



Coffee Break Training - Fire Protection Series

Building Construction: Metal Plate Connected Truss Inspections

No. FP-2014-11 March 18, 2014

Learning Objective: The student will be able to identify one potential failure point of a lightweight wood truss that should be repaired.

Firefighters and inspectors pay particular attention to modern lightweight construction. During a recent townhouse remodeling project, this metal plate connected floor truss was discovered to have lost the connection between the plate and lumber. These metal nailing plates sometimes are known as “gusset plates.”

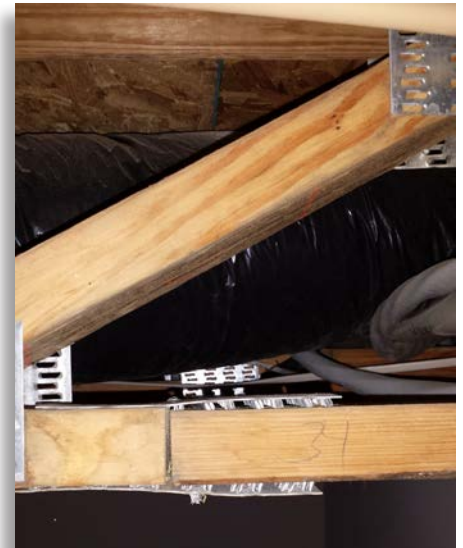
Trusses are designed using sophisticated software that accurately calculates the structural load conditions in accordance with building code requirements. During construction is the best time to see how a truss roof system is configured and distributes loads.

Almost as soon as trusses are set in place, maybe even on the same day, the roof sheathing is attached. This quick construction time prevents inspectors from having a good opportunity to see the framing from outside the building. Fortunately, everything that the fire service and building inspector need to see is visible from inside the structure during the complete building framing inspection. The web and chord elements are fabricated to exact dimensions. The pieces are arranged in their final orientation, and the metal plates are applied using equipment capable of exerting high pressure to embed the metal plate teeth. Trusses are inspected for proper plate orientation and plate teeth penetration depth prior to shipment to the job site.

Metal plate connected wood trusses are the predominant type of truss used in residential construction. They are typically fabricated from 2-by-4 or 2-by-6 inch (51-by-102 or 51-by-152 millimeter) dimension lumber. Trusses are categorized as “parallel” chord for use in floor and flat-roof applications or “pitch” chord for sloped-roof applications.

Metal truss plates should be properly installed to ensure that they perform as designed. Typically, adjacent framing members are tightly fitted, and metal plates are fully embedded in the wood members. The building owner should check with the truss manufacturer to determine if remediation is needed.

For additional information and resources on modern building construction methods and materials, visit http://www.usfa.fema.gov/fireservice/firefighter_health_safety/safety/building_construction/index.shtm.



The cause for this metal plate connection to pull out of the bottom chord is unknown, but it is a concern that should be addressed.



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