Coffee Break Training - Fire Protection Series

Inspection Techniques: Sprinkler Clearances and Storage

No. FP-2012-1 January 3, 2012

Learning Objective: *The student shall be able to identify clearance requirements between sprinkler deflectors and storage.*

The model fire codes typically require storage to be kept at least 18 inches (457 mm) beneath sprinkler deflectors so that the system can develop an adequate spray pattern when a sprinkler operates. Temporary obstructions, such as these boxes, can interfere with the discharge pattern.

This storage on top of a walk-in cooler creates an obstruction to water spray discharge patterns.

The discharge pattern of upright and pendent spray sprinklers assumes a parabolic shape and to ensure the distribution of water over the area that the sprinkler was designed to protect, the spray pattern should not be obstructed. Rack storage fire tests, other tests with solid-piled storage, and field experience have shown that *standard spray* sprinklers are effective with a minimum 18 inches clearance. (See Coffee Break Trainings 2010-10 and 2010-11 for descriptions and limitations of different sprinkler types.)

There are conditions, though, where different dimensions are specified by the National Fire Protection Association (NFPA) 13, *Standard for the Installation of Sprinkler Systems*. For example, the 18-inch dimension is not intended to limit the height of shelving on a wall or shelving against a wall. Where shelving is installed on a wall and is not directly below sprinklers, the shelves, including storage that is on it, can extend above the level of a plane located 18 inches below ceiling sprinkler deflectors. Shelving and any storage directly below the sprinklers cannot extend above a plane located 18 inches below the ceiling sprinkler deflectors.

Other circumstances that require different clearances include

- Building heights where baled cotton is stored should allow for proper clearance between the pile height and sprinkler deflectors. Fire tests of high-piled storage have shown that sprinklers are generally more effective if located 1-1/2 to 4-1/2-ft (0.45 m to 1.4 m) above the storage height.
- The 18 inches clearance does not apply to vehicles in concrete parking structures.
- A minimum clearance to storage of 36 inches (914 mm) is permitted for *special sprinklers*. (See Coffee Break Trainings 2010-10 and 2010-11 for descriptions and limitations of different sprinkler types.)
- A minimum clearance to storage of less than 18 inches between the top of storage and ceiling sprinkler deflectors is permitted where proven by successful large-scale fire tests for the particular hazard.
- Where rubber tires are stored, the clearance from the top of storage to sprinkler deflectors should be at least 36 inches.

These varying dimensions and conditions serve as a good reminder that the code official should conduct thorough research regarding the nature of the fire protection system and storage array before making a determination on sprinkler clearance. For additional information, refer to NFPA 13.