



Rapid Set® Low-P™ Cement and Fly Ash, Route 95 Bridge (Foxboro, MA)

# UNIQUE MIX DESIGN

## FOR BRIDGE PRESERVATION

Massachusetts Bridge Repaired in Short Timeframe

**Project:**

Route 95 Bridge Rehabilitation

**Location:**

Foxboro, MA

**Date:**

May 2013

**Highway & Bridge Contractor:**

Aetna Bridge Company

**Size:**

3.5-inch to 4-inch overlayment

**Product Used:**

Rapid Set® Low-P™ cement and fly ash

Like many bridge repair projects, the Route 95 bridge rehabilitation project in Foxboro, Mass., required a tight timeframe for work. Because of the high traffic volume on the interstate bridge, MassDOT developed a unique solution: to complete deck repairs over the course of two weekends. In May of 2013, Aetna Bridge Company of Pawtucket, R.I., was approved to perform the 50-year-old bridge deck's total rehabilitation.

First, crews milled the existing asphalt concrete pavement with a scarification machine. Next, a hydrodemolition machine made multiple passes to remove deteriorated surface concrete.

"The hydrodemolition machine didn't remove all deteriorated concrete to full-depth," said Dan Crovo, Highway Division District 5 Bridge Engineer, MassDOT. "Crews jackhammered the remaining areas of deteriorated concrete and filled them with a rapid-setting concrete that contained Rapid Set® Low-P™ cement and fly ash. After those patches were made, the concrete overlayment was placed."

The rapid-setting concrete mix of Low-P cement and fly ash was also used for the 3.5- to 4-inch overlayment, a first for such a specification in Massachusetts. Low-P cement is a low permeability, corrosion resistant, fast-setting hydraulic cement often used for fast-track bridge deck repairs. The contract contained a performance based special provision for the deck repair and overlayment concrete as

# PROJECT PROFILE

a means to improve the concrete durability. Rapid Set® Low-P™ cement concrete was trial batch tested and the results indicated that its low permeability will limit water and salt penetration into the new overlay and the old deck. This will preserve the existing bridge without any further repair work for many years. Fly ash was added to eliminate any potential alkali silica reactivity problems.

“The fly ash was necessary because, without it, the mix exceeded MassDOT’s expansion limit for ASR reactivity,” said Crovo. “The mix design was mitigated by replacing 15 percent of the Low-P with fly ash. We ran trial batches with 15-percent fly ash, and the ASR expansion limits were satisfied.”

Concrete was mixed on site in mobile mixers, saving time and eliminating waste. In all, more than 100 yards of concrete were mixed for the project. The mobile-mixed concrete was delivered to the discharge points via a telescoping conveyor system, feeding concrete in front of the Terex Bid-Well bridge paver. The conveyor system eliminated the concern of trucks or other equipment maneuvering over exposed rebar. Crews worked quickly and cured the concrete with burlap and water.

With Route 95’s bridge deck now fully repaired in Foxboro, the project has demonstrated that with proper scheduling and the right equipment and mix design, interstate bridge decks can be repaired successfully within short timeframes.

“Because of the success of this repair, we have plans to implement repairs using the same technique on additional bridges in Massachusetts,” said Crovo.

