

Engineered Trusses

Reading Truss Engineering and other considerations

Reference: Virginia Construction Code *section* 2303.4

2303.4.1.1 Truss design drawings.

The written, graphic and pictorial depiction of each individual truss shall be provided to the building official for approval prior to installation. Truss design drawings shall also be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified below:

1. Slope or depth, span and spacing;
2. Location of all joints and support locations;
3. Number of plies if greater than one;
4. Required bearing widths;

5. Design loads as applicable, including;

5.1. Top chord live load;

5.2. Top chord dead load;

5.3. Bottom chord live load;

5.4. Bottom chord dead load;

5.5. Additional loads and locations; and

5.6. Environmental design criteria and loads
(wind, rain, snow, seismic, etc.).

6. Other lateral loads, including drag strut loads;
7. Adjustments to wood member and metal connector plate design value for conditions of use;
8. Maximum reaction force and direction, including maximum uplift reaction forces where applicable;
9. Metal-connector-plate type, size and thickness or gage, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface;
10. Size, species and grade for each wood member;

11. Truss-to-truss connections and truss field assembly requirements;

12. Calculated span-to-deflection ratio and maximum vertical and horizontal deflection for live and total load as applicable;

13. Maximum axial tension and compression forces in the truss members; and

14. Required permanent individual truss member restraint location and the method and details of restraint/bracing to be used in accordance with Section 2303.4.1.2.

2303.4.1.2 Permanent individual truss member restraint.

Where permanent restraint of truss members is required on the truss design drawings, it shall be accomplished by one of the following methods:

1. Permanent individual truss member restraint/bracing shall be installed using standard industry lateral restraint/bracing details in accordance with generally accepted engineering practice. Locations for lateral restraint shall be identified on the truss design drawing.
2. The trusses shall be designed so that the buckling of any individual truss member is resisted internally by the individual truss through suitable means (i.e., buckling reinforcement by T-reinforcement or L-reinforcement, proprietary reinforcement, etc.). The buckling reinforcement of individual members of the trusses shall be installed as shown on the truss design drawing or on supplemental truss member buckling reinforcement details provided by the truss designer.
3. A project-specific permanent individual truss member restraint/bracing design shall be permitted to be specified by any registered design professional.

2303.4.1.4.1 Truss design drawings.

Where required by the registered design professional, the building official or the statutes of the jurisdiction in which the project is to be constructed, each individual truss design drawing shall bear the seal and signature of the truss designer.

Exceptions:

1. Where a cover sheet and truss index sheet are combined into a single sheet and attached to the set of truss design drawings, the single cover/truss index sheet is the only document required to be signed and sealed by the truss designer.
2. When a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings, the cover sheet and the truss index sheet are the only documents required to be signed and sealed by the truss designer.

2303.4.2 Truss placement diagram.

The truss manufacturer shall provide a truss placement diagram that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The truss placement diagram shall be provided as part of the truss submittal package, and with the shipment of trusses delivered to the job site. Truss placement diagrams that serve only as a guide for installation and do not deviate from the permit submittal drawings shall not be required to bear the seal or signature of the truss designer.

2303.4.3 Truss submittal package.

The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; and, as applicable, the cover/truss index sheet.

2303.4.4 Anchorage.

The design for the transfer of loads and anchorage of each truss to the supporting structure is the responsibility of the registered design professional.

2303.4.5 Alterations to trusses.

Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and approval of a registered design professional.

Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, piping, additional roofing or insulation, etc.) shall not be permitted without verification that the truss is capable of supporting such additional loading.

What do I do now?



