11 Steps to Pipe Repair

Careful consideration, planning & execution are key to effective sectional repair inside a pipeline

By Matt Timberlake

Today's wastewater collection system operators are faced with many daily challenges that range from simple tasks to comprehensive capital improvement plans that must be prioritized, planned and executed under ever-shrinking budgets.

One of the methodologies that is available for buried gravity wastewater pipes is the ability to rehabilitate a single defect in a pipe segment through the use of a cured-in-place pipe (CIPP) sectional point repair, which allows the defect to be structurally repaired from inside the pipe with no digging and very little impact on traffic flow and the general public. This allows collection system operators to maximize their budget dollars and make repairs without many of the steps required for a traditionally excavated repair.

Steps to Success

The task of installing a sectional repair often is done by utility staff or through a contractor. Regardless of who takes on the task, the keys to a successful project rely on the step-by-step considerations, planning and execution of a sectional repair installation inside a pipeline. These steps are outlined below.

1. It is essential to start every project by obtaining as much "as-build" information as possible. This often includes closed-circuit television (CCTV) data and Pipeline Assessment & Certification Program coding reports, maps of the system, flow data for the area, interviews with collections system staff that have worked in a line segment or sewer basin, and traffic flows and volumes. By having the most reliable information available the project manager can best plan a project that can be executed successfully in the field.
2. In evaluating the pipe defect, one must first determine the extent of the structural deficiency of the defect and if a CIPP sectional repair will address the defect. Determining the type and make of the repair as well as the design thickness, strength and length are critical considerations. It is common to overlap the ends of a defect by 6 to 12 in. with the repair or to overlap a nearby pipe joint with the repair.
3. Once the materials have been selected and evaluated, project execution can be planned.
4. As with all work in a sewer system, crew safety is of utmost importance and all aspects of the site and crew safety should be identified and a strategy put in place to protect the crew and the public. These considerations include work zone and traffic control, confined space entry procedures, personal protective equipment, chemical handling and more. A site safety plan should be written and reviewed with the entire crew.
5. During project execution, the line is first precleaned to remove debris and flows are isolated as needed to prepare the line for internal CCTV inspection. It is critical to know the condition of the line prior to cleaning so the jet truck does not cause additional damage at the defect, which could render the line unable to be repaired with this method.
6. The line is inspected by CCTV and the defect to be repaired is viewed to determine whether any conditions have changed that would warrant a change in the original repair plan. If no changes are needed, a center point of the defect is found and a hard mark made to the CCTV cable. As the CCTV inspection is completed, it will pull a small-diameter rope through the line and leave it "strung."
7. CIPP point repair materials consist of a felt or fiberglass mat, resin that is made of various materials dependent on the application and product manufacturer, protective plastic used to keep resins from the inflatable bladder, and ties that are used to temporarily hold the repair in place while it is transported through the line to the defect.
8. The materials are prepared and "wet out," which is the process of impregnating the felt or fiberglass with the resin. The material then is wrapped onto the inflatable bladder much like a burrito and secured with temporary ties.
9. Once complete, the bladder is lowered into the manhole and pulled, using the string previously left in the line, to the defect and inflated. This inflation puts the repair in place, where it is expanded to the pipe wall and left in place while the reaction in the resins cures the repair to a hardened state.
10. Once cured, the bladder is deflated and a CCTV camera again is used to confirm the repair is successful and the defect repaired. The final CCTV inspection should then become part of the system "as-build" prints and noted on the system maps or GIS system.
11. The work site then is restored and the line is fully operational again.

Having a detailed step-by-step work plan is critical to a successful sewer project, and ensuring that everyone knows their individual roles and responsibilities is essential to meeting the objective of the project. w&wd

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