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A New Era Is Upon Us

It is a great honor to serve as the new ACMA president. It is an exciting time and there is a lot of opportunity for the organization. We have a hard working staff and board of directors, all of whom are involved and want to be a part of the growth, changes and challenges.

I have seen many changes in ACMA since I attended my first annual trade show held at Lake Geneva, Wis., 25 years ago. I could not imagine that I would someday be the first female president of ACMA, a testament to it being a forward thinking organization.

Like each of our businesses, our association has grown, matured and gone through its ups and downs. I have many big shoes to fill—the most immediate being former Marine Monty Felix. Monty led this organization through two of the toughest years and I believe ACMA has emerged stronger than ever. I thank him for all of his hard work in guiding ACMA through very difficult times. His forward thinking mentality moved ACMA from being reactive to proactive. I will work hard to keep that same momentum.

I look forward to the next two years and the many and varied opportunities ahead. The focus on energy efficiency and the increase in demand for lighter, more durable products has opened the door for composites. I am grateful my company has weathered the storm. It was tough but we have emerged even better than before. We are now more diversified, making new products and serving new industries that were not even thought of 20 years ago, such as electric car bodies, small wind parts, light rail car liners and streetcars. During my two years as president, there are a few goals I hope to accomplish:

1. Enhance ACMA’s academic outreach by engaging community colleges and technical schools by expanding CCT programs and adding hands on curriculum. We can do this by further including academic institutes in our trade shows, CM magazine, the ACMA website and blog, and adding them as a Composite Growth Committee.

2. Increase partnerships with similar associations by networking and representing ACMA. We should combine our strengths and join forces to accomplish similar goals.

3. Be the industry spokesperson to enhance the profile of composites on Capitol Hill. It is my objective to testify before Congress and relevant agencies when needed, make Congressional visits and recruit member companies to participate in ACMA Lobby Day. I challenge you to get to know your Congressman and join us on the hill.

ACMA has had great leaders over the past years and I am grateful to have learned from them. Of course I cannot forget my father, Lowell Miles who served two terms. I learned a lot from watching my father lead ACMA through difficult times. At one point he and others personally guaranteed a loan to keep the association alive—that’s how much they believed in ACMA. I believe ACMA is stronger than ever and is poised for great times ahead.

Lori Luchak
Miles Fiberglass & Composites, ACMA President
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On June 10, 2011, Secretary of Health and Human Services Kathleen Sebelius approved the 12th Report on Carcinogens (RoC), which includes a classification of styrene as a “reasonably anticipated” carcinogen. As a result of the RoC listing, OSHA’s Hazard Communications Standard will require suppliers and employers to put cancer warning labels on drums and other “containers” of styrene and styrene-containing materials, including resin and gelcoat.

Since the National Toxicology Program (NTP) announced that styrene was under consideration for potential listing in the RoC, ACMA has challenged the assessment by working to educate decision-makers on Capitol Hill and in the White House about the solid science supporting a conclusion that styrene does not pose a cancer threat for humans. ACMA is now evaluating the options available to reverse the listing decision.

“We are very disappointed that the National Toxicology Program failed to address the legitimate concerns of the styrene industry and Congress in its 12th Report on Carcinogens. Based on the significant research now available, ACMA, as well as leaders in the scientific community, believe that styrene does not pose a cancer risk,” says ACMA President Lori Luchak.

“More than 750,000 Americans are employed in jobs that depend on styrene,” says ACMA Immediate Past President Monty Felix, CEO of Alaglass Pools. “Historically, people have worked safely for 50 years with styrene in the United States and Europe. Several long-term studies examined 60,000 health records of workers exposed to styrene. These findings showed no significant health problems linked to styrene exposure.”

European Union scientists recently completed an exhaustive review of styrene’s health effects and concluded that exposure to styrene is not likely to cause cancer in humans. The same conclusion was reached by an expert panel whose report was published in the November 2009 issue of the Journal of Occupational and Environmental Medicine. In addition, other federal agencies, including OSHA and EPA are aware of the scientific data and have not concluded that there is sufficient risk to require additional protections.

It is also important to note that the RoC does not present quantitative assessments of carcinogenic risk. Listing in the RoC does not establish that styrene presents a risk to people in their daily lives.

ACMA’s focus is now on supporting our members by providing education and the tools they require to responsibly respond to this challenge. Members-only briefing webinars are being scheduled that will provide the most complete and accurate information to attendees and will allow ample time for discussion of the implications and a period for questions. In addition, the Risk Management Tool Kit, which is provided free to members, will be updated to include information about how to communicate the facts about the RoC listing to employees and plant neighbors. To learn more about how ACMA is working for our members and the profession, please turn to Inside ACMA on page 28.

Stay current on the latest breaking information: turn to ACMA’s website, the CM Blog, Twitter, LinkedIn and Facebook.
Safety Issues Drive Composite Manhole Cover Market

“When electrical cables underneath manhole covers become damaged, the covers can become electrified and a person can be electrocuted,” says Larry Jordan, a consultant and engineer with Energy Systems, LLC, in Mahopac, N.Y. Jordan is the inventor of a composite manhole cover that prevents shocks and burns if touched, as do other composite covers. The difference is that Jordan’s cover is heavy — a rarity in the composite cover industry. The company received a patent for the invention in April.

Jordan’s design is a composite matrix surrounding an aggregate. “We put in stone, essentially, and we surround that aggregate with a fire retardant epoxy mixture.” When tested at 100,000 pounds of load, he says the cover survived.

Reducing injuries to pedestrians requires a public perception of the need for composite covers, says Jordan. “I hate to see it driven by lawsuits, but unfortunately, that’s what germinated the idea for the aggregate cover. I’m not a fan of that. I’d like to see it as a technical, real issue needing a solution.”

Two tragedies involving manhole covers in New York City garnered heavy news coverage in 2004 by the New York Times. In January of that year, Jodie Lane died from stepping on a damaged Con Edison junction box. The second mishap occurred later that year when Elizabeth C. Wallenberg fell off her skateboard, landing atop a steam pipe cover. After receiving emergency treatment for severe burns, she was left with an unhappy reminder of her fall. A portion of the Con Edison logo had been branded onto her backside, according to documents filed with The New York State Supreme Court in Manhattan, in July 2005.

Following Wallenberg’s fall, Con Edison began sealing steam manhole covers with epoxy. The utility company also paid over $7 million in a settlement with Lane’s family, according to the New York Times. Following Lane’s death, Con Edison employees subsequently discovered over 1,200 stray-voltage sites in the city. For five years, municipalities have restrained spending, says Jordan. “It’s hard to beat cast iron, until you are faced with a situation where you need an alternative,” says Jordan. “No matter what it costs, it is still an issue, because it’s a cost they wouldn’t have to incur if they did not do anything. So, it has to be an overwhelming need that comes along.”

Safety concerns continue to be a major driver of the pipe-hole composite industry, says Jim Goodman, president of Fibrelite Composites USA, in Pawcatuck, Conn. “We sell a lot of composite covers in the steam industry, where they are extremely concerned about a conducting heat surface. There’s been quite a bit of innovation in composite manhole covers, primarily from a design standpoint,” as the industry invests in stronger, more anticorrosive materials, he says. “Essentially the composite manhole business is driven by end-user requirements,” says Goodman, and for most of his customers, “it’s usually less than half the weight of a cast-iron equivalent and doesn’t conduct heat or electricity.” An additional market sector is universities with steam systems. “Students wearing flip-flops walking across steam-carrying infrastructure — that can get the parents upset,” he says. As a result, more universities are upgrading their manhole covers, particularly in pedestrian-rich areas, he says. “When they build out a new dorm, they put in a new steam line.”

The spread between cast-iron covers and composite covers is narrowing, Goodman says, as a result of the rising cost of steel. “It used to be two to one. We used to have a difficult time if the customer was focused on price. We still have to sell based on performance, and with utilities it’s also based on price. When you talk to a municipal end user, obviously they are looking at cost, but they’re also looking at the life span of the product,” he says. “Things have improved, but composite cover life span is still not equivalent on a one-to-one basis with cast iron.”

