Coffee Break Training - Fire Protection Series

Automatic Sprinklers: Special Application Attic Sprinklers

No. FP-2011-51 December 20, 2011

Learning Objective: *The student shall be able to identify four conditions affecting the installation of special application attic sprinklers.*

Combustible attic fire protection creates a unique environment that is challenging to sprinkler designs. Structural members that intersect at a variety of angles, variable ceiling slopes, obstructions caused by heating, ventilating, and air conditioning (HVAC) equipment, insulation materials, and an often unheated atmosphere forces the designer to consider a wide variety of options.

This attic special sprinkler is designed to be installed near the ridge of a peaked attic and can project water up to 40 ft (12.1 m).

One solution is the installation of attic sprinklers similar to the one illustrated today. Attic sprinklers are a type of special sprinkler recognized in National Fire Protection Association (NFPA) 13, *Standard for the Installation of Sprinkler Systems* (see Coffee Break Trainings FP-2010-10 and FP-2010-11 for an explanation of special sprinklers).

The primary benefit of the use of attic sprinklers is that, given the right conditions, the number of branch lines and sprinklers installed in the attic can be dramatically reduced. In some cases, a single branch line at the peak of the attic can provide complete protection.

Unlike the installation of sprinklers beneath smooth, flat ceilings, the complex environment in the attic requires the sprinkler designer to pay very close attention to a variety of factors. These include

- Whether the attic fire protection is from a wet-pipe or dry-pipe system. In general, the design flow for a dry-pipe system will be greater than for the wet-pipe system. The minimum flow per sprinkler ranges from 13 to 40 gallons per minute (gpm) (49 to 152 Lpm) depending upon the design.
- The attic and roof structural configuration. Gable and hip roof configurations require different sprinkler placement. The presence of trusses and shear walls for structural stability also influence the location of sprinkler pipe and sprinklers.
- The steepness of the roof. Roof pitches can range from 3:12 to 10:12 and the steepness of the pitch may affect water demand.
- The allowable roof span. The roof span is the distance from the center of the roof peak to the outer edge of the roof. For some sprinkler installations, the permitted span may be as little as 10 ft (3 m) or as much as 60 ft (18.3 m).

The design, installation, and inspection of specific application attic sprinklers require strict attention to detail. The code official should obtain competent technical assistance for those designs where the code official has concerns about their accuracy and compliance with both standards and the manufacturer's installation instructions.