September 19, 2023

# 3033 W. Kilbourne
# Milwaukee, WI 53208

STRUCTURAL CALCULATIONS FOR

## Reinforcing of Existing Garage
## For 2nd floor occupancy and
## Rooftop Solar Panels

Prepared by:

BLODGETT
Engineering, LLC
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Germantown, WI 53022
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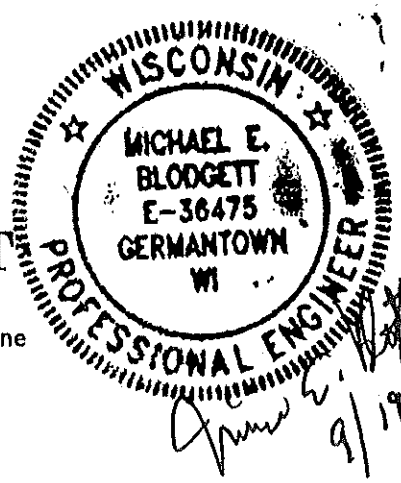


This report is limited to items specifically calculated and documented herein, members, connections, or details not specifically covered, shall be built in accordance with WI SPS 321, the WI Deck Code (SPS 320-325 Appendix B) or the IRC as required.

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Tel/Fax: 262.293.9923

JOB _____

SHEET NO. _____ OF _____

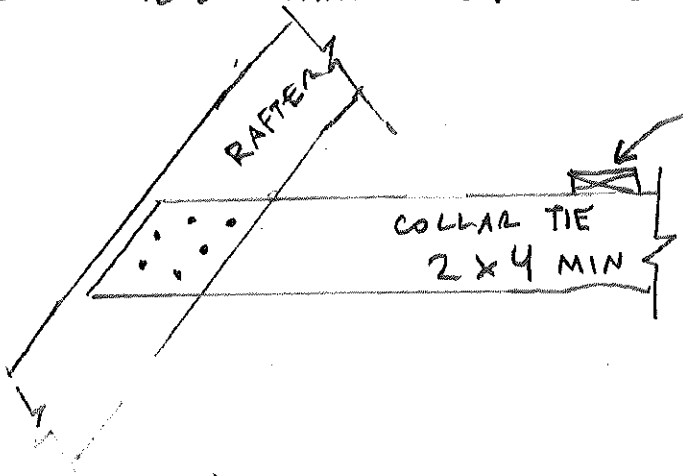
CALCULATED BY _____ DATE _____

## CONNECTIONS FOR NEW COLLARTIE

$T = -0.39223\,k$ NEW UPPER TIE $= 392.2\#$

USE 10d NAILS $= 69\# \times 1.15 = 79.35\#/\text{NAIL} \Rightarrow$ 4.94 NAILS REQ'D

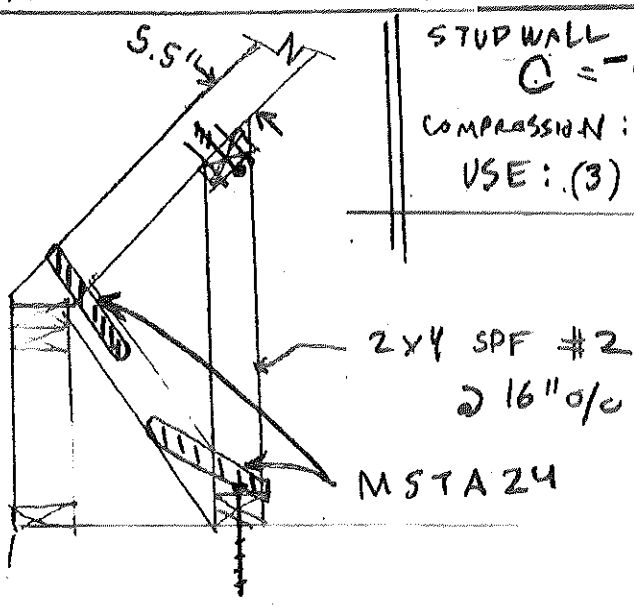
USE (6) 10d NAILS




(−) C

(+) T

## WALL CONNECTIONS (TOP + BOTTOM)




STUD WALL
$C = -475.3\#$
COMPRESSION:
USE: (3) 10d NAILS

DIAGONAL
1.4564k (T)
$= 1456.4\#$

USE: MSTA 24 STRAP (UP AND OVER RAFTER)

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JOB NICHOLAS: ROOF CHECK
SHEET NO. _____ OF _____
CALCULATED BY MEB DATE 9/16/2023

## LOADS:

SNOW = 30 psF × 0.625 = 18.75 psF → USE 20 psF MIN

$C_s = 1 - \left(\frac{45-30}{40}\right) = 0.625$

$D_L$ = SHINGLES × 2 = 4
1× BOARDS = 2.5 psF
PLYWOOD = 1.5 psF
RS 2 × 6 @ 16" O/C = 2 psF
+ MISC + CEIL = 2 psF
12 psF
+ ADD SOLAR = 3 psF
15 psF

3rd
$L_L$ = 5 psF × 1.33 = 6.66 plf
$D_L$ = 10 psF × 1.33 = 13.33 plf

2ND
$L_L$ = 40 psF × 1.33 = 0.053 klf
$D_L$ = 15 psF × 1.33 = 0.02 klf

## LOADS TO MODEL:

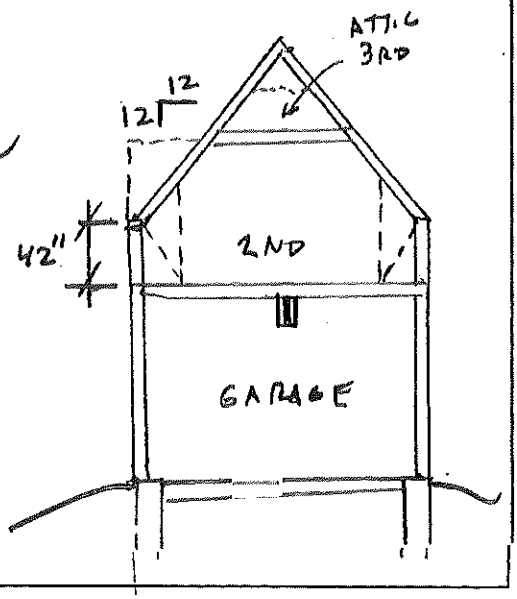
SNOW = 20 psF × 1.33 = 26.66 plf = 0.026 klf

