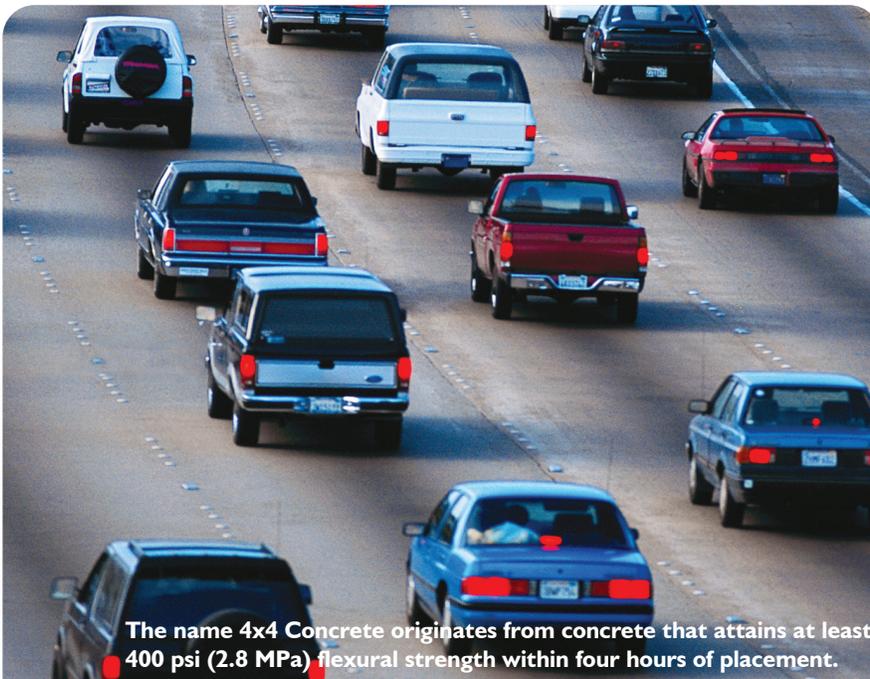


Strength-on-Demand Concrete

Interstates I-77 and I-64 Lane Replacement



Several stretches of the I-77/I-64 West Virginia turnpike were in need of replacement. The turnpike commission was interested in a fast-track replacement of the deteriorated lanes to minimize inconvenience to motorists. Boxley Materials, Inc., a local ready-mixed concrete producer, was asked to develop a mixture that would achieve the required compressive strength even in the cool springtime ambient temperatures.

Project:

I-77 / I-64 Turnpike Lane Replacement

Location:

Beckley, WV

Owner/s:

West Virginia Turnpike

Concrete Producer:

Boxley Materials, Inc.

Concrete Contractor:

West Virginia Paving, Inc.

Requirements:

High-early strength concrete

Compressive Strength:

2,000 psi (13.8 MPa) @ 4 - 6 hours

Target air content: 4.5 - 9.5%

Products Used:

MasterAir[®] VR 10

air-entraining admixture

MasterSet[®] DELVO

extended set-controlling admixture

MasterGlenium[®] 3030

high-range water-reducing admixture

MasterPolyheed[®] 997

mid-range water-reducing admixture

MasterSet AC 534

accelerating admixture

Market Sector:

Paving

Project Profile

Interstates I-77 and I-64 Lane Replacement



The Solution

To meet the turnpike requirements for minimizing the time the lanes were to be closed during replacement, Boxley Materials, Inc. developed a quality, high-early compressive strength concrete mixture using the patented 4x4 Concrete system from Master Builders Solutions. The first phase of the project began at approximately 7:00 p.m. with removal of the deteriorated pavement sections and preparation of the subgrade for fresh concrete.

The high-early strength concrete was then delivered, placed, and cured by 1:30 a.m. The target of 2,000 psi (13.8 MPa) compressive strength was easily achieved and the lane was reopened to traffic by early morning in time for rush hour traffic.

High-Early Strength Concrete Mixture Proportions

Cement	700 lb/yd ³ (445 kg/m ³)
w/cm	0.35
s/a	0.41

Plastic Properties

Slump	5 in. (125 mm)
Air Content	5.8%
Unit Weight	142.6 lb/yd ³ (85 kg/m ³)

Project Facts and Benefits

- 1,000 yd³ (765 m³) concrete for lane repairs
- Haul time was approximately 30 minutes
- A roller screed was used to level and consolidate the concrete
- Typical compressive strength:
 - Type I Cement – 2,000 psi (13.8 MPa) @ 4 hours
 - Type III Cement (used around toll booths) – 3,500 psi (24.1 MPa) @ 4 hours
- Joints cut every 15 ft (4.6 m) over the 100 ft (30.5 m) section
- Lane replacement took only 10 - 12 hours from start to finish
- Pavement open to traffic quickly with minimal inconvenience to motorists

About Master Builders Solutions

Master Builders Solutions is a leading global manufacturer of concrete admixtures, as well as other sustainable solutions for the construction industry, focussed on delivering its vision: **Inspiring people to build better**. Master Builders Solutions provides value-added technology and market-leading R&D capabilities to improve the performance of

construction materials and to enable the reduction of CO₂ emissions in the production of concrete. Founded in 1909, Master Builders Solutions has ca. 1,600 employees operating 35 production sites globally, supporting their customers in mastering their building challenges of today – for a decarbonised future.

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