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CM Online Exclusive: Follow a Car with CFRP through Production
More than 20 percent of the new Volkswagen XL1 series of cars are made from CFRP. The fuel-efficient vehicles, covered in the automotive article in this issue on page 14, went into production in 2013. Volkswagen provided an all-access look into the production process: You can read the article at compositesmanufacturingblog.com by clicking on the “Online Exclusives” tab.
A Message From the ACMA Chair

Sowing Seeds for Industry Success

As we head into spring, I thought an agricultural analogy seemed fitting for this column. Spring is when farmers plant their crops, hoping for a successful harvest in the fall. At ACMA, we too have been busy planting the seeds for success. Let me give you a few examples.

By now you’ve all heard about our “new crop,” CAMX – The Composites and Advanced Materials Expo to be held Oct. 13-16 in Orlando, Fla. CAMX continues to grow as new exhibitors sign up – more than 325 as of February – and educational programs are added. The planning is nearly complete, and the result will be bountiful. For up-to-date information, check out the website at theCAMX.org.

Another packet of seeds is being sewn by ACMA’s Composites Growth Initiatives (CGIs). Each of the 12 CGI committees are hard at work establishing standards and specifications that encourage the use of composites, launching websites to produce leads for members and forming strategic alliances with industry leaders. March is CGI month. It’s a great time to join a committee and reap the benefits. For an in-depth look at what some of the CGI committees have been up to – including a ground-breaking Composites Pavilion to be held at the American Institute of Architects’ annual convention – read the article on page 29.

Next, I would like to touch on the association’s effort to generate funding from grants distributed by federal and state agencies. To tap into grants and grow the industry as a whole, ACMA has teamed up with numerous partners, including a consulting firm, the Oak Ridge Carbon Fiber Composites Consortium and the US Automotive Partnership for Advancing Research and Technologies (USAutoPARTs). We are working hard on this, but the grant “crop” is sometimes slow to develop: The “growing season” may take 18-24 months. The reward, however, is a plentiful harvest. If you would like to roll up your sleeves and get involved in ACMA’s grant activity, contact John Busel, ACMA’s vice president of the Composites Growth Initiatives, at jbusel@acmanet.org.

Finally, spring is a time of renewal. If you have not renewed your ACMA membership, do so now! And if you know other companies that are not current ACMA members, please reach out and encourage them to join. ACMA represents the entire composites industry: If more companies join our association we are sure to create greener pastures for the industry as a whole.

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Composites Manufacturing has been your source for composites insights and analysis for the past 30 years. We are excited to introduce our magazine's new logo, premiering in the May/June issue.

A New Look

Longer, Stronger Turbine Blades

Recycled Composite Applications  What's New in Core Materials  Building Better Bridges

But the Same Great Coverage

*Composites Manufacturing* has been your source for composites insights and analysis for the past 30 years. We are excited to introduce our magazine’s new logo, premiering in the May/June issue.
Does your leadership team get caught up in “people issues” — those discussions about employee problems that eat up valuable meeting time without really accomplishing anything? People problems are a huge drain on your business, both in the lost time discussing these challenges and in the lost business opportunities that result when you don’t have the right people doing the jobs they’re meant to do.

The rise of companies like online shoe retailer Zappos has popularized core values and culture as a solution to a company’s people problems. However, focusing on culture isn’t a catch-all solution. No matter how much time a leadership team spends on developing and communicating its culture or vision, it doesn’t do much good if it doesn’t have the people who are willing and able to execute it.

One powerful solution, propagated by Jim Collins in his best-selling book *Good to Great*, emphasizes getting the “right people in the right seats,” which means matching your team members with the positions that will leverage their best qualities and allow them to thrive. While this sounds simple enough, most companies don’t operate this way. In fact, many leaders and managers hold onto the wrong people — or let good people languish in positions that don’t complement their unique abilities.

For your business to reach the next level, you need people on your team who are able to take the ball and run with it. You need people who are confident in their ability to deliver the goods, to get results. This happens when you’ve matched the right people to the right seats. And when everyone on your team is in the right seat, you’ve got a foundation for a great business.

To match team members and seats, we use a simple yet powerful test that I call GWC: When someone is in...
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the right seat, we say that they “get it, want it and have the capacity to do it.”

Here’s what each of these criteria looks like:

**Get It** – When it comes to their role, the company culture and the systems that are in place, people either “get it” or they don’t. Although not everyone gets it, there are plenty of people out there who do. Don’t waste your time on the people who don’t.

