Truss Installation and Bracing  
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With today’s use of modern technology, trusses are not only being used more in construction, they are becoming much more complex than ever. Today’s roof designs are not as simple as those of the 50's, 60's or 70's. The basic ranch style house is not nearly as common as in the past. Trusses are being incorporated into floor systems more frequently too. As truss systems become more complicated, careful and correct installation of these systems is a must. Adequate support, proper bracing, correct fastening and the use of approved truss/wall plate connectors must be provided. Truss failure is not a pretty site, and can be avoided with correct installation.

The 2003 Michigan Residential Code (MRC) addresses truss installation in a couple of sections. The first of these sections is section R502.11, which covers the installation of floor trusses. Section R802.10 covers the installation of roof trusses. Both of these sections contain sub-sections that address design and engineering, bracing, and alterations to trusses.

The first subsections of these code sections tell us that trusses must be engineered by a registered professional, and constructed per approved engineering and strict design standards. Builders and homeowners, designing and building their own trusses onsite, though still possible, is not a common practice. Professional truss manufacturing is the standard in today’s construction. Typically truss manufacturers design, construct, and deliver their product directly to the job site. Truss design will be based on several factors that include live and dead loads, snow loads, spans, building location, temperature variations, etc. Proper design and construction are the first steps in a code compliant and structurally sound truss system.

Another subsection for floor and roof trusses addresses truss bracing. Trusses must be braced to provide stability in a lateral direction and to prevent rotation of the truss system. The truss design and engineering drawings, commonly known as the truss specs, should show the location of any required truss bracing. Even when no specific truss bracing requirements are provided, the trusses need to be braced in accordance with the Truss Plate Institute (TPI) HIB specifications. In lieu of lateral bracing, other methods of bracing may be allowed. These methods may include T bracing, strong- back bracing, L bracing, etc. Regardless of the method used, the bracing must be installed on the correct webs of the trusses, and fastened as per the truss specs. While a spec sheet may show the bracing on the top of a truss web, many times, for ease of installation, the bracing may be applied to either the top or bottom of the web. Trusses with overbuilds above, such as valley trusses, may require bracing on the top chords, if the truss top chords are not covered with roof sheathing. Floor trusses may have specific requirements for bracing as well and must be braced as per the truss specs. When in doubt about a specific bracing location, it is better to contact the truss manufacturer and ask about a brace location, than to guess where the bracing may be located. The truss bracing must be installed as per the truss specs for an approved installation. Improperly braced trusses can lead to truss failure, both during, and after truss installation.

Alterations and repairs to trusses are not allowed to be made without the approval of a registered design professional. Alterations to trusses include cuts, notches, splices or other revisions that can alter the design and load capabilities of the truss. Alterations that could result in additional load on a truss member must also have approval to support those added loads. When alterations must be made to a truss, the truss designer/manufacturer should be contacted. The truss designer/manufacturer can provide written details for repairs or alterations and instructions on how to make the repair or alteration. By following the written details for a truss alteration, the changes should be capable of supporting the loads that the truss is designed to carry.

Section R802.10.5 covers truss/wall plate connection, and is a code section that became effective with the 2003 MRC. This section states that roof trusses must be connected to wall plates by the use of approved connectors that have a minimum uplift resistance of 175 pounds, and must be installed as per the manufacturer’s specifications. Many truss specs will show the minimum uplift required for a specific truss. The uplift connector provided must be capable of resisting the uplift required for each truss or a minimum of 175 pounds, which ever number is greater. Trusses in wind prone areas may require a truss/wall plate connector with a higher resistance per Section 802.11 of the MRC. Many girder trusses will require a much higher uplift resistance. Again this number should be shown on the truss specs provided from the truss manufacturer. Truss/wall plate connectors are typically manufactured by joist hanger companies, and are made in a variety of styles. Each style of connector is tested and approved for a maximum uplift resistance. The uplift connector used on a truss must be capable of the loads called out on the truss specs, so the installer needs to be aware of the maximum load allowed for each style of connector used.

Multiple trusses, connected together for greater strength, are known as girder trusses. Girder trusses must be properly connected to each other to share the loads being placed on them. Fastening instructions for girder trusses can be found on the truss specs. These fastening instructions must be followed for a compliant installation. Improper connection of the girder truss can result in structural failure. When multi-ply trusses are used, adequate support must be provided within the wall framing. Multiple studs or posts are typically used to transfer the loads through the wall system, to the floor system and down to the foundation. The amount of support required in a wall and floor system will vary depending on the amount of load that the girder truss carries.

Ignoring the code requirements and truss manufacturer’s specifications for a truss installation will probably result in some type of structural failure. Correct installation of truss systems is a must in providing buildings that will last for many years to come. Should you have questions regarding truss installation, contact your truss manufacturer or local Building Department for assistance.

Code information from the 2003 MRC