# Concrete Q&A

# Anchorage of Sprinkler Piping

**Q.** *I'm a construction contract administrator on a multi-story concrete building project. The structural drawings for the project state that the building is in Seismic Design Category C per ASCE/SEI 7-10.[1] The subcontractor for the sprinkler system has submitted shop drawings showing that drop-in anchors are to be used for supporting sprinkler piping. The anchor manufacturer's test reports include only data from tests in uncracked concrete, however, so I have rejected the submittal because the indicated anchors aren't allowed in seismic applications. The subcontractor has been fighting back, claiming that NFPA 13, "Standard for the Installation of Sprinkler Systems,"[2] allows the drop-in anchors for hanging sprinkler pipes, regardless of seismic category. Am I correct?*

**A.** You are correct. Section 1911.1 of the International Building Code (IBC)[3] states that the allowable stress design provisions for anchorage "...do not apply to anchors installed in hardened concrete or where load combinations include earthquake loads or effects." The clause "anchors installed in hardened concrete" clearly refers to post-installed anchors. Per IBC Section 1912.1, the strength design provisions included in ACI 318-08, Appendix D,[4] govern. Section D.3.3.2 of ACI 318-08[4] states, "Post-installed structural anchors shall be qualified for use in cracked concrete and shall have passed the Simulated Seismic Tests in accordance with ACI 355.2." ACI 355.2[5] prescribes testing programs and evaluation requirements for post-installed mechanical anchors intended for use in concrete.

For further support, note that Section 9.3.5.9.7.1 of NFPA 13[2] states, "Concrete anchors shall be prequalified for seismic applications in accordance with ACI 355.2, 'Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary,' and installed in accordance with the manufacturer's instructions." While this section applies only to anchorage of seismic sway bracing, it's clear that unless a bracing system is perfectly symmetrical, anchors supporting vertical hangers will carry the vertical component of the bracing force during a seismic event. Thus, all sprinkler system anchors should be considered part of the sway bracing in a seismic zone, even if the primary function of an anchor is supporting the weight of the piping.

## References


1. ASCE/SEI 7-10, "Minimum Design Loads for Buildings and Other Structures," American Society of Civil Engineers, Reston, VA, 2010, 608 pp.

2. NFPA 13, "Standard for the Installation of Sprinkler Systems," National Fire Protection Association, Quincy, MA, 2010, 414 pp.

3. 2009 International Building Code, International Code Council, 2009, 676 pp.

4. ACI Committee 318, "Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary," American Concrete Institute, Farmington Hills, MI, 2008, 473 pp.

5. ACI Committee 355, "Qualification of Post-Installed Mechanical Anchors in Concrete (ACI 355.2-07) and Commentary," American Concrete Institute, Farmington Hills, MI, 2007, 39 pp.



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