

MiTek Industries, Inc.
Engineering Design Guidelines

May 2010

MiTek Engineering software is a powerful tool used for the design of Metal Plate Connected Wood trusses and Building Design that greatly increases the accuracy and the efficiency of the design process. However, it must always be remembered that Engineering software is just that, a tool. Neither it nor any other software program can take the place of an experienced designer. Designs should always be reviewed before put into production. Trusses designed following the guidelines outlined below can normally be sealed as shown on the output. Trusses falling outside these limits may be sealable as well but should be reviewed by an experienced truss engineer before fabrication.

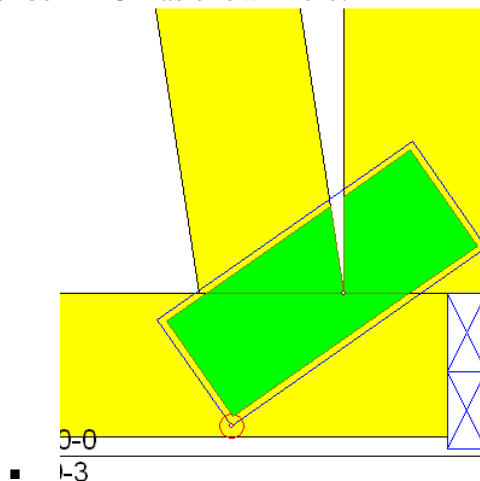
Floor Trusses

- Maximum span to depth ratio of 20 (For example, a 14" deep truss should not exceed a span of 23' 4")
- Maximum 30" (2' 6") top chord panel length on flat-wise trusses
- Minimum duct chase offset from the bearing is ¼ of the span
- No duct chase opening in cantilever sections
- Maximum cantilever is 4 times the depth of the truss or 1/3 the length
- Maximum cantilever without a concentrated load at the end is 4 times the depth of the truss
- DOL cannot be set above 1.00
- Deflection limits cannot be less than $L/360$ LL + $L/240$ DL (The higher the number on the bottom of the fraction, the stiffer the truss)
- $L/480$ required for residential floors in NC over 20' clear span.
- No splices in chase openings
- Trusses used for an office application must be designed with the 2000 lb Moving Office Load (safe load)
- Stacked top chords for the purposes of having a change in floor elevation in the course of the truss length should run at least one panel back for each level of chord decrease. If the change in elevation exceeds 3", a "K" web should be used.
- Do not splice in end panel of top chord when truss is top chord bearing
- Trimmable end trusses must be ran using software feature or test runs must be made manually.

Roof Trusses

- Do not break truss triangulation by removing webs
- Scissors truss slope differentials between top and bottom chords must be greater than or equal to 2/12
- Maximum span to depth ratio is 24 for parallel chord roof trusses.
- Valleys and Piggy must have verticals 4' o.c or close to it in odd panel.

- Limit number of girder plies to 5; however 6 plies are allowed if load is tying in from both sides of the truss.
- Increase dead loads to include the self-weight of the truss if needed. This is normally applicable to multiply girders.
- Maximum span of 80'0" without special design considerations.
 Upsize all plates for handling, 3x6 at single web joints, 6x6 at double web joints, and heavy-gauge and or high strength plates at all joints on chord breaks (i.e. heels, peaks, splices).
 100' Maximum span without early PE involvement.
- Maximum span truss with un-triangulated heels 20'-0".
- Maximum overhang lengths: 2x4 = 3.0', 2x6 = 5.0'
- Lumber Requirements
 2x4 chords up to a 45' span
 2x6 chord size up to 65' span
 Minimum No. 2 for all chords on trusses over 8' long, excluding verticals.
 Permissible to use lower grades on bottom chords of valleys, piggy backs and continuously supported gables.
 Maximum of one size change for step down lumber conditions at a mid panel point. Maximum of two size change at a panel point.
 2x3 minimum web size
- Bearings
 No "Pinned-Pinned" trusses with out special considerations
 No off-joint bearings unless bearing is considered a separate joint labeled with a joint number.
 No splice at an off-joint bearing
 Eliminate or limit uplift in gravity load cases to 1000 lbs
 Shear plate required on all notched bearing for ledger details with reactions over 500 lbs x DOL as shown here:



- Minimum heel height with legdown = 12" (requires two joints)
- Member above a top chord bearing must be labeled as a block and the vertical next to it must be a top chord.
- No tie-in trusses at bearing block locations

- Deflection Limits

Horizontal total load = 1.25" without special consideration. Residential jobs should not exceed 1.25".

