb·ft^{-2}	181.1·lb·ft^{-2}
6·ft	88.8·lb·ft^{-2}	626.5·lb·ft^{-2}	165.8·lb·ft^{-2}
6.5·ft	75.4·lb·ft^{-2}	578.2·lb·ft^{-2}	152.9·lb·ft^{-2}
7·ft	64.7·lb·ft^{-2}	536.7·lb·ft^{-2}	141.9·lb·ft^{-2}

L_i	WLL_i
2·ft	501·lb·ft^{-2}
2.5·ft	401·lb·ft^{-2}
3·ft	333·lb·ft^{-2}
3.5·ft	265·lb·ft^{-2}
4·ft	202·lb·ft^{-2}
4.5·ft	159·lb·ft^{-2}
5·ft	129·lb·ft^{-2}
5.5·ft	106·lb·ft^{-2}
6·ft	89·lb·ft^{-2}
6.5·ft	75·lb·ft^{-2}
7·ft	65·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.837 \cdot psf$	Panel Weight
$M_{tc} := 4894 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
618·lb·ft^{-2}
394.9·lb·ft^{-2}
273.6·lb·ft^{-2}
200.6·lb·ft^{-2}
153.1·lb·ft^{-2}
120.6·lb·ft^{-2}
97.3·lb·ft^{-2}
80.1·lb·ft^{-2}
67·lb·ft^{-2}
56.8·lb·ft^{-2}
48.8·lb·ft^{-2}

W_{sb_i}
571.8·lb·ft^{-2}
375.2·lb·ft^{-2}
264·lb·ft^{-2}
195.3·lb·ft^{-2}
150·lb·ft^{-2}
118.7·lb·ft^{-2}
96.1·lb·ft^{-2}
79.3·lb·ft^{-2}
66.4·lb·ft^{-2}
56.4·lb·ft^{-2}
48.5·lb·ft^{-2}

W_{c_i}
418.5·lb·ft^{-2}
334.6·lb·ft^{-2}
278.7·lb·ft^{-2}
238.8·lb·ft^{-2}
208.9·lb·ft^{-2}
185.6·lb·ft^{-2}
166.9·lb·ft^{-2}
151.7·lb·ft^{-2}
139·lb·ft^{-2}
128.2·lb·ft^{-2}
119·lb·ft^{-2}

W_{so_i}
$1.5 \cdot 10^3$·lb·ft^{-2}
$1.2 \cdot 10^3$·lb·ft^{-2}
$1 \cdot 10^3$·lb·ft^{-2}
860.2·lb·ft^{-2}
752.5·lb·ft^{-2}
668.8·lb·ft^{-2}
601.7·lb·ft^{-2}
546.9·lb·ft^{-2}
501.2·lb·ft^{-2}
462.5·lb·ft^{-2}
429.4·lb·ft^{-2}

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
418·lb·ft^{-2}
335·lb·ft^{-2}
264·lb·ft^{-2}
195·lb·ft^{-2}
150·lb·ft^{-2}
119·lb·ft^{-2}
96·lb·ft^{-2}
79·lb·ft^{-2}
66·lb·ft^{-2}
56·lb·ft^{-2}
48·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.837 \cdot psf$	Panel Weight
$M_{tc} := 4894 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	721.5·lb·ft^{-2}	654·lb·ft^{-2}	457.6·lb·ft^{-2}	$1.6 \cdot 10^3$·lb·ft^{-2}
2.5·ft	461·lb·ft^{-2}	432·lb·ft^{-2}	366·lb·ft^{-2}	$1.2 \cdot 10^3$·lb·ft^{-2}
3·ft	319.5·lb·ft^{-2}	305.1·lb·ft^{-2}	304.8·lb·ft^{-2}	$1 \cdot 10^3$·lb·ft^{-2}
3.5·ft	234.2·lb·ft^{-2}	226.3·lb·ft^{-2}	261.2·lb·ft^{-2}	885.8·lb·ft^{-2}
4·ft	178.8·lb·ft^{-2}	174.1·lb·ft^{-2}	228.4·lb·ft^{-2}	774.8·lb·ft^{-2}
4.5·ft	140.8·lb·ft^{-2}	137.9·lb·ft^{-2}	202.9·lb·ft^{-2}	688.6·lb·ft^{-2}
5·ft	113.6·lb·ft^{-2}	111.7·lb·ft^{-2}	182.6·lb·ft^{-2}	619.6·lb·ft^{-2}
5.5·ft	93.5·lb·ft^{-2}	92.3·lb·ft^{-2}	165.9·lb·ft^{-2}	563.1·lb·ft^{-2}
6·ft	78.3·lb·ft^{-2}	77.4·lb·ft^{-2}	152·lb·ft^{-2}	516.1·lb·ft^{-2}
6.5·ft	66.4·lb ft^{-2}	65.7·lb·ft^{-2}	140.3·lb·ft^{-2}	476.2·lb·ft^{-2}
7·ft	56.9·lb·ft^{-2}	56.4·lb·ft^{-2}	130.2·lb·ft^{-2}	442.1·lb·ft^{-2}

L_i	WLL_i
2·ft	458·lb·ft^{-2}
2.5·ft	366·lb·ft^{-2}
3·ft	305·lb·ft^{-2}
3.5·ft	226·lb·ft^{-2}
4·ft	174·lb·ft^{-2}
4.5·ft	138·lb·ft^{-2}
5·ft	112·lb·ft^{-2}
5.5·ft	92·lb·ft^{-2}
6·ft	77·lb·ft^{-2}
6.5·ft	66·lb·ft^{-2}
7·ft	56·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 12 \cdot in$	Panel Width
$w_{dlp} = 1.837 \cdot psf$	Panel Weight
$M_{tc} = 4894 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1885 \cdot lb$	Allowable Shear
$P_{ae} = 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i =$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8} \qquad V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2} \qquad C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$$

$$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$$

$$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$$

$$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$$

$$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$$

$$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$$

L_i	WLL_i
2·ft	$671 \cdot lb \cdot ft^{-2}$
2.5·ft	$530 \cdot lb \cdot ft^{-2}$
3·ft	$369 \cdot lb \cdot ft^{-2}$
3.5·ft	$272 \cdot lb \cdot ft^{-2}$
4·ft	$209 \cdot lb \cdot ft^{-2}$
4.5·ft	$165 \cdot lb \cdot ft^{-2}$
5·ft	$134 \cdot lb \cdot ft^{-2}$
5.5·ft	$111 \cdot lb \cdot ft^{-2}$
6·ft	$94 \cdot lb \cdot ft^{-2}$
6.5·ft	$80 \cdot lb \cdot ft^{-2}$
7·ft	$70 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.837 \cdot psf$	Panel Weight
$M_{tc} := 4897 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$818 \cdot lb \cdot ft^{-2}$	$719.2 \cdot lb \cdot ft^{-2}$	$419.9 \cdot lb \cdot ft^{-2}$	$1.5 \cdot 10^3 \cdot lb \cdot ft^{-2}$
2.5·ft	$524.2 \cdot lb \cdot ft^{-2}$	$480.9 \cdot lb \cdot ft^{-2}$	$336.1 \cdot lb \cdot ft^{-2}$	$1.2 \cdot 10^3 \cdot lb \cdot ft^{-2}$
3·ft	$364.6 \cdot lb \cdot ft^{-2}$	$342.8 \cdot lb \cdot ft^{-2}$	$280.2 \cdot lb \cdot ft^{-2}$	$1 \cdot 10^3 \cdot lb \cdot ft^{-2}$
3.5·ft	$268.3 \cdot lb \cdot ft^{-2}$	$256.2 \cdot lb \cdot ft^{-2}$	$240.3 \cdot lb \cdot ft^{-2}$	$863.2 \cdot lb \cdot ft^{-2}$
4·ft	$205.9 \cdot lb \cdot ft^{-2}$	$198.6 \cdot lb \cdot ft^{-2}$	$210.3 \cdot lb \cdot ft^{-2}$	$755.5 \cdot lb \cdot ft^{-2}$
4.5·ft	$163.1 \cdot lb \cdot ft^{-2}$	$158.5 \cdot lb \cdot ft^{-2}$	$187 \cdot lb \cdot ft^{-2}$	$671.7 \cdot lb \cdot ft^{-2}$
5·ft	$132.4 \cdot lb \cdot ft^{-2}$	$129.4 \cdot lb \cdot ft^{-2}$	$168.4 \cdot lb \cdot ft^{-2}$	$604.7 \cdot lb \cdot ft^{-2}$
5.5·ft	$109.8 \cdot lb \cdot ft^{-2}$	$107.6 \cdot lb \cdot ft^{-2}$	$153.2 \cdot lb \cdot ft^{-2}$	$549.8 \cdot lb \cdot ft^{-2}$
6·ft	$92.5 \cdot lb \cdot ft^{-2}$	$91 \cdot lb \cdot ft^{-2}$	$140.5 \cdot lb \cdot ft^{-2}$	$504.1 \cdot lb \cdot ft^{-2}$
6.5·ft	$79.1 \cdot lb \cdot ft^{-2}$	$78 \cdot lb \cdot ft^{-2}$	$129.7 \cdot lb \cdot ft^{-2}$	$465.5 \cdot lb \cdot ft^{-2}$
7·ft	$68.5 \cdot lb \cdot ft^{-2}$	$67.6 \cdot lb \cdot ft^{-2}$	$120.5 \cdot lb \cdot ft^{-2}$	$432.3 \cdot lb \cdot ft^{-2}$

L_i	WLL_i
2·ft	$559 \cdot lb \cdot ft^{-2}$
2.5·ft	$447 \cdot lb \cdot ft^{-2}$
3·ft	$373 \cdot lb \cdot ft^{-2}$
3.5·ft	$320 \cdot lb \cdot ft^{-2}$
4·ft	$264 \cdot lb \cdot ft^{-2}$
4.5·ft	$211 \cdot lb \cdot ft^{-2}$
5·ft	$172 \cdot lb \cdot ft^{-2}$
5.5·ft	$143 \cdot lb \cdot ft^{-2}$
6·ft	$121 \cdot lb \cdot ft^{-2}$
6.5·ft	$104 \cdot lb \cdot ft^{-2}$
7·ft	$90 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 12" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 12 \cdot in$	Panel Width
$w_{dlp} := 1.837 \cdot psf$	Panel Weight
$M_{tc} := 4894 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3719 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$954.4 \cdot lb \cdot ft^{-2}$	$813.1 \cdot lb \cdot ft^{-2}$	$459.2 \cdot lb \cdot ft^{-2}$	$1.6 \cdot 10^3 \cdot lb \cdot ft^{-2}$
2.5·ft	$611.6 \cdot lb \cdot ft^{-2}$	$548.7 \cdot lb \cdot ft^{-2}$	$367.6 \cdot lb \cdot ft^{-2}$	$1.2 \cdot 10^3 \cdot lb \cdot ft^{-2}$
3·ft	$425.4 \cdot lb \cdot ft^{-2}$	$393.4 \cdot lb \cdot ft^{-2}$	$306.4 \cdot lb \cdot ft^{-2}$	$1 \cdot 10^3 \cdot lb \cdot ft^{-2}$
3.5·ft	$313.1 \cdot lb \cdot ft^{-2}$	$295.2 \cdot lb \cdot ft^{-2}$	$262.8 \cdot lb \cdot ft^{-2}$	$888.8 \cdot lb \cdot ft^{-2}$
4·ft	$240.2 \cdot lb \cdot ft^{-2}$	$229.5 \cdot lb \cdot ft^{-2}$	$230 \cdot lb \cdot ft^{-2}$	$777.9 \cdot lb \cdot ft^{-2}$
4.5·ft	$190.3 \cdot lb \cdot ft^{-2}$	$183.4 \cdot lb \cdot ft^{-2}$	$204.6 \cdot lb \cdot ft^{-2}$	$691.6 \cdot lb \cdot ft^{-2}$
5·ft	$154.5 \cdot lb \cdot ft^{-2}$	$149.9 \cdot lb \cdot ft^{-2}$	$184.2 \cdot lb \cdot ft^{-2}$	$622.6 \cdot lb \cdot ft^{-2}$
5.5·ft	$128.1 \cdot lb \cdot ft^{-2}$	$124.9 \cdot lb \cdot ft^{-2}$	$167.5 \cdot lb \cdot ft^{-2}$	$566.1 \cdot lb \cdot ft^{-2}$
6·ft	$108 \cdot lb \cdot ft^{-2}$	$105.7 \cdot lb \cdot ft^{-2}$	$153.6 \cdot lb \cdot ft^{-2}$	$519.1 \cdot lb \cdot ft^{-2}$
6.5·ft	$92.3 \cdot lb \cdot ft^{-2}$	$90.6 \cdot lb \cdot ft^{-2}$	$141.9 \cdot lb \cdot ft^{-2}$	$479.3 \cdot lb \cdot ft^{-2}$
7·ft	$79.9 \cdot lb \cdot ft^{-2}$	$78.6 \cdot lb \cdot ft^{-2}$	$131.8 \cdot lb \cdot ft^{-2}$	$445.1 \cdot lb \cdot ft^{-2}$

L_i	WLL_i
2·ft	$611 \cdot lb \cdot ft^{-2}$
2.5·ft	$489 \cdot lb \cdot ft^{-2}$
3·ft	$408 \cdot lb \cdot ft^{-2}$
3.5·ft	$349 \cdot lb \cdot ft^{-2}$
4·ft	$305 \cdot lb \cdot ft^{-2}$
4.5·ft	$244 \cdot lb \cdot ft^{-2}$
5·ft	$199 \cdot lb \cdot ft^{-2}$
5.5·ft	$166 \cdot lb \cdot ft^{-2}$
6·ft	$141 \cdot lb \cdot ft^{-2}$
6.5·ft	$121 \cdot lb \cdot ft^{-2}$
7·ft	$105 \cdot lb \cdot ft^{-2}$

STRUCTURAL CALCULATIONS FOR:
16" WIDE X 24 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
Denver, Colorado 80216

Prepared By:

YOOSEF LAVI, P.E.
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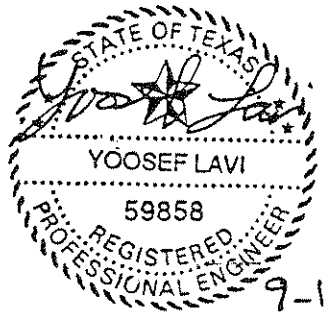

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ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	16 in.	1	260	208	173	148	113	89	72	59	49	42	36
		2	224	179	141	105	80	64	51	42	35	30	26
		3	245	196	163	121	93	74	60	49	41	35	30

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	16 in.	1	350	280	200	147	113	90	73	61	51	44	38
		2	300	240	200	172	146	117	96	80	68	58	50
		3	328	263	219	188	164	135	111	93	78	67	59

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

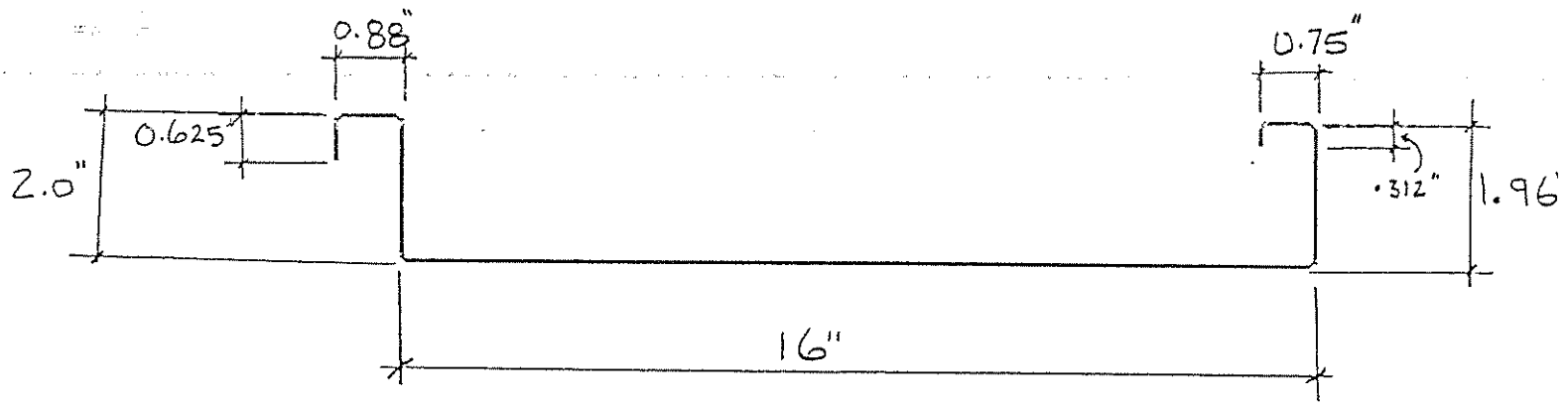
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 50 KSI

CFS Version 2.20

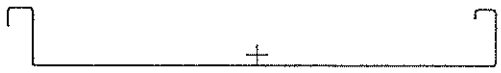
Section: SS21624
Rev. Date 08-25-1997
Rev. Time 18:00:24
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0720	No	0.00	0.000	0.312
0.880	0.000	0.0720	No	0.00	0.000	0.440
2.000	270.000	0.0720	Sgl	0.00	0.000	1.000
16.000	0.000	0.0720	Sgl	0.00	0.000	8.000
1.960	90.000	0.0720	Sgl	0.00	0.000	0.980
0.750	180.000	0.0720	No	0.00	0.000	0.375
0.312	270.000	0.0720	No	0.00	0.000	0.156



Full Section Properties

Area	0.5298	Wt.	1.8014	Width	22.1679
Ix	0.2427	rx	0.6768	Ixy	-0.1733
Sx(t)	0.1500	y(t)	1.6181	Alpha	89.4317
Sx(b)	0.6353	y(b)	0.3819		
Iy	17.7109	ry	5.7818	Xo	0.1647
Sy(l)	2.0540	x(l)	8.6229	Yo	-1.0687
Sy(r)	2.1512	x(r)	8.2332	jx	-0.1625
				jy	14.2842
I1	17.7127	r1	5.7820		
I2	0.2409	r2	0.6744		
Ic	17.9536	rc	5.8212	Cw	10.9091
Io	18.5731	ro	5.9208	J	0.0001009

CFS Version 2.20

Section: SS21624
Rev. Date 08-25-1997
Rev. Time 18:00:24
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	3.2344	Maxo	3.6498	Mayo	28.7708
Ae	0.1240	Ixe	0.2037	Iye	10.6053
		Sxe(t)	0.1217	Sye(l)	1.8292
Tension		Sxe(b)	0.6251	Sye(r)	0.9590
Ta	15.8944				
		Negative Moment		Negative Moment	
		Maxo	2.6811	Mayo	26.6096
Shear		Ixe	0.0994	Iye	10.2490
Vay	1.2049	Sxe(t)	0.1120	Sye(l)	0.8870
Vax	0.0721	Sxe(b)	0.0894	Sye(r)	1.9333

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3650 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	454.9·lb·ft^{-2}	902.4·lb·ft^{-2}	260.4·lb·ft^{-2}
2.5·ft	290.6·lb·ft^{-2}	721.6·lb·ft^{-2}	208·lb·ft^{-2}
3·ft	201.4·lb·ft^{-2}	601.1·lb·ft^{-2}	173.1·lb·ft^{-2}
3.5·ft	147.6·lb·ft^{-2}	515.1·lb·ft^{-2}	148.2·lb·ft^{-2}
4·ft	112.7·lb·ft^{-2}	450.5·lb·ft^{-2}	129.5·lb·ft^{-2}
4.5·ft	88.8·lb·ft^{-2}	400.3·lb·ft^{-2}	115·lb·ft^{-2}
5·ft	71.6·lb·ft^{-2}	360.1·lb·ft^{-2}	103.3·lb·ft^{-2}
5.5·ft	59·lb·ft^{-2}	327.3·lb·ft^{-2}	93.8·lb·ft^{-2}
6·ft	49.3·lb·ft^{-2}	299.9·lb·ft^{-2}	85.9·lb·ft^{-2}
6.5·ft	41.8·lb·ft^{-2}	276.7·lb·ft^{-2}	79.2·lb·ft^{-2}
7·ft	35.9·lb·ft^{-2}	256.9·lb·ft^{-2}	73.4·lb·ft^{-2}

L_i	WLL_i
2·ft	260·lb·ft^{-2}
2.5·ft	208·lb·ft^{-2}
3·ft	173·lb·ft^{-2}
3.5·ft	148·lb·ft^{-2}
4·ft	113·lb·ft^{-2}
4.5·ft	89·lb·ft^{-2}
5·ft	72·lb·ft^{-2}
5.5·ft	59·lb·ft^{-2}
6·ft	49·lb·ft^{-2}
6.5·ft	42·lb·ft^{-2}
7·ft	36·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3649 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
333.8·lb·ft^{-2}
213.1·lb·ft^{-2}
147.6·lb·ft^{-2}
108.1·lb·ft^{-2}
82.4·lb·ft^{-2}
64.8·lb·ft^{-2}
52.3·lb·ft^{-2}
43·lb·ft^{-2}
35.9·lb·ft^{-2}
30.4·lb·ft^{-2}
26·lb·ft^{-2}