For some infrastructure managers however, that lack of equivalency may be weighed against the benefit that composite covers offer in their capacity to transmit radio and cellular frequencies reporting the status of the infrastructure, says Goodman.

Safety remains the overriding driver for composite covers, says Bob Brady, president of GMI Composites, Inc., in Muskegon, Mich. His firm’s sales to the municipal marketplace continue to grow, “due to the attention being paid to employee safety,” he says. “Our customers have shared with us that one injury would justify switching to composite manhole covers, due to workers’ compensation costs and lost work time.”

Jan Fletcher is a freelance writer based in Spokane, Wash.
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A Fore-sea-able Change for Unmanned Boats

The new unmanned vessel by Zyvex Technologies of Columbus, Ohio, named the Piranha, is not just another smooth boat ride on calm waters. When the 54-foot carbon nanotube (CNT) reinforced carbon fiber boat underwent testing in Washington’s choppy Puget Sound, the boat didn’t experience a planing effect, which is where acceleration lifts the front of the boat from the water and limits its effective top speed. This triumph sent Russell Belden, vice president of Advanced Composites Solutions with Zyvex Technologies, looking for choppier waters, including waves up to 12 feet high in the open ocean.

“Testing has gone very well, including rough ocean tests out in the Pacific,” said Mike Nemeth, head of commercial and defense applications for Zyvex. The boat cruised 600 nautical miles off the coast of Washington and Oregon and only consumed 12 gallons of fuel per hour travelling at 25 knots, despite rough waters. According to company data, a conventional aluminum or fiberglass boat would have used about 50 gallons of fuel per hour at that speed.

The Piranha boasts a range of 2,800 nautical miles at cruising speed, equal to 29 miles per hour, and has a top speed of 45 knots, or 52 miles per hour. Zyvex touts the vessel as a companion boat to guard merchant vessels against piracy, as a surveillance vessel to watch the coast for drug runners or terrorists, and as a rescue vessel to go out in severe weather. “In each instance, the unmanned vessel can be monitored to give it the same capabilities as a manned vessel without risking lives,” adds Belden. The Piranha can be launched from a larger ship or dropped from the air and can stay out on the water for 40 days and can carry a load of 15,000 pounds—a weight far exceeding the range and payload of existing drone vessels.

Zyvex Technologies, a spin-off of parent company Zyvex, is a molecular nanotechnology company originally based in Richardson, Texas. The company moved to Columbus, Ohio to concentrate on advanced materials. The new location allows Zyvex Technologies to connect with the Ohio composites manufacturing community and forge partnerships important to the growth of its products, says Nameth.

The new division developed a process that binds carbon nanotubes to carbon fiber composites. “Carbon nanotubes aren’t necessarily a good actor with other materials,” Belden says. “They bond to themselves and reject the host matrix.” This new process makes carbon nanotubes compatible with an epoxy and the materials readily bond.

The result? “Carbon fiber on steroids -- stronger, stiffer, tougher,” says Belden. He emphasizes that the material can be used to make a part that will be stronger than the metal or fiberglass part, or, with engineering, can be smaller and lighter but just as strong as the part it replaces.

Zyvex engineers its own prepreg and epoxy in order to enhance the Piranha with carbon nanotubes. “For workers building the vessel, this means they’re able to quickly assemble a Piranha in our tooling without needing doctorate degrees in nano chemistry,” says Nameth.

From start of construction to launch, a boat takes approximately 90 days, with most of the time dedicated to system integration work such as placing the engines in the craft and connecting the systems. The nano composite build process takes place at the beginning of the assembly process and overall, hulls are outfitted to meet customer requirements.

The company took more than two years to evaluate its options before settling on a boat as its technology demonstrator. “As an alternative to marine, we seriously evaluated the wind energy market with the intent to create an ultra-light blade that would increase efficiency and reduce operating costs,” says Nemeth. “We also looked at airplanes and concept cars,” adds Belden. “Ultimately, we had very strong internal marine design capabilities and
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recognized that our nanocarbon fiber composites could greatly impact the performance of a maritime platform if fully considered in every stage of development.”

Existing unmanned surface vessels, typically made of aluminum are heavier, carry a smaller payload and generally have a tenth of the range of the Piranha. “But a major drawback at the moment is that the carbon nanotube product is 30 percent more costly than regular carbon fiber,” Belden says. “The biggest challenge we’ve found with our customers is that they don’t have the ability to design products to use our material.” If a boat manufacturer using aluminum or fiberglass attempts to simply switch the materials out, Belden explains, the boat would be too light for the design and would be unstable. For example, if a sailboat manufacturer wanted to replace an aluminum beam, Zyvex would suggest a redesign to account for the lighter weight while maintaining stability. “Composites require a different engineering process than metal or fiberglass,” says Belden. Those differences reflect industry reluctance to greater adoption of the material.

Despite challenges, Zyvex showed boat manufacturers that while a typical 50-foot boat weighs 50,000 pounds, it can make a 10,000-pound boat with a fully furnished cabin and galley that will use smaller engines, equating to significant fuel savings. “Right now they can’t get their minds around it,” Belden says.

But the company is pressing onward. According to Belden, Zyvex would love to produce other products, such as car bodies, with its new materials. “Currently carbon fiber hoods are custom built for enthusiasts but they only save about 20 pounds over their conventional counterpart. We’d like to be involved in the whole process,” says Belden. “A 1,000 pound, 100-miles-per-gallon car would be cool.”

Greg Rohloff is a freelance writer based in Amarillo, Texas.

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Last year in the U.S., solar power grew by more than 100 percent to more than 1 gigawatt of generating capacity, according to a recent story in *Renewable Energy World*. This year, it’s again predicted to at least double. That’s certainly good news for San Diego-based Envision Solar, and it could also benefit composites manufacturers.

Envision Solar designs and develops solar infrastructure with an eye toward design. Its products, including LifePort, a solar carport, and LifeTree, a solar shade canopy for the backyard, are meant to deliver solar power in a way that complements the existing architecture of a building.

“We want solar to look good,” explains Envision founder and CEO Bob Noble. “It’s all about being off the roof and having solar you can see.”

This year, the company plans to debut another addition to its line of solar-integrated building systems, one it believes will be the first ever to incorporate composites. Its ComposiTree will be an engineered solar tree structure that can produce up to 14 kilowatts of electricity, enough to charge 8 to 10 electric vehicles. Unlike the company’s existing solar trees, whose base and canopy are steel, ComposiTree will be made from composites.

Envision decided to create a composite version of its solar tree because the materials offered more flexibility for their design, an important characteristic for a company that’s seeking to set itself apart from the competition by bringing high-design architecture to its solar structures. The FRP composites it is testing are around

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one-fifth of the weight of steel, which will save money on shipping and handling and reduce the need for heavy equipment for delivery and installation, thus reducing labor costs. Composites are also 30 to 50 percent cheaper than the steel used in other solar trees, and they don’t corrode or require treatments or coatings.

Envision has worked with Chula Vista, Calif.-based Ebert Composites to design some composite parts for ComposiTree, the first prototype of which it anticipates in the third quarter of this year. They are currently designing pultruded components as well as sandwich panels with foam and honeycomb cores to see which offers the best cost benefit, aesthetic appeal and performance characteristics that will allow them to meet IBC requirements for the locations where they’re built.

Beyond his own business, Noble says he could see applications for composites in other areas of the solar industry, such as a replacement for traditional aluminum or steel rooftop solar racks.

“There’s no technological hurdle to make that happen,” Noble says. “What needs to happen is that it needs to be funded and companies need to focus on it.”