**Want It** – When someone genuinely likes his or her job, it shows. He or she takes the time to understand the role, embraces the responsibilities of the position and accepts fair compensation to execute it. If, for example, you find yourself having to beg someone to take a job, you’re going to end up with a person who doesn’t genuinely want it. You’ll be better off looking for another candidate.

**Capacity to Do It** – Capacity isn’t just about having the knowledge to do the job, but also the time as well as the physical and emotional capacity. Some roles may require more hours than a person is actually willing to work each week – or they may require skills that a person simply doesn’t have. Make sure that the role suits a candidate’s capacity before making a hire.

These principles go for your existing employees as much as future hires. Think about all of the people your company employs. Is anyone sitting in a seat who doesn’t get it, want it or have the capacity to do the job? If you have someone occupying a seat who doesn’t pass the GWC test, it’s time for a change. You owe it to that person – and to your company. It may feel like a tough decision in the moment, but it’s what both parties need to be able to move forward and make progress.

Kevin J. McArdle is the founder of McArdle Business Advisors and the author of *The Six Deadly Marketing Mistakes – and How to Fix Them.* For additional resources on moving your business forward, visit McArdleBusinessAdvisors.com.

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Composite Roofs Crown Rail Stations

In one of the most extensive uses of advanced composites in the architectural industry to date, Saudi Arabia’s $7 billion Al Haramain high-speed rail project includes four passenger stations with a total of more than 160,000 square meters of fiber-reinforced plastic (FRP) roof panels. The 275-mile railway – the first high-speed rail in the Middle East – will link Jeddah, King Abdullah Economic City and the Muslim holy cities of Mecca and Medina. Travelling at nearly 200 mph, the high-speed trains are expected to reduce congestion during the annual Haj, when millions of Islamic pilgrims from around the world visit Mecca.

The expansive project was a collaboration between the architectural firm Foster + Partners and the civil and structural engineering company Buro Happold in Abu Dhabi. Each rail station will include quarter-mile long platforms, mosques, helipads, shops and restaurants. The roofs are being built using modular construction, with 65 FRP panels assembled into 27 x 27 meter modules before being lifted onto the supporting steel structure.

Panels for the 28,000-square-meter Medina station roof are currently being produced and installed by Premier Composite Technologies of Dubai. Premier joined the project in 2009 when Foster + Partners and Buro Happold were exploring material options for the roofs. During this phase, Premier worked with material supplier Gurit and the designers to conduct feasibility studies, model structural behavior using finite element analysis and finalize the concept design.

Participating in this preliminary stage is critical to the success of composites in architectural projects, says Mark Hobbs, senior engineer at Gurit. “Although composites have been used for almost 50 years in facades and things, they are still seen as quite a novel material in that industry,” he says. “As a result, designers aren’t really very familiar with composites, what they can do or how to best use them.”

The design team opted to use composite panels for the rail station roofs because they provide numerous advantages over traditional materials like concrete. Foremost, composite panels are lightweight. The Medina station roof weighs just 750 tons, resulting in a lighter supporting steel structure and smaller foundations. This, in turn, offers a significant cost savings.

Prefabricated composite panels also allow for quick installation, which was a key requirement for this fast-paced project. The fire-resistant FRP panels also integrate aluminum-framed windows, reflective light shafts, suspension systems for cleaning cradles, roof cappings and external walkways, providing a turnkey solution.

Premier Composites is producing 2,048 panels for the Medina station, the largest of which measures 9 ½ x 2 meters. These advanced FRP sandwich panels feature a structural foam core between two skins of glass reinforced epoxy. Laminated female molds are first layered with quadraxial E-glass fabric that has been impregnated with Gurit’s Ampreg 21FR (fire retardant) epoxy resin.

The next layer consists of Gurit’s fire-retardant G-PET 75 FR LITE™ foam core, followed by more layers of glass fabric. The entire mold is then vacuum-bagged and cured at 50 degrees Celsius overnight. The Ampreg 21FR wet laminating system, which was first developed to produce panels for the 45,000-square-meter façade of the Mecca clock tower in 2012, features a very long working time that allows for this single lamination sequence.

After curing, the finished panels are bolted together into larger modules, which are then tiled and disassembled for transport. The panels are then re-assembled into 27 x 27 square meter sections on site and hoisted by crane onto the main steel structure. The station is expected to be completed later this year.

