

Need a bridge fast? Local Company, PennStress, Has the Answer

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For the Herald

How many drivers in the Cove ever give a second thought to the roads and bridges on which they're bustling back and forth? They assume the roads and bridges are safe, because most are.

Over time, however, every surface deteriorates. Potholes spring up like dandelions and turn into moon-like craters. Rough road surfaces and resulting road construction yield more major driving irritations.

But to many drivers the worst nightmare is when a bridge is out, closed by water damage, age, or some other act of Nature. How long will the detour take, they wonder, as they're forced to take a new route? How long will repairs on the bridge take?

One local company, PennStress, builds solutions to the bridge dilemma. It is located a stone's throw from New Enterprise Stone and Lime's quarry in Roaring Spring.

Founded in late 2014, the now-independent company began its life as the Newcrete division of NESL back in the early 1950s. It now employs about 100 people who work to give bridges and other structures new life.

If you drive to Duncansville, Altoona, or even Roaring Spring from Martinsburg, you'll cross over or under some sort of bridge. Some are short, spanning narrow creeks or drainage zones. Other long ones span multiple roadways below or overhead.

The needs of every bridge are the same: economical, built with quality and dependable, with a stable surface that will last for years. And when replaced, one that won't require major replacement expense or time for installation to minimize driver frustration and time in the field.

Until relatively recently those orders were tough to fill. But the total precast bridge system is becoming more accepted as a project delivery system.

Finished Products

Instead of transporting all the raw materials to a

site to build or reconstruct a bridge and leave construction open to all the vagaries of weather, PennStress transports finished bridge sections for assembly at the site.

The company fabricates total precast finished sections for bridges and all sorts of other large structures. The sections – footings, walls, beams, wing walls, moment slabs (they're the bridge approach slabs onto which cars drive), decks – almost resemble gigantic Tinker Toys or Legos.

Except that the "toys" can span up to 172 feet long, 8 feet tall, and weigh in at around 115 tons. Not toys at all, of course, these precast products are helping improve Pennsylvania's aging and deteriorating bridge and road infrastructure, among other projects.

"When you're talking about bridges, it's almost always a question of achieving best quality while saving time and money," Greg Gorman, the company's senior vice president and chief operating officer, said. Gorman joined Newcrete in 2000 and has been with the companies ever since. Gorman was referring to the bridges given new life by the precast products.

Six Bridges

Consider the six precast bridges crossing over I-78 in Berks County. PennStress made these massive bridge structures at its facility here and transported them to the site. Total roadway close-to-open time was only 30 days for the first of the fully functional overhead bridges.

Closer to home, the company fabricated and delivered the pedestrian bridge at DelGrosso's Amusement Park in Tipton. While time wasn't a major requirement, delivering a cost-effective and good-looking product was.

"We were really proud that the DelGrosso project turned out as well as it did," Gorman said. "It's really a beautiful bridge that adds to its environment."

When it comes to making these massive structures, the process begins with careful analysis of site needs. In the past, that analysis was limited to

seemingly endless complex, two-dimensional drawings.

"But it was often difficult to see how everything fit together," Gorman said. Plus, there were the challenges of making sure all the hidden interlocking pieces came together properly."

A local engineer, Derek Diebert, attacked the hidden interlocking piece challenge with modern technology – plus his own special interests. Time away from the company often finds Diebert in his home shop where he enjoys carpentry and wood projects.

Like other hobbyists, he had become fascinated by the capabilities of the programmable cutting machines. These machines can, with high precision, pare and slice blocks of wood or plastic to almost any shape.

Hidden Pieces

New 3-D modeling and printing (BIM, building information modeling) and CAD (computer-aided design) technology have now made seeing how the previously hidden pieces and parts can fit together. This can dramatically reduce errors and costly in-field adjustments.

Building a precast section itself starts with laying out and pre-stressing (putting the steel strands under a load) as many as 100, half-inch wire strands to 30,000 lbs. per square inch of tension each.

A hundred wires at 30,000 pounds stress, gives 3 million pounds of tension. Released when the forms are finally removed, these tensioned wires will exert a tremendous force up, counterbalancing the downward load of the concrete structure.

Next, the many miles of rebar rods are placed, laced and welded together into complex mazes according to the engineering requirements.

Once done, the concrete forms are set up, surrounding the rebar and tensioned strands. Following the setting of the forms, workers pour hundreds of cubic yards of concrete, much like any other concrete casting operation.

After concrete sets and cures several days later, the forms are removed. Fi-



The pedestrian bridge at DelGrosso's Amusement Park, Tipton, was installed by PennStress.

[Photo by Doug McLaughlin]



A PennStress I-beam is ready to leave the yard at the East Freedom manufacturing site.

[Photo by Doug McLaughlin]

nally, the tensioned strands are cut and the beam is released.

"When the strands are cut loose, a beam can actually arch upwards -- it's called camber -- by as much as an inch and a half," Gorman said.

This process – engineering, using CAD and BIM, fabricating the structures themselves – happens over and over until the required pieces are ready.

Then specially-equipped trucks transport the sections from the East Freedom yard to the site where cranes lift and set the sections into place. The result is bridges that appear or replace older structures in fractions of the time of a site-built one.

Cove and Beyond

In addition to building bridges, the Cove-based

company uses this same technology in building other structures. Its corporate predecessors used similar technology in constructing the huge Eagle's stadium in Philadelphia, for example.

Like Philadelphia, other municipalities and private companies everywhere are constantly looking for ways to save money. Precast structures have helped shave taxpayer dollars off parking garages, prisons, airports, and other large structures.

Simple as pre-cast concrete structures seem, there is considerable engineering and fabrication expertise in making them. That expertise, plus careful attention to detail, give the company's products the ability to stand the test of time.

"We strive for excellence

in whatever we build," James Van Buren, the company's president and chief executive officer from the Hollidaysburg headquarters offices, said.

"When your products are going to be around for at least 100 years, they have to be designed well and made well," he said. "We're thankful for the dedicated, hard working, PennStress team of employees who contribute greatly to our daily successes."

Whatever the project, wherever it will eventually end up, the Cove-based company's precast concrete products will meet or exceed the standards to which they are constantly measured. Which means they'll be helping to save money – and reduce driver irritation – for a long, long time.