W_{sb_i}
303·lb·ft^{-2}
199.9·lb·ft^{-2}
141.1·lb·ft^{-2}
104.5·lb·ft^{-2}
80.4·lb·ft^{-2}
63.6·lb·ft^{-2}
51.4·lb·ft^{-2}
42.4·lb·ft^{-2}
35.5·lb·ft^{-2}
30.1·lb·ft^{-2}
25.8·lb·ft^{-2}

W_{c_i}
224.5·lb·ft^{-2}
179.5·lb·ft^{-2}
149.5·lb·ft^{-2}
128·lb·ft^{-2}
112·lb·ft^{-2}
99.5·lb·ft^{-2}
89.5·lb·ft^{-2}
81.3·lb·ft^{-2}
74.5·lb·ft^{-2}
68.7·lb·ft^{-2}
63.7·lb·ft^{-2}

W_{so_i}
721.9·lb·ft^{-2}
577 3·lb·ft^{-2}
480.9·lb·ft^{-2}
412.1·lb·ft^{-2}
360.4·lb·ft^{-2}
320.3·lb·ft^{-2}
288.1·lb·ft^{-2}
261.8·lb·ft^{-2}
239.9·lb·ft^{-2}
221.4·lb·ft^{-2}
205.5·lb·ft^{-2}

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
224·lb·ft^{-2}
179·lb·ft^{-2}
141·lb·ft^{-2}
105·lb·ft^{-2}
80·lb·ft^{-2}
64·lb·ft^{-2}
51·lb·ft^{-2}
42·lb·ft^{-2}
35·lb·ft^{-2}
30·lb·ft^{-2}
26·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3649 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
$389.7 \cdot lb \cdot ft^{-2}$
$248.8 \cdot lb \cdot ft^{-2}$
$172.3 \cdot lb \cdot ft^{-2}$
$126.2 \cdot lb \cdot ft^{-2}$
$96.2 \cdot lb \cdot ft^{-2}$
$75.7 \cdot lb \cdot ft^{-2}$
$61 \cdot lb \cdot ft^{-2}$
$50.2 \cdot lb \cdot ft^{-2}$
$41.9 \cdot lb \cdot ft^{-2}$
$35.5 \cdot lb \cdot ft^{-2}$
$30.4 \cdot lb \cdot ft^{-2}$

W_{sb_i}
$345 \cdot lb \cdot ft^{-2}$
$229.5 \cdot lb \cdot ft^{-2}$
$162.7 \cdot lb \cdot ft^{-2}$
$120.9 \cdot lb \cdot ft^{-2}$
$93.1 \cdot lb \cdot ft^{-2}$
$73.8 \cdot lb \cdot ft^{-2}$
$59.8 \cdot lb \cdot ft^{-2}$
$49.3 \cdot lb \cdot ft^{-2}$
$41.3 \cdot lb \cdot ft^{-2}$
$35 \cdot lb \cdot ft^{-2}$
$30 \cdot lb \cdot ft^{-2}$

W_{c_i}
$245.5 \cdot lb \cdot ft^{-2}$
$196.3 \cdot lb \cdot ft^{-2}$
$163.4 \cdot lb \cdot ft^{-2}$
$140 \cdot lb \cdot ft^{-2}$
$122.4 \cdot lb \cdot ft^{-2}$
$108.8 \cdot lb \cdot ft^{-2}$
$97.8 \cdot lb \cdot ft^{-2}$
$88.9 \cdot lb \cdot ft^{-2}$
$81.4 \cdot lb \cdot ft^{-2}$
$75.1 \cdot lb \cdot ft^{-2}$
$69.7 \cdot lb \cdot ft^{-2}$

W_{so_i}
$743.3 \cdot lb \cdot ft^{-2}$
$594.4 \cdot lb \cdot ft^{-2}$
$495.2 \cdot lb \cdot ft^{-2}$
$424.3 \cdot lb \cdot ft^{-2}$
$371.1 \cdot lb \cdot ft^{-2}$
$329.7 \cdot lb \cdot ft^{-2}$
$296.7 \cdot lb \cdot ft^{-2}$
$269.6 \cdot lb \cdot ft^{-2}$
$247 \cdot lb \cdot ft^{-2}$
$227.9 \cdot lb \cdot ft^{-2}$
$211.6 \cdot lb \cdot ft^{-2}$

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
$245 \cdot lb \cdot ft^{-2}$
$196 \cdot lb \cdot ft^{-2}$
$163 \cdot lb \cdot ft^{-2}$
$121 \cdot lb \cdot ft^{-2}$
$93 \cdot lb \cdot ft^{-2}$
$74 \cdot lb \cdot ft^{-2}$
$60 \cdot lb \cdot ft^{-2}$
$49 \cdot lb \cdot ft^{-2}$
$41 \cdot lb \cdot ft^{-2}$
$35 \cdot lb \cdot ft^{-2}$
$30 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3649 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	$350 \cdot lb \cdot ft^{-2}$
2.5·ft	$280 \cdot lb \cdot ft^{-2}$
3·ft	$200 \cdot lb \cdot ft^{-2}$
3.5·ft	$147 \cdot lb \cdot ft^{-2}$
4·ft	$113 \cdot lb \cdot ft^{-2}$
4.5·ft	$90 \cdot lb \cdot ft^{-2}$
5·ft	$73 \cdot lb \cdot ft^{-2}$
5.5·ft	$61 \cdot lb \cdot ft^{-2}$
6·ft	$51 \cdot lb \cdot ft^{-2}$
6.5·ft	$44 \cdot lb \cdot ft^{-2}$
7·ft	$38 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3649 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	457.5·lb·ft^{-2}	386.8·lb·ft^{-2}	225.5·lb·ft^{-2}	724.1·lb·ft^{-2}
2.5·ft	293.3·lb·ft^{-2}	261.7·lb·ft^{-2}	180.5·lb·ft^{-2}	579.5·lb·ft^{-2}
3·ft	204.1·lb·ft^{-2}	188·lb·ft^{-2}	150.5·lb·ft^{-2}	483.1·lb·ft^{-2}
3.5·ft	150.3·lb·ft^{-2}	141.3·lb·ft^{-2}	129.1·lb·ft^{-2}	414.2·lb·ft^{-2}
4·ft	115.4·lb·ft^{-2}	110·lb·ft^{-2}	113·lb·ft^{-2}	362.6·lb·ft^{-2}
4.5·ft	91.5·lb·ft^{-2}	88·lb·ft^{-2}	100.5·lb·ft^{-2}	322.4·lb·ft^{-2}
5·ft	74.3·lb·ft^{-2}	72·lb·ft^{-2}	90.5·lb·ft^{-2}	290.3·lb·ft^{-2}
5.5·ft	61.7·lb·ft^{-2}	60.1·lb·ft^{-2}	82.4·lb·ft^{-2}	264·lb·ft^{-2}
6·ft	52·lb·ft^{-2}	50.9·lb·ft^{-2}	75.5·lb·ft^{-2}	242.1·lb·ft^{-2}
6.5·ft	44.5·lb·ft^{-2}	43.7·lb·ft^{-2}	69.8·lb·ft^{-2}	223.5·lb·ft^{-2}
7·ft	38.6·lb·ft^{-2}	37.9·lb·ft^{-2}	64.8·lb·ft^{-2}	207.7·lb·ft^{-2}

L_i	WLL_i
2·ft	300·lb·ft^{-2}
2.5·ft	240·lb·ft^{-2}
3·ft	200·lb·ft^{-2}
3.5·ft	172·lb·ft^{-2}
4·ft	146·lb·ft^{-2}
4.5·ft	117·lb·ft^{-2}
5·ft	96·lb·ft^{-2}
5.5·ft	80·lb·ft^{-2}
6·ft	68·lb·ft^{-2}
6.5·ft	58·lb·ft^{-2}
7·ft	50·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.354 \cdot psf$	Panel Weight
$M_{tc} := 3649 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2681 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	534.1·lb·ft^{-2}	434.1·lb·ft^{-2}	246.7·lb·ft^{-2}	745.6·lb·ft^{-2}
2.5·ft	342.4·lb·ft^{-2}	296.9·lb·ft^{-2}	197.4·lb·ft^{-2}	596.7·lb·ft^{-2}
3·ft	238.3·lb·ft^{-2}	214.8·lb·ft^{-2}	164.6·lb·ft^{-2}	497.4·lb·ft^{-2}
3.5·ft	175.5·lb·ft^{-2}	162.2·lb·ft^{-2}	141.2·lb·ft^{-2}	426.5·lb·ft^{-2}
4·ft	134.7·lb·ft^{-2}	126.7·lb·ft^{-2}	123.6·lb·ft^{-2}	373.3·lb·ft^{-2}
4.5·ft	106.8·lb·ft^{-2}	101.6·lb·ft^{-2}	110·lb·ft^{-2}	332·lb·ft^{-2}
5·ft	86.8·lb·ft^{-2}	83.3·lb·ft^{-2}	99·lb·ft^{-2}	298.9·lb·ft^{-2}
5.5·ft	72·lb·ft^{-2}	69.6·lb·ft^{-2}	90.1·lb·ft^{-2}	271.8·lb·ft^{-2}
6·ft	60.8·lb·ft^{-2}	59·lb·ft^{-2}	82.6·lb·ft^{-2}	249.3·lb·ft^{-2}
6.5·ft	52·lb·ft^{-2}	50.7·lb·ft^{-2}	76.3·lb·ft^{-2}	230.2·lb·ft^{-2}
7·ft	45.1·lb·ft^{-2}	44.1·lb·ft^{-2}	70.9·lb·ft^{-2}	213.8·lb·ft^{-2}

L_i	WLL_i
2·ft	328·lb·ft^{-2}
2.5·ft	263·lb·ft^{-2}
3·ft	219·lb·ft^{-2}
3.5·ft	188·lb·ft^{-2}
4·ft	164·lb·ft^{-2}
4.5·ft	135·lb·ft^{-2}
5·ft	111·lb·ft^{-2}
5.5·ft	93·lb·ft^{-2}
6·ft	78·lb·ft^{-2}
6.5·ft	67·lb·ft^{-2}
7·ft	59·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
16" WIDE X 22 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
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Prepared By:

YOOSEF LAVI, P.E.
Consulting Engineer
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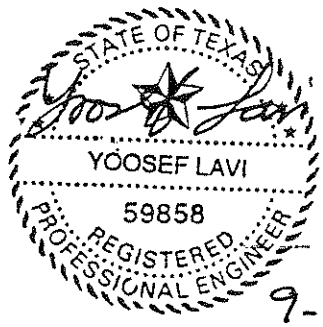

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P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	16 in.	1	376	300	250	192	146	115	93	77	64	54	47
		2	314	251	198	147	113	89	72	59	50	42	36
		3	343	274	228	170	131	103	84	69	58	49	42

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	16 in.	1	504	399	278	205	157	125	102	84	71	61	53
		2	419	335	280	240	201	161	131	109	93	79	69
		3	458	367	306	262	230	186	152	127	107	92	80

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

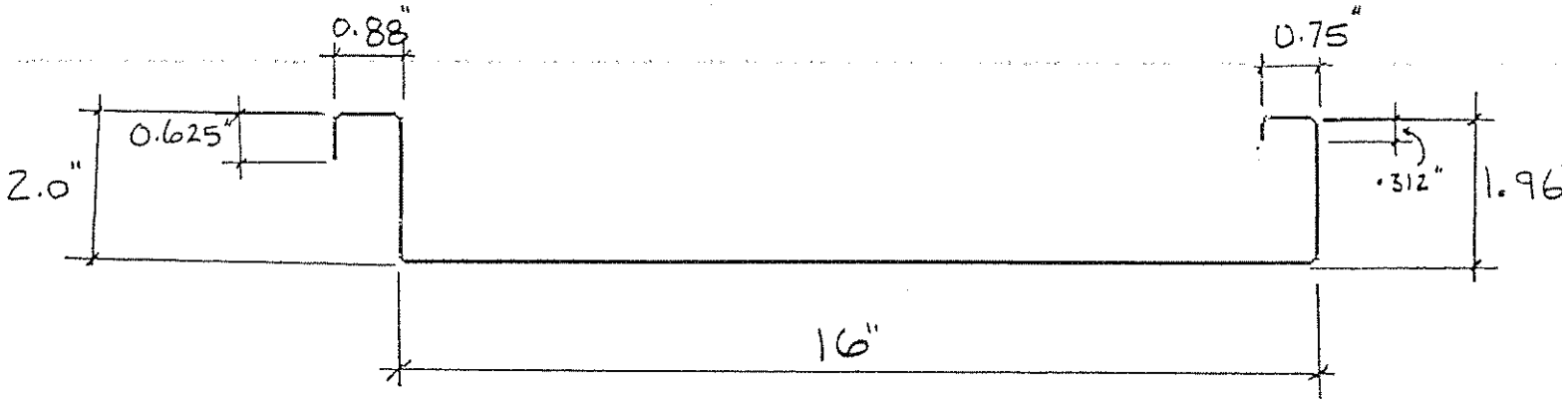
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 22 GA. (0.0299")

FY: 50 KSI

CFS Version 2.20

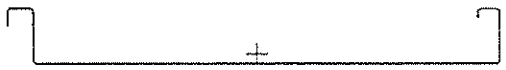
Section: SS21622
Rev. Date 08-25-1997
Rev. Time 18:06:47
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0299 22 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole	Distance
0.625	90.000	0.0900	No	0.00	0.000	0.312
0.880	0.000	0.0900	No	0.00	0.000	0.440
2.000	270.000	0.0900	Sgl	0.00	0.000	1.000
16.000	0.000	0.0900	Sgl	0.00	0.000	8.000
1.960	90.000	0.0900	Sgl	0.00	0.000	0.980
0.750	180.000	0.0900	No	0.00	0.000	0.375
0.312	270.000	0.0900	No	0.00	0.000	0.156



Full Section Properties

Area	0.6601	Wt.	2.2444	Width	22.0778
Ix	0.2974	rx	0.6712	Ixy	-0.2150
Sx(t)	0.1836	y(t)	1.6199	Alpha	89.4317
Sx(b)	0.7825	y(b)	0.3801		
Iy	21.9737	ry	5.7695	Xo	0.1466
Sy(l)	2.5499	x(l)	8.6175	Yo	-1.0568
Sy(r)	2.6691	x(r)	8.2326	jx	-0.1434
				jy	14.3509
I1	21.9758	r1	5.7698		
I2	0.2953	r2	0.6688		
Ic	22.2711	rc	5.8084	Cw	13.3610
Io	23.0225	ro	5.9056	J	0.0001967

CFS Version 2.20

Section: SS21622
Rev. Date 08-25-1997
Rev. Time 18:06:47
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	4.7355	Maxo	4.9741	Mayo	40.5615
Ae	0.1815	Ixe	0.2728	Iye	14.4339
		Sxe(t)	0.1658	Sye(l)	2.3376
Tension		Sxe(b)	0.7692	Sye(r)	1.3521
Ta	19.8038				
		Negative Moment		Negative Moment	
		Maxo	3.7323	Mayo	40.0263
Shear		Ixe	0.1324	Iye	14.6396
Vay	1.8852	Sxe(t)	0.1415	Sye(l)	1.3342
Vax	0.1416	Sxe(b)	0.1244	Sye(r)	2.4907

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4735 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	$590.2 \cdot lb \cdot ft^{-2}$	$1.4 \cdot 10^3 \cdot lb \cdot ft^{-2}$	$375.6 \cdot lb \cdot ft^{-2}$
2.5·ft	$377.1 \cdot lb \cdot ft^{-2}$	$1.1 \cdot 10^3 \cdot lb \cdot ft^{-2}$	$300.1 \cdot lb \cdot ft^{-2}$
3·ft	$261.4 \cdot lb \cdot ft^{-2}$	$940.8 \cdot lb \cdot ft^{-2}$	$249.8 \cdot lb \cdot ft^{-2}$
3.5·ft	$191.6 \cdot lb \cdot ft^{-2}$	$806.2 \cdot lb \cdot ft^{-2}$	$213.9 \cdot lb \cdot ft^{-2}$
4·ft	$146.3 \cdot lb \cdot ft^{-2}$	$705.2 \cdot lb \cdot ft^{-2}$	$186.9 \cdot lb \cdot ft^{-2}$
4.5·ft	$115.2 \cdot lb \cdot ft^{-2}$	$626.6 \cdot lb \cdot ft^{-2}$	$166 \cdot lb \cdot ft^{-2}$
5·ft	$93 \cdot lb \cdot ft^{-2}$	$563.8 \cdot lb \cdot ft^{-2}$	$149.2 \cdot lb \cdot ft^{-2}$
5.5·ft	$76.6 \cdot lb \cdot ft^{-2}$	$512.4 \cdot lb \cdot ft^{-2}$	$135.5 \cdot lb \cdot ft^{-2}$
6·ft	$64.1 \cdot lb \cdot ft^{-2}$	$469.6 \cdot lb \cdot ft^{-2}$	$124.1 \cdot lb \cdot ft^{-2}$
6.5·ft	$54.3 \cdot lb \cdot ft^{-2}$	$433.3 \cdot lb \cdot ft^{-2}$	$114.4 \cdot lb \cdot ft^{-2}$
7·ft	$46.6 \cdot lb \cdot ft^{-2}$	$402.2 \cdot lb \cdot ft^{-2}$	$106.1 \cdot lb \cdot ft^{-2}$

L_i	WLL_i
2·ft	$376 \cdot lb \cdot ft^{-2}$
2.5·ft	$300 \cdot lb \cdot ft^{-2}$
3·ft	$250 \cdot lb \cdot ft^{-2}$
3.5·ft	$192 \cdot lb \cdot ft^{-2}$
4·ft	$146 \cdot lb \cdot ft^{-2}$
4.5·ft	$115 \cdot lb \cdot ft^{-2}$
5·ft	$93 \cdot lb \cdot ft^{-2}$
5.5·ft	$77 \cdot lb \cdot ft^{-2}$
6·ft	$64 \cdot lb \cdot ft^{-2}$
6.5·ft	$54 \cdot lb \cdot ft^{-2}$
7·ft	$47 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4974 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	464.8·lb·ft^{-2}	429.8·lb·ft^{-2}	313.7·lb·ft^{-2}	$1.1 \cdot 10^3$·lb·ft^{-2}
2.5·ft	296.9·lb·ft^{-2}	282·lb·ft^{-2}	250.8·lb·ft^{-2}	903.5·lb·ft^{-2}
3·ft	205.6·lb·ft^{-2}	198.4·lb·ft^{-2}	208.9·lb·ft^{-2}	752.7·lb·ft^{-2}
3.5·ft	150.6·lb·ft^{-2}	146.7·lb·ft^{-2}	179·lb·ft^{-2}	644.9·lb·ft^{-2}
4·ft	114.9·lb·ft^{-2}	112.6·lb·ft^{-2}	156.5·lb·ft^{-2}	564.2·lb·ft^{-2}
4.5·ft	90.5·lb·ft^{-2}	89·lb·ft^{-2}	139.1·lb·ft^{-2}	501.3·lb·ft^{-2}
5·ft	73·lb·ft^{-2}	72·lb·ft^{-2}	125.1·lb·ft^{-2}	451.1·lb·ft^{-2}
5.5·ft	60·lb·ft^{-2}	59.4·lb·ft^{-2}	113.7·lb·ft^{-2}	409.9·lb·ft^{-2}
6·ft	50.1·lb·ft^{-2}	49.7·lb·ft^{-2}	104.1·lb·ft^{-2}	375.7·lb·ft^{-2}
6.5·ft	42.5 lb·ft^{-2}	42.2·lb·ft^{-2}	96.1·lb·ft^{-2}	346.7·lb·ft^{-2}
7·ft	36.4·lb·ft^{-2}	36.2·lb·ft^{-2}	89.2·lb·ft^{-2}	321.8·lb·ft^{-2}

