January 2007

Truss-T Hanger®

Submittal and Installation Information

Truss-T Hanger™
HOW ARE YOU HANGING?

Patented

INSTALLATION INSTRUCTIONS:

Truss-T Hanger®

Applications:

1. Conduits / Piping with Threaded Coupler (Application #1)
2. Truss-T bolted to Clevis Hanger with Threaded Coupler (Application #2)
3. Nutt and Washer Installation (Application #3)
4. Truss-T Mounted to Top Chord of Truss System with Anti-Twist Bushing or "ATB" using a Nut and Washer (Application #4)

Application #1

1. Remove Truss-T Hanger® unit from packaging
2. Using your hands, unthread the coupling (counter clockwise) to provide a 2 ½" clearance between the bottom of the "T" and the top of the Coupling
3. Precut a section of ½" Schedule 40 pipe to the required length for the application
4. Thread the pipe section into the Coupler while maintaining the 2 ½" distance outlined in Step 2
5. While holding on to the pipe section, insert the Truss-T Hanger Assembly parallel through the center of the steel truss
6. Rotate the Truss-T Hanger Assembly 90 clockwise while insuring the bottom of the Truss-T Hanger "T" is above the top surface of the steel truss
7. Position the Truss-T Hanger Assembly in the proper location prior to tightening (35 ft #)
8. Once installed, the Truss-T Hanger Assembly may be repositioned by loosening the assembly and reapplying the proper torque value*

** Insure not to disengage the threaded coupler completely when repositioning.*

Application #2

1. Remove Truss-T Hanger® unit from packaging
2. Using your hands, unthread the coupling (counter clockwise) to provide a 2 ½" clearance between the bottom of the "T" and the top of the Coupling
3. Rotate the Truss-T Hanger Assembly 90 clockwise while insuring the bottom of the Truss-T Hanger "T" is above the top surface of the steel truss
4. Position the Truss-T Hanger Assembly in the proper location prior to tightening (35 ft#)
5. Once installed, the Truss-T Hanger Assembly may be repositioned by loosening the assembly and reapplying the proper torque value*

** Insure not to disengage the threaded coupler completely when repositioning.*

INSTALLATION INSTRUCTIONS:

Truss-T Hanger®

Applications:

1. Conduits / Piping with Threaded Coupler (Application #1)
2. Truss-T bolted to Clevis Hanger with Threaded Coupler (Application #2)
3. Nutt and Washer Installation (Application #3)
4. Truss-T Mounted to Top Chord of Truss System with Anti-Twist Bushing or "ATB" using a Nut and Washer (Application #4)

Application #3

1. Remove Truss-T Hanger® unit from packaging
2. Using your hands, unthread the nut and washer (counter clockwise) to provide a 2 ½" clearance between the bottom of the "T" and the top of the washer
3. Rotate the Truss-T Hanger Assembly 90 clockwise while insuring the bottom of the Truss-T Hanger "T" is above the top surface of the steel truss
4. Position the Truss-T Hanger Assembly in the proper location prior to tightening (35 ft#)
5. Once installed, the Truss-T Hanger Assembly may be repositioned by loosening the assembly and re-applying the proper torque value

** Insure not to disengage the nut and washer completely when repositioning.*

Application #4

1. Remove Truss-T Hanger® unit from packaging
2. Using your hands, unthread the nut and washer (counter clockwise) to provide a 2 ½" clearance between the bottom of the "T" and the top of the washer
3. Rotate the Truss-T Hanger Assembly 90 clockwise while insuring the bottom of the Truss-T Hanger "T" is above the top surface of the steel truss
   * ***The top point of the Anti-Twist Bushing or "ATB" must be perpendicular to the truss system to insure the Truss-T Hanger to lock into place and provide strength and stability.***
4. Position the Truss-T Hanger Assembly in proper location prior to tightening (35ft#)
5. Once installed, the Truss-T Hanger Assembly may be repositioned by loosening the assembly and re-applying the proper torque value*

** Insure not to disengage the nut and washer completely when repositioning.*

January 2007

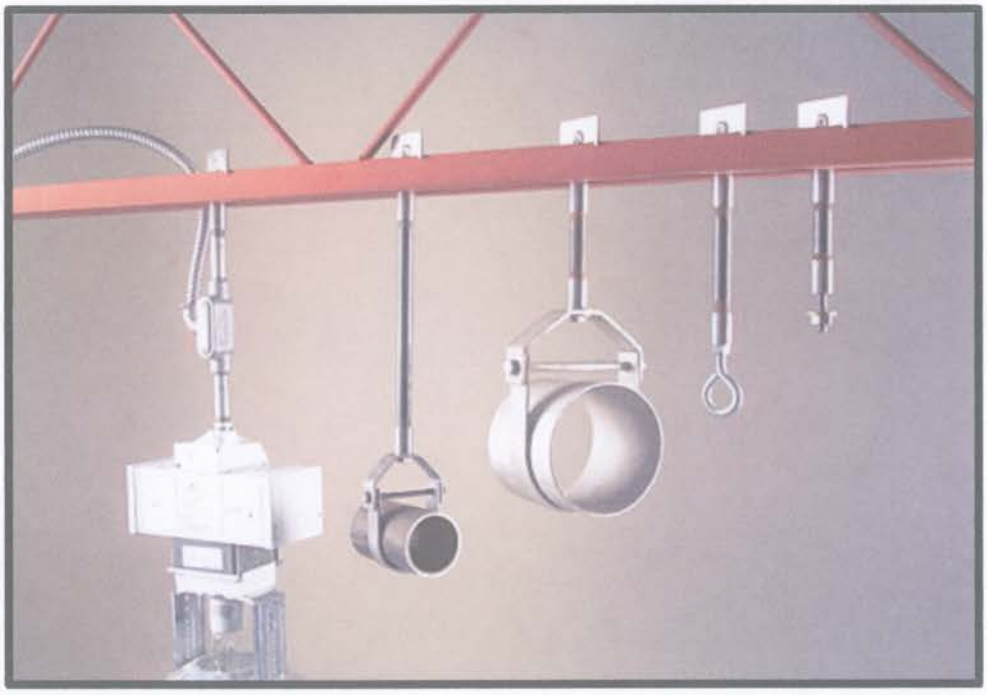
Underwriters Laboratories

Conduit and Cable Hardware

15NE/15MY

Truss-T Hanger™

HOW ARE YOU HANGING?



File EX6647 .
Project 04CA04554

November 29, 2004

REPORT

on

PIPE HANGER

SBR Inc
Caldwell, ID

File EX6647 Page 1 Issued: 2004-11-29

DESCRIPTION

PRODUCT COVERED:

Hangers, Pipe

Standard pipe hanger:

Truss Bracket, Model HD Truss-T, 8 in. maximum pipe size, 1/2 in. rod. Intended for installation onto minimum 1-3/4 in. x 1-3/4 in. x 0.2 in. steel web joist spaced 1/2 to 1 in. apart.

