Sturdi-Wall Calculation Package

(Addendum 1)

Allowable shear and uplift for drill set models based upon strength of steel plate

Project Number S021-12

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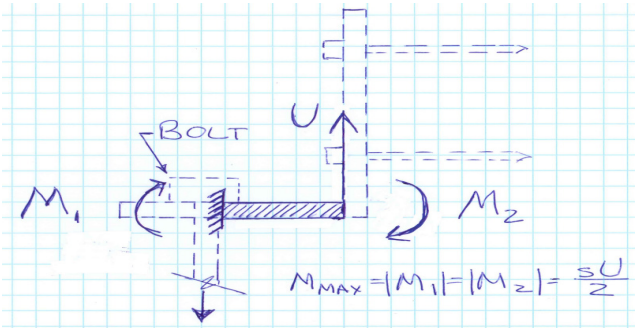
DEFINITION SKETCH FOR BENDING MOMENT CALCULATIONS BELOW



UPLIFT: BENDING STRENGTH OF SW60 UNIVERSAL BRACKET (PAIR)

Uplift Load (lbs)	U	7050	
Distance between Moment 1 and Moment 2	s	1.06	
Maximum Bending Moment (lb-in)	M_{max}	**3737**	$M_{max} = M_1 = M_2 = sU/2$ *(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE			
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1
Specified Minimum Yield Stress (ksi)	F_y	40	
Plate Width (in)	t	10.00	*(bolt head covers hole, moment at bolt passes thru*
Plate Depth (in)	d	0.25	*gross width)*
Approximate Distance Between Bracing Points (in)	L_b	1.00	
L_bd/t^2		0.00	
$0.08E/F_y$		58.00	$L_b d/t^2 \le 0.08E/F_y$ [OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.16	
Elastic Section Modulus (in^3)	S	0.10	
Plastic Bending Strength (ft-lb)	M_p	520.8	$M_p = ZF_y$ (1000/12)
Elastic Bending Strength (ft-lb)	M_y	347.2	$M_y = SF_y$ (1000/12)
Safety Factor	Ω	1.67	*AISC Section F1.1*
Allowable Bending Strength (in-lb)	**Mn/Ω**	**3743**	Mn/Ω = Mp/Ω ≤ 1.6My/Ω
Actual/Allowable =	***3737 ÷ 3743***	***=***	***1.00*** ***<*** ***1.0*** ***PASS***

UPLIFT: BENDING STRENGTH OF SW80 UNIVERSAL BRACKET (PAIR)

Uplift Load (lbs)	U	8300	
Distance between Moment 1 and Moment 2	s	1.25	
Maximum Bending Moment (lb-in)	M_{max}	**5188**	$M_{max} = M_1 = M_2 = sU/2$ *(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE			
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1
Specified Minimum Yield Stress (ksi)	F_y	40	
Plate Width (in)	t	14.00	*(bolt head covers hole, moment at bolt passes thru*
Plate Depth (in)	d	0.25	*gross width)*
Approximate Distance Between Bracing Points (in)	L_b	1.00	
L_bd/t^2		0.00	
$0.08E/F_y$		58.00	$L_b d/t^2 \le 0.08E/F_y$ [OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.22	
Elastic Section Modulus (in^3)	S	0.15	
Plastic Bending Strength (ft-lb)	M_p	729.2	$M_p = ZF_y$ (1000/12)
Elastic Bending Strength (ft-lb)	M_y	486.1	$M_y = SF_y$ (1000/12)
Safety Factor	Ω	1.67	*AISC Section F1.1*
Allowable Bending Strength (in-lb)	**Mn/Ω**	**5240**	Mn/Ω = Mp/Ω ≤ 1.6My/Ω
Actual/Allowable =	***5188 ÷ 5240***	***=***	***0.99*** ***<*** ***1.0*** ***PASS***

