

Market Application Focus

Admixtures

High Early Strength Concrete

Roadway Repairs / Roadway Patches

Projects: SR #476 and SR #30, Chester County, PA
Owner: PENN DOT
Concrete Producer: Silvi Concrete Products
General Contractor: Allan A. Myers
Year: 2006

The Problem

SR #476 and SR #30 are located north west of Philadelphia. Both routes are heavily used by daily commuters who travel to the Philadelphia metro area to work. Any highway restriction will create massive traffic congestion that can create traffic back ups of several miles, therefore the road has to be open to full traffic within 7 hours from final placement. No detour routes are available in this area.

In order to minimize the negative impact on traffic, all repairs must be done during night hours and stringent closure requirements apply to all maintenance work.



The Sika Solution



The goal of this project was to remove and patch a large section of the highway surface and replace it with high performance concrete. The concrete requirements included not only high early strength but also strict air content as these state roads are located in an area where a relatively high number of freeze thaw cycles can be expected and de-icing salts are commonly used. Prolonged concrete workability was a must as construction occurred during the summer when temperatures reached 70–75°F at night. Hauling distance for this project was approximately 45-60 minutes.

Sika's approach to meeting all requirements was to make the mix design as simple as possible with a minimum number of admixtures being used, therefore the following admixture system was chosen.

Yardage: Approx. 2000 cubic yards
Concrete Spec: Slump: 6" +/- 2"
 Air: 6% +/- 1 ½%
 Min. Strength 1200 psi in 7 hours

Average Results: Slump: 6"
 Air content: 6%
 Strength: 1840 psi in 7 hours

Dosage rates: Sikament 686: 11 oz/cwt
 Sika Rapid-1: 32 oz/cwt
 Sika AIR: 1.2 oz/cwt

Benefits: Easy placement due to high slump with outstanding slump retention.
 High early compressive strengths allowing for minimal lane restriction in high density traffic areas.



Sika's Admixture Systems

Products Used:

Sikament® 686 - High Range Water reducing admixture with neutral setting times and extended slump life.

Sika® AIR - Air entraining admixture with long history using local cements. Sika® AIR delivers consistent and predictable results on a daily basis and is being used by many local concrete producers.

Sika® Rapid-1 - Hardening accelerator was preferred versus a set accelerator as Sika Rapid-1 has a minimal negative effect on slump loss of fresh concrete and still delivers improved early strength, which was a key requirement in this case.



Admixture Systems Product Groups

- ▲ Water Reducers
- ▲ Mid Range Water Reducers
- ▲ High Range Water Reducers
- ▲ Self-Consolidating Concrete
- ▲ Water Reducers and Retarders
- ▲ Set Accelerators
- ▲ Hardening Accelerators
- ▲ Air Entrainers
- ▲ Corrosion Inhibitors
- ▲ Microsilica
- ▲ Dry Cast Admixtures
- ▲ Specialty Admixtures
- ▲ Concrete Fibers

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