Projects such as this one point to strong potential growth for composites in architectural structures, says Hobbs. “We are seeing much more interest in composites in architecture,” he says. “They are still seen as quite novel, whereas composites have been used in other markets like aerospace, marine and transport for quite a number of years. …It’s an interesting area for us to take technology that’s well proven and bring it into a new field.”

Melissa Haley O’Leary is a freelance writer based in Cleveland. Email comments to mxh144@case.edu.

For more stories like this, visit compositesmanufacturingblog.com and search “architecture.”
When Textron AirLand LLC, a joint venture between Textron Inc. and AirLand Enterprises LLC, was established to rapidly design and manufacture an affordable, versatile, tactical military jet, common wisdom was against the company. “The development schedule for military aircraft through the traditional RFP process can be 10 to 20 years,” says Dave Sylvestre, director of corporate communications for Textron. “We saw a market opportunity for this military jet, and we didn’t think it was in our benefit to wait that long.”

The Scorpion Intelligence, Surveillance and Reconnaissance (ISR)/Strike aircraft program kicked off in January 2012 and launched its first flight Dec. 12, 2013. The jet features an all-composite airframe and structure. “Leveraging commercially available technologies and processes developed by affiliated companies Cessna and Bell Helicopter, we were able to develop the Scorpion in under 23 months,” says Sylvestre. “That, in the military market, is almost unheard of.”

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The Scorpion was independently designed to meet a gap in the military market between turbo propeller-operated aircraft that perform surveillance and the opposite end of the spectrum, more advanced combat aircraft such as the F16, F18 and F35. Textron AirLand’s goal was the middle ground, providing speed and range capability with an economical configuration that recognizes current constraints impacting many government budgets. The Scorpion is ideally suited for border and maritime security missions, counter narcotics, irregular warfare support, humanitarian assistance/disaster response and aerospace control alert.

The Scorpion program’s ambitious goals included a purchase price of below $20 million per jet and a flight per hour cost of less than $3,000. By comparison, operation of the fourth and fifth generation F16 or F18 fighters can be as much as $14,000 to $15,000 per hour, according to Textron AirLand President Bill Anderson. “We surmised that if we could make a strong, solid and stable jet without the issues posed by metal aircraft, we would achieve a low cost for operation as well as reduce the ownership cost over the life of the aircraft,” says Sylvestre.

Enter the approximately 200 development engineers, technicians and mechanics – primarily from sister company Cessna – who fast tracked their work on the Scorpion program in “The Glass House,” Cessna’s development facility located adjacent to Fort McConnell Air Force Base in Wichita, Kan. “Composites are a big part of the Scorpion’s story,” says Sylvestre.

“The lighter the jet, the more you can carry, including a large, modular interior payload bay meant to house high-technology equipment for reconnaissance such as sensors, cameras, computer components, cooling equipment and wiring. Composites are light weight but they are durable.”

Seven suppliers provided composite parts for the Scorpion, and Textron AirLand produced more than 700 composite parts in house. The Scorpion’s primary structure, fuselage, wings, empennage and control surfaces are made predominantly from composite materials. The primary structure includes a mix of unidirectional and woven carbon fibers, depending on the specific needs of the parts. The aircraft utilizes the HexPly® 8552 epoxy resin system, which has already been used for commercial aircraft at Cessna. “Since the development schedule was so tight, we wanted to use a proven material,” says Dale Tutt, chief engineer for the Scorpion program.

The Scorpion’s composite structures have a high level of corrosion resistance and address fatigue characteristics that can occur with metal structures. “We were

The maximum speed of the Scorpion is 450 Knots True Airspeed, which indicates airspeed adjusted for altitude and temperature. This translates to approximately 520 mph.
looking for a 20,000-hour life span, and composites helped us achieve that,” says Ben De Putter, fuselage team lead for the Scorpion program. “It’s not unachievable with metals, but you have to keep adding weight to get there, which is not desirable for overall operation costs.”

De Putter and his team discovered another advantage. “Composites have proven to be very robust in our manufacturing environment,” says De Putter. “For example, when manufacturing a typical solid laminate, we can’t vary too much from the specification. But the composites we used are not overly sensitive. They are reasonably tolerant of variation in cycle time, temperature and pressure, within spec. It gives us more flexibility from a quality control standpoint.”

Composites were also chosen for their life-cycle costs, adds De Putter. “In the design methodology we chose, large laminate structures made of composites can be easily maintained and repaired – on the assembly line or out in the field,” he says. “We can repair rather than replace a whole wing.”