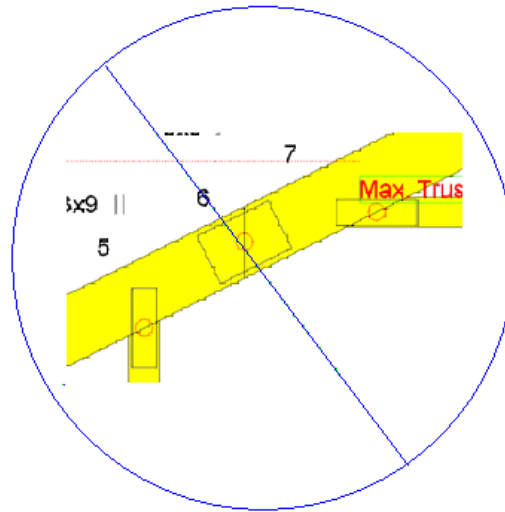
Horizontal live load = 0.75" without special consideration. Residential jobs should not exceed 0.75"

If vertical total load = 2.0" add excessive deflection note unless agricultural truss. Maximum of 3" total load deflection with note.

- Attics

Limit attic room bottom chord L/d to max 23, 23-24 with note.

No top chord slices in haunch of attic room as shown here:

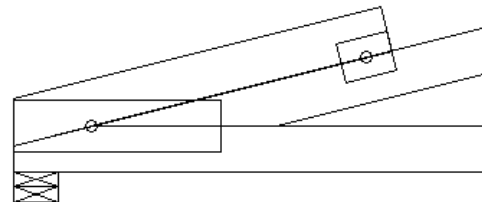
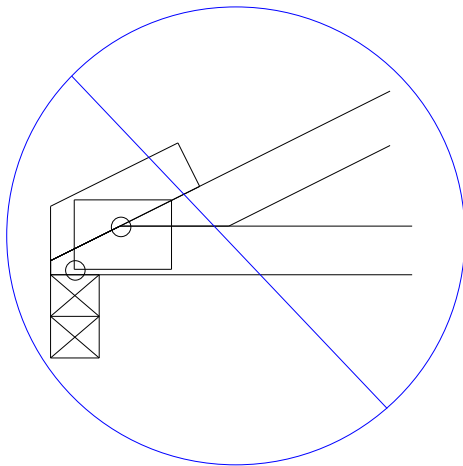


No bottom chord splice permitted directly over a bearing within a room.

- Plating

Do not reduce minimum plating defaults. When trusses are sent for seals they are reanalyzed with MiTek minimums and a different plate may appear on the sealed drawing.

Top chord blocks must be increased in length to add second plate as shown here:



- Scabs and Stacked Chords

If the “special connection required between scab...” is printed in the notes section of the engineering drawing, the scab connection is not adequate even though it is shown on the truss drawing. The scab length or type of fastener may need to be altered to try and eliminate the note.

Scab must not extend past end of truss or scabbed member.

- **See MiTek Technical Article *Truss Design with Treated Lumber or Corrosive Environments* for information on preservative treatments.**

Please note that this list is not comprehensive. It is an attempt to address the most frequent problems that we encounter with Metal Plate Connected Wood Truss designs sent for seals. Each situation is unique and only an experienced truss designer/engineer can be the final authority on whether a design is acceptable; not a list.

To preserve the conciseness of this list, explanations are intentionally left out. Please contact the Engineering Department at MiTek with any questions.