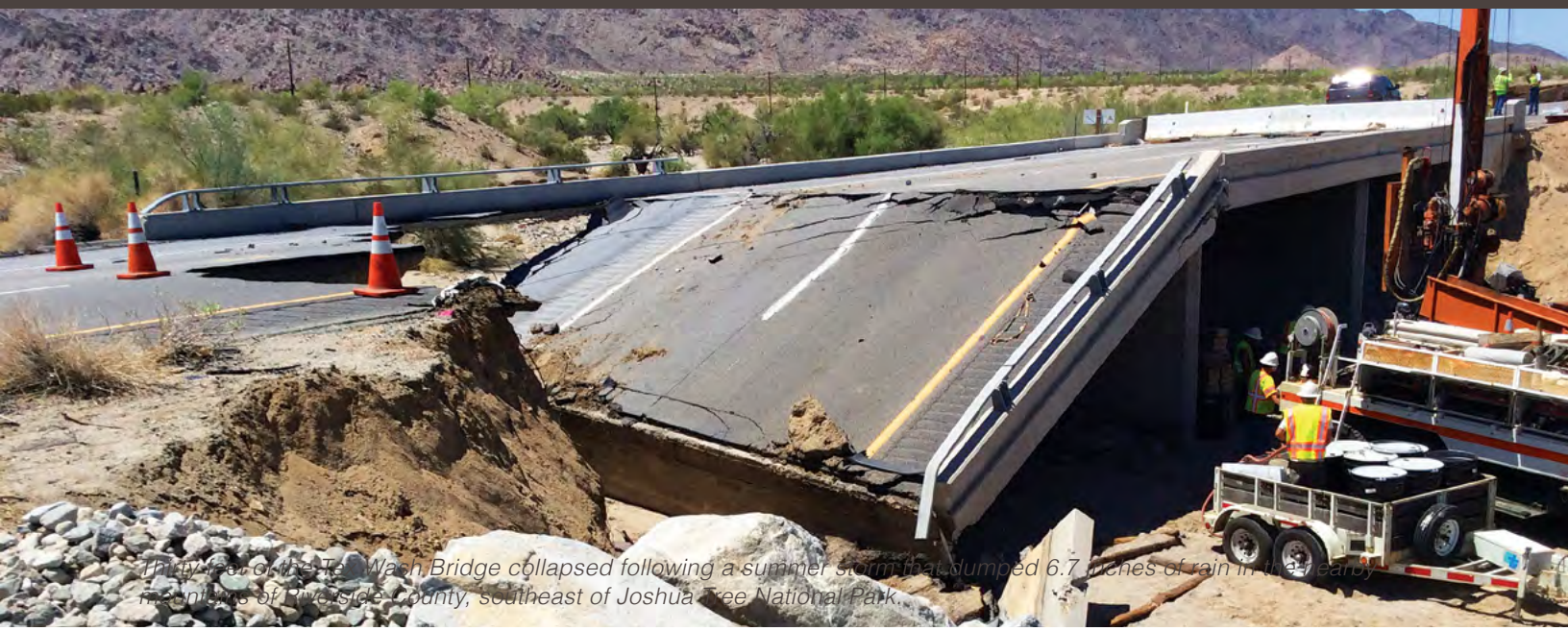
Rapid Response

Caltrans Rebuilds I-10 Bridge after 1,000-Year flood



Thirty feet of the Tex Wash Bridge collapsed following a summer storm that dumped 6.7 inches of rain in the nearby mountains of Riverside County, southeast of Joshua Tree National Park.

Few who traveled Interstate 10 between Riverside and Phoenix could have distinguished the Tex Wash Bridge from the dozens of other nondescript 1960s-era spans over dry creek beds in the parched desert.