The Scorpion passed its initial flight test in December with flying colors. Test pilot Dan Hinson, a former U.S. Navy pilot, indicated the jet is very nimble and responsive but solid and stable as well. Since its first flight, it has made at least five additional flights, and ground vibration testing was conducted during the first two months of 2014.

Textron AirLand’s next challenge is to identify buyers for the Scorpion. The company considers the U.S. Air National Guard as a potential fit. They are also targeting allied nations that may require tactical aircraft but not at the price of high-end fighter jets. Some countries could see it as a cost-effective alternative to replace turboprop reconnaissance aircraft with a capable jet aircraft.

But for now, the project team celebrates each flight the Scorpion makes. “Our initial success definitely has us feeling good,” says De Putter.

Patrice Aylward is a communications consultant based in Cleveland. Email comments to paylward@aol.com.

For more stories like this, visit compositesmanufacturingblog.com and click on the tab marked “military.”
Milwaukee installed a combined sewer system in 1925 to collect rainwater runoff, domestic sewage and industrial wastewater. But the old sewer system is inadequate for a modern city with nearly 600,000 residents and 39,000 business establishments. So in 2013, Milwaukee embarked on a sewer upgrade, which included the largest fiberglass sliplining project in North America.

The upgrade was imperative because the sewer system overloaded during heavy rainfall. “The sewer was showing structural distress, developing cracks throughout,” explains Timothy Thur, Milwaukee’s chief sewer design manager. “There were multiple leaks through the cracks and significant ground water infiltration. Large mineral deposits were also present at various locations in the sewer.”

As part of the upgrade, the city rehabilitated a 4,500-foot section of the existing combined sewer. The pipes are buried 63 to 103 feet below ground. “Many of the older sewer pipes are now located under other utilities, streets or even businesses, so rehab [rather than pipe replacement] allows the utilities above to be minimally affected,” says Kim Paggioli, principal engineer and vice president of marketing and quality control at Hobas Pipe USA.

Thur and his team looked at both cured-in-place pipe (CIPP) and sliplining for the repair. Because of the depth and amount of flow in the sewer, the city opted for sliplining using fiberglass mortar pipe. The project contractor, Michels Corporation, selected Houston-based Hobas Pipe USA to supply the pipe.

With sliplining, a smaller carrier pipe is installed – or slipped – into the existing host pipe. The space between the two pipes is grouted and each manhole is sealed. Sliplining is a very cost effective and easily installed rehabilitation method, which is especially important in populated areas since it minimizes the disruption of businesses and highways.

Hobas Pipe manufactured a 126-inch diameter centrifugally cast, fiberglass reinforced polymer mortar pipe (CCFRPM) for this project. “There are other fiberglass pipes and other centrifugally cast pipes, but the combination we have is unique,” says Paggioli. The pipe incorporates FRP and mortar (or sand). This was the largest diameter custom manufactured pipe ever made by Hobas Pipe and the biggest fiberglass sliplining job done in North America at the time, according to Paggioli.

Centrifugal casting is an automated production process: A computer program controls a feeder arm that continuously inserts three basic components – glass fiber, unsaturated polyester resin and aggregates – into a 6-meter-long rotating mold.

The pipe was designed with a stiffness class of 46 pounds per
square inch (psi) to meet structural requirements. “The ASTM standards require the pipe manufacturer to run the product line through a variety of factory tests including, in this case, ASTM D4161, Standard Specification for Fiberglass Pipe Joints,” says Truong Do, process quality control, Hobas Pipe. “Hobas performed this test on low profile bell pipe joints of this configuration at a test pressure of 50 psi, well above the anticipated operating pressure of the gravity pipeline.”

Once the pipe was delivered, Michels used an industrial tow tractor – or tugger – to pull it through the sewer and a skid steer to follow and assist in pushing, setting in place and final blocking. The pipe was installed in only four runs – ranging from 267 feet to 1,372 feet – through three manholes and two shafts used to drop materials down into the sewer pipes. The installation occurred in a live sewer tunnel, but the water was only six to 12 inches deep, says Russ Pollard, project manager at Michels Corporation.

After installation, grouting was added to fill the annular (ring-shaped) space between the existing pipe and the new fiberglass pipe. This increases the life of the pipeline and reduces the possibility of collapse as the original host pipe weakens.

