Coffee Break Training - Fire Protection Series

Building Construction: Part 5: Understanding Construction: Fire Test "Survival"

No. FP-2009-49 December 8, 2009

Learning Objective: *The student shall be able to list three performance requirements that determine an assembly's ability to survive a laboratory fire test.*

When a fire assembly is submitted for evaluation, it must meet certain minimum acceptance criteria before it is granted a fire resistance rating.

Fire assemblies must survive in a gas-fired furnace to achieve a fire-resistance rating.

According to the American Society for Testing and Materials (ASTM) standard E119, *Test Methods for Fire Tests of Building Construction and Materials*, these requirements cover the following measurements and determinations during the test exposure:

- For wall, partition, floor and roof assemblies, the measurement of the heat transmission through the assembly, and the ability of hot fire gases to ignite cotton waste on the side of the assembly opposite the gas-fired flame.
- For wall, partition, floor and roof assemblies, the measurement of the load carrying ability of load bearing elements.
- For individual load bearing assemblies such as beams and columns, the measurement of the load carrying ability of, with consideration for the end support conditions, either restrained or not restrained[1].

All ratings are based on the assumption that the stability of structural members supporting the assembly are not impaired by the effects of fire. For example, for a floor assembly fire-resistance test, the final hourly rating is given only if the floor's supporting columns or beams survive the test as well.

Some components like fire door or window assemblies, depending upon how they are intended to be installed, also may be subjected to a "hose stream" test that assesses their ability to resist a fire stream while retaining their capacity to stay in their frame.

For more information and training, you may wish to visit UL University at www.ul.com and select the following course title: "Achieving Code Compliance Using UL Fire Resistance Designs." There is a fee for this course. Code officials may be eligible for a special discount on this course. Contact UL University at 888-503-5536 for more information.

[1] Appendix C of ASTM E119 describes restraint: "Floor-ceiling and roof-ceiling assemblies and individual beams in buildings should be considered restrained when the surrounding or supporting structure is capable of resisting substantial thermal expansion throughout the range of anticipated elevated temperatures. Constructions not complying with this definition are assumed to be free to rotate and expand and should therefore be considered as unrestrained."