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Discovering Opportunity

EDITORIAL

Composites Industry Outlook:

A LOOK BACK, A LOOK AHEAD TO 2010



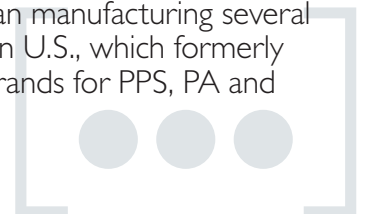
As we close out 2009 and prepare for 2010, it's exciting to see that despite recent turbulence in the market, a rebound in the economy and our industry is underway.

Committed to customers

We remain firmly committed to the composites industry. We know that for you to be positioned for profitable growth in 2010 and beyond, we must continue to provide supply security and an industry-leading product portfolio that positions us as your supplier of choice.

As markets recover around the world, we're:

- Restarting facilities that were idled during the slowdown. We took advantage of shutdowns to convert facilities, like our Vado Ligure, Italy, facility, to our patented boron- and fluorine-free Advantex® glass platform, which offers a higher performing fiber and a smaller environmental footprint compared to standard E-glass.
- Adding capacity with new weaving production to serve the Asian wind market, and an expansion of our reinforcements plant near Shanghai, which will come online in 2010 to serve the China market.
- Continuing to expand the manufacturing platform of key product lines in additional regions to meet customer requests for local supply. Recently, for example, we began manufacturing several of our leading thermoplastic reinforcement products in the Southeastern U.S., which formerly were only manufactured in Europe. These products include chopped strands for PPS, PA and other high-temperature resins.



EDITORIAL

Breakthrough technology for high-performance materials

We've maintained our momentum in research and development with steady investments to ensure we continue our 70-year history of innovation, regardless of market conditions.

We're excited to announce that we're re-entering the S-glass business with a manufacturing process breakthrough that provides production in large enough quantities for use in a wide range of high-performance applications. Previously, S-glass was limited to niche use, given that it was only possible to produce the product in small quantities. This issue of Market Vision highlights the benefits of this high-strength glass and the possibilities greater availability creates for all of us to continue to transform the materials market.

Discovering and seizing opportunity

Throughout the year we've also continued refining existing products for our internal and external wet-use chopped glass customers. For our gypsum customers, for example, enhancements in our wet-chopped glass helped increase the speed at which our glass can be processed and is therefore helping to drive down their costs. This publication highlights other examples of where we're helping customers find new opportunities. Our researchers are located regionally in five science and technology centers, ready to help you drive similar applications development for you and your customers.

Helping our customers win in the marketplace remains our focus. It's said that "calm seas don't make good sailors," and we're hoping that the lessons of the past year have made our companies stronger. We look forward to continuing to working together with you and building on our collective strengths for a successful 2010.

Sincerely,



Group President
Composite Solutions Business

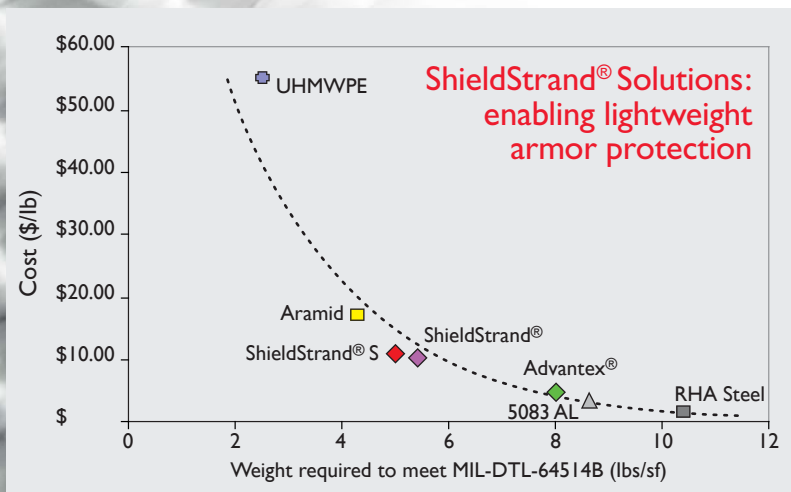
4 Owens Corning Returns to S-Glass Production



Building on its heritage of leadership and innovation, Owens Corning has developed a new generation of high-performance glass fiber reinforcements that redefine the value of composites materials.

Breakthrough glass fiber manufacturing technology has made possible an extensive lineup of Owens Corning high-performance reinforcements.

- This new era in reinforcements is the result of more than 70 years of advancing technology, including the 1997 introduction of Advantex® glass, a patented boron- and fluorine-free platform that produces a higher-performing E- and E-CR glass fiber combination, and a significantly smaller environmental footprint compared with standard E-glass processes.
- In 2006, Owens Corning introduced a family of high-performance reinforcements based on an R-glass formulation. Now the company is launching a large-scale S-glass platform of high-performance reinforcements made with a direct-melt process, an achievement previously thought to be technically unfeasible.
- The first products in the S-glass reinforcement portfolio are ShieldStrand® S reinforcements for the defense market and XStrand® S reinforcements for industrial, sports and recreation applications. FliteStrand® reinforcements for aerospace applications will be available in 2010.



