



# STRUCTURAL CALCULATIONS

FOR

## Hardy Tie Back Device

## HTB-32

## SDS Connection

PREPARED FOR:

## Hardy Fall Protection Systems, Inc.



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## DESIGN CRITERIA AND ASSUMPTIONS

### BUILDING CODES AND MATERIAL STANDARDS

STRUCTURAL DESIGN MEETS OR EXCEEDS PROVISIONS OF THE FOLLOWING BUILDING CODES AND MATERIAL STANDARDS

2018 IBC	CALIFORNIA BUILDING CODE
2019 IRC	CALIFORNIA RESIDENTIAL CODE
ASCE 7-16	MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
AISC 360-16	STEEL CONSTRUCTION MANUAL, FOURTEENTH EDITION
AISC 341-16	SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS
ACI 318-14	BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
AWS D1.1 / D1.1M 2015	STRUCTURAL WELDING CODE

### MATERIAL SPECIFICATIONS

UNLESS OTHERWISE NOTED ON THE DRAWINGS, MATERIALS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS

1) **STRUCTURAL STEEL:**

STRUCTURAL STEEL SHALL CONFORM TO THE ASTM DESIGNATION AS FOLLOWS:

W SHAPE	ASTM A992	$F_y =$	50 ksi
PIPE	ASTM A53 - Gr. B	$F_y =$	35 ksi
RECTANGULAR HSS	ASTM A500 - Gr. B	$F_y =$	46 ksi
CIRCULAR HSS	ASTM A500 - Gr. B	$F_y =$	42 ksi
ANGLES	ASTM A36	$F_y =$	36 ksi
CHANNELS	ASTM A36	$F_y =$	36 ksi
STEEL PLATES	ASTM A572 GRADE 50	$F_y =$	50 ksi

2) **CONNECTIONS:**

BOLTS	ASTM A325 - N
WELDS	E70XX

3) **CONCRETE:**

CONCRETE USED FOR FOUNDATION SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 2500 psi IN 28 DAYS"

4) **REINFORCING STEEL:**

REINFORCING STEEL SHALL CONFORM TO ASTM A615	$F_y =$	60 ksi
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5) **ANCHORS:**

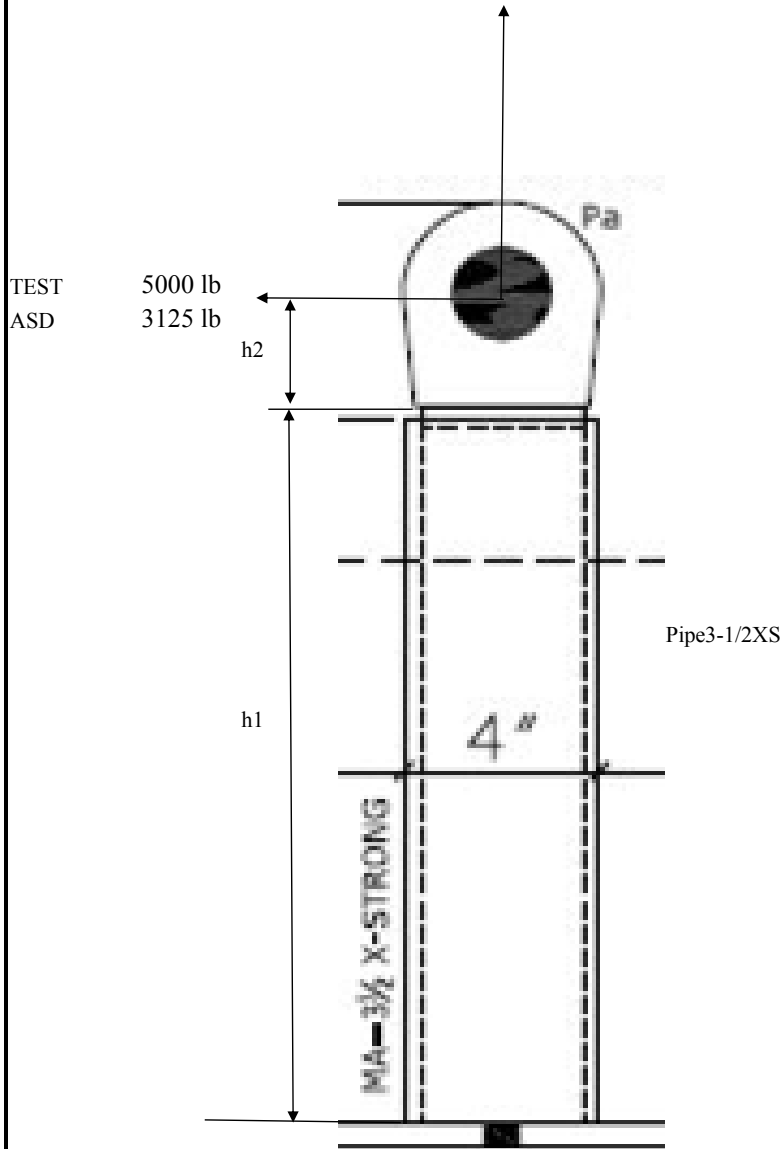
ANCHOR RODS	ASTM F1554 Gr. 36	$F_y =$	36 ksi
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**HARDY TIE BACK DEVICE HORIZONTAL LOADING**

