The New York Times

"All the News That's Fit to Print" WEDNESDAY, APRIL 18, 2012 Reprinted With Permission

Did Someone Order An Instant Bridge?

By JOHN SCHWARTZ

BOSTON — The River Street Bridge here is normally unremarkable, the kind of structure people drive over every day without a thought. When it fell into disrepair, state officials knew that replacing it would normally involve two years of detours and frustration for local drivers.

Instead, they did it over a weekend.

By using "accelerated bridge construction" techniques, a collection of technologies and methods that can shave months if not years off the process of building and replacing critical infrastructure, Massachusetts is at the forefront of a national effort that is aimed at putting drivers first.

"This will be the new normal," said Victor M. Mendez, the head of the Federal Highway Administration.

Quick replacement of bridges, however, is anything but intuitive, he said. "If you haven't seen it, it seems kind of odd that you'll pick up a bridge and slide it into place," he said.

As the sun climbed into the sky on Sunday, the new River Street Bridge, 400 tons of steel and concrete, rode on a set of trailers and high supports that adjust to keep the span as level as a tray of drinks balanced on a waiter's hand.

Jaiden Rivera, 7, watched the operation from the other side of a chain-link fence with his grandfather, Eddie Anderson. Mr. Anderson invited his five grandchildren to sleep over so they could be there to watch a bridge moved and slipped onto its abutments like the world's biggest Lego block.

"It's awesome!" Jaiden said.

Get a bridge replaced in days, not years, and "there's 'wow,' " said Theodore Zoli, national bridge chief engineer for HNTB Corporation, who has received a MacArthur "genius" grant for his innovative work on bridge construction.

Nowhere have the various techniques for speeding bridge work been more enthusiastically embraced than in Massachusetts, which replaced 14 bridges on Interstate 93 last year over 10 weekends. But similar techniques are being used around the country, from Mesquite, Nev., to the Golden Gate Bridge in San Francisco, which is getting 300 feet of new roadway one 25-foot prefabricated section at a time, 78 pieces in all. "We have a bridge that we simply cannot close to traffic," said Ewa Bauer, chief engineer for the Golden Gate Bridge Highway

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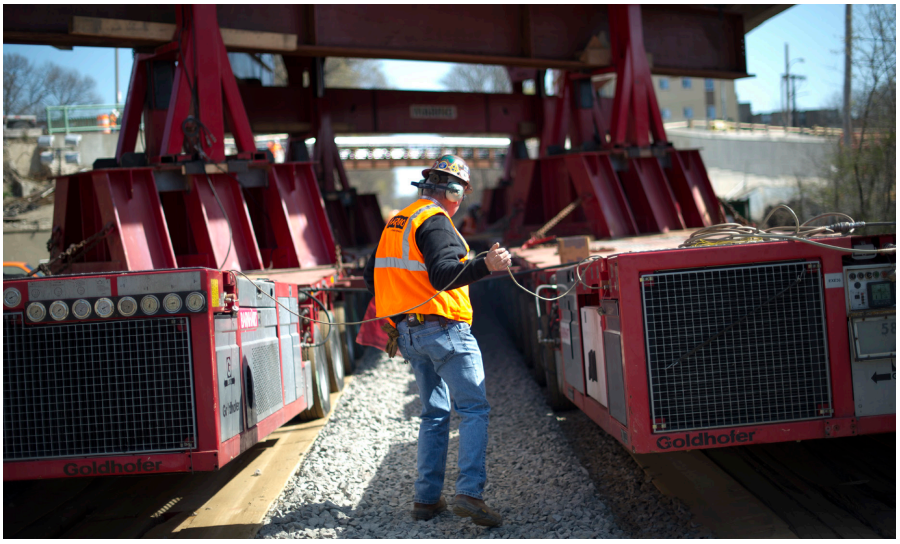
Brendan Marino, a rigger, checked the position of the replacement bridge as it was in the final few inches of its journey.



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Ed Stuczko used a controller to operate the heavy haul transporter that carried the replacement span.

and Transportation District.