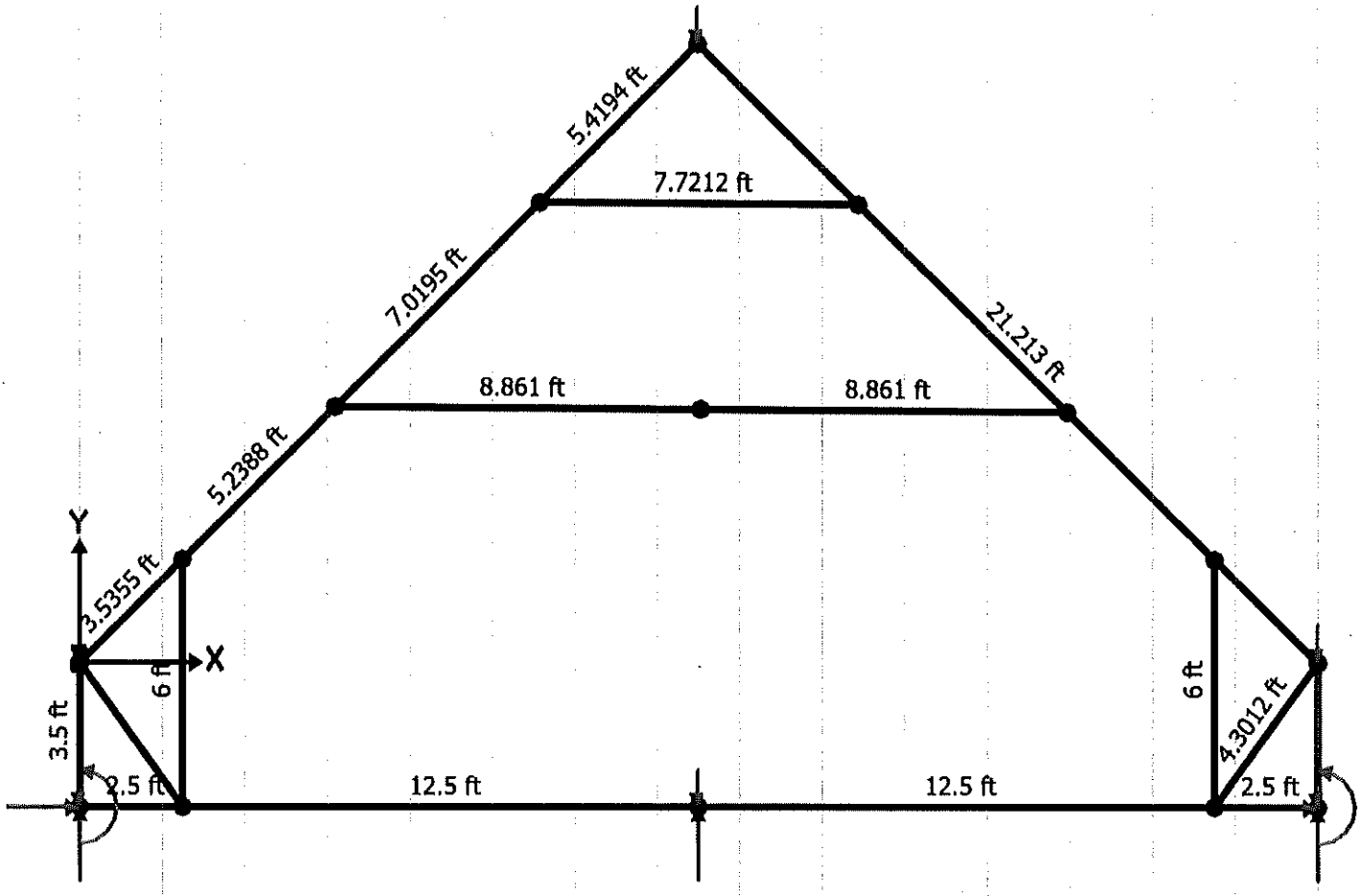
DL = 15 × 1.33 = 20 plf = 0.02 klf

WIND = 20 psF × 1.33' = 0.0266 klf

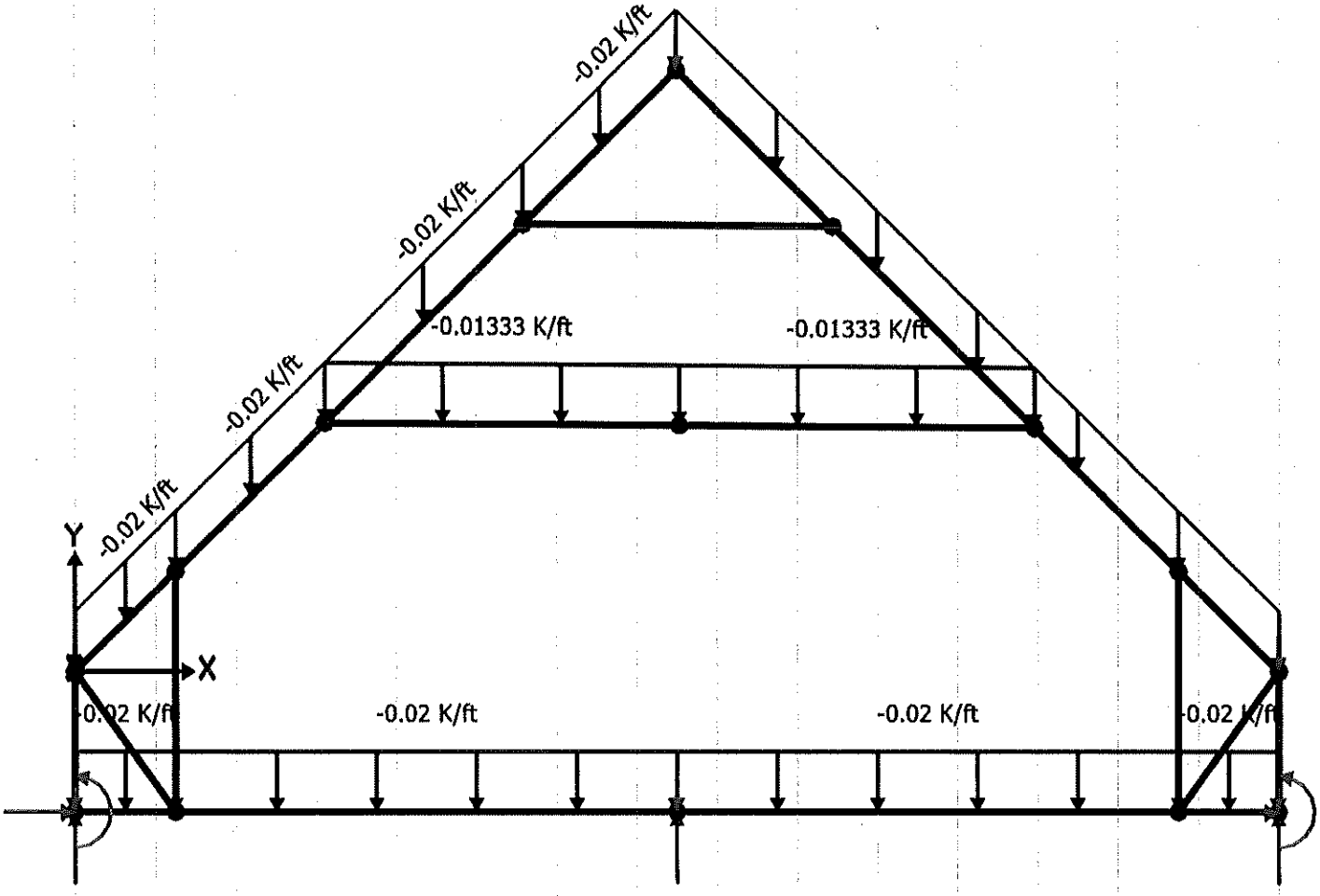
- SCC REPORT OUTPUT
- ADD NEW COLLARTIES
- ADD REINFORCING AT CORNERS OF 2ND FLOOR TO REINFORCE 42" WALLS

REMOVE DORMER

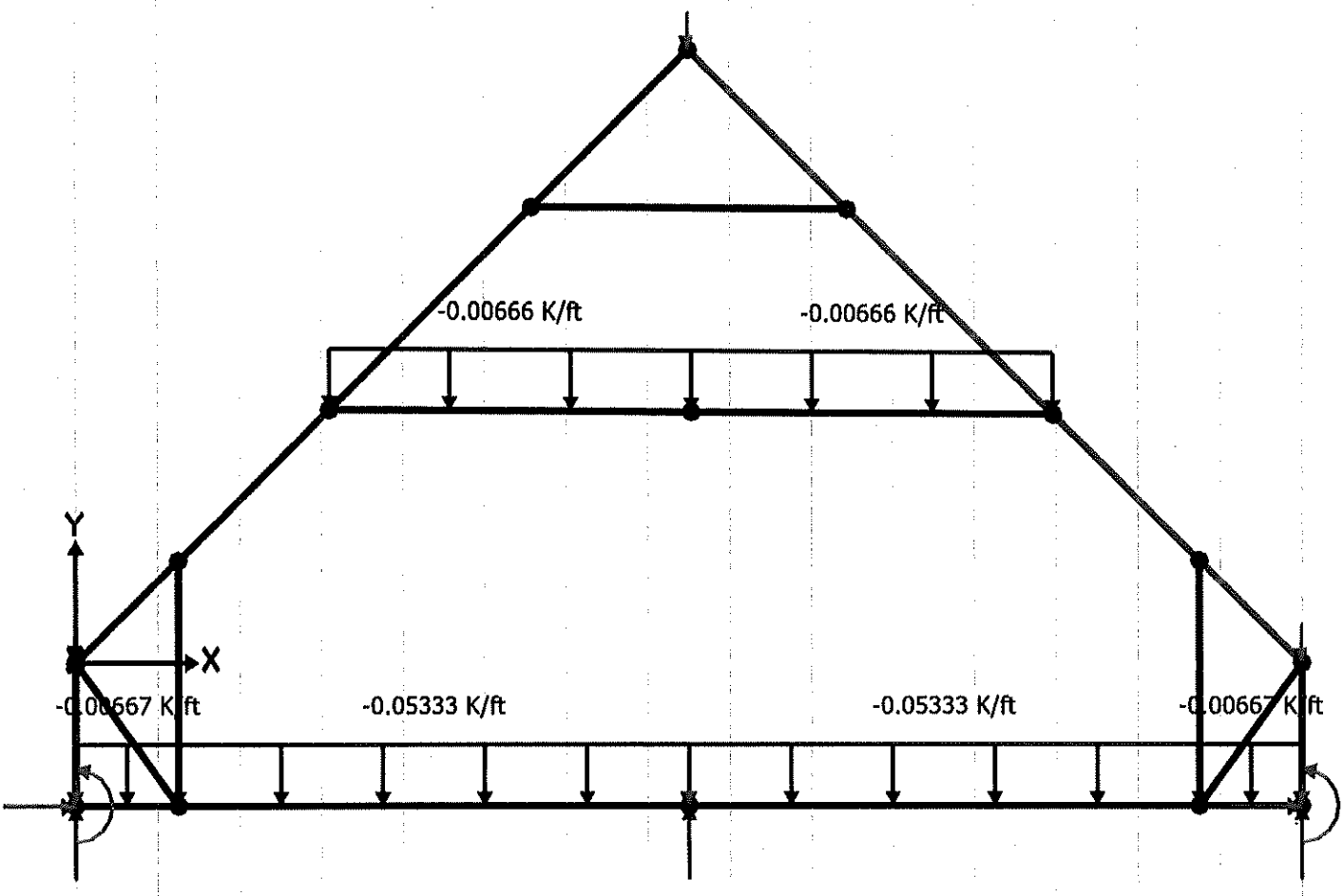



5.4194 ft
7.7212 ft
7.0195 ft
21.213 ft
8.861 ft
8.861 ft
5.2388 ft
3.5355 ft
Y
X
6 ft
3.5 ft
2.5 ft
12.5 ft
12.5 ft
6 ft
4.3012 ft
2.5 ft