The solar industry, he says, has been one that composites manufacturers have largely ignored. According to Noble, composites manufacturers should partner with solar industry players to develop working prototypes and to validate the cost effectiveness and performance characteristics of their materials. “Composite manufacturers are very much embedded in the wind industry, but I think these companies need to start to look at what parts of the solar industry might make sense for composite support,” Noble says. “This industry is growing so rapidly and I think the composites industry has the opportunity to participate in one of the fastest growing industries anyone has ever seen.”

Jamie Hartford is a freelance writer based in Los Angeles.
Recycling Pioneer Predicts Robust Market for Repurposed Materials

Recycling carbon fiber may be complicated, but Trek Bicycle decided that keeping this valuable material out of landfills was the right thing to do regardless. This past spring the company, which designs and manufactures bicycles, launched an ambitious full-scale carbon fiber recycling program at its Waterloo, Wis.-based manufacturing facility.

Trek’s proprietary OCLV (optimum compaction, low void) carbon material, revered by the cycling world for its strength and ultra light-weight properties, has long been considered nearly impossible to recycle. However, this thought only serves to make Trek’s goal to become “zero landfill” more impressive. Until recently, the only course for a carbon fiber bike frame at the end of its lifecycle was to languish in a landfill, becoming an exceedingly long-term environmental burden. Not to mention that in its manufacturing processes and returned product, Trek already sends between 3,500 and 4,500 pounds of carbon composites to the recycling facility each month. With its zero landfill goal, the company projects to divert up to 54,000 pounds of carbon from the landfill to repurpose each year.

Trek collaborates to overcome recycling challenges

After reading an article in Bicycle Retailer magazine on the unique challenges of recycling carbon fiber featuring Trek Senior Composites Manufacturing Engineer James Colegrove, Materials Innovation Technologies (MTI) President and CEO Jim Stike, called Colegrove with the proposal to help Trek become the first bicycle company to recycle carbon fiber. “They had a nearly complete solution for us,” Colegrove recalls.

The recycling partners face challenges like different material grades, recycling streams and a logistical nightmare. The cost of raw carbon fiber depends on the grade of strength and stiffness. “To get the biggest bang for the buck, we need to separate out the different moduli and strengths,” Colegrove, who has been with Trek for over 21 years, explains. That’s why the carbon fiber coming out of Trek’s manufacturing process is recycled in four streams: trimmings (or scraps) of nearly raw, pre-impregnated carbon fiber with epoxy resin left over from cutting preforms; noncompliant molded parts; fully assembled warranty frames returned by consumers; and the fourth and most difficult stream the company is trying to implement: end-of-life recycling. “We want consumers to be able to bring their product back to one of our stores when they are done with it to be recycled instead of deposited into a landfill,” Colegrove says.

Another challenge for the partnership is logistics. Trek is located in central Wisconsin, where a truck hauls the material down to its reclamation partner in South Carolina. “We have dealers around the country (and the world) and if everyone wants to recycle their carbon fiber bikes, it will start to become a fairly large logistical nightmare,” Colegrove says. We have to ask, if Trek’s shipping things around then is this recycling program still justified from a carbon footprint standpoint? He contemplates, “We don’t want this material to go into a landfill. We want it repurposed into secondary parts. This works well within the United States but we may need to set up similar programs around the world to minimize the logistical dilemma.”

The recycling process

Trek keeps the prepreg scrap carbon fiber trimmings segregated by modulus so it can be recycled separately. That’s not always possible with molded parts, as some of those use both intermediate and standard
modulus materials. In recycling noncompliant molded parts using different materials of various grades, the higher-performance material consequentially has to be downgraded. “But at least it’s not wasted and still can be reused in parts that typically use standard-grade carbon fiber,” explains Colegrove.

First, MIT chops the different material types into one-inch square pieces. In a patented oven process called pyrolysis, where the carbon fiber material is heated in a virtually oxygen free environment, the binding resin is removed from the fibers without deteriorating the fiber properties. However, while raw carbon material comes in a continuous, unidirectional fiber, the recycling process yields a chopped fiber. “Our bikes use continuous fiber in all portions, because it’s the fiber that’s the strong part, the resin is only there to hold the fiber in position.” While Trek doesn’t believe it could manufacture its high-end performance frames from reclaimed carbon fiber at this point, it is currently trying to find a good fit for reuse in other carbon fiber parts that don’t require the long continuous fiber reinforcement. However, none of the options the bicycle manufacturer is investigating has ripened enough to specifically talk about it, says Colegrove.

Manufacturing secondary parts makes recycling viable

While the quality of the carbon fiber stays intact, the chopped-up recycled material requires a different manufacturing process. “MIT has developed a unique pre-forming methodology that works very well with these shorter fibers. At that point, the pre-form can be infused with an epoxy resin or even a vinylester, polyester or thermoplastic,” Colegrove explains. For now, the recycled material will be used in reinforced thermoplastic applications while research and development is underway for use in automotive, aerospace, medical and recreational applications. For example, recycled carbon fiber could replace glass fiber in the near future to enhance strength and stiffness performance where raw carbon fiber would be cost-prohibitive.

Colegrove envisions, “If through development and advocacy we can push the bicycle industry as well as other industries, there will come a time when the recycling of carbon fiber parts will be a very
viable alternative to throwing them away.” In fact, he sees the composite manufacturing industry right on the threshold of reaching critical mass with carbon recycling. “Once other industries (and the bicycle industry) develop those good secondary parts made from non-continuous fibers and find other uses for this very expensive, very high-performance material, all of a sudden this whole recycling system becomes very viable.” MIT, for instance, has prototyped a Corvette wheelhouse support and noise or propeller spinners for aircraft. Furthermore, Colegrove deems the chopped fibers very suitable for use in injection molding for fiber-reinforced thermoplastic applications. For example, these could be electromagnetic interference shielding or other strengthening and stiffening needs in plastic parts.

It’s too early for Trek to have a good feel for the true cost savings potential in applications. “We know that the cost to reclaim fiber is significantly lower than the cost to produce raw material. So if you are making a part that uses chopped fibers anyway, it makes a lot more sense to use reclaimed fiber over chopping raw material.” According to Trek, its recycling partner MIT states that reclamation of carbon results in 96 percent less energy expended than the manufacture of raw fiber. Given these indications, recycled carbon used in applications that don’t require maximal strength should find a robust market. Until then, “this is actually costing us a considerable amount of money,” Colegrove admits. “But it’s the right thing to do. And if what Trek is doing sparks some creativity and some innovation, we are all in a better place.”

Sandra Henderson is a freelance writer based in Lafayette, Colo.
One of David Giovannini’s top priorities when he joined Molded Fiber Glass (MFG) South Dakota in 2007 as general manager was to upgrade the company’s workplace training. “When I arrived we had a 4-hour training program for new employees, then we put people out in the plant,” says Giovannini. “It was sink or swim time.”

The training, which included filling out paperwork for the human resources department and learning a bit about the company’s culture and products, was simply not enough. Consequently, MFG South Dakota experienced quality problems and double-digit employee turnover.

Giovannini turned to Laura Miller for assistance. Miller, an instructor at Pulaski Technical College in North Little Rock, Ark., had helped Giovannini develop a detailed training program for his former employer, a start-up wind blade manufacturer that closed during the recession. He realized there—and at MFG South Dakota—that robust workplace training is critical. “Bringing in new technology requires a much more detailed training program than you would normally need in a brownfield environment,” he says.

During a training session, Jeremy Swan and Matt Aaron of Miles Fiberglass & Composites prepare to infuse a sample portion of a mock blade.

MFG South Dakota, a 300,000-square-foot greenfield plant with 350 employees in Aberdeen, S.D., produces wind blades. Serving as a consultant, Miller teamed with Giovannini and others at the company to create a 40-hour on-site training class. It includes a discussion on the company’s culture and four key elements at the plant: safety, quality, teamwork and lean manufacturing.

Employees learn about the different processes conducted at MFG South Dakota, such as layup and vacuum infusion.

