Coffee Break Training - Fire Investigation Series

Building Construction: Part 1: Fire Investigations: Building Construction Types

No. FI-2010-1 June 24, 2010

Learning Objective: *The student shall be able to recognize and understand various types of construction, and their relationship to fire investigation, and the safety of personnel on scene.*

Understanding building construction is critical to the safety of fire investigators. National Fire Protection Association (NFPA) 921, *Guide for Fire and Explosion Investigations*, states: "Many structural hazards are easily identified without the need to have specialized technical assistance, but in complex scenes or heavily damaged scenes the investigator may want to consider the assistance of a structural engineer."

Understanding structural integrity is critical for fire investigators. The National Institute of Occupational Safety and Health (NIOSH) investigated a case where a chimney fell on a New York fire investigator and killed him. NIOSH's report concluded: "Personnel should conduct an assessment of the stability and safety of the structure, e.g., roofs, ceilings, partitions, load-bearing walls, floors, and chimneys before entering damaged, e.g., by fire or water, structures for the purpose of investigations."

This burned out bank building shows an example of collapse in Type III construction.

The types of construction (Type I–Fire resistive, Type II–Noncombustible, Type III–Ordinary, Type IV–Heavy timber, and Type V–Wood frame) are important to understand potential collapse, properly describe the building in a report, and understand fire extension. Fire-resistive and Noncombustible construction generally use noncombustible exterior walls and non-combustible floors, roofs, and interior structural components. Fire-resistive construction protects the structural elements from the effects of fire.

Ordinary and Heavy timber (sometimes called "Mill") construction use noncombustible outer walls and any permitted material, including combustible materials, for the floors, roofs, and interior structural elements. Heavy timber uses framing materials not less than 6 inches in any dimension and has floor and roof dimensions not less than 2-inches (51 mm) thick. In all types of construction requiring noncombustible materials, there are some exceptions where fire-retardant lumber is permitted in place of noncombustible construction.

Wood-frame construction uses any permitted materials and has combustible walls, floors, and roofs. Generally, the material used is wood. There are subtypes in wood frame including balloon-frame, post-and-beam, and platform construction. Balloon-frame is rare today since it uses a continuous piece of lumber from foundation to the roof. Platform construction is one of the most common types used for residential construction.

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