LOADING CRITERIA:

	TEST LOADING	ALLOWABLE STRESS DESIGN LOADING
VERTICAL LOAD =	5.00 kip	3.125 kip
HORIZONTAL LOAD =	5.00 kip	3.125 kip
RUN CALCULATIONS FOR:		ALLOWABLE STRESS DESIGN LOADING
POST HEIGHT $h_1$ =		32.00 in
HEIGHT FROM TOP OF POST TO CENTER OF EYELET $h_2$ =		2.50 in
TOTAL HEIGHT OF HORIZONTAL LOAD FROM BASE OF POST =		34.50 in
VERTICAL LOAD =		3.13 kip
HORIZONTAL LOAD =		3.13 kip
MAXIMUM SHEAR AT POST BASE $F_{max}$ =		3.13 kip
MAXIMUM MOMENT AT POST BASE $M_{max}$ =		107.81 kip-in

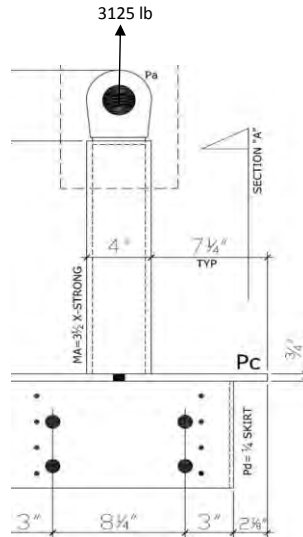
TEST 5000 lb  
ASD 3125 lb



**CHECK OF EYELET PLATE AS TENSION MEMBER**

BY PROVISIONS OF ANSI/AISC 360-16

(STEEL CONSTRUCTION MANUAL- FIFTEENTH EDITION)



**INPUT**

<b>GENERAL:</b>	MEMBER ID	EYELET PLATE	
<b>STRAP INPUT:</b>	PLATE THICKNESS	1 in	PLATE WIDTH: 3.50 in
	ASTM SPECIFICATION	ASTM A36	SHEAR LAG FACTOR U = 1.00
	HOLE DIAMETER =	2 in	NUMBER OF HOLES IN STRAP PLATE SECTION n = 1
	ADDED WIDTH FOR HOLES =	0 in	NEGLECTED WIDTH DUE TO HOLE PUNCHING = 1/16 in

