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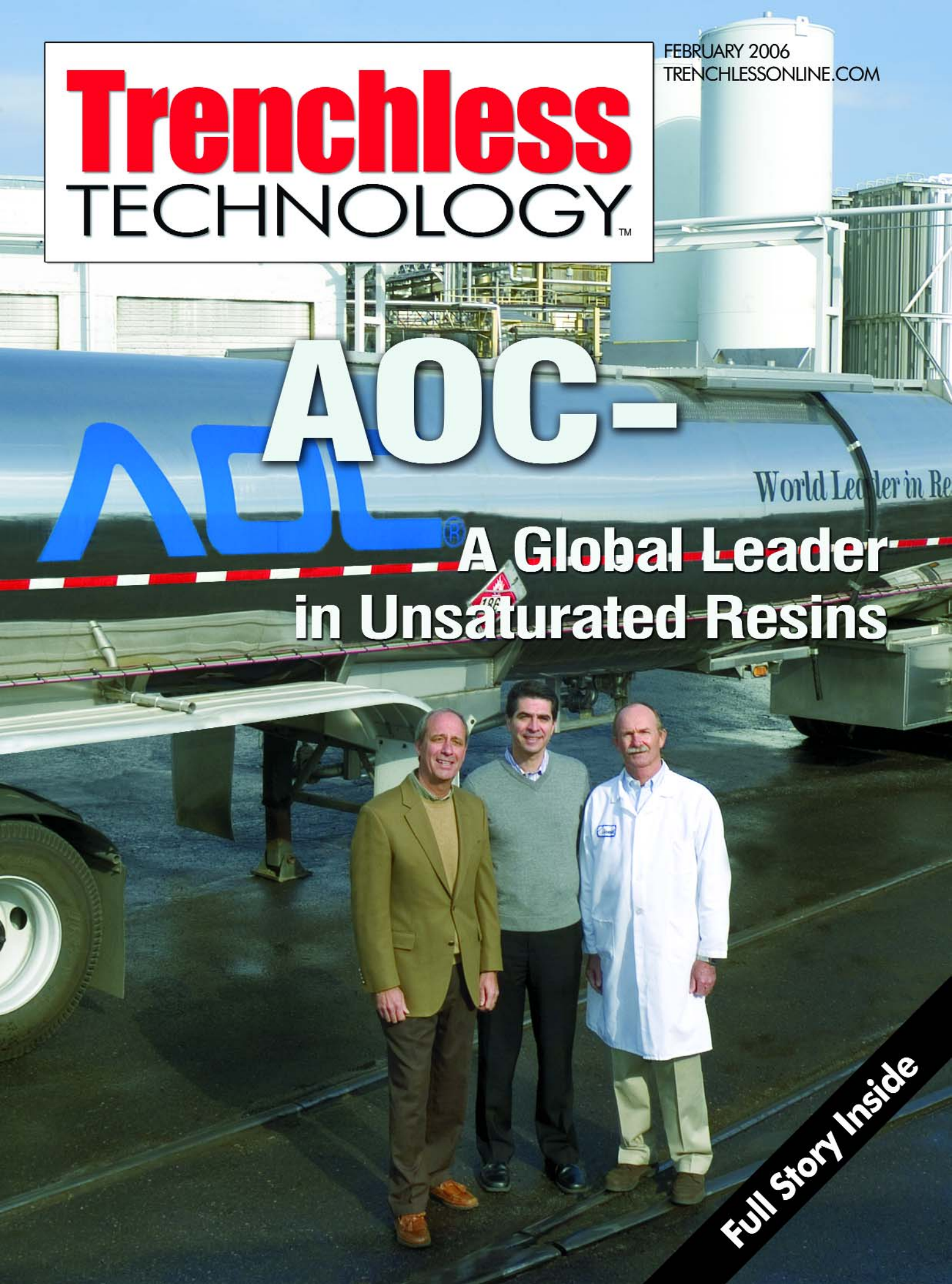


Consistency Resin-ates at AOC

(From left) AOC's Randy Weghorst, Emilio Oramas and David Treadwell.

By Bradley Kramer

You see it almost everywhere. You just don't know it.

From doorframes to bathware, boats to automobiles, storage tanks to pipelines, these are just a few products made with synthetic resins. These resins — called unsaturated polyester or vinyl ester resins — are used in so many industries that it is a chore to name every one.

Resins are adaptable to many different uses. By using different raw materials and processes, the chemical properties of a resin product can be manipulated to suit a number of applications. One such application in the trenchless market is cured-in-place pipe (CIPP).

One of the global leaders in unsaturated resins is AOC LLC, based in Collierville, Tenn., a company that has built its reputation on maintaining a painstakingly consistent product. Batch after batch of resins used in a variety of industries must come out the same time and again.

