

U.S. Fire Administration / National Fire Academy

Coffee Break Training

Topic: Structural Alterations

Learning objective: The student shall be able to identify unauthorized alterations to prefabricated wood I-joists.

Every year, several firefighters are killed in the line of duty as the result of construction-related failures. Many of these deaths may be prevented if inspectors or firefighters can identify potential structural trouble spots and have them corrected before disasters occur.

The illustration shows a prefabricated wooden I-joist that has been cut to provide space for the steel air duct. While it may seem like a minor alteration, the work has potentially compromised the structural integrity of the floor that the I-joist is supporting.

Building codes typically establish the minimum structural requirements for construction. The structural capacities and designs for prefabricated wooden I-joists must be in accordance with American Society for Testing and Materials (ASTM) Standard D 5055, *Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists*.

Wood I-joist manufacturers provide contractor guidance for their products to assure that they are installed in accordance with their testing and listings to maintain structural integrity. Generally, I-joists may be field-cut to fit the correct length, but otherwise cutting the flanges is never recommended. The I-joists are manufactured with knock-outs to allow pipes and wires to pass through the solid web.

In many cases like the one illustrated, the damage may occur long after the carpenter has left the job site and another subcontractor is performing his or her work.

Inspectors or firefighters who discover alterations to a building's structural integrity should provide a written report to the building code official, and request investigation to have the problem corrected, if it proves necessary.

For additional information, refer to NFPA 5000™, *NFPA Building Construction and Safety Code™*, Chapter 45; or *International Building Code®*, Chapter 23.