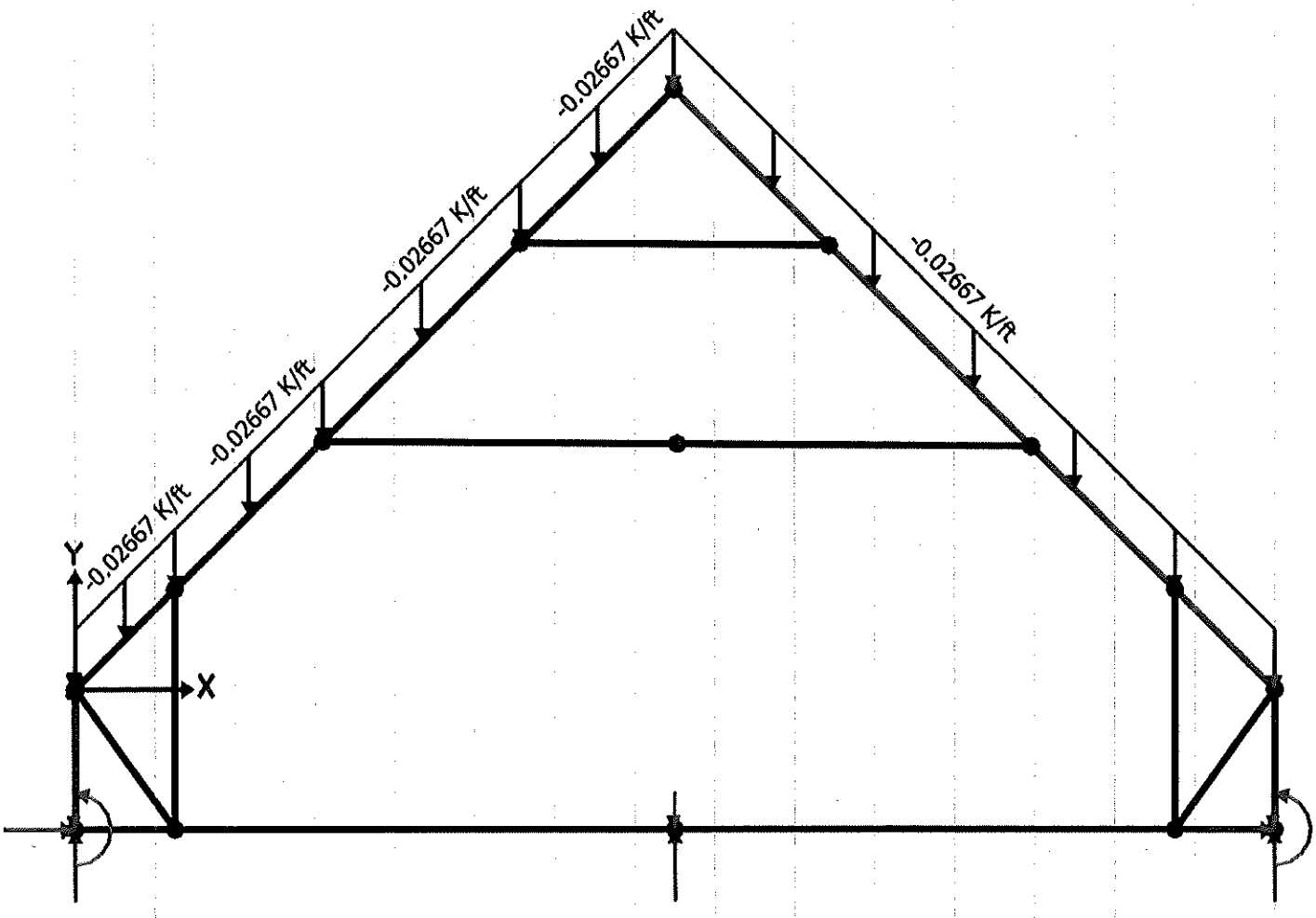
Front


-0.02 K/ft
-0.02 K/ft
-0.02 K/ft
-0.02 K/ft
-0.01333 K/ft
-0.01333 K/ft
Y
X
-0.02 K/ft
-0.02 K/ft
-0.02 K/ft
-0.02 K/ft

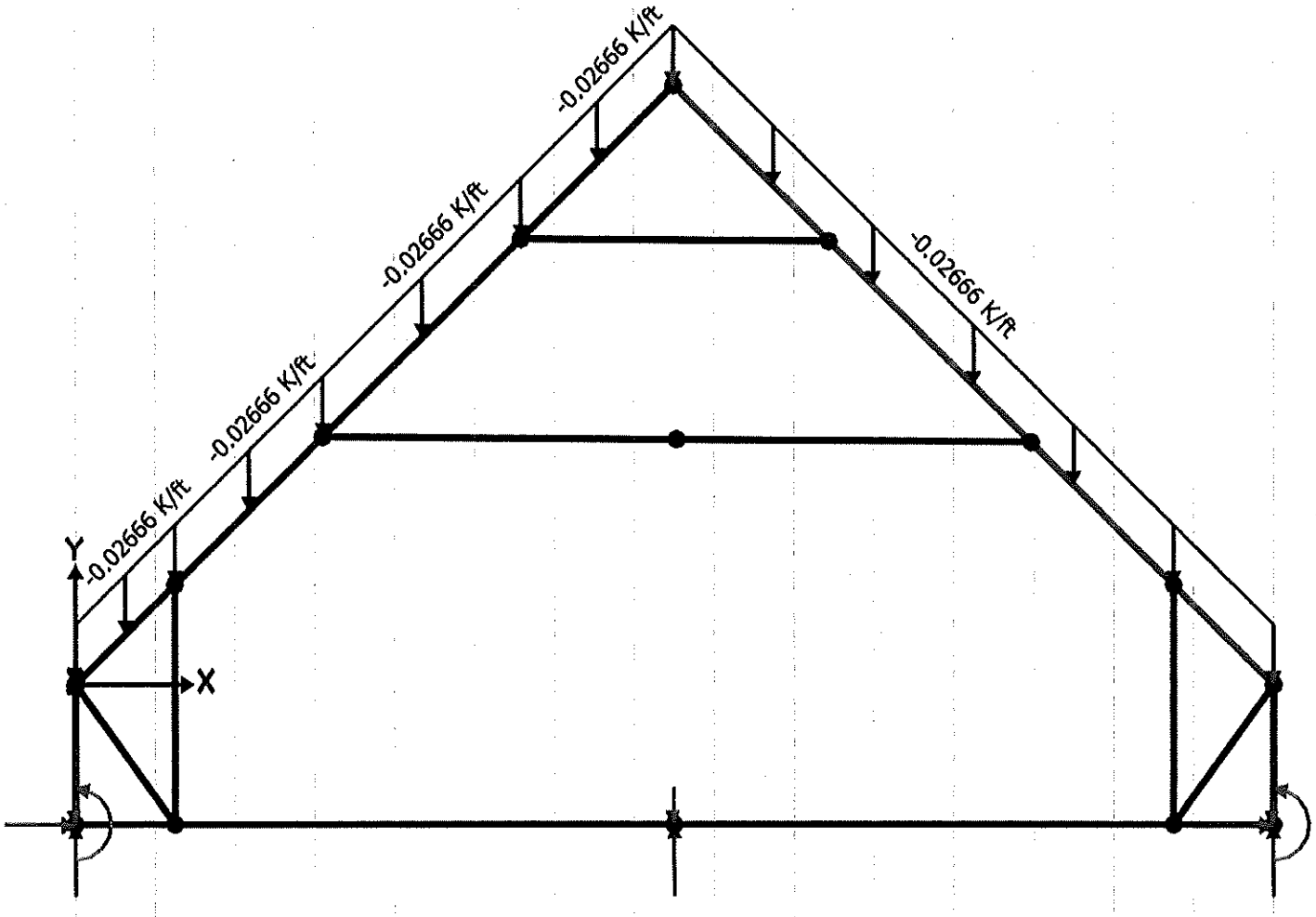
Front


-0.00666 K/ft
-0.00666 K/ft
Y
X
-0.00667 K/ft
-0.05333 K/ft
-0.05333 K/ft
-0.00667 K/ft

Front




Front




Front

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JOB
SHEET NO. OF
CALCULATED BY DATE

## REACTIONS FOR FLOOR SUPPORT BEAM:

(Load / Foot (x 12/16))

$P_D = 0.3028\ K \times 1000 \rightarrow 302.8 \times 12/16 = 227.1\ plf$

$P_L = 0.7666\ K \times 1000 \rightarrow 766.6 \times 12/16 = 574.95\ plf$

$P_{RL} = 0$

$P_S = 0$

$P_{W*} = 0.023\ K \rightarrow 23 \times 12/16 = 17.25\ plf$

## FLOOR SUPPORT BEAM:

USE: (3) 18" LVL (2.0E)

W/ (1) POST BELOW LOCATED

* 11.5' FROM WEST WALL (TO LAND BETWEEN DOORS)

(BRG. REQUIREMENT IS 6.66" x 5.25" = 35 in²)

## SUPPORT POST:

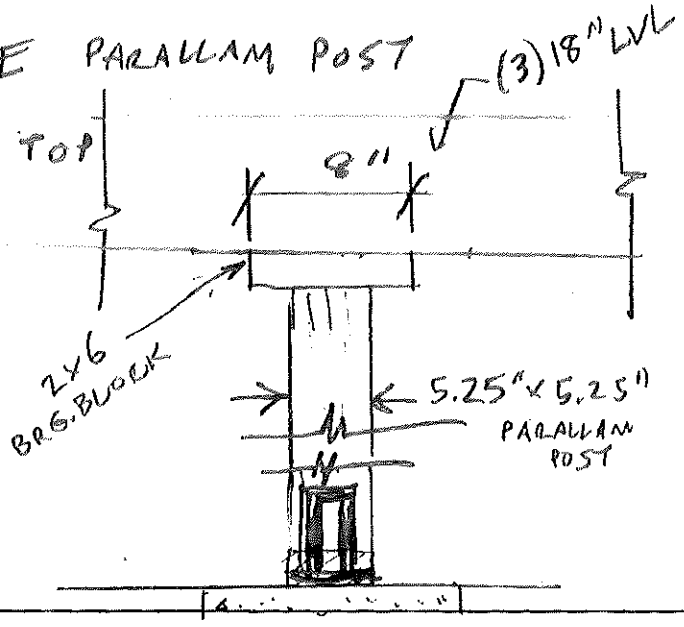
- USE A 5.25" x 5.25" 1.8E PARALLAM POST