“ We are excited to have scale production of high-performance reinforcements because increased availability will enable expanded use of high-strength glass fiber to replace steel and aluminum, as well as aramid and carbon fiber,” says **Byron Hulls**, global program general manager, High-Performance Reinforcements. “Designers and manufacturers can now have confidence that the material will be available in the quantities they need for large-volume production.”

5 Innovations Enable Move from Niche to Scale

Since the company first commercialized the processes for making fiberglass reinforcements, Owens Corning has continued to deliver innovative solutions.

When Owens Corning introduced S-glass to the market in 1963, the new glass formulation required a special melting process due to its elevated processing temperature. This led to the development of the paramelt process still used today for some fibers.

In the nearly 50 years since S-glass was developed, Owens Corning continued to advance fiber-forming science and redefine what is possible. The company now makes high-strength glass fibers with new glass melting technology, new glass delivery technology, new glass fiberizing technology and new glass chemistry and application technology. Used together, these cutting-edge technologies are enabling large-scale, direct-melt production of high-quality, high-strength glass fiber reinforcements.

Ashish Diwanji, vice president, innovations, Composites Group, says technical successes have made it possible for the company to produce high-strength glass fibers at a level of performance, availability and value never before achieved.



“ The processes for making large-scale high-performance reinforcements are ‘enabling technologies;’” says **Diwanji**. They allow more applications that are cost competitive with other materials. These high-performance reinforcements will help open doors for customers in new markets as well. This is a great example of our commitment to drive innovations that deliver value for our customers and end-users. ”





6 Products Meet Performance Standards

The development of new high-performance glass fiber reinforcements is being driven by the need for large-volume production of high-strength material that will compete effectively by significantly improving the value of composites.

Owens Corning high-performance reinforcements are made from R- and S-glass compositions specifically formulated to yield higher tensile strength and stiffness.

“Bare glass properties are comparable to other commercial high-strength glasses,” says Wisdom Dzotsi, business manager, High-Performance Reinforcements. “With advances in sizing and application technology, laminate properties can actually exceed previous standards.”

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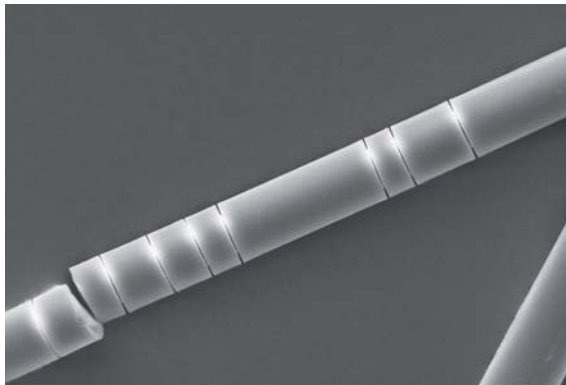
“Dzotsi says global combat and security needs are driving demand for ballistic solutions that can defeat increasing threats. At the same time, enhancing safety and security must be balanced with practical constraints such as weight and cost. The result is a need for armor that can withstand new threats while weighing less and providing a level of value that allows the military to protect more vehicles and structures.

Grey Chapman, key account manager, OCV™ Reinforcements, says most current armor solutions are driven by a metals culture that adds weight. “Increased weight reduces vehicle maneuverability and decreases the amount of payload that can be carried,” explains Chapman. “The military’s future combat strategy requires vehicles that are lighter and more nimble.”

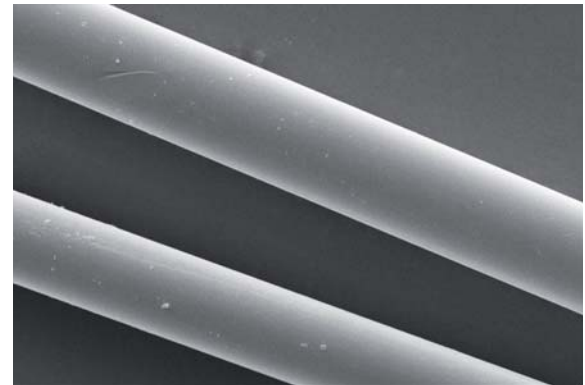
“Composites are helping to save life and limb today,” says Dave Hartman, senior research associate, Science and Technology. “Lightweight composite armor enhances metal structures for mitigation of lethal behind-armor effects from overmatch threats of roadside bombs. ShieldStrand® composite armor is an excellent material to help protect against blast and fragmentation which causes over 90 percent of the loss of life and limb. We will see the ballistic armor market transforming as applications migrate from armor kits on existing vehicles to integration of composites through the entire vehicle for lightweight structure and protection.”

