AOC®
World Leader in Resin Technology

CaseHistory

Unique Polymer Concrete Pipe

Resin	Special blend for proprietary polymer concrete
Composite Applications	Sewer interceptor structures
Manufacturing Process	Polymer concrete casting (metal rod-reinforced)
Diameters	10 feet (3 meters)
Height Parameters	80 feet (24.4 meters) Average depth of individual stacks
Chemical Exposure	Sewer gases
Location	Charleston, South Carolina.

The huge polymer concrete structures were installed in “stack-up” sections.

The rehabilitation of an 8-mile (12.9-kilometer) sanitary sewer tunnel is one of the largest infrastructure projects in the more than 330-year history of Charleston, South Carolina. The original tunnel was built more than 30 years ago. Materials technology was limited and little was known about deep, wastewater tunnel conditions.

When corrosive sewer gases caused portions of the system to collapse, the Charleston Water System utility embarked on a long-term rebuilding program. Technological advances made over the past three decades are helping to create a new tunnel system with significantly improved durability.

Advanced technology for the new system is seen in 10-foot (3-meter) diameter cylindrical sewer interceptor structures. The structures were installed in “stack-up” sections that upon completion reached a total average depth of 80 feet (24.4 meters). The structures combine the strength of steel reinforcing rods with polymer concrete made with the superior corrosion-resistance of Vipel® resin technology from AOC.

‘Consider polymer concrete’

The interceptor structures were part of the work that the Charleston office of consulting engineers Black &Veatch contracted to Affholder Inc., a subsidiary of Insituform Technologies®, Inc., Chesterfield, Missouri. “The shafts were originally specified to be constructed with conventional concrete, but our project management leadership was advised to consider polymer concrete as an alternative,” said Affholder President Bruce A. Frost.

“If the shafts were formed by pouring concrete in forms, we would have had to wait 28 days for the concrete to cure,” Frost explained. “Then we would have had to apply an impervious epoxy coating toprotect the concrete surface from severe attack from sewer gases.

Unique Polymer Concrete Pipe, continued

The average depth of a completed shaft was 80 vertical feet.

Using a stack-up of pre-cast polymer concrete sections made installation simpler and faster. And the polymer concrete's inherent corrosion resistance eliminated the secondary coating step as well as possible recoating maintenance down the road."

The polymer concrete structures were manufactured by U.S. Composite Pipe, Inc., Alvarado, Texas, using Interpipe® technology licensed from Polymer Pipe, LLC, Des Moines, Iowa. Frost said the Interpipe design included special flanged fittings that meet American Water Works Association (AWWA) C-300 standards for air and water tightness.

Vipel® resin replaces cement

Interpipe components are manufactured by vertically casting polymer concrete into a formwork. A reinforcement cage fabricated of steel rod is placed in the form prior to mix. The mixture is vibrated for optimal compaction following standard concrete wet cast procedures.

The significant difference with Interpipe technology is the replacement of traditional cementious materials with an engineered thermoset resin system. Compared to cement, the resin cures faster and results in measurably higher compressive, tensile, shear, bonding and flexural properties. Polymer concrete is also lighter in weight and inherently resists corrosive attack.

In addition to sewer interceptor structures, other monolithic structural products that benefit from this technology include:

- Pipe, intakes and headwalls;
- Manholes;
- Tunnel liners, and
- Solvent extraction/electrowinning mining cells.

Interpipe technology is tailored to the cost/performance requirements of the application through a designed mixture of specialized resin, filler, aggregate and additive technologies.

"Polymer Pipe Technology has recommended the use of AOC resin to its licensed manufacturers through a proprietary blending arrangement with AOC," said Robert Espeland, Vice President of Operations for Polymer Pipe. "AOC's vast resources and quality control ensure a consistent product and material properties. And we can always count on valued marketing and technical support from AOC. We consider AOC Infrastructure and Corrosion Specialist Ben Bogner a member of our team."

About Polymer Pipe

Headquartered in Des Moines, Iowa, USA, Polymer Pipe Technology, LLC has an extensive history of providing corrosion-resistant, large monolithic polymer concrete structures of various sizes and shapes for industries ranging from petrochemical, pulp and paper, and mining and refining of non-ferrous metals. For more information, phone (515) 267-8884, fax (515) 267-9148, or e-mail sales@polymerpipe.com. The web site is www.polymerpipe.com.

About AOC

Headquartered in Collierville, Tennessee, USA, AOC is a leading global supplier of resins, gel coats, colorants, additives and synergistic systems for composites and cast polymers. AOC is the North American leader in resins for corrosion-resistant applications. For more information on AOC technology, quality and service to the corrosion sector, contact Ben Bogner, P.E., C. Eng., by e-mailing bbogner@aoc-resins.com, or phoning (630) 665-2675. Or go to the Internet's most user-friendly resource for corrosion-resistant composites: www.corrosionresins.com,

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Effective Date: September, 2008
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