

Case History

Styrene-free CIPP for Toronto

Market Segment:	Sewer Rehabilitation
Composite Application:	Cured-in-place pipe
Resin:	EcoTek® L040-TNVG-33 Styrene-free vinyl ester
Host:	Storm water pipe and culvert Corrugated steel
Diameters:	30, 36 and 48 inches (762, 914 and 1,219 millimeters)
Length:	700 feet (200 meters)
Installed:	2008
Location:	Toronto, Ontario, Canada



The rehabilitated pipe and culvert carry storm water through a golf course.



Access matting helped workers reach the job site and protected the terrain during repair.

Nationally recognized in Canada for environmental leadership, the City of Toronto has taken its greenness underground by specifying a more Earth-friendly material for storm sewer rehabilitation.

Under the direction of Toronto Water's Senior Engineer Kamran Sarrami, P. Eng., a sensitive rehabilitation project with respect to timing and location had new cured-in-place pipe (CIPP) installed inside old corrugated steel pipe. By eliminating the need to excavate, CIPP was the lowest cost, much less disruptive to the public and businesses in the area, and much friendlier to the environment.

The environmental advantage increased when installer Capital Sewer Services Inc. used new EcoTek L040-TNVG-33 vinyl ester resin from AOC. Unlike conventional CIPP resins, EcoTek L040-TNVG-33 uses proprietary, styrene-free monomer chemistry with ultra-low volatile organic compound (VOC) content.

"We continually seek leading-edge technologies to turn problems into solutions," said Capital Sewer Vice President Brian Ratchford. "The EcoTek resin was part of a pilot program with the City of Toronto to reduce VOC emissions. New Canadian regulations for lower VOC limits are on the horizon. This experience puts



Capital Sewer Services used an EcoTek styrene-free resin for its ultra low VOC content.

the City and Capital Sewer ahead of the game for tomorrow's mandate while providing an environmental benefit today."

The project rehabilitated approximately 700 feet (200 meters) of sewer line and culverts that carry storm water through a golf course into Don River. The river drains into Lake Ontario, Toronto's only source of drinking water. Host pipe diameters were 30, 36 and 48 inches (762, 914 and 1,219 millimeters). A pipe failure in the 30-inch section led to flooding of an apartment building and the golf course. A spot dig and further CCTV inspection revealed that all pipe sections were showing signs of rust and decay that caused leaking and threatened pipe integrity.

The CIPP process

Capital Sewer used the EcoTek resin to impregnate non-woven polyester felt tubes supplied by National Liner LLC, Houston TX, USA. The felt products were impregnated at Capital Sewer's facility where the resin's styrene-free technology resulted in lower VOC workplace emissions. The impregnated tubes were shipped to job sites in refrigerated trucks to prevent premature resin cure.

During installation, interior water pressure advanced the tubing forwarded as it was inverted through the host pipe. When an insertion of predetermined length was achieved, hot water or steam was introduced. The heat initiated the chemical reaction that cured the liquid resin into a molecularly crosslinked solid polymer. The result inside the host pipe was a new, seamless, conforming liner with excellent durability and corrosion resistance.

Natural transition to EcoTek

To facilitate the transition to styrene-free technology, AOC scientists developed EcoTek L040 resin to process like conventional materials, which use styrene as a diluent to optimize resin viscosity. "The handling and processing characteristics of EcoTek L040 resin are identical to those of resins we have always used," Ratchford pointed out. "We get the same workability, the same wetting, the same pot life, and the same or better physical properties.



Host pipe was up to 48 inches (1,219 millimeters) in diameter.



A new liner emerges during the inversion process through a culvert.

"And because the resin is from AOC, we get the same excellent delivery, service and technical support," he added. "Sales Representative Steve Maybee and CIPP Product Leader Bill Moore helped us reach this milestone and were on site for our first styrene-free resin installation."

About Capital Sewer Services Inc.

Formed in 1998, Capital Sewer Services Inc. has become recognized as a major force in the field of pipeline maintenance, inspection and reconstruction. Headquartered in Hamilton, Ontario, Capital Sewer is one of the largest municipal, commercial and industrial service providers in Canada. For more information, phone (905) 522-0522, e-mail pipeservices@capitalsewer.com.

About AOC

AOC is the leading global supplier of resins and specialty materials which enable customers to create robust, durable and versatile products and components. With strong capabilities around the world in manufacturing and science, the company works closely with customers to deliver unrivaled quality, service and reliability for today, and create innovative solutions for tomorrow. Partner with AOC and we will work together to find the right solutions for your business.