Job	Truss	Truss Type	Qty	Ply	Farm Credit
MJ-1553	T01GE	COMMON SUPPORTED GAB	1	1	
Job Reference (optional)					

BERRY HOME CENTERS, INC., CHILHOWIE, VA, 24319
 7/20 a Apr 15 2015 Milltek Industries, Inc. Fri Nov 06 13:48:22 2015 Page 1
 ID:1aoYsXC24eQzL9TSUOKzRbyLxaO-K_13_bwONX18_80ofmZ904ZgvNk58FM7pLyR7bgyLuw7

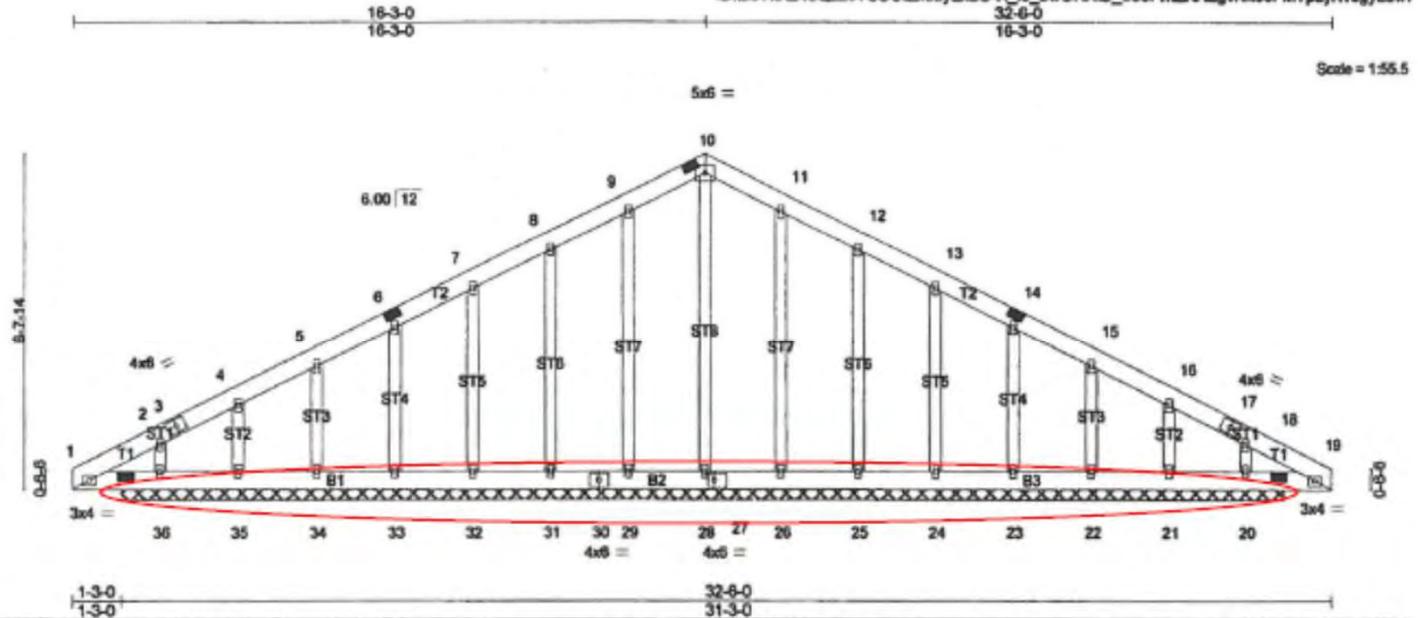


Plate Offsets (X,Y) - [27:0-2-0,0-2-0]

LOADING (psf)	SPACING-	2-0-0	CSL	DEFL	in (loc)	l/defl	L/d	PLATES	GRIP
TCLL 20.0	Plate Grip DOL	1.15	TC 0.06	Vert(LL)	n/a	-	n/a	MT20	244/190
TCDL 7.0	Lumber DOL	1.15	BC 0.05	Vert(TL)	n/a	-	n/a		
BCLL 0.0	Rep Stress Incr	YES	WB 0.19	Horz(TL)	-0.00	20	n/a		
BCDL 10.0	Code IBC2012/TPI2007		(Matrix)					Weight 252 lb	FT = 0%

LUMBER-
TOP CHORD 2x6 SP No.1
BOT CHORD 2x6 SP No.1
OTHERS 2x4 SP No.3

BRACING-
TOP CHORD
Installation
Permanent
BOT CHORD
Installation
Permanent

1 Stabilizer(s) at 15-0-0 (max) oc.
Structural wood sheathing directly applied or 10-0-0 oc purfins.

1 Stabilizer(s) at 9-4-8 (max) oc.
Rigid ceiling directly applied or 6-0-0 oc bracing.

MITek recommends that Stabilizers and required cross bracing be installed during truss erection, in accordance with Stabilizer Installation guide.