07 Microscope shows proof Advantex[®] Glass Resists Corrosion

Which of the fibers pictured below do you want in your product?



Typical E-glass fibers



Advantex[®] glass fibers from Owens Corning

Both sets were immersed in acid for four hours. The microscopic view on the left shows the degradation of the E-glass which occurs by an etching process that starts with hydration and is followed by total dissolution of the E-glass. The Advantex[®] glass reinforcement on the right remains unharmed.

Advantex glass fiber reinforcements from Owens Corning are both an E-glass and a true E-CR glass according to ASTM D578, ISO 2078, and DIN1259-1. The product provides improved corrosion resistance compared to standard E-glass.

When it was introduced, Advantex glass was expected to provide superior corrosion resistance in acidic environments. That benefit was confirmed with field use data, and field experience also found that the product performs well in any aqueous environment, including water and alkaline solutions.

“Advantex glass fibers reflect our ability to combine technical and market knowledge, experience in composites manufacturing

and leading-edge resources in materials, equipment and processes,” says Dr. Ashish Diwanji, vice president, innovations, Owens Corning Composites Group. “It provides a competitive advantage for our customers by helping them create high-value applications for the benefit of their customers and the end-users.”

For additional information, visit <http://www.owenscorning.com/composites/aboutAdvantex.asp>

08 Teel Strategy Generating Growth

In a year when many companies are experiencing a decline in sales, the composites business of Teel Plastics, Inc. in Baraboo, Wis., is expected to grow by 40 percent.

According to Chairman Jay Smith, Teel's success results from a four-part strategy that focuses on talent and supply chain management, customer-focused innovation and continuous improvement. He says the company isn't doing anything different as a result of economy but is seeing the payoff from a strategy the company has been implementing in the past few years.

“The economic situation didn't force us to do anything different but it did require that we give our strategy greater emphasis,” he explains.

Teel started operations in 1951 making custom plastic tubing and profiles. They entered the pultrusion business in 1992 and now operate five automated lines with multiple streams. The business was purchased by the Jay L. Smith family in 1999. Teel manufactures a variety of tubes and profiles for markets including automotive, building products, lawn and garden, and tool handles. The company has about 250 employees.



Teel's strategy has helped the company reduce its costs and become more competitive. This is attracting business that once migrated overseas.

“We have several new customers who previously sourced profiles from overseas to reduce their cost,” explains Smith. “They were later disappointed with product quality, lead-time requirements and the total value equation. They decided to move the business back to the U.S.

“With our focus on continuous improvement and our use of state-of-the-art processing equipment, we can be very competitive with companies in so-called low-cost countries,” says Smith.

Joe Spitz, chief technical officer, says Teel often cites OCV™ Reinforcements as an example of how an engaged supplier can help their business.

“OCV Reinforcements helped us understand a problem we were having with our process,” explains Spitz. “A representative of their technical team took photo micrographs of our products so we could really see what was happening. That helped us see and understand the problem, a critical first step in solving it.”

For additional information, visit Teel Plastics online at www.teel.com



09 GreenBlade Driving Change to Thermoplastic Blades

The goal of GreenBlade GmbH is to revolutionize the way large wind turbine blades are made using thermoplastic composites. While that ambitious project is underway, the company is also busy making micro-wind turbine blades up to 6 meters in length. The company expects to produce about 5,000 blades this year and increase that total by 50 percent in 2010.

Located in Brandenburg, Germany, GreenBlade is a joint venture established in 2007 by Eire Composites of Ireland and other investors. Eire is involved in the aerospace, wind and marine markets, and also composite testing. They specialize in thermoplastics. Greenblade took over Eire's manufacturing and technology for wind and other non-aerospace business.



GreenBlade supplies blades to Proven Energy in Scotland, one of the world's largest micro-wind turbine manufacturers. GreenBlade also supplies blades to manufacturers throughout Europe and has its own blades in 2.5-, 3- and 5-meter lengths. The company uses Twintex® co-mingled glass and polypropylene fiber, a specialty reinforcement from OCV™ Reinforcements.

GreenBlade believes thermoplastic blades offer superior benefits in terms of strength, abrasion resistance, impact (toughness) and weight. Their technology allows cost-effective production.

"The combined properties of thermoplastics and elimination of adhesives offer great advantages to the wind industry," says Production Manager Paul Costello. "Our main purpose is to develop a large-scale, liquid-molded thermoplastic wind blade in a one-shot vacuum process. We are starting with a 12.6-meter demonstration blade.

"Until now, the primary limitation of thermoplastic blades was the tooling, especially in large blades, due to thermal expansion," continues Costello.