L_i	WLL_i
2·ft	314·lb·ft^{-2}
2.5·ft	251·lb·ft^{-2}
3·ft	198·lb·ft^{-2}
3.5·ft	147·lb·ft^{-2}
4·ft	113·lb·ft^{-2}
4.5·ft	89·lb·ft^{-2}
5·ft	72·lb·ft^{-2}
5.5·ft	59·lb·ft^{-2}
6·ft	50·lb·ft^{-2}
6.5·ft	42·lb·ft^{-2}
7·ft	36·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4974 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	542.7·lb·ft^{-2}	491.7·lb·ft^{-2}	343.1·lb·ft^{-2}	$1.2 \cdot 10^3$·lb·ft^{-2}
2.5·ft	346.6·lb·ft^{-2}	324.7·lb·ft^{-2}	274.3·lb·ft^{-2}	930.2·lb·ft^{-2}
3·ft	240.1·lb·ft^{-2}	229.3·lb·ft^{-2}	228.5·lb·ft^{-2}	775·lb·ft^{-2}
3.5·ft	175.9·lb·ft^{-2}	170·lb·ft^{-2}	195.7·lb·ft^{-2}	664.1·lb·ft^{-2}
4·ft	134.2·lb·ft^{-2}	130.7·lb·ft^{-2}	171.2·lb·ft^{-2}	580.9·lb·ft^{-2}
4.5·ft	105.6·lb·ft^{-2}	103.4·lb·ft^{-2}	152.1·lb·ft^{-2}	516.2·lb·ft^{-2}
5·ft	85.2·lb·ft^{-2}	83.8·lb·ft^{-2}	136.8·lb·ft^{-2}	464.4·lb·ft^{-2}
5.5·ft	70·lb·ft^{-2}	69.1·lb·ft^{-2}	124.3·lb·ft^{-2}	422.1·lb·ft^{-2}
6·ft	58.5·lb·ft^{-2}	57.9·lb·ft^{-2}	113.9·lb·ft^{-2}	386.8·lb·ft^{-2}
6.5·ft	49.6·lb·ft^{-2}	49.1·lb·ft^{-2}	105.1·lb·ft^{-2}	356.9·lb·ft^{-2}
7·ft	42.5·lb·ft^{-2}	42.1·lb·ft^{-2}	97.5·lb·ft^{-2}	331.3·lb·ft^{-2}

L_i	WLL_i
2·ft	343·lb·ft^{-2}
2.5·ft	274·lb·ft^{-2}
3·ft	228·lb·ft^{-2}
3.5·ft	170·lb·ft^{-2}
4·ft	131·lb·ft^{-2}
4.5·ft	103·lb·ft^{-2}
5·ft	84·lb·ft^{-2}
5.5·ft	69·lb·ft^{-2}
6·ft	58·lb·ft^{-2}
6.5·ft	49·lb·ft^{-2}
7·ft	42·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4974 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	504·lb·ft^{-2}
2.5·ft	399·lb·ft^{-2}
3·ft	278·lb·ft^{-2}
3.5·ft	205·lb·ft^{-2}
4·ft	157·lb·ft^{-2}
4.5·ft	125·lb·ft^{-2}
5·ft	102·lb·ft^{-2}
5.5·ft	84·lb·ft^{-2}
6·ft	71·lb·ft^{-2}
6.5·ft	61·lb·ft^{-2}
7·ft	53·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4974 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$623.4\cdot lb\cdot ft^{-2}$	$546.1\cdot lb\cdot ft^{-2}$	$315.1\cdot lb\cdot ft^{-2}$	$1.1\cdot 10^{3}\cdot lb\cdot ft^{-2}$
2.5·ft	$399.6\cdot lb\cdot ft^{-2}$	$365.6\cdot lb\cdot ft^{-2}$	$252.2\cdot lb\cdot ft^{-2}$	$906.1\cdot lb\cdot ft^{-2}$
3·ft	$278\cdot lb\cdot ft^{-2}$	$260.9\cdot lb\cdot ft^{-2}$	$210.3\cdot lb\cdot ft^{-2}$	$755.3\cdot lb\cdot ft^{-2}$
3.5·ft	$204.7\cdot lb\cdot ft^{-2}$	$195.2\cdot lb\cdot ft^{-2}$	$180.3\cdot lb\cdot ft^{-2}$	$647.6\cdot lb\cdot ft^{-2}$
4·ft	$157.1\cdot lb\cdot ft^{-2}$	$151.4\cdot lb\cdot ft^{-2}$	$157.9\cdot lb\cdot ft^{-2}$	$566.8\cdot lb\cdot ft^{-2}$
4.5·ft	$124.5\cdot lb\cdot ft^{-2}$	$120.9\cdot lb\cdot ft^{-2}$	$140.4\cdot lb\cdot ft^{-2}$	$504\cdot lb\cdot ft^{-2}$
5·ft	$101.2\cdot lb\cdot ft^{-2}$	$98.7\cdot lb\cdot ft^{-2}$	$126.4\cdot lb\cdot ft^{-2}$	$453.7\cdot lb\cdot ft^{-2}$
5.5·ft	$83.9\cdot lb\cdot ft^{-2}$	$82.2\cdot lb\cdot ft^{-2}$	$115\cdot lb\cdot ft^{-2}$	$412.6\cdot lb\cdot ft^{-2}$
6·ft	$70.8\cdot lb\cdot ft^{-2}$	$69.6\cdot lb\cdot ft^{-2}$	$105.5\cdot lb\cdot ft^{-2}$	$378.3\cdot lb\cdot ft^{-2}$
6.5·ft	$60.6\cdot lb\cdot ft^{-2}$	$59.7\cdot lb\cdot ft^{-2}$	$97.4\cdot lb\cdot ft^{-2}$	$349.3\cdot lb\cdot ft^{-2}$
7·ft	$52.4\cdot lb\cdot ft^{-2}$	$51.8\cdot lb\cdot ft^{-2}$	$90.5\cdot lb\cdot ft^{-2}$	$324.5\cdot lb\cdot ft^{-2}$

L_i	WLL_i
2·ft	$419\cdot lb\cdot ft^{-2}$
2.5·ft	$335\cdot lb\cdot ft^{-2}$
3·ft	$280\cdot lb\cdot ft^{-2}$
3.5·ft	$240\cdot lb\cdot ft^{-2}$
4·ft	$201\cdot lb\cdot ft^{-2}$
4.5·ft	$161\cdot lb\cdot ft^{-2}$
5·ft	$131\cdot lb\cdot ft^{-2}$
5.5·ft	$109\cdot lb\cdot ft^{-2}$
6·ft	$93\cdot lb\cdot ft^{-2}$
6.5·ft	$79\cdot lb\cdot ft^{-2}$
7·ft	$69\cdot lb\cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 16" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 16 \cdot in$	Panel Width
$w_{dlp} := 1.687 \cdot psf$	Panel Weight
$M_{tc} := 4974 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3732 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	727.9·lb·ft^{-2}	617.3·lb·ft^{-2}	344.6·lb·ft^{-2}	$1.2 \cdot 10^{3}$·lb·ft^{-2}
2.5·ft	466.5·lb·ft^{-2}	417.2·lb·ft^{-2}	275.8·lb·ft^{-2}	933·lb·ft^{-2}
3·ft	324.6·lb·ft^{-2}	299.5·lb·ft^{-2}	230·lb·ft^{-2}	777.7·lb·ft^{-2}
3.5·ft	239·lb·ft^{-2}	224.9·lb·ft^{-2}	197.2·lb·ft^{-2}	666.8·lb·ft^{-2}
4·ft	183.4·lb·ft^{-2}	175·lb·ft^{-2}	172.7·lb·ft^{-2}	583.7·lb·ft^{-2}
4.5·ft	145.4·lb·ft^{-2}	139.9·lb·ft^{-2}	153.6·lb·ft^{-2}	519·lb·ft^{-2}
5·ft	118.1·lb·ft^{-2}	114.5·lb·ft^{-2}	138.3·lb·ft^{-2}	467.2·lb·ft^{-2}
5.5·ft	98·lb·ft^{-2}	95.4·lb·ft^{-2}	125.8·lb·ft^{-2}	424.9·lb·ft^{-2}
6·ft	82.6·lb·ft^{-2}	80.8·lb·ft^{-2}	115.3·lb·ft^{-2}	389.6·lb·ft^{-2}
6.5·ft	70.7·lb·ft^{-2}	69.3·lb·ft^{-2}	106.5·lb·ft^{-2}	359.7·lb·ft^{-2}
7·ft	61.2·lb·ft^{-2}	60.2·lb·ft^{-2}	99·lb·ft^{-2}	334.1·lb·ft^{-2}

L_i	WLL_i
2·ft	458·lb·ft^{-2}
2.5·ft	367·lb·ft^{-2}
3·ft	306·lb·ft^{-2}
3.5·ft	262·lb·ft^{-2}
4·ft	230·lb·ft^{-2}
4.5·ft	186·lb·ft^{-2}
5·ft	152·lb·ft^{-2}
5.5·ft	127·lb·ft^{-2}
6·ft	107·lb·ft^{-2}
6.5·ft	92·lb·ft^{-2}
7·ft	80·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
18" WIDE X 24 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
Denver, Colorado 80216

Prepared By:

YOOSEF LAVI, P.E.
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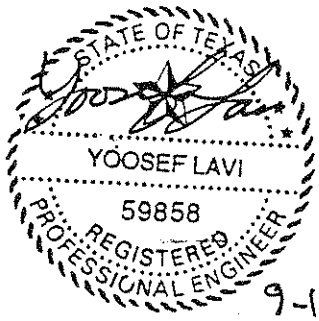


9-10-97

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	18 in.	1	231	185	154	130	99	78	63	52	43	37	32
		2	199	159	125	93	71	56	46	38	31	27	23
		3	218	174	145	107	83	65	53	44	37	31	27

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	18 in.	1	311	249	178	131	101	80	65	54	46	39	34
		2	267	213	178	153	129	104	85	71	60	51	45
		3	292	233	195	167	146	120	98	82	70	60	52

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

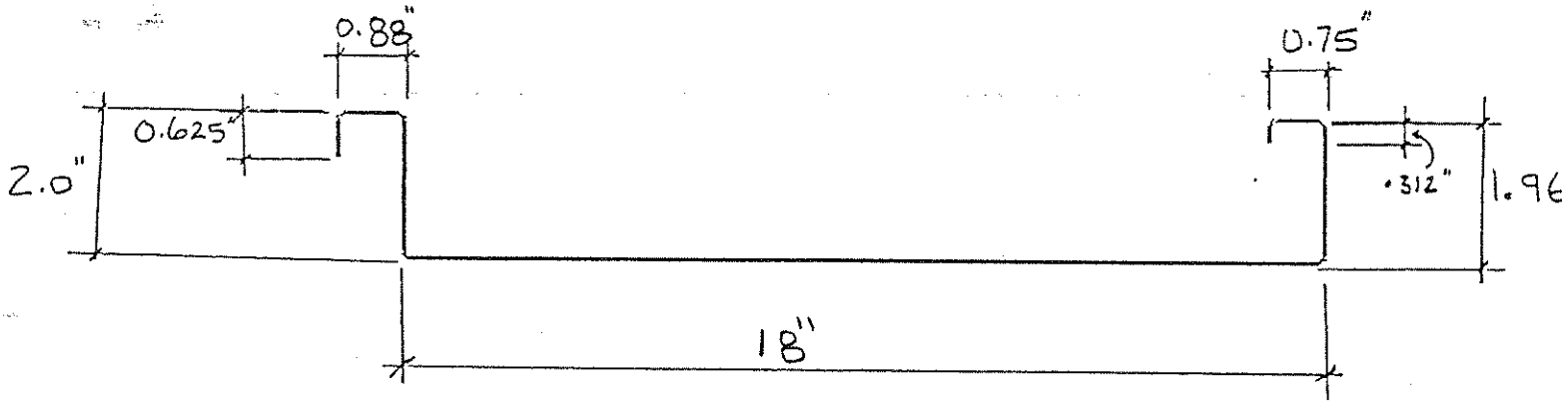
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 50 KSI

CFS Version 2.20

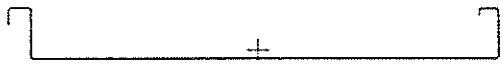
Section: SS21824
Rev. Date 08-25-1997
Rev. Time 18:00:55
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0720	No	0.00	0.000	0.312
0.880	0.000	0.0720	No	0.00	0.000	0.440
2.000	270.000	0.0720	Sgl	0.00	0.000	1.000
18.000	0.000	0.0720	Sgl	0.00	0.000	9.000
1.960	90.000	0.0720	Sgl	0.00	0.000	0.980
0.750	180.000	0.0720	No	0.00	0.000	0.375
0.312	270.000	0.0720	No	0.00	0.000	0.156



Full Section Properties

Area	0.5776	Wt.	1.9639	Width	24.1679
Ix	0.2487	rx	0.6561	Ixy	-0.1934
Sx(t)	0.1508	y(t)	1.6487	Alpha	89.5273
Sx(b)	0.7078	y(b)	0.3513		
Iy	23.6875	ry	6.4038	Xo	0.0635
Sy(l)	2.4618	x(l)	9.6222	Yo	-1.0009
Sy(r)	2.5653	x(r)	9.2339	jx	-0.0602
				jy	17.6884
I1	23.6891	r1	6.4041		
I2	0.2471	r2	0.6540		
Ic	23.9361	rc	6.4374	Cw	14.4229
Io	24.5172	ro	6.5150	J	0.0001100

CFS Version 2.20

Section: SS21824
Rev. Date 08-25-1997
Rev. Time 18:00:55
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	3.2356	Maxo	3.6276	Mayo	32.3841
Ae	0.1240	Ixe	0.2061	Iye	13.5796
		Sxe(t)	0.1209	Sye(l)	2.1637
Tension		Sxe(b)	0.6982	Sye(r)	1.0795
Ta	17.3284				
		Negative Moment		Negative Moment	
		Maxo	2.6833	Mayo	30.0343
Shear		Ixe	0.0995	Iye	13.1066
Vay	1.2049	Sxe(t)	0.1121	Sye(l)	1.0011
Vax	0.0640	Sxe(b)	0.0894	Sye(r)	2.2737

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.309 \cdot psf$	Panel Weight
$M_{tc} := 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	$401.7\cdot lb\cdot ft^{-2}$	$802\cdot lb\cdot ft^{-2}$	$231.4\cdot lb\cdot ft^{-2}$
2.5·ft	$256.6\cdot lb\cdot ft^{-2}$	$641.4\cdot lb\cdot ft^{-2}$	$184.8\cdot lb\cdot ft^{-2}$
3·ft	$177.8\cdot lb\cdot ft^{-2}$	$534.2\cdot lb\cdot ft^{-2}$	$153.8\cdot lb\cdot ft^{-2}$
3.5·ft	$130.3\cdot lb\cdot ft^{-2}$	$457.7\cdot lb\cdot ft^{-2}$	$131.6\cdot lb\cdot ft^{-2}$
4·ft	$99.4\cdot lb\cdot ft^{-2}$	$400.4\cdot lb\cdot ft^{-2}$	$115\cdot lb\cdot ft^{-2}$
4.5·ft	$78.3\cdot lb\cdot ft^{-2}$	$355.7\cdot lb\cdot ft^{-2}$	$102.1\cdot lb\cdot ft^{-2}$
5·ft	$63.2\cdot lb\cdot ft^{-2}$	$320\cdot lb\cdot ft^{-2}$	$91.8\cdot lb\cdot ft^{-2}$
5.5·ft	$52\cdot lb\cdot ft^{-2}$	$290.8\cdot lb\cdot ft^{-2}$	$83.3\cdot lb\cdot ft^{-2}$
6·ft	$43.5\cdot lb\cdot ft^{-2}$	$266.5\cdot lb\cdot ft^{-2}$	$76.2\cdot lb\cdot ft^{-2}$
6.5·ft	$36.8\cdot lb\cdot ft^{-2}$	$245.9\cdot lb\cdot ft^{-2}$	$70.3\cdot lb\cdot ft^{-2}$
7·ft	$31.6\cdot lb\cdot ft^{-2}$	$228.2\cdot lb\cdot ft^{-2}$	$65.2\cdot lb\cdot ft^{-2}$

L_i	WLL_i
2·ft	$231\cdot lb\cdot ft^{-2}$
2.5·ft	$185\cdot lb\cdot ft^{-2}$
3·ft	$154\cdot lb\cdot ft^{-2}$
3.5·ft	$130\cdot lb\cdot ft^{-2}$
4·ft	$99\cdot lb\cdot ft^{-2}$
4.5·ft	$78\cdot lb\cdot ft^{-2}$
5·ft	$63\cdot lb\cdot ft^{-2}$
5.5·ft	$52\cdot lb\cdot ft^{-2}$
6·ft	$43\cdot lb\cdot ft^{-2}$
6.5·ft	$37\cdot lb\cdot ft^{-2}$
7·ft	$32\cdot lb\cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.309 \cdot psf$	Panel Weight
$M_{tc} := 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
296.8·lb·ft^{-2}
189.5·lb·ft^{-2}
131.2·lb·ft^{-2}
96·lb·ft^{-2}
73.2·lb·ft^{-2}
57.6·lb·ft^{-2}
46.4·lb·ft^{-2}
38.1·lb·ft^{-2}
31.8·lb·ft^{-2}
26.9·lb·ft^{-2}
23·lb·ft^{-2}

W_{sb_i}
269.4·lb·ft^{-2}
177.7·lb·ft^{-2}
125.4·lb·ft^{-2}
92.9·lb·ft^{-2}
71.4·lb·ft^{-2}
56.4·lb·ft^{-2}
45.6·lb·ft^{-2}
37.6·lb·ft^{-2}
31.5·lb·ft^{-2}
26.7·lb·ft^{-2}
22.8·lb·ft^{-2}

W_{c_i}
199.5·lb·ft^{-2}
159.5·lb·ft^{-2}
132.8·lb·ft^{-2}
113.8·lb·ft^{-2}
99.5·lb·ft^{-2}
88.4·lb·ft^{-2}
79.5·lb·ft^{-2}
72.2·lb·ft^{-2}
66.1·lb·ft^{-2}
61·lb·ft^{-2}
56.6·lb·ft^{-2}

W_{so_i}
641.6·lb·ft^{-2}
513.1·lb·ft^{-2}
427.4·lb·ft^{-2}
366.2·lb·ft^{-2}
320.3·lb·ft^{-2}
284.6·lb·ft^{-2}
256·lb·ft^{-2}
232.6·lb·ft^{-2}
213.2·lb·ft^{-2}
196.7·lb·ft^{-2}
182.6·lb·ft^{-2}

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
199·lb·ft^{-2}
159·lb·ft^{-2}
125·lb·ft^{-2}
93·lb·ft^{-2}
71·lb·ft^{-2}
56·lb·ft^{-2}
46·lb·ft^{-2}
38·lb·ft^{-2}
31·lb·ft^{-2}
27·lb·ft^{-2}
23·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.309 \cdot psf$	Panel Weight
$M_{tc} := 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
$346.5 \cdot lb \cdot ft^{-2}$
$221.2 \cdot lb \cdot ft^{-2}$
$153.2 \cdot lb \cdot ft^{-2}$
$112.1 \cdot lb \cdot ft^{-2}$
$85.5 \cdot lb \cdot ft^{-2}$
$67.2 \cdot lb \cdot ft^{-2}$
$54.2 \cdot lb \cdot ft^{-2}$
$44.5 \cdot lb \cdot ft^{-2}$
$37.1 \cdot lb \cdot ft^{-2}$
$31.4 \cdot lb \cdot ft^{-2}$
$26.9 \cdot lb \cdot ft^{-2}$

W_{sb_i}
$306.8 \cdot lb \cdot ft^{-2}$
$204 \cdot lb \cdot ft^{-2}$
$144.6 \cdot lb \cdot ft^{-2}$
$107.4 \cdot lb \cdot ft^{-2}$
$82.7 \cdot lb \cdot ft^{-2}$
$65.5 \cdot lb \cdot ft^{-2}$
$53 \cdot lb \cdot ft^{-2}$
$43.7 \cdot lb \cdot ft^{-2}$
$36.6 \cdot lb \cdot ft^{-2}$
$31 \cdot lb \cdot ft^{-2}$
$26.6 \cdot lb \cdot ft^{-2}$

W_{c_i}
$218.2 \cdot lb \cdot ft^{-2}$
$174.4 \cdot lb \cdot ft^{-2}$
$145.2 \cdot lb \cdot ft^{-2}$
$124.4 \cdot lb \cdot ft^{-2}$
$108.8 \cdot lb \cdot ft^{-2}$
$96.6 \cdot lb \cdot ft^{-2}$
$86.9 \cdot lb \cdot ft^{-2}$
$79 \cdot lb \cdot ft^{-2}$
$72.3 \cdot lb \cdot ft^{-2}$
$66.7 \cdot lb \cdot ft^{-2}$
$61.9 \cdot lb \cdot ft^{-2}$

W_{so_i}
$660.6 \cdot lb \cdot ft^{-2}$
$528.3 \cdot lb \cdot ft^{-2}$
$440.1 \cdot lb \cdot ft^{-2}$
$377 \cdot lb \cdot ft^{-2}$
$329.8 \cdot lb \cdot ft^{-2}$
$293 \cdot lb \cdot ft^{-2}$
$263.6 \cdot lb \cdot ft^{-2}$
$239.5 \cdot lb \cdot ft^{-2}$
$219.5 \cdot lb \cdot ft^{-2}$
$202.5 \cdot lb \cdot ft^{-2}$
$188 \cdot lb \cdot ft^{-2}$