UPLIFT: BENDING STRENGTH OF SW46 BRACKET

Uplift Load (lbs)	U	7050	
Distance between Moment 1 and Moment 2	s	1.06	
Maximum Bending Moment (lb-in)	M_{max}	**3737**	$M_{max} = M_1 = M_2 = sU/2$ *(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE			
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1
Specified Minimum Yield Stress (ksi)	F_y	40	
Plate Width (in)	t	10.00	*(bolt head covers hole, moment at bolt passes thru*
Plate Depth (in)	d	0.25	*gross width)*
Approximate Distance Between Bracing Points (in)	L_b	1.00	
L_bd/t^2		0.00	
$0.08E/F_y$		58.00	$L_b d/t^2 \leq 0.08E/F_y$ [OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.16	
Elastic Section Modulus (in^3)	S	0.10	
Plastic Bending Strength (ft-lb)	M_p	520.8	$M_p = ZF_y$ (1000/12)
Elastic Bending Strength (ft-lb)	M_y	347.2	$M_y = SF_y$ (1000/12)
Safety Factor	Ω	1.67	*AISC Section F1.1*
Allowable Bending Strength (in-lb)	**Mn/Ω**	**3743**	$Mn/\Omega = Mp/\Omega \leq 1.6My/\Omega$
Actual/Allowable =	***3737 ÷ 3743***	**=**	***1.00*** **<** ***1.0*** ***PASS***

UPLIFT: BENDING STRENGTH OF SW66 SERIES BRACKET

Uplift Load (lbs)	U	7050	
Distance between Moment 1 and Moment 2	s	1.06	
Maximum Bending Moment (lb-in)	M_{max}	**3737**	$M_{max} = M_1 = M_2 = sU/2$ *(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE			
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1
Specified Minimum Yield Stress (ksi)	F_y	40	
Plate Width (in)	t	10.00	*(bolt head covers hole, moment at bolt passes thru*
Plate Depth (in)	d	0.25	*gross width)*
Approximate Distance Between Bracing Points (in)	L_b	1.00	
L_bd/t^2		0.00	
$0.08E/F_y$		58.00	$L_b d/t^2 \leq 0.08E/F_y$ [OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.16	
Elastic Section Modulus (in^3)	S	0.10	
Plastic Bending Strength (ft-lb)	M_p	520.8	$M_p = ZF_y$ (1000/12)
Elastic Bending Strength (ft-lb)	M_y	347.2	$M_y = SF_y$ (1000/12)
Safety Factor	Ω	1.67	*AISC Section F1.1*
Allowable Bending Strength (in-lb)	**Mn/Ω**	**3743**	$Mn/\Omega = Mp/\Omega \leq 1.6My/\Omega$
Actual/Allowable =	***3737 ÷ 3743***	**=**	***1.00*** **<** ***1.0*** ***PASS***

UPLIFT: BENDING STRENGTH OF SW63 AND SW64 BRACKETS

Uplift Load (lbs)	U	7050		
Distance between Moment 1 and Moment 2	s	1.06		
Maximum Bending Moment (lb-in)	M_{max}	**3737**	$M_{max} = M_1 = M_2 = sU/2$	*(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE				
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1	
Specified Minimum Yield Stress (ksi)	F_y	40		
Plate Width (in)	t	10.00	*(bolt head covers hole, moment at bolt passes thru*	
Plate Depth (in)	d	0.25	*gross width)*	
Approximate Distance Between Bracing Points (in)	L_b	1.00		
L_bd/t^2		0.00		
$0.08E/F_y$		58.00	$L_b d/t^2 \leq 0.08E/F_y$	[OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.16		
Elastic Section Modulus (in^3)	S	0.10		
Plastic Bending Strength (ft-lb)	M_p	520.8	$M_p = ZF_y$ (1000/12)	
Elastic Bending Strength (ft-lb)	M_y	347.2	$M_y = SF_y$ (1000/12)	
Safety Factor	Ω	1.67	*AISC Section F1.1*	
Allowable Bending Strength (in-lb)	**Mn/Ω**	**3743**	Mn/Ω = Mp/Ω ≤ 1.6My/Ω	
Actual/Allowable =	***3737 ÷ 3743***	**=**	***1.00***	**<** ***1.0*** ***PASS***

UPLIFT: BENDING STRENGTH OF SW83, SW84 AND SW85 BRACKETS

Uplift Load (lbs)	U	8300		
Distance between Moment 1 and Moment 2	s	1.25		
Maximum Bending Moment (lb-in)	M_{max}	**5188**	$M_{max} = M_1 = M_2 = sU/2$	*(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE				
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1	
Specified Minimum Yield Stress (ksi)	F_y	40		
Plate Width (in)	t	14.00	*(bolt head covers hole, moment at bolt passes thru*	
Plate Depth (in)	d	0.25	*gross width)*	
Approximate Distance Between Bracing Points (in)	L_b	1.00		
L_bd/t^2		0.00		
$0.08E/F_y$		58.00	$L_b d/t^2 \leq 0.08E/F_y$	[OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.22		
Elastic Section Modulus (in^3)	S	0.15		
Plastic Bending Strength (ft-lb)	M_p	729.2	$M_p = ZF_y$ (1000/12)	
Elastic Bending Strength (ft-lb)	M_y	486.1	$M_y = SF_y$ (1000/12)	
Safety Factor	Ω	1.67	*AISC Section F1.1*	
Allowable Bending Strength (in-lb)	**Mn/Ω**	**5240**	Mn/Ω = Mp/Ω ≤ 1.6My/Ω	
Actual/Allowable =	***5188 ÷ 5240***	**=**	***0.99***	**<** ***1.0*** ***PASS***