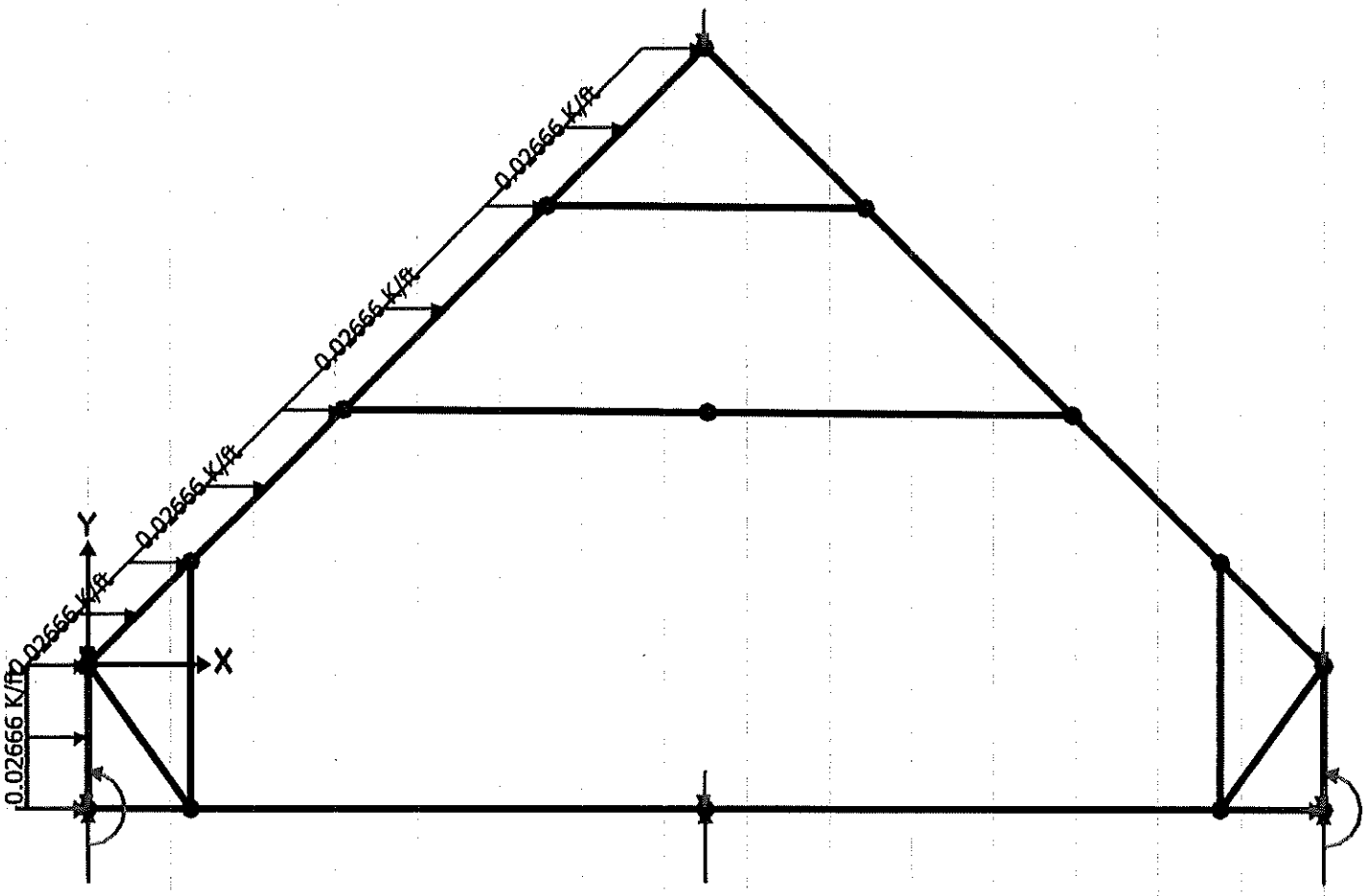
* ADD A BRG. PLATE AT TOP
5.25 x 8 = 42 in² ⇒ ok

REACTION = 19,771#

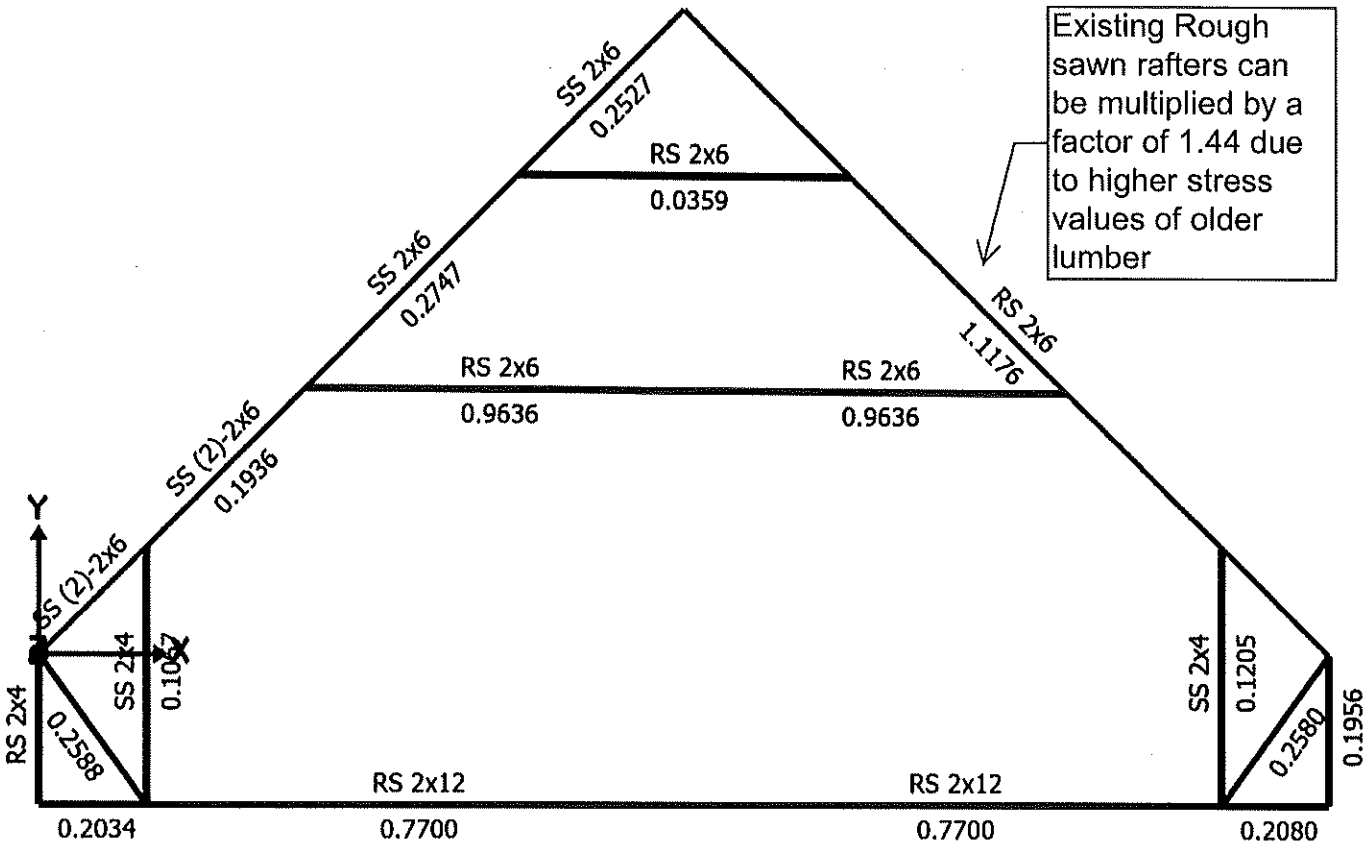
CAPACITY = 25270#

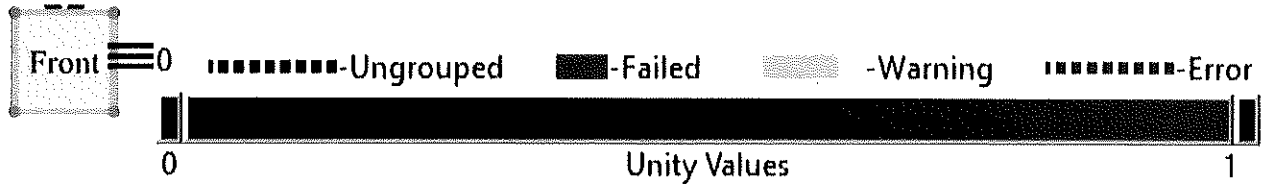
USE PBG6 POST BASE




0.02666 K/ft
0.02666 K/ft
0.02666 K/ft
0.02666 K/ft
0.02666 K/ft
0.02666 K/ft
Y
X

Front


Existing Rough sawn rafters can be multiplied by a factor of 1.44 due to higher stress values of older lumber
SS 2x6
0.2527
RS 2x6
0.0359
SS 2x6
0.2747
RS 2x6
1.1176
RS 2x6
0.9636
RS 2x6
0.9636
SS (2)-2x6
0.1936
SS (2)-2x6
SS 2x4
0.1057
RS 2x4
0.2588
SS 2x4
0.1205
0.2580
0.1956
RS 2x12
0.7700
RS 2x12
0.7700
0.2034
0.2080


Front
0
-Ungrouped
-Failed
-Warning
-Error
0
Unity Values
1

NATIONAL LUMBER MANUFACTURERS ASSOCIATION—WOOD CONSTRUCTION INFORMATION
International Building, Washington, D. C. Harris Trust Building, Chicago, Ill.