The course is taught by various senior employees, including Giovannini, a training coordinator and the lean coordinator. At the conclusion, new employees work alongside senior technicians in their team to complete hands-on training. Since implementing the class last year, MFG South Dakota has witnessed significant improvements. Giovannini says turnover has dropped by approximately 60 percent, quality results are up 50 percent and employee overtime has decreased because the plant is more efficient.

Despite its success, the company continues to improve its training program under Miller’s guidance. MFG South Dakota is building a mini mold and adding education on layup, infusion, closing, trimming and final finish using blades made from the mini mold. “That will give new hires experience in every phase of the operation,” says Giovannini.

The company also is developing a 13-part leadership training program for first-line supervisors and senior technicians.

“For us to be successful, we’ve got to have promotable and local leadership,” says Giovannini. “We have to put programs in place to develop the people we need long-term to run this organization.”

Creating Cutting-edge Curriculum
Relying on the expertise and
experience of local colleges and technical schools is an excellent way to train skilled workers. Miles Fiberglass & Composites (MFC) has partnered with nearby Clackamas Community College for more than 20 years. “They serve a great need in the community for workforce training,” says Lori Luchak, president of the company with plants in Portland and Oregon City, Ore. “You get a big bang for your buck with community colleges.”

Instructors from Clackamas have taught math, English as a second language and other basic courses on-site at MFC. Approximately six months ago the school began offering classes on vacuum infusion and wind blade repair at the manufacturer’s facility. “During a regular visit, Lori mentioned they were moving into wind blade technology and asked if we would be interested in helping the company develop curriculum and bring jobs to our community,” says Pam Clem, who works in business solutions for the customized development and training department at Clackamas Community College.

Miles Wind Services, a division of Miles Fiberglass & Composites, was created three years ago. The division’s field service technicians travel around the country inspecting and repairing composite wind blades. The company has had four major jobs and five smaller ones at the local port or wind farms. “It’s difficult to find experienced technicians,” says Luchak. “A lot of them get done with our contract, then are hired by bigger companies. So we saw a need for training.”

Clackamas Community College developed a certificate program featuring four classes: basic composites, composite materials, vacuum infusion and wind blade repair. The college, MFC and the American Composites Manufacturers Association (ACMA) teamed up to create curriculum and a test for the last two, so those enrolled earn a CCT—Vacuum Infusion Process (VIP) and CCT—Wind Blade Repair (WBR).

This spring, 12 MFC employees became certified. In addition, 13 students enrolled in the full program at Clackamas, which also features a 180-hour internship requirement to graduate. Ten of those students interned at Miles, and five have subsequently been hired as full-time employees.

Calvin Doll is one of those employees. Doll became interested

Since implementing the class last year, MFG South Dakota has witnessed significant improvements: *Turnover has dropped by approximately 60 percent*, quality results are up 50 percent and employee overtime has decreased because the plant is more efficient.
in renewable energy after visiting a local wind farm, so he enrolled at Clackamas. “The wind blade repair program taught me the value of composites to our everyday life and how they will shape our future,” says Doll. “I was introduced to techniques and materials used to make composites as strong as possible while still considering cost limitations and how to repair those composites should they become damaged.”

Doll has already put his CCT certifications to use, working on open molding and vacuum infusion in the plant. He’s excited to get out in the field and repair wind blades. MFC is currently making nacelles for a small wind blade manufacturer and expects to land a service contract soon.

**Getting Grant Money**

The benefits of working with a community college are huge, says Luchak. “We did a little training in-house to begin,” she says. “But the college is taking people off the street and skilling them up. It doesn’t cost us time and money, and when they graduate they are ready to be hired.” The company doesn’t pay anything to train employees in-house, either.

Funds for the partnership between MFC and Clackamas Community College were derived from two grants. Clackamas received a federal Workforce Innovation in Regional Economic Development (WIRED) grant, which allowed ACMA, the college and Miles Fiberglass & Composites to create a thorough curriculum.

The second grant, which named MFC as a partner, was a multipart Oregon Manufacturing Extension Partnership grant from the Department of Labor. “The part that was most beneficial to MFC was the ability to take that curriculum material and the certification tests, and do employee training in-house at no cost to them,” says Carrie Kraten, grant manager for the customized development and training department at Clackamas Community College.

“There is so much workforce training money available through state grants,” says Luchak. Giovannini agrees. The state of South Dakota has awarded MFG South Dakota three separate training grants totaling nearly $1 million. Most recently, the company received a $360,000 grant in April to help fund a training class covering a new blade size it plans to produce.

Kenway Corporation in Augusta, Maine, has also benefited from grants. In 2006, the governor of Maine established the North Star Alliance Initiative (NSAI) to re-skill the workforce in coastal Maine. NSAI received a three-year, $12 million grant from the Department of Labor, which funded the establishment of the Maine Advanced Technology Center (MATC) on the campus of the Southern Maine Community College. Nearly 20 Kenway employees have received training at the MATC on advanced molding.
New CCT Programs Keep Companies at the Forefront

All senior technicians and quality employees at Molded Fiber Glass (MFG) South Dakota in Aberdeen, S.D., are required to undergo CCT training. The company has held four CCT—Vacuum Infusion Process (VIP) classes and approximately 20 employees are currently certified.

“We build wind blades here, but philosophically and strategically that’s not all we do. We have to be good at change,” says David Giovannini, general manager of MFG South Dakota. “With changing market conditions and clients expecting new designs, we must have a trained organization that can make moves as easily as possible.”

Created in 1999, ACMA’s Certified Composites Technician (CCT) program helps companies adapt. Training focuses on the fundamental technology used in producing a wide range of products within open molding, boat manufacturing, cast polymer and solid surface manufacturing, and the closed molding processes of vacuum infusion and light resin transfer.

There are currently more than 1,600 CCTs in nine different programs. Since 2010, ACMA has introduced three new programs: CCT-VIP, CCT Wind Blade Repair (WBR) and CCT—Light Resin Transfer Molding (LRTM). “ACMA members and our standing education committees notice trends in the marketplace that need education, and we respond,” says Heather Rhoderick, director of Conferences & Education for ACMA.

ACMA members are critical in creating new programs. MFC introduced ACMA to one of its training partners, Clackamas Community College in Oregon City, Ore. Together, ACMA, the college and MFC created curriculum and the test for the CCT-WBR. The program is now offered on-site at MFC as well as at Clackamas Community College.

“The wind blade repair and vacuum infusion process classes I took through Clackamas Community College taught me a lot of great information I can use out in the field,” says Alex Luchak, a wind turbine field service repair technician with MFC.

Having CCTs helps both employees and companies stay ahead in the ever-evolving composites industry. “If you have technical people and leaders in your company that understand the theory behind what you do and understand the engineering behind the products, they can make changes rapidly and teach the rest of your organization,” says Giovannini.

For more information on the CCT program, visit ACMA’s website at www.acmanet.org/cct.

For us to be successful, we’ve got to have promotable and local leadership. We have to put programs in place to develop the people we need long-term to run this organization.”

David Giovannini
General Manager
Molded Fiber Glass South Dakota
Aberdeen, S.D.

Susan Keen Flynn is a freelance writer based in Cleveland, Ohio.

For more stories like this, visit www.compositesmanufacturingblog.com and search using keyword “certification.”
Composite production is ramping up in both Europe and the U.S., as the auto industry looks to shed weight, and companies invest in partnerships and facilities to meet the demand. Composites are also making inroads under the hood, in transmissions, and in structural components, too.

“When you talked to car companies five years ago, all you heard was cost, cost, cost,” says Jeffrey Helms, global automotive director for Ticona Engineering Polymers, in Auburn Hills, Mich. “You hear now that weight is the new cost. The value of a pound of weight is significantly higher than it was five or 10 years ago.”

Forward Thinking

Helms says glass fiber reinforced thermoplastics will continue trending upward in automotive applications, driven by several factors. “Glass fiber reinforced thermoplastics have been the norm in European vehicle instrument panel applications, and are just starting to launch in North American designed vehicles,” he says.