CONSTRUCTION DETAILS:

The product has been examined and found to comply with the requirements of the Standard for Pipe Hanger Equipment for Fire Protection Service, UL 203; and the Other Recognized Document for Pipe Hanger Equipment for Fire Protection Service, ULC/ORD C203, in effect as of the date of this Report

USE:

The products covered by this Report are intended for use in accordance with the National Fire Protection Association Standard for the Installation of Sprinkler Systems, NFPA 13 and the Standard for Water Spray Fixed Systems for Fire Protection, NFPA 15.

TEST RECORD NO. 1

SAMPLES:

Representative samples of the Hangers, Pipe as indicated below and constructed as described herein, were submitted by the manufacturer for examination and test.

Truss Bracket, Model HD Truss-T, 8 in. maximum pipe size, 1/2 in. rod. Intended for installation onto minimum 1-3/4 in. x 1-3/4 in. x 0.2 in. steel web joist spaced 1/2 to 1 in. apart.

GENERAL:

Test results relate only to the items tested.

The following tests were conducted.

Pull	UL 203, Section 8, Edition 8 ULC/ORD C203, Section 4.2, Edition 1

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in the Standard for Pipe Hanger Equipment for Fire Protection Service, UL 203, Edition 8; and the Other Recognized Document for Pipe Hanger Equipment for Fire Protection Service, ULC/ORD C203, Edition 1.

The material covered by this Report has been tested and found to comply with the requirements of the Standard for Pipe Hanger Equipment for Fire Protection Service, UL 203, Edition 8; and the Other Recognized Document for Pipe Hanger Equipment for Fire Protection Service, ULC/ORD C203, Edition 1, in effect as of the date of this Report.

CONCLUSION

Samples of the products covered by this Report have been found to comply with the requirements covering the category and the products are judged to be eligible for Listing and Follow-Up Service. The manufacturer is authorized to use the UL Mark on such products which comply with the Follow-Up Service Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the UL Mark are considered as Listed by Underwriters Laboratories Inc.

Report by:

Blake M Shugarman
Engineer Sr Project

Reviewed by:

Kenneth W Zastrow
Staff Engineer

Underwriters Laboratories Inc.®

Northbrook Division
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
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fax: 1 847 272 8129
Customer service: 1 877 854 3577

File EX6647 Vol 1 Issued 2004-11-30
Revised

FOLLOW-UP SERVICE PROCEDURE
(TYPE R)

HANGERS, PIPE
(VFXT,VFXT7)

Manufacturer: SBR INC
(103522-001) 212 EVANS ST
CALDWELL ID 83605

Applicant: SAME AS MANUFACTURER
(103522-001)

Listee: SAME AS MANUFACTURER
(103522-001)

This Procedure authorizes the above Manufacturer to use the marking specified by Underwriters Laboratories Inc. only on products covered by this Procedure, in accordance with the applicable Follow-Up Service Agreement.

The prescribed Mark or Marking shall be used only at the above manufacturing location on such products which comply with this Procedure and any other applicable requirements.

The Procedure contains information for the use of the above named Manufacturer and representatives of Underwriters Laboratories Inc. and is not to be used for any other purpose. It is lent to the Manufacturer with the understanding that it is not to be copied, either wholly or in part, and that it will be returned to Underwriters Laboratories Inc. upon request.

This PROCEDURE, and any subsequent revisions, is the property of UNDERWRITERS LABORATORIES INC. and is not transferable.

UNDERWRITERS LABORATORIES INC.

A.W. Schaefer
Sr. Vice President
Global Services and Administration

N

File EX6647 Vol. 1 VPXT Page 1 Issued: 01/04

Listing Mark Data Page

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested.

XXXX = The control number assigned by UL, 15MY.

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

The product identity is: "Pipe Hanger".

The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

Separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) will always include the four elements.

The complete four element Listing Mark will on appear the smallest unit container in which the product is packaged, with or without the UL symbol on the product.

The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized label suppliers can be found on UL's online directory at www.ul.com.

THIS FORM PAGE IS TO BE REVISED BY THE NORTHBROOK LABEL DEPARTMENT ONLY

File EX6647 Vol. 1 VFXT7 Page 1 Issued: 01/04

Canadian Listing Mark Data Page

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested. (If only Canadian coverage is authorized, use only the C-UL Symbol).

UL Symbol to the left and the C-UL Symbol to the right.

Alternatively, the Canadian/US Mark may be used. The UL Symbol with "C" to the left and "US" to the right.

XXXX = The control number assigned by UL, 15MY.

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

The product identity is: "Pipe Hanger".

The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

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The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier. The list of UL authorized label suppliers can be found on UL's online directory at www.ul.com.

THIS FORM PAGE IS TO BE REVISED BY THE NORTHBROOK LABEL DEPARTMENT ONLY

333 Pfingsten Road
Northbrook, Illinois 60062-2096
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http://www.ul.com

Underwriters Laboratories Inc.®

File E246876 Vol 1 Issued 2004-05-31
Revised

FOLLOW-UP SERVICE PROCEDURE
(TYPE R)

CONDUIT AND CABLE HARDWARE
(DWMU,DWMU7)

Manufacturer: SBR INC
(103522-001) 212 EVANS ST
CALDWELL ID 83605

Applicant: SAME AS MANUFACTURER
(103522-001)

Listee: SAME AS MANUFACTURER
(103522-001)

This Procedure authorizes the above Manufacturer to use the marking specified by Underwriters Laboratories Inc. only on products covered by this Procedure, in accordance with the applicable Follow-Up Service Agreement.

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This PROCEDURE, and any subsequent revisions, is the property of UNDERWRITERS LABORATORIES INC. and is not transferable.

UNDERWRITERS LABORATORIES INC.

A.W. Schaefer
Vice President and General Manager
US and Canadian Operations

N

File E246876 Vol. 1 DWMU Page 1 Issued: 1/2/98
Listing Mark Data Page (LMDP)

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested.

XXXX = The control number assigned by UL, 15NE .

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

The product identity is: "CONDUIT AND CABLE HARDWARE", or appropriate product identities, as shown in the individual Listing.

The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

Separable Listing Mark (not part of a nameplate and in the form of decals, stickers or labels) will always include the four elements.

The complete four element Listing Mark will appear on the smallest unit container in which the product is packaged when the product is of such a size that only the UL Symbol can be applied to the product or when the product size, shape, material or surface texture makes it impossible to apply any legible marking to the product.

The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier.

THIS PAGE IS TO BE REVISED BY FUS DEPARTMENT ONLY

File E246876 Vol. 1 DWMU7 Page 1 of 2 Issued: 1/2/98

Canadian Listing Mark Data Page (CLMDP)

(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

The Listing Mark consists of four elements placed in close proximity and shall appear on Listed products only. Minimum size is not specified, as long as the Listing Mark is legible. The following is suggested. (If only Canadian coverage is authorized, use only the C-UL Symbol).