Sept. 1st, 1922

# MAXIMUM SPANS FOR JOISTS AND RAFTERS*

The following tables provide a handy means of determining the maximum clear spans for wood joists and rafters. They are based upon a wide range of strength values and cover ordinary load conditions.

The span length should be limited by deflection to prevent cracks where ceilings are covered with some hard, inelastic material such as plaster. Where ceilings are not so covered and where a small amount of sag or spring is not objectionable the span length may be determined by the bending strength of the member instead of by its stiffness.

All spans given in these tables are based on the actual sizes of lumber.

When the allowable stresses for timber are not prescribed in the local building code use the values given below. They are taken from the recommendations of the Forest Products Laboratory, Department of Agriculture, at Madison, Wisconsin, that were officially adopted by the American Society for Testing Materials and the American Railway Engineering Association.

## ALLOWABLE UNIT STRESSES FOR STRUCTURAL TIMBER

(Pounds Per Square Inch)

| Species of Timber | Modulus of Elasticity | Bending | | Compression | |
|---|---|---|---|---|---|
| | | Stress in Extreme Fibre | Horizontal Shear Stress | Parallel to Grain, "Short Columns" | Perpendicular to Grain |
| Cedar, Western Red | 1,000,000 | 900 | 80 | 700 | 200 |
| Cedar, Northern White | 800,000 | 750 | 70 | 550 | 175 |
| Chestnut | 1,000,000 | 950 | 90 | 800 | 300 |
| Cypress | 1,400,000 | 1,300 | 100 | 1,100 | 350 |
| Douglas Fir (No. 1 Struct.) | 1,600,000 | 1,600 | 100 | 1,200 | 350 |
| Douglas Fir (No. 2 Struct.) | 1,500,000 | 1,300 | 90 | 1,000 | 300 |
| Douglas Fir, Rocky Mt. Region | 1,200,000 | 1,100 | 85 | 800 | 275 |
| Fir, Balsam | 1,000,000 | 900 | 70 | 700 | 150 |
| Gum, Red | 1,200,000 | 1,100 | 100 | 800 | 300 |
| Hemlock, Western | 1,400,000 | 1,300 | 75 | 900 | 300 |
| Hemlock, Eastern | 1,100,000 | 1,000 | 70 | 700 | 300 |
| Larch, Western | 1,300,000 | 1,200 | 100 | 1,100 | 325 |
| Maple, Sugar or Hard | 1,600,000 | 1,500 | 150 | 1,200 | 500 |
| Maple, Silver or Soft | 1,100,000 | 1,000 | 100 | 800 | 350 |
| Oak, White or Red | 1,500,000 | 1,400 | 125 | 1,000 | 500 |
| Pine, Southern Yellow (Dense) | 1,600,000 | 1,600 | 125 | 1,200 | 350 |
| Pine, Southern Yellow (Sound) | 1,500,000 | 1,300 | 105 | 1,000 | 300 |
| Pine, Eastern White | 1,000,000 | 900 | 85 | 750 | 250 |
| Pine, Western White | 1,000,000 | 900 | 85 | 750 | 250 |
| Pine, Norway | 1,200,000 | 1,100 | 85 | 800 | 300 |
| Redwood | 1,300,000 | 1,200 | 70 | 1,000 | 250 |
| Spruce, Red, White or Sitka | 1,200,000 | 1,100 | 85 | 800 | 250 |
| Spruce, Engelmann | 800,000 | 750 | 70 | 600 | 175 |
| Tamarack, Eastern | 1,300,000 | 1,200 | 95 | 1,000 | 300 |

MODERN VALUE 900 psi INCREASE FACTOR = 1300/900 = 1.44

* Prepared by Richard G. Kimball, primarily as a service to Building Officials.

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

## Strap Ties (cont.)

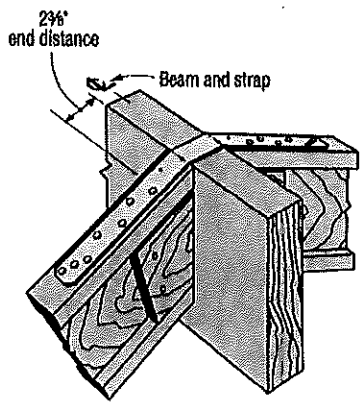
**Codes:** See p. 11 for Code Reference Key Chart

These products are available with additional corrosion protection. For more information, see p. 14.

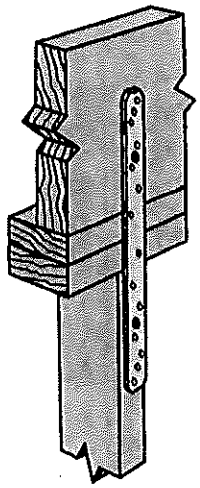
SS For stainless-steel fasteners, see p. 21.

SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 348–352 for more information.

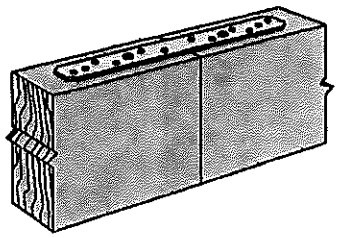
| Model No. | Ga. | Dimensions (in.) W | Dimensions (in.) L | Fasteners (Total) (in.) | Allowable Tension Loads (DF/SP) (160) | Allowable Tension Loads (SPF/HF) (160) | Code Ref. |
|---|---|---|---|---|---|---|---|
| ST2115 | 20 | ¾ | 16⅝ | (10) 0.162 x 2½ | 660 | 660 | IBC, FL, LA |
| LSTA9 | 20 | 1¼ | 9 | (8) 0.148 x 2½ | 740 | 635 | IBC, FL, LA |
| LSTA12 | 20 | 1¼ | 12 | (10) 0.148 x 2½ | 925 | 795 | IBC, FL, LA |
| LSTA15 | 20 | 1¼ | 15 | (12) 0.148 x 2½ | 1,110 | 955 | IBC, FL, LA |
| LSTA18 | 20 | 1¼ | 18 | (14) 0.148 x 2½ | 1,235 | 1,115 | IBC, FL, LA |
| LSTA21 | 20 | 1¼ | 21 | (16) 0.148 x 2½ | 1,235 | 1,235 | IBC, FL, LA |
| LSTA24 | 20 | 1¼ | 24 | (18) 0.148 x 2½ | 1,235 | 1,235 | IBC, FL, LA |
| LSTA30 | 18 | 1¼ | 30 | (22) 0.148 x 2½ | 1,640 | 1,640 | IBC, FL, LA |
| LSTA36 | 18 | 1¼ | 36 | (24) 0.148 x 2½ | 1,640 | 1,640 | IBC, FL, LA |
| MSTA9 | 18 | 1¼ | 9 | (8) 0.148 x 2½ | 750 | 650 | IBC, FL, LA |
| SS MSTA12 | 18 | 1¼ | 12 | (10) 0.148 x 2½ | 940 | 810 | IBC, FL, LA |
| MSTA15 | 18 | 1¼ | 15 | (12) 0.148 x 2½ | 1,130 | 970 | IBC, FL, LA |
| SS MSTA18 | 18 | 1¼ | 18 | (14) 0.148 x 2½ | 1,315 | 1,135 | IBC, FL, LA |
| MSTA21 | 18 | 1¼ | 21 | (16) 0.148 x 2½ | 1,505 | 1,295 | IBC, FL, LA |
| MSTA24 | 18 | 1¼ | 24 | (18) 0.148 x 2½ | 1,640 | 1,460 | IBC, FL, LA |
| MSTA30 | 16 | 1¼ | 30 | (22) 0.148 x 2½ | 2,050 | 1,825 | IBC, FL, LA |
| SS MSTA36 | 16 | 1¼ | 36 | (26) 0.148 x 2½ | 2,050 | 2,050 | IBC, FL, LA |
| MSTA49 | 16 | 1¼ | 49 | (26) 0.148 x 2½ | 2,020 | 2,020 | IBC, FL, LA |
| ST9 | 16 | 1¼ | 9 | (8) 0.162 x 2½ | 885 | 765 | IBC, FL, LA |
| ST12 | 16 | 1¼ | 11⅝ | (10) 0.162 x 2½ | 1,105 | 955 | IBC, FL, LA |
| ST18 | 16 | 1¼ | 17¾ | (14) 0.162 x 2½ | 1,420 | 1,335 | IBC, FL, LA |
| ST22 | 16 | 1¼ | 21⅝ | (18) 0.162 x 2½ | 1,420 | 1,420 | IBC, FL, LA |
| HRS6 | 12 | 1⅜ | 6 | (6) 0.148 x 2½ | 605 | 530 | IBC, FL, LA |
| HRS8 | 12 | 1⅜ | 8 | (10) 0.148 x 2½ | 1,010 | 880 | IBC, FL, LA |
| HRS12 | 12 | 1⅜ | 12 | (14) 0.148 x 2½ | 1,415 | 1,230 | IBC, FL, LA |
| ST292 | 20 | 2⅛ | 9⅛ | (12) 0.162 x 2½ | 1,260 | 1,120 | IBC, FL, LA |
| ST2122 | 20 | 2⅛ | 12⅜ | (16) 0.162 x 2½ | 1,530 | 1,510 | IBC, FL, LA |
| ST2215 | 20 | 2⅛ | 16⅝ | (20) 0.162 x 2½ | 1,875 | 1,875 | IBC, FL, LA |
| ST6215 | 16 | 2⅛ | 16⅝ | (20) 0.162 x 2½ | 2,090 | 1,910 | IBC, FL, LA |
| ST6224 | 16 | 2⅛ | 23⅝ | (28) 0.162 x 2½ | 2,535 | 2,535 | IBC, FL, LA |
| ST6236 | 14 | 2⅛ | 33⅛ | (40) 0.162 x 2½ | 3,845 | 3,845 | IBC, FL, LA |
| MSTI26 | 12 | 2⅛ | 26 | (26) 0.148 x 1½ | 2,745 | 2,380 | IBC, FL, LA |
| MSTI36 | 12 | 2⅛ | 36 | (36) 0.148 x 1½ | 3,800 | 3,295 | IBC, FL, LA |
| MSTI48 | 12 | 2⅛ | 48 | (48) 0.148 x 1½ | 5,070 | 4,390 | IBC, FL, LA |
| MSTI60 | 12 | 2⅛ | 60 | (60) 0.148 x 1½ | 5,070 | 5,070 | IBC, FL, LA |
| MSTI72 | 12 | 2⅛ | 72 | (72) 0.148 x 1½ | 5,070 | 5,070 | IBC, FL, LA |
| HTP37Z | 16 | 3 | 7 | (20) 0.148 x 1½ | 900 | 690 | IBC, FL, LA |
| MSTC28 | 16 | 3 | 28¼ | (36) 0.148 x 3¼ | 3,460 | 2,990 | IBC, FL, LA |
| MSTC40 | 16 | 3 | 40¼ | (52) 0.148 x 3¼ | 4,735 | 4,315 | IBC, FL, LA |
| MSTC52 | 16 | 3 | 52¼ | (62) 0.148 x 3¼ | 4,735 | 4,735 | IBC, FL, LA |
| MSTC66 | 14 | 3 | 65¾ | (76) 0.148 x 3¼ | 5,850 | 5,850 | IBC, FL, LA |
| MSTC78 | 14 | 3 | 77¾ | (76) 0.148 x 3¼ | 5,850 | 5,850 | IBC, FL, LA |
| HRS416Z | 12 | 3¼ | 16 | (16) ¼ x 1½ SDS | 2,835 | 2,305 | — |
| LSTI49 | 18 | 3¼ | 49 | (32) 0.148 x 1½ | 2,970 | 2,560 | IBC, FL, LA |
| LSTI73 | 18 | 3¼ | 73 | (48) 0.148 x 1½ | 4,205 | 3,840 | IBC, FL, LA |