With Chinese designed vehicles on average 30 percent heavier than their Western counterparts, this is driving an acceleration of plastics and composites use in vehicles designed there, he says. In May, Ticona announced plans to nearly double production at its Celstran long-fiber reinforced thermoplastic manufacturing unit in Nanjing, China.
“Traditionally composites have been used in body panels,” says Mark Murfitt, sales manager for Core Molding Technologies, in Columbus, Ohio, but he thinks growth opportunities exist in structural components.

“There are many instrumentation panels and consoles made of composites,” Helms says, as everyone is getting more comfortable with them. There’s lots of potential for further penetration in composites in vehicles: under the hoods and in vehicle exteriors. Front ends are pretty standard these days,” and he says seating is also a good target for weight reduction.

**More Than Secondary Parts**

Jim Cederstrom, Detroit automotive business development manager for Bulk Molding Compounds, Inc., in West Chicago, Ill., says that due to the challenging environment under the hood — a place rife with chemical and temperature pressures, “a lot of the power-train sealing components couldn’t be composite in the past.” But as a result of advances in composite technology, he now sees a lot of action in those applications, including oil pans, transmission systems and hydraulic pump housings. Federal incentives will facilitate under-the-hood composite use, he says.

“On the face of things, composites should win hands down every time,” says Andrew Hopkins, executive vice president of RheTech, Inc., in Whitmore Lake, Mich. “With composites, you can simplify the design. The basic question is why do they have such a minimal share of the automotive market?” He says part of the answer is composite manufacturers need to educate designers to understand the benefits of composites.

“Composites have very good acoustic properties,” says Hopkins. “They have an interior role in headliners, a role in some of the side panels for sound management. It’s never been something the industry has investigated well.”

Another reason is that historical experience and design standards were developed around metals, says Cederstrom. “The biggest challenge is to overcome what is established and to prove that new materials can be used and are just as robust.”

**Battling Public Perception**

Although composite use reduces vehicle weight, psychology can come into play, too. Hopkins says weight equals safety in the U.S. “Composites are quite strong, but that’s not a message well managed by the composite industry. Image issues like ‘composites are cheap, not very strong, and not safe,’ still remain,” says Hopkins. “A major piece of education needs to be done in the public arena.”

Developments portending sizable investment in composite production in the automotive sector include three carbon fiber manufacturing initiatives underway in early 2011. Two German companies — SGL Automotive Carbon Fibers and the BMW Group — launched a joint operation to manufacture carbon fiber in Moses Lake, Wash. that will employ 80 people, according to Washington State officials. Annual production will be 1,500 metric tons of fiber per year, according to SGL. Carbon fiber is coveted for its superior weight-reduction capabilities in automotive applications. However, the fiber’s current cost dampens adoption outside the luxury auto market. “If we can ever lower carbon fiber costs, you’ll see composite adoption grow very quickly,” says Helms.

Commenting on the Moses Lake facility, Murfitt said the development was encouraging for the composite industry. “I think that any time a well known and well regarded company makes that type of commitment to a process, it can only be a positive sign for the industry because that process is being recognized for its value and other companies may see it as an opportunity as well.”

**High Performance Composites**

The main driver in the plans to increase carbon fiber production is the “competitive nature of the industry,” says Murfitt. “If the end customer is wanting greener, the industry will figure out a way to produce that.”

“My impression is that it has always been the European automakers in particular specifying composites more than the U.S. or Asian automakers,” says Cedric Ball, global market development director for Bulk Molding Compounds, Inc. “It’s interesting to me to see that it was a European firm that made the first investment in carbon fiber, looking forward to the point when vehicle manufacturing will be using a significant volume.”

SGL’s carbon fiber will be used in manufacturing the BMW i3.
Cost-pressure Impacts Bio-composite Adoption

In 1940, Henry Ford took an axe to his soy-composite automobile trunk lid to demonstrate its strength. More than 70 years later, “bio-fiber is still on the fringe” of the industry, says Jeffrey Helms, global automotive director for Ticona Engineering Polymers, in Auburn Hills, Mich. “You see some bio-fiber composites as part of a sustainability strategy, but you don’t get the same kind of structural performance.” A doable application would be in “decorative-type pieces,” says Helms.

The industry continues to improve fiber-based composites, says Andrew Hopkins, executive vice president of RheTech, Inc., in Whitmore Lake, Mich. However, both economic viability and public perception must be addressed, he says. “This is a good step — a good environmental story. We’re getting better at it. We’re getting the right property sets out of it. The challenge is in the economics.”

Jim Cederstrom, automotive business development manager, for Bulk Molding Compounds, Inc., in West Chicago, Ill., points to a growing interest in renewable resin manufacturing, using soy-based resins. “There are more and more green conversations,” he says. “It is less a priority behind costs, weight and performance, as green is slightly more expensive.” His company, also a player in the food industry, sees more interest in sustainability in that market segment than in automotive composites.

Ohio BioProducts Innovation Center in North Canton, Ohio has worked with Detroit’s Big Three in the past, says John Hickman, vice president of programs at the Center, which was established in 2005 with an $11.5 million grant through the state of Ohio’s Third Frontier Program. The center’s technology-based economic development initiative helps manufacturers take an idea for a bio-fiber product and commercialize it up to the point of distribution. Hickman says one Ohio business is compounding natural fiber with 20 percent polypropylene material. “Instead of glass fibers, they are using a natural fiber. It’s in the post start-up mode,” he says.

“The pursuit of complete sustainability is difficult, but partial attainment is possible. We have clients asking us to work with natural fiber,” says Hickman. “We have materials right now — today — that can substitute and have reasonable performance. General Motors is pushing hard to get some sustainability, but it’s got to be a cost proposition. Ford is leading the pack in sustainability in what it’s doing.”

Ashland Chemical Company’s environmental resins are used in John Deere tractors, says Hickman, and the chemical company has expanded its Envirez resin range, that has a bio content ranging from 13 to 22 percent. An interim step to more bio-based composites would be a natural fiber that meets impact requirements inside the car, Hickman says. “The next step is a totally sustainable plastic resin polypropylene, and we’re not there yet, but it’s the most common resin there is. That’s where a lot of the changes are being made.”

Hickman says Dow Chemical made recent advances in impact modifiers for packaging applications using corn plant material. Teaming up with PolyOne Corporation, Dow Chemical introduced OnCap BIO L, a bio-based polymer impact modifier designed to improve the impact resistance of opaque, injection-molded polylactic acid products. “It’s made from corn, but it could be made from other things,” says Hickman. “It would be nice to make it out of saw grass, and there’s a big move to do that, too. There’s also a move afoot attempting to use wheat stalk to create polymers,” says Hickman.

which will debut in 2013, with production commencing in the third quarter of 2011, says Dr. Joerg Pohlman, managing director of SGL Automotive Carbon Fibers. BMW Group will have exclusive access to the carbon fiber, which will be shipped to Wackersdorf, Germany.

In February, Audi AG and Voith GmbH announced the formation of a partnership to produce high-volume carbon fiber in Germany. Also in February, a U.S. carbon fiber composite manufacturer, Plasan Carbon Composites, received nearly $700,000 seven-year tax credit through the Michigan Economic Development Corporation when it moved its research and development operations from Bennington, Vt., to Wixom, Mich., a Detroit suburb.

At a Wixom, Mich. city council meeting, in which a public hearing took place, Plasan Carbon Composites requested a state tax abatement. Jim Staargaard, president of the company, told council members Plasan planned to launch a “full scale pilot line” for carbon fiber manufacturing. Staargaard says his company “received a tremendous amount of support from the car companies.”

Staargaard told the council his company had spent a considerable amount of money over the last three to four years developing new process technology, which reduced carbon fiber manufacturing cycle time by 75 percent, thus supporting production for 30,000 vehicles per year. According to Staargaard, Detroit was willing to pay for weight savings as composite technology was a key enabler for them to be able to achieve the lightweight targets that they have.

Industry drivers

Murfitt notes around 20 to 30 platforms are currently using some form of glass reinforced composite, and as the OEMs continue to pursue their objective of weight reduction, he expects applications to expand.

