

**Project:**

*I-44 Pavement Repair*

**Location:**

*Springfield, MO*

**Owner/s:**

*Missouri Department of Transportation  
(MODOT)*

**Concrete Producer:**

*City Wide Construction Products,  
Ozark, MO*

**Construction Contractor:**

*Journagen Construction*

**Requirements:**

*Compressive strength: 3,500 psi (24  
MPa) in 4 hours after placement*

*Target air content: 6%*

*Target slump: 6-7 in. (150-175 mm)*

**Products Used\*:**

*MasterAir® VR 10 air-entraining  
admixture*

*MasterGlenium® 7500 high-range  
water-reducing admixture*

*MasterPolyheed® 997 mid-range water-  
reducing admixture*

*MasterSure® Z 60 workability-retaining  
admixture*

**Market Sector:**

*Paving*

## Project Profile

### Strength-on-Demand Concrete

#### I-44 Pavement Repair



### The Background

This was a full-depth pavement replacement project along Interstate 44 in Greene, Webster and Laclede counties in Missouri. Substantial penalties would be assessed by the Missouri Department of Transportation for delay in re-opening the highway for traffic. It was necessary to use innovative technologies to minimize the impact on commuters.

# I-44 Pavement Repair



## The Challenge

The concrete producer had to deliver a total of 1,500 yd<sup>3</sup> (1,200 m<sup>3</sup>) of consistent quality concrete that would achieve a compressive strength of 3,500 psi (24 MPa) in 4 hours after placement.

Timing was an important challenge on this job, as the contractor could not begin demolition before 11:00 p.m. each night. The contractor needed to saw-cut and remove the existing pavement sections, clean the placement area and install dowel pins at night, before placing new concrete.

## The Solution

MODOT 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. Concrete producer City Wide Construction Products, and their admixture partner, BASF, developed a modified 4x4 Concrete mixture utilizing Type I cement, fly ash and BASF admixtures that was able to achieve the compressive strength of 3,500 psi (24 MPa) in 4 hours after placement. MasterSure Z 60 workability-retaining admixture was included in the mixture to retain slump thus eliminating the need for re-tempering at the jobsite, which would have compromised the quality of the concrete mixture. The concrete met all the requirements of MODOT, and the highway was re-opened each day at 6:00 a.m. for rush-hour traffic.

## Portland Cement Concrete Pavement High Early Strength Mixture Proportions

Type I Cement	846 lb/yd <sup>3</sup> (502 kg/m <sup>3</sup> )
Fly ash	150 lb/yd <sup>3</sup> (89 kg/m <sup>3</sup> )
Water	319 lb/yd <sup>3</sup> (189 kg/m <sup>3</sup> )
Calcium Chloride	2% by mass of cementitious materials
w/c	0.32

## Project Facts and Benefits

- Full depth pavement replacement on I-44 in Springfield, MO
- 1,500 yd<sup>3</sup> (1,200 m<sup>3</sup>) of 4x4 Concrete used
- Work began each night at 11:00 p.m. and the highway was re-opened for traffic at 6:00 a.m. the following morning

## 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:  
MB-VR became MasterAir VR 10  
Glenium 7500 became MasterGlenium 7500  
PolyHeed 997 became MasterPolyheed 997  
RheoTEC Z-60 became MasterSure Z 60

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