

Project:

I-75 Rehabilitation Project

Location:

Kentucky/Ohio border

Owner/s:

Kentucky DOT

Concrete Producer:

Hilltop Basic Resources

Construction Contractor:

The John R. Jurgensen Company

Requirements:

Target compressive strength: 3,500 psi (24 MPa) at 6, 12 or 24 hours

Target air content: 6%

Target slump: 3-1/2 in. (90 mm)

Products Used*:

MasterSure® Z 60 workability-retaining admixture

MasterGlenium® 7500 high-range water-reducing admixture

MasterAir® AE 200 air-entraining admixture

MasterSet® AC 534 accelerating admixture

Market Sector:

Paving

Project Profile

Strength-On-Demand Concrete

I-75 Rehabilitation Project



The Background

A portion of Interstate 75 on the Kentucky-Ohio border needed to be replaced because of unsafe pavement conditions caused by the unstable ground under the existing pavement. This required removal and replacement of 26,000 yd³ (19,900 m³) of concrete on Interstate 75 cut into the hill. This was the first concrete paving project for the contractor, who traditionally uses asphalt.

I-75 Rehabilitation Project



The Challenge

To minimize lane closure time on this high-traffic interstate highway, the contractor had to remove and replace approximately 1,600 yd³ (1,230 m³) of concrete each weekend for a period of sixteen weeks. All old concrete had to be removed on Friday evening, followed by base stabilization, placement of new concrete and striping of lanes prior to reopening to traffic by 5 a.m. on Monday. For every hour of delay, the contractor was required to pay a penalty of \$50,000.

Logistically, the accelerating admixture could not be added at the job site because of space constraints, as this portion of the highway is cut into the hill. Hence, all the admixtures had to be dispensed at the concrete batch plant to avoid dosing admixtures in the dangerous and crowded construction zone.

The Solution

To accommodate these strict requirements, KY DOT approved the use of BASF's 4x4 Concrete technology, a unique method of achieving 400 psi (2.75 MPa) flexural strength in 4 hours or as needed. With this technology, BASF and the concrete producer Hilltop Basic Resources developed a concrete mixture that was able to achieve the required compressive strength of 3,500 psi (24 MPa) at 6, 12 or 24 hours by simply adjusting the dosages of the admixtures. The concrete met all the plastic and hardened performance criteria set by the contractor and the KY DOT, and permitted the lanes to be reopened to traffic on schedule. Hilltop Basic Resources used MasterSure Z 60 workability-retaining admixture in the 4x4 Concrete mixture to maintain the concrete slump for up to one hour, even with the addition of the MasterSet AC 534 accelerating admixture at the batch plant, instead of at the jobsite as is typically done. With all the admixtures being added at the batch plant, Hilltop Basic Resources was able to avoid storing and dispensing admixture at the constricted construction site.

High-Early-Strength Concrete Mixture Proportions:

Type I Cement	800 lb/yd ³ (475 kg/m ³)
Water	256 lb/yd ³ (152 kg/m ³)
w/c	0.32

Project Facts and Benefits

- Full depth, 4x4 Concrete mainline paving replacement
- Sixteen weekends to complete
- Slip-form paving application
- 26,000 yd³ (19,900 m³) of 4x4 Concrete is being placed
- All admixtures dispensed at the batch plant
- Required slump of 3-1/2 in. (90 mm) maintained for up to one hour
- Pavement open to traffic quickly with minimal inconvenience to motorists

More Information

The Master Builders Solutions brand brings all of BASF's expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.

The know-how and experience of a global community of BASF construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing solutions, sealants, concrete repair & protection solutions, performance grouts, performance flooring solutions.

*Effective January 1, 2014, the names of BASF's Master Builders Solutions brand products have changed:
RheoTEC Z-60 became MasterSure Z 60
Glenium 7500 became MasterGlenium 7500
Micro Air became MasterAir AE 200
Pozzolith NC 534 became MasterSet AC 534

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