UL Symbol to the left and the C-UL Symbol to the right.

Alternatively, the Canadian/US Mark may be used. The UL Symbol with "C" to the left and "US" to the right.

XXXX = The control number assigned by UL, 15NE.

The minimum height of the registered trademark symbol ® shall be 3/64 of an inch. When the overall diameter of the UL Mark is less than 3/8 of an inch, the trademark symbol may be omitted if it is not legible to the naked eye.

The product identity is: "CONDUIT AND CABLE HARDWARE", or appropriate product identities, as shown in the individual Listing.

The product identity may be omitted if the Mark is directly and permanently applied to the product by stamping, molding, ink-stamping, silk screening or similar process. The product identity may appear elsewhere on the product if the other three elements are part of the nameplate which includes the rating or the catalog or model designation.

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(FILE IMMEDIATELY AFTER AUTHORIZATION PAGE)

LISTING MARK

All elements of the Listing Mark will appear on the smallest unit container in which the product is packaged when the product is of such a size that only the Symbol(s) can be applied to the product or when the product size, shape, material or surface texture makes it impossible to apply any legible marking to the product.

The manufacturer may reproduce the Mark or obtain it from a UL authorized supplier.

THIS PAGE IS TO BE REVISED BY FUS DEPARTMENT ONLY

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INDEX

Product	Section	USL / CNL
Strut/Rod hangers, Model Truss Bracket Assembly.	2004-05-31	USL, CNL

USL - Indicates Listing to United States requirements, Hardware for the Support of Conduit, Tubing and Cable,UL 2239, First Edition.

CNL - Indicates Listing to Canadian requirements, Hardware for the Support of Conduit, Tubing and Cable, CSA C22.2 No. 18.4-04, First Edition.

File E246876 Page T1-1 of 1 Issued: 2004-05-31

TEST RECORD NO. 1

SAMPLES:

The manufacturer submitted representative production samples of metallic Hanger Assembly Model Truss Bracket Assembly made from plated steel and having a 0.13 in. thickness.

Testing was conducted in accordance with the Standard for Safety for Hardware for the Support of Conduit, Tubing and Cable, UL 2239.

GENERAL:

Test results relate only to the items tested.

Tests were considered covered as follows:

Test	File Reference	Report Date	Test Record No.
Pull Test at 4050 lbs for 5 minutes and then 6075 lbs for 1 minute.	EX6647	2004-03-22	1

The following tests were conducted.

Metallic Coating Thickness

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in Standard for Safety for Hardware for the Support of Conduit, Tubing and Cable, UL 2239.

Test Record Summary:

The results of this investigation indicate that the products evaluated comply with the applicable requirements and, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report.

Test Record by:	Reviewed by:
Richard Fendrych	Daniel Haiducu
Staff Engineer	Senior Project Engineer
CAS 3018A NBK	CAS 3018A NBK

½" Heavy Duty Load Calculation

January 2007

Truss-T Hanger™

HOW ARE YOU HANGING?

Structural Calculations
for
INDUSTRIAL HANGERS
PREPARED FOR
SAM HARTWICK

Leavitt & Associates Engineers, Inc.
1324 First Street South – Nampa, ID 83651
(208) 463-0333
http://www.leavittengineers.com

Revision #	Prepared by	Reviewed by	Project #
0	Jimmy Church	J. Reese Leavitt, PE/SE	03232.002

DESIGN CRITERIA:
CODE: AISC ASD NINTH EDITION

NOTE: CALCULATIONS HAVE BEEN LIMITED TO DETERMINING THE MAXIMUM ALLOWABLE TENSILE LOAD THAT MAY BE APPLIED TO THE HANGER ASSEMBLIES.

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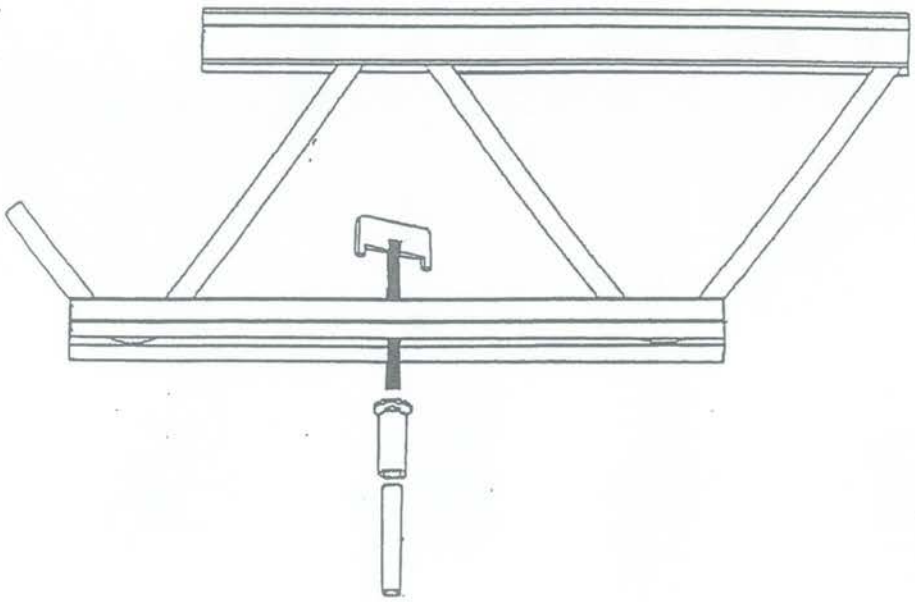

Title:

HEAVY DUTY HANGER SCHEMATIC

Owner:	Project:		
SAM HARTWICK 308 EVANS STREET NAMPA, IDAHO 83605 (208) 455-7752	INDUSTRIAL HANGERS		
	Job Number: 03232.002		Scale: NTS
	Designed by: J.R.C.	Drawn by: J.R.C.	Checked by: J.R.L.

