Truss deflection may be something you do not give much thought to when designing trusses. Unfortunately, meeting the code permitted deflection ratio does not always guarantee satisfactory performance. Regardless of what the codes say, most people regard large levels of deflection as a sign of structural deficiency. Paying attention to deflection may be the key to whether your customer is satisfied with you as a supplier and continues to buy your products.

Deflection of a truss is generally based on the amount of vertical movement from its original position due to the loads applied to the members.

The amount of deflection depends on the span and stiffness of the members, and the magnitude of the loads applied. Codes provide the maximum allowable deflection limits for floor and roof trusses, which is based solely on the truss span. Generally, for roof trusses, the deflection in inches due to live load cannot exceed the span in inches divided by 240 (L/240) and due to total load L/180. For floor trusses, the deflection in inches due to live load cannot exceed the span in inches divided by 360 (L/360) and due to total load L/240. To meet code deflection criteria, a 40-foot span roof truss could have live load deflection 2 inches, which does not ensure satisfactory performance.

MiTek engineers recommend using the deflection limits listed below. Roof trusses should use the following settings:
Please note the settings for cantilever and overhang are half that of the main span.

Deflection due to wind load is not often a governing condition, however, there are certain instances where it may control. Long overhang/cantilevers and tall end verticals exposed to wind can be limited by deflection.

Floor trusses should use the following settings:

If a stiffer floor system is desired, architects and engineers often specify the live load deflection criteria L/480. In this situation, it is recommended that the total load deflection be increased to L/360 in order to achieve a corresponding increase in overall stiffness. This applies to other common settings for live and total load deflections, such as 600/480 or 720/600.
Truss Deflection

MiTek Engineering software allows you to limit the truss deflection to a specific absolute value, in inches. Although the deflection ratio may allow for much higher deflections based on the truss span, it is recommended to set the absolute deflection that won’t produce aesthetic issues.

In addition to immediate load induced deflection, wood trusses will also experience what is called creep. Creep is a property of wood that causes trusses under a sustained long term load to deflect more with time. Creep can increase the calculated immediate dead load deflection by as much as two times.

Trusses are frequently cambered for the dead load portion of the deflection. Camber is upward curvature built into the truss to counteract dead load deflections. This gives a flat, level ceiling line after dead loads are applied. Cambering for design loads that exceed actual dead loads results in arched ceiling line that may be undesirable.

Differential deflection can also be a problem. For example, if you compare deflections of a truss with an interior support adjacent to a clear span truss under the same loading condition, the clear span truss is likely to deflect more than the adjacent truss with the interior support and that difference can be noticeable even if both trusses meet code deflection criteria.

A truss designer can bring potential issues mentioned above to the attention of the building designer, so the correction can be made during design phase and truss performance problems can be avoided.

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