"However, with GreenBlade's patented MECH tooling, developed by Eire, we can process at up to of 400 degrees Celsius (752°F) without those problems."

Sales Leader Stephen Costello says GreenBlade chose to base itself in Germany for several reasons including the country's reputation for quality and proactive attitude toward renewable energy.

"There is already an abundance of wind turbine facilities in Germany and we see this as an advantage for a blade supplier," he explains. "Also, GreenBlade's technology and products are so different from today's blades that it doesn't matter where other wind blade factories are located."

For more, visit <http://greenblade.de/>

10 LFTP Used in Award-Winning Hitachi Appliance

Long fiber thermoplastics from OCV™ Reinforcements helps Hitachi Appliances Inc. make an energy-efficient washer-dryer that recently won an award from Japan's Ministry of Economy, Trade and Industry.

Hitachi received the 2008 Minister's Prize for its front-loading washer-dryer combination known as "Big Drum." The product includes parts made with a proprietary long fiber thermoplastic (LFTP) from OCV Reinforcements known in Japan as Glass Master Batch (GMB).

The Minister's Prize, which has been awarded for 19 years, recognizes a company or organization that provides a solution or creates a new system for saving resources and energy. The result is a reduction in greenhouse gas and carbon dioxide emissions.

Owens Corning Japan worked with Hitachi during product development to provide a heat-resistant material for its heat-recycle system. GMB was selected for the outside of the drum and the pipe between the motor and drum.

Production team member Nobusato Aoyama said, "Hitachi needs pellets that are about half the standard length and problems occurred initially because the shorter pellet was breakable.

The GMB team worked for five years to develop a new product that would meet Hitachi's needs. The team discovered a way to create the needed short pellets using a different cutter and changing its rotation frequency to reduce the impact. The resulting product provided stable production for Hitachi.

According to Yusuke Matsumoto, Owens Corning sales representative, Hitachi adopted LFTP because of its stability and the fact that its waste material can be recycled.

Hitachi's Big Drum washer-dryer:

- re-uses the heat energy from the motor
- uses high-velocity air flow to reduce wrinkles
- cuts power consumption by 75 percent (compared with 2001 models)
- reduces drying time by 10 minutes (compared with 2001 models)

For more information, contact Yusuke Matsumoto at 81.3.5733.2544 or yusuke.matsumoto@owenscorning.com



Amalga Conversions Stay with Composites



Pneumatic cylinder tubing for the fluid power industry

“We have never had a product go back to metal once the customer tried composites.”

The speaker is Dr. Jack DeLuca, president and chief operating officer of Amalga Composites, Inc., West Allis, Wis., U.S.A. He is talking about his company's experience helping customers convert metal parts to composite materials.

“Ninety-eight percent of the time we're asked to help replace metal because there is a problem the customer hopes we can solve for them,” explains DeLuca. “Something forces them to look at alternative materials; it could be weight, corrosion, conductivity, cost or the timeliness of delivery.”

“Many times the issue is cost and the metal part supplier will come back and offer a reduced price,” he continues.

“But once the customer sees all the other benefits of composites, such as easier assembly and reduced shipping costs resulting from lighter weight, they don't want to give them up.”

DeLuca speaks from 19 years of experience at Amalga, a company that was founded in 1966. The privately held enterprise changed ownership in 1989 and he and other members of the core team joined in the following year.

Amalga has since become one of the country's largest independent filament winding operations. Sales in 2008 topped US\$7 million and employment exceeded 60. The company also has a compression molding operation and is adding resin transfer molding (Light-RTM). Another area of expertise is machining composite parts.

The company's products include pneumatic tubing, driveshaft tubing, reservoir-quality tubing, launch tubes and other engineered composite components. Part diameter can be up to 42 inches and lengths up to 30 feet.

“Our largest market is the fluid power industry, specifically pneumatic cylinder tubing,” says DeLuca. The company uses glass, carbon and aramid reinforcements with most of their production using Advantex® glass fiber from OCV™ Reinforcements.

“We believe our engineering team is significantly better than our competitors,” says DeLuca. “We have developed solutions to problems we were told were unsolvable by applying sound theoretical knowledge with real-world experience.”

For additional information, visit www.amalgacomposites.com.

Missile launching tubes



Resource Center

New Publications Available

Several helpful new publications are available from the OCV™ businesses:

Marine Market – A new brochure presents OCV™ solutions for boat building in North America including glass roving, veil and mat; products are aligned with the processes commonly used in the marine market

Advantex® Glass – A new data sheet for **composite fabricators** shows how applications in corrosive environments made using Owens Corning Advantex® glass reinforcements outperform applications made with traditional E-glass

Advantex® Glass – A data sheet for **design engineers** shows how composite applications made with Advantex® reinforcements offer substantial benefits in corrosive environments compared to traditional materials

To download copies of these publications, visit our Library in www.owenscorning.com/composites.



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