

Laterals – 4th In A Series

Effective Point Repair Of Laterals

by Jeff Griffin Senior Editor

Rehabilitating sanitary sewer laterals was the subject of a recent series of articles that focused on legal issues regarding ownership of laterals and the emergence of trenchless methods for lateral rehabilitation.

However, another key element in dealing with laterals involves point repairs that effectively address inflow and infiltration (I&I) problems that are structurally sound and do not require rehabilitation.

In such instances, point repair often is the solution. Grouting also is necessary for reinstated laterals following relining of mainline pipe.

“A common misconception in the sewer rehabilitation industry is that lining the mainline in a sewer will stop infiltration,” said Daniel Magill, president, Avanti International, a leading provider of high-quality chemical grouts for sewers, storm drains, other underground structures and applications in a variety of industries.

“When a lining system is installed,” Magill continued, “an annular space is created between the lining system and the host pipe. When the lining is bored to reinstate the laterals, the groundwater/infiltration will flow through the annular space and enter the sewer system at the reinstated lateral connections. When lining is required in mainlines or laterals due to non-structurally sound pipe conditions, the use of chemical grout to seal lateral/mainline connections and the annular space between the host pipe and liner is necessary.”

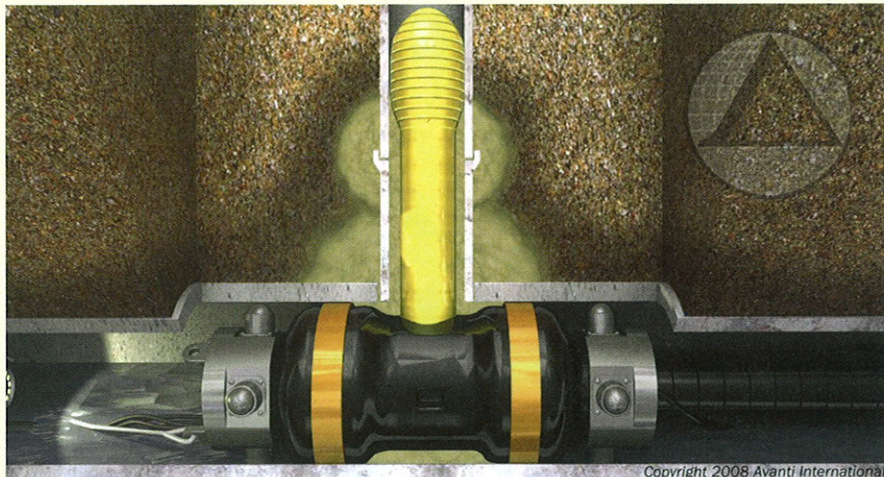
Technology is available that allows grouts to be applied to buried pipes trenchlessly.

“Flexible packers to seal lateral pipe joints can be inserted from above ground access and pushed/pulled into position to apply grout,” said Marc Antcil, president, Logiball Inc. Logiball is a leading provider of test and seal lateral grouting packers that operate from the mainline sewer and as far as 30 feet into the lateral from the mainline access. The company also provides packers that can be inserted from an above ground access to seal lateral pipe joints above the mainline lateral connection.

Common repair location

Antcil said the most common repairs needed are usually found at the connection (main to lateral) and the first five feet of the lateral from the connection.

“This is where most of the infiltration is found, as this part of the service lateral is subject to being below the groundwater table,” he said.



Magill said acrylamide gels are the most widely used chemical grout for lateral repairs. Others are acrylic gels, acrylates and urethanes.

He provided these descriptions of grouting products:

Acrylamide chemical grout is the thinnest product on the market. It has the same viscosity as water and becomes a firm, impermeable gel within a controllable time frame (anywhere from 5 seconds to 10 hours). Because it is a true solution-grout (no suspended solids) and has such low viscosity, it easily penetrates annular spaces and soil outside of pipes. Once the grout cures it will seal the pipe from infiltration/exfiltration, stabilize the soil around the pipe and lock the pipe in place at the points of injection. Acrylamide

chemical grout's longevity in the soil, low viscosity, controllable cure time and 60-plus year history make it the most widely used grout for controlling groundwater.

Acrylic gel (NMA) is a water solution of acrylic resins used similarly to acrylamide chemical grout. Because the behavior of the materials can be closely controlled under leak flow conditions, acrylic gels are also used for sealing leaks in mainlines, manholes or other below grade structures.

Acrylate grouts have been introduced into the sewer sealing and geotechnical industry over the past 25 years. Acrylate grouts have not gained widespread acceptance because they create weak gels and swell considerably in the presence of water.

Rehabilitation Technology

Urethane grouts have a long history of success in stopping infiltration in underground structures. However, they are stickier than other grouts and require more effort to keep pumping equipment clean. They are also moisture activated which means special steps must be taken to keep moisture out of the hoses and pumping equipment. Urethane gels are pumped at a 7:1 or 8:1 ratio of water to resin so the pump equipment must be set up to pump multiple ratios; in contrast to the acrylics which are pumped at a 1:1 ratio of Part A to Part B. When comparing ease of use, cost of product, viscosity and controllability of the cure-time, urethanes are used far less in lateral rehabilitation than acrylamide/acrylic gels.

Grout application

Grout typically is applied to reinstated mainline-lateral connections, and Anctil said a detailed closed-circuit television inspection of the laterals can also find other defects higher in the lateral that allow infiltration during high groundwater tables.

Grout is applied by positioning and inflating the grout packer over a defect.

“Chemical grout,” Anctil said, “is pumped through two different hoses and mixed within the grouting chamber and pressure injected through the pipe defects and out into the soil (pipe bedding) where they saturate and fill voids in the bedding and react into a gel to form a watertight matrix around the lateral preventing ground water infiltration and sewer exfiltration. This external repair also prevents the loss of fine bedding materials entering the sewer system through pipe defects and eventually creating voids around the structure.”

Grouting usually is performed at the lateral/mainline connection and the first one to six feet of the lateral. Grouting can also be performed along the entire length of the lateral at mainline joints.

When using chemical grouts, it is critical to follow safety precautions for the product.

“Avanti International established a training guide many years ago to protect contractors and the environment from any potential hazards,” said Magill. “As recommended when using any household chemi-

cal, follow the Safe Operating Procedures as defined by the Material Safety Data Sheets (MSDS) when handling, mixing and storing chemical grouts.

Magill said training for the application of chemical grouts used to control I&I includes:

Understanding the personal protective equipment necessary for the product and its correct use;

- Fully understanding and applying instructions of material safety data sheets;
- Carefully following mixing instructions;
- Understand the use of additives;
- Practice good housekeeping in the work area; and
- Follow storage requirements and use proper storage facilities.

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