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



**Typical LSTA18 Installation**



**Typical MSTA15 Installation**

1. See pp. 266–267 for Straps and Ties General Notes.
2. **Fasteners:** Nail dimensions are listed diameter by length. SDS screws are Simpson Strong-Tie® Strong-Drive SDS Heavy-Duty Connector screws. See pp. 21–22 for fastener information.

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

## Strap Ties

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

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

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

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

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

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

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

**Finish:** Galvanized. Some products are available in stainless steel, ZMAX® coating or black powder coat (add PC to SKU); contact Simpson Strong-Tie. See Corrosion Information, pp. 12–15.

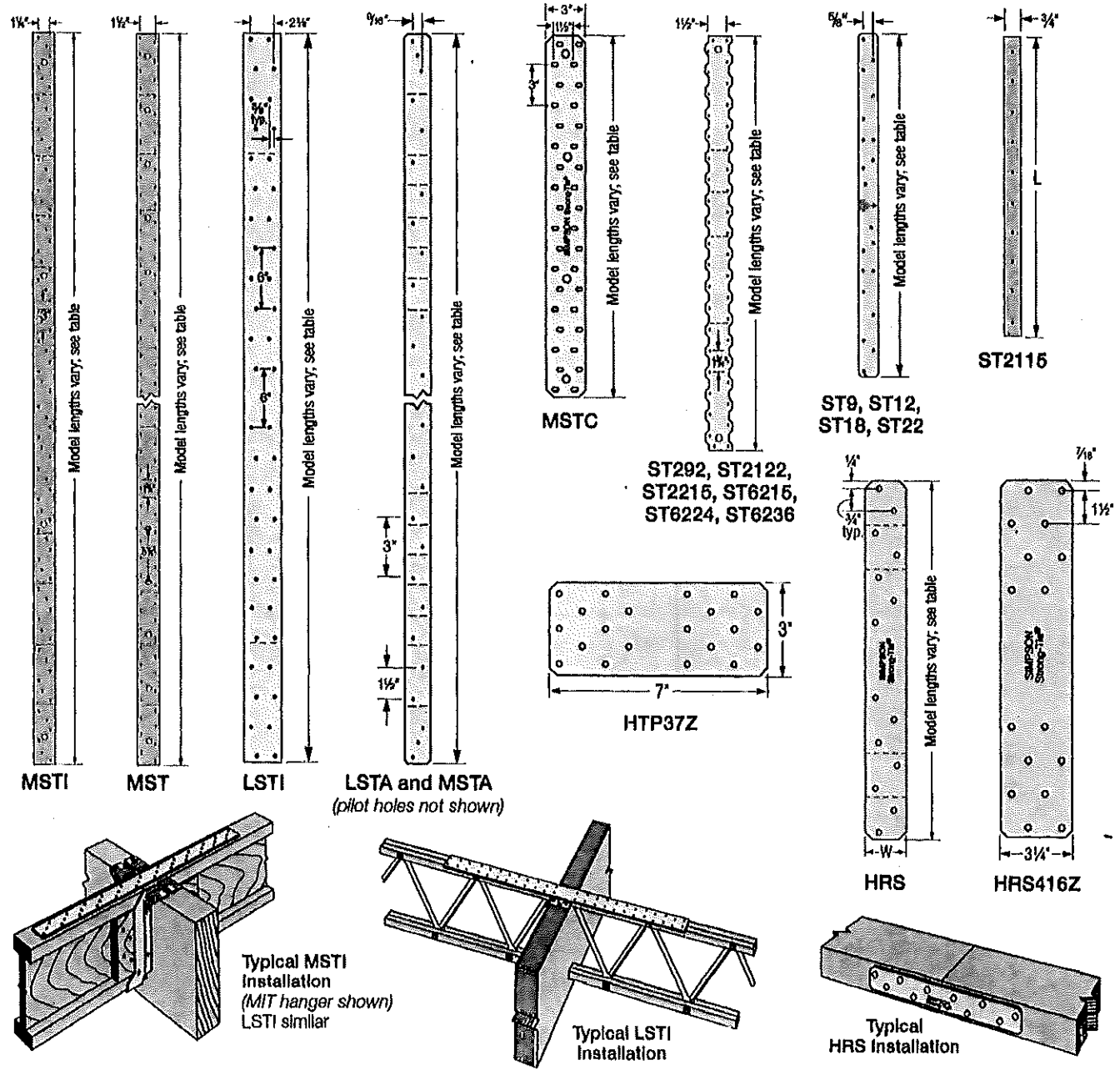
**Installation:** Use all specified fasteners; see General Notes

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

**Codes:** See p. 11 for Code Reference Key Chart

MSTC and RPS meet code requirements for reinforcing cut members (16 gauge) at top plate and RPS at sill plate.
International Residential Code® — 2012/2015/2018/2021 R602.6.1
International Building Code® — 2012 2308.9.8; 2015/2018/2021 2308.5.8

(For RPS, refer to p. 309. For CTS218 compression and tension strap, see p. 307.)

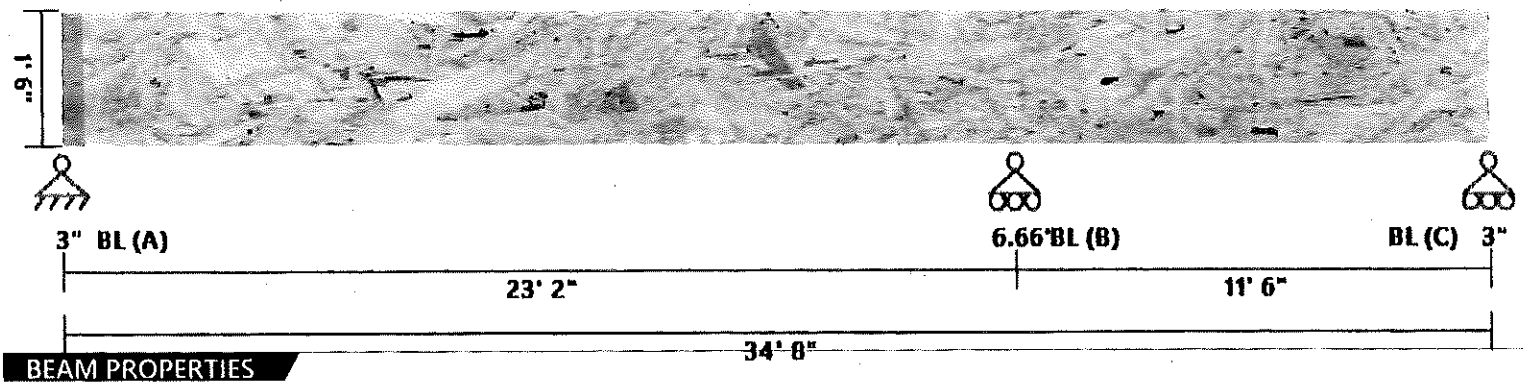


# PASS

| | | | |
|---|---|---|---|
| DATE: | 9/19/2023 | COMPANY: | Blodgett Engineering |
| STRUCALC BUILD: | StruCalc Pro | DESIGNED BY: | Michael Blodgett |
| CUSTOMER: | James Nicholas | REVIEWED BY: | -- |
| PROJ. ADDRESS: | -- | PROJECT NAME: | Nicholas |
| | -- | | |
| LEVEL: | Main Floor | LOADING: | ASD |
| MEMBER NAME: | Floor Support Beam | CODE: | 2015 International Building Code |
| MEMBER TYPE: | FLOOR BEAM | NDS: | 2015 NDS |
| MATERIAL: | Structural Composite Lumber | | |

| | | | | | |
|---|---|---|---|---|---|
| Global LVL | 2.0E 3300Fb LVL | (3) 1.75 X 18 | DRY | | |