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
$218 \cdot lb \cdot ft^{-2}$
$174 \cdot lb \cdot ft^{-2}$
$145 \cdot lb \cdot ft^{-2}$
$107 \cdot lb \cdot ft^{-2}$
$83 \cdot lb \cdot ft^{-2}$
$65 \cdot lb \cdot ft^{-2}$
$53 \cdot lb \cdot ft^{-2}$
$44 \cdot lb \cdot ft^{-2}$
$37 \cdot lb \cdot ft^{-2}$
$31 \cdot lb \cdot ft^{-2}$
$27 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 18 \cdot in$	Panel Width
$w_{dlp} = 1.309 \cdot psf$	Panel Weight
$M_{tc} = 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1205 \cdot lb$	Allowable Shear
$P_{ae} = 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	311·lb·ft^{-2}
2.5·ft	249·lb·ft^{-2}
3·ft	178·lb·ft^{-2}
3.5·ft	131·lb·ft^{-2}
4·ft	101·lb·ft^{-2}
4.5·ft	80·lb·ft^{-2}
5·ft	65·lb·ft^{-2}
5.5·ft	54·lb·ft^{-2}
6·ft	46·lb·ft^{-2}
6.5·ft	39·lb·ft^{-2}
7·ft	34·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 18 \cdot in$	Panel Width
$w_{dlp} = 1.309 \cdot psf$	Panel Weight
$M_{tc} = 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1205 \cdot lb$	Allowable Shear
$P_{ae} = 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	404.3·lb·ft^{-2}	342.4·lb·ft^{-2}	200.5·lb·ft^{-2}	643.7·lb·ft^{-2}
2.5·ft	259.2·lb·ft^{-2}	231.6·lb·ft^{-2}	160.5·lb·ft^{-2}	515.2·lb·ft^{-2}
3·ft	180.4·lb·ft^{-2}	166.3·lb·ft^{-2}	133.9·lb·ft^{-2}	429.5·lb·ft^{-2}
3.5·ft	132.9·lb·ft^{-2}	125·lb·ft^{-2}	114.8·lb·ft^{-2}	368.3·lb·ft^{-2}
4·ft	102.1·lb·ft^{-2}	97.3·lb·ft^{-2}	100.5·lb·ft^{-2}	322.4·lb·ft^{-2}
4.5·ft	80.9·lb·ft^{-2}	77.9·lb·ft^{-2}	89.4·lb·ft^{-2}	286.7·lb·ft^{-2}
5·ft	65.8·lb·ft^{-2}	63.8·lb·ft^{-2}	80.5·lb·ft^{-2}	258.1·lb·ft^{-2}
5.5·ft	54.6·lb·ft^{-2}	53.2·lb·ft^{-2}	73.3·lb·ft^{-2}	234.7·lb·ft^{-2}
6·ft	46.1·lb·ft^{-2}	45.1·lb·ft^{-2}	67.2·lb·ft^{-2}	215.3·lb·ft^{-2}
6.5·ft	39.5·lb·ft^{-2}	38.7·lb·ft^{-2}	62.1·lb·ft^{-2}	198.8·lb·ft^{-2}
7·ft	34.2·lb·ft^{-2}	33.6·lb·ft^{-2}	57.7·lb·ft^{-2}	184.7·lb·ft^{-2}

L_i	WLL_i
2·ft	267·lb·ft^{-2}
2.5·ft	213·lb·ft^{-2}
3·ft	178·lb·ft^{-2}
3.5·ft	153·lb·ft^{-2}
4·ft	129·lb·ft^{-2}
4.5·ft	104·lb·ft^{-2}
5·ft	85·lb·ft^{-2}
5.5·ft	71·lb·ft^{-2}
6·ft	60·lb·ft^{-2}
6.5·ft	51·lb·ft^{-2}
7·ft	45·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.309 \cdot psf$	Panel Weight
$M_{tc} := 3627 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2683 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$472\cdot lb\cdot ft^{-2}$	$384.4\cdot lb\cdot ft^{-2}$	$219.3\cdot lb\cdot ft^{-2}$	$662.8\cdot lb\cdot ft^{-2}$
2.5·ft	$302.6\cdot lb\cdot ft^{-2}$	$262.8\cdot lb\cdot ft^{-2}$	$175.6\cdot lb\cdot ft^{-2}$	$530.5\cdot lb\cdot ft^{-2}$
3·ft	$210.6\cdot lb\cdot ft^{-2}$	$190.1\cdot lb\cdot ft^{-2}$	$146.4\cdot lb\cdot ft^{-2}$	$442.2\cdot lb\cdot ft^{-2}$
3.5·ft	$155.2\cdot lb\cdot ft^{-2}$	$143.6\cdot lb\cdot ft^{-2}$	$125.6\cdot lb\cdot ft^{-2}$	$379.2\cdot lb\cdot ft^{-2}$
4·ft	$119.2\cdot lb\cdot ft^{-2}$	$112.1\cdot lb\cdot ft^{-2}$	$109.9\cdot lb\cdot ft^{-2}$	$331.9\cdot lb\cdot ft^{-2}$
4.5·ft	$94.5\cdot lb\cdot ft^{-2}$	$89.9\cdot lb\cdot ft^{-2}$	$97.8\cdot lb\cdot ft^{-2}$	$295.2\cdot lb\cdot ft^{-2}$
5·ft	$76.8\cdot lb\cdot ft^{-2}$	$73.8\cdot lb\cdot ft^{-2}$	$88.1\cdot lb\cdot ft^{-2}$	$265.8\cdot lb\cdot ft^{-2}$
5.5·ft	$63.7\cdot lb\cdot ft^{-2}$	$61.6\cdot lb\cdot ft^{-2}$	$80.1\cdot lb\cdot ft^{-2}$	$241.7\cdot lb\cdot ft^{-2}$
6·ft	$53.8\cdot lb\cdot ft^{-2}$	$52.3\cdot lb\cdot ft^{-2}$	$73.5\cdot lb\cdot ft^{-2}$	$221.7\cdot lb\cdot ft^{-2}$
6.5·ft	$46.1\cdot lb\cdot ft^{-2}$	$44.9\cdot lb\cdot ft^{-2}$	$67.9\cdot lb\cdot ft^{-2}$	$204.7\cdot lb\cdot ft^{-2}$
7·ft	$39.9\cdot lb\cdot ft^{-2}$	$39.1\cdot lb\cdot ft^{-2}$	$63.1\cdot lb\cdot ft^{-2}$	$190.1\cdot lb\cdot ft^{-2}$

L_i	WLL_i
2·ft	$292\cdot lb\cdot ft^{-2}$
2.5·ft	$233\cdot lb\cdot ft^{-2}$
3·ft	$195\cdot lb\cdot ft^{-2}$
3.5·ft	$167\cdot lb\cdot ft^{-2}$
4·ft	$146\cdot lb\cdot ft^{-2}$
4.5·ft	$120\cdot lb\cdot ft^{-2}$
5·ft	$98\cdot lb\cdot ft^{-2}$
5.5·ft	$82\cdot lb\cdot ft^{-2}$
6·ft	$70\cdot lb\cdot ft^{-2}$
6.5·ft	$60\cdot lb\cdot ft^{-2}$
7·ft	$52\cdot lb\cdot ft^{-2}$

STRUCTURAL CALCULATIONS FOR:
18" WIDE X 22 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
Denver, Colorado 80216

Prepared By:

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Consulting Engineer
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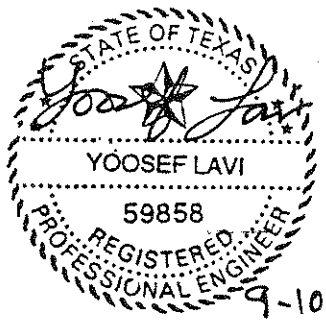

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P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	18 in.	1	334	267	222	180	137	108	87	72	60	51	44
		2	279	223	176	130	100	79	64	53	44	37	32
		3	305	244	203	151	116	92	74	61	51	44	37

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	18 in.	1	448	356	248	182	140	111	91	75	64	54	47
		2	373	298	249	213	180	144	118	98	83	71	62
		3	407	326	272	233	204	166	136	114	96	83	72

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

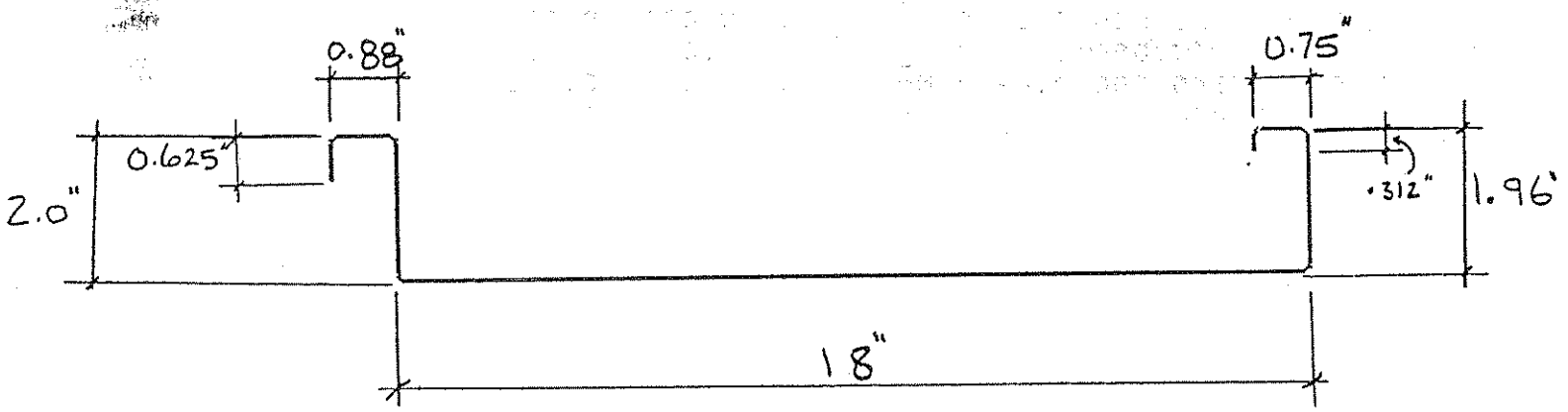
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 22 GA. (0.0299")

FY: 50 KSI

CFS Version 2.20

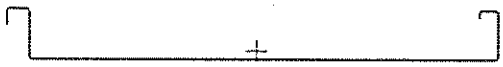
Section: SS21822
Rev. Date 08-25-1997
Rev. Time 18:07:33
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0299 22 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0900	No	0.00	0.000	0.312
0.880	0.000	0.0900	No	0.00	0.000	0.440
2.000	270.000	0.0900	Sgl	0.00	0.000	1.000
18.000	0.000	0.0900	Sgl	0.00	0.000	9.000
1.960	90.000	0.0900	Sgl	0.00	0.000	0.980
0.750	180.000	0.0900	No	0.00	0.000	0.375
0.312	270.000	0.0900	No	0.00	0.000	0.156



Full Section Properties

Area	0.7199	Wt.	2.4478	Width	24.0778
Ix	0.3047	rx	0.6506	Ixy	-0.2401
Sx(t)	0.1846	y(t)	1.6503	Alpha	89.5273
Sx(b)	0.8712	y(b)	0.3497		
Iy	29.4035	ry	6.3908	Xo	0.0437
Sy(l)	3.0575	x(l)	9.6168	Yo	-0.9894
Sy(r)	3.1845	x(r)	9.2333	jx	-0.0396
				jy	17.7755
I1	29.4055	r1	6.3910		
I2	0.3027	r2	0.6485		
Ic	29.7082	rc	6.4238	Cw	17.6673
Io	30.4143	ro	6.4997	J	0.0002145

Section: SS21822
Rev. Date 08-25-1997
Rev. Time 18:07:33
Rev. by
Phone
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Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	4.7378	Maxo	5.0020	Mayo	45.6442
Ae	0.1816	Ixe	0.2791	Iye	18.5104
		Sxe(t)	0.1667	Sye(l)	2.7693
Tension		Sxe(b)	0.8562	Sye(r)	1.5215
Ta	21.5978				
		Negative Moment		Negative Moment	
		Maxo	3.7366	Mayo	45.1856
Shear		Ixe	0.1325	Iye	18.7689
Vay	1.8852	Sxe(t)	0.1416	Sye(l)	1.5062
Vax	0.1257	Sxe(b)	0.1246	Sye(r)	2.9378

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.632 \cdot psf$	Panel Weight
$M_{tc} := 5002 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3736 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	$554.1 \cdot lb \cdot ft^{-2}$	$1.3 \cdot 10^3 \cdot lb \cdot ft^{-2}$	$333.7 \cdot lb \cdot ft^{-2}$
2.5·ft	$354.1 \cdot lb \cdot ft^{-2}$	$1 \cdot 10^3 \cdot lb \cdot ft^{-2}$	$266.6 \cdot lb \cdot ft^{-2}$
3·ft	$245.4 \cdot lb \cdot ft^{-2}$	$836.1 \cdot lb \cdot ft^{-2}$	$221.9 \cdot lb \cdot ft^{-2}$
3.5·ft	$179.8 \cdot lb \cdot ft^{-2}$	$716.5 \cdot lb \cdot ft^{-2}$	$190 \cdot lb \cdot ft^{-2}$
4·ft	$137.3 \cdot lb \cdot ft^{-2}$	$626.7 \cdot lb \cdot ft^{-2}$	$166 \cdot lb \cdot ft^{-2}$
4.5·ft	$108.2 \cdot lb \cdot ft^{-2}$	$556.9 \cdot lb \cdot ft^{-2}$	$147.4 \cdot lb \cdot ft^{-2}$
5·ft	$87.3 \cdot lb \cdot ft^{-2}$	$501 \cdot lb \cdot ft^{-2}$	$132.5 \cdot lb \cdot ft^{-2}$
5.5·ft	$71.9 \cdot lb \cdot ft^{-2}$	$455.3 \cdot lb \cdot ft^{-2}$	$120.3 \cdot lb \cdot ft^{-2}$
6·ft	$60.1 \cdot lb \cdot ft^{-2}$	$417.3 \cdot lb \cdot ft^{-2}$	$110.1 \cdot lb \cdot ft^{-2}$
6.5·ft	$51 \cdot lb \cdot ft^{-2}$	$385 \cdot lb \cdot ft^{-2}$	$101.5 \cdot lb \cdot ft^{-2}$
7·ft	$43.7 \cdot lb \cdot ft^{-2}$	$357.4 \cdot lb \cdot ft^{-2}$	$94.2 \cdot lb \cdot ft^{-2}$

L_i	WLL_i
2·ft	$334 \cdot lb \cdot ft^{-2}$
2.5·ft	$267 \cdot lb \cdot ft^{-2}$
3·ft	$222 \cdot lb \cdot ft^{-2}$
3.5·ft	$180 \cdot lb \cdot ft^{-2}$
4·ft	$137 \cdot lb \cdot ft^{-2}$
4.5·ft	$108 \cdot lb \cdot ft^{-2}$
5·ft	$87 \cdot lb \cdot ft^{-2}$
5.5·ft	$72 \cdot lb \cdot ft^{-2}$
6·ft	$60 \cdot lb \cdot ft^{-2}$
6.5·ft	$51 \cdot lb \cdot ft^{-2}$
7·ft	$44 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.632 \cdot psf$	Panel Weight
$M_{tc} := 5002 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3736 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	413.5·lb·ft^{-2}	382.3·lb·ft^{-2}	278.8·lb·ft^{-2}	$1 \cdot 10^3$·lb·ft^{-2}
2.5·ft	264·lb·ft^{-2}	250.8·lb·ft^{-2}	222.9·lb·ft^{-2}	803·lb·ft^{-2}
3·ft	182.9·lb·ft^{-2}	176.4·lb·ft^{-2}	185.7·lb·ft^{-2}	668.9·lb·ft^{-2}
3.5·ft	133.9·lb·ft^{-2}	130.4·lb·ft^{-2}	159·lb·ft^{-2}	573.2·lb·ft^{-2}
4·ft	102.1·lb·ft^{-2}	100.1·lb·ft^{-2}	139.1·lb·ft^{-2}	501.4·lb·ft^{-2}
4.5·ft	80.4·lb·ft^{-2}	79.1·lb·ft^{-2}	123.6·lb·ft^{-2}	445.5·lb·ft^{-2}
5·ft	64.8·lb·ft^{-2}	64·lb·ft^{-2}	111.1·lb·ft^{-2}	400.8·lb·ft^{-2}
5.5·ft	53.3·lb·ft^{-2}	52.7·lb·ft^{-2}	101·lb·ft^{-2}	364.3·lb·ft^{-2}
6·ft	44.5·lb·ft^{-2}	44.1·lb·ft^{-2}	92.5·lb·ft^{-2}	333.8·lb·ft^{-2}
6.5·ft	37.7·lb·ft^{-2}	37.4·lb·ft^{-2}	85.3·lb·ft^{-2}	308·lb·ft^{-2}
7·ft	32.3·lb·ft^{-2}	32.1·lb·ft^{-2}	79.2·lb·ft^{-2}	285.9·lb·ft^{-2}

L_i	WLL_i
2·ft	279·lb·ft^{-2}
2.5·ft	223·lb·ft^{-2}
3·ft	176·lb·ft^{-2}
3.5·ft	130·lb·ft^{-2}
4·ft	100·lb·ft^{-2}
4.5·ft	79·lb·ft^{-2}
5·ft	64·lb·ft^{-2}
5.5·ft	53·lb·ft^{-2}
6·ft	44·lb·ft^{-2}
6.5·ft	37·lb·ft^{-2}
7·ft	32·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 18 \cdot in$	Panel Width
$w_{dlp} := 1.632 \cdot psf$	Panel Weight
$M_{tc} := 5002 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3736 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$482.7 \cdot lb \cdot ft^{-2}$	$437.3 \cdot lb \cdot ft^{-2}$	$304.9 \cdot lb \cdot ft^{-2}$	$1 \cdot 10^3 \cdot lb \cdot ft^{-2}$
2.5·ft	$308.3 \cdot lb \cdot ft^{-2}$	$288.8 \cdot lb \cdot ft^{-2}$	$243.8 \cdot lb \cdot ft^{-2}$	$826.8 \cdot lb \cdot ft^{-2}$
3·ft	$213.5 \cdot lb \cdot ft^{-2}$	$203.9 \cdot lb \cdot ft^{-2}$	$203 \cdot lb \cdot ft^{-2}$	$688.8 \cdot lb \cdot ft^{-2}$
3.5·ft	$156.3 \cdot lb \cdot ft^{-2}$	$151.1 \cdot lb \cdot ft^{-2}$	$173.9 \cdot lb \cdot ft^{-2}$	$590.2 \cdot lb \cdot ft^{-2}$
4·ft	$119.3 \cdot lb \cdot ft^{-2}$	$116.2 \cdot lb \cdot ft^{-2}$	$152.1 \cdot lb \cdot ft^{-2}$	$516.2 \cdot lb \cdot ft^{-2}$
4.5·ft	$93.8 \cdot lb \cdot ft^{-2}$	$91.9 \cdot lb \cdot ft^{-2}$	$135.1 \cdot lb \cdot ft^{-2}$	$458.7 \cdot lb \cdot ft^{-2}$
5·ft	$75.6 \cdot lb \cdot ft^{-2}$	$74.4 \cdot lb \cdot ft^{-2}$	$121.5 \cdot lb \cdot ft^{-2}$	$412.7 \cdot lb \cdot ft^{-2}$
5.5·ft	$62.2 \cdot lb \cdot ft^{-2}$	$61.3 \cdot lb \cdot ft^{-2}$	$110.4 \cdot lb \cdot ft^{-2}$	$375.1 \cdot lb \cdot ft^{-2}$
6·ft	$51.9 \cdot lb \cdot ft^{-2}$	$51.3 \cdot lb \cdot ft^{-2}$	$101.2 \cdot lb \cdot ft^{-2}$	$343.7 \cdot lb \cdot ft^{-2}$
6.5·ft	$44 \cdot lb \cdot ft^{-2}$	$43.5 \cdot lb \cdot ft^{-2}$	$93.3 \cdot lb \cdot ft^{-2}$	$317.2 \cdot lb \cdot ft^{-2}$
7·ft	$37.7 \cdot lb \cdot ft^{-2}$	$37.3 \cdot lb \cdot ft^{-2}$	$86.6 \cdot lb \cdot ft^{-2}$	$294.4 \cdot lb \cdot ft^{-2}$

