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SUBJECT:    Project Delivery Memo #7-02 – Use of Fast-Set Epoxies in Projects

**Background**

The National Transportation Safety Board (NTSB) conducted a study of the ceiling collapse in the Interstate 90 Connector Tunnel in Boston, Massachusetts (commonly referred to as the “Big Dig”). Concrete ceiling panels, held in place with epoxy adhesive anchors, failed and resulted in fatal injuries. The concrete ceiling panel module was anchored by an epoxy adhesive, Power-Fast Epoxy Injection Gel Fast Set Formula by Powers Fasteners, Inc., also packaged under the name NRC-1000 Gold epoxy. The NTSB determined the collapse to be caused as follows:

“The National Transportation Safety Board determines that the probable cause of the July 10, 2006, ceiling collapse in the D Street portal of the Interstate 90 connector tunnel in Boston, Massachusetts was the use of an epoxy anchor adhesive with poor creep resistance, that is, an epoxy formulation that was not capable of sustaining long-term loads. Over time the epoxy deformed and fractured until several ceiling support anchors pulled free and allowed a portion of the ceiling to collapse.”

Key to the NTSB findings was that the epoxy used, a fast-set two-part epoxy adhesive, was known by the company, Power Fasteners, Inc., to have poor long-term load characteristics (i.e. poor creep characteristics under sustained vertical loads). Powers Fasteners, Inc., “Power-Fast” epoxy was manufactured in both slow-setting (also called “standard set”) and quick-setting formulations (also called “fast set”), but only the quick-setting formulation was found in samples tested after the ceiling failure. Testing by FHWA at the Turner-Fairbank Highway Research Center concluded that Powers Fast-Setting Epoxy “exhibited significant and continued displacement (creep) when subjected to loads as low as 1,000 pounds.”

**Direction**

The following actions for all the active contracts shall be implemented:

- Immediately discontinue use of adhesives labeled as “fast-set” by the manufacturer in all resin-bonded anchor applications;
- Contact the HQ Construction Office if “fast-set” resins have been used for installation of any resin-bonded anchors; and
- Approve only use of “standard-set” adhesives for resin-bonded anchors.

**Recommended Additional Steps**

All the known “fast-set” epoxies have been removed from the QPL. Pending development and approval of new AASHTO testing standards addressing creep requirements for adhesives, consult with the HQ Materials Lab for approval of the adhesives used for all resin-bonded anchors.

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