LEAVITT & ASSOCIATES ENGINEERS, INC.
STRUCTURAL • CIVIL
SURVEYING

1324 FIRST STREET SOUTH, NAMPA, IDAHO 83651
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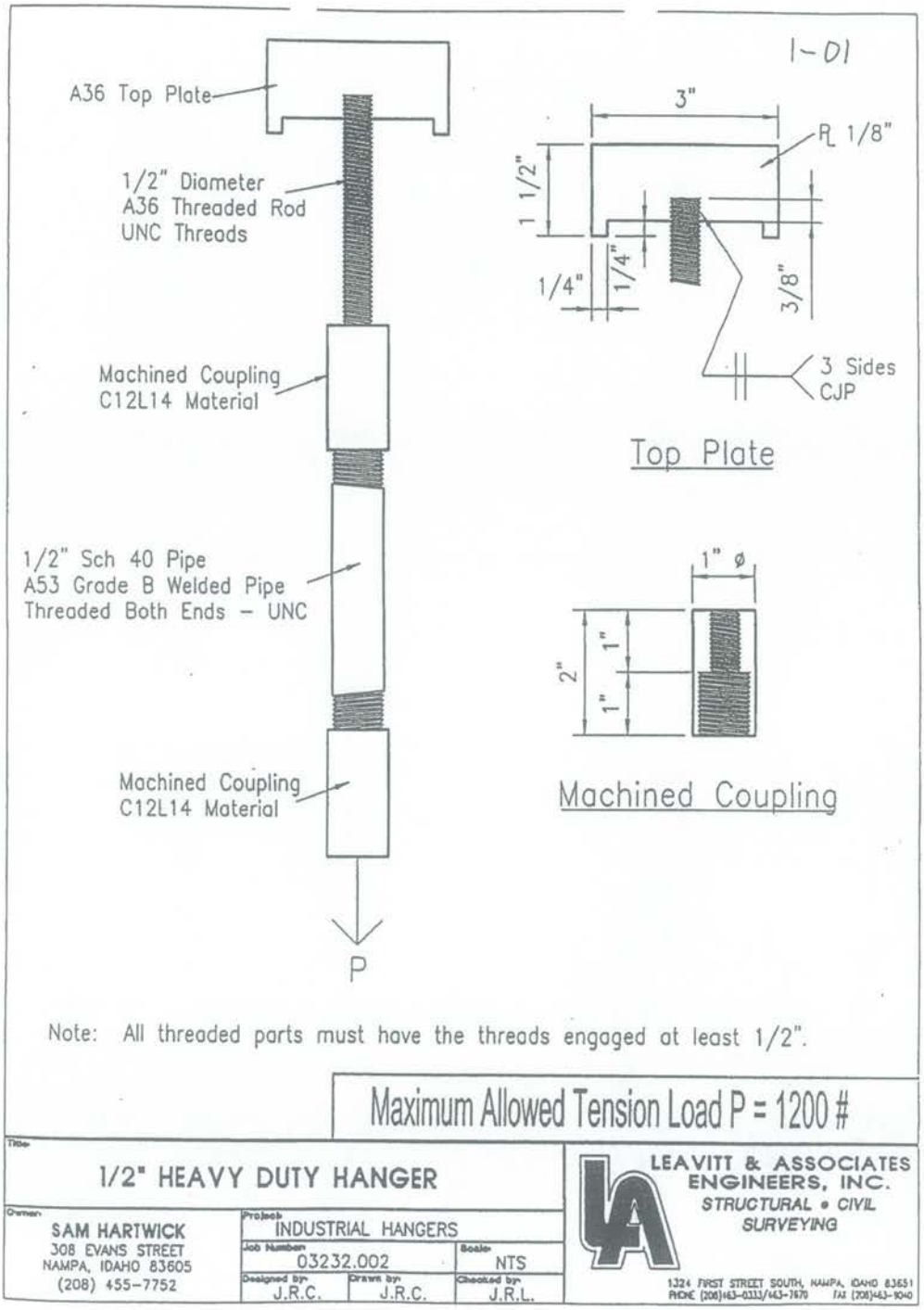
1-01
A36 Top Plate
1/2" Diameter
A36 Threaded Rod
UNC Threads
Machined Coupling
C12L14 Material
1/2" Sch 40 Pipe
A53 Grade B Welded Pipe
Threaded Both Ends - UNC
Machined Coupling
C12L14 Material
P
3"
℄ 1/8"
1 1/2"
1/4"
1/4"
3/8"
3 Sides
CJP
Top Plate
1" ø
2"
1"
1"
Machined Coupling
Note: All threaded parts must have the threads engaged at least 1/2".
Maximum Allowed Tension Load P = 1200 #
1/2" HEAVY DUTY HANGER
SAM HARTWICK
308 EVANS STREET
NAMPA, IDAHO 83605
(208) 455-7752
INDUSTRIAL HANGERS
03232.002
NTS
J.R.C.
J.R.C.
J.R.L.
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PHONE (208)463-0333/463-7670 FAX (208)463-1040

1-02

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	1/2" hanger rods
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\rod
	COMMENTS:	

1/2" HANGER ROD IN TENSION

ROD SECTION PROPERTIES:

diameter, d:	1/2	in	F_Y:	36	ksi
Area:	0.20	in^2	F_U:	58	ksi

ALLOWABLE TENSILE STRESS IN THREADED ROD:

$F_T = 0.33*F_U$ = 19.14 ksi (Ref.: AISC ASD 9th Ed., Page 4-3 Table I-B)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(Area)$ = **3.76 k**

STRENGTH OF WELD:

Rod to Top Plate: Rod is welded to top plate with complete joint penetration welds on 3 sides.

* Weld rod to top plate:
  Weld strength is the strength of the base metal. (AISC ASD 9th Ed., Table J2.5)
  Thus, the weld strength is the strength of block shear of the plate.

  weld length, L_W = 0.375 in

* Block shear of top plate at weld (AISC ASD Sect. J4)
  $P_{ALLOW} = (0.3*2*L_W+0.5*d)*t*F_U$

  Plate: t = 0.125 in

  P_{ALLOW} = **3.44 k**

1-03

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	1/2" Pipe Hanger
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\Pipe
	COMMENTS:	

1/2" HANGER PIPE IN TENSION

PIPE SECTION PROPERTIES:

Nominal Diameter:	1/2	in	F_Y:	35 ksi
Gross Area:	0.25	in^2	F_U:	60 ksi
Net Area:	0.10	in^2		

ALLOWABLE TENSILE STRESS IN THREADED PIPE:

GROSS TENSION

$F_T = 0.60 * F_Y =$ 21.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(\text{Gross Area}) =$ 5.25 k

EFFECTIVE TENSION

$F_T = 0.50 * F_U =$ 30.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(\text{Net Area}) =$ 5.86 k

$P_{ALLOW} =$ 5.25 k

1-04

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	1" Coupling
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\Coupling
	COMMENTS:	

1" COUPLING IN TENSION

COUPLING SECTION PROPERTIES:

Outside Diameter: 1 in F_Y: 60 ksi
Rod End - 1/2" Threaded Rod F_U: 65 ksi
Gross Area: 0.65 in^2
Net Area: 0.59 in^2

Pipe End - 1/2" Threaded Pipe
Gross Area: 0.38 in^2
Net Area: 0.23 in^2

ALLOWABLE TENSILE STRESS IN COUPLING (CHECKED AT CRITICAL END):

GROSS TENSION

$F_T = 0.60*F_Y =$ 36.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load
$P_{ALLOW} = (F_T)(\text{Gross Area}) =$ 13.82 k

EFFECTIVE TENSION

$F_T = 0.50*F_U =$ 32.50 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load
$P_{ALLOW} = (F_T)(\text{Net Area}) =$ 15.03 k