L_i	WLL_i
2·ft	$305 \cdot lb \cdot ft^{-2}$
2.5·ft	$244 \cdot lb \cdot ft^{-2}$
3·ft	$203 \cdot lb \cdot ft^{-2}$
3.5·ft	$151 \cdot lb \cdot ft^{-2}$
4·ft	$116 \cdot lb \cdot ft^{-2}$
4.5·ft	$92 \cdot lb \cdot ft^{-2}$
5·ft	$74 \cdot lb \cdot ft^{-2}$
5.5·ft	$61 \cdot lb \cdot ft^{-2}$
6·ft	$51 \cdot lb \cdot ft^{-2}$
6.5·ft	$44 \cdot lb \cdot ft^{-2}$
7·ft	$37 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.632 \cdot psf$	Panel Weight
$M_{tc} := 5002 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3736 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	$448 \cdot lb \cdot ft^{-2}$
2.5·ft	$356 \cdot lb \cdot ft^{-2}$
3·ft	$248 \cdot lb \cdot ft^{-2}$
3.5·ft	$182 \cdot lb \cdot ft^{-2}$
4·ft	$140 \cdot lb \cdot ft^{-2}$
4.5·ft	$111 \cdot lb \cdot ft^{-2}$
5·ft	$91 \cdot lb \cdot ft^{-2}$
5.5·ft	$75 \cdot lb \cdot ft^{-2}$
6·ft	$64 \cdot lb \cdot ft^{-2}$
6.5·ft	$54 \cdot lb \cdot ft^{-2}$
7·ft	$47 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$ Panel Width

$w_{dlp} := 1.632 \cdot psf$ Panel Weight

$M_{tc} := 5002 \cdot in \cdot lb$ Allowable Moment Top Compression

$M_{bc} := 3737 \cdot in \cdot lb$ Allowable Moment Bottom Compression

$V := 1885 \cdot lb$ Allowable Shear

$P_{ae} := 503 \cdot lb$ Allowable Web Crippling Exterior Condition

$P_{ai} := 1048 \cdot lb$ Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	557.4·lb·ft^{-2}	487.6·lb·ft^{-2}	280.1·lb·ft^{-2}	$1 \cdot 10^3$·lb·ft^{-2}
2.5·ft	357.3·lb·ft^{-2}	326.6·lb·ft^{-2}	224.2·lb·ft^{-2}	805.6·lb·ft^{-2}
3·ft	248.6·lb·ft^{-2}	233.2·lb·ft^{-2}	187·lb·ft^{-2}	671.5·lb·ft^{-2}
3.5·ft	183.1·lb·ft^{-2}	174.5·lb·ft^{-2}	160.3·lb·ft^{-2}	575.8·lb·ft^{-2}
4·ft	140.6·lb·ft^{-2}	135.4·lb·ft^{-2}	140.4·lb·ft^{-2}	504·lb·ft^{-2}
4.5·ft	111.4·lb·ft^{-2}	108.1·lb·ft^{-2}	124.9·lb·ft^{-2}	448.1·lb·ft^{-2}
5·ft	90.6·lb·ft^{-2}	88.4·lb·ft^{-2}	112.4·lb·ft^{-2}	403.4·lb·ft^{-2}
5.5·ft	75.1·lb·ft^{-2}	73.6·lb·ft^{-2}	102.3·lb·ft^{-2}	366.9·lb·ft^{-2}
6·ft	63.4·lb·ft^{-2}	62.3·lb·ft^{-2}	93.8·lb·ft^{-2}	336.4·lb·ft^{-2}
6.5·ft	54.3·lb·ft^{-2}	53.4·lb·ft^{-2}	86.6·lb·ft^{-2}	310.6·lb·ft^{-2}
7·ft	47·lb·ft^{-2}	46.4·lb·ft^{-2}	80.5·lb·ft^{-2}	288.5·lb·ft^{-2}

L_i	WLL_i
2·ft	373·lb·ft^{-2}
2.5·ft	298·lb·ft^{-2}
3·ft	249·lb·ft^{-2}
3.5·ft	213·lb·ft^{-2}
4·ft	180·lb·ft^{-2}
4.5·ft	144·lb·ft^{-2}
5·ft	118·lb·ft^{-2}
5.5·ft	98·lb·ft^{-2}
6·ft	83·lb·ft^{-2}
6.5·ft	71·lb·ft^{-2}
7·ft	62·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 18" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 18 \cdot in$	Panel Width
$w_{dlp} := 1.632 \cdot psf$	Panel Weight
$M_{tc} := 5002 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3736 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	$650.8\cdot lb\cdot ft^{-2}$	$551\cdot lb\cdot ft^{-2}$	$306.3\cdot lb\cdot ft^{-2}$	$1\cdot 10^3\cdot lb\cdot ft^{-2}$
2.5·ft	$417.2\cdot lb\cdot ft^{-2}$	$372.6\cdot lb\cdot ft^{-2}$	$245.2\cdot lb\cdot ft^{-2}$	$829.5\cdot lb\cdot ft^{-2}$
3·ft	$290.3\cdot lb\cdot ft^{-2}$	$267.6\cdot lb\cdot ft^{-2}$	$204.5\cdot lb\cdot ft^{-2}$	$691.4\cdot lb\cdot ft^{-2}$
3.5·ft	$213.8\cdot lb\ ft^{-2}$	$201.1\cdot lb\cdot ft^{-2}$	$175.4\cdot lb\cdot ft^{-2}$	$592.9\cdot lb\cdot ft^{-2}$
4·ft	$164.1\cdot lb\cdot ft^{-2}$	$156.4\cdot lb\cdot ft^{-2}$	$153.5\cdot lb\cdot ft^{-2}$	$518.9\cdot lb\cdot ft^{-2}$
4.5·ft	$130.1\cdot lb\cdot ft^{-2}$	$125.2\cdot lb\cdot ft^{-2}$	$136.5\cdot lb\cdot ft^{-2}$	$461.4\cdot lb\cdot ft^{-2}$
5·ft	$105.7\cdot lb\cdot ft^{-2}$	$102.4\cdot lb\cdot ft^{-2}$	$123\cdot lb\cdot ft^{-2}$	$415.4\cdot lb\cdot ft^{-2}$
5.5·ft	$87.7\cdot lb\cdot ft^{-2}$	$85.4\cdot lb\cdot ft^{-2}$	$111.9\cdot lb\cdot ft^{-2}$	$377.8\cdot lb\cdot ft^{-2}$
6·ft	$74\cdot lb\cdot ft^{-2}$	$72.3\cdot lb\cdot ft^{-2}$	$102.6\cdot lb\cdot ft^{-2}$	$346.4\cdot lb\cdot ft^{-2}$
6.5·ft	$63.3\cdot lb\cdot ft^{-2}$	$62.1\cdot lb\cdot ft^{-2}$	$94.8\cdot lb\cdot ft^{-2}$	$319.9\cdot lb\cdot ft^{-2}$
7·ft	$54.9\cdot lb\cdot ft^{-2}$	$53.9\cdot lb\cdot ft^{-2}$	$88\cdot lb\cdot ft^{-2}$	$297.1\cdot lb\cdot ft^{-2}$

L_i	WLL_i
2·ft	$407\cdot lb\cdot ft^{-2}$
2.5·ft	$326\cdot lb\cdot ft^{-2}$
3·ft	$272\cdot lb\cdot ft^{-2}$
3.5·ft	$233\cdot lb\cdot ft^{-2}$
4·ft	$204\cdot lb\cdot ft^{-2}$
4.5·ft	$166\cdot lb\cdot ft^{-2}$
5·ft	$136\cdot lb\cdot ft^{-2}$
5.5·ft	$114\cdot lb\cdot ft^{-2}$
6·ft	$96\cdot lb\cdot ft^{-2}$
6.5·ft	$83\cdot lb\cdot ft^{-2}$
7·ft	$72\cdot lb\cdot ft^{-2}$

STRUCTURAL CALCULATIONS FOR:
20" WIDE X 24 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
Denver, Colorado 80216

Prepared By:

YOOSEF LAVI, P.E.
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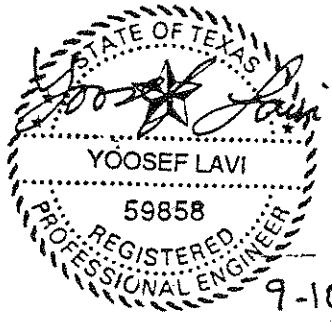


9-10-97

P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	20 in.	1	208	166	138	117	89	70	56	46	39	33	28
		2	179	143	113	84	64	51	41	34	28	24	20
		3	196	157	130	97	74	59	48	39	33	28	24

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	20 in.	1	280	224	160	118	91	72	59	49	41	36	31
		2	240	192	160	137	116	93	76	63	54	46	40
		3	263	210	175	150	132	107	88	74	62	54	47

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

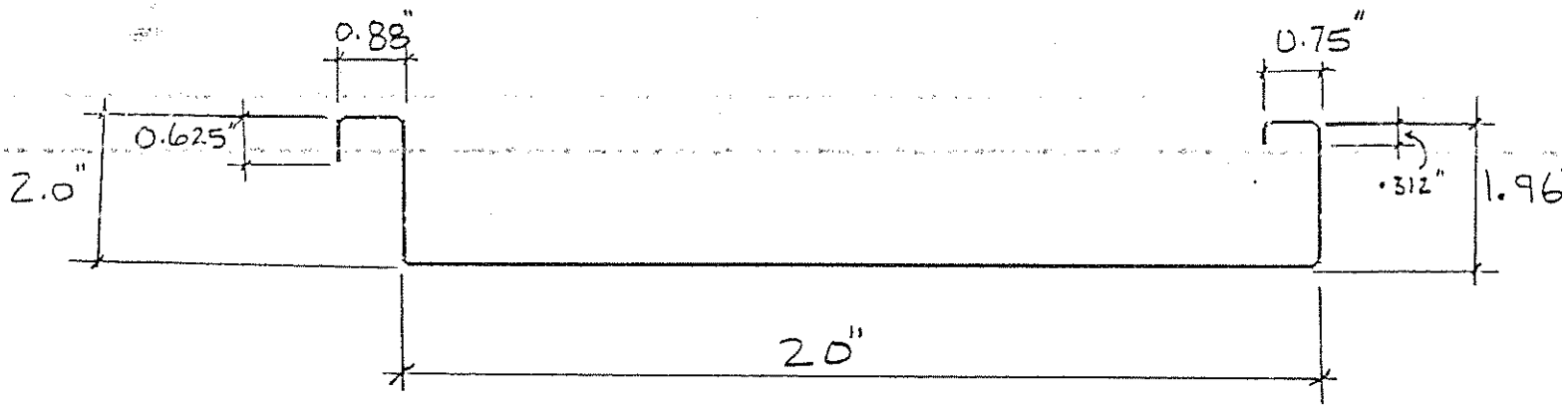
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 50 KSI

CFS Version 2.20

Section: SS22024
Rev. Date 08-25-1997
Rev. Time 18:02:05
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0720	No	0.00	0.000	0.312
0.880	0.000	0.0720	No	0.00	0.000	0.440
2.000	270.000	0.0720	Sgl	0.00	0.000	1.000
20.000	0.000	0.0720	Sgl	0.00	0.000	10.000
1.960	90.000	0.0720	Sgl	0.00	0.000	0.980
0.750	180.000	0.0720	No	0.00	0.000	0.375
0.312	270.000	0.0720	No	0.00	0.000	0.156

Full Section Properties

Area	0.6254	Wt.	2.1264	Width	26.1679
Ix	0.2537	rx	0.6370	Ixy	-0.2136
Sx(t)	0.1515	y(t)	1.6746	Alpha	89.5997
Sx(b)	0.7798	y(b)	0.3254		
Iy	30.8193	ry	7.0198	Xo	-0.0392
Sy(l)	2.9016	x(l)	10.6216	Yo	-0.9414
Sy(r)	3.0113	x(r)	10.2345	jx	0.0431
				jy	21.5112
I1	30.8208	r1	7.0200		
I2	0.2523	r2	0.6351		
Ic	31.0730	rc	7.0487	Cw	18.4916
Io	31.6282	ro	7.1114	J	0.0001191

CFS Version 2.20

Section: SS22024
Rev. Date 08-25-1997
Rev. Time 18:02:05
Rev. by
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Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	3.2366	Maxo	3.6107	Mayo	35.9984
Ae	0.1241	Ixe	0.2082	Iye	16.9443
		Sxe(t)	0.1204	Sye(l)	2.5158
Tension		Sxe(b)	0.7708	Sye(r)	1.1999
Ta	18.7624				
		Negative Moment		Negative Moment	
		Maxo	2.6850	Mayo	33.4602
Shear		Ixe	0.0995	Iye	16.3364
Vay	1.2049	Sxe(t)	0.1121	Sye(l)	1.1153
Vax	0.0575	Sxe(b)	0.0895	Sye(r)	2.6311

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$ Panel Width

$w_{dlp} := 1.273 \cdot psf$ Panel Weight

$M_{tc} := 3610 \cdot in \cdot lb$ Allowable Moment Top Compression

$M_{bc} := 2685 \cdot in \cdot lb$ Allowable Moment Bottom Compression

$V := 1205 \cdot lb$ Allowable Shear

$P_{ae} := 349 \cdot lb$ Allowable Web Crippling Exterior Condition

$P_{ai} := 750 \cdot lb$ Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i =$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	359.7·lb·ft^{-2}	721.7·lb·ft^{-2}	208.1·lb·ft^{-2}
2.5·ft	229.8·lb·ft^{-2}	577.1·lb·ft^{-2}	166.2·lb·ft^{-2}
3·ft	159.2·lb·ft^{-2}	480.7·lb·ft^{-2}	138.3·lb·ft^{-2}
3.5·ft	116.6·lb·ft^{-2}	411.9·lb·ft^{-2}	118.4·lb·ft^{-2}
4·ft	89·lb·ft^{-2}	360.2·lb·ft^{-2}	103.4·lb·ft^{-2}
4.5·ft	70·lb·ft^{-2}	320.1·lb·ft^{-2}	91.8·lb·ft^{-2}
5·ft	56.5·lb·ft^{-2}	287.9·lb·ft^{-2}	82.5·lb·ft^{-2}
5.5·ft	46.5·lb·ft^{-2}	261.6·lb·ft^{-2}	74.9·lb·ft^{-2}
6·ft	38.8·lb·ft^{-2}	239.7·lb·ft^{-2}	68.5·lb·ft^{-2}
6.5·ft	32.9·lb·ft^{-2}	221.2·lb·ft^{-2}	63.2·lb·ft^{-2}
7·ft	28.2·lb·ft^{-2}	205.3·lb·ft^{-2}	58.6·lb·ft^{-2}

L_i	WLL_i
2·ft	208·lb·ft^{-2}
2.5·ft	166·lb·ft^{-2}
3·ft	138·lb·ft^{-2}
3.5·ft	117·lb·ft^{-2}
4·ft	89·lb·ft^{-2}
4.5·ft	70·lb·ft^{-2}
5·ft	56·lb·ft^{-2}
5.5·ft	46·lb·ft^{-2}
6·ft	39·lb·ft^{-2}
6.5·ft	33·lb·ft^{-2}
7·ft	28·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.273 \cdot psf$	Panel Weight
$M_{tc} := 3610 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2685 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	267.2·lb·ft^{-2}	242.5·lb·ft^{-2}	179.5·lb·ft^{-2}	577.4·lb·ft^{-2}
2.5·ft	170.6·lb·ft^{-2}	160·lb·ft^{-2}	143.5·lb·ft^{-2}	461.7·lb·ft^{-2}
3·ft	118.1·lb·ft^{-2}	112.9·lb·ft^{-2}	119.5·lb·ft^{-2}	384.6·lb·ft^{-2}
3.5·ft	86.4·lb·ft^{-2}	83.6·lb·ft^{-2}	102.3·lb·ft^{-2}	329.5·lb·ft^{-2}
4·ft	65.9·lb·ft^{-2}	64.2·lb·ft^{-2}	89.5·lb·ft^{-2}	288.2·lb·ft^{-2}
4.5·ft	51.8·lb·ft^{-2}	50.7·lb·ft^{-2}	79.5·lb·ft^{-2}	256·lb·ft^{-2}
5·ft	41.7·lb·ft^{-2}	41·lb·ft^{-2}	71.5·lb·ft^{-2}	230.3·lb·ft^{-2}
5.5·ft	34.2·lb·ft^{-2}	33.8·lb·ft^{-2}	64.9·lb·ft^{-2}	209.3·lb·ft^{-2}
6·ft	28.6·lb·ft^{-2}	28.2·lb·ft^{-2}	59.5·lb·ft^{-2}	191.8·lb·ft^{-2}
6.5·ft	24.1·lb·ft^{-2}	23.9·lb·ft^{-2}	54.9·lb·ft^{-2}	177·lb·ft^{-2}
7·ft	20.6·lb·ft^{-2}	20.5·lb·ft^{-2}	50.9·lb·ft^{-2}	164.2·lb·ft^{-2}

L_i	WLL_i
2·ft	179·lb·ft^{-2}
2.5·ft	143·lb·ft^{-2}
3·ft	113·lb·ft^{-2}
3.5·ft	84·lb·ft^{-2}
4·ft	64·lb·ft^{-2}
4.5·ft	51·lb·ft^{-2}
5·ft	41·lb·ft^{-2}
5.5·ft	34·lb·ft^{-2}
6·ft	28·lb·ft^{-2}
6.5·ft	24·lb·ft^{-2}
7·ft	20·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.273 \cdot psf$	Panel Weight
$M_{tc} := 3610 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2685 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{sb_i}
276.2·lb·ft^{-2}
183.6·lb·ft^{-2}
130.1·lb·ft^{-2}
96.7·lb·ft^{-2}
74.4·lb·ft^{-2}
58.9·lb·ft^{-2}
47.7·lb·ft^{-2}
39.3·lb·ft^{-2}
32.9·lb·ft^{-2}
27.9·lb·ft^{-2}
23.9·lb·ft^{-2}

W_{c_i}
196.3·lb·ft^{-2}
156.9·lb·ft^{-2}
130.7·lb·ft^{-2}
111.9·lb·ft^{-2}
97.9·lb·ft^{-2}
86.9·lb·ft^{-2}
78.2·lb·ft^{-2}
71·lb·ft^{-2}
65.1·lb·ft^{-2}
60·lb·ft^{-2}
55.7·lb·ft^{-2}

W_{so_i}
594.5·lb·ft^{-2}
475.4·lb·ft^{-2}
396·lb·ft^{-2}
339.3·lb·ft^{-2}
296.7·lb·ft^{-2}
263.6·lb·ft^{-2}
237.2·lb·ft^{-2}
215.5·lb·ft^{-2}
197.5·lb·ft^{-2}
182.2·lb·ft^{-2}
169.1·lb·ft^{-2}

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
196·lb·ft^{-2}
157·lb·ft^{-2}
130·lb·ft^{-2}
97·lb·ft^{-2}
74·lb·ft^{-2}
59·lb·ft^{-2}
48·lb·ft^{-2}
39·lb·ft^{-2}
33·lb·ft^{-2}
28·lb·ft^{-2}
24·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.273 \cdot psf$	Panel Weight
$M_{tc} := 3610 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2685 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	$280 \cdot lb \cdot ft^{-2}$
2.5·ft	$224 \cdot lb \cdot ft^{-2}$
3·ft	$160 \cdot lb \cdot ft^{-2}$
3.5·ft	$118 \cdot lb \cdot ft^{-2}$
4·ft	$91 \cdot lb \cdot ft^{-2}$
4.5·ft	$72 \cdot lb \cdot ft^{-2}$
5·ft	$59 \cdot lb \cdot ft^{-2}$
5.5·ft	$49 \cdot lb \cdot ft^{-2}$
6·ft	$41 \cdot lb \cdot ft^{-2}$
6.5·ft	$36 \cdot lb \cdot ft^{-2}$
7·ft	$31 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 20 \cdot in$	Panel Width
$w_{dlp} = 1.273 \cdot psf$	Panel Weight
$M_{tc} = 3610 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 2685 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1205 \cdot lb$	Allowable Shear
$P_{ae} = 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	362.3·lb·ft^{-2}	307.2·lb·ft^{-2}	180.5·lb·ft^{-2}	579.4·lb·ft^{-2}
2.5·ft	232.3·lb·ft^{-2}	207.7·lb·ft^{-2}	144.5·lb·ft^{-2}	463.7·lb·ft^{-2}
3·ft	161.7·lb·ft^{-2}	149.2·lb·ft^{-2}	120.5·lb·ft^{-2}	386.6·lb·ft^{-2}
3.5·ft	119.2·lb·ft^{-2}	112.1·lb·ft^{-2}	103.4·lb·ft^{-2}	331.5·lb·ft^{-2}
4·ft	91.5·lb·ft^{-2}	87.3·lb·ft^{-2}	90.5·lb·ft^{-2}	290.2·lb·ft^{-2}
4.5·ft	72.6·lb·ft^{-2}	69.9·lb·ft^{-2}	80.5·lb·ft^{-2}	258.1·lb·ft^{-2}
5·ft	59·lb·ft^{-2}	57.2·lb·ft^{-2}	72.5·lb·ft^{-2}	232.4·lb·ft^{-2}
5.5·ft	49·lb·ft^{-2}	47.7·lb·ft^{-2}	66·lb·ft^{-2}	211.3·lb·ft^{-2}
6·ft	41.4·lb·ft^{-2}	40.5·lb·ft^{-2}	60.5·lb·ft^{-2}	193.8·lb·ft^{-2}
6.5·ft	35.5·lb·ft^{-2}	34.8·lb·ft^{-2}	55.9·lb·ft^{-2}	179·lb·ft^{-2}
7·ft	30.7·lb·ft^{-2}	30.2·lb·ft^{-2}	51.9·lb·ft^{-2}	166.3·lb·ft^{-2}