REACTIONS. All bearings 30-0-0.
(lb) - Max Horz 36=116(LC 11)
Max Uplift All uplift 100 lb or less at joint(s) 31, 32, 33, 34, 35, 36, 25, 24, 23,
22, 21, 20
Max Grav All reactions 250 lb or less at joint(s) 28, 29, 31, 32, 33, 34, 35, 26, 25,
24, 23, 22, 21 except 36=283(LC 27), 20=283(LC 28)

FORCES. (lb) - Max. Comp./Max. Ten. - All forces 250 (lb) or less except when shown.

NOTES-

- 1) Unbalanced roof live loads have been considered for this design.
- 2) Wind: ASCE 7-10; Vult=115mph (3-second gust) Vasd=91mph; TCDL=4.2psf; BCDL=6.0psf; h=25ft; B=45ft; L=33ft; eave=2ft; Cat. II; Exp B; enclosed; MWFRS (directional); cantilever left and right exposed; end vertical left and right exposed; Lumber DOL=1.60 plate grip DOL=1.60
- 3) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSITPI 1.
- 4) TLL: ASCE 7-10; Pr=20.0 psf (roof live load; Lumber DOL=1.15 Plate DOL=1.15); Pg=20.0 psf (ground snow); Pf=13.9 psf (flat roof snow; Lumber DOL=1.15 Plate DOL=1.15); Category II; Exp B; Fully Exp.; Ct=1.1
- 5) Unbalanced snow loads have been considered for this design.
- 6) All plates are 2x4 MT20 unless otherwise indicated.
- 7) Gable studs spaced at 2-0-0 oc.
- 8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
- 9) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 100 lb uplift at joint(s) 31, 32, 33, 34, 35, 36, 25, 24, 23, 22, 21, 20.
- 10) Non Standard bearing condition. Review required.
- 11) This truss is designed in accordance with the 2012 International Building Code section 2306.1 and referenced standard ANSITPI 1.
- 12) For Stabilizer bracing, see MITek Stabilizer Installation Guide. Cross brace at TC: Inst. 20-0-0.
- 13) Warning: Additional permanent and stability bracing for truss system (not part of this component design) is always required.