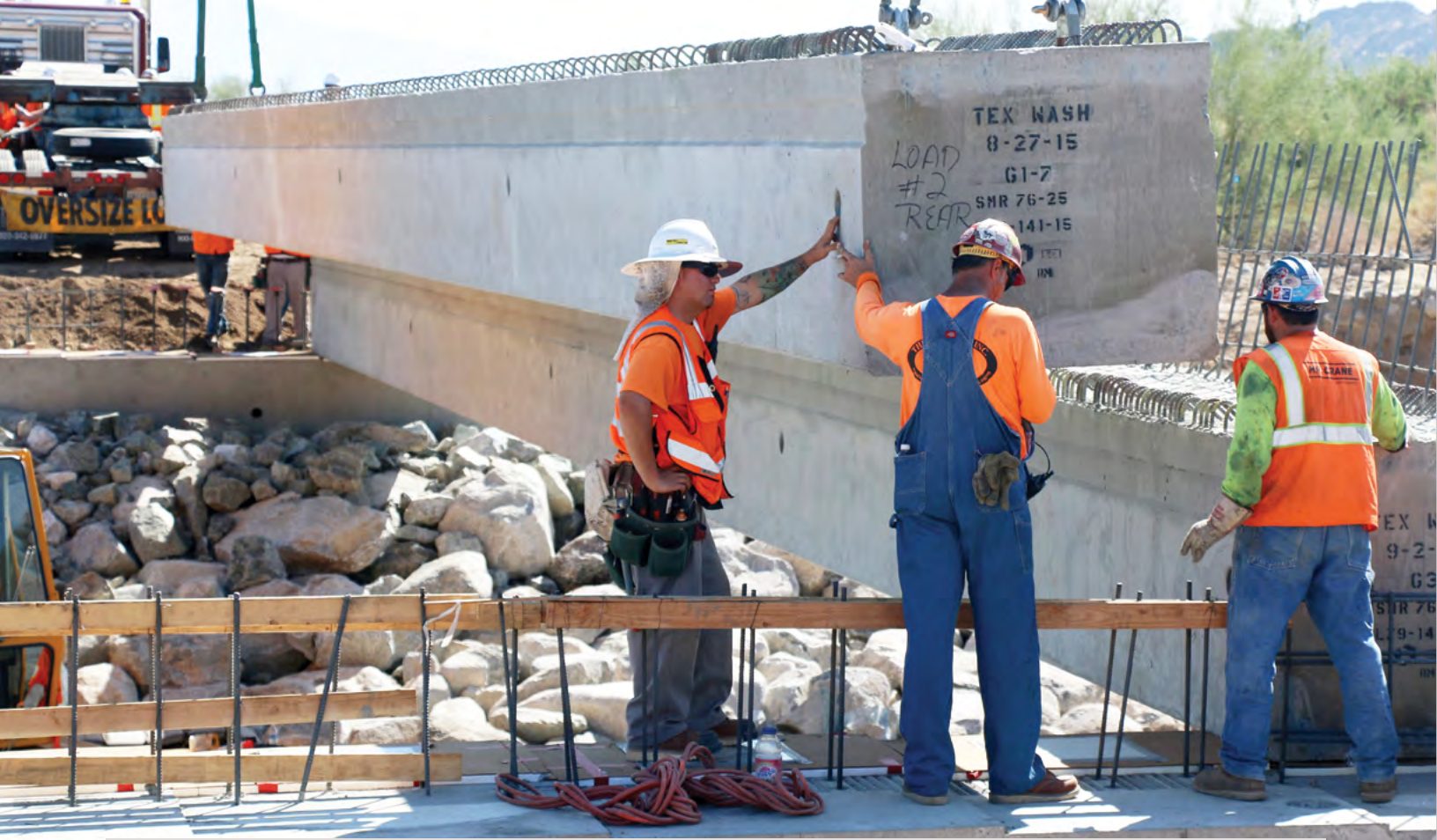
But that was before 6.7 inches of rain fell on the Chuckwalla Mountains on July 19, 2015, in what the National Weather Service deemed a 1,000-year flood. A massive torrent gushed off the mountains sweeping away the bridge's embankment and foundation, collapsing the eastbound lanes, injuring a motorist and dramatically undermining the two-lane span on the westbound side of the parallel bridge.