“As long as fuel economy and therefore weight remain critical to the automotive sector, one could be optimistic about the important role that glass, carbon, or other fibers will
Accelerating adoption of both carbon fiber and glass fiber composites are the U.S. Corporate Average Fuel Economy (CAFE) standards, and federally mandated fuel economy labels on automobiles that will commence with model year 2013. “There is going to be big demand for lighter vehicles,” Helms says. The labels will provide consumers with estimated vehicle fuel costs at the time of purchase.

“A lot of actions on the engineering side are increasing the industry’s readiness to meet CAFE targets,” says Cederstrom. He notes that companies are investing in education, and “OEMs are getting together, working on the supply base and standards.”

Murfitt says the composite industry must do a better job of developing materials and applications that meet the end users needs. “The other challenge is to educate the industry on composite applications other than in the vehicle body,” he says.

“Let’s look at Europe to gain perspective on this,” says Hopkins. “Anytime you go to six or eight or nine bucks for a gallon of gasoline, the industry has seen lightening: less metals, smaller cars, smaller engines. Does that fit with the culture here in the U.S. of four dollars a gallon?”

Although the automotive industry has already affirmed the willingness to use “much less traditional materials,” Hopkins says, “the challenge facing the industry is the willingness of Americans to adopt composites before a rise in fuel prices forces the issue.”

“With electric vehicles, weight is more important to those guys,” says Helms. “Mass reduction is probably a leading factor in EV or PHEV extended range hybrids,” he says, adding that his firm concluded electric vehicles will comprise five to 10 percent of a global automotive market estimated to be as large as 80 to 90 million vehicles. “It’s driven by fuel cost. When gas is $7 a gallon in North America, composites look very cost effective.”

Bill Fotsch, president of Wellman Engineering Resins, in Johnsonville, S.C., says his company manufactures composites from post-consumer PET recyclables under the brand name EcoLon. “The reason why Detroit hasn’t used recyclers in the past is because it’s risky to have inconsistency,” says Fotsch.

His business is booming, and Fotsch says it’s a testimony to the impact rising fuel prices have on the composite market. “We had six people from Ford in late May,” he says. “GM folks were here, too. Customers are calling, engineers are calling,” and Fotsch says his hair is on fire due to the intense interest from Detroit. The company’s products are used in cylinder heads, cams, and intake manifolds. “Our price doesn’t move like the price of oil. When it hits $60 or $70 per barrel, we are quite competitive. When it hits $100, it’s kind of insane.”

Jan Fletcher is a freelance writer based in Spokane, Wash.
The Waterpark of America in Bloomington, Minn., needed several platforms and stair towers that would be exposed constantly to chlorinated water. Officials at the new entertainment destination wanted to keep the park attractive while limiting the need for constant maintenance. They wanted their structures to attract kids, not corrosion. They wondered: Would aluminum work?

At the same time, across the country in Indian Wells, Calif., a country club community called The Vintage Club had pyramid-shaped screens on its rooftops to conceal air-conditioning units. The screens, constructed from structural timber, deteriorated quickly and required $75,000 in maintenance costs every other year. They wondered: Was there a more effective, long-term replacement?

Both organizations were about to experience the power of pultrusion.

“Many people make the mistake of believing that a successful pultrusion operation is about selecting the right machine. While the right machine is certainly one very important component, it ignores the greater need of creating synergy between the many different technologies that make up a pultrusion line.”

Jeffrey Martin, President
Martin Pultrusion Group
Oakwood Village, Ohio

The architectural firm in charge of the waterpark’s design explained that aluminum extruded shapes can cause galvanic corrosion, and that in contrast, pultruded composites are highly corrosive-resistant. In addition, the firm explained, pultrusions are electrically and thermally non-conductive, impact-resistant and EMI/RFI-transparent. The firm installed DURAGRID pultruded fiberglass vinyl ester grating, developed by Bristol, Va.-based pultruder Strongwell, to serve as flooring on the waterpark’s platforms. It also installed skid-free DURAGRID stair treads.

At the country club community, leaders at an industrial plastics distribution firm explained how pultruded fiberglass doesn’t rot or decay. In addition, the company said, pultruded composites would be stronger, more rigid and lighter than

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Benefits of Pultruded Products

High Strength
Stronger than structural steel on a pound-for-pound basis. Has been used to form the superstructures of multistory buildings, walkways, sub-floors and platforms.

Lightweight
Pultrusions are 20-25 percent the weight of steel and 70 percent the weight of aluminum. Pultruded products are easily transported, handled and lifted into place. Total structures can often be preassembled and shipped to the job site ready for installation.

Corrosion/Rot Resistant
Pultruded products will not rot and are impervious to a broad range of corrosive elements. This feature makes pultrusions a natural selection for indoor or outdoor structures in pulp and paper mills, chemical plants, water and sewage treatment plants, structures near salt water and other corrosive environments.

Non-Conductive
Glass reinforced pultrusions have low thermal conductivity and are electrically non-conductive.

Electro-Magnetic Transparency
Pultruded products are transparent to radio waves, microwaves and other electromagnetic frequencies.

Dimensional Stability
The coefficient of thermal expansion of pultruded products is slightly less than steel and significantly less than aluminum.

Parts Consolidation
Custom designed pultrusions allow multiple discrete parts to be designed and fabricated into a single part thus reducing the number of fabricated parts and the need to join these parts together.

Low Temperature Capabilities
Glass fiber reinforced pultrusions exhibit excellent mechanical properties at very low temperatures, even -70 F.

Aesthetics
Pultruded profiles are pigmented throughout the thickness of the part and can be made to virtually any desired custom color. Special surfacing veils are also available to create special surface appearances such as wood grain, marble, granite, etc.

Success Today Requires More Than the Machine

Pultrusion is a manufacturing process for producing continuous lengths of reinforced polymer structural shapes with constant cross-sections. The process involves pulling the liquid resin mixture and flexible textile reinforcing fibers (rather than pushing them, as is the case in extrusion) through a heated steel forming die, using a continuous pulling device.

The reinforcement materials are in continuous forms such as rolls of fiberglass mat and doffs of fiberglass roving. As the reinforcements are saturated with the resin mixture (“wet out”) in the resin bath and pulled through the die, the gelation of the resin is initiated by heat from the die. A rigid, cured profile is formed that corresponds to the die’s shape.

Several years ago, buying equipment to make that process occur was all most new pultruders needed to gain new accounts and make money. The development of the niche hinged on improvements in equipment and raw materials. Today, however, growth is driven by new applications for pultruded FRP composites, including transportation structures (especially bridges) and replacement of wood and other materials in a wide range of markets. Success requires much more than equipment.

“Many people make the mistake of believing that a successful pultrusion operation is about selecting the right machine,” says Jeffrey Martin, president of Martin Pultrusion Group, a leading independent producer of turnkey pultrusion equipment and tooling that has installed 230 machines in 25 different countries worldwide and has helped more than 90 companies start pultrusion operations. “While the right machine is certainly one very important component, it ignores the greater need of creating synergy between the many different technologies that make up a pultrusion line.”

Martin Pultrusion Group recently branded its holistic view of pultrusion with the moniker MPG 360. It includes processing technology, comprehensive tooling solutions and ongoing training in addition to pultrusion machines. “One key to a successful pultrusion operation is proper engineering before a die is ever put online,” Martin says.

“A well-made pultrusion profile represents the convergence of many different technologies fine-tuned to work together in concert. Material selection, reinforcement architecture, forming technology, die design, temperature profiles and line speeds are considerations that will determine production and quality success.”

That viewpoint is echoed by Joseph Sumerak, owner of Sumerak Pultrusion Resource International, which provides both a consultancy and a product-development resource to pultruders, and the former owner of Pultrusion Dynamics Inc. “Today, companies can’t afford to wait for business to come to them,” he says. “If you’re a pultruder, it’s simply not going to happen. You have to
have a specific application in place or mind, and proactively match it to the specific benefits pultrusion provides.”