LOAD CASE(S) Standard

Job	Truss	Truss Type	Qty	Ply	Farm Credit
MJ-1553	T05	ROOF SPECIAL GIRDER	1	2	

BERRY HOME CENTERS, INC., CHILHOWIE, VA 24319

Job Reference (optional)
 7.620 s Apr 15 2015 MiTek Industries, Inc. Fri Nov 06 13:50:41 2015 Page 1
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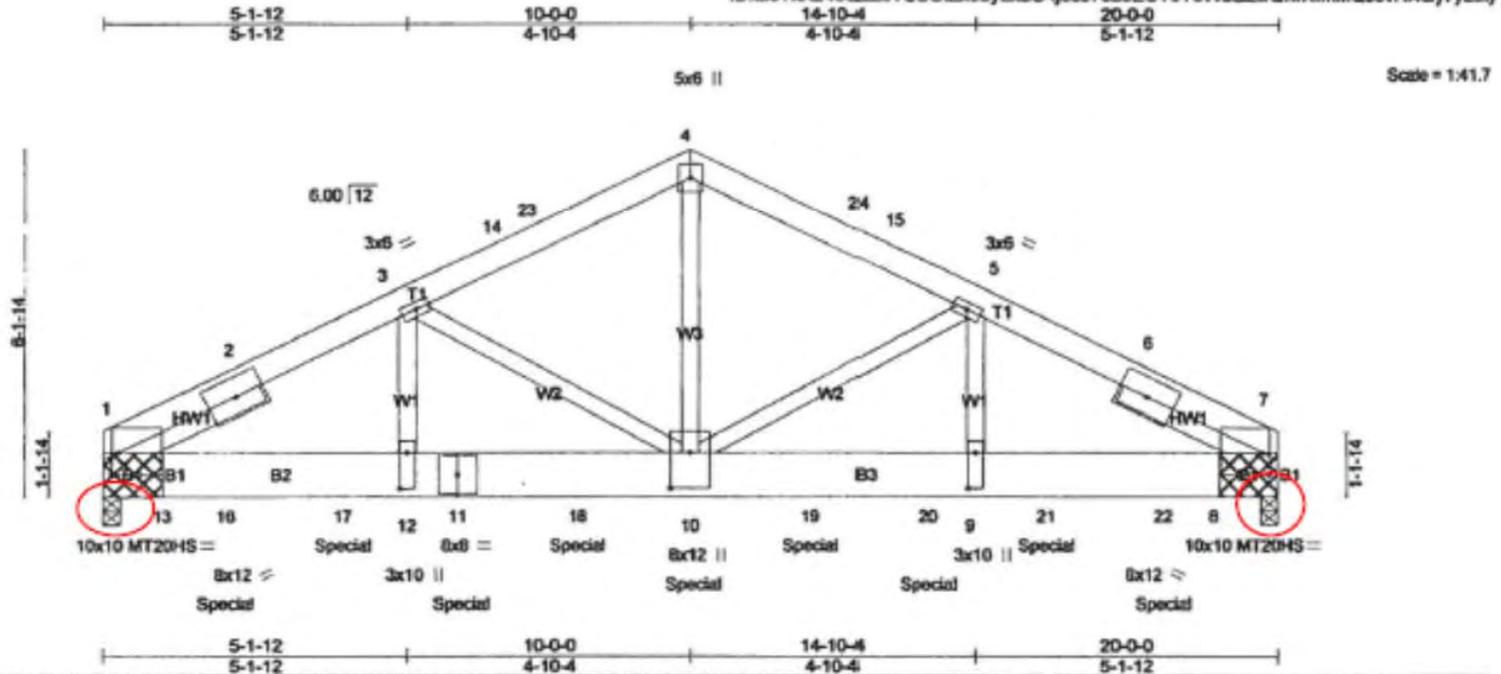


Plate Offsets (X,Y) - [1:0-1-4,0-4-10], [7:0-1-4,0-4-10], [9:0-7-8,0-1-8], [10:0-7-8,0-4-0], [12:0-7-8,0-1-8]

LOADING (psf)	SPACING-	2-0-0	CSI	DEFL	in (loc)	l/defl	L/d	PLATES	GRIP
TCLL 20.0	Plate Grip DOL	1.15	TC 0.63	Vert(LL)	-0.10 10-12	>999	240	MT20	244/190
TCDL 7.0	Lumber DOL	1.15	BC 0.77	Vert(TL)	-0.19 10-12	>999	180	MT20HS	167/143
BCLL 0.0	Rep Stress Incr	NO	WB 0.80	Horz(TL)	0.06 7	n/a	n/a		
BCDL 10.0	Code IBC2012/TPI2007		(Matrix)					Weight 372 lb	FT = 0%

LUMBER-

TOP CHORD 2x6 SP No.1
 BOT CHORD 2x10 SP No.1
 WEBS 2x4 SP No.3 *Except*
 W3: 2x4 SP No.2
 SLIDER Left 2x4 SP No.3 2-7-14, Right 2x4 SP No.3 2-7-14

BRACING-

TOP CHORD Structural wood sheathing directly applied or 4-3-1 oc purlins.
 BOT CHORD Rigid ceiling directly applied or 10-0-0 oc bracing.

REACTIONS. (lb/size) 1=5845/(0-3-8 + bearing block) (req. 0-4-3), 7=5896/(0-3-8 + bearing block) (req. 0-4-4)
 Max Horz 1=71(LC 34)
 Max Uplift 1=-265(LC 12), 7=-267(LC 12)
 Max Grav 1=7122(LC 2), 7=7184(LC 2)

FORCES. (lb) - Max. Comp./Max. Ten. - All forces 250 (lb) or less except when shown.

