

Sometimes a user will input a bearing into the middle of a panel without running a web down to the bearing location. We refer to this as an un-triangulated bearing. There may be issues with having un-triangulated bearings beyond the truss design itself. When a web does not occur over an interior bearing the magnitude of the reactions may not be as expected. Note that in Figure 1, the center bearing has a reaction of 128 pounds and the exterior reactions are 1116 pounds each, and in Figure 2, that center reaction is 1287 pounds when there is a web. While the first truss design is structurally sound and the loads will be supported, there may be other downstream effects to consider.

The most critical deals with the load paths within the structure. When the Building Designer “laid out” the load paths for the structure, they may have assumed a different load distribution when they added the interior bearing, similar to that shown in Figure 2. The Building Designer typically will make approximations for the reactions based on the spans on each side of the interior bearing. By using un-triangulated bearings, the magnitudes of these reactions can be significantly different. These unexpected reactions may impact headers, beams, and other structural members that extend all the way down to the foundation.

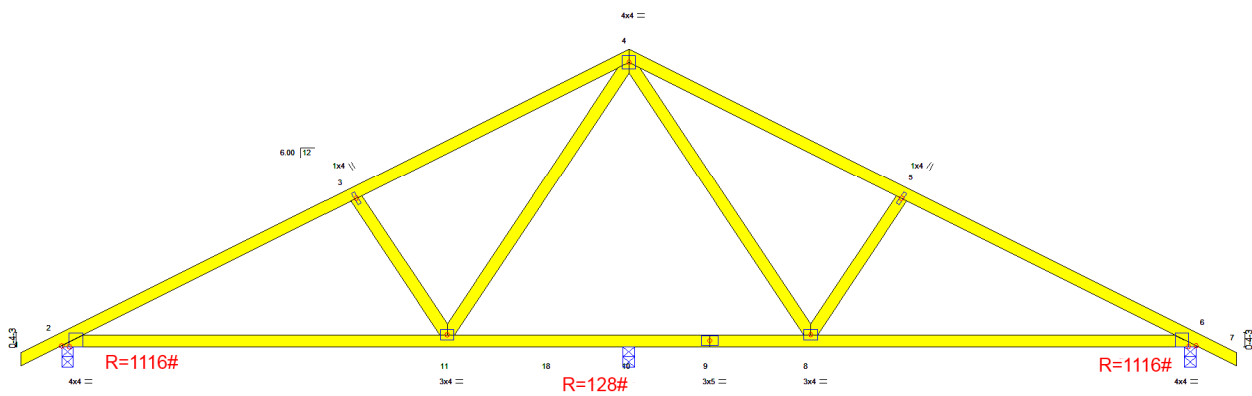


Figure 1 – Un-Triangulated Bearing

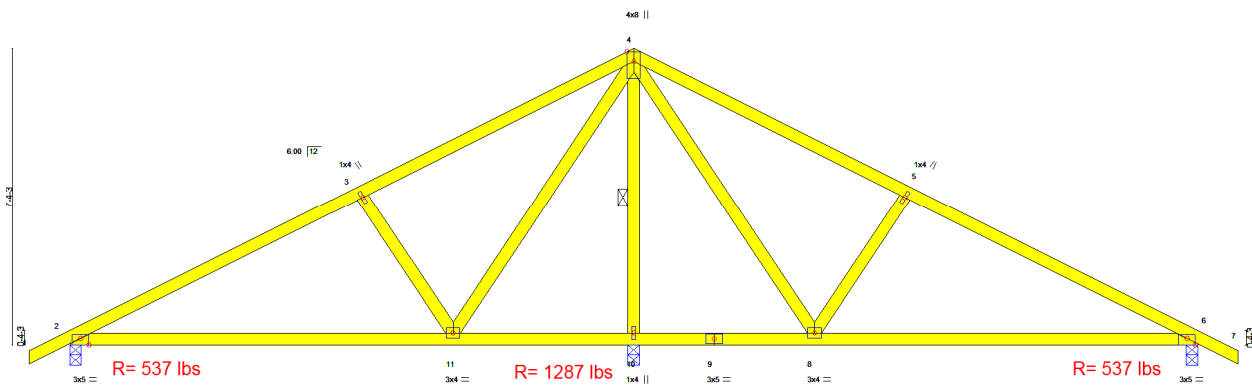


Figure 2 – Triangulated Bearing

A secondary concern deals with the overall performance of the truss. Will an un-triangulated bearing truss perform as well as a truss with triangulated bearings? Figure 3 and 4 are the deflection results for both conditions. Although the overall shape of the diagrams is the same, the magnitude of the deflections is considerably different.

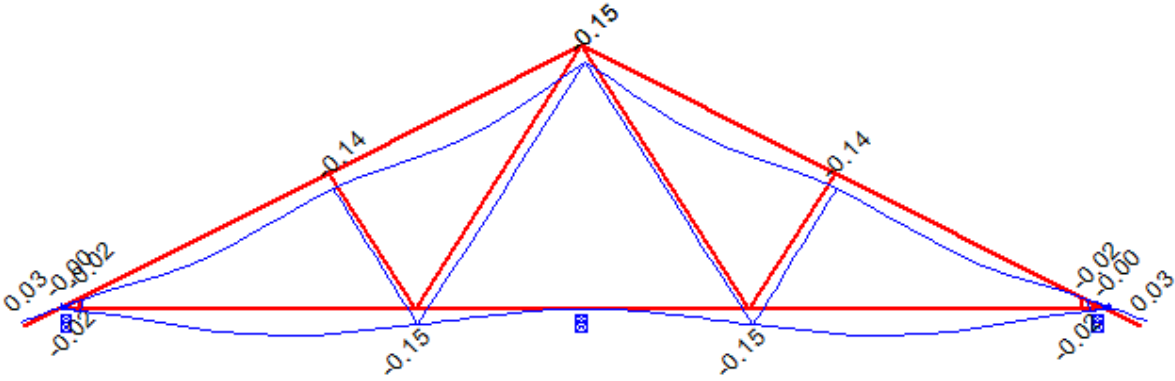


Figure 3 – Un-Triangulated Deflection

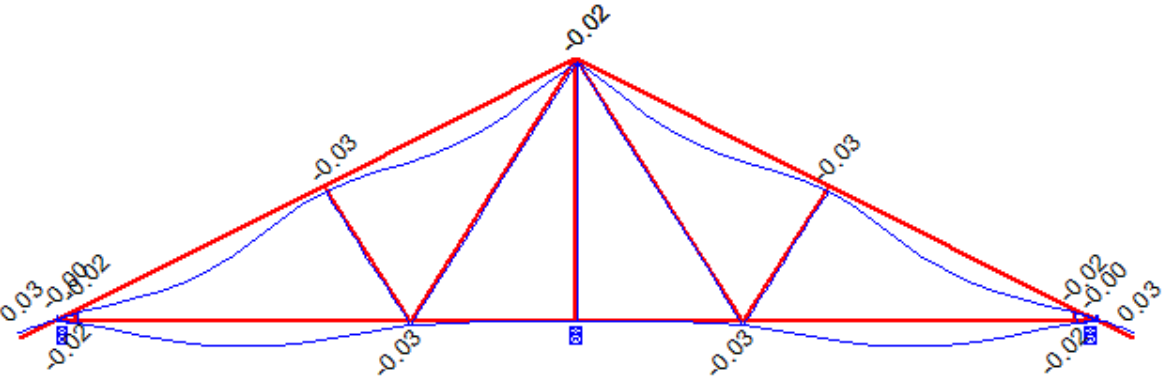


Figure 4 – Triangulated Deflection

Due to these reasons, MiTek Engineers suggest that un-triangulated bearings should be used with caution. If un-triangulated bearings are to be used, the Building Designer should be consulted so that they are aware and approve of their use.

For additional information, or if you have questions, please contact the MiTek Engineering department.