Holes In Building Structure

Not Hangers or Sway Braces

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NFPA 13 defines hangers used for vertical support and vertical restraint of fire sprinkler system piping. It further addresses sway braces and restraint to resist horizontal force on fire sprinkler system piping in seismic areas. Holes whether round or irregular are not hangers, sway braces or restraints. Let's discuss holes per NFPA 13 chapter 9 as follows:

The hole is not a hanger per NFPA 13. Holes can exempt the installation of a hanger to provide vertical support. Holes through structural building elements can provide an economical support alternative to fire sprinkler system hangers. When holes can provide support and spacing per the requirements of chapter 9, then most hangers can be eliminated. Chapter 9 defines the ability of a hanger as 5(wt.)+250#. However, a hole only need to conform to 1(wt.)+250# to provide support per chapter 9. If the hole is snug horizontally to the sprinkler pipe it will further eliminate the need of an additional hanger to restrict non-seismic horizontal movement.

Holes are not sway braces per NFPA 13. Since the existing holes through structural elements are larger than the outside diameter of fire sprinkler piping, they do not provide the proper connection or characteristics required for sway braces. The holes common to building structural elements do not exempt the installation of sway braces. The properties of sway braces and their ability are strictly defined in chapter 9. Holes do not conform to chapter 9 requirements regarding tightness, attached directly or listed. These requirements are identified in sections 9.3.5.8.1, 9.3.5.11.1 and 9.3.5.10.2.

Existing holes due to their loose geometry don't properly confine piping to provide restraint. Looseness brings unintended consequences in seismic events. Chapter 9 requires restraint to keep fire sprinkler system components from impacting other building elements. Restraint is required to limit both vertical and horizontal movement. Restraint criteria though not as rigorous as sway brace criteria, is still important. The phenomena of the seismic event can be detrimental to fire sprinkler systems components.

Round holes could theoretically eliminate the need to install sway bracing and restraint in seismic areas. Their diameter would have to be snug to the pipe with depth through the structure sufficient to provide a broad contact surface. This broad contact surface would further need to be smooth enough to not damage installed steel, copper or CPVC sprinkler piping. In reality tight holes never exist unless they are specifically engineered and executed.

The common practice of using holes to provide support is prudent fire protection, but don't mistakenly call the holes sway braces, restraint or hangers.