TOP CHORD 1-2=-10478/392, 2-3=-10436/413, 3-14=-8154/340, 14-23=-8111/340, 4-23=-8048/351,
 4-24=-8049/351, 15-24=-8111/340, 5-15=-8154/340, 5-6=-10424/413, 6-7=-10465/392
 BOT CHORD 1-13=-308/9004, 13-16=-308/9004, 16-17=-308/9004, 12-17=-308/9004, 11-12=-308/9004,
 11-18=-308/9004, 10-18=-308/9004, 10-19=-307/8995, 19-20=-307/8995, 9-20=-307/8995,
 9-21=-307/8995, 21-22=-307/8995, 8-22=-307/8995, 7-8=-307/8995
 WEBS 4-10=-220/6506, 5-10=-1999/111, 5-9=-55/2723, 3-10=-1999/112, 3-12=-55/2738

NOTES-

- 1) 2-ply truss to be connected together with 16d (0.131"x 3.5") nails as follows:
 Top chords connected as follows: 2x6 - 2 rows staggered at 0-9-0 oc clinched.
 Bottom chords connected as follows: 2x10 - 2 rows staggered at 0-7-0 oc clinched.
 Webs connected as follows: 2x4 - 1 row at 0-9-0 oc clinched.
- 2) All loads are considered equally applied to all plies, except if noted as front (F) or back (B) face in the LOAD CASE(S) section. Ply to ply connections have been provided to distribute only loads noted as (F) or (B), unless otherwise indicated.
- 3) 2x10 SP No.1 bearing block 12" long at j. 1 attached to each face with 5 rows of 10d (0.131"x3") nails spaced 3" o.c. 20 Total fasteners per block. Bearing is assumed to be SP No.1.
- 4) 2x10 SP No.1 bearing block 12" long at j. 7 attached to each face with 5 rows of 10d (0.131"x3") nails spaced 3" o.c. 20 Total fasteners per block. Bearing is assumed to be SP No.1.
- 5) Unbalanced roof live loads have been considered for this design.
- 6) Wind: ASCE 7-10; Vult=115mph (3-second gust) Vasd=91mph; TCCL=4.2psf; BCDL=6.0psf; h=25ft; B=45ft; L=24ft; eave=4ft; Cat. II; Exp B; enclosed; MWFRS (directional); cantilever left and right exposed; end vertical left and right exposed; Lumber DOL=1.60 plate grip DOL=1.60
- 7) TCCL: ASCE 7-10; Pr=20.0 psf (roof live load; Lumber DOL=1.15 Plate DOL=1.15); Pg=20.0 psf (ground snow); Pf=13.9 psf (flat roof snow; Lumber DOL=1.15 Plate DOL=1.15); Category II; Exp B; Fully Exp.; Ct=1.1
- 8) Unbalanced snow loads have been considered for this design.
- 9) All plates are MT20 plates unless otherwise indicated.
- 10) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
- 11) Provide mechanical connection (by others) of truss to bearing plate capable of withstanding 100 lb uplift at joint(s) except (j=lb) 1=265, 7=267.

12) This truss is designed in accordance with the 2012 International Building Code section 2306.1 and referenced standard ANSI/TPI 1.

MJ-1553	T05	ROOF SPECIAL GIRDER	1	2	Job Reference (optional)
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NOTES-

13) Hanger(s) or other connection device(s) shall be provided sufficient to support concentrated load(s) 1427 lb down and 62 lb up at 2-0-12, 1427 lb down and 62 lb up at 4-0-12, 1427 lb down and 62 lb up at 6-0-12, 1427 lb down and 62 lb up at 8-0-12, 1427 lb down and 62 lb up at 10-0-12, 1427 lb down and 62 lb up at 12-0-12, 1427 lb down and 62 lb up at 14-0-12, and 1427 lb down and 62 lb up at 16-0-12, and 1427 lb down and 62 lb up at 18-0-12 on bottom chord. The design/selection of such connection device(s) is the responsibility of others.

