CIPP for Des Moines

Market Segment:	Sewer Rehabilitation
Composite Application:	Liner for Brick Sewers
Resin:	Vipel® L704-FAH High Molecular Weight Isophthalic Polyester
Diameter:	8 to 27 inches (20 to 183 centimeters)
Total Project Length:	25,285 feet (7,707 meters)
Installed:	2005
Location:	Des Moines, Iowa, USA

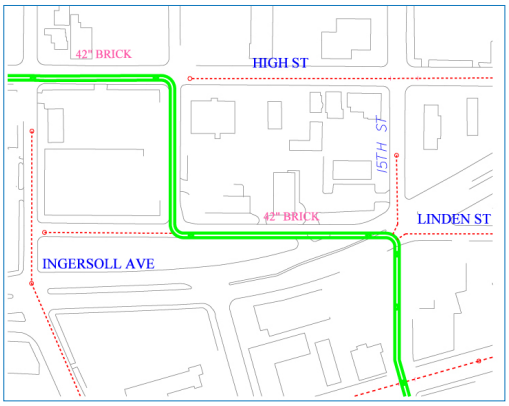
Nineteenth Century sewers under the City of Des Moines have been brought into the Twenty-First Century with new thermoset composite liners installed by Visu-Sewer Clean & Seal, Inc.

To ensure minimal disruption to the bustling Iowa state capital, Visu-Sewer used cured-in-place pipe (CIPP) technology. To ensure long-term durability, the new liners are made with Vipel® L704-FAH resin, a proven high molecular weight isophthalic polyester engineered by AOC for CIPP use.

The new project rehabilitated more than 12,000 feet (3650 meters) of brick sewer lines ranging in diameter from 18 to 60 inches (46 to 152 centimeters). Most of the original combined storm and sanitary sewer lines is estimated to be 80 to 100 years old, and several sections under the downtown district were most likely installed in late 1800s.

Saturating a non-woven polyester felt liner with a corrosion resistant thermoset resin, then inserting the liner into the pipe in need of repair. Under pressure, the felt liner is expanded against the interior of the host pipe. Under heat, the liquid resin cures into a crosslinked solid that encapsulates the felt to produce a new smooth, continuous liner inside the old pipe.

The sewer under this narrow, tree-lined street of the city's downtown transit mall was upgraded without causing surface disruption. "We would not want to dig this street up," said City Project Engineer Jeff Hansen.



Visu-Sewer crews negotiated the liner through sweeping curves in the underground system such as this section of sewer line, just two blocks away from Iowa Methodist Medical Center, the state's largest private hospital.

Visu-Sewer resolved several design and process issues that arose during the Des Moines project. Drawing on their experience and expertise, Visu-Sewer workers knew how to:
negotiate the resin-saturated liner through sweeping bends in sections of 36-, 42- and 48-inch (91-,107- and 122-centimeter) diameter sewers
keep the resin from prematurely curing when temperatures in Des Moines approached 100° Fahrenheit (38 Celsius)
install sections of liner where the grade changed as much as 15 feet (4.6 meters)
make adaptations when what was supposed to be 36-inch (91-centimeter) round cross-sections often ended up being 33-inch wide by 40-inch tall (84- by 102-centimeter) ovals.

Vipel® Processability and Performance
Visu-Sewer Project Engineer Alex Rossebo says that crews benefited from the good processing characteristics of Vipel L704-FAH resin. "Wet-out with the Vipel resin was never an issue, regardless of location" he states. "Wet-out of liners up to 48 inches (122 centimeters) were performed at our facility in Pewaukee, Wisconsin. For the 60-inch (152 centimeter) liners, three over-the-hole wet-outs were performed on site next to the Des Moines River. The longest over-the-hole insertion was approximately 1000 feet (305 meters)."

In addition to providing good processability, the Vipel resin contributes to City of Des Moines requirements for long-term durability. Rossebo says the resin retains a high modulus of elasticity over time while providing excellent resistance to the corrosive environment of municipal wastewater. Visu-Sewer purchases Vipel resin through distributor CIPPCON, Inc. "We get terrific technical support from CIPPCON people," says Rossebo. "They are available 24/7 when needed and are extremely flexible in scheduling resin deliveries for on-site wet-outs. A CIPPCON representative was there for our first on-site wet-out."

Emilio Oramas, AOC business manager for Vipel corrosion resistant resins, points out, "AOC helped pioneer the development of isophthalic polyester resin technology that sets the standard for most CIPP rehabilitation projects around the world. We're pleased that this technology could help the people of Des Moines get a major infrastructure upgrade with little disruption to their daily lives."

About Visu-Sewer

From headquarters in Pewaukee, Wisconsin, and branches in Fridley, Minnesota, and Bridgeview, Illinois, Visu-Sewer Clean & Seal, Inc., offers a wide range of services for sewer inspection, maintenance and rehabilitation throughout the Midwest. Visu-Sewer also provides complete, professional contract management to ensure that a customer's sewer system is always operating at peak efficiency. For more information, phone (800) 876-8478, e-mail visu-info@visu-sewer.com or go to www.visu-sewer.com.

About National Liner

The National Liner® product is a proven, cost-effective trenchless pipeline rehabilitation system based on cured in-place pipe (CIPP) technology. The product is made by saturating a non-woven polyester felt material with a high performance, corrosion resistant thermoset resin. For more information, contact Ray Pavlic of National EnviroTech Group, LLC, in Houston, Texas. Phone: 800-547-1235; e-mail info@nationalliner.com; web site www.nationalliner.com.

About AOC

AOC is a leading global supplier of resins, gelcoats, colorants, additives and synergistic systems for composites and cast polymers. AOC knows technology, lives quality and delivers service better than any other supplier. For more information, e-mail CIPP@aoc-resins.com, phone (901) 854-2800 or go to www.aoc-resins.com.

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