L_i	WLL_i
2·ft	240·lb·ft^{-2}
2.5·ft	192·lb·ft^{-2}
3·ft	160·lb·ft^{-2}
3.5·ft	137·lb·ft^{-2}
4·ft	116·lb·ft^{-2}
4.5·ft	93·lb·ft^{-2}
5·ft	76·lb·ft^{-2}
5.5·ft	63·lb·ft^{-2}
6·ft	54·lb·ft^{-2}
6.5·ft	46·lb·ft^{-2}
7·ft	40·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.273 \cdot psf$	Panel Weight
$M_{tc} := 3610 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2685 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	423·lb·ft^{-2}	345·lb·ft^{-2}	197.4·lb·ft^{-2}	596.6·lb·ft^{-2}
2.5·ft	271.2·lb·ft^{-2}	235.8·lb·ft^{-2}	158·lb·ft^{-2}	477.5·lb·ft^{-2}
3·ft	188.8·lb·ft^{-2}	170.5·lb·ft^{-2}	131.8·lb·ft^{-2}	398.1·lb·ft^{-2}
3.5·ft	139.1·lb·ft^{-2}	128.8·lb·ft^{-2}	113·lb·ft^{-2}	341.4·lb·ft^{-2}
4·ft	106.9·lb·ft^{-2}	100.6·lb·ft^{-2}	99·lb·ft^{-2}	298.8·lb·ft^{-2}
4.5·ft	84.7·lb·ft^{-2}	80.7·lb·ft^{-2}	88·lb·ft^{-2}	265.7·lb·ft^{-2}
5·ft	68.9·lb·ft^{-2}	66.2·lb·ft^{-2}	79.3·lb·ft^{-2}	239.3·lb·ft^{-2}
5.5·ft	57.2·lb·ft^{-2}	55.3·lb·ft^{-2}	72.1·lb·ft^{-2}	217.6·lb·ft^{-2}
6·ft	48.3·lb·ft^{-2}	46.9·lb·ft^{-2}	66.2·lb·ft^{-2}	199.6·lb·ft^{-2}
6.5·ft	41.4·lb·ft^{-2}	40.4·lb·ft^{-2}	61.1·lb·ft^{-2}	184.3·lb·ft^{-2}
7·ft	35.9·lb·ft^{-2}	35.1·lb·ft^{-2}	56.8·lb·ft^{-2}	171.2·lb·ft^{-2}

L_i	WLL_i
2·ft	263·lb·ft^{-2}
2.5·ft	210·lb·ft^{-2}
3·ft	175·lb·ft^{-2}
3.5·ft	150·lb·ft^{-2}
4·ft	132·lb·ft^{-2}
4.5·ft	107·lb·ft^{-2}
5·ft	88·lb·ft^{-2}
5.5·ft	74·lb·ft^{-2}
6·ft	62·lb·ft^{-2}
6.5·ft	54·lb·ft^{-2}
7·ft	47·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
20" WIDE X 22 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
201 E. 58TH Ave.
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Prepared By:

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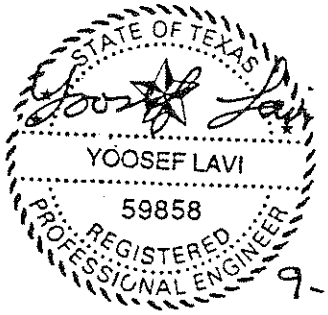

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P. 1-18

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	20 in.	1	300	240	200	162	124	98	79	65	54	46	39
		2	251	201	159	117	90	71	58	47	40	34	29
		3	274	219	183	136	105	83	67	55	46	39	34

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	20 in.	1	404	320	223	165	126	100	82	68	57	49	43
		2	335	268	224	192	163	130	106	89	75	64	56
		3	367	294	245	210	184	150	123	103	87	75	65

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

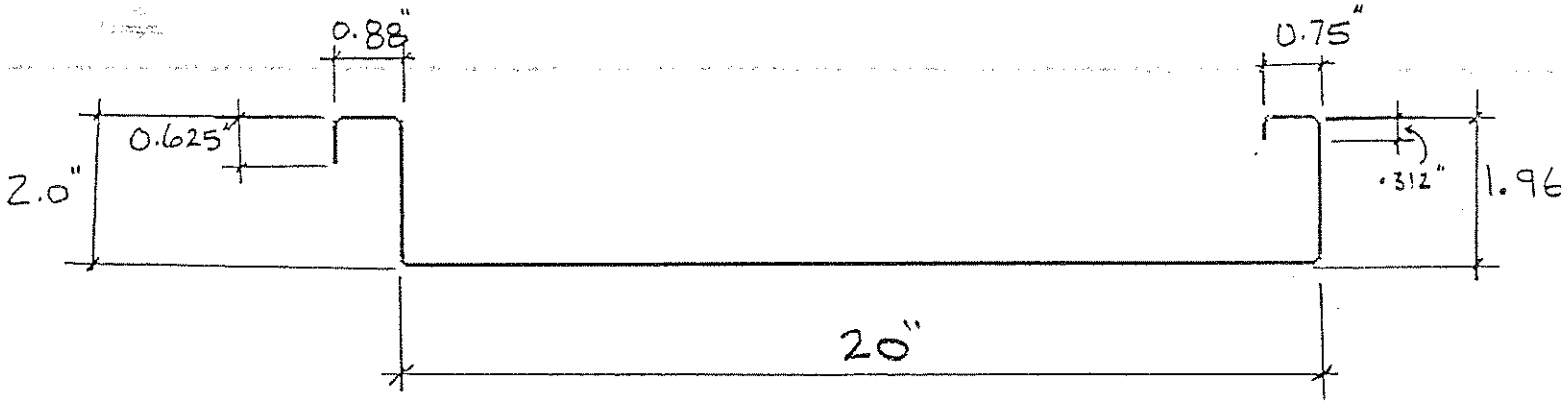
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 22 GA. (0.0299")

FY: 50 KSI

CFS Version 2.20

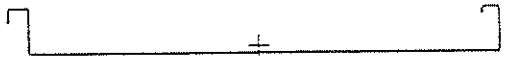
Section: SS22022
Rev. Date 08-25-1997
Rev. Time 18:08:11
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0299 22 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0900	No	0.00	0.000	0.312
0.880	0.000	0.0900	No	0.00	0.000	0.440
2.000	270.000	0.0900	Sgl	0.00	0.000	1.000
20.000	0.000	0.0900	Sgl	0.00	0.000	10.000
1.960	90.000	0.0900	Sgl	0.00	0.000	0.980
0.750	180.000	0.0900	No	0.00	0.000	0.375
0.312	270.000	0.0900	No	0.00	0.000	0.156



Full Section Properties

Area	0.7797	Wt.	2.6511	Width	26.0778
Ix	0.3109	rx	0.6314	Ixy	-0.2652
Sx(t)	0.1855	y(t)	1.6759	Alpha	89.5997
Sx(b)	0.9594	y(b)	0.3241		
Iy	38.2732	ry	7.0061	Xo	-0.0606
Sy(l)	3.6052	x(l)	10.6162	Yo	-0.9303
Sy(r)	3.7398	x(r)	10.2339	jx	0.0655
				jy	21.6209
I1	38.2751	r1	7.0063		
I2	0.3090	r2	0.6296		
Ic	38.5841	rc	7.0345	Cw	22.6533
Io	39.2617	ro	7.0960	J	0.0002324

CFS Version 2.20

Section: SS22022
Rev. Date 08-25-1997
Rev. Time 18:08:11
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	4.7397	Maxo	5.0200	Mayo	50.7296
Ae	0.1817	Ixe	0.2842	Iye	23.1284
		Sxe(t)	0.1673	Sye(l)	3.2246
Tension		Sxe(b)	0.9427	Sye(r)	1.6910
Ta	23.3918				
		Negative Moment		Negative Moment	
		Maxo	3.7400	Mayo	50.3498
Shear		Ixe	0.1326	Iye	23.4472
Vay	1.8852	Sxe(t)	0.1416	Sye(l)	1.6783
Vax	0.1129	Sxe(b)	0.1247	Sye(r)	3.4082

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$ Panel Width

$w_{dlp} := 1.587 \cdot psf$ Panel Weight

$M_{tc} := 5020 \cdot in \cdot lb$ Allowable Moment Top Compression

$M_{bc} := 3740 \cdot in \cdot lb$ Allowable Moment Bottom Compression

$V := 1885 \cdot lb$ Allowable Shear

$P_{ae} := 503 \cdot lb$ Allowable Web Crippling Exterior Condition

$P_{ai} := 1048 \cdot lb$ Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	500.4·lb·ft^{-2}	$1.1 \cdot 10^3$·lb·ft^{-2}	300.2·lb·ft^{-2}
2.5·ft	319.7·lb·ft^{-2}	903.2·lb·ft^{-2}	239.9·lb·ft^{-2}
3·ft	221.5·lb·ft^{-2}	752.4·lb·ft^{-2}	199.6·lb·ft^{-2}
3.5·ft	162.3·lb·ft^{-2}	644.7·lb·ft^{-2}	170.9·lb·ft^{-2}
4·ft	123.9·lb·ft^{-2}	563.9·lb·ft^{-2}	149.3·lb·ft^{-2}
4.5·ft	97.6·lb·ft^{-2}	501.1·lb·ft^{-2}	132.5·lb·ft^{-2}
5·ft	78.7·lb·ft^{-2}	450.8·lb·ft^{-2}	119.1·lb·ft^{-2}
5.5·ft	64.8·lb·ft^{-2}	409.7·lb·ft^{-2}	108.2·lb·ft^{-2}
6·ft	54.2·lb·ft^{-2}	375.4·lb·ft^{-2}	99·lb·ft^{-2}
6.5·ft	45.9·lb·ft^{-2}	346 4·lb·ft^{-2}	91.3·lb·ft^{-2}
7·ft	39.4·lb·ft^{-2}	321.6·lb·ft^{-2}	84.6·lb·ft^{-2}

L_i	WLL_i
2·ft	300 lb·ft^{-2}
2.5·ft	240·lb·ft^{-2}
3·ft	200·lb·ft^{-2}
3.5·ft	162·lb·ft^{-2}
4·ft	124·lb·ft^{-2}
4.5·ft	98·lb·ft^{-2}
5·ft	79·lb·ft^{-2}
5.5·ft	65·lb·ft^{-2}
6·ft	54·lb·ft^{-2}
6.5·ft	46·lb·ft^{-2}
7·ft	39·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.587 \cdot psf$	Panel Weight
$M_{tc} := 5020 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3740 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	372.4·lb·ft^{-2}	344.3·lb·ft^{-2}	250.9·lb·ft^{-2}	903.5·lb·ft^{-2}
2.5·ft	237.8·lb·ft^{-2}	225.9·lb·ft^{-2}	200.6·lb·ft^{-2}	722.6·lb·ft^{-2}
3·ft	164.6·lb·ft^{-2}	158.8·lb·ft^{-2}	167·lb·ft^{-2}	601.9·lb·ft^{-2}
3.5·ft	120.5·lb·ft^{-2}	117.4·lb·ft^{-2}	143.1·lb·ft^{-2}	515.8 lb·ft^{-2}
4·ft	91 9·lb·ft^{-2}	90.1·lb·ft^{-2}	125.1·lb·ft^{-2}	451.1·lb·ft^{-2}
4.5·ft	72.3·lb·ft^{-2}	71.1·lb·ft^{-2}	111.2·lb·ft^{-2}	400.9·lb·ft^{-2}
5·ft	58.3·lb·ft^{-2}	57.5·lb·ft^{-2}	100·lb·ft^{-2}	360.7·lb·ft^{-2}
5.5·ft	47.9·lb·ft^{-2}	47.4·lb·ft^{-2}	90.8·lb·ft^{-2}	327.7·lb·ft^{-2}
6·ft	40·lb·ft^{-2}	39.6·lb·ft^{-2}	83.2·lb·ft^{-2}	300.3·lb·ft^{-2}
6.5·ft	33.8·lb·ft^{-2}	33.6·lb·ft^{-2}	76.8·lb·ft^{-2}	277.1·lb·ft^{-2}
7·ft	28.9·lb·ft^{-2}	28.8·lb·ft^{-2}	71.2·lb·ft^{-2}	257.2·lb·ft^{-2}

L_i	WLL_i
2·ft	251·lb·ft^{-2}
2.5·ft	201·lb·ft^{-2}
3·ft	159·lb·ft^{-2}
3.5·ft	117·lb·ft^{-2}
4·ft	90·lb·ft^{-2}
4.5·ft	71·lb·ft^{-2}
5·ft	58·lb·ft^{-2}
5.5·ft	47·lb·ft^{-2}
6·ft	40·lb·ft^{-2}
6.5·ft	34·lb·ft^{-2}
7·ft	29·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 20 \cdot in$	Panel Width
$w_{dlp} = 1.587 \cdot psf$	Panel Weight
$M_{tc} = 5020 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 3740 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1885 \cdot lb$	Allowable Shear
$P_{ae} = 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i =$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	434.8·lb·ft^{-2}	393.8·lb·ft^{-2}	274.4·lb·ft^{-2}	930.3·lb·ft^{-2}
2.5·ft	277.6·lb·ft^{-2}	260·lb·ft^{-2}	219.4·lb·ft^{-2}	744·lb·ft^{-2}
3·ft	192.2·lb·ft^{-2}	183.5·lb·ft^{-2}	182.7·lb·ft^{-2}	619.8·lb·ft^{-2}
3.5·ft	140.7·lb·ft^{-2}	136·lb·ft^{-2}	156.5·lb·ft^{-2}	531.1·lb·ft^{-2}
4·ft	107.3·lb·ft^{-2}	104.5·lb·ft^{-2}	136.8·lb·ft^{-2}	464.5·lb·ft^{-2}
4.5·ft	84.4·lb·ft^{-2}	82.7·lb·ft^{-2}	121.6·lb·ft^{-2}	412.8·lb·ft^{-2}
5·ft	68·lb·ft^{-2}	66.9·lb·ft^{-2}	109.3·lb·ft^{-2}	371.3·lb·ft^{-2}
5.5·ft	55.9·lb·ft^{-2}	55.1·lb·ft^{-2}	99.3·lb·ft^{-2}	337.5·lb·ft^{-2}
6·ft	46.7·lb·ft^{-2}	46.1·lb·ft^{-2}	91·lb·ft^{-2}	309.2·lb·ft^{-2}
6.5·ft	39.5·lb·ft^{-2}	39.1·lb·ft^{-2}	83.9·lb·ft^{-2}	285.3·lb·ft^{-2}
7·ft	33.8·lb·ft^{-2}	33.5·lb·ft^{-2}	77.9·lb·ft^{-2}	264.9·lb·ft^{-2}

L_i	WLL_i
2·ft	274·lb·ft^{-2}
2.5·ft	219·lb·ft^{-2}
3·ft	183·lb·ft^{-2}
3.5·ft	136·lb·ft^{-2}
4·ft	105·lb·ft^{-2}
4.5·ft	83·lb·ft^{-2}
5·ft	67·lb·ft^{-2}
5.5·ft	55·lb·ft^{-2}
6·ft	46·lb·ft^{-2}
6.5·ft	39·lb·ft^{-2}
7·ft	34·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.587 \cdot psf$	Panel Weight
$M_{tc} := 5020 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3740 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	404·lb·ft^{-2}
2.5·ft	320·lb·ft^{-2}
3·ft	223·lb·ft^{-2}
3.5·ft	165·lb·ft^{-2}
4·ft	126·lb·ft^{-2}
4.5·ft	100·lb·ft^{-2}
5·ft	82·lb·ft^{-2}
5.5·ft	68·lb·ft^{-2}
6·ft	57·lb·ft^{-2}
6.5·ft	49·lb·ft^{-2}
7·ft	43·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 20 \cdot in$	Panel Width
$w_{dlp} = 1.578 \cdot psf$	Panel Weight
$M_{tc} = 5020 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} = 3740 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V = 1885 \cdot lb$	Allowable Shear
$P_{ae} = 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} = 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} = if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} = if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} = if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} = if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i = if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	503.6·lb·ft^{-2}	440.2·lb·ft^{-2}	252.2·lb·ft^{-2}	906.1·lb·ft^{-2}
2.5·ft	322.9·lb·ft^{-2}	294.9·lb·ft^{-2}	201.8·lb·ft^{-2}	725.1·lb·ft^{-2}
3·ft	224.7·lb·ft^{-2}	210.6·lb·ft^{-2}	168.3·lb·ft^{-2}	604.5·lb·ft^{-2}
3.5·ft	165.5·lb·ft^{-2}	157.7·lb·ft^{-2}	144.4·lb·ft^{-2}	518.3·lb·ft^{-2}
4·ft	127.1·lb·ft^{-2}	122.4·lb·ft^{-2}	126.4·lb·ft^{-2}	453.7·lb·ft^{-2}
4.5·ft	100.7·lb·ft^{-2}	97.7·lb·ft^{-2}	112.4·lb·ft^{-2}	403.4·lb·ft^{-2}
5·ft	81.9·lb·ft^{-2}	79.9·lb·ft^{-2}	101.2·lb·ft^{-2}	363.2·lb·ft^{-2}
5.5·ft	68·lb·ft^{-2}	66.6·lb·ft^{-2}	92.1·lb·ft^{-2}	330.3·lb·ft^{-2}
6·ft	57.4·lb·ft^{-2}	56.4·lb·ft^{-2}	84.5·lb·ft^{-2}	302.9·lb·ft^{-2}
6.5·ft	49.1·lb·ft^{-2}	48.4·lb·ft^{-2}	78·lb·ft^{-2}	279.7·lb·ft^{-2}
7·ft	42.6·lb·ft^{-2}	42·lb·ft^{-2}	72.5·lb·ft^{-2}	259.8·lb·ft^{-2}

L_i	WLL_i
2·ft	335·lb·ft^{-2}
2.5·ft	268·lb·ft^{-2}
3·ft	224·lb·ft^{-2}
3.5·ft	192·lb·ft^{-2}
4·ft	163·lb·ft^{-2}
4.5·ft	130·lb·ft^{-2}
5·ft	106·lb·ft^{-2}
5.5·ft	89·lb·ft^{-2}
6·ft	75·lb·ft^{-2}
6.5·ft	64·lb·ft^{-2}
7·ft	56·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 20" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 20 \cdot in$	Panel Width
$w_{dlp} := 1.587 \cdot psf$	Panel Weight
$M_{tc} := 5020 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3740 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

3sw2022.MCD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	587.9·lb·ft^{-2}	497.3·lb·ft^{-2}	275.8·lb·ft^{-2}	932.9·lb·ft^{-2}
2.5·ft	376.9·lb·ft^{-2}	336.4·lb·ft^{-2}	220.7·lb·ft^{-2}	746.6·lb·ft^{-2}
3·ft	262.3·lb·ft^{-2}	241.7·lb·ft^{-2}	184.1·lb·ft^{-2}	622.4·lb·ft^{-2}
3.5·ft	193.2·lb·ft^{-2}	181.6·lb·ft^{-2}	157.9·lb·ft^{-2}	533.7·lb·ft^{-2}
4·ft	148.4·lb·ft^{-2}	141.4·lb·ft^{-2}	138.2·lb·ft^{-2}	467.1·lb·ft^{-2}
4.5·ft	117.6·lb·ft^{-2}	113.1·lb·ft^{-2}	122.9·lb·ft^{-2}	415.4·lb·ft^{-2}
5·ft	95.6·lb·ft^{-2}	92.6·lb·ft^{-2}	110.7·lb·ft^{-2}	374·lb·ft^{-2}
5.5·ft	79.4·lb·ft^{-2}	77.3·lb·ft^{-2}	100.7·lb·ft^{-2}	340.1·lb·ft^{-2}
6·ft	67·lb·ft^{-2}	65.5·lb·ft^{-2}	92.4·lb·ft^{-2}	311.9·lb·ft^{-2}
6.5·ft	57.3·lb·ft^{-2}	56.2·lb·ft^{-2}	85.3·lb·ft^{-2}	288·lb·ft^{-2}
7·ft	49.7·lb·ft^{-2}	48.8·lb·ft^{-2}	79.3·lb·ft^{-2}	267.5·lb·ft^{-2}