**CALCULATIONS**

**EYELET PLATE STRENGTH IN TENSION**

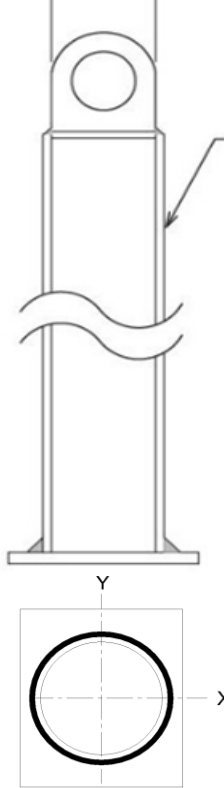
<b>GROSS, NET AND EFFECTIVE AREA:</b>	PLATE THICKNESS t =	1.000 in
	GROSS AREA OF MEMBER A <sub>g</sub> =	3.500 sq.in
	HOLE DIAMETER =	2 1/16 in
	NET AREA OF MEMBER A <sub>n</sub> =	1.438 sq.in
	EFFECTIVE NET AREA A <sub>e</sub> = A <sub>n</sub> U =	1.438 sq.in
<b>MATERIAL PROPERTIES:</b>	TENSION MEMBER YIELD STRESS F <sub>y</sub> =	36 ksi
	TENSION MEMBER ULTIMATE TENSILE STRESS F <sub>u</sub> =	58 ksi
<b>TENSILE YIELDING IN THE GROSS SECTION</b>		
AISC 360-16 EQUATION D2-1	P <sub>n</sub> = F <sub>y</sub> A <sub>g</sub> =	126.000 kip
AISC 360-16 EQUATION D2-1		Ω = 1.67
	DESIGN TENSILE STRENGTH Φ P <sub>n</sub> OR ALLOWABLE TENSILE STRENGTH P <sub>n</sub> /Ω =	75.449 kip
<b>TENSILE RUPTURE IN THE NET SECTION</b>		
AISC 360-16 EQUATION D2-2	P <sub>n</sub> = F <sub>u</sub> A <sub>e</sub> =	83.375 kip
AISC 360-16 EQUATION D2-2		Ω = 2.00
	DESIGN TENSILE STRENGTH Φ P <sub>n</sub> OR ALLOWABLE TENSILE STRENGTH P <sub>n</sub> /Ω =	41.688 kip
	<b>TENSILE RUPTURE IN THE NET SECTION GOVERNS,</b>	
	DESIGN TENSILE STRENGTH Φ P <sub>n</sub> OR ALLOWABLE TENSILE STRENGTH P <sub>n</sub> /Ω =	41.688 kip
<b>CHECK EYELET PLATE STRENGTH IN TENSION:</b>		
	AVAILABLE TENSILE STRENGTH P <sub>n</sub> /Ω =	41.688 kip
	REQUIRED TENSILE STRENGTH =	3.125 kip
	RATIO OF REQUIRED STRENGTH/ AVAILABLE STRENGTH =	0.075
		OK