Sumerak says in order for the composites industry to achieve the best possible pultrusion outcomes at the lowest possible cost, its company leaders would be wise to view pultrusion as an applied science. “The key to success along this path is to understand the science of heat transfer, fluid dynamics, reaction kinetics, composite design, etc., and to apply it in a practical and affordable manner to pultrusion process design and control,” he says.

“The correct emphasis isn’t on selling today; it’s on educating,” Martin says. “If we can educate somebody to understand what’s involved in the pultrusion process, it’s relatively easy for them to make a decision about what they want to buy. The challenge is arming industry professionals with that information.” He held a two-and-a-half-day pultrusion seminar in May at his firm’s Oakwood Village, Ohio, conference center. It was attended by 32 composites professionals.

A Future of Bigger Structures, Better Standards

One key trend in the pultrusion industry is the development of better polyurethane chemistry, says Harry M. George, a polyurethanes expert at Bayer MaterialScience LLC, which recently formed a partnership with Martin Pultrusion Group. “Polyurethane is the pultrusion resin of the future,” George says. “Polyurethane chemistry offers many benefits over the chemistries traditionally used in the pultrusion process. Not only can polyurethane chemistries be customized on a project-by-project basis to provide greater strength, as well as better working and performance characteristics than polyester, vinyl esters and epoxies, but polyurethane resins are also free of the hazardous styrene emissions common to polyesters and vinyl esters.”

Another key development, says Witcher, is that cross-sections in pultruding have become larger during the past few years — a possible advantage for engineers and end users in markets such as construction and infrastructure.

Wade Parrow Construction LLC (WPC) recently needed a low-maintenance, high-strength material to replace rotten wooden towers and walkways at an observation facility on St. Paul Island, Alaska. The structures were deemed unsafe for the surveillance of Northern fur seals in the corrosive, arctic salt water environment.

WPC used Strongwell composite products to replace the towers and walkways. To complete the project while seals weren’t on land, WPC worked in the sub-zero temperatures and high winds of winter, and the ease of installing the FRP materials enabled the company to complete the project a year ahead of schedule.

WPC was awarded the Aon Build America Award for Best Renovation of a Federal and Heavy Construction Project from the Associated General Contractors of America. “The electrical utility market is also ripe for pultrusion,” Witcher says. “Because designers and engineers from electrical utility companies are becoming more comfortable with specifying FRP composites for use as poles, towers and cross arms.” Those designers and engineers appreciate structural performance and durability, and to some degree, the industry is still constrained by lack of standards and communication in structural applications, experts say.

Standards play an important role in acceptance of new materials. A design standard is an engineer’s tool to guide the process of selecting the right material when performing structural design for civil engineering structures. A standard provides credibility of a material used in structural applications; identifies performance criteria for design, specification and installation of products; reduces liability exposure for both the designer and manufacturer; and educates engineers on the proper use of materials.

To that end, the American Composites Manufacturers Association (ACMA) Pultrusion Industry Council is developing a Load Resistance Factor Design (LRFD) standard for FRP pultruded structures. This standard would provide critical information for designers and engineers to specify pultruded FRP composites as a replacement for traditional construction materials.

“The benefits of pultrusion are clear, and with ongoing innovation and better communication to engineers and end users, the future looks bright for this area of the industry,” Witcher says.

Darin Painter is a freelance writer based in Cleveland, Ohio.
The process to develop a standard can be slow, especially when it’s on the cutting edge of a technology or introducing new materials and technology to designers, engineers, and specifiers. Such is the life of composites. In order for a standard to be successful, it takes the commitment—both technical and financial—of many industry stakeholders such as material suppliers, manufacturers and consultants to ensure what is written can be manufactured and produced. The American Composites Manufacturers Association (ACMA) Pultrusion Industry Council (PIC) represents such a commitment and foresight that will best position growth for this area of the composites industry.

Pre-Standard to Ballot
In November 2010, the American Society of Civil Engineers (ASCE) delivered an important document to the ACMA and the Pultrusion PIC that would educate structural and civil engineers in the design of structures using pultruded profiles. This document, Pre-Standard for Load and Resistance Factor Design (LRFD) of Pultruded Fiber Reinforced Polymer (FRP) Structures represented three years of dedicated effort from leading manufacturers in the pultrusion industry and leading academics with significant knowledge in testing and design of pultrusions to develop this cutting edge design protocol that will expand existing and open new markets for composite applications.

Then in January of this year, the ASCE assembled the Fiber Composites and Polymers Standards Committee (FCAPS) to start the first ballot of the LRFD Pre-Standard commissioned by ACMA. The standards committee, comprised of individuals representing the producer, user, regulatory, and general interest communities, held its first meeting in mid-April after the first ballot was canvassed in March (a process where a formal ballot is issued to members of a committee for a specified period of time that makes the vote valid.) The ballot results were a mixed; several chapters within the Pre-Standard received positive votes while others had negative votes. Once all results were in, committees were formed by members of the FCAPS Committee to address issues associated with each chapter that didn’t pass.

The committees are currently working directly with LRFD chapter authors to address the issues brought up by voting members of the FCAPS Committee. In total, four subcommittees were formed to review specific chapters. These issues are of course resolvable but will require hard work on the pultrusion industry’s part. The FCAPS Committee and chapter authors are scheduled to meet in early summer to address all outstanding issues in preparation for another ballot that is expected to be canvassed before the next face to face

PIC Focuses on Further Industry Education
At the annual PIC meeting held during the American Composites Manufacturers (ACMA) COMPOSITES 2011, in Ft. Lauderdale, Fla., the Pultrusion Industry Council (PIC) Marketing Committee created a sub-committee focused on promoting the LRFD led by Dustin Troutman, Creative Pultrusions, Inc. The committee will work to create complementary tools to educate engineers including software, textbooks, and complimentary design aids that will be useful for structural engineers. A major challenge for the PIC will be obtaining the financial resources needed to continue the mission of making the most from the LRFD by educating engineers. For more information on how you can get involved, contact John Busel, ACMA's director of Composites Growth Initiative at jbusel@acmanet.org.
In January of this year, the ASCE assembled the Fiber Composites and Polymers Standards Committee (FCAPS) to start first ballot of the LRFD Pre-Standard commissioned by ACMA. The eight chapters reviewed are:

Chapter 1: General Provisions
Chapter 2: Design Requirements
Chapter 3: Tension Members
Chapter 4: Compression Members
Chapter 5: Flexural and Shear Members
Chapter 6: Combined Forces & Torsion
Chapter 7: Plates and Built-Up Members
Chapter 8: Bolted Connections

Next Steps for LRFD
The members of the FCAPS Committee requested an ANSI endorsed document from the composites industry in order for the code to be referenced in the LRFD standard. According to the Committee, this ANSI endorsement will further legitimize the work being done, making it more binding within the industry as a whole. With that in mind, the PIC is converting the ACMA Industry Guideline into an ANSI standard.

In the interim, however, the Pre-Standard code can be referenced in the LRFD commentary until such a time that it becomes an ANSI standard, at which time the code can be referenced in the LRFD standard. In conjunction with these efforts, the PIC LRFD Technical Committee, led by Dan Witcher, chief structural engineer at Strongwell, drafted a new composites industry document Code of Standard Practice for Fabrication and Installation of Pultruded FRP Structures. This document, which ACMA soon plans to publish as an industry guideline, will serve as a companion document to the published ASCE standard and is intended to provide recommendations for construction contract documents, as well as procedures and practices for the fabrication and installation of pultruded FRP structures that is followed by the pultrusion industry manufacturers.

Within the last several years a lot has been done to better position the composites industry for future growth but the job is not done yet. There is much more to come in this year alone within the ASCE FCAPS committee. But one thing is certain, the LRFD Pre-Standard is well on its way to becoming a standard.

John Busel is director of Composites Growth Initiative at the American Composites Manufacturers Association (ACMA). Email him at jbusel@acmanet.org.