LOAD CASE(S) Standard

1) Dead + Snow (balanced): Lumber Increase=1.15, Plate Increase=1.15

Uniform Loads (plf)

Vert 1-4=-42, 4-7=-42, 1-7=-20

Concentrated Loads (lb)

Vert: 11=-1169(B) 10=-1169(B) 16=-1169(B) 17=-1169(B) 18=-1169(B) 19=-1169(B) 20=-1169(B) 21=-1169(B) 22=-1169(B)

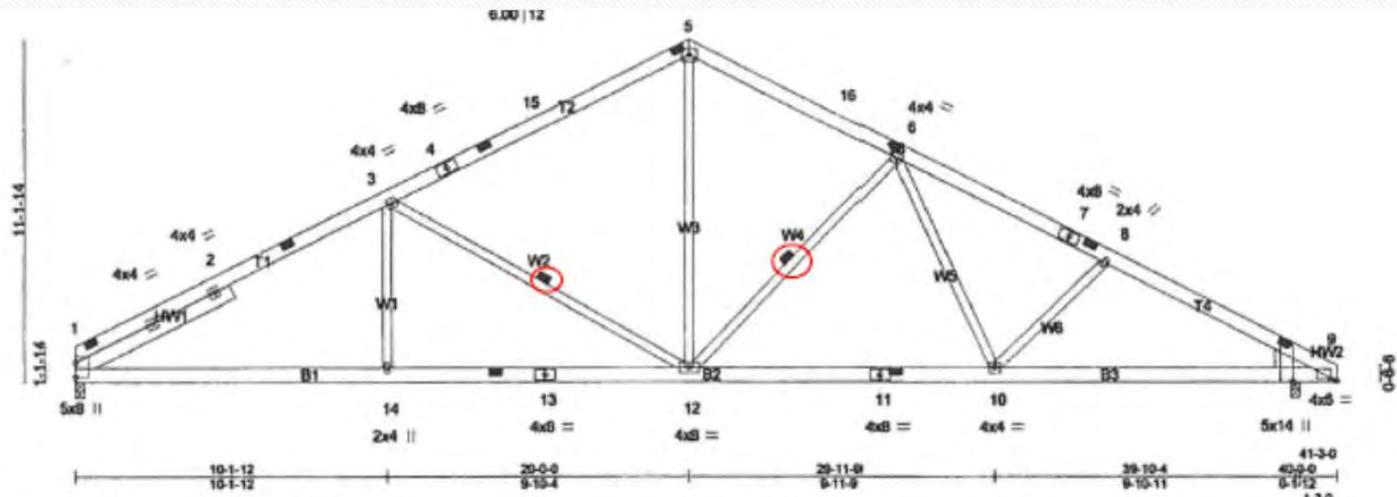


Plate Offsets (X,Y)– [9-0-2-4,0-0-10], [9-0-0-4,Edge]

LOADING (psf)	SPACING-	CSL	DEFL	in (loc)	l/defl	L/d	PLATES	GRIP
TCLL 20.0	2-0-0	TC 0.74	Vert(LL) -0.11	9-10	>999	240	MT20	244/190
TCDL 7.0	Plate Grip DOL 1.15	BC 0.67	Vert(TL) -0.31	9-10	>999	180		
BCLL 0.0	Lumber DOL 1.15	WB 0.47	Horz(TL) 0.10	9	n/a	n/a		
BCDL 10.0	Rep Stress Incr YES	(Matrix)						
	Code IBC2012/TPI2007						Weight: 284 lb	FT = 0%

LUMBER-

TOP CHORD 2x6 SP No.1
 BOT CHORD 2x6 SP No.1
 WEBS 2x4 SP No.3
 WEDGE
 Right: 2x6 SP No.1
 SLIDER Left 2x6 SP No.2 5-8-1

BRACING-

TOP CHORD
 Installation
 Permanent
 BOT CHORD
 Installation
 Permanent
 WEBS
 1 Stabilizer(s) at 9-4-8 (max) oc.
 Structural wood sheathing directly applied or 4-4-7 oc purlins.
 1 Stabilizer(s) at 15-0-0 (max) oc.
 Rigid ceiling directly applied or 10-0-0 oc bracing.
 1 Row at midpt 3-12, 6-12

MiTek recommends that Stabilizers and required cross bracing be installed during truss erection, in accordance with Stabilizer Installation guide.