<b>CHECK OF HTB STEEL POST STRENGTH</b>				
BY PROVISIONS OF AISC 360-16				
<b>MEMBER INPUT</b>				
<b>SECTION INPUT:</b>	MEMBER ID	HTB-32	SHAPE:	PIPE
	SECTION:	Pipe3-1/2XS	SELECT PREFERRED SPECIFICATION	ASTM A53 Grade B
<b>EFFECTIVE LENGTH FOR DESIGN FOR COMPRESSION:</b> AISC 360-16 SECTION E2			<b>FOR X AXIS</b>	<b>FOR Y AXIS</b>
LATERALLY UNBRACED LENGTH L			2.88 ft	2.88 ft
K			2.00	2.00
AISC 360-16 SECTION (B4-2)		USE DESIGN WALL THICKNESS = 0.93 NOMINAL WALL THICKNESS?	YES	
<b>DISTANCE FROM MAXIMUM TO ZERO SHEAR FORCE:</b>			$L_v =$	2.88 ft
<b>SUMMARY OF RESULTS</b>				
<b>AVAILABLE STRENGTH OF SECTION:</b>		<b>LRFD</b>		<b>ASD</b>
AVAILABLE COMPRESSIVE STRENGTH:		$\Phi_c P_n =$	94.137 kips	$P_n / \Omega_c =$ 62.633 kips
AVAILABLE TENSILE STRENGTH:		$\Phi_t P_n =$	108.411 kips	$P_n / \Omega_t =$ 72.130 kips
AVAILABLE FLEXURAL STRENGTH:		$\Phi_b M_n =$	10.675 kip-ft	$M_n / \Omega_b =$ 7.102 kip-ft
AVAILABLE SHEAR STRENGTH:		$\Phi_v V_n =$	32.523 kips	$V_n / \Omega_v =$ 21.639 kips
<b>CALCULATIONS</b>				
<b>MATERIAL PROPERTIES</b>				
YOUNG'S MODULUS $E_c =$		29000 ksi		
$F_y =$		35 ksi		
$F_u =$		60 ksi		
<b>SECTION PROPERTIES</b>				
OUTSIDE DIAMETER $D =$		4 in		
NOMINAL WALL THICKNESS $t_{nom} =$		0.318 in		
DESIGN WALL THICKNESS $t_{des} =$		0.296 in		
CROSS SECTION AREA $A =$		3.442 sq.in		
$D/t =$		13.53		
MOMENT OF INERTIA $I (in^4) =$		5.94		
SECTION MODULUS $S =$		2.97		
RADIUS OF GYRATION $r =$		1.314 cu.in		
PLASTIC SECTION MODULUS $Z =$		4.067 in		
<b>AVAILABLE COMPRESSIVE STRENGTH</b>				
<b>1- CLASSIFICATION OF SECTION FOR UNIFORM COMPRESSION: (AISC 360-16 TABLE B.4.1a)</b>				
$D/t =$		13.53		
$\lambda_p =$		N/A		
$\lambda_r = 0.11 E/F_y =$		91.143		
CLASSIFICATION FOR UNIFORM COMPRESSION:		NONCOMPACT		
<b>2- SLENDERNESS RATIO:</b> AISC 360-16 SECTION E2		$(L_c/r)_x = (KL/r)_x =$		
		52.52		
		$(L_c/r)_y = (KL/r)_y =$		
		52.52		
		$(L_c/r)_{max} = (KL/r)_{max} =$		
		52.52		
		$\leq 200$		
		<b>OK</b>		
<b>ELASTIC CRITICAL BUCKLING STRESS <math>F_c</math></b>				
AISC 360-16 EQUATION (E3-4)		$F_c = \pi^2 E / (L_c / r)^2 =$		103.770 ksi
<b>MEMBERS WITHOUT SLENDER ELEMENTS</b> BY PROVISIONS OF AISC 360-16 SECTION E3 (ASD)				
LIMIT STATE OF FLEXURE BUCKLING		$4.71 \sqrt{E/F_y} =$		135.58
AISC 360-16 EQUATION (E3-2)		$F_{cr} = [0.658^{F_y/F_c}] F_y$		30.392 ksi
AISC 360-16 EQUATION (E3-3)		$F_{cr} = 0.877 F_c$		N/A
		$F_{cr} =$		30.392 ksi
<b>AVAILABLE COMPRESSIVE STRENGTH</b> PROVISIONS OF AISC 360-16 SECTION E3, "MEMBERS WITHOUT SLENDER ELEMENTS" APPLY				
		$F_{cr} =$		30.392 ksi
AISC 360-16 EQUATION (E3-1)		$P_n = F_{cr} A_g =$		104.60 kips
		<b>LRFD</b>		<b>ASD</b>
AISC 360-16 SECTION E1		$\Phi_c =$	0.9	$\Omega_c =$ 1.67
AVAILABLE COMPRESSIVE STRENGTH:		$\Phi_c P_n =$	94.137 kips	$P_n / \Omega_c =$ 62.63 kips