“Due to the size of the pipe, it was a little more cumbersome than smaller diameter pipe, but once we developed a safe procedure and system of installation, the install went smoothly,” says Pollard. Milwaukee plans to evaluate its remaining original sewer pipes in the next few years for potential rehabilitation.

Terin Bufford is the communications coordinator at ACMA. Email comments to tbufford@acmanet.org.

For more stories like this, visit compositesmanufacturingblog.com and click the tab marked “infrastructure.”
Fresh off the heels of this year’s North American International Automotive Show in Detroit, where automakers have previewed their latest and greatest models, features and technologies, it is clear the composites industry continues to make strides. But where exactly does the industry stand and what will it take to get to the next level of adoption, especially among the main automotive manufacturers?

Taking Inventory
Research and innovation within major automotive manufacturers around the globe are largely driven by two primary forces – meeting the Corporate Average Fuel Economy (CAFE) standards of 36.6 mpg by 2017 and 54.5 mpg by 2025 as well as CO2 emissions standards in Europe.

To meet the demand for fuel economy, automotive manufacturers are turning to suppliers to help them shed weight; and this is where composites are gaining a foothold. OEMs need to make big changes to their vehicle lineups during the next decade or so to achieve these more stringent standards, giving them roughly two design cycles (already reduced down from nine years to seven years) to adopt these changes.

Meanwhile, the International Organization of Motor Vehicle Manufacturers reports that approximately 63
Composites: No Longer the Odd-Component Out

The BMW i3 is the first mass production car to have most of its internal structure and body made of CFRP.

fenders, hoods and roofs. It shaves an impressive 73 minutes off process time, down from 90 minutes to 17. Prodrive Composites, based in the United Kingdom, developed a new process where fixings can be incorporated into injection-molding plastic parts on the back of CFRP components. “One of the challenges of using CFRP panels and trims is the provision of fastenings for their attachment,” says Dominic Cartwright, managing director of Prodrive Composites. “Conventional solutions involve creating a complex carbon shape to carry the fittings, which adds significant cost to the manufacturing process. After a year of R&D, we’ve created a process that gives the same superb finish, but at a fraction of the cost and with greater mechanical strength.” (To read the full interview with Cartwright of Prodrive, go to compositesmanufacturingblog.com and click on “CM Interviews.”)

OEMs Make Composites Inroads

The regulatory ticking time clock makes joint ventures such as Toray with Magna International and Plasan Carbon Composites with Global Machine Manufacturing Co. and Weber Manufacturing within the composite industry as well as BMW and SGL Group between OEMs and composite manufacturers increasingly important. “Each group is focused on a wide range of manufacturing techniques to reduce cycle times of composites as well as create stronger, lighter parts,” says Terry O’Donovan, vice president of marketing and sales for Core Molding Technologies and chair of ACMA’s Automotive Composites Alliance. “In terms of composite solutions the sky’s the limit as people create new ways of joining, fastening and manufacturing, which is spurred by successes in the high-performance automotive market, which is in turn spurred by successes in the aerospace industry.”

Luciano De Oto, Lamborghini’s division chief for the Advanced Composites Division, agrees. “Formula 1 was the first to use composites in 1981. Lamborghini soon used the same thing,” he says. “We see ourselves as a bridge when it comes to composite adaptation. We adapt what is done in the super sports arena, do research to reduce costs and production, utilize it, and then look for potential uses within other vehicles within the Volkswagen Group, such as Audi and Volkswagen.”

To an OEM, the goals are simple: It must reduce weight, increase efficiency, reign-in costs and maintain – if not increase – passenger safety. Automotive manufacturers still have a decade to meet CAFE and CO2 standards, but it doesn’t mean they’re waiting around to unveil the latest technologies. Looking at the latest releases provides a glimpse into what OEMs are focused on and how partnering with composite
companies is changing their vehicle lineups.

**BMW – The Trend Setter**

The BMW i3 was first unveiled in 2011, however production of the 5-door hatchback electric commuter car didn’t begin until the last quarter of last year. While the i3 is only one of nearly 100 vehicle models manufactured that features at least some standard equipment made of CFRP, it does have one notable distinction: Most other vehicles in this category are luxury vehicles and supercars, pricing them out of not only large production, but also out of the range the average consumer is willing to spend. “By going into more structural parts of vehicles instead of just body panels, BMW shows the potential of composites within a vehicle,” says O’Donovan.

