

STRUCTURAL BUILDING COMPONENTS MAGAZINE

March 2004

Frequently Asked Questions

Inspecting Trusses under ANSI/TPI 1-2002: Tooth Count Method Plate Placement by WTCA Staff

WTCA's technical team provides another concise answer to one of life's persistent questions.

Over the last few years, SBC Magazine has discussed the two inspection procedures for manufacturing metal plate connected wood trusses (Plate Placement Method [PPM] and Tooth Count Method [TCM]), as outlined in Chapter 3 of ANSI/TPI 1-2002 (see Figure 1).

Currently only about five percent of all trusses are designed to the latest TPI 1 standard due to different building code cycle adoption procedures. As more and more areas adopt the 2003 international codes, the use of TPI 1-2002 will increase, as will questions regarding some of the new or changed requirements.

We have recently



FIGURE 1. ANSI/TPI 1-2002. [COURTESY OF TRUSS PLATE INSTITUTE]

CLICK ON IMAGES BELOW FOR LARGER VIEW

received a few questions on the plate positioning requirements of the TCM inspection (Alternate Joint Inspection) procedures outlined in Section Annex A3.

Section A3.2 Plate Placement

The TCM positioning tolerance for any joint selected for inspection shall be 1/2" from the design position shown on the truss design drawing, unless otherwise shown on the Joint QC Detail for that joint. [Courtesy of Truss Plate Institute, ANSI/TPI 1-2002]

QUESTION:

Based upon the requirements outlined in Section A3.2, if my plate is positioned within the 1/2", does that mean I can assume the joint will pass inspection without doing the additional Annex A3 checks?

ANSWER:

Figure 4.5.3.1
Metal Connector Plate Location Tolerance (T)

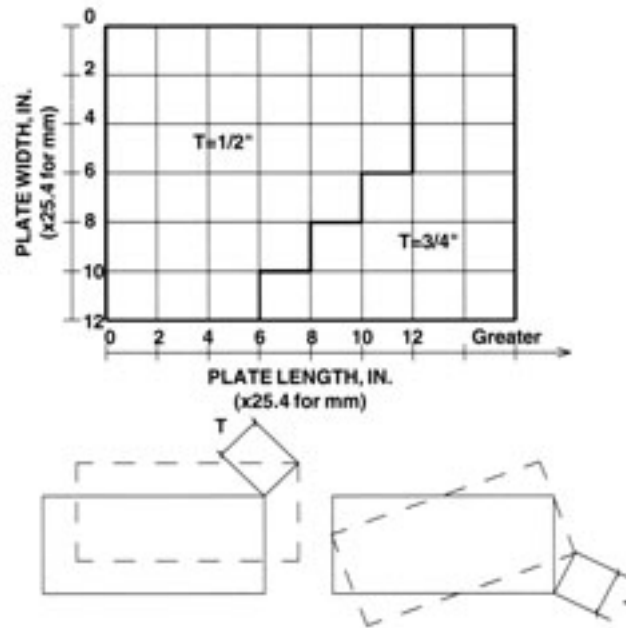


FIGURE 2. 1995 EDITION PLATE LOCATION TOLERANCES [COURTESY OF TRUSS PLATE INSTITUTE, ANSI/TPI 1-1995]



FIGURE 3. UNDER TCM, PLATE POSITIONING IS JUST ONE OF FOUR NECESSARY CHECKS.

No! The Alternate Joint Inspection procedures outlined in Annex A3 consist of four distinct compliance checks. Plate Placement (Section A3.2) is just one of those checks. Plate Rotation (A3.3), Effective Tooth Count (A3.4) and Wood Member-To-Member Gaps (A3.5) must also be checked and confirmed for the joint to be deemed compliant.

Let's take a closer look at the four inspection criteria under the TCM inspection protocols.

1. A3.2 Plate Placement

This section does not address tooth grip. It only addresses net steel area and lumber section. In other words, it checks to make sure that the plate does not shear or that the lumber does not fail. It does not check to make sure there are enough teeth in the plate to transfer the load.

Under TCM, every plate is allowed a minimum 1/2" translation in any

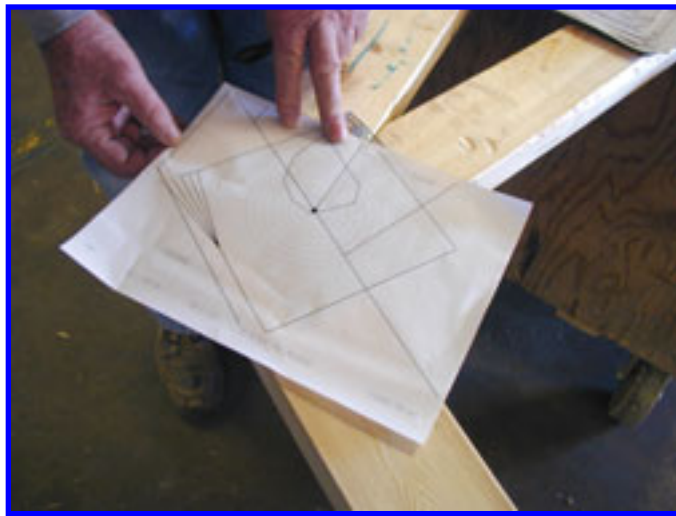


FIGURE 4. THE 10° ROTATIONAL CHECK IS EASILY DONE WITH THE JOINT QC DETAIL.