<b>AVAILABLE TENSILE STRENGTH</b>					
(ASSUMING $A_g = A_n = A_e$ )		$A_g = A_n = A_e =$	3.442 sq.in		
TENSILE YIELDING IN THE GROSS SECTION: AISC 360-16 EQUATION (D2-1)		$P_n = F_y A_g =$	120.46 kips		
AISC 360-16 SECTION D2. (a)		LRFD		ASD	
		$\Phi_t =$	0.9	$\Omega_t =$	1.67
AVAILABLE TENSILE STRENGTH:		$\Phi_t P_n =$	108.411 kips	$P_n / \Omega_t =$	72.13 kips
TENSILE RUPTURE IN THE NET SECTION: AISC 360-16 EQUATION (D2-2)		$P_n = F_u A_e =$	206.50 kips		
AISC 360-16 SECTION D2. (b)		LRFD		ASD	
		$\Phi_t =$	0.75	$\Omega_t =$	2.00
AVAILABLE TENSILE STRENGTH:		$\Phi_t P_n =$	154.872 kips	$P_n / \Omega_t =$	103.25 kips
TENSILE YIELDING IN THE GROSS SECTION GOVERNS		LRFD		ASD	
AVAILABLE TENSILE STRENGTH:		$\Phi_t P_n =$	108.411 kips	$P_n / \Omega_t =$	72.13 kips
<b>AVAILABLE FLEXURE STRENGTH</b>					
<b>CLASSIFICATION OF SECTION FOR LOCAL BUCKLING IN FLEXURE: (AISC 360-16 TABLE B.4.1b)</b>					
		$\lambda = D/t =$	13.53		
		$\lambda_p = 0.07 E/F_y =$	58.000 cu.in		
		$\lambda_r = 0.31 E/F_y =$	256.857 in		
SECTION CLASSIFICATION FOR LOCAL BUCKLING IN FLEXURE:		COMPACT			
<b>LIMIT STATE OF YIELDING:</b>					
CHECK $D/t < 0.45 E/F_y$ :		13.52539393	<	372.86	OK
AISC 360-16 EQUATION (F8-1)		$M_n = M_p = F_y Z =$	142 kip-in		
<b>LIMIT STATE OF FLANGE LOCAL BUCKLING:</b>					
<b>FOR NONCOMPACT SECTIONS:</b>					
AISC 360-16 EQUATION (F8-2)		$M_n = (0.021 E / (D/t) + F_y) S$	N/A		
<b>FOR SLENDER SECTIONS:</b>					
AISC 360-16 EQUATION (F8-4)		$F_{cr} = 0.33 E / (D/t)$	N/A		
AISC 360-16 EQUATION (F8-3)		$M_n = F_{cr} S$	N/A		
<b>DESIGN FLEXURE STRENGT</b> THE LIMIT STATE OF YIELDING GOVERNS,					
		NOMINAL FLEXURAL STRENGTH OF THE SECTION $M_n =$		142 kip-in	
AISC 360-16 SECTION F1		LRFD		ASD	
		$\Phi_b =$	0.9	$\Omega_b =$	1.67
AVAILABLE FLEXURAL STRENGTH:		$\Phi_b M_n =$	128.099 kip-in	$M_n / \Omega_b =$	85.229 kip-in
<b>AVAILABLE SHEAR STRENGTH</b>					
		$L_v =$	2.88 ft		
AISC 360-16 SECTION G6 $F_{cr}$ IS THE LARGER OF:					
AISC 360-16 EQUATION (G5-2a)		$F_{cr} = 1.60 E / \sqrt{(L_v / D) (D/t)^{5/4}} =$	609.117 ksi		
AISC 360-16 EQUATION (G5-2b)		$F_{cr} = 0.78 E / (D/t)^{3/2} =$	454.745 ksi		
		$F_{cr}$ UPPER LIMIT $= 0.6 F_y =$	21.000 ksi		
		$F_{cr} =$	21.000 ksi		
AISC 360-16 EQUATION (G5-1)		NOMINAL SHEAR STRENGTH $V_n = F_u A_g / 2 =$	36.14 kips		
AISC 360-16 SECTION G1		LRFD		ASD	
		$\Phi_v =$	0.9	$\Omega_v =$	1.67
AVAILABLE SHEAR STRENGTH:		$\Phi_v V_n =$	32.523 kips	$V_n / \Omega_v =$	21.64 kips
<b>CHECK POST STRENGTH</b>					
<b>CHECK POST STRENGTH FOR ALLOWABLE STRESS DESIGN LOADING</b>					
	<b>REQUIRED</b>	<b>AVAILABLE</b>	<b>REQUIRED / AVAILABLE</b>	<b>CHECK</b>	
TENSILE STRENGTH:	3.13 kip	72.13 kip	0.043324848	OK	
SHEAR STRENGTH:	3.13 kip	21.64 kip	0.144416159	OK	
FLEXURAL STRENGTH:	107.81 kip-in	85.23 kip-in	1.264977463	NG	