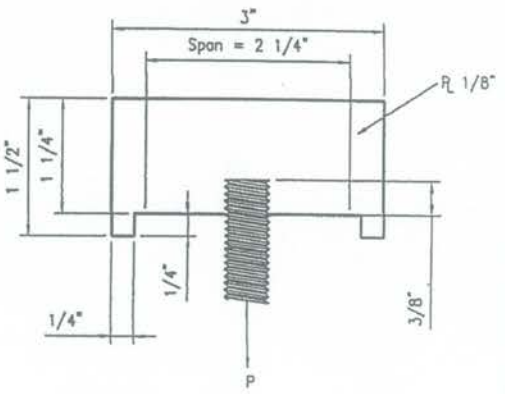
$P_{ALLOW} =$ 13.82 k

Leavitt & Associates Engineers, Inc.
1324 1st Street South
NAMPA, IDAHO 83651
(208) 463-0333

JOB Hartwick
SHEET NO. 1-05 OF
CALCULATED BY J. Clark DATE 9/5/03
CHECKED BY DATE
SCALE

Top Plate Allowable Load Determination

Bending



$M = PL/4 = \frac{P(2.25)}{4}$

$= 0.563 * P$

$L_c = 76 b_f / \sqrt{F_y} = \frac{76(0.125)}{\sqrt{36}}$

$= 1.58"$

or

$= 20{,}000 / (d/A_f) F_y = 20{,}000 / 1.25/(1.25/3(0.125))(36)$

$= 23.15"$

$\therefore L_c = 1.58"$

$L_b = 2.125" > L_c$

$r_T = 0.125/\sqrt{12} = 0.0361$

$l/r_T = 2.125/0.0361 = 58.86$

$l/r_T > \sqrt{\frac{102 \times 10^3 C_b}{F_y}} = \sqrt{\frac{102 \times 10^3 (1)}{36}} = 53.2$

Leavitt & Associates Engineers, Inc.
1324 1st Street South
NAMPA, IDAHO 83651
(208) 463-0333

JOB Hartwick
SHEET NO. 1-06 OF
CALCULATED BY J. Church DATE 9/5/03
CHECKED BY DATE
SCALE

$l/r_T < \sqrt{\frac{510 \times 10^3 C_b}{F_y}} = 119.0$

$F_b = \left[2/3 - \frac{F_y (l/r_T)^2}{1530 \times 10^3 C_b} \right] F_y \leq 0.60 F_y$

$= \left[2/3 - \frac{36(58.86)^2}{1530 \times 10^3 (1)} \right] 36 \leq 0.60(36)$

$= 21.1$ ksi

$S_x = b d^2/6 = 0.125(1.25)^2/6 = 0.0325$ in^3

Set $F_b = f_b$ and solve for P

$F_b = M/S_x$

$21.1 = 0.563 + P/0.0325$

$P = 1.22$ k

Shear

Set $f_v = F_v$ and solve for P

$F_v = 0.4 F_y = f_v = P/2 / b d$

$0.4(36) = P/(0.125)(1.25)(2)$

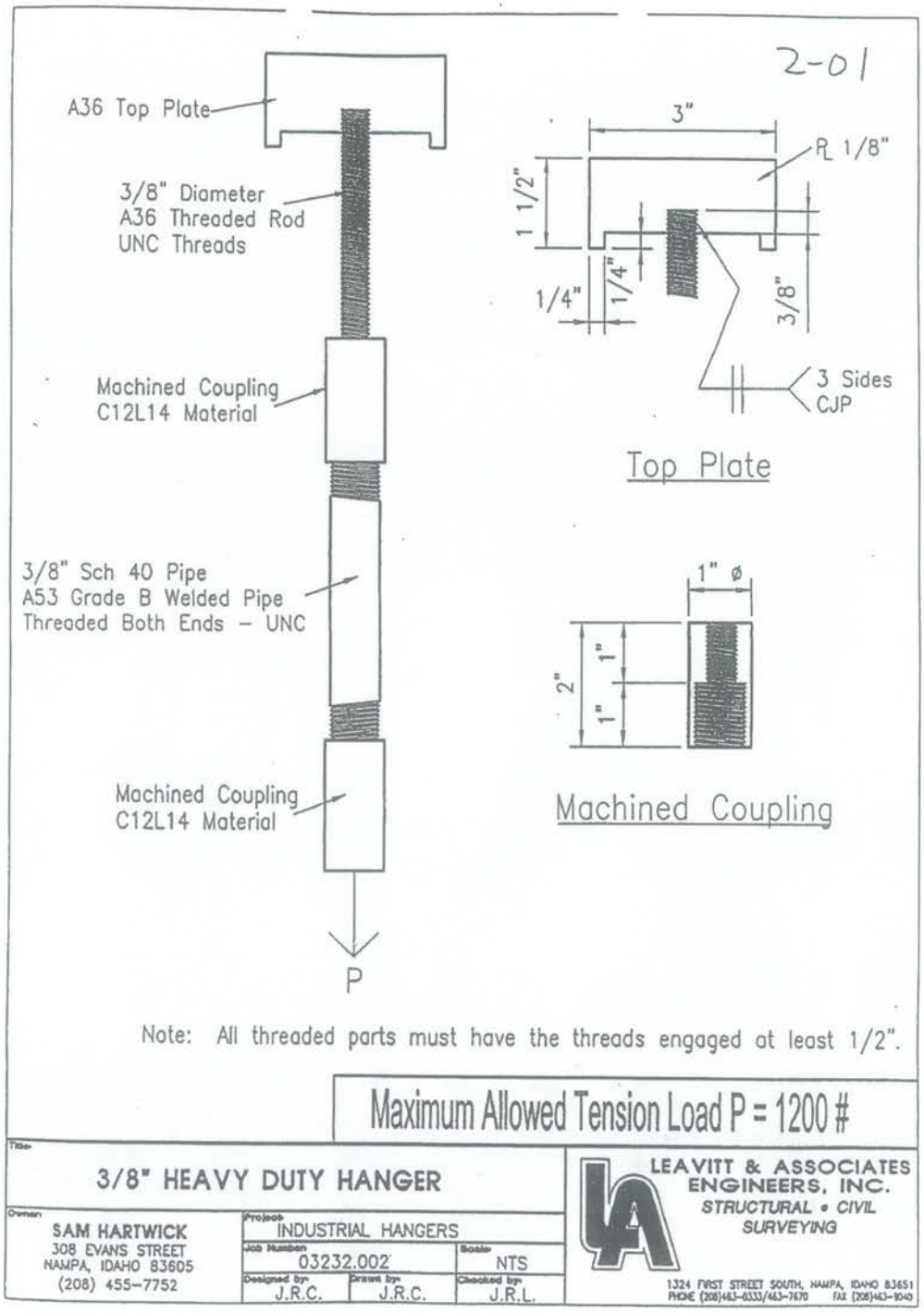
$P = 4.5$ k

3/8" Heavy Duty Load Calculation

January 2007

Truss-T Hanger™

HOW ARE YOU HANGING?


