

# Experience Counts with Unique Grouting Project

by Allen Thomas

**W**hen Norm Sirna with Specialty Sewer Services Inc., Hazelwood, Mo., heard about the problems with a 10-ft square box culvert he knew it was going to be an unusual job. The joints on the 7-ft long sections had opened when the culvert settled, allowing water and sand to enter the box and cause further settlement.

"We were called in to seal the joints," Sirna said. "It was a situation where the culverts had been installed on open bedding stone which permits sand to move into the void space as the water table rises and falls. The weight of the sections is about 22,000 lb. We had to grout every joint to provide support and stop the running sand."

## Settled Joints

The box culvert was constructed to carry the surface water runoff from the land-based facilities which support two barge casinos. When the heavy sections settled and forced the joints open, the operation of the support facilities was jeopardized. The owners decided to move forward with rehabilitation efforts.

The unusual shape of the box culvert required a specially designed packer which was provided by American Logiball. The packer consisted of a steel frame on rollers and an inflation bladder designed to adapt to the square culvert and the haunched (mitered) corners.

"Logiball did a nice job building the packer for us," Sirna said. "We pumped acrylamide grout which we prefer. The packer design allowed us to inject the grout under high pressure, so we were assured of filling all of the voids outside of the joints."

Sirna explained that the initial settling and further concerns were the key factors that made them decide to seal all 286 joints. "There was no need to pressure test the joints,

It was a matter of injecting acrylamide; some of the joints took as much as 200 gallons." More than 20,000 gallons of mixed acrylamide were used to complete the job.

## Grout Sealing

The job took more than 60 days to complete. The procedure was for three men to work inside the culvert positioning the packer at the joint.

"Our above-ground equipment consists of a large capacity, truck-mounted sealing system that gives us the capability of mixing almost 200 gallons of grout at a time," Sirna said. "The truck is set up so we can mix while we are shooting grout, which means we don't have to stop."

Preparation for the work required placing a skid-steer loader in the culvert to remove the sand and debris. This effort was then impacted with unseasonably high water conditions which caused silting in of the intake structure. Bypass

pumping was then required and one 8-in. Godwin pump running 24 hours per day was able to remove the extraneous water. Once most of the sand and water was removed, Specialty's crews applied quick-setting cement to the joints, leaving access holes to inject the grout through the sealing packer.

Sirna said, "We pumped under high pressure — 20 psi. When we could read the back pressure or see the grout entering at the next joint, we knew we had sealed that area."

With 1,700 ft plus of the box culvert stabilized and sealed with the chemical grout, Sirna feels comfortable that the joints will remain tight for many years. "We have been using acrylamide for over 30 years. While this project was difficult and unusual, it is still a case of using the proper material and using it the way it was intended."

*The author is editorial consultant to Trenchless Technology and executive director of NASSCO.*



A custom-designed packer grouts and seals the culvert joints.



The packer awaits launch in the box culvert which was filling with sand from failed joints.