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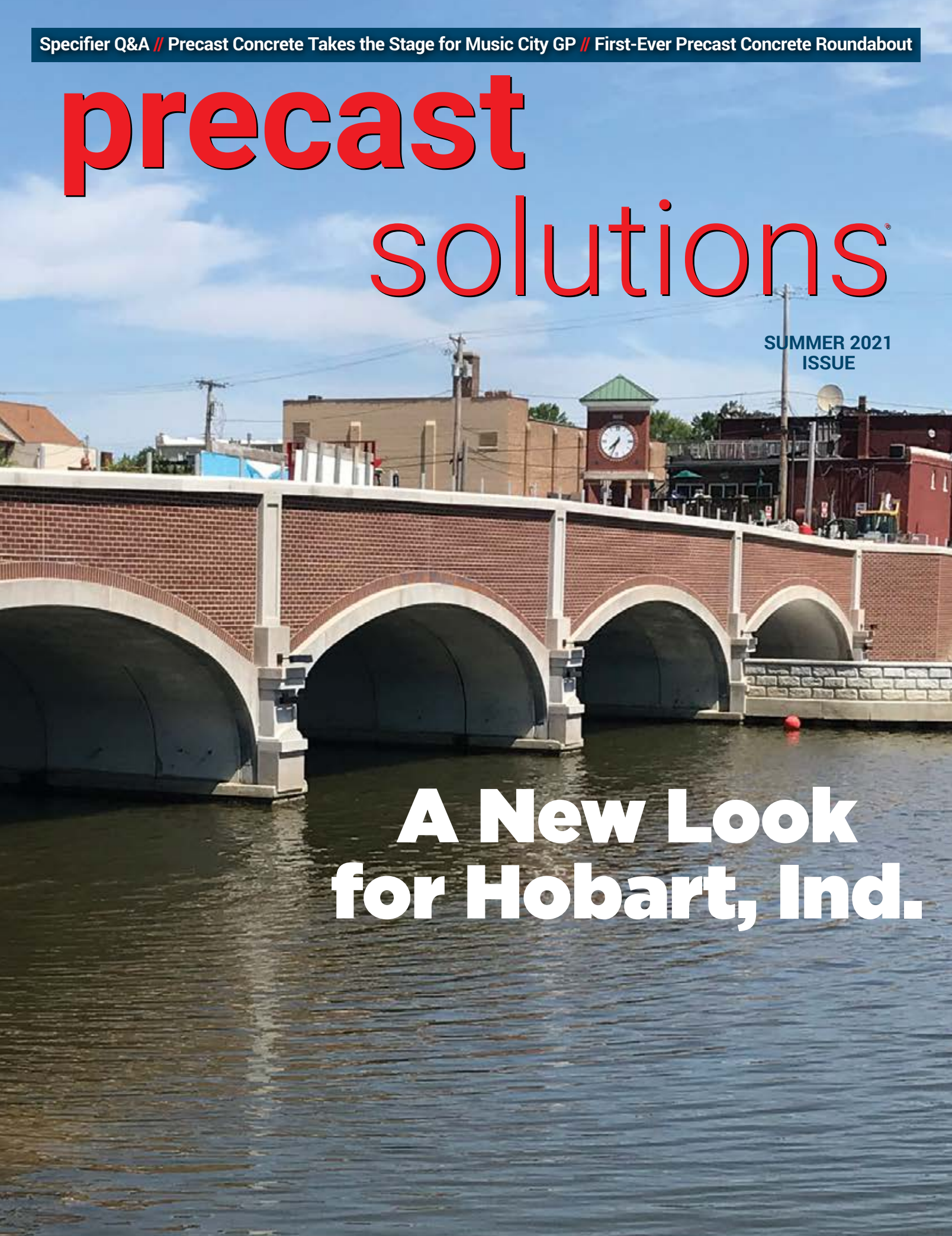

A New Look for Hobart, Ind.

WHAT'S INSIDE

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ON THE COVER:
The Third Street Bridge in Hobart, Ind., is the first of three projects that will reshape drainage and bring new life to the downtown.

Image courtesy of County Materials Corp.

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First of its Kind

The Virginia Department of Transportation partners with The Fort Miller Co. to install the first-ever precast concrete roundabout in the United States.

By Mason Nichols
Photos courtesy of The Fort Miller Co.

New York-based The Fort Miller Co. worked with the Virginia Department of Transportation to design and install the first-ever precast concrete roundabout in the United States.

From floating docks to basement foundations, building envelopes and beyond, precast concrete is cemented as the ultimate building material.

Throughout the precast industry's history, innovative approaches to product development, engineering and production have sparked countless unique projects.

And because the industry's manufacturers remain nimble – always thinking of what's next – there's never a shortage of fresh ideas to fuel the search for solutions that are durable, resilient and capable of adapting to seemingly any situation.

Take the Virginia Department of Transportation for example. In 2020, VDOT partnered with New York-based The Fort Miller Co. to design and install the first-ever precast concrete roundabout in the United States.