Suddenly, the crucial corridor linking California and Arizona was closed. Caltrans diverted traffic between State Route 177 and SR-86 as engineers assessed the damage and surveyed the 58 other bridges within 30 miles. Delay was not an option. I-10 is one of Southern California's most important east-west arteries, carrying billions of dollars' worth of tourism and commerce. Approximately 27,000 cars and trucks cross that bridge daily.

The bridge, or more precisely 30 feet of it, came down on a Sunday. The following Friday, the interstate was opened again. Of course, the fallen structure had not yet been replaced. Instead, crews reinforced the still-standing westbound side of and built a temporary crossover lane in the median for eastbound traffic.

As internet users watched on a live stream from the site, crews placed 1,400 truckloads of fill dirt and laid down 2,500 tons of asphalt to create the temporary detour and get traffic moving again.

The big question at that point was whether to rehabilitate the old eastbound bridge or to tear it down



Workers guide one of 10 girders, each weighing 55 tons, during construction of the new Tex Wash Bridge.

completely and reconstruct it. Plans for both choices were being drawn up simultaneously. In the end, it was decided that a rehabilitation would have left them with a 50-year-old bridge that would still be susceptible to collapse in case of similar floods (while statistically improbable, 1,000-year floods could happen at any time).

At that time, John Bulinski had not yet been appointed director of District 8. He was acting in that capacity until the director made a permanent selection. This project "was part of my interview," he joked recently, almost a year after receiving his appointment.

Though ultimately responsible for the project, Bulinski had many partners. Caltrans staff, contractors and other stakeholders all had roles in building the new bridge. The Federal Highway Administration, Riverside County and several other federal, state and local agencies helped obtain necessary clearances before construction could begin. Caltrans also worked with the California Department of Fish and Wildlife to address concerns about the desert tortoises living in the area. Even Arizona officials were "heavily involved," helping out with alerting truckers on their way to California to the various detours initially required on the California side.

Granite Construction Co., based in Watsonville, was hired as lead contractor the day after the collapse under time-saving emergency contracting procedures. Granite was paid for time and materials without added bonuses. Getting the westbound bridge open and demolishing the eastbound bridge, cost $5 million. An additional $6 million was needed to rebuild the eastbound bridge.

The new bridge has a much deeper foundation than the 1967 original. Engineers included piles 48 inches in diameter extending 52 feet below ground for the footing. The existing westbound bridge received two 48-inch supports extending 23 feet deep.

Engineers also redesigned the eastbound bridge to current standards, using one span. Using Accelerated Bridge Construction methods — meaning building many portions offsite to reduce time and minimize road closures and traffic disruptions — 10 girders, each weighing 55 tons, were built offsite by Oldcastle Precast, 130 miles away in Perris, south of Riverside. Likewise, the abutments, made up of 240 cubic yards of concrete, were also made in Perris.

