MASTER® BUILDERS SOLUTIONS

Project Profile

Strength-on-Demand Concrete

Boat Section - Interstate 5

Project:
Interstate 5 pavement replacement

Location:
Sacramento, California

Owner/s:
California Department of Transportation (Caltrans)

Concrete Producer:
CEMEX

Concrete Contractor:
C.C. Myers, Inc.

Requirements:
3,630 psi (25 MPa) compressive strength in 24 hours

50% slag cement replacement

Products Used*:
MasterGlenium® 7500 - high-range water-reducing admixture

MasterSet® DELVO - extended set-controlling admixture

MasterLife® SRA 20 - shrinkage-reducing admixture

MasterSet® AC 534 - accelerating admixture

MasterLife® CI 30 - corrosion-inhibiting admixture

Market Sector:
Paving

The Situation

California's Interstate 5 is the main north-south highway on the West Coast. The three-quarter mile stretch of I-5 along the Sacramento River is often referred to as the "Boat Section" since it lies below water level and required draining of the area when it was originally built in the 1960s. Since then, the Boat Section has been plagued by river silt and sand blockages in its drainage system, which allowed water to be pushed up through the pavement and cause cracking and deterioration. In 2008, the California Department of Transportation (Caltrans) decided to replace the Boat Section of the interstate to better accommodate the nearly 200,000 trucks and motorists that drive the stretch daily.

BASF
We create chemistry

Boat Section - Interstate 5

The Challenge

Caltrans wanted to minimize disruption to motorists, and reduce congestion and resulting emissions as much as possible. In addition, to support local sustainability initiatives, Caltrans specified a “greener” mix design for the replacement slabs, calling for 50% slag cement replacement and 3,630 psi (25 MPa) compressive strength for concrete use on the “seal slab.” For the amount of repair that needed to take place, most of the bids came in with year-long schedules. However, C.C. Myers Inc. a contractor famous for meeting short timelines on other Caltrans projects, proposed completion in roughly four months and was awarded the contract. Subsequently, C.C. Myers, Inc. submitted an even more aggressive value engineered plan that would be safer for the public and work crews: full lane closures and ramp restrictions, a 24/7 work schedule and a timeline to repair the Boat Section in less than two months. In addition, C.C. Myers, Inc. chose the 24-hour strength option in the specification, which was quite a challenge given the requirement for 50% slag cement replacement. All parties, including government officials, the media, the public, material suppliers and contractors would need to partner together to ensure this project’s success.

The Solution

Concrete producer CEMEX worked with admixture supplier BASF to develop the rapid-setting and rapid-strength gaining concrete mixtures used for the job. To overcome the difficult design requirements for the seal slab mixture, CEMEX and BASF tested several trial batches before developing a mixture that included MasterLife SRA 20 shrinkage-reducing admixture, MasterSet DELVO hydration-controlling admixture, and MasterGlenium 7500 high-range water-reducing admixture and was mixed at CEMEX’s nearby plant. On-site, the CEMEX-BASF team added a non-chloride accelerator to make high-early-strength concrete. Concrete was placed round the clock depending on the overall project schedule. Typically, the concrete achieved compressive strength 3,630 psi (25 MPa) within 12 to 14 hours, meeting all the requirements of the Caltrans specification. More importantly, the early strength allowed C.C. Myers to open the newly-placed concrete to construction traffic so that operations could continue nonstop.

Results

CEMEX and BASF were able to develop concrete mixtures that gained strength rapidly to keep to the short timeline, in spite of the 50% slag cement replacement required by Caltrans. The concrete also met Caltrans’ strict specifications for shrinkage. With the cooperation and round the clock hard work of all parties, the I-5 project was finished on time, with as little disruption to motorists as possible. This project is an early success of California Governor Arnold Schwarzenegger’s initiative to fight global climate change by reducing the quantity of cement in concrete.

Project Facts and Benefits

- Nearly 200,000 vehicles travel though downtown Sacramento on I-5 daily
- Cost for repairs was approximately $37 million
- Caltrans installed a new electronic monitoring drainage system as part of the project to help prevent against future water-related damage.
- More than 12,000 yd^3 (9,200 m^3) of concrete placed

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:
Glenium 7500 became MasterGlenium 7500
DELVO became MasterSet DELVO
Pozzolith NC 534 became MasterSet AC 534
Rheocrete CNI became MasterLife CI 30

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