2-01
A36 Top Plate
3/8" Diameter
A36 Threaded Rod
UNC Threads
Machined Coupling
C12L14 Material
3/8" Sch 40 Pipe
A53 Grade B Welded Pipe
Threaded Both Ends – UNC
Machined Coupling
C12L14 Material
P
3"
R 1/8"
1 1/2"
1/4"
1/4"
3/8"
3 Sides
CJP
Top Plate
1" ø
2"
1"
1"
Machined Coupling
Note: All threaded parts must have the threads engaged at least 1/2".
Maximum Allowed Tension Load P = 1200 #
3/8" HEAVY DUTY HANGER
SAM HARTWICK
308 EVANS STREET
NAMPA, IDAHO 83605
(208) 455-7752
INDUSTRIAL HANGERS
03232.002
NTS
J.R.C.
J.R.C.
J.R.L.
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PHONE (208)463-0333/463-7670 FAX (208)463-1040

2-02

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	3/8" hanger rods
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\rod
	COMMENTS:	

3/8" HANGER ROD IN TENSION

ROD SECTION PROPERTIES:

diameter, d:	3/8	in	F_Y:	36	ksi
Area:	0.11	in^2	F_U:	58	ksi

ALLOWABLE TENSILE STRESS IN THREADED ROD:

$F_T = 0.33 * F_U$ = 19.14 ksi (Ref.: AISC ASD 9th Ed., Page 4-3 Table I-B)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(Area)$ = **2.11 k**

STRENGTH OF WELD:

Rod to Top Plate: Rod is welded to top plate with complete joint penetration welds on 3 sides.

* Weld rod to top plate:
  Weld strength is the strength of the base metal. (AISC ASD 9th Ed., Table J2.5)
  Thus, the weld strength is the strength of block shear of the plate.

  weld length, L_W = 0.375 in

* Block shear of top plate at weld (AISC ASD Sect. J4)
  $P_{ALLOW} = (0.3*2*L_W+0.5*d)*t*F_U$

  Plate: t = 0.125 in

  P_{ALLOW} = **2.99 k**

2-03

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	3/8" Pipe Hanger
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\Pipe
	COMMENTS:	

3/8" HANGER PIPE IN TENSION

PIPE SECTION PROPERTIES:

Nominal Diameter:	3/8	in	F_Y:	35 ksi
Gross Area:	0.167	in^2	F_U:	60 ksi
Net Area:	0.069	in^2		

ALLOWABLE TENSILE STRESS IN THREADED PIPE:

GROSS TENSION

$F_T = 0.60 * F_Y =$ 21.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(\text{Gross Area}) =$ 3.51 k

EFFECTIVE TENSION

$F_T = 0.50 * F_U =$ 30.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load

$P_{ALLOW} = (F_T)(\text{Net Area}) =$ 4.13 k

$P_{ALLOW} =$ **3.51 k**

2-04

LEAVITT & ASSOCIATES ENGINEERS 1324 First Street South Nampa, ID 83651 (208) 463-7670	CLIENT: JOB: DESCRIPTION: DESIGNER: DATE: FILE: COMMENTS:	Sam Hartwick Industrial Hanger 1" Coupling Jimmy Church Sep. 5, 2003 \\Coupling

1" COUPLING IN TENSION

COUPLING SECTION PROPERTIES:

Outside Diameter: 1 in F_Y: 60 ksi
Rod End - 3/8" Threaded Rod F_U: 65 ksi
Gross Area: 0.71 in^2
Net Area: 0.67 in^2

Pipe End - 3/8" Threaded Pipe
Gross Area: 0.53 in^2
Net Area: 0.43 in^2

ALLOWABLE TENSILE STRESS IN COUPLING (CHECKED AT CRITICAL END):

GROSS TENSION

$F_T = 0.60 * F_Y =$ 36.00 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load
$P_{ALLOW} = (F_T)(\text{Gross Area}) =$ 18.93 k

EFFECTIVE TENSION

$F_T = 0.50 * F_U =$ 32.50 ksi (Ref.: AISC ASD 9th Ed., Page 5-40)

Maximum Allowed Load
$P_{ALLOW} = (F_T)(\text{Net Area}) =$ 27.79 k

P_{ALLOW} = 18.93 k

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JOB Hartwick
SHEET NO. 2-05 OF
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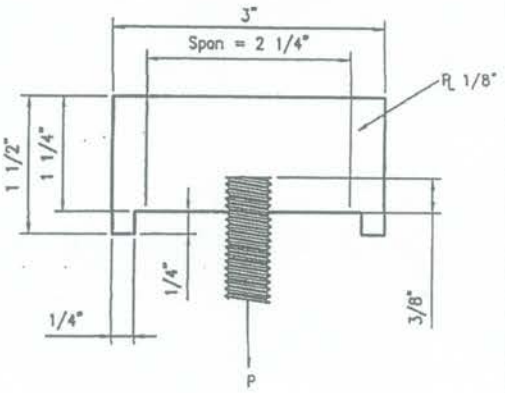
SCALE

Top Plate Allowable Load Determination

Bending



$$M = PL/4 = \frac{P(2.25)}{4}$$

$$= 0.563 * P$$

$$L_c = 76 b_f / \sqrt{F_y} = \frac{76(0.125)}{\sqrt{36}}$$

$$= 1.58"$$

or

$$= 20{,}000 / (d/A_f) F_y = 20{,}000 / 1.25/(1.25/3(0.125))(36)$$

$$= 23.15"$$

$\therefore L_c = 1.58"$

$L_B = 2.125" > L_c$

$$r_T = 0.125/\sqrt{12} = 0.0361$$

$$l/r_T = 2.125/0.0361 = 58.86$$

$$l/r_T > \sqrt{\frac{102 \times 10^3 C_b}{F_y}} = \sqrt{\frac{102 \times 10^3 (1)}{36}} = 53.2$$

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JOB Hartwick
SHEET NO. 2-05 OF
CALCULATED BY J. Clark DATE 9/5/03
CHECKED BY DATE
SCALE

Top Plate Allowable Load Determination

Bending

$$M = PL/4 = \frac{P(2.25)}{4}$$

$$= 0.563 * P$$

$$L_c = 76 b_f / \sqrt{F_y} = \frac{76(0.125)}{\sqrt{36}}$$

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or

$$= 20{,}000 / (\ell/A_f) F_y = 20{,}000 / 1.25/(1.25/3(0.125))(36)$$

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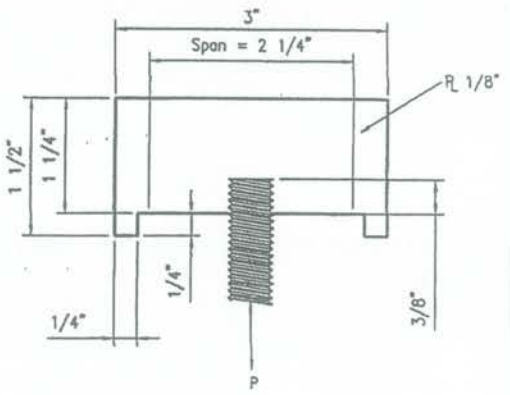

