

# Quick Patch On Highway 99

## Caltrans uses fast-setting concrete to repair Highway 99 and other California freeways

By William Feldman -- California Builder and Engineer, 12/3/2007  
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Highway 99 is a heavily traveled corridor for industrial truck and commuter traffic, and one of the main highways that connects Los Angeles to Sacramento. Due to the age of the freeway and heavy vehicle traffic, many sections of this highway need repair.

### Sample Caltrans Challenge

A Kern County project on Highway 99 near Bakersfield recently required this: Remove 300 tons of concrete pavement; replace with 150 cubic yards of fresh concrete. Perform the job at night on the busy highway. Re-open by 6:00 a.m. for the morning rush hour.

#### The Past

In the 1990s, Caltrans began looking for a better and faster way to rehabilitate California's



*Above: Rapid setting concrete placement on Highway 99 ramp, Bakersfield.*

aging freeways. The answer was rapid-strength concrete, a longer-lasting and more durable solution.

In the past, Caltrans used asphalt or concrete mixes with calcium chloride for road repairs. Road repairs using both materials do not have a long lifespan and lack durability. Road repairs performed with conventional Portland cement concrete (PCC) may require seven to 10 days to reach a strength high enough to accept traffic. Caltrans requires a minimal flexural strength of 406 psi before a lane is opened to traffic.

#### The Present

Options for the Central Valley project were evaluated and critical decisions were made to find the best way to complete the work. Typical lane closures for panel replacement projects occur from 10:00 p.m. to 6:00 a.m. In some cases, the closures may be as short as five hours.

Granite Construction, the general contractor, working within Caltrans' guidelines, chose Rapid Set concrete, produced with volumetric mixers, for the solution, since it is:

- Durable and exceeding compressive strengths of 3,000 psi in one hour, it continues to gain strength and reaches 10,000 psi in one year.
- According to the manufacturer, tests on Rapid Set concrete conclude that it has double the lifespan of regular concrete (i.e. 40 years, compared to the 20 years of PCC) and five times that of asphalt alternatives.
- Able to achieve the seven-day strength requirement in five hours or less. Caltrans understands the importance of opening highways in a

timely manner for motorists. In order to ensure on-time delivery, late opening fees of up to \$1,000 per minute and performance penalties are defined in the Caltrans' project specifications.

- Removal of the worn-out concrete is done in an efficient and productive manner. A non-impact removal method is specified in order to preserve the base and subgrade. Contractors are allowed to saw cut the perimeter two days prior to the removal. Once the removal process begins, the panels are cut to a manageable size so they can easily be excavated and transported to a concrete recycling location.
- Caltrans requires mandatory Just-In-Time Training at least seven days prior to the start of the project for contractors, engineers and other personnel involved in the rapid-strength concrete pavement projects.

## Other Details

The project was completed ahead of schedule due to the hard work of Caltrans, Granite Construction and George L. Throop, the concrete producer.

Rapid strength concrete is specified by Caltrans as part of its Pavement Preservation Strategy to minimize the effects of road closures on traffic.

Over 135 Caltrans panel replacement projects have used Rapid Set Cement. In District 6 (Central Valley, including Kern, Fresno, Kings, Madera, and Tulare County), Rapid Set Cement was used on a panel replacement project near Caliente Creek Bridge. Granite Construction placed 550 cubic yards for the panel replacement. George L. Throop Company was the concrete producer for that project. Shortload Concrete and Professional Construction Services have also produced concrete on similar projects in Central California.

To ensure uniformity and accuracy, volumetric mixers are held to the same stringent standards as ready mix plants. Caltrans certifies each volumetric mixer that is used on each project in accordance with the California Test 109 Ready Mix Batch Plant Certification.

The resulting fresh concrete made possible by a volumetric mixer "meets the same scale of accuracies and same mandatory tests for strength

gain that concrete from a central batch plant would meet," said Jeff Throop, president of George L. Throop Company.

The ability to control the mix at the job site offers many benefits. In each installation, "we produce exactly what is needed," he noted. "It is absolutely fresh and there is no waste."

The volumetric trucks are loaded from a local staging yard of stockpiled materials either right on the job or within a couple of miles. "Productivity is excellent. We can do hundreds of yards with three or four machines," Throop said. In fact, he said, on occasion, over 390 cubic yards have been placed in an 8-hour lane closure.

Caltrans, a pioneer in innovative pavement rehabilitation, has provided a short- and long-term solution. Minimizing disruption to commuters by working at off-peak hours, maximizing productivity, and utilizing a fast-setting durable concrete has proven to be an extremely successful Pavement Preservation Strategy. "We are now able to perform repairs once considered unthinkable in the short time frames allotted each night," said Asghar Rezaei, P.E., resident engineer, California Department of Transportation — Construction.

### Location:

Kern County, Bakersfield, Highway 99

### Contractor:

Granite Construction  
Watsonville, Calif.  
(831) 724-1011  
[www.graniteconstruction.com](http://www.graniteconstruction.com)

### Concrete Producer:

George L. Throop Company  
Pasadena, Calif.  
(800) 796-0285  
[www.throop.com](http://www.throop.com)

### Rapid Set Cement:

CTS Cement Manufacturing Corporation  
Cypress, Calif.  
(800) 929-3030  
[www.ctscement.com](http://www.ctscement.com)