

Out of Round

A custom-built elliptical packer enables a New Jersey borough to keep its street reconstruction program on schedule

By **Scottie Dayton**

Depressions at regular intervals were one reason the Streets and Roads Department in the borough of Carteret, N.J., was reconstructing Carteret Avenue.

Donald Norbut, P.E., municipal engineer of record from T&M Associates in Middletown, N.J., believed the reinforced concrete storm sewer under the road had defective joints, allowing sediment to enter and the asphalt to settle.

When the subcontractor televised the 2,000-foot-long, 15-inch pipe, he found a 14- by 23-inch elliptical section 300 feet long. The camera revealed fines infiltrating



Antonio Rocha (left) from Oswald Enterprises Inc. in Belford, N.J., attaches hoses that deliver air and grout to the 14- by 23-inch elliptical packer custom-built by Logiball Inc. Project manager John Read oversees the process. (Photo courtesy of Oswald Enterprises Inc.)

Norbut turned to Oswald Enterprises Inc., the borough's pipe and sewer cleaning contractor in Belford, N.J. Manager Bill Carver took the challenge to Marc Ancil, president of Logiball Inc. The Logiball team designed what Ancil believed to be the industry's first

our 2008 road improvement program, and the grouting was done early in 2009," he says.

Ancil asked Carver to take the dimensions and radii of the elliptical pipe and make a cardboard template, as the pipe probably was not manufactured to ASTM standards. Using

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Marc Ancil

through unplugged lift holes in the round pipe and bad joints in the elliptical pipe.

Norbut recommended repairing them with chemical grouting, but the subcontractor had no source for an elliptical packer. Open cutting to replace the elliptical portion would jeopardize the project's completion before winter and run over budget.

elliptical packer. It helped deliver a flawless trenchless repair.

Creative muses

Without knowing how long it would take for the packer to arrive, Norbut had the road paved to avoid losing the repair window and getting a delay claim from the general contractor. “Carteret Avenue was part of

the template, Logiball engineers built a steel pipe in which to test their designs. “The three and nine o'clock positions had sharp radii, and the inflation bladders – two on each side of the joint – had to fit tightly against the walls to isolate the coupling,” says Ancil. “Without it, the pressurized chemical grout would blow past the bladders and into the line.”

TOUGH JOB

PROJECT:

Chemical grout defective joints in an elliptical pipe under a newly surfaced road

CUSTOMER:

Borough of Carteret, N.J.

CONTRACTOR:

Bill Carver, Oswald Enterprises Inc., Belford, N.J.

EQUIPMENT:

14- by 23-inch elliptical packer, Logiball Inc.

RESULTS:

Joints grouted and integrity of road maintained

The Logiball design team started with the stainless steel packer framework, built the reinforced rubber bladders around it, then tested the unit in the pipe they made. The challenge was to provide enough tolerance for the packer to travel past offset joints, yet seat the bladders against the pipe. After each test run,

the men adjusted and re-aimed the frame.

"We didn't change seven design elements at once because we didn't know which modifications would work," says Anctil. "We also gave ourselves a little more tolerance than normal in case the storm sewer held some surprises." The third design attempt was successful.

To seat the bladders correctly, the team had to know the optimal pressure before producing a blow-by. They placed the packer back in the pipe, then played with various inflation pressures. The magic number was 40 psi. "Now we could tell Bill the volumes and injecting pressures," says Anctil. "The storm sewer was only eight feet deep, so we were in good shape, because depth increases pressure. Every 2.32 vertical feet of groundwater over the crown represents 1 psi."

Winch away

Working manhole to manhole, the subcontractor's crew grouted 150 lift holes in the round pipe and all the joints per Norbut's specifications. They conducted a pressure test to ensure that the repairs were airtight.

Before grouting the elliptical pipe, John Read, Oswald Enterprises' project manager, televised it using an OZII camera from CUES Inc. Nothing had changed since the initial inspection.

Read's crew used a stand-alone electric winch to pull the elliptical packer downstream. Guided by the camera, Read set the packer at a joint and inflated the bladders to isolate it. Separate hoses then delivered the

two-part chemical grout to the packer, which raised the injection pressure to 10 psi, the equivalent of 23 feet of head.

Once injected, the grout filled the annular space around the packer, flowed out the defective joint into the soil, and gelled to form the seal. How much grout to inject depended on the porosity of the soil and voids behind the pipe.

"Because the pipe was eight feet deep, we needed only 5 psi," says Read. "However, we used 10 psi and left nothing to chance." It took two days to seal 23 joints, each averaging five gallons of grout. Then Read televised the pipe again. The repairs were perfect.

The pavement on Carteret Avenue remains smooth and level, with no more loss of sediment. The grouting industry now has a 14- by 23-inch elliptical packer and a source for others custom-built to any dimension and radius. ■

MORE INFO:

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