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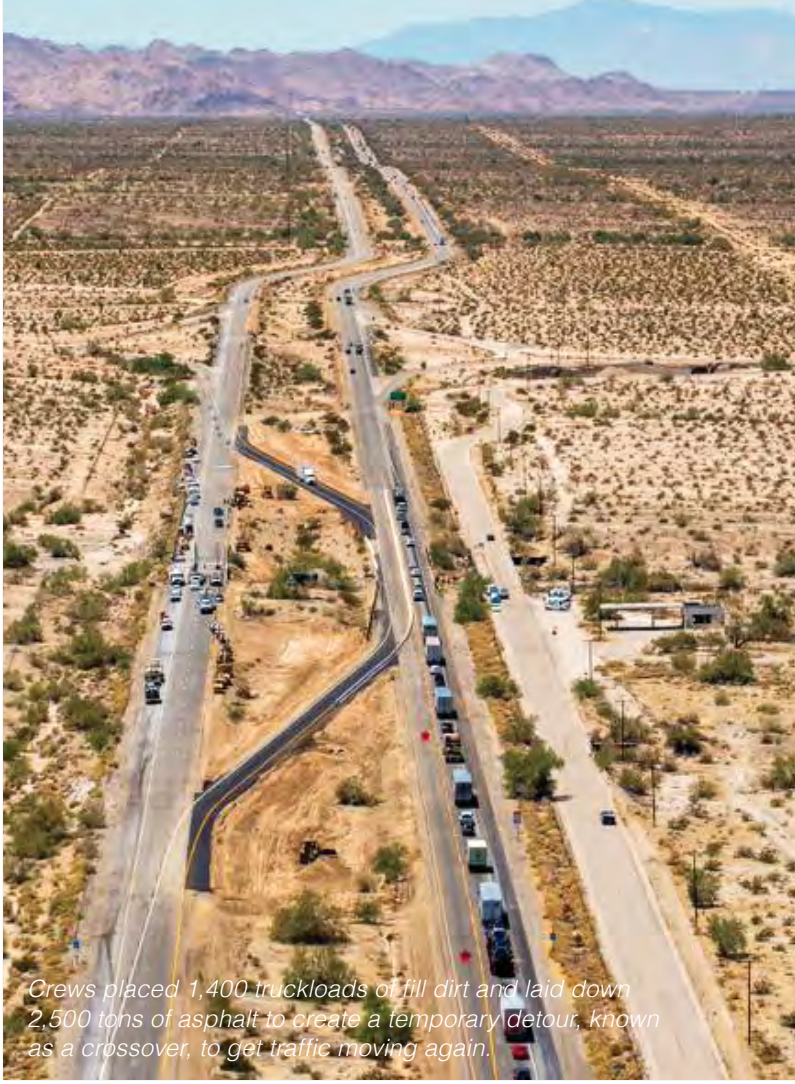
By eliminating the need for formwork, this process likely shaved a month off the construction time, Bulinski said.

Less than two months after the collapse, Interstate 10 was fully back in business. And should another 1,000-year flood occur there, Bulinski said the chance of another bridge collapse is "doubly, extremely unlikely." MM

Source: *District 8 Director John Bulinski, Information Officer Tyeisha Prunty*

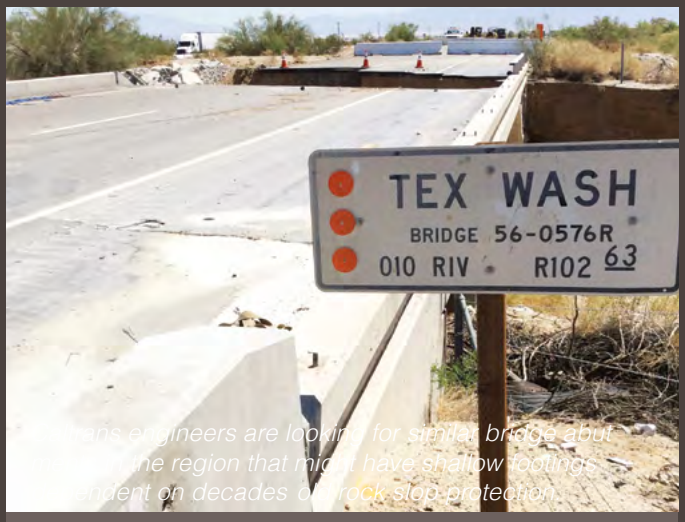


Crews placed 1,400 truckloads of fill dirt and laid down 2,500 tons of asphalt to create a temporary detour, known as a crossover, to get traffic moving again.

Caltrans Identifying Bridges with Similar Designs

With the ground still soggy from the deluge, specially trained Caltrans engineers pored over the collapsed Tex-Wash Bridge to learn precisely why it succumbed to the freak flash flood. Interstate 10 has dozens of similar bridges, any of which could one day be subjected to a so-called 1,000-year storm.

Members of the Structures Maintenance and Investigations Hydraulics team reviewed plans for those other bridges. They looked for abutment designs similar to Tex Wash, shallow footings dependent on decades-old rock slope protection. About 70 were deemed vulnerable, so the team recommended replacing the old rock slopes with new and better ones that feature not only larger material, but meshing to hold the supporting soil in place. Additional advanced hydraulic modeling is planned for some of these structures to determine if some of the piers may need added protection as well. Caltrans is conducting a similar analysis to identify bridges along I-40 that have vulnerable abutments.



Caltrans engineers are looking for similar bridges about the region that might have shallow footings dependent on decades old rock slop protection.