FIGURE 5. EFFECTIVE TOOTH COUNTS NOW CONSIDER BOTH PLATED FACES.

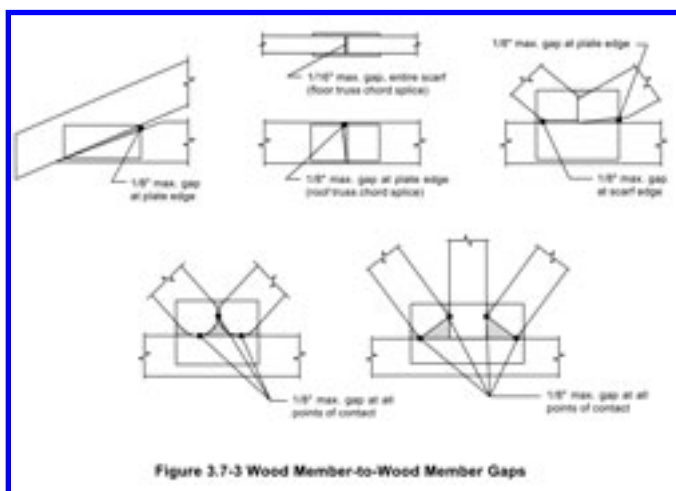


FIGURE 6. 2002 EDITION WOOD MEMBER-TO-WOOD MEMBER GAPS. [COURTESY OF TRUSS PLATE INSTITUTE, ANSI/TPI 1-2002]

direction from the intended design position. This is a little different than previous editions. The 1995 edition permitted plate placement within 1/2" or 3/4" of design position, depending on the plate length and width (see Figure 2).

2. A3.3 Plate Rotation

Plate orientation shall be within 10° of the design position as shown on the Joint QC Detail, unless otherwise specified by the Truss Designer.
[Courtesy of Truss Plate Institute, ANSI/TPI 1-2002]

This separate plate rotation check is new to the 2002 edition. Previous editions looked at both translation and rotation as one plate position measurement. They are now separate checks and the 10° allowable plate rotation is taken into account in the design.

3. A3.4 Effective Tooth Count

A3.4.1 The combined number of effective teeth for both faces of the truss at each joint in each metal connector plate contact area shall meet or exceed two times the minimum number specified for a single face by the Truss Designer per Section 2.1.3.

The number of effective teeth for a single plated face in a contact area shall be permitted to be 15 percent less than the number specified for a single face per Section 2.1.3, provided the sum of the number of effective teeth on both faces meets or exceeds the total required number for both faces for that contact area.

[Courtesy of Truss Plate Institute, ANSI/TPI 1-2002]

We know that the forces acting at a joint are resisted by the combined effort of both the front and the back plates. Under the 2002 edition, excess

teeth on one plated face can make up for a shortage of teeth on the opposite plated face (within 15 percent to limit unbalanced load transfer).

4. A3.5 Wood Member-To-Wood Member Gaps

3.7.6.1 Except as indicated in Section 3.7.6.2, maximum gaps in all joints except floor truss chord splices shall not exceed $1/8"$, where the gap is measured at each edge of the metal connector plate for joints in which the plate edge is within the scarf, and measured at the end of the scarf for joints in which the plate edge is outside the scarf. Scarf is the portion of the joint in which it is intended that there be wood-to-wood contact between two wood members. The maximum gap for floor truss chord splices shall not exceed $1/16"$ across the entire scarf. For joints

designed with single points of contact between adjacent members as shown on the Truss Design Drawings, the maximum gap between all contact points shall not exceed 1/8".

[Courtesy of Truss Plate Institute, ANSI/TPI 1-2002]

Unlike previous editions, these gap allowances no longer include averages and maximums nor does it differ as much according to specific joint types. The only distinction of joint types is between floor truss chord splices and all other joint types. This is due to the greater significance of chord splice gaps on floor truss deflection and serviceability (see Figure 6). Only needing to remember and check one measurement makes the process easier. As with the other changes, we are always looking for ways to improve the efficiency of checking quality.

It is our hope that as

we refine our
industry's national
design standard, TPI 1
will become
increasingly easy to
follow and will
continue to be based
on sound engineering
and common sense.

Editor's Note: The recently introduced Truss Technician Training Level III Online offers a section on TPI 1-2002 which provides insight into other changes besides that involving in-plant quality control. Visit www.wtcatko.com for more information on this course.

To pose a question for this column, email us at faq@woodtruss.com. To view other questions visit the [WTCA website](http://www.wtcatko.com).

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