<b>CHECK OF FILLET WELD AT POST BASE (ASD)</b>
BY PROVISIONS OF ANSI/AISC 360-16

**INPUT**



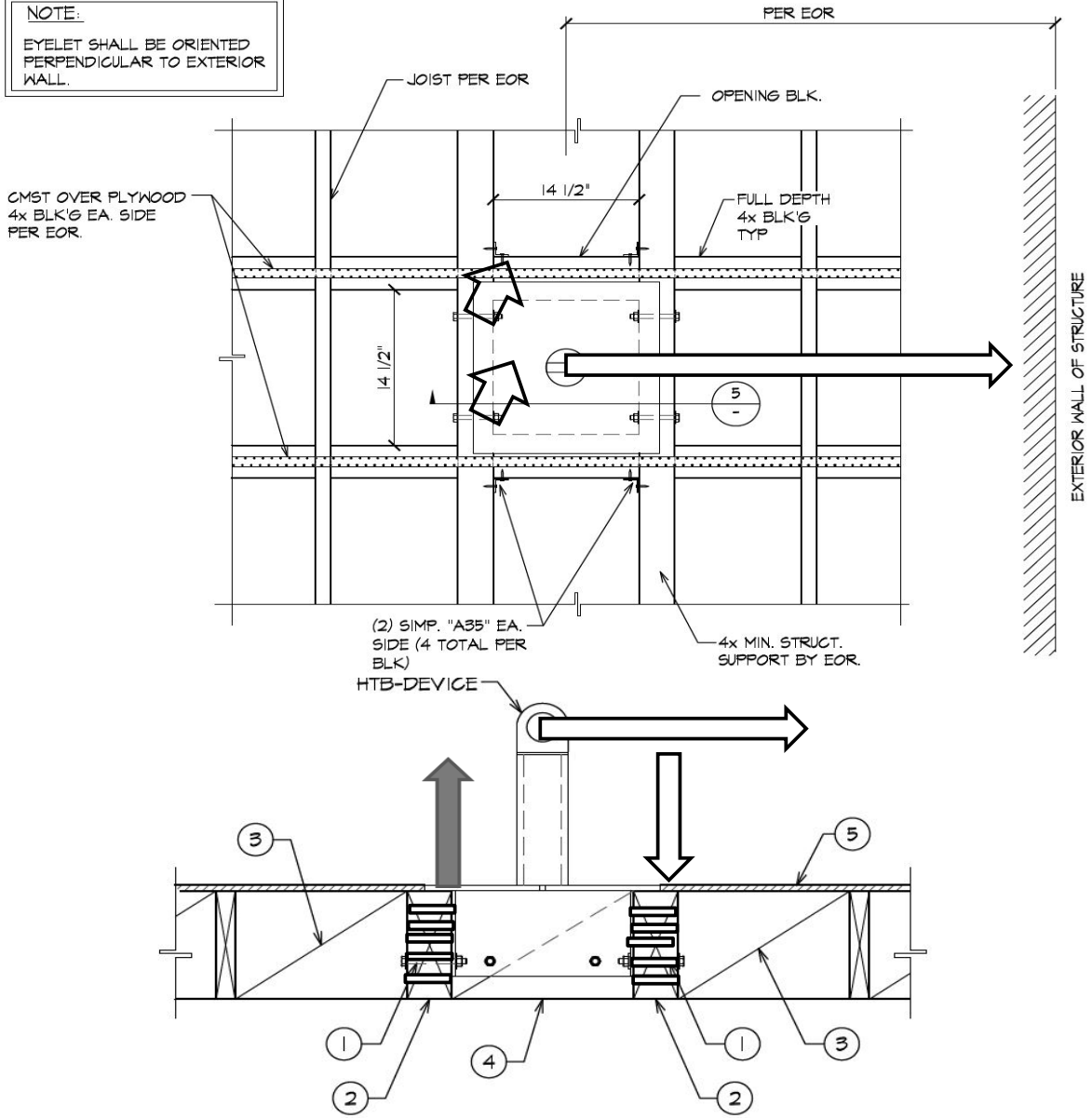
<b>POST:</b>	SECTION:	Pipe3-1/2XS
	ASTM SPECIFICATION	ASTM A53 Grade B
<b>BASE PLATE:</b>	THICKNESS t =	0.500 in
	ASTM SPECIFICATION	ASTM A36
<b>FILLET WELD PROPERTIES:</b>	ELECTRODE CLASSIFICATION	E70XX
	FILLET WELD LEG SIZE AT FLANGE =	1/2 in
<b>APPLIED LOADS</b>	APPLIED AXIAL FORCE $F_z$ =	3.125 kip
	APPLIED SHEAR FORCE $F_x$ =	3.125 kip
	APPLIED SHEAR FORCE $F_y$ =	0.000 kip
	APPLIED BENDING MOMENT $M_x$ =	0.000 kip-in
	APPLIED BENDING MOMENT $M_y$ =	107.813 kip-in
	APPLIED BENDING MOMENT $M_z$ =	0.000 kip-in