The company has invested many of its resources toward this area of process control since its formation in 1994. Consistency is important. If a resin's properties vary, especially its curing time, the installation process changes and the user could be up that creek without ye old paddle.

As the largest resin producer in North America, AOC has sealed its reputation in the trenchless market by providing its Vipel Corrosion Resistant resins to various CIPP contractors, including Insituform Technologies Inc. and National Liner. AOC considers CIPP an integral part of its business, a part that continues to evolve.

In fact, AOC has just announced a resin for CIPP that contains no hazardous air pollutants (HAP). The resin was developed as a specialized product for one of AOC's customers and is now available to the broader market, AOC business manager Emilio Oramas says. The resin uses alternate monomers in place of styrene.

Being able to adapt its products to different applications, as well as anticipated regulatory changes in the industry, helps AOC serve its customers' needs, AOC president and CEO Randy Weghorst says. Adaptability and customer service have allowed AOC to grow to become a company with revenues of more than $500 million per year.

The company is represented well in North America, with four plants in the United States (Tennessee, Florida, Indiana and California), one in Guelph, Ontario, Canada, and one in Mexico City.

Global Leader in Unsaturated Resins Adapts Products to Suit Customers

Although North America is AOC's "wheelhouse," as Weghorst says, the company has branched to Europe and Asia, with manufacturing locations in the United Kingdom, Slovakia, Thailand and, most recently, Vietnam.

"We put our plants near where the business is," says Weghorst, adding that AOC is adapting to the growing global marketplace.

Sealing the Cure

AOC's roots in the trenchless market began in the late 1970s when, as the Alpha Corp., it partnered with Insituform, now one of the global leaders in CIPP installation. From there, the company has grown to include many private and public customers.

"From our perspective it was a market that had great growth potential," Oramas says. "Strategically it is one of the focus markets for AOC where we want to continue to grow and continue to be a leading player."

Company officials estimate the CIPP market to be growing at an average annual rate of 8 to 15 percent, depending on future project funding.

CIPP is a cost-effective way to rehabilitate old sewer lines without tearing up roads or inserting new pipe. The installation process involves a felt liner impregnated with resin that bonds to the inside of the host pipe.

Essentially, CIPP reseals damaged pipe with a durable sleeve from a 1/4-inch to 3 in. thick and up to 100 in. or more in diameter. The sleeve has an absorbent felt surface on one side and a smooth flexible plastic-like surface on the other.

Some of the largest CIPP installations are performed over the hole. At the jobsite, the liner sleeve with the felt inside is filled with resin. As the liner is installed, it is turned inside out so the resin-impregnated felt side bonds to the host pipe.

Time is of the essence to ensure a smooth installation. AOC coordinates with CIPP contractors to provide resin at the site with just-in-time delivery.

To cure the resin, the pipe usually is filled with hot steam or water, which causes the resin to harden. Another curing method is UV or light curing — a process that product leader David Treadwell says has become popular in the European market and is just beginning to emerge in North America.

For CIPP, unsaturated polyester is suitable for water pipeline applications whereas vinyl ester is for more aggressive uses, such as in industrial settings with corrosive chemicals.

AOC is dedicated to advancing its offering for CIPP, says Thomas Folda, vice president of technology. Its new no-HAP, corrosion-resistant resin (product No. L704-AAB) is just the next stop in more enhancements to come.

Growing with Consistency

What makes AOC so successful in the resin industry is its ability to consistently churn out the same product over and over again. Each resin product is mixed in a batch and each batch must match the last.

AOC operates the world's largest polyester resin reactor, with a volume of more than 16,000 gal at its Collierville, Tenn., plant.

Manufacturing resin involves many complicated stages. In a basic sense, raw materials — difunctional acids and glycols — are combined in a reactor where the mixture is heated, and water is distilled and removed. The result is a polymer alkyd, or base resin.

AOC's Collierville plant, just outside of Memphis, Tenn., houses the largest polyester resin reactor in the world, with a volume of more than 16,000 gal.

After the polymer alkyd is synthesized, it is placed in a "thin tank" where it is dissolved in styrene. Styrene is a monomer that allows resin to maintain liquid form at room temperature and reacts — or cross-links — with the polymer alkyd during the curing process to make the resin hard.

Applying different raw materials and production processes results in different chemical properties, such as resin strength, flexibility and shorter or longer cure time.

The different chemical properties in each resin are what distinguish AOC's different products, Treadwell says. Customers buy the resins based on their applications and installation requirements.

"Resin consistency is critical to the success of the installation process," Treadwell says. However, the ability to manipulate how resins react also allows AOC to create specified products for each of its customers.

The company has a variety of testing and analysis tools that help AOC understand and troubleshoot its customers' problems, Folda says. "As long as we understand the problems, we can custom-design a product," he says.

This capability is the foundation of the customer service AOC considers its top guiding principle, Weghorst says. The ability to analyze and custom-fit its products to every customer helps AOC meet its customers' needs.