NEED FOR SPEED

Roundabouts provide a slew of benefits for drivers, including increased traffic flow, improved safety and enhanced aesthetics. The yield-controlled design means fewer stops, resulting in shorter queues and reduced delays. Additionally, because vehicles travel at slower speeds through roundabouts, collisions that do occur tend to be less severe.

As a result, many state departments of transportation are converting traditional intersections to roundabouts. And in most of these cases, DOTs are seeking long-term solutions that can be quickly installed, limiting the impact to the traveling public.

According to Tommy Schinkel, P.E., Richmond District materials engineer for VDOT, installation speed was crucial to his agency's project at the intersection of Laburnum Avenue and the I-195 south off-ramp in Richmond, Va.

"A big part of this project was that we had to have it built quickly," he said. "There's a railroad facility located right at this intersection, so we couldn't have it closed for long periods of time."

To meet this demand, Schinkel and his team turned to precast concrete paving slabs. While precast concrete paving slabs have been used on a wide variety of jobs over the past few decades, they recently have experienced significant growth throughout the United States and Canada because of myriad benefits. Precast paving slabs are produced off-site in a controlled manufacturing environment, meaning they can be delivered to the project site ready to be installed, perfectly fitting the need for an extremely tight construction site and timeline.

AN EXPERIENCED PARTNER

With a building material selected, VDOT needed a partner that not only could produce the precast panels but also handle the intricate engineering associated with the roundabout's design, which called for 23 panels with complex geometry to create the truck apron portion of the roundabout. VDOT officials selected Fort Miller, a long-time producer member and contributor to the National Precast Concrete Association's Manual for Jointed Precast Concrete Pavement.[1]

"We've been manufacturing precast concrete pavement since 2001," said Mike Quaid, senior project manager for Fort Miller. "In that time span, we've completed approximately 150 jobs. On each and every one of them, we've learned a little trick or picked up something new."

Quaid said the Fort Miller team was confident in its ability to devise a solution that would meet the project's needs. Still, the group – which consisted of VDOT, Fort Miller and the general contractor – participated in a "trial fit" ahead of the in-field installation. The trial fit was held at Fort Miller's manufacturing facility in Greenwich, N.Y., and livestreamed so that all project teams could participate.

"We had a short time frame in the roadway, so we wanted to make sure that all the pieces fit together properly and that the contractor knew what was happening," Schinkel said. "We didn't want to get into the field and discover we had a flaw that would keep the area closed longer than anticipated."

Fort Miller walked through the steps necessary to install the panels in the field. Each of the project partners could ask questions and collaborate as the trial run proceeded.

"Going this route made sense because of the complicated geometry," Quaid said. "The process gave everyone that extra level of comfort to see all the pieces fit together beforehand."

MAKING IT HAPPEN

After the trial run, Fort Miller prepared the precast panels for shipment from New York to Virginia. Most of the slabs were trapezoidal, weighing 6-7 tons each and ranging from 8- to-10-feet wide by 12-to-16-feet long. The panels boasted a special stamped brick pattern and integral pigmentation.

While the driving force behind these features was aesthetics, Shabbir Hossain, P.E., associate principal research scientist for the Virginia Transportation Research Council division of VDOT, said that the brick appearance also deters the traveling public from driving on top of the roundabout's apron, which is meant only for semis.

With the panels on-site, the contractor got to work with the first step in the installation process – milling the existing pavement. According to Quaid, this presented more difficulty than initially anticipated because of the existing pavement's cross-section. The existing pavement consisted of a crowned road, and the roundabout was designed to be a flat plain. As a result, milling had to go 2 inches deep into the existing pavement on the edges and up to about 6 inches deep at the crown.

"Getting this part right is all about experience, touch and finesse," Quaid said. "Grade control is imperative in these situations. This project was milled on a Friday night, but there were high spots, so the team had to come back and re-mill."

Once the team navigated through the milling process, the rest of the installation was a breeze. Thanks in part to the trial run that took place ahead of time, crews installed all 23 panels in just a few days, with the roundabout opening up for use at the conclusion of the weekend. Schinkel said that because the project took place in December under cold weather conditions, the use of precast was paramount in getting things done quickly.

"We wouldn't have been able to pour the concrete out in the field with the temperatures where they were at," he said. "Going this route allowed us to close the intersection for just one weekend instead of having our normal process of closing it four or more times to do different quadrants of building the concrete."

Using cast-in-place concrete would have required multiple closures and several months to complete the job.

READY FOR THE FUTURE

Shiraz Tayabji, president of Advanced Concrete Pavement Consultancy, observed the roundabout project on behalf of the Federal Highway Administration. In addition to the quick installation and the long-term resiliency of the precast panels, he noted another important aspect of the work.

"With good specifications and plans, any contractor – even those who haven't done previous precast work – can successfully construct something just like this," he said.

Schinkel agreed, adding that with a successful proof of concept in place, VDOT hopes to expand on its use of precast concrete pavement for similar projects in the future. "Now that we've gotten through the learning curve and we fully understand how timely and cost-effective going this route can be, this is something we want to repeat throughout the state." PS

Mason Nichols is a Grand Rapids, Mich.-based writer and editor who has covered the precast concrete industry since 2013.

Endnotes

[1]https://precast.org/jprcp-manual/