<b>CALCULATIONS</b>		
<b>POST PROPERTIES:</b>	OUTSIDE DIAMETER D =	4.000 in
	$t_{des}$ =	0.296 in
	$F_y$ =	35 ksi
	$F_u$ =	60 ksi
<b>BASE PLATE PROPERTIES:</b>	$F_y$ =	36 ksi
	$F_u$ =	58 ksi
<b>FILLET WELD PROPERTIES:</b>	AISC 360-16 TABLE J2.5 $F_y = 0.6 F_{EXX}$ =	42.0 ksi
	TOTAL LENGTH OF WELD L =	13.68 in
	$I_x = I_y = \pi d_1^4 / 64 - \pi d_2^4 / 64$ =	11.53 in <sup>4</sup>
	$C_x = C_y$ =	2.35 in
	$S_x = S_y$ =	4.90 cu.in
AISC 360-16 TABLE J2.4	MINIMUM WELD SIZE =	3/16 in
	CHECK PROVIDED WELD SIZE $\geq$ MINIMUM ALLOWABLE	OK
	EFFECTIVE LENGTH	13.68 in
	EFFECTIVE THROAT	0.35 in
	EFFECTIVE AREA $A_w$ =	4.84 sq.in
<b>WELD REQUIRED STRENGTH</b>		
1- SHEAR STRESSES:		
	SHEAR STRESS DUE TO $F_x$ $r_{Fax} = F_x / A_e$ =	0.646 ksi
	SHEAR STRESS DUE TO $F_y$ $r_{Fay} = F_y / A_e$ =	0.000 ksi
MOST CRITICAL SHEAR STRESS DUE TO TORSION $M_z$	$r_{Max} = M_z C_y / I_p$ =	0.000 ksi
	$r_{May} = M_z C_x / I_p$ =	0.000 ksi
RESULTANT SHEAR STRESS:	$r_a = \sqrt{(r_{Fax} + r_{Max})^2 + (r_{Fay} + r_{May})^2}$	0.646 ksi
2- TENSION STRESSES:		
	TENSION STRESS DUE TO $F_z$ $r_{Faz} = F_z / A_e$ =	0.646 ksi
	CRITICAL TENSILE STRESS DUE TO $M_x$ $r_{Max} = M_x C_y / I_x$ =	0.000 ksi
	CRITICAL TENSILE STRESS DUE TO $M_y$ $r_{May} = M_y C_x / I_y$ =	22.004 ksi
	$r_a = r_{Faz} + r_{Max} + r_{May}$ =	22.650 ksi
3- COMBINING SHEAR AND TENSILE STRESSES INTO RESULTANT SHEAR STRESS:		
	$r_a = \sqrt{r_{a\ SHEAR}^2 + r_{a\ TENSION}^2}$	22.659 ksi
AISC 360-16 TABLE J2.5	WELD NOMINAL STRESS $F_{nw} = 0.6 F_{EXX}$ =	42.00 ksi
AISC 360-16 TABLE J2-5	$\Omega$ =	2
WELD AVAILABLE STRESS =	WELD AVAILABLE STRESS = $F_{nw} / \Omega$ =	<b>21.000 ksi</b>
	<b>RATIO OS REQUIRED STRENGTH/ AVAILABLE STRENGTH =</b>	<b>1.079</b>
	<b>REQUIRED STRENGTH &gt; AVAILABLE STRENGTH</b>	<b>NG</b>

