

Northampton County Township Is First in State to Use Roller-Compacted Concrete

BY BRENDA WILT / ASSOCIATE EDITOR

Like many townships, Upper Nazareth Township in Northampton County has a lot of roads that need to be fixed and no budget to repair them all.

This past summer, however, after discussions with its engineering firm, Keystone Consulting Engineers, the township came to the conclusion that it had to reconstruct a 420-foot section of road.

“The road was so cracked, it looked like a dried creek bed,” says Sean Dooley, a project manager with Keystone.

After rejecting several repair methods, including cold-in-place recycling, full-depth reclamation, and full-depth reconstruction using conventional blacktop, the township finally found what it was looking for: an affordable option, Dooley says.

“Our research led us to roller-compacted concrete, or RCC, because it had been in the various national trade publications,” he says. “We found that RCC has been used in the Lehigh Valley by private owners for warehouse facilities and service yards subject to heavy loads.”

The material, which has been used for many years in other states but is just making inroads into Pennsylvania, is just what the name implies: concrete that is placed and rolled like blacktop, rather than troweled like a traditional concrete highway.

Keystone projected that the concrete could save the township 15 to 20 percent on the initial cost compared to conventional pavement. It didn't take much convincing to get the township supervisors on board with the idea.



Upper Nazareth Township in Northampton County served as a test site for roller-compacted concrete, a low-cost paving option. The material was applied to a 420-foot section of road that has been in use for about two months. “It looks as good as the day we finished it,” an official says. “We’ve had absolutely no complaints.” (Photo courtesy of Sean Dooley, Keystone Consulting Engineers.)

“We work very closely with Keystone,” Upper Nazareth supervisor Jim Augustine says. “When they approached us with the idea, they had enough information about its use in limited applications to convince us that it would be a good fit for our road program. This was a way we could do the project for less money and get the same or better result as blacktop.”

‘No complaints’

Although RCC can be applied with the same equipment as traditional pavement, there is a learning curve involved. Consequently, the bid specifications for the Upper Nazareth Township project required a third-party RCC supervisor to be onsite

during the paving. Northampton County-based Livengood Excavators, Inc., which has experience with RCC, placed the concrete.

Dooley says RCC is not as forgiving as blacktop so there is a tight window for working with it.

“As soon as it hits the paver, you have about 20 minutes to get it down and rolled,” he says. “Then you have another 20 minutes to get it sealed in some way.”

After placing the 6-inch layer of concrete over a 3-inch stone subbase, the paving crew applied a standard tack coat to seal it. An hour or two later, they made saw cuts in the concrete to create 14-foot by 18-foot panels to allow for expansion. Then the

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crew applied another tack coat.

Because RCC is rolled, rather than troweled, it does not have the smooth appearance or feel of traditional concrete. Therefore, the township decided to add a 1½-inch layer of blacktop to finish the surface and make it blend smoothly with the rest of the road. The blacktop could have been put down right after the second tack coat, but Keystone decided to wait a few days to allow the concrete to cure completely.

“Because Keystone is considering it a pilot project, we wanted to let it go for several days to optimize the strength,” Dooley says.

The crew put down the RCC on a Thursday and applied the pavement overlay the following Tuesday, he says. The road was opened to traffic later that day.

When the *News* went to press, the road had been in use for about two months. “It looks as good as the day we finished it,” Dooley says. “We’ve

had absolutely no complaints.”

Augustine says that although he hasn’t received any feedback from the public, he hasn’t heard any negative comments either. So far, the material seems to be living up to its reputation.

“We fully anticipate that this will be a long-term solution to the issues with this road,” he says.

After two months, the blacktop overlay hadn’t exhibited any signs of reflective cracking, which might be expected with the saw joints underneath. When it does inevitably crack, as all blacktop roads do within three to five years, the cracks should be straight, predictable crevasses in line with the joints in the concrete. Thus, they can be easily routed and sealed, Dooley says.

The savings add up

Using RCC instead of conventional pavement ended up saving the township 30 percent in the initial cost. The savings were due to several factors, Dooley says:

- The overall pavement depth is 10½ inches, compared to the 16½ inches

it would have been with traditional asphalt pavement. This reduces the amount of excavation, the number of truck trips to remove and dispose of waste material, and the amount of new material and corresponding trucks needed to transport it.

- Concrete is currently about \$40 per ton, compared to \$60 per ton for blacktop.

- The installed cost for the RCC on this project was \$39 per square yard, compared to \$55 to \$64 per square yard for equivalent asphalt pavement. The overall cost was \$70,000, as opposed to \$99,000 to \$116,000 for 1,728 square yards.

RCC is not yet a PennDOT-approved product, although the department is developing specifications for its use. Consequently, Upper Nazareth Township could not use liquid fuels funds for the concrete but was able to use them for everything else on the project.

A cost-effective alternative

With many townships — and the commonwealth — watching their roads



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deteriorate because they don't have the funds to repair or replace them, roller-compacted concrete offers a cost-effective alternative, Dooley says.

"This is so much cheaper, and we have such a deficit statewide to keep up with our infrastructure that this material has to be part of the solution in the future," he says.

Ken Crank of the Pennsylvania Aggregates and Concrete Association says that RCC has quite a bit of potential given the volatile economic status of liquid asphalt.

"When you start looking at trends in the industry, things seem to be conspiring to affect the supply of low-grade oil for asphalt," he says. "That works to concrete's advantage. RCC is a very durable, cost-effective alternative."

PACA has been working with PennDOT to develop a specification for RCC, with the goal of getting it into the department's *Publication 408, Highway Specifications*.

"Things are moving in a positive direction," Crank says. "About two years ago, PennDOT placed an RCC shoulder on a road in District 11 as a test project. The department is watching that closely and will look at the project in Upper Nazareth as it moves forward with a draft specification."

Marcy Lucas, a research project manager in PennDOT's New Products and Innovations Section, is leading the drive to get RCC approved. She anticipates that a final specification for its use will come sometime in 2014.

One of the challenges with RCC is that currently, there are few pavement companies using it.

"Anything that's new has a learning curve," Crank says. "As opportunities grow and more people use it, the number of vendors who have worked with it will expand."

In the Lehigh Valley, where several RCC projects have been done, several contractors are familiar with the product. A large RCC project was taking place in Greencastle, Franklin County, for Norfolk Southern Railroad when the *News* went to press. This month, PACA is conducting a Concrete Operations seminar devoted to RCC for ready-mix concrete producer members of the association.

"The industry is starting to recognize that there are more opportunities out there," Crank says. "We're excited, from an organizational standpoint, that the word is getting out."

Although Upper Nazareth Township does not have any plans to use RCC in the foreseeable future, concentrating instead on surface treatments to save as many road miles as possible, Dooley says the township wants to tell people about RCC so others can consider it.

"We hope people will take the time to learn about it," he says. "As a taxpayer, I want to make sure we have as many tools as possible to address our infrastructure problems."

"I would encourage other townships to look into roller-compacted concrete to see if it would suit their needs," township supervisor Jim Augustine says. "Everyone is trying to do more with less. Hopefully, this is something other townships can use to save money when addressing their road repair issues." ♦

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