To achieve light weighting, the model was designed from the ground up and uses CFRP in both its internal structure and the body of the vehicle. With an annual production volume target of 30,000 vehicles, the i3 is the largest-volume production car ever to extensively use CFRP. At this high volume, the i3 consumes more than 9.6 million pounds of finished CFRP in a single year. Take into account that the car is currently on a 6-month waiting list in Europe and not yet available for purchase in the U.S., and demand for CFRP is bound to increase.

BMW can produce such high volumes, the company says, because it has its own production facility for materials. The automaker recently opened a $100 million plant in Moses Lake, Wash., to manufacture carbon strands that form the basis of the i3’s CFRP bodywork. “BMW made a strong statement by doing this,” says De Oto. “For Lamborghini, carbon fiber supply is not as big of a deal because we manufacture a small run of vehicles each year. However for OEMs, supply is a problem; the quantity is so low for potential demand that manufacturers don’t have the power to negotiate price. You either have to produce it yourself or make an agreement.”

**General Motors – The Prototype**

In November 2013, GM introduced the Chevrolet Silverado Cheyenne concept vehicle. Touting it as the company’s performance-oriented version of the new 2014 Silverado, the Silverado Cheyenne cuts weight and was designed to explore performance possibilities. “The unique lightweight features built into the concept vehicle include CFRP replacements for the bumpers, tailgate and inner cargo box,” explains Jennifer Ecclestone, GM’s manager of engineering and safety communications. “This shaves approximately 200 pounds from the 4,503-pound base curb weight of the 5.3L Silverado.”

The carbon fiber front bumper includes a racing-inspired ground effects styling complemented by CFRP body-side ground effects, while the CFRP tailgate incorporates a spoiler. The company also used its Camaro Z/28 ceramic brakes to save weight. “By using the carbon ceramic-matrix rotors we not only shed weight, but increase driving performance by allowing for more immediate and direct handling,” says Ecclestone. “Created by our design and engineering teams as a ‘what if’ concept vehicle, it allows us to showcase what is possible on the material and technology advancement front.” So, while this exact model is not necessarily something GM will bring to market, the techniques, processes and engineering are certainly something composite manufacturers can look forward to.

**Volkswagen AG – The Envelope Pusher**

Volkswagen began prototyping a “one-liter car” in 2002, reflecting a fuel consumption of less than 1 liter diesel fuel per 100 km (261 mpg) On the official European Drive Cycle NEDC. “In early stages, the cigar-shaped form made it necessary for occupants to be seated behind each other,” says Christian Buhlmann, spokesman for Volkswagen and Volkswagen Products in the Americas. “Further down the engineering and production timeline it became clear that only by using CFRP structures as well as electrification of the drivetrain would the car be able to perform as needed as well as seat passengers next to each other.” This series, officially named the XL1, went into production in early 2013.

VW calls it the game-changer of vehicle
manufacturing because roughly 21 percent of the XL1 is made of CFRP, including the monocoque and wing doors. Designed as a 2-person vehicle able to get 240 mpg on the official European Drive Cycle NEDC, the XL1 is manufactured through patented processes including RTM, assembly, tooling and even painting the CFRP components developed within Volkswagen. For example, the individual CFRP components are joined to one another in the body shell frame through a complex gluing process. “Unlike welded metal parts, the roof of the XL1 cannot simply be placed on the monocoque,” explains Buhlmann. “The strength of the adhesive must compensate for all fit gaps of the monocoque-roof side structure and the thicknesses of the laminated roof. The part is actually made to hover over the monocoque before gluing, which requires precise curing times – and that is just one aspect of the process.”

There are hundreds of composite components, processes and tooling being scrutinized for a better return, from types and formations of fibers and resins to the parts they can produce. Many of these are demonstrated as prototypes within the industry, while others are simply rumors and whispers behind company and lab doors. “These are complicated problems and R&D takes a long time,” says O’Donovan. “The good thing is, a lot of people are working on it from a technical, chemical, tooling and manufacturing point of view.”

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As the new LEED v4 rating system pushes for material transparency and life-cycle details, savvy composites pros can gain business in the building and construction market.

By Darin Painter

To school officials responsible for the $30 million renovation and expansion of the John F. Savage Arena at the University of Toledo, one thing was more powerful than the new video scoreboard, more valuable than the plush corporate suites and weightier than the state-of-the-art training room: A simple conference room table.