L_i	WLL_i
2·ft	367·lb·ft^{-2}
2.5·ft	294·lb·ft^{-2}
3·ft	245·lb·ft^{-2}
3.5·ft	210·lb·ft^{-2}
4·ft	184·lb·ft^{-2}
4.5·ft	150·lb·ft^{-2}
5·ft	123·lb·ft^{-2}
5.5·ft	103·lb·ft^{-2}
6·ft	87·lb·ft^{-2}
6.5·ft	75·lb·ft^{-2}
7·ft	65·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
24" WIDE X 24 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:
ZIMMERMAN METALS, INC.
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Prepared By:

YOOSEF LAVI, P.E.
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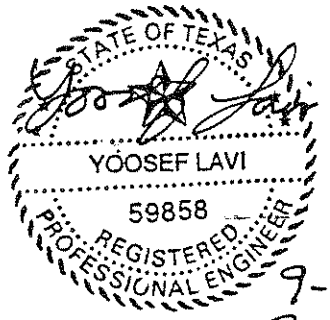

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ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	24 in.	1	173	138	115	96	73	58	47	38	32	27	23
		2	150	120	94	70	53	42	34	28	23	20	17
		3	164	131	108	80	62	49	40	33	27	23	20

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
24 GA Steel	24 in.	1	234	187	134	99	76	60	49	41	35	30	26
		2	200	160	134	115	96	77	63	53	45	39	34
		3	219	175	146	125	110	89	73	61	52	45	39

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

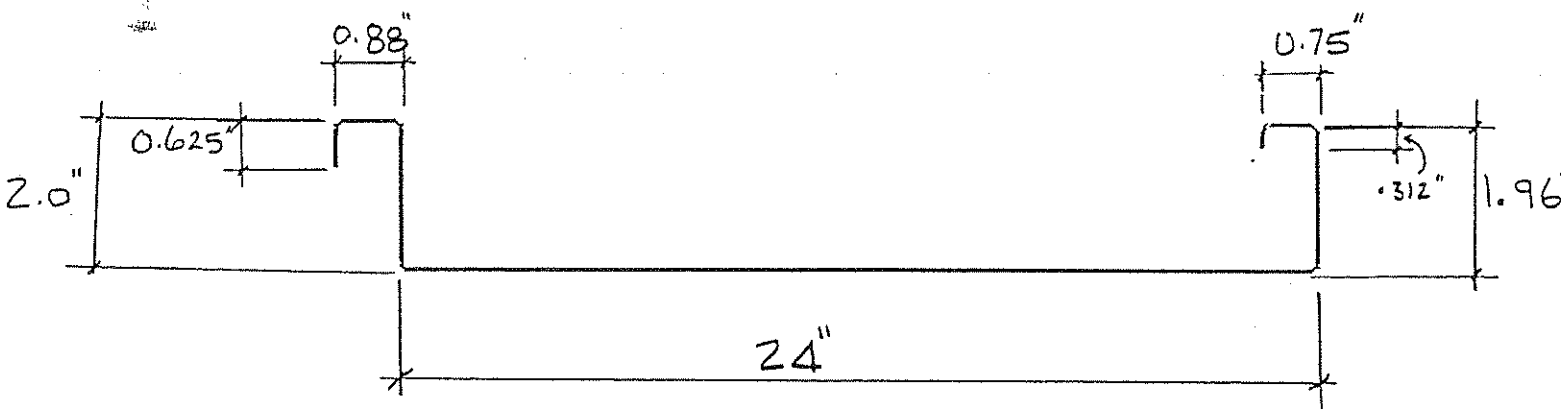
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 24 GA. (0.0239")

FY: 50 KSI

CFS Version 2.20

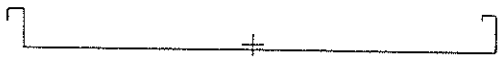
Section: SS22424
Rev. Date 08-25-1997
Rev. Time 18:02:43
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0239 24 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0720	No	0.00	0.000	0.312
0.880	0.000	0.0720	No	0.00	0.000	0.440
2.000	270.000	0.0720	Sgl	0.00	0.000	1.000
24.000	0.000	0.0720	Sgl	0.00	0.000	12.000
1.960	90.000	0.0720	Sgl	0.00	0.000	0.980
0.750	180.000	0.0720	No	0.00	0.000	0.375
0.312	270.000	0.0720	No	0.00	0.000	0.156



Full Section Properties

Area	0.7210	Wt.	2.4514	Width	30.1679
Ix	0.2619	rx	0.6027	Ixy	-0.2539
Sx(t)	0.1526	y(t)	1.7162	Alpha	89.7011
Sx(b)	0.9228	y(b)	0.2838		
Iy	48.9309	ry	8.2380	Xo	-0.2483
Sy(l)	3.8770	x(l)	12.6207	Yo	-0.8417
Sy(r)	3.9991	x(r)	12.2354	jx	0.2531
				jy	30.4099
I1	48.9322	r1	8.2381		
I2	0.2606	r2	0.6012		
Ic	49.1928	rc	8.2600	Cw	28.3317
Io	49.7480	ro	8.3065	J	0.0001373

CFS Version 2.20

Section: SS22424
Rev. Date 08-25-1997
Rev. Time 18:02:43
Rev. by
Phone
Fax

Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	3.2380	Maxo	3.5868	Mayo	43.2310
Ae	0.1241	Ixe	0.2115	Iye	24.8623
		Sxe(t)	0.1196	Sye(l)	3.2701
Tension		Sxe(b)	0.9150	Sye(r)	1.4410
Ta	21.6304				
		Negative Moment		Negative Moment	
		Maxo	2.6876	Mayo	40.3158
Shear		Ixe	0.0996	Iye	23.9286
Vay	1.2049	Sxe(t)	0.1121	Sye(l)	1.3439
Vax	0.0479	Sxe(b)	0.0896	Sye(r)	3.3940

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.225 \cdot psf$	Panel Weight
$M_{tc} := 3586 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	$297.6\cdot lb\cdot ft^{-2}$	$601.3\cdot lb\cdot ft^{-2}$	$173.3\cdot lb\cdot ft^{-2}$
2.5·ft	$190\cdot lb\cdot ft^{-2}$	$480.8\cdot lb\cdot ft^{-2}$	$138.4\cdot lb\cdot ft^{-2}$
3·ft	$131.6\cdot lb\cdot ft^{-2}$	$400.4\cdot lb\cdot ft^{-2}$	$115.1\cdot lb\cdot ft^{-2}$
3.5·ft	$96.4\cdot lb\cdot ft^{-2}$	$343.1\cdot lb\cdot ft^{-2}$	$98.5\cdot lb\cdot ft^{-2}$
4·ft	$73.5\cdot lb\cdot ft^{-2}$	$300\cdot lb\cdot ft^{-2}$	$86\cdot lb\cdot ft^{-2}$
4.5·ft	$57.8\cdot lb\cdot ft^{-2}$	$266.6\cdot lb\cdot ft^{-2}$	$76.3\cdot lb\cdot ft^{-2}$
5·ft	$46.6\cdot lb\cdot ft^{-2}$	$239.8\cdot lb\cdot ft^{-2}$	$68.6\cdot lb\cdot ft^{-2}$
5.5·ft	$38.3\cdot lb\cdot ft^{-2}$	$217.9\cdot lb\cdot ft^{-2}$	$62.2\cdot lb\cdot ft^{-2}$
6·ft	$32\cdot lb\cdot ft^{-2}$	$199.6\cdot lb\cdot ft^{-2}$	$56.9\cdot lb\cdot ft^{-2}$
6.5·ft	$27.1\cdot lb\cdot ft^{-2}$	$184.2\cdot lb\cdot ft^{-2}$	$52.5\cdot lb\cdot ft^{-2}$
7·ft	$23.2\cdot lb\cdot ft^{-2}$	$170.9\cdot lb\cdot ft^{-2}$	$48.6\cdot lb\cdot ft^{-2}$

L_i	WLL_i
2·ft	$173\cdot lb\cdot ft^{-2}$
2.5·ft	$138\cdot lb\cdot ft^{-2}$
3·ft	$115\cdot lb\cdot ft^{-2}$
3.5·ft	$96\cdot lb\cdot ft^{-2}$
4·ft	$73\cdot lb\cdot ft^{-2}$
4.5·ft	$58\cdot lb\cdot ft^{-2}$
5·ft	$47\cdot lb\cdot ft^{-2}$
5.5·ft	$38\cdot lb\cdot ft^{-2}$
6·ft	$32\cdot lb\cdot ft^{-2}$
6.5·ft	$27\cdot lb\cdot ft^{-2}$
7·ft	$23\cdot lb\cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.225 \cdot psf$	Panel Weight
$M_{tc} := 3586 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	222.7·lb·ft^{-2}	202.1·lb·ft^{-2}	149.5·lb·ft^{-2}	481·lb·ft^{-2}
2.5·ft	142.1·lb·ft^{-2}	133.3·lb·ft^{-2}	119.5·lb·ft^{-2}	384.6·lb·ft^{-2}
3·ft	98.3·lb·ft^{-2}	94·lb·ft^{-2}	99.5·lb·ft^{-2}	320.4·lb·ft^{-2}
3.5·ft	71.9·lb·ft^{-2}	69.5·lb·ft^{-2}	85.2·lb·ft^{-2}	274.4·lb·ft^{-2}
4·ft	54.8·lb·ft^{-2}	53.4·lb·ft^{-2}	74.5·lb·ft^{-2}	240·lb·ft^{-2}
4.5·ft	43·lb·ft^{-2}	42.2·lb·ft^{-2}	66.2·lb·ft^{-2}	213.2·lb·ft^{-2}
5·ft	34.6·lb·ft^{-2}	34.1·lb·ft^{-2}	59.5·lb·ft^{-2}	191.8·lb·ft^{-2}
5.5·ft	28.4·lb·ft^{-2}	28·lb·ft^{-2}	54.1·lb·ft^{-2}	174.3·lb·ft^{-2}
6·ft	23.7·lb·ft^{-2}	23.4·lb·ft^{-2}	49.5·lb·ft^{-2}	159.7·lb·ft^{-2}
6.5·ft	20·lb·ft^{-2}	19.8·lb·ft^{-2}	45.7·lb·ft^{-2}	147.3·lb·ft^{-2}
7·ft	17.1·lb·ft^{-2}	16.9·lb·ft^{-2}	42.4·lb·ft^{-2}	136.7·lb·ft^{-2}

L_i	WLL_i
2·ft	150·lb·ft^{-2}
2.5·ft	120·lb·ft^{-2}
3·ft	94·lb·ft^{-2}
3.5·ft	70·lb·ft^{-2}
4·ft	53·lb·ft^{-2}
4.5·ft	42·lb·ft^{-2}
5·ft	34·lb·ft^{-2}
5.5·ft	28·lb·ft^{-2}
6·ft	23·lb·ft^{-2}
6.5·ft	20·lb·ft^{-2}
7·ft	17·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.225 \cdot psf$	Panel Weight
$M_{tc} := 3568 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	260·lb·ft^{-2}	230.1·lb·ft^{-2}	163.5·lb·ft^{-2}	495.3·lb·ft^{-2}
2.5·ft	165.9·lb·ft^{-2}	153·lb·ft^{-2}	130.7·lb·ft^{-2}	396·lb·ft^{-2}
3·ft	114.8·lb·ft^{-2}	108.4·lb·ft^{-2}	108.8·lb·ft^{-2}	329.9·lb·ft^{-2}
3.5·ft	83.9·lb·ft^{-2}	80.4·lb·ft^{-2}	93.2·lb·ft^{-2}	282.6·lb·ft^{-2}
4·ft	63.9·lb·ft^{-2}	61.9·lb·ft^{-2}	81.5·lb·ft^{-2}	247.1·lb·ft^{-2}
4.5·ft	50.2·lb·ft^{-2}	48.9·lb·ft^{-2}	72.4·lb·ft^{-2}	219.6·lb·ft^{-2}
5·ft	40.4·lb·ft^{-2}	39.6·lb·ft^{-2}	65.1·lb·ft^{-2}	197.5·lb·ft^{-2}
5.5·ft	33.1·lb·ft^{-2}	32.6·lb·ft^{-2}	59.1·lb·ft^{-2}	179.5·lb·ft^{-2}
6·ft	27.6·lb·ft^{-2}	27.2·lb·ft^{-2}	54.1·lb·ft^{-2}	164.4·lb·ft^{-2}
6.5·ft	23.3·lb·ft^{-2}	23·lb·ft^{-2}	49.9·lb·ft^{-2}	151.7·lb·ft^{-2}
7·ft	19.9·lb·ft^{-2}	19.7·lb·ft^{-2}	46.3·lb·ft^{-2}	140.8·lb·ft^{-2}

L_i	WLL_i
2·ft	164·lb·ft^{-2}
2.5·ft	131·lb·ft^{-2}
3·ft	108·lb·ft^{-2}
3.5·ft	80·lb·ft^{-2}
4·ft	62·lb·ft^{-2}
4.5·ft	49·lb·ft^{-2}
5·ft	40·lb·ft^{-2}
5.5·ft	33·lb·ft^{-2}
6·ft	27·lb·ft^{-2}
6.5·ft	23·lb·ft^{-2}
7·ft	20·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.226 \cdot psf$	Panel Weight
$M_{tc} := 3586 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8} \qquad V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2} \qquad C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$$

$$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$$

$$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$$

$$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$$

$$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$$

$$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$$

L_i	WLL_i
2·ft	234·lb·ft^{-2}
2.5·ft	187·lb·ft^{-2}
3·ft	134·lb·ft^{-2}
3.5·ft	99·lb·ft^{-2}
4·ft	76·lb·ft^{-2}
4.5·ft	60·lb·ft^{-2}
5·ft	49·lb·ft^{-2}
5.5·ft	41·lb·ft^{-2}
6·ft	35·lb·ft^{-2}
6.5·ft	30·lb·ft^{-2}
7·ft	26·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.225 \cdot psf$	Panel Weight
$M_{tc} := 3587 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2}} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	300.1·lb·ft^{-2}	254.9·lb·ft^{-2}	150.5·lb·ft^{-2}	483·lb·ft^{-2}
2.5·ft	192.5·lb·ft^{-2}	172.3·lb·ft^{-2}	120.5·lb·ft^{-2}	386.6·lb·ft^{-2}
3·ft	134.1·lb·ft^{-2}	123.8·lb·ft^{-2}	100.5·lb·ft^{-2}	322.3·lb·ft^{-2}
3.5·ft	98.8·lb·ft^{-2}	93.1·lb·ft^{-2}	86.2·lb·ft^{-2}	276.4·lb·ft^{-2}
4·ft	76·lb·ft^{-2}	72.5·lb·ft^{-2}	75.5·lb·ft^{-2}	242·lb·ft^{-2}
4.5·ft	60.3·lb·ft^{-2}	58·lb·ft^{-2}	67.2·lb·ft^{-2}	215.2·lb·ft^{-2}
5·ft	49.1·lb·ft^{-2}	47.6·lb·ft^{-2}	60.5·lb·ft^{-2}	193.8·lb·ft^{-2}
5.5·ft	40.8·lb·ft^{-2}	39.7·lb·ft^{-2}	55·lb·ft^{-2}	176.3·lb·ft^{-2}
6·ft	34.4·lb·ft^{-2}	33.7·lb·ft^{-2}	50.5·lb·ft^{-2}	161.6·lb·ft^{-2}
6.5·ft	29.5·lb·ft^{-2}	29·lb·ft^{-2}	46.6·lb·ft^{-2}	149.3·lb·ft^{-2}
7·ft	25.6·lb·ft^{-2}	25.2·lb·ft^{-2}	43.3·lb·ft^{-2}	138.7·lb·ft^{-2}

L_i	WLL_i
2·ft	200·lb·ft^{-2}
2.5·ft	160·lb·ft^{-2}
3·ft	134·lb·ft^{-2}
3.5·ft	115·lb·ft^{-2}
4·ft	96·lb·ft^{-2}
4.5·ft	77·lb·ft^{-2}
5·ft	63·lb·ft^{-2}
5.5·ft	53·lb·ft^{-2}
6·ft	45·lb·ft^{-2}
6.5·ft	39·lb·ft^{-2}
7·ft	34·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 24 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.225 \cdot psf$	Panel Weight
$M_{tc} := 3586 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 2687 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1205 \cdot lb$	Allowable Shear
$P_{ae} := 349 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 750 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

W_{b_i}
350.3·lb·ft^{-2}
224.7·lb·ft^{-2}
156.5·lb·ft^{-2}
115.4·lb·ft^{-2}
88.7·lb·ft^{-2}
70.3·lb·ft^{-2}
57.3·lb·ft^{-2}
47.6·lb·ft^{-2}
40.2·lb·ft^{-2}
34.5·lb·ft^{-2}
29.9·lb·ft^{-2}

W_{sb_i}
286.3·lb·ft^{-2}
195.6·lb·ft^{-2}
141.5·lb·ft^{-2}
106.9·lb·ft^{-2}
83.5·lb·ft^{-2}
67·lb·ft^{-2}
55·lb·ft^{-2}
46·lb·ft^{-2}
39.1·lb·ft^{-2}
33.6·lb·ft^{-2}
29.3·lb·ft^{-2}

W_{c_i}
164.6·lb·ft^{-2}
131.8·lb·ft^{-2}
109.9·lb·ft^{-2}
94.3·lb·ft^{-2}
82.6·lb·ft^{-2}
73.4·lb·ft^{-2}
66.2·lb·ft^{-2}
60.2·lb·ft^{-2}
55.2·lb·ft^{-2}
51·lb·ft^{-2}
47.4·lb·ft^{-2}

W_{so_i}
497.3·lb·ft^{-2}
398·lb·ft^{-2}
331.9·lb·ft^{-2}
284.6·lb·ft^{-2}
249.2·lb·ft^{-2}
221.6·lb·ft^{-2}
199.5·lb·ft^{-2}
181.5·lb·ft^{-2}
166.4·lb·ft^{-2}
153.7·lb·ft^{-2}
142.8·lb·ft^{-2}

L_i
2·ft
2.5·ft
3·ft
3.5·ft
4·ft
4.5·ft
5·ft
5.5·ft
6·ft
6.5·ft
7·ft

WLL_i
219·lb·ft^{-2}
175·lb·ft^{-2}
146·lb·ft^{-2}
125·lb·ft^{-2}
110·lb·ft^{-2}
89·lb·ft^{-2}
73·lb·ft^{-2}
61·lb·ft^{-2}
52·lb·ft^{-2}
45·lb·ft^{-2}
39·lb·ft^{-2}

STRUCTURAL CALCULATIONS FOR:
24" WIDE X 22 GA STEEL
ZIMMERMAN METAL SS-2000 ROOF PANEL

Prepared For:

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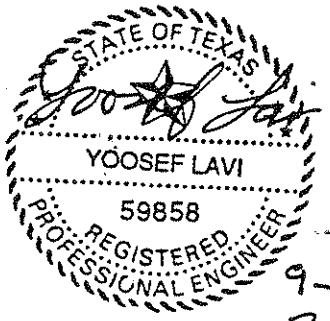

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ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE LIVE LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)										
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	24 in.	1	250	200	166	134	103	81	65	54	45	38	32
		2	209	167	132	98	75	59	48	39	33	28	24
		3	229	183	152	113	87	69	56	46	38	32	28

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, and all supports must be designed to resist load imposed by the panel.

4. Materials:

   FY = 50 KSI for steel panels

5. All Loads are in PSF.

6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

ALLOWABLE LOAD TABLES FOR:
ZIMMERMAN METAL SS2000 ROOF PANEL

ALLOWABLE UPLIFT LOAD (PSF)

Panel Gage	Panel Width	# of Equal Spans	SPAN (FT.)									
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
22 GA Steel	24 in.	1	337	268	187	138	106	84	68	57	48	41	36
		2	280	224	187	160	135	108	88	74	62	54	47
		3	306	245	204	175	153	125	103	86	73	62	54

NOTES:

1. All calculations for panel properties have been made in accordance with 1996 edition of "Specification for Cold-Formed Steel Design Manual" published by American Iron and Steel Institute.

2. Values for 3 or more spans are based on 4 equal spans.

3. These load capacities are for the panel itself. Frames, purlins, clips, fasteners, panel interlocking and all supports must be designed to resist load imposed by the panel.