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Shape Your Industry by Joining a Committee Now

July 1 marks a new fiscal year and a change of leadership for ACMA. We welcome Lori Luchak, president of Miles Fiberglass, as the new president of ACMA. She brings vision, energy, and a long history of service to the Association and an impressive list of accomplishments. She follows Monty Felix, who had a very productive time as president-elect and president. During his term, Monty:

• Led the Strategic Planning Committee, which set a new course for ACMA and revitalized programs.
• As treasurer he overhauled ACMA’s finances and financial reporting.
• As president, created a new vision for the Composites Growth Initiative committees, giving them new prominence and more resources in the organization.
• Built off of the significant work he did as the Government Affairs Committee chairman to launch the Congressional Composites Caucus, where Members of Congress work closely with the industry on issues that impact us as manufacturers.

This shows how much impact any one member can have on our industry by working through the ACMA. Your association is a vehicle to enhance and grow your business. But like any vehicle, it won’t go anywhere unless you get behind the wheel and turn the key. As we start a new fiscal year there are numerous opportunities to participate in ACMA’s many committees. I encourage you to think about how you can benefit your company and the industry by serving on an ACMA committee. It is not a significant time or travel commitment but you will have additional benefits as you have an opportunity to work with the best and the brightest in the industry.

For more information, visit our website or email me at tdobbins@acmanet.org.

Tom Dobbins, CAE

ACMA Presents on Composites Opportunities at SAMPE Conference

At this year’s SAMPE Conference, held May 23 in Long Beach, Calif., ACMA’s Director of Composites Growth Initiative John Busel participated in a panel session organized by ACMA Past President Bill Kreysler, Kreysler & Associates. The panel session entitled The Other 95 Percent: Opportunities Outside Aerospace focused on manufactured composites that serve the construction, infrastructure, corrosion, automotive, sports, electric utility, architectural, and wind energy industries. For more information on this panel session, contact John Busel at jbusel@acmanet.org.

Plant Tour and Press Conference Results in Local Coverage

Bristol, Va.-based company Strongwell hosted a plant tour, inviting local media and elected officials. The plant tour, led by CEO John Tickle, highlighted the benefits of composites and potential for job loss that could occur if styrene is listed as a carcinogen. The tour even made a front-page newspaper story and TV coverage.

To read the newspaper article, view the TV coverage, visit ACMA’s Wiki site at http://acma-regulatory.wikispaces.com. more information on how you can plan a plant tour for your elected officials, contact ACMA’s Jonathan Roberts.
**New Members**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Location</th>
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<tbody>
<tr>
<td>Apex Alternative Access</td>
<td>Spokane, Wash.</td>
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<tr>
<td>BGF Industries, Inc.</td>
<td>Greensboro, N.C.</td>
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<tr>
<td>Blackfleet Advanced Technologies</td>
<td>Browning, Mont.</td>
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<td>Butler Community College</td>
<td>Andover, Kan.</td>
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<td>Containment Solutions, Inc.</td>
<td>Conroe, Texas</td>
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<td>General Plastics &amp; Composites</td>
<td>Houston, Texas</td>
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<tr>
<td>Green Mountain Pipeline Service</td>
<td>South Royalton, Vt.</td>
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<td>Inliner Technologies, LLC</td>
<td>Paoli, Ind.</td>
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<td>KEIR Manufacturing, Inc.</td>
<td>Brevard, N.C.</td>
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<td>National Association of Sewer Service Companies</td>
<td>Owings Mill, Md.</td>
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<td>Norplex-Micarta</td>
<td>Postville, Iowa</td>
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<td>Stahlin Enclosures</td>
<td>Stahlin, Mich.</td>
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<tr>
<td>Twin City Fan &amp; Blower</td>
<td>Plymouth, Minn.</td>
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<td>United Initiators, Inc.</td>
<td>Elyria, Ohio</td>
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<td>University Of Texas at Austin</td>
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**New CCTs**

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<tr>
<td>Miguel Ambriz, CCT</td>
<td>American Canyon, Calif.</td>
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<tr>
<td>Matt Arrant, CCT-WBR</td>
<td>S. D.</td>
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<td>Brandon Bassett, CCT</td>
<td>Atwater, Minn.</td>
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<td>Scott Bridges, CCT-WBR</td>
<td>Happy Valley, Ore.</td>
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<td>Scott Bruce, CCT</td>
<td>Kansas City, Mo.</td>
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<td>Cid Cabeza, CCT-CP</td>
<td>Sao Paulo, Brazil</td>
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<td>Deborah Cannon, CCT-CP</td>
<td>Deborah, Minn.</td>
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<td>Cayce, S.C.</td>
<td>Chennai, India</td>
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<td>Charles Carignan, CCT</td>
<td>St-Georges, Quebec, Canada</td>
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<td>Simon Carter, CCT</td>
<td>Mississauga, Ontario, Canada</td>
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<td>Rick Casey, CCT-WBR</td>
<td>Tiverton, R.I.</td>
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<td>Christopher Cox, CCT-CP</td>
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<td>Scott Doering, CCT</td>
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<td>Eric Doyle, CCT-WBR</td>
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<td>Franco Fernando, CCT-C</td>
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<td>Dan Foley, CCT</td>
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<td>Richmond, Minn.</td>
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<td>Gabino Gil, CCT</td>
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<td>Caldwell, Idaho</td>
<td>Matthew Hart, CCT-CP</td>
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<tr>
<td>Robert Henry, CCT-C</td>
<td>Aberdeen, S.D.</td>
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<tr>
<td>Washougal, Wash.</td>
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Straight From the Source: Industry Leaders Speak Out

< Five Steps Needed for a “Composites Revolution”
Rahul Pangre is the founder and director of Eternus Carbon Composites in Mumbai, India. His interest in car racing and bikes exposed him to advanced composites and in 2002 he founded Eternus Carbon Composites, which focuses on developing advanced composite applications.

One Company’s Approach to the Growing Demand for Composites
Tom Pilette is vice president of product and process development for Magna Exteriors and Interiors of Troy, Mich., a designer, developer and manufacturer of automotive systems. He has been with Magna for 17 years, and has 25 years of automotive composites experience. Some of his previous positions include operations group general manager, business unit director, engineering director and manager of program management.

< Three Key Motives Driving Automotive Manufacturing
Vineet Kapila is the automotive product marketing manager for the Americas of materials-supplier Styron in Detroit. He has over 15 years of experience in the automotive industry, first as a manufacturing and product engineer with Ford Motor in 1995, and later in marketing roles at Bayer Material Science and BASF and is a member of the board of directors for the Society of Plastics Engineers (SPE)—Detroit section.

Composites One COO on Closed Molding, Future Trends and More
Leon Garoufalis is the president and COO for Composites One. He began his tenure with GLS Composites Distribution Corporation (later part of the joint venture forming Composites One) in 1988 as a resin product manager. Over the past 22 years he has held various sales, marketing, operations and executive management positions.

To read the interviews with these and other leading members of the composites industry, visit www.compositesmanufacturingblog.com and click on “Q&A Interviews.”

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Testing of the Piranha, a new unmanned vessel by Ohio-based Zyvex Technologies, was not just another smooth boat ride on calm waters. The 54-foot carbon nanotube (CNT) reinforced carbon fiber boat, designed for use as a surveillance vessel against piracy and drug runners, underwent testing in Washington’s choppy Puget Sound against 12 feet high waves—and conquered them.

To read more about it, turn to page 6.

1. Removed mooring poles from back left side.
2. Removed passenger on front left side of boat.
3. Removed gray from mid-back side of boat.
4. Added second tower, left side of photo.
5. Added second Coast Guard boat to back right.
6. Added channel marker with osprey nest, left side of photo.
7. Added osprey flying, top right of photo.
8. Removed lettering on boat to the left of the photo.
9. Life preserver added on boat to the left of the photo.
10. Removed piling from top right of photo.
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