## Floor Support Beam DIAGRAM




## BEAM PROPERTIES

Start (ft): 0 End (ft): 34.667 Member Slope: 0/12 Actual Length (ft): 34.67

| Area ($in^2$) | Ix ($in^4$) | Iy ($in^4$) | BSW (lbf/ft) | Lams | Cfn | Kcr Creep Factor |
|---|---|---|---|---|---|---|
| 94.5 | 2551.5 | 24.12 | 22.31 | 3 | 6.67 | 1 |

## STRENGTH PROPERTIES

| | Fb (psi) | Ft (psi) | Fv (psi) | Fc (psi) | Fc⊥ (psi) | E (psi) x$10^3$ | Emin (psi) x$10^3$ |
|---|---|---|---|---|---|---|---|
| Base Values | 3300 | 2700 | 290 | 2700 | 575 | 2000 | 984.984 |
| Adjusted Values | 3432 | 2700 | 290 | 2700 | 575 | 2000 | 985 |
| $C_M$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| $C_T$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Bending Adjustment Factors $C_V = 0.94C_r - 1.04$ Volume factor is applied on a load combination basis And is Not reflected in the adjusted values

## BEAM DATA

| Span | Length (ft) | Unbraced Length (ft) Top | Unbraced Length (ft) Bottom | Beam End Elev. Diff (ft) | CL(Top) | CL(Bottom) | CL(Left) | CL(Right) |
|---|---|---|---|---|---|---|---|---|
| 1 | 23.16667 | 0 | 23.16667 | 0 | 1.00 | 0.83 | 1.00 | 1.00 |
| 2 | 11.5 | 0 | 11.5 | 0 | 1.00 | 0.97 | 1.00 | 1.00 |

## PASS-FAIL

| | PASS/FAIL | MAGNITUDE | STRENGTH | LOCATION (ft) | LOAD COMBO | DURATION FACTOR C |
|---|---|---|---|---|---|---|
| Shear Stress Y (psi) | PASS (60.8%) | 176.2 | 290.0 | 22.88 | D+L | 1 |
| Bending Stress Y (psi) | PASS (56.9%) | 1619.1 | 2846.4 | 22.88 | D+L | 1 |
| Deflection Y (in) | PASS (75.6%) | 0.584 (=L/476) | 0.772 (=L/360) | 10.4 | D+L | 1 |
| Bearing Stress (psi) | PASS (97.9%) | 563.0 | 575.0 | 23.17 | D+L | 1 |

## REACTIONS

Units for V: lbf Units for M: lbf-ft

| Y axis | DEAD | LIVE | TOTAL |
|---|---|---|---|
| A | 2347 | 5411 | 7758 |
| B | 5956 | 13729 | 19685 |
| C | 343 | 791 | 1134 |

Reaction Location

A B C

## LOAD LIST

| Type | Name | Left Magnitude | Right Magnitude | Load Start (ft) | Load End (ft) | Load Type | Direction |
|---|---|---|---|---|---|---|---|
| Uniform (lbf/ft) | Uniform | 574.95 | 574.95 | 0 | 34.66667 | Live | Y |
| Uniform (lbf/ft) | Uniform | 227.1 | 227.1 | 0 | 34.66667 | Dead | Y |
| Self Weight (lbf/ft) | - | 22.31 | 22.31 | 0 | 34.66667 | Dead | Y |

# PASS



| | | | |
|---|---|---|---|
| DATE: | 9/19/2023 | COMPANY: | Blodgett Engineering |
| STRUCALC BUILD: | StruCalc Pro | DESIGNED BY: | Michael Blodgett |
| CUSTOMER: | James Nicholas | REVIEWED BY: | -- |
| PROJ. ADDRESS: | -- | PROJECT NAME: | Nicholas |
| | -- | | |
| LEVEL: | Main Floor | LOADING: | ASD |
| MEMBER NAME: | Support Post | CODE: | 2015 International Building Code |
| MEMBER TYPE: | COLUMN | NDS: | 2015 NDS |
| MATERIAL: | Structural Composite Lumber | | |

| | | | | | |
|---|---|---|---|---|---|
| Weyerhaeuser | 1.8E Parallam PSL | (1) 5.25 X 5.25 | DRY | | |

## COLUMN PROPERTIES

Start(ft) 0 End(ft): 10

| Area ($in^2$) | Ix ($in^4$) | Iy ($in^4$) | BSW (lbf/ft) | Lams | Cfn | Kcr Creep Factor |
|---|---|---|---|---|---|---|
| 27.56 | 63.31 | 63.31 | 8.61 | 1 | 9 | 1 |

## STRENGTH PROPERTIES

| | Fb (psi) | Ft (psi) | Fv (psi) | Fc (psi) | Fc⊥ (psi) | E (psi) x$10^3$ | Emin (psi) x$10^3$ |
|---|---|---|---|---|---|---|---|
| Base Values | 2500 | 1995 | 230 | 2500 | 545 | 1800 | 914.88 |
| Adjusted Values | 2500 | 1995 | 230 | 2500 | 545 | 1800 | 915 |
| $C_M$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| $C_T$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Bending Adjustment Factors $C_V$ = 1.1 $C_r$ = 1 Volume factor is applied on a load combination basis And is Not reflected in the adjusted values

## COLUMN DATA

| Span | Length (ft) | Unbraced Length (ft) X | Unbraced Length (ft) Y | Column End Offset | CP | Ke(X Axis) | Ke(Y Axis) | KeL/d (X Axis) | KeL/d (Y Axis) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 10 | 10 | 0 | 0.52 | 1.00 | 1.00 | 22.86 | 22.86 |

## PASS-FAIL

| | PASS/FAIL | MAGNITUDE | STRENGTH | LOCATION (ft) | LOAD COMBO | DURATION FACTOR C |
|---|---|---|---|---|---|---|
| Compressive Stress (psi) | PASS (55.2%) | 717.3 | 1299.0 | 0 | D+L | 1 |

## REACTIONS

Units for V: lbf Units for M: lbf-ft

| Z axis | DEAD | LIVE | TOTAL |
|---|---|---|---|
| A | 6042 | 13729 | 19771 |
| B | 0 | 0 | 0 |

Reaction Location

A B

## LOAD LIST

| Type | Name | Left Magnitude | Right Magnitude | Load Start (ft) | Load End (ft) | Load Type | Direction |
|---|---|---|---|---|---|---|---|
| Self Weight (lbf/ft) | - | 8.61 | 8.61 | 0 | 10 | Dead | Z |

## LINKED LOAD LIST

| Type | Member | Support | Left Magnitude | Right Magnitude | Load Start (ft) | Load End (ft) | Load Type | Direction |
|---|---|---|---|---|---|---|---|---|
| Axial (lbf) | Floor Support Beam | B | 13729.18 | -13729.18 | 10 | 10 | Live | Z |
| Axial (lbf) | Floor Support Beam | B | -5955.699 | -5955.699 | 10 | 10 | Dead | Z |

SIMPSON Strong-Tie

# PB/PBS

## Regular and Standoff Post Bases



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

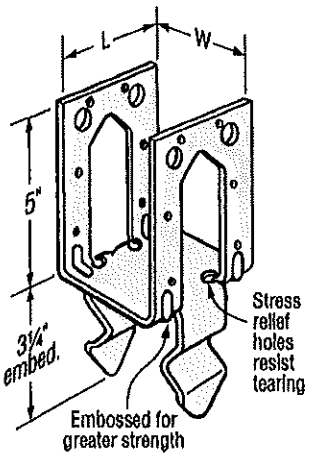
**Material:** PB — 12 gauge; PBS — see table

**Finish:** Galvanized. Some products available in ZMAX® or HDG coating; see Corrosion Information, pp. 12–15.

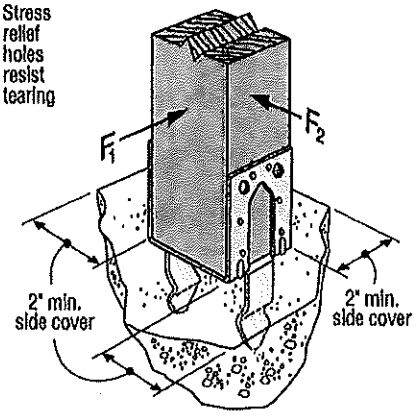
**Installation:**

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

**Codes:** See p. 11 for Code Reference Key Chart




PB

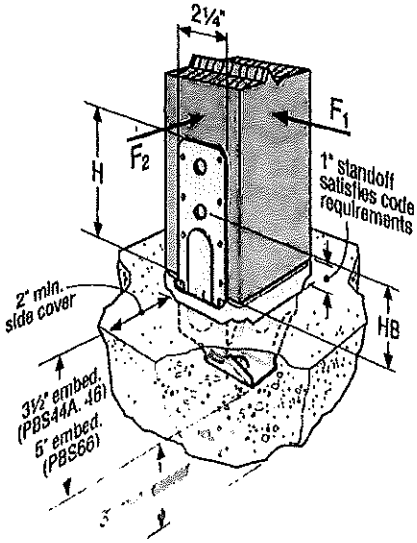



Typical PB Installation

These products are available with additional corrosion protection. For more information, see p. 14.