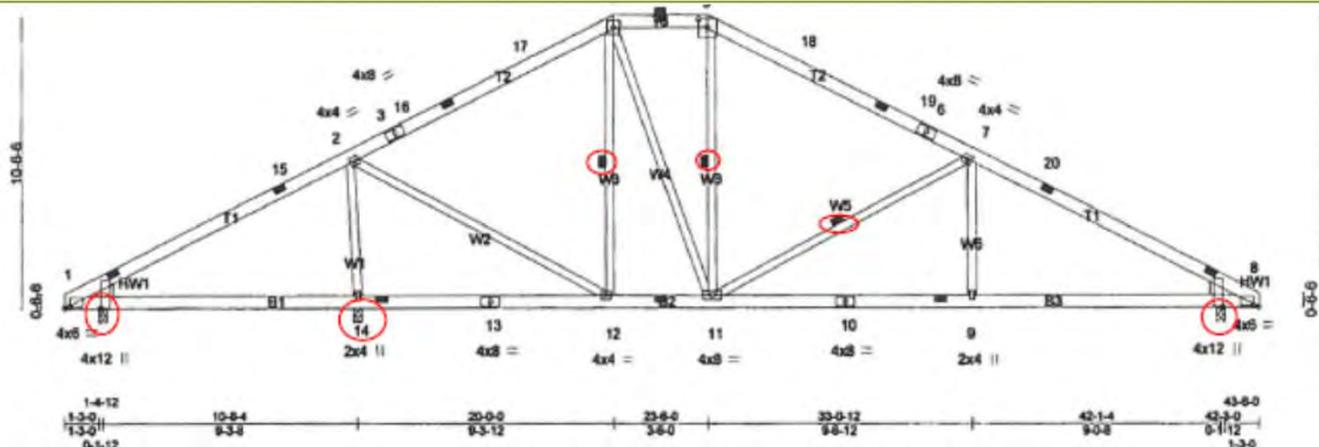


Plate Offsets (X,Y) - [1-0-0,1-3-13], [1-0-2-4,0-0-10], [5-0-4-0,0-3-8], [8-0-2-4,0-0-10], [8-0-0-0,1-3-13]

LOADING (psf)	SPACING-	CSI.	DEFL.	in (loc)	l/defl	L/d	PLATES	GRIP
TCLL 20.0	2-0-0	TC 0.60	Vert(LL)	-0.08	8-9	>999	MT20	244/190
TCDL 7.0	Plate Grip DOL 1.15	BC 0.81	Vert(TL)	-0.24	8-9	>999		
BCLL 0.0	Lumber DOL 1.15	WB 0.88	Horz(TL)	0.05	8	n/a		
BCDL 10.0	Rep Stress Incr YES	(Matrix)						
	Code IBC2012/TPI2007						Weight: 308 lb	FT = 0%

LUMBER-
 TOP CHORD 2x6 SP No.1
 BOT CHORD 2x6 SP No.1
 WEBS 2x4 SP No.3
 WEDGE
 Left: 2x6 SP No.2, Right: 2x6 SP No.2

BRACING-
TOP CHORD
 Installation
 Permanent
 1 Stabilizer(s) at 9-4-8 (max) oc.
 Structural wood sheathing directly applied or 4-10-12 oc purtins, except
 2-0-0 oc purtins (6-0-0 max.): 4-5.

BOT CHORD
 Installation
 Permanent
 WEBS
 1 Stabilizer(s) at 15-0-0 (max) oc, Except:
 9-4-8 oc: 12-14.
 Rigid ceiling directly applied or 6-0-0 oc bracing.
1 Row at midpt 4-12, 5-11, 7-11

MiTek recommends that Stabilizers and required cross bracing be installed during truss erection, in accordance with Stabilizer Installation guide.

REACTIONS, (lb/size) 14=1456/0-3-8 (min. 0-2-5), 1=250/0-3-8 (min. 0-1-8), 8=995/0-3-8 (min. 0-1-8)
 Max Horz 1=153(LC 10)
 Max Uplift 14=44(LC 12), 1=14(LC 12), 8=36(LC 12)
 Max Grav 14=1960(LC 32), 1=333(LC 47), 8=1252(LC 32)





The possibilities are endless with Engineered Roof Trusses



When executed properly

Next planned meeting:
Erosion/Sediment Control
Stormwater Management

Time and place to be determined

Go to:

<http://www.washcova.com/administrative-directory/building-development/>

For updates

Reminder:

The Uniform Statewide Building Code is available online at:

<http://codes.iccsafe.org/Virginia.html>