Around that table, before new ground was broken, a group of people gathered to discuss how they could work together to make the building as impressive – and as green – as possible. The University of Toledo arena project began with collaboration among an architect, a mechanical engineer, a civil engineer, an electrical engineer, a lighting designer, an acoustician, an interior design team and others. If those people could work cohesively from the get-go, university administrators decided, the building had a better chance for Leadership in Energy and Environmental Design (LEED) Certification from the U.S. Green Building Council (USGBC).

LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high-performance green buildings. The program, which recently announced a new ratings system (LEED v4), promotes a holistic, whole-building approach to sustainability. It recognizes performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Nationwide, more than 900 buildings are now LEED-certified. One of them is the Owens Corning headquarters in downtown Toledo, where Gayle Tedhams works as the firm’s director of sustainability. She and her team aim to get Owens Corning materials specified during the
beginning phases of building design and construction projects, and the company’s products contributed to LEED points earned by the John F. Savage Arena.

“Even before the design phase of a project, it’s effective to have everyone playing from the same pages of the book,” Tedhams says. “In the composites industry, if you can help a designer, builder or general contractor meet LEED requirements and explain how you can do that from the outset, you’ll have a much better chance of being specified for a project. It’s a big competitive advantage when any company can help building officials meet their sustainability goals.”

A stated goal at the University of Toledo for the past several years has been to achieve at least a LEED Silver rating for all construction projects, which equates to 50 LEED points. (Material & Resources, the category most relevant to composites firms, account for up to 13 of those points. See the three “LEED v4 Points Charts” on p. 20.)

The arena renovation and expansion went beyond that mark, achieving a LEED Gold rating, the second-highest certification in the four-tier system.

“It was a great example of how having an integrated design strategy is more valuable than ever,” Tedhams says. “The composites industry is always looking for opportunities to advance and grow, so we should all understand how LEED and other initiatives like it are evolving. Doing so will improve how we go after business.”

**Behind the Push to Disclose Ingredients**

Before LEED was introduced in 1998, buildings essentially were constructed as a series of independent systems. Those elements – roofs, panels, heating systems, etc. – were basically put in place to keep the outdoors out. LEED challenged that status quo, supporting the notion that buildings are more like living organisms with interconnected parts.

On the heels of the November 2013 launch of LEED v4, the program has gone from a set of aspirations to a marketplace standard, mainly because energy efficiency and sustainability goals have become commonplace, says Bob Moffit, product manager at Ashland Performance Materials in Dublin, Ohio, and chair of ACMA’s Green Composites Council.

Energy-efficient buildings once seemed nice; now many decision-makers deem them necessary. They help to decrease utility costs, use less water, consume fewer resources and reduce the environmental footprint on the planet.

“With heightened interest in sustainability and LEED certification, more builders are looking beyond traditional materials for green alternatives,” Moffit says. “Composites are a great option, if the builders can find the fabricators to provide the right materials. This is what our industry needs – a chance for the building community to hear of the value composites can offer, like design flexibility, durability, low weight and dimensional stability. It’s what building specifiers want to hear.”

But today, what those specifiers *see* can be even more important. They want proof that materials used for building construction lack potential environmental and safety hazards. To that end, more architecture and design firms are placing limits on who they’ll work with and what products they’ll put in showrooms, Moffit says.

The USGBC isn’t the only organization driving the increased commitment to green materials, says Ken Schmidtchen, engineering manager at Kalwall Corporation in Manchester, N.H. Groups like the HPD Collaborative (hpdcollaborative.org) are also responsible for the transparency push.

HPD stands for “Health Product Declaration.” It’s a public statement of product content and risks associated with exposure to individual ingredients. HPDs are written into LEED v4 as a tool for measuring point requirements. The HPD Collaborative, supported by large firms from the architectural and design community, makes available a standardized format for disclosure of product contents, emissions and health information. The format is intended to help designers, building owners and others make informed purchasing decisions.

“If I’m making a composite part, I need to report all ingredients used and the potential hazards of those ingredients – not just on my polyester resin, glass and filler, but also details back upstream,” says Schmidtchen. “The struggle a lot of people have with the HPD Collaborative is that a composite is a cured state, so it’s much different from a hazard standpoint than the individual ingredients used to make the polymer, glass or filler. For better or worse, the HPD assesses the hazards of those individual raw materials like it does the product itself. The good news is the group hasn’t chipped its standard into stone. They seem to be open to revision and modification based on cogent input from manufacturers.”