**CHECK OF HTB ATTACHMENT (CASE 1)**

**NOTE:**  
EYELET SHALL BE ORIENTED PERPENDICULAR TO EXTERIOR WALL.



**A-A ATTACHMENT OPTION #2**

1. (2) 7/8"Ø THRU-BOLTS INTO EA. STRUCTURAL SUPPORT MEMBERS PER MANUFACTURER (2 EA. SIDE, 4 TOTAL)
2. STRUCTURAL SUPPORT MEMBER BY EOR, 4x MIN.
3. MIN. 4x BLK'G w/ STRAP PER EOR.
4. MIN. 4x OPENING BLK'G w/ (2) SIMP. "A35" EA. SIDE TO STRUCTURAL SUPPORT MEMBER.
5. ROOF SHEATHING PER DESIGN PROFESSIONAL

POST HEIGHT h <sub>1</sub> =	32.00 in
HEIGHT FROM TOP OF POST TO CENTER OF EYELET h <sub>2</sub> =	2.50 in
TOTAL HEIGHT OF HORIZONTAL LOAD FROM BASE OF POST =	34.50 in
VERTICAL LOAD =	3.13 kip
HORIZONTAL LOAD =	3.13 kip
MAXIMUM MOMENT AT POST BASE M <sub>max</sub> =	107.81 kip-in
HORIZONTAL DISTANCE BETWEEN BEARING / UPLIFT ON 6X STRUCTURAL MEMBERS =	14.25 in
BEARING / UPLIFT ON 6X STRUCTURAL MEMBERS =	<b>7.566 kip</b>

<b>HARDY TIE BACK DEVICE UPLIFT CHECK</b>								
		TYPE OF FASTENERS	SDS 3"X1/4"					
IAPMO UES 461 SECTION 4.2.2		MINIMUM MAIN MEMBER THICKNESS =	3 1/2 in					
IAPMO UES 461 SECTION 4.2.2		MAIN MEMBER SPECIFIC GRAVITY =	0.50 in					
ICC ESR-2236 TABLE 2		REFERENCE SHEAR DESIGN VALUE Z =	420 lb					
<b>GROUP ACTION FACTOR C<sub>g</sub></b>	NDS 2018 SECTION 11.3.6	ASSUMING A MINIMUM STRUCTURAL MEMBER 4X10,	A <sub>m</sub> =	40.00 sq.in				
			A <sub>s</sub> = 10 X 1/4 =	2.50 sq.in				
			A <sub>m</sub> / A <sub>s</sub> =	16				
GROUP 1:		NUMBER OF FASTENER ROWS =	2					
		NUMBER OF FASTENERS IN A ROW =	5					
NDS 2018 TABLE 11.3.6C		GROUP ACTION FACTOR C <sub>g</sub> =	0.987					
GROUP 2:		NUMBER OF FASTENER ROWS =	2					
		NUMBER OF FASTENERS IN A ROW =	5					
NDS 2018 TABLE 11.3.6C		GROUP ACTION FACTOR C <sub>g</sub> =	0.987					
Adjustment Factors per NDS 2018 Table 11.3.1								
		C <sub>D</sub>	C <sub>M</sub>	C <sub>t</sub>	C <sub>g</sub>	C <sub>Δ</sub>	C <sub>d</sub>	C <sub>st</sub>
		1.5	1	1	VARRIES	1	1	1
GROUP 1:		SHEAR DESIGN VALUE OF ONE FASTENER Z' =					622 lb	
		SHEAR DESIGN VALUE OF ONE ROW OF FASTENERS =					3108 lb	
		SHEAR DESIGN VALUE OF GROUP =					6216 lb	
GROUP 2:		SHEAR DESIGN VALUE OF ONE FASTENER Z' =					622 lb	
		SHEAR DESIGN VALUE OF ONE ROW OF FASTENERS =					3108 lb	
		SHEAR DESIGN VALUE OF GROUP =					6216 lb	
		UPLIFT STRENGTH = SHEAR DESIGN VALUE OF CONNECTION =					<b>12432 lb</b>	
		REQUIRED UPLIFT STRENGTH =					<b>7566 lb</b>	
		<b>RATIO OF REQUIRED STRENGTH/ AVAILABLE STRENGTH =</b>					<b>0.609</b>	
							<b>OK</b>	