4. Materials:
   FY = 50 KSI for steel panels

5. All Loads are in PSF.

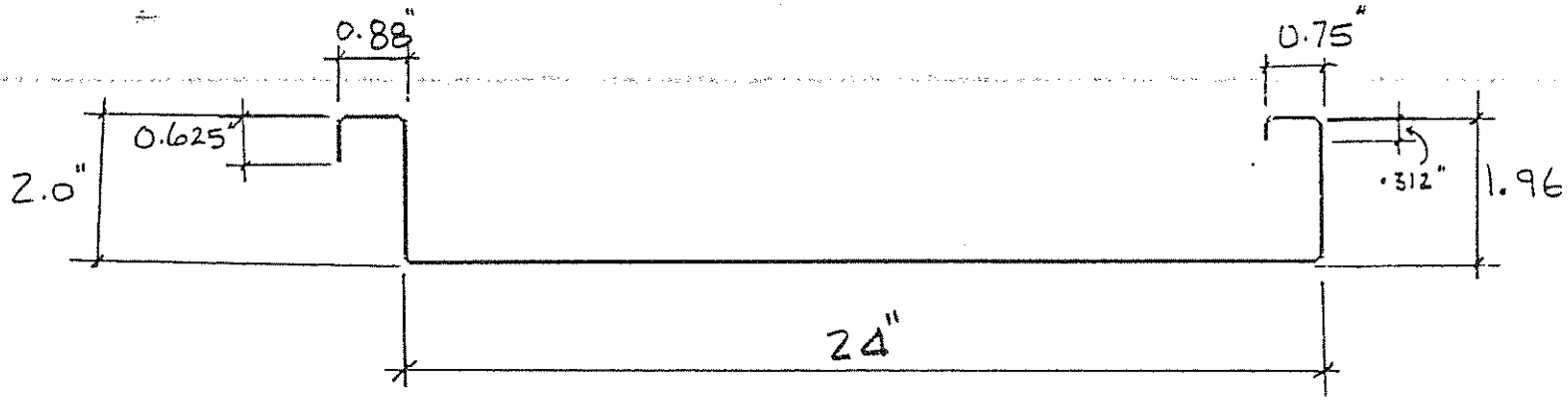
6. Minimum panel support bearing length = 3.00 in.

7. Loads shown are limited by L/180 deflection.

8. Above capacities have been increased by 33-1/3% as per AISI Sec. A4.4

9. **THESE UPLIFT LOAD TABLES ARE FOR PANEL CAPACITY ONLY. FULL SCALE TESTS SUCH AS ASTM E-1592 MUST BE CONDUCTED TO DETERMINE THE FULL CAPACITY OF THE PANEL SYSTEM INCLUDING CLIPS, AND PANEL INTERLOCKING SYSTEM.**

ZIMMERMAN METAL SS2000 ROOF PANEL



ALL INSISIDE RAD. 0.072 U.N.O.

THICKNESS: 22 GA. (0.0299")

FY: 50 KSI

CFS Version 2.20

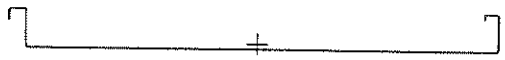
Section: SS22422
Rev. Date 08-25-1997
Rev. Time 18:08:49
Rev. by
Phone
Fax

Section Input

Yield	(Fy)	50.000	Unit Weight	3.4000
Ultimate	(Fu)	50.000	One Inch =	1.0000
Modulus	(E)	29500.000	Cw Override	0.0000
			J Override	0.0000

Part 1 Thickness 0.0299 22 GAGE X=0.000, Y=0.000

Length	Angle	Radius	Web	k	Hole Distance	
0.625	90.000	0.0900	No	0.00	0.000	0.312
0.880	0.000	0.0900	No	0.00	0.000	0.440
2.000	270.000	0.0900	Sgl	0.00	0.000	1.000
24.000	0.000	0.0900	Sgl	0.00	0.000	12.000
1.960	90.000	0.0900	Sgl	0.00	0.000	0.980
0.750	180.000	0.0900	No	0.00	0.000	0.375
0.312	270.000	0.0900	No	0.00	0.000	0.156



Full Section Properties

Area	0.8993	Wt.	3.0577	Width	30.0778
Ix	0.3208	rx	0.5973	Ixy	-0.3155
Sx(t)	0.1868	y(t)	1.7170	Alpha	89.7011
Sx(b)	1.1338	y(b)	0.2830		
Iy	60.8106	ry	8.2230	Xo	-0.2730
Sy(l)	4.8204	x(l)	12.6152	Yo	-0.8313
Sy(r)	4.9702	x(r)	12.2349	jx	0.2787
				jy	30.5718
I1	60.8122	r1	8.2231		
I2	0.3192	r2	0.5957		
Ic	61.1314	rc	8.2447	Cw	34.7099
Io	61.8199	ro	8.2910	J	0.0002680

CFS Version 2.20

Section: SS22422
Rev. Date 08-25-1997
Rev. Time 18:08:49
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Fully Braced Allowables

Compression		Positive Moment		Positive Moment	
Pao	4.7425	Maxo	4.9979	Mayo	60.9092
Ae	0.1818	Ixe	0.2899	Iye	34.0155
		Sxe(t)	0.1666	Sye(l)	4.2014
Tension		Sxe(b)	1.1154	Sye(r)	2.0303
Ta	26.9798				
		Negative Moment		Negative Moment	
		Maxo	3.7451	Mayo	60.6900
Shear		Ixe	0.1327	Iye	34.4765
Vay	1.8852	Sxe(t)	0.1417	Sye(l)	2.0230
Vax	0.0939	Sxe(b)	0.1248	Sye(r)	4.4156

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.529 \cdot psf$	Panel Weight
$M_{tc} := 4998 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3744 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ BENDING

$W_{s_i} := \frac{V - V_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ SHEAR

$W_{c_i} := \frac{P_{ae} - C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$ WEB CRIPPLING

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{s_i}	W_{c_i}
2·ft	415·lb·ft^{-2}	941·lb·ft^{-2}	250·lb·ft^{-2}
2.5·ft	265·lb·ft^{-2}	752.5·lb·ft^{-2}	199.7·lb·ft^{-2}
3·ft	183.6·lb·ft^{-2}	626.8·lb·ft^{-2}	166.1·lb·ft^{-2}
3.5·ft	134.5·lb·ft^{-2}	537·lb·ft^{-2}	142.2·lb·ft^{-2}
4·ft	102.6·lb·ft^{-2}	469.7·lb·ft^{-2}	124.2·lb·ft^{-2}
4.5·ft	80.7·lb·ft^{-2}	417.4·lb·ft^{-2}	110.2·lb·ft^{-2}
5·ft	65.1·lb·ft^{-2}	375.5·lb·ft^{-2}	99.1·lb·ft^{-2}
5.5·ft	53.5·lb·ft^{-2}	341.2·lb·ft^{-2}	89.9·lb·ft^{-2}
6·ft	44.7·lb·ft^{-2}	312.6·lb·ft^{-2}	82.3·lb·ft^{-2}
6.5·ft	37.9·lb·ft^{-2}	288.5·lb·ft^{-2}	75.9·lb·ft^{-2}
7·ft	32.5·lb·ft^{-2}	267.8·lb·ft^{-2}	70.3·lb·ft^{-2}

L_i	WLL_i
2·ft	250·lb·ft^{-2}
2.5·ft	200·lb·ft^{-2}
3·ft	166·lb·ft^{-2}
3.5·ft	134·lb·ft^{-2}
4·ft	103·lb·ft^{-2}
4.5·ft	81·lb·ft^{-2}
5·ft	65·lb·ft^{-2}
5.5·ft	54·lb·ft^{-2}
6·ft	45·lb·ft^{-2}
6.5·ft	38·lb·ft^{-2}
7·ft	32·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.529 \cdot psf$	Panel Weight
$M_{tc} := 4998 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3745 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	310.6·lb·ft^{-2}	287.1·lb·ft^{-2}	209·lb·ft^{-2}	752.8·lb·ft^{-2}
2.5·ft	198.2·lb·ft^{-2}	188.3·lb·ft^{-2}	167.1·lb·ft^{-2}	602·lb·ft^{-2}
3·ft	137.2·lb·ft^{-2}	132.3·lb·ft^{-2}	139.1·lb·ft^{-2}	501.4·lb·ft^{-2}
3.5·ft	100.4·lb·ft^{-2}	97.7·lb·ft^{-2}	119.2·lb·ft^{-2}	429.6·lb·ft^{-2}
4·ft	76.5·lb·ft^{-2}	75·lb·ft^{-2}	104.2·lb·ft^{-2}	375.8·lb·ft^{-2}
4.5·ft	60.1·lb·ft^{-2}	59.2·lb·ft^{-2}	92.5·lb·ft^{-2}	333.9·lb·ft^{-2}
5·ft	48.4·lb·ft^{-2}	47.8·lb·ft^{-2}	83.2·lb·ft^{-2}	300.4·lb·ft^{-2}
5.5·ft	39.7·lb·ft^{-2}	39.3·lb·ft^{-2}	75.6·lb·ft^{-2}	273·lb·ft^{-2}
6·ft	33.1·lb·ft^{-2}	32.9·lb·ft^{-2}	69.3·lb·ft^{-2}	250.1·lb·ft^{-2}
6.5·ft	28·lb·ft^{-2}	27.8·lb·ft^{-2}	63.9·lb·ft^{-2}	230.8·lb·ft^{-2}
7·ft	23.9·lb·ft^{-2}	23.8·lb·ft^{-2}	59.3·lb·ft^{-2}	214.2·lb·ft^{-2}

L_i	WLL_i
2·ft	209·lb·ft^{-2}
2.5·ft	167·lb·ft^{-2}
3·ft	132·lb·ft^{-2}
3.5·ft	98·lb·ft^{-2}
4·ft	75·lb·ft^{-2}
4.5·ft	59·lb·ft^{-2}
5·ft	48·lb·ft^{-2}
5.5·ft	39·lb·ft^{-2}
6·ft	33·lb·ft^{-2}
6.5·ft	28·lb·ft^{-2}
7·ft	24·lb·ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 22 GA., FY = 50 KSI

THREE SPAN CONDITION
ALLOWABLE LIVE LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w = 24 \cdot in$	Panel Width
$w_{dlp} := 1.529 \cdot psf$	Panel Weight
$M_{tc} := 4998 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3744 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(13) \cdot (M_{tc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending between supports $W_{bs_i} := \frac{(9.34) \cdot (M_{bc} - M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V - V_{dl_i}}{0.607 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.607^2 \cdot (L_i)^2}{(V - V_{dl_i})^2} + .1071^2 \cdot \frac{(L_i)^4}{(M_{bc} - M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} - C_{dl_i}}{0.393 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} - C_{dl_i}}{1.143 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i})$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2 ft	362.5 lb ft^{-2}	328.3 lb ft^{-2}	228.6 lb ft^{-2}	775.1 lb ft^{-2}
2.5 ft	231.3 lb ft^{-2}	216.7 lb ft^{-2}	182.7 lb ft^{-2}	619.8 lb ft^{-2}
3 ft	160.1 lb ft^{-2}	152.9 lb ft^{-2}	152.1 lb ft^{-2}	516.3 lb ft^{-2}
3.5 ft	117.2 lb ft^{-2}	113.2 lb ft^{-2}	130.3 lb ft^{-2}	442.4 lb ft^{-2}
4 ft	89.3 lb ft^{-2}	87 lb ft^{-2}	113.9 lb ft^{-2}	386.9 lb ft^{-2}
4.5 ft	70.2 lb ft^{-2}	68.7 lb ft^{-2}	101.2 lb ft^{-2}	343.8 lb ft^{-2}
5 ft	56.5 lb ft^{-2}	55.6 lb ft^{-2}	91 lb ft^{-2}	309.3 lb ft^{-2}
5.5 ft	46.4 lb ft^{-2}	45.7 lb ft^{-2}	82.7 lb ft^{-2}	281.1 lb ft^{-2}
6 ft	38.7 lb ft^{-2}	38.2 lb ft^{-2}	75.7 lb ft^{-2}	257.5 lb ft^{-2}
6.5 ft	32.7 lb ft^{-2}	32.4 lb ft^{-2}	69.9 lb ft^{-2}	237.6 lb ft^{-2}
7 ft	28 lb ft^{-2}	27.7 lb ft^{-2}	64.8 lb ft^{-2}	220.6 lb ft^{-2}

L_i	WLL_i
2 ft	229 lb ft^{-2}
2.5 ft	183 lb ft^{-2}
3 ft	152 lb ft^{-2}
3.5 ft	113 lb ft^{-2}
4 ft	87 lb ft^{-2}
4.5 ft	69 lb ft^{-2}
5 ft	56 lb ft^{-2}
5.5 ft	46 lb ft^{-2}
6 ft	38 lb ft^{-2}
6.5 ft	32 lb ft^{-2}
7 ft	28 lb ft^{-2}

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 22 GA., FY = 50 KSI

SIMPLE SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.528 \cdot psf$	Panel Weight
$M_{tc} := 4998 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3745 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1..11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{b_i} := \frac{(8) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$

$W_{s_i} := \frac{V_{dl_i} + V}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{c_i} := \frac{P_{ae} + C_{dl_i}}{0.5 \cdot (L_i) \cdot (P_w)}$

$W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$

L_i	WLL_i
2·ft	$337 \cdot lb \cdot ft^{-2}$
2.5·ft	$268 \cdot lb \cdot ft^{-2}$
3·ft	$187 \cdot lb \cdot ft^{-2}$
3.5·ft	$138 \cdot lb \cdot ft^{-2}$
4·ft	$106 \cdot lb \cdot ft^{-2}$
4.5·ft	$84 \cdot lb \cdot ft^{-2}$
5·ft	$68 \cdot lb \cdot ft^{-2}$
5.5·ft	$57 \cdot lb \cdot ft^{-2}$
6·ft	$48 \cdot lb \cdot ft^{-2}$
6.5·ft	$41 \cdot lb \cdot ft^{-2}$
7·ft	$36 \cdot lb \cdot ft^{-2}$

ALLOWABLE LOAD TABLE CALCULATIONS FOR:
ZIMMERMAN METAL SS2000, 24" WIDE X 22 GA., FY = 50 KSI

TWO SPAN CONDITION
ALLOWABLE UPLIFT LOAD

units:

$plf := \frac{lb}{ft}$ $psf := \frac{lb}{ft^2}$ $psi := \frac{lb}{in^2}$ $kip := 1000 \cdot lb$ $ksi := \frac{kip}{in^2}$

INPUTS:

$P_w := 24 \cdot in$	Panel Width
$w_{dlp} := 1.528 \cdot psf$	Panel Weight
$M_{tc} := 4998 \cdot in \cdot lb$	Allowable Moment Top Compression
$M_{bc} := 3745 \cdot in \cdot lb$	Allowable Moment Bottom Compression
$V := 1885 \cdot lb$	Allowable Shear
$P_{ae} := 503 \cdot lb$	Allowable Web Crippling Exterior Condition
$P_{ai} := 1048 \cdot lb$	Allowable Web Crippling Interior Condition

Calculations:

$i := 1 .. 11$

$L_i :=$

2.0·ft
2.5·ft
3.0·ft
3.5·ft
4.0·ft
4.5·ft
5.0·ft
5.5·ft
6.0·ft
6.5·ft
7.0·ft

$M_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)^2}{8}$ $V_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$ $C_{dl_i} := \frac{(w_{dlp}) \cdot (P_w) \cdot (L_i)}{2}$

$W_{bbs_i} := \frac{(128) \cdot (M_{bc} + M_{dl_i})}{(L_i)^2 \cdot (P_w) \cdot (9)}$ Bending between supports $W_{bs_i} := \frac{(8) \cdot (M_{tc} + M_{dl_i})}{(L_i)^2 \cdot (P_w)}$ Bending at supports

$W_{so_i} := \frac{V + V_{dl_i}}{0.625 \cdot (L_i) \cdot (P_w)}$ Shear only $W_{sb_i} := \left[\frac{1}{\left[\frac{.625^2 \cdot (L_i)^2}{(V + V_{dl_i})^2} + .125^2 \cdot \frac{(L_i)^4}{(M_{tc} + M_{dl_i})^2} \right]} \right]^{.5} \cdot \frac{1}{P_w}$ Bending + Shear

$W_{ce_i} := \frac{P_{ae} + C_{dl_i}}{0.375 \cdot (L_i) \cdot (P_w)}$ Web crippling at exterior $W_{ci_i} := \frac{P_{ai} + C_{dl_i}}{1.25 \cdot (L_i) \cdot (P_w)}$ Web crippling at interior

$W_{b_i} := if(W_{bbs_i} < W_{bs_i}, W_{bbs_i}, W_{bs_i})$ $W_{c_i} := if(W_{ce_i} < W_{ci_i}, W_{ce_i}, W_{ci_i})$

$W_{s_i} := if(W_{so_i} < W_{sb_i}, W_{so_i}, W_{sb_i})$ $W_{comp_i} := if(W_{s_i} < W_{b_i}, W_{s_i}, W_{b_i})$

$WLL_i := if(W_{comp_i} < W_{c_i}, W_{comp_i}, W_{c_i}) \cdot 1.33$ ALLOWABLE LOAD

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	418·lb·ft^{-2}	365.7·lb·ft^{-2}	210.2·lb·ft^{-2}	755.2·lb·ft^{-2}
2.5·ft	268.1·lb·ft^{-2}	245.1·lb·ft^{-2}	168.3·lb·ft^{-2}	604.4·lb·ft^{-2}
3·ft	186.6·lb·ft^{-2}	175·lb·ft^{-2}	140.3·lb·ft^{-2}	503.9·lb·ft^{-2}
3.5·ft	137.5·lb·ft^{-2}	131·lb·ft^{-2}	120.4·lb·ft^{-2}	432.1·lb·ft^{-2}
4·ft	105.7·lb·ft^{-2}	101.8·lb·ft^{-2}	105.4·lb·ft^{-2}	378.2·lb·ft^{-2}
4.5·ft	83.8·lb·ft^{-2}	81.3·lb·ft^{-2}	93.8·lb·ft^{-2}	336.3·lb·ft^{-2}
5·ft	68.2·lb·ft^{-2}	66.5·lb·ft^{-2}	84.5·lb·ft^{-2}	302.8·lb·ft^{-2}
5.5·ft	56.6·lb·ft^{-2}	55.4·lb·ft^{-2}	76.8·lb·ft^{-2}	275.4·lb·ft^{-2}
6·ft	47.8·lb·ft^{-2}	47·lb·ft^{-2}	70.5·lb·ft^{-2}	252.6·lb·ft^{-2}
6.5·ft	41·lb·ft^{-2}	40.3·lb·ft^{-2}	65.1·lb·ft^{-2}	233.2·lb·ft^{-2}
7·ft	35.5·lb·ft^{-2}	35.1·lb·ft^{-2}	60.5·lb·ft^{-2}	216.7·lb·ft^{-2}

L_i	WLL_i
2·ft	280·lb·ft^{-2}
2.5·ft	224·lb·ft^{-2}
3·ft	187·lb·ft^{-2}
3.5·ft	160·lb·ft^{-2}
4·ft	135·lb·ft^{-2}
4.5·ft	108·lb·ft^{-2}
5·ft	88·lb·ft^{-2}
5.5·ft	74·lb·ft^{-2}
6·ft	62·lb·ft^{-2}
6.5·ft	54·lb·ft^{-2}
7·ft	47·lb·ft^{-2}

L_i	W_{b_i}	W_{sb_i}	W_{c_i}	W_{so_i}
2·ft	488·lb·ft^{-2}	413.3·lb·ft^{-2}	229.9·lb·ft^{-2}	777.6·lb·ft^{-2}
2.5·ft	313·lb·ft^{-2}	279.6·lb·ft^{-2}	184·lb·ft^{-2}	622.3·lb·ft^{-2}
3·ft	217.9·lb·ft^{-2}	200.8·lb·ft^{-2}	153.5·lb·ft^{-2}	518.8·lb ft^{-2}
3.5·ft	160.6·lb·ft^{-2}	151·lb·ft^{-2}	131.7·lb·ft^{-2}	444.9·lb·ft^{-2}
4·ft	123.4·lb·ft^{-2}	117.6·lb·ft^{-2}	115.3·lb·ft^{-2}	389.4·lb·ft^{-2}
4.5·ft	97.8·lb·ft^{-2}	94.1·lb·ft^{-2}	102.5·lb·ft^{-2}	346.3·lb·ft^{-2}
5·ft	79.6·lb·ft^{-2}	77.1·lb·ft^{-2}	92.4·lb·ft^{-2}	311.8·lb·ft^{-2}
5.5·ft	66.1·lb·ft^{-2}	64.3·lb·ft^{-2}	84·lb·ft^{-2}	283.6·lb·ft^{-2}
6·ft	55.8·lb·ft^{-2}	54.6·lb·ft^{-2}	77.1·lb·ft^{-2}	260·lb·ft^{-2}
6.5·ft	47.8·lb·ft^{-2}	46.9·lb·ft^{-2}	71.2·lb·ft^{-2}	240.1·lb·ft^{-2}
7·ft	41.5·lb·ft^{-2}	40.8·lb·ft^{-2}	66.2·lb·ft^{-2}	223.1·lb·ft^{-2}

L_i	WLL_i
2·ft	306·lb·ft^{-2}
2.5·ft	245·lb·ft^{-2}
3·ft	204·lb·ft^{-2}
3.5·ft	175·lb·ft^{-2}
4·ft	153·lb·ft^{-2}
4.5·ft	125·lb·ft^{-2}
5·ft	103·lb·ft^{-2}
5.5·ft	86·lb·ft^{-2}
6·ft	73·lb·ft^{-2}
6.5·ft	62·lb·ft^{-2}
7·ft	54·lb·ft^{-2}