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JOB Hartwick
SHEET NO. 2-06 OF
CALCULATED BY J. Church DATE 9/5/03
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SCALE

$l/r_T < \sqrt{\frac{510 \times 10^3 C_b}{F_y}} = 119.0$

$F_b = \left[2/3 - \frac{F_y (l/r_T)^2}{1530 \times 10^3 C_b} \right] F_y \leq 0.60 F_y$

$= \left[2/3 - \frac{36(58.86)^2}{1530 \times 10^3 (1)} \right] 36 \leq 0.60(36)$

$= 21.1$ ksi

$S_x = b d^3/6 = 0.125(1.25)^2/6 = 0.0325$ in^3

Set $F_b = f_b$ and solve for P

$F_b = M/S_x$

$21.1 = 0.563 * P / 0.0325$

$P = 1.22$ k

Shear

Set $f_v = F_v$ and solve for P

$F_v = 0.4 F_y = f_v = P/bd$

$0.4(36) = P/(0.125)(1.25)$

$P = 2.25$ k

2-07

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	3/8" Heavy Duty Hanger Summary
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\Summary
	COMMENTS:	

3/8" HEAVY DUTY HANGER SUMMARY

Summary of Allowable Tension Loads

3/8" Hanger Rod	2.11 k
Weld of Rod to Top Plate / Block Shear	2.99 k
3/8" Hanger Pipe	3.51 k
1" Coupling	18.93 k
Top Plate Bending	1.22 k
Top Plate Shear	4.5 k

Allowable Tension Load = **1.22 k**

1-07

LEAVITT & ASSOCIATES ENGINEERS	CLIENT:	Sam Hartwick
1324 First Street South	JOB:	Industrial Hanger
Nampa, ID 83651	DESCRIPTION:	1/2" Heavy Duty Hanger Summary
(208) 463-7670	DESIGNER:	Jimmy Church
	DATE:	Sep. 5, 2003
	FILE:	\\Summary
	COMMENTS:	

1/2" HEAVY DUTY HANGER SUMMARY

Summary of Allowable Tension Loads

1/2" Hanger Rod	3.76 k
Weld of Rod to Top Plate / Block Shear	3.44 k
1/2" Hanger Pipe	5.25 k
1" Coupling	13.82 k
Top Plate Bending	1.22 k
Top Plate Shear	4.5 k

Allowable Tension Load = 1.22 k

Seismic Lateral Load Calculation

January 2007

Truss-T Hanger™

HOW ARE YOU HANGING?

Structural Calculations for Lateral Loads
for
TRUSS-T HANGER
PREPARED FOR
SBR, INC.

Leavitt & Associates Engineers, Inc.
1324 First Street South – Nampa, ID 83651
(208) 463-0333
http://www.leavittengineers.com

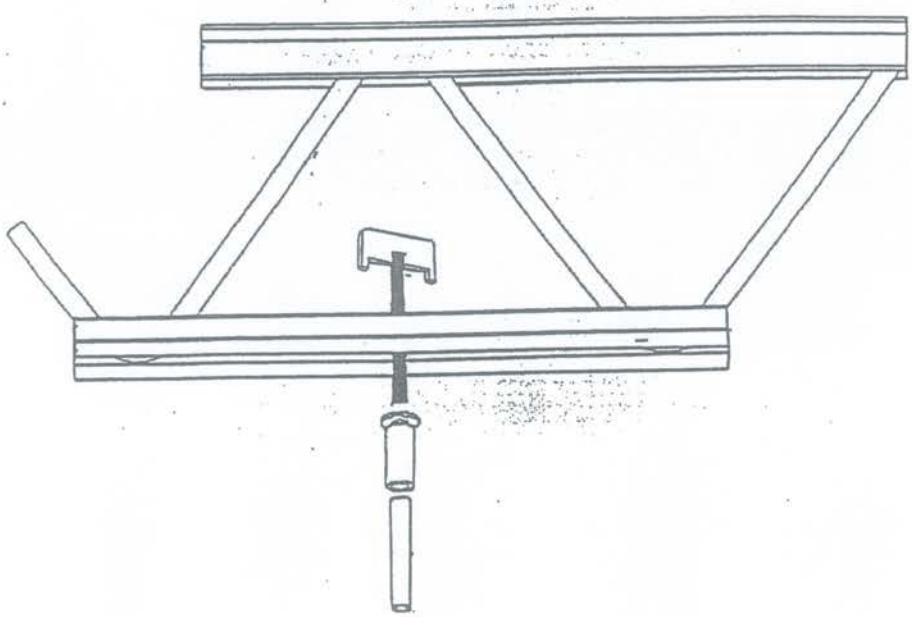
Revision #	Prepared by	Reviewed by	Project #
0	Jimmy Church	J. Reese Leavitt, PE/SE	03232.002

DESIGN CRITERIA:
CODE: AISC ASD NINTH EDITION

NOTE: CALCULATIONS HAVE BEEN LIMITED TO DETERMINING THE MAXIMUM ALLOWABLE HORIZONTAL LOADS THAT MAY BE APPLIED TO THE HANGER ASSEMBLY BASED ON THE HANGER ASSEMBLY CAPACITY ONLY. THE CALCULATIONS HAVE NOT INVESTIGATED THE SUPPORTING TRUSS'S CAPACITY FOR SUPPORTING THE LOADS INDUCED BY THE HANGER. SEE CALCULATIONS DATED SEPTEMBER 9, 2003 FOR ALLOWABLE HANGER TENSILE LOAD CALCULATIONS.

TABLE OF CONTENTS

I-01



TRUSS-T HANGER SCHEMATIC			
SBR, INC. 212 EVANS STREET CALDWELL, IDAHO 83605 (208) 455-7752	Project: INDUSTRIAL HANGERS		
	Job Number: 03232.002		Scale: NTS
	Designed by: J.R.C.	Drawn by: J.R.C.	Checked by: J.R.L.