Prefabrication techniques allow Ms. Bauer's crews to close individual lanes instead of shutting down the bridge. Since February, they have torn out and installed one length of deck each night, and they have already completed a third of the task, she said.

None of the techniques is quite as eye-popping as "heavy lift" — when a hunk of bridge is simply picked up and put into place.

Time and the elements had not been kind to the steel and concrete of the old River Street Bridge, which stretches over railroad tracks used by freight and commuter trains. The bridge also needed raising — an additional 18 inches would allow double-decker commuter trains to pass underneath.

So the Massachusetts Department of Transportation got to work.

It had upgraded its own inspection and replacement processes after the August 2007 collapse of an Interstate bridge in Minneapolis, said Richard A. Davey, the Massachusetts secretary of transportation. It put its focus on rapid replacement, which tends to cost the same as slower approaches, if not less.

"The highway department didn't use to see the drivers as customers," said Frank DePaola, administrator of the highway division for the department. "For a while there, the highway department was so focused on construction and road projects, it's almost as if the contractors became their customers."

One local resident who is happy about the quick work is Gov. Deval Patrick. "It's their money, after all," he said. "And it's their broken bridge."

At River Street, workers started on the project last year, and began building the new superstructure on an adjacent lot in recent months. On Friday, the department shut down the rail line, leveled the track area with gravel and covered the tracks with sheets of plywood and steel to accommodate the trailers. On Friday night, heavy machinery tore out the old bridge, and on Saturday workers installed precast concrete caps on the old bridge abutments, shaped to accept the new, higher superstructure.

The trailers are known as self-propelled modular transporters, but the workers here call them by the name of the company that makes them: Goldhofer. Gravel made a popping noise as it shifted under the tires, and the sweetish smell of diesel fumes filled the air.

Ed Stuczko stood in front of the trailers, operating them with a big yellow controller and using a team of spotters to help make sure that everything was lining up correctly. The controller was strapped to him with a harness, and had joysticks, buttons and readouts. He played it like a virtuoso. "My son says, 'I got Xbox,' " he says. "I got Goldhofer."

He stopped every few feet, checked, communicated with the team. Fiddled with the controls. More motion. It was a gradual thing.

The level and alignment do not require the kind of fancy laser plumb bobs and rangefinders that fill engineering catalogs. Mr. Stuczko, who also helped repair the Lake Pontchartrain bridge after Hurricane Katrina, pointed at the underside of one of the massive girders holding the bridge, where one of several magnetized bubble levels had been slapped up. Old technology and good eyes keep things straight and true.

"The bubble is perfect for us," he said.

As the trailers conveyed the span over the substructure, riggers were watching the progress, calling out alignment into the walkie-talkies. "You want to come over one inch," said Brendan Marino, and the bridge shifted, almost imperceptibly to the right.

No one was looking at it more closely than Luigi Gioioso, one of five brothers whose family founded the P. Gioioso & Sons construction company 50 years ago. The company is the prime contractor on the job. He is 78 and walks with a cane; he was the only person on the site not wearing a hard hat, and no one told him to put one on.

He eyeballed the advancing bridge and said to his nephew, "It's not going to fit."

He had noticed that the girders supporting the superstructure were sticking out too far and would bump a utility bridge built to channel the water, gas and fiber-optic lines.

It was not a disaster, just a delay. The workaround took another hour or so, but was easily accomplished: the bridge was laid gently on the abutments about two feet from its final position, and then the supporting girders lowered, moved back and raised again for the final bridge heave, the lip of the superstructure sliding down over the outside edge of the abutment like a lid fitting onto a box.

By 2:05 Sunday afternoon, everything was in place — and by the next night, traffic had begun to cross the new span.

A reporter asked how the new bridge would be secured to the old substructure.

"It's 400 tons," said Walter Heller, a district highway director from Massachusetts Department of Transportation, one of the officials who came to watch the show. "Nobody's going to pick it up and take it home."