

HOBAS Case Study

January 2005

STOPPING THE CORROSION IN ELMSFORD

Elmsford, N.Y., is located in Westchester County midway between White Plains and Tarrytown, app.40 km from the eight million residents of New York City.

Elmsford dates back to revolutionary days and has maintained its charm. In 1870, it received its current name, inspired by a mammoth elm tree nearly thirty feet in circumference, which had been a landmark since revolutionary days. Incorporated in 1910, the town has a colorful history dating back to the early 1700s.

As with many older communities, maintaining its charm also requires significant maintenance of an aging infrastructure system. Westchester County's main line, the Saw Mill Valley Trunk Sewer, was originally constructed in the 1940s and was showing signs of aging. Many preventive repairs had been made over the years to prolong its life. The line traverses the town adjacent to the Saw Mill Parkway, collecting and carrying sewage from the town to the Yonkers Joint Waste Water Treatment Plant.



Hydrogen Sulfide Takes Toll

However, in December 2002, a major collapse of the pipeline occurred at the intersection of Route 119 and the Saw Mill Parkway. Years of attack from hydrogen sulfide gas had finally taken their toll. The gas was generated in the slower flowing sewerage, then released at more turbulent areas. The H₂S gas reacted through a microbial induced corrosion process with the existing bacteria in the sewer to create sulfuric acid that eventually deteriorated the roof of the concrete pipe. The brunt of the damage occurred at the point where a force main discharged into the interceptor sewer.

The County quickly stabilized the collapse to maintain the service by allowing flow to continue through the pipe. They engaged the engineering firm Camp Dresser & McKee (CDM) of Cambridge, Mass., to assist them in a further evaluation of the pipe's condition. The goal was to find a solution that would extend the life of the

interceptor sewer. Field investigations included closed circuit video inspection of the downstream pipe that revealed significant deterioration affecting several pipe sections totalling approximately 335.3 m.

Three possible solutions were evaluated including open cut replacement and two rehabilitation methods. The first rehab option would have required bypass pumping in order to work on the interceptor while it was dry. The second rehab possibility was to slipline the pipe without interrupting the flow. The ultimate decision was affected by such factors as the risk and hassle of bypass pumping, the resulting disruption to the local traffic and the capital cost. Sliplining “live” was selected.

Corrosion Resistance Needed

Contract documents were developed around the chosen alternative. The only product that was specified for this sliplining method was HOBAS CC-GRP (Centrifugally Cast Glassfiber Reinforced Plastics) Pipe. The reasons included its high resistance to sulphuric acid. HOBAS pipes are stringently tested in accordance with international standards in a sulphuric acid environment. When CDM designed the liner pipe, they gave no consideration to the existing concrete host pipe because

of its deteriorated condition. The County had faith in HOBAS since they had previous experience with the product. Years earlier, the lower end of the 76 cm diameter force main that discharged into the interceptor sewer had been relined with HOBAS 61 cm diameter sliplining pipe. This line, which was rehabbed in 1997 as part of the Tarrytown Extension project, is still performing perfectly.

Greatest Flow Recovery

The existing sewer segments were of diameters 1500 and 1600 mm; therefore, HOBAS SewerLine of DN 1300 and 1500 diameter were chosen. This downsizing would allow for a design clearance of 25.4 mm between the host ID (inner diameter) and the liner OD (outer diameter). A bell-spigot joint that is flush on both the exterior and interior was used to provide the greatest clearance between the existing concrete host sewer and the outside diameter of the joint, which is typically the area with the tightest fit.

CDM completed a hydraulic analysis to determine if the reduced diameter would also diminish the interceptor’s flow capacity. “We performed a hydraulic analysis of the sewer, comparing present conditions to the new relined sewer, and even with the decreased diameter found negligible decreases in flow capacity,” said

Chris Patackis, environmental engineer with the New York office of the engineering firm. The extremely smooth, Manning's .009, interior of the HOBAS CC-GRP Pipe allows for substantial flow recovery in most sliplining applications.

Installation Ease

Northeast Remsco Construction, Inc. of Toms River, N.J., has been installing HOBAS pipes for over a decade and was aware of its benefits from previous installations. "We sliplined about 305 m of existing 2000 diameter sewer with HOBAS DN 1800 under active flow conditions in Massachusetts. Also, we pushed about 91.4 m of HOBAS SewerLine DN 1300, in the dry, through a casing we installed under a flood control dike in Connecticut. On the same project, we installed about 152.4 m of 1.45 m HOBAS pipe via microtunneling under the Connecticut Department of Transportation Route 2. All our prior experience with HOBAS Pipe Systems has been positive," said Richard Palmer, PE, with the installation contractor.



The pipe can be inserted in high or low flow and pushed up stream or down. In this case, the segmented, gasket-sealed pipes allowed for live insertion. "There was no option to bypass flow from this interceptor sewer and at times the flow was within six inches of the crown of the pipe," Palmer explained.

The HOBAS Pipe also gave the contractor flexibility in the pushing directions and pit locations. This was a great benefit since the existing 1.68 m line made several direction changes and varied in diameter along the project alignment. The line was located 4.57 m deep along several highly travelled roadways requiring that the installation pit locations be chosen carefully.

Field Service Available

The project was rather complex even though it was fairly small, consisting of 285.3 m of DN 1500 and 37.8 m of DN 1300 pipe plus a variety of closures

and fittings. Because of the complexity and other reasons, the Westchester Department of Public Works required that a HOBAS representative be available on site during the entire project. HOBAS field service personnel were there at the beginning of the job and representatives including the area manager were in constant contact with the contractor to provide assistance when it was needed.

Success!

Once installation was complete, the line was grouted and inspected. The annulus at each end of each pipe run was bull-headed. Then, cellular grout was pumped into the annular space between the host pipe and the sliplined pipe. A post-construction video inspection and videotape were required to verify the complete and proper installation of the HOBAS pipe. The project was started in December 2003 and despite the winter weather, the project was substantially complete by February 2004.

With this successful project behind them, Westchester County is looking forward to years of reliable service from their new HOBAS Pipeline.

Year of Construction	2003-2004
Duration of Construction	3 months
Length of Pipes Laid	app. 285m of 1,5m long pipes and app. 37,8m of 1,37m long pipes
Pressure Class	PN 0
Diameter	DN 1300 & DN 1600
Stiffness Class	SN 6000
Method of Installation	sliplining method
Application	collection for sewage
Client	Westchester Department Of Public Works
Contractor	Northeast Remsco Costruction, Inc. of Toms River, N.Y.
Features	<ul style="list-style-type: none"> - high corrosion resistance and negligible decreases in flow capacity despite the decreased diameter - extremelv smooth interior

HOBAS CC-GRP Pipe Systems are manufactured in sizes from DN 150 to DN 2900 in pressure and non-pressure classes.

For more details please contact:

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