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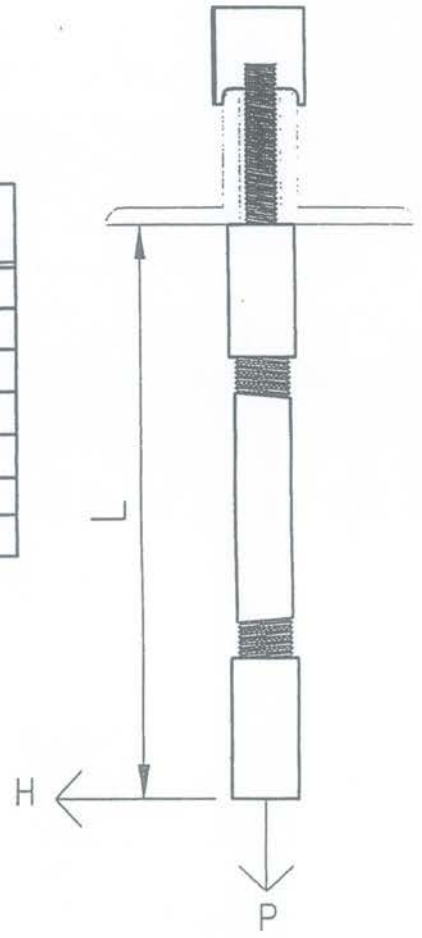
1-03

MAXIMUM ALLOWABLE
HORIZONTAL LOAD H (#)

P (#)	L 6"	12"	18"
1,200	28	14	9
1,000	44	22	15
800	61	30	20
600	78	39	26
400	94	47	31
200	111	55	37
0	128	64	43



Maximum Allowed Horizontal Loads

Title: TRUSS-T HANGER

Owner: SBR., INC.
212 EVANS STREET
CALDWELL, IDAHO 83605
(208) 455-7752

Project: INDUSTRIAL HANGERS

Job Number: 03232.002

Date: NTS

Designed by: J.R.C. | Drawn by: J.R.C. | Checked by: J.R.L.

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JOB SBR, Inc.
SHEET NO. 2-01 OF
CALCULATED BY J. Chunk DATE 9/2/04
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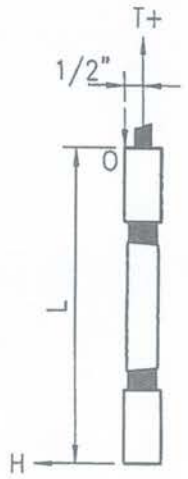
Determination of Increased Tension Load Due to Horizontal Force



$$\Sigma M_0 = H * L - T^+ * (1/2) = 0$$

$$T^+ = H * L / 1/2$$

$$= 2HL$$

In the structural calculations for Industrial Hangers prepared 9/9/04, the allowable tension loads that may be applied to the hanger were calculated and summarized on page 1-07 for the heavy duty hanger. In this summary the thru plate bending is clearly the governing element. In the following two pages this allowable load is recalculated to include a 1/3 increase in stress allowed for seismic load combinations.

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SHEET NO. 1-02 OF
CALCULATED BY J. Clark DATE 9/2/04
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SCALE

Top Plate Allowable Load Determination

Bending

$$M = PL/4 = \frac{P(2.25)}{4}$$

$$= 0.563 * P$$

$$L_c = 76b_f/\sqrt{F_y} = \frac{76(0.125)}{\sqrt{36}}$$

$$= 1.58''$$

or

$$= 20{,}000/(d/A_f)F_y = 20{,}000/1.25/(1.25/2(0.125))(36)$$

$$= 23.15''$$

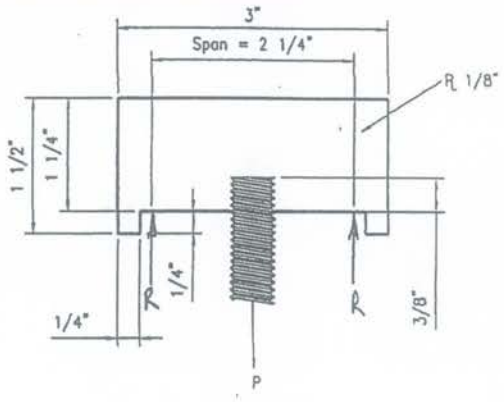
$\therefore L_c = 1.58''$

$L_B = 2.125'' > L_c$

$$r_T = 0.125/\sqrt{12} = 0.0361$$

$$l/r_T = 2.125/0.0361 = 58.86$$

$$l/r_T > \sqrt{\frac{102 \times 10^3 C_b}{F_y}} = \sqrt{\frac{102 \times 10^3 (1)}{36}} = 53.2$$



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1324 1st Street South
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JOB SBR, Inc.
SHEET NO. 2-03 OF
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SCALE

$l/r_T < \sqrt{\frac{510 \times 10^3 C_b}{F_y}} = 119.0$

$F_b = \left[2/3 - \frac{F_y (l/r_T)^2}{1530 \times 10^3 C_b} \right] F_y \leq 0.60 F_y$

$= \left[2/3 - \frac{36(58.86)^2}{1530 \times 10^3 (1)} \right] 36 \leq 0.60(36)$

$= 21.1$ ksi + 1/3 increase for seismic $= 28.1$ ksi

$S_x = bd^2/6 = 0.125(1.25)^2/6 = 0.0325$ in^3

Set $F_b = f_b$ and solve for P

$F_b = M/S_x$

$28.1 = 0.563 + P/0.0325$

$P = 1.53$ k

Shear

Set $f_v = F_v$ and solve for P

$F_v = 0.4 F_y = f_v = P/2/bd$

$0.4(36) = P/(0.125)(1.25)(2)$

$P = 4.5$ k

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JOB SBK, Inc
SHEET NO. 7-04 OF
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CHECKED BY DATE
SCALE

Determination of Allowable Horizontal Loads

$T + T' \leq 1530\ \#$

With no decrease in allowable vertical load

$1200 + 2HL \leq 1530\ \#$

$H \leq (1530 - 1200)/2L$

$H \leq 165/L$

For $L = 6''$

$H = 28\ \#$

See the table for allowable loads for other values of L

With decreased allowable vertical load

Say $T = 1000\ \#$

$H \leq (1530 - 1000)/2L = 265/L$

For $L = 6''$

$H = 44\ \#$

Other values in table determined by similar means

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CALCULATED BY S. Church DATE 9/2/04
CHECKED BY DATE
SCALE

Checks for Other Elements of Hanger

Based on the Maximum Allowable Horizontal Load Table the maximum Allowable Moment is

$M = 6'' * 129\#$
$= 774$ in-#

1/2" Hanger Pipe

$S = 0.041$ in^2

$F_b = 0.6\, F_y = 0.6(35) = 21$ ksi

$M_{max} = F_b S = 861$ in-#

$M_{max} > M$ ok

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JOB SKK., Inc.
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SCALE

Machined Coupling

Rod End

$d_o = 1"$

$d_i = 0.5"$

$S = \pi (d_o^4 - d_i^4)/32 d_o = 0.092 in^3$

$F_b = 0.6 F_y = 0.6(60)$

$= 36 ksi$

$M_{max} = F_b S = 3313 in-\#$

$M_{max} > M$ ok

Pipe End

$d_o = 1"$

$d_i = 0.84"$

$S = \pi (d_o^4 - d_i^4)/32 d_o = 0.049 in^3$

$F_b = 36 ksi$

$M_{max} = F_b S = 1775 in-\#$

$M_{max} > M$ ok