STRUCTURAL BUILDING COMPONENTS MAGAZINE (FORMERLY WOODWORDS)
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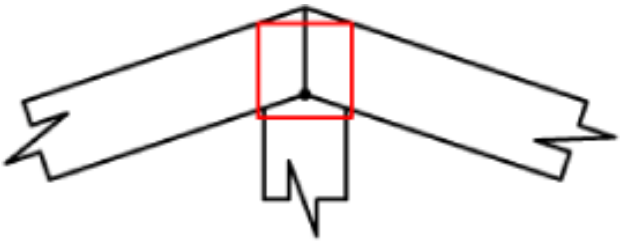
"The Importance of Proper Plate Placement" by Ryan J. Dexter

Many times while doing a WTCA QC training, our staff trainer will ask the question: “Is the plate on this joint placed properly?” This question invariably starts an interesting conversation, where plant personnel talk about the “rules” for placing plates. Are there rules that govern the placement of plates at all joints? Plate companies call out certain plate offsets on some joints in the truss design drawings. How many plates are placed to the correct offsets?

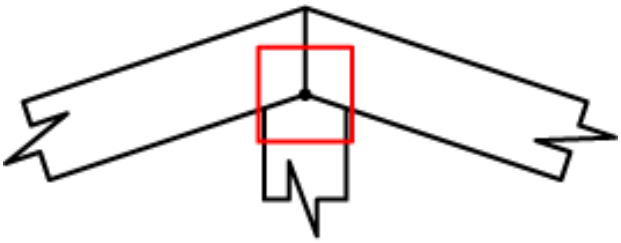
There are a few common myths that have been passed down through the years. In this article, we will address a few of the myths we have encountered since undertaking QC training, in order to add to your experience base on plate placement issues.

MYTH #1: One myth involves the peak joint. Many people believe plates should be placed at peaks such that the top corners of the plate line up to the edge of the sloping members (control points). See Graphic 1.

Have you noticed the small circles in the joints on the truss design drawing? They are intended to act as a reference for plate placement. Usually the plate placement on top and bottom chords is centered on the center of the joint. That is why, in most cases, the small circle is located at the center of the joint. Therefore, when placing a plate at the peak in the manner shown in Graphic 1, the number of effective teeth in the king-post member may be jeopardized. The only way to know the proper placement is to review the truss design drawing. All metal connector plates must be positioned in accordance with the truss design (ANSI/TPI 1-1995 section 4.5.3). Therefore, with proper plate placement, the peak joint should look like Graphic 2.



GRAPHIC 1

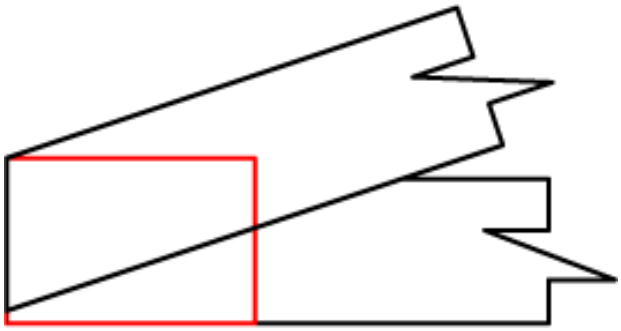


GRAPHIC 2

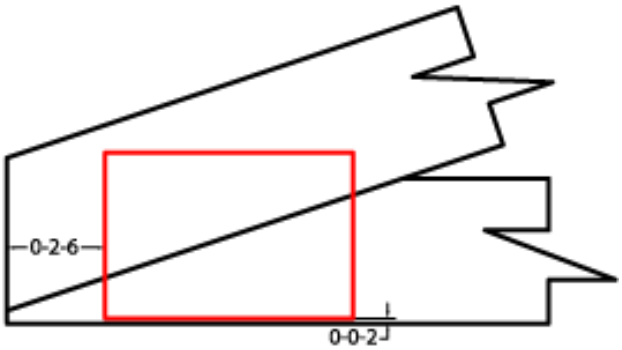
MYTH #2: Another highly accepted myth involves plate placement at the heel joint. Many people assume that the metal connector plate should be placed flush with the plumb and butt cut as shown in Graphic 3.

The heel joint is usually the most difficult joint to plate. One might assume that, as drawn, this plate is properly placed. One must also assume here (albeit incorrectly) that there were no plate offsets included on the truss design drawings to account for special plate placement. If the plate were placed as shown in Graphic 3, the top member would have over two times more plate coverage than the bottom member would.

Let us now assume that the plate offset (See Graphic 4) was given in the truss design drawing: Plate Offset (X, Y): [0-2-6, 0-0-2]. The heel joint would be plated as shown in Graphic 4. Also shown in Graphic 4, the heel joint is properly plated with the plate's area distributed equally between the top and bottom members. When the plate is placed with the given offsets, the top member will have 97 of the designed 83 effective teeth and the bottom member will have 95 of the designed 88 effective teeth. A couple of inches makes a big difference!



GRAPHIC 3

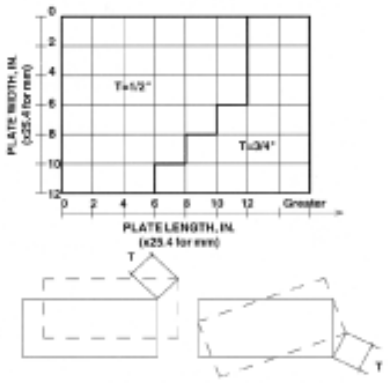


GRAPHIC 4

Trusses are designed with a required number of effective teeth for lateral resistance. It is an obvious and important concept that if the provided number of teeth is less than the required, the performance of the truss will be less than expected. The number of effective teeth for both faces of the truss at each joint in each metal connector plate contact area shall meet or exceed the minimum number specified by the truss designer (ANSI/TPI 1-1995 section 4.5.4).

MYTH #3: One final myth that we hope to dispel with this article is that metal connector plates are only used for connecting members together. Well, some believe it does not matter how the plate is placed, as long as it is placed over all the members to be connected. Plates do much more than simply connect members; metal connector plates resist the design forces coming into each truss joint. Compression, tension, shear and moment forces are all transferred simultaneously from the wood members, through the teeth and into the connector plate. The plates are designed to handle the forces, and must be placed properly to do that job. The plates may be sized correctly; but if incorrectly positioned, the functionality of the plate will be diminished. The current tolerance for metal connector plate positioning is shown in Figure 4.5.3.1 of ANSI/TPI 1-1995 courtesy of TPI, Madison, WI

Figure 4.5.3.1
Metal Connector Plate Location Tolerance (T)



CLICK ON IMAGE FOR LARGER VIEW

This seemingly obvious primer is intended to provide an understanding about the importance of proper plate placement. Every joint must be plated as shown in the truss design drawing and within the current TPI tolerances. Sometimes these drawings are hard to read; therefore, you may want to print the blow-up views of certain joints, such as heels and peaks, to gain a better sense for the exact position of the plates. The same can be done for any joints that require a plate offset. Plate offsets are critical because the plate must be positioned as shown or the transfer of loads will not take place as the truss designer expected.

We hope this review helps provide greater understanding of the importance of plating. You may wish to have a

conversation in your plant between your manufacturing and technical departments, so that everyone is clear as to exactly how plate placement and plate offsets work. If you have any further questions, please contact WTCA at 608/274-4849.

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