"We have to understand their strategies and where they're coming from," Weghorst says. "If we have the better mousetrap in technology, we feel we'll get the lion's share of the business.

"We have to know what the customers are doing and what they need. If we're going to be successful, we have to work at getting better every day."

Constant evolution hinges on AOC's ability to maintain strict quality control — namely consistency and troubleshooting — while "cross-pollinating" resins for use in varying industries, Oramas says.

"The reason companies come to AOC is because of our commitment to the industry," Oramas says. "This commitment is reflected in the industry leading investment AOC makes in product development and operational excellence to ensure we are the best in the marketplace."

AOC's capability to do its own testing and analysis is essential to adhering to regulations set forth by federal, state and municipal governments. Resins must fall in line with a number of testing standards such as the EPA, American Society for Testing and Materials (ASTM) and *California Green Book*.

Developing new resins, such as no-HAP and no-VOC resins, helps AOC stay on the cutting edge of industry standards.

The Whole Gamut

AOC has a strong commitment to the trenchless market. However, because resin is so versatile the company also has vested interests in a number of other industries.

The different resin products are divided into different market categories such as corrosion, marine, transportation, bathware and other composite polymer products.

Aside from unsaturated polyester and vinyl ester, gelcoat and pigments are other popular products from AOC.

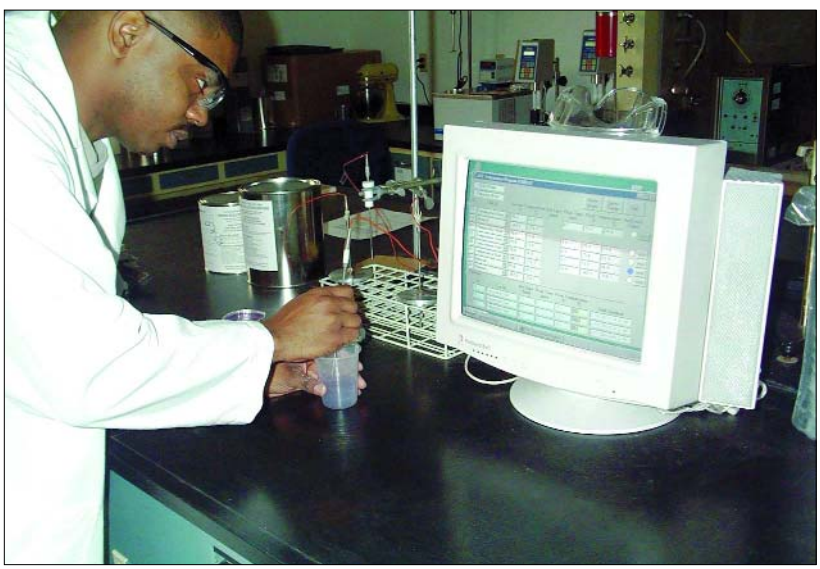
Gelcoats are used often in the marine market, where the coating is sprayed on boat frames. The gelcoat makes for a smooth, durable and watertight seal.

Another growing area for AOC is the transportation industry, in which the company produces resins for sheet molding compounds (SMC). AOC's latest SMC resin reduces paint defects up to 98 percent, Folda says.

Other products made with resin include bathroom fixtures, doorframes and bowling balls, just to name a few.

On the Right Foot

AOC started in 1994 as a joint venture between Alpha Corp. of Collierville and the Resins and Coating Division of Owens Corning of Toledo, Ohio. The combination of Alpha open mold resins and Owens Corning closed mold resins created a synergy of successful products, technology and services.



AOC is capable of testing and analyzng its resins, which allows the company to understand and troubleshoot its customers problems, as well as adhere to industry standards.

This partnership helped solidify the company as a world-class resin producer. Alpha purchased Owens Corning's interest in the company in 1998, a move that streamlined the business decisions.

By merging the initials of the two company names, AOC was born. However, now the letters no longer bear that meaning, Weghorst says. It was retained in order to maintain brand recognition. AOC is wholly owned by Alpha.

The company has built its reputation in the trenchless industry — and plans to continue doing so — by building long-term relationships with its customers, expanding and developing products and providing strong technical support and service, Oramas says.

"We started off dedicated to the trenchless market under the Alpha umbrella, and we still are growing that commitment under the AOC marquee," says Oramas, who believes that the only way trenchless business will continue to grow is if municipalities continue to fund infrastructure projects.

In a way, AOC has been behind the scenes of the trenchless industry, supporting its success for many years. However, during the last two years, the company has begun sponsoring industry trade show events, including this year's No-Dig Show Gala Awards Dinner Event.

"We no longer want to be the best kept secret in the industry," says Oramas.

Well, the secret is out. As the global trenchless market expands, AOC continues to produce diverse products that consistently meet its customers' expectations.

Bradley Kramer is an assistant editor of *Trenchless Technology*.