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

1. Loads may not be increased for duration of load.
2. Concrete shall have a minimum compressive strength of $f'_c$ = 2,500 psi.
3. Multiply Seismic and Wind ASD uplift and lateral load values by 1.43 or 1.67, respectively, to obtain LRFD capacities.
4. In accordance with IBC, Section 1613.1, detached one- and two-family dwellings in Seismic Design Category (SDC) C may use "Wind and SDC A&B" allowable loads.
5. Downloads shall be reduced where limited by capacity of the post.
6. For lateral loads for all PB models: $F_1$ allowable = 765 lb. $F_2$ allowable = 1,325 lb.
7. Designer is responsible for concrete design.
8. Structural composite lumber columns have sides that show either the wide face or the edges of the lumber strands/veneers known as the narrow face. Values in the tables reflect installation into the wide face. See technical bulletin T-C-SCLCLM at **strongtie.com** for load reductions resulting from narrow-face installations.
9. **Fasteners:** Nail dimensions are listed diameter by length. See pp. 21–22 for fastener information.




Typical PBS44A Installation

BLODGETT ENGINEERING LLC
STRUCTURAL CONSULTING ENGINEERS
W169 N10815 Redwood Lane
Germantown, WI 53022
blodgetteng@wi.rr.com
Tel/Fax: 262.293.9923

JOB_____

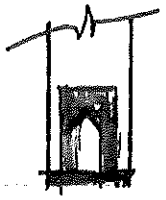
SHEET NO._____ OF _____

CALCULATED BY_____ DATE_____

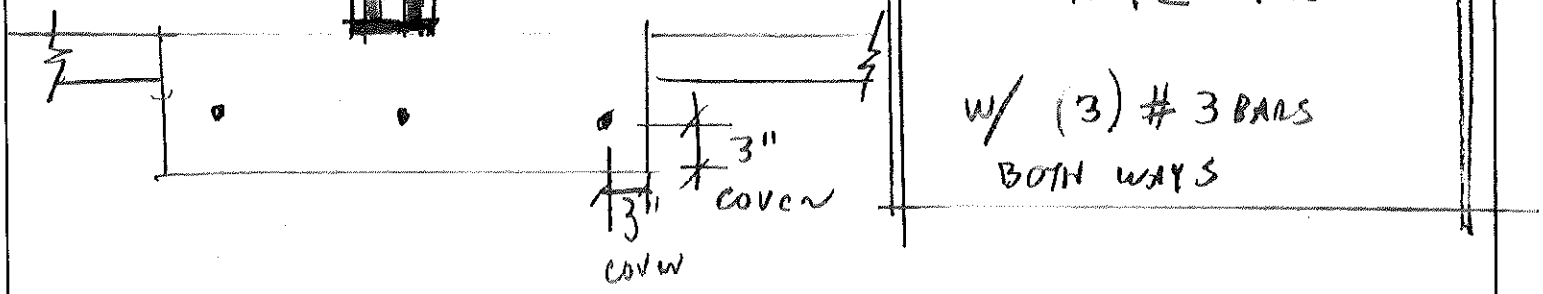
# FOOTING FOR NEW POST

$P = 19771\#$ SOIL CAPACITY = 2000 psf

$A_{REQ'D} = \frac{19771}{2000} = 9.88\ SF = 3.14'$ EACH SIDE



5.25 x 5.25" POST

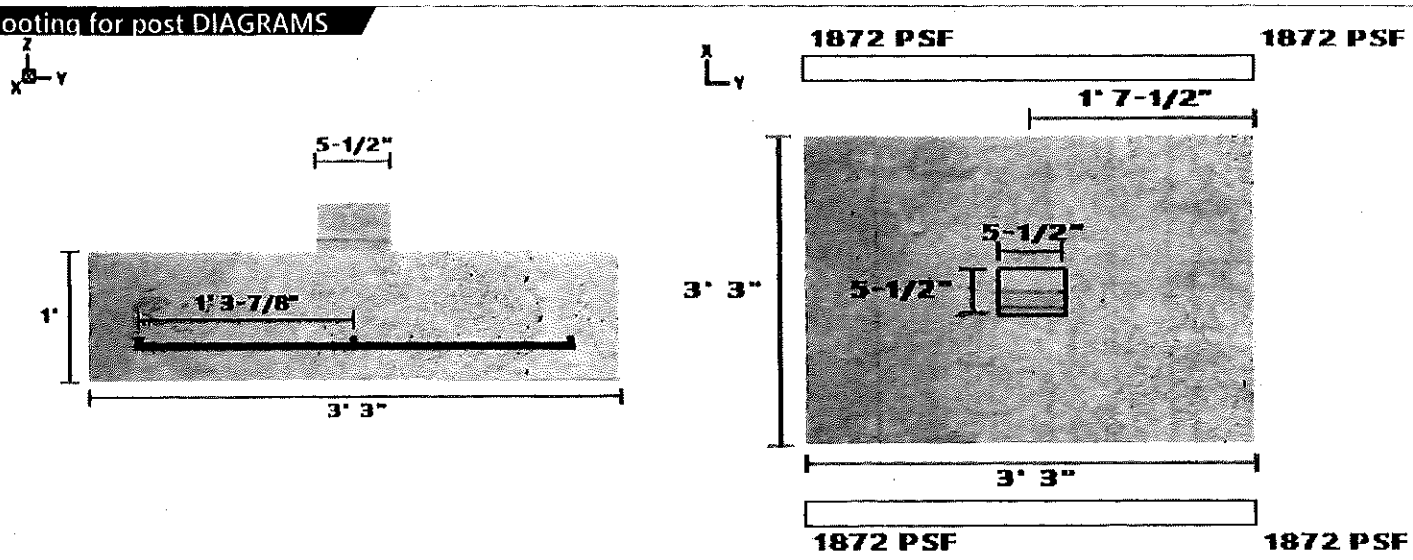


# PASS

| | | | |
|---|---|---|---|
| DATE: | 9/19/2023 | COMPANY: | Blodgett Engineering |
| STRUCALC BUILD: | StruCalc Pro | DESIGNED BY: | Michael Blodgett |
| CUSTOMER: | James Nicholas | REVIEWED BY: | -- |
| PROJ. ADDRESS: | -- | PROJECT NAME: | Nicholas |
| | -- | | |
| LEVEL: | Main Floor | LOADING: | |
| MEMBER NAME: | Footing for post | CODE: | 2015 International Building Code |
| MEMBER TYPE: | ISOLATED FOOTING | ACI: | ACI 318-14 |
| MATERIAL: | Concrete | | |

| | | |
|---|---|---|
| 3.25 (ft) X 3.25 (ft) X 12 (in) | Soil Depth TOF: 0 (ft) | (3) #5 Long, (3) #5 Short |

## Footing for post DIAGRAMS




## MATERIAL PROPERTIES

FOOTING

| fc' (psi) | Ec (psi) | Density (lbf/ft³) | Width (ft) | Length (ft) | Depth (in) | Volume (ft³) |
|---|---|---|---|---|---|---|
| 3000 | 3155924 | 145 | 3.25 | 3.25 | 12 | 10.56 |

CALCULATION VARIABLES

| Bo (in) | Φ-X | Φ-Y |
|---|---|---|
| 55.5 | 0 | 0 |

COLUMN

| Width (in) | Length (in) | Material | Offset (in) |
|---|---|---|---|
| 5.5 | 5.5 | Wood | 0 |

SOIL

| Bearing Strength (lbf/ft²) | Density (lbf/ft³) | Cohesion | Friction Angle | Depth (ft) | Rankine Coefficient (Kp) |
|---|---|---|---|---|---|
| 2000 | 140 | 0 | 30 | 0 | 3 |

REBAR

| Bar Size # | # Bars Long | # Bars Short | fy (psi) | Es (psi) |
|---|---|---|---|---|
| 5 | 3 | 3 | 60000 | 2.9E+07 |

## PASS-FAIL

| | PASS/FAIL | MAGNITUDE | STRENGTH | LOAD COMBO |
|---|---|---|---|---|
| Soil Bearing Pressure (lbf/ft²) | PASS (93.6%) | 1871.8 | 2000.0 | D+L |
| Two-Way Shear (Punching) (lbf) | PASS (38.3%) | 29216.9 | 76376.5 | 1.2D+1.6L+0.5Lr |
| One-Way Shear X (lbf) | PASS (23.4%) | 6274.1 | 26835.0 | 1.2D+1.6L+0.5Lr |
| Moment X (lbf-ft) | PASS (98.4%) | 8757.7 | 8900.5 | 1.2D+1.6L+0.5Lr |
| One-Way Shear Y (lbf) | PASS (23.4%) | 6274.1 | 26835.0 | 1.2D+1.6L+0.5Lr |
| Moment Y (lbf-ft) | PASS (98.4%) | 8757.7 | 8900.5 | 1.2D+1.6L+0.5Lr |
| Crushing (psi) | PASS (58.3%) | 965.8 | 1657.5 | 1.2D+1.6L+0.5Lr |

## LOAD LIST

| Type | Name | Left Magnitude | Right Magnitude | Load Start (ft) | Load End (ft) | Load Type | Direction |
|---|---|---|---|---|---|---|---|

## LINKED LOAD LIST

| Type | Member | Support | Left Magnitude | Right Magnitude | Load Start (ft) | Load End (ft) | Load Type | Direction |
|---|---|---|---|---|---|---|---|---|
| Point (lbf) | Support Post | A | 13729.18 | - | 0 | - | Live | Z |
| Point (lbf) | Support Post | A | 6041.832 | - | 0 | - | Dead | Z |