SW6C UPLIFT: BENDING STRENGTH OF STEEL ANGLES (PAIR)

Uplift Load (lbs)	U	7050	
Distance between Moment 1 and Moment 2	s	0.8125	
Maximum Bending Moment (lb-in)	M_{max}	**2864**	$M_{max} = M_1 = M_2 = sU/2$ *(see definition sketch)*
BENDING STRENGTH OF STEEL PLATE			
Design Method, ASD or LRFD:		ASD	AISC Steel Construction Manual, Section F11.1
Specified Minimum Yield Stress (ksi)	F_y	40	
Plate Width (in)	t	8.00	*(bolt head covers hole, moment at bolt passes thru*
Plate Depth (in)	d	0.25	*gross width)*
Approximate Distance Between Bracing Points (in)	L_b	1.00	
$L_b d/t^2$		0.00	
$0.08E/F_y$		58.00	$L_b d/t^2 \leq 0.08E/F_y$ [OK, COMPACT]
Plastic Section Modulus (in^3)	Z	0.13	
Elastic Section Modulus (in^3)	S	0.08	
Plastic Bending Strength (ft-lb)	M_p	416.7	$M_p = ZF_y$ (1000/12)
Elastic Bending Strength (ft-lb)	M_y	277.8	$M_y = SF_y$ (1000/12)
Safety Factor	Ω	1.67	*AISC Section F1.1*
Allowable Bending Strength (in-lb)	**Mn/Ω**	**2994**	$Mn/\Omega = Mp/\Omega \leq 1.6My/\Omega$
Actual/Allowable =	***2864 ÷ 2994***	**=**	***0.96*** **<** ***1.0*** ***PASS***

STEEL SHEAR CALCUALTIONS FOR SW46, SW60 (PAIR), SW63, SW64 AND SW66 BRACKETS

Load on Connection (lbs)			**31430**		
SHEAR STRENGTH - AiSC STEEL MANUAL, SECTION J4.3					
Design Method, ASD or LRFD:			ASD		
Specified Minimum Yield Stress (ksi)		F_y	40		
Net Area Subject to Shear (in^2)		A_{nv}	2.19		
Safety Factor		Ω	1.67		
Allowable Strength (lbs)		**Rn/Ω**	**31437**	Rn/Ω = 0.6FyAnv/Ω	
Actual/Allowable =	***31430 ÷ 31437***	**=**	***1.00***	**<** ***1.0***	***PASS***

STEEL SHEAR CALCUALTIONS FOR SW80 (PAIR), SW83, SW84 AND SW85 BRACKETS

Load on Connection (lbs)			**45800**		
SHEAR STRENGTH - AISC STEEL MANUAL, SECTION J4.3					
Design Method, ASD or LRFD:			ASD		
Specified Minimum Yield Stress (ksi)		F_y	40		
Net Area Subject to Shear (in^2)		A_{nv}	3.19		
Safety Factor		Ω	1.67		
Allowable Strength (lbs)		**Rn/Ω**	**45808**	Rn/Ω = 0.6FyAnv/Ω	
Actual/Allowable =	***45800 ÷ 45808***	**=**	***1.00***	**<** ***1.0***	***PASS***

STEEL SHEAR CALCUALTIONS FOR SW6C BRACKET (SINGLE)

Load on Connection (lbs)			**13470**		
SHEAR STRENGTH - AISC STEEL MANUAL, SECTION J4.3					
Design Method, ASD or LRFD:			ASD		
Specified Minimum Yield Stress (ksi)		F_y	40		
Net Area Subject to Shear (in^2)		A_{nv}	0.94		
Safety Factor		Ω	1.67		
Allowable Strength (lbs)		**Rn/Ω**	**13473**	Rn/Ω = 0.6FyAnv/Ω	
Actual/Allowable =	***13470 ÷ 13473***	**=**	***1.00***	**<** ***1.0***	***PASS***