Moffit adds, “The standards for LEED certification will continue to evolve, but it’s apparent that the push toward transparency is unlikely to go away. This is important, because more people are going to be asking, ‘What exactly is in this product, and what’s it going to do to me and our environment?’ You have to be prepared to answer that question reasonably and knowledgeably.”

(An ad-hoc committee of ACMA's Green Composites Council is planning to launch a series of webinars to educate composites pros on LEED v4. Look for more information in upcoming issues of Composites Manufacturing.)

Moffit points out that the composites industry is already committed to the overall concept of product transparency, through efforts to produce life cycle assessments and life cycle inventories that share information on composite products and processes. “It’s just that what’s being asked for now goes beyond that,” he says. “These kinds of requirements aren’t going away. More end users are focused on making transparency a regular part of their project plans.”

**ACMA**

[www.acmanet.org](http://www.acmanet.org)
A few months ago, a global architecture, engineering and interior design firm specializing in the healthcare and education markets sent product manufacturers a letter. The end of the first paragraph read, “Transparent information related to product content and direct health hazards of building components is imperative.” It went on to say that by Jan. 1, 2015, only products supported by HPDs or that show material transparency in a similar way “will be allowed in our library and selected for inclusion in our products.”

That kind of communication underscores an important point. The onus is on composites firms to get their materials into the mainstream, particularly in the building and construction market. And as they try, architects are becoming increasingly wary of false-claim “green washing.” The composites industry can use this sentiment as an opportunity to show its abilities and benefits, Moffit says.

After analyzing LEED v4, composites experts agree, opportunities exist for composites companies under almost every category. Some categories are easy to draw a connection between the LEED requirement and the composite part, such as the use of rapidly renewable content or recycled content. Other requirements aren’t defined outright, but drive use of composites through application needs such as use of fiberglass tanks and piping in water conservation and re-use systems.

But LEED v4 points require legwork. For example, for a project to gain points in the Materials & Resources category, Schmidtchen says, a composites firm might have to refer to a Material Safety Data Sheet from a resin supplier, or go back to a supplier and say that Chemical Abstracts Service numbers are needed. “Basically, it can seem like a supply-chain research exercise,” he says.

Timeliness of that exercise is important, too. Steve Brauneis, LEED certification quality assurance specialist for the Green Building Certification Institute, says that when documenting LEED credits in general, and materials credits in particular, “documentation needs to be procured from subcontractors and contractors before they’ve left the job site.”

Moffit believes that in specific LEED categories, such as Material & Resources and Energy & Atmosphere, composites companies are well-suited to gain business because of the performance and lifetime cost benefits of the industry’s materials. Schmidtchen agrees, citing that Kalwall Corporation has landed business recently through its production of a translucent panel with FRP faces. The product helps to transmit diffused natural daylight from outdoors to indoors, a major energy saver.

Tedhams adds that the push toward product transparency extends beyond the building products market. She says Owens Corning has been asked by furniture producers, ceiling tile manufacturers and others to specify material-ingredient details. “In those cases, we have to figure out what percentage of their product is made up of our product, and then determine what we need to disclose.”

Says Schmidtchen: “It boils down to this: There’s a great chance you’re going to bid on a project soon, and someone with influence is going to say, ‘Oh, by the way, you also have to be on board with product transparency.’ The best thing you can do now is educate yourself on the new LEED standard. The worst thing you can do is nothing – to look around and wonder how to respond, and eventually miss an opportunity to win business.”

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For More Information on LEED v4
The U.S. Green Building Council’s website at usgbc.org/v4 is the best place to go to learn about LEED v4. The site includes numerous free webinars about the standard, details about LEED credit submittal requirements, information on services to make LEED certification easier, reference guides with video tutorials and much more.
Please share with the entire Wisconsin Oven staff how satisfied Sewah Studios is with our new oven. Your product has exceeded our expectations in every way. I can now understand why Wisconsin Oven is said to be the best industrial oven manufacturer in the country. The grant procedures made this project a little out of the norm; however everything went on schedule and as planned; I attribute that to the fine folks at Wisconsin Oven. Again thank you and we look forward to working with you in the very near future.

Bradford Smith, President

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Reinforcements are the backbone of composite materials, providing key properties such as strength and durability. For decades, raw materials including glass and carbon fiber have been processed and tailored to best utilize their physical properties. But as the composites industry changes, so must reinforcements.

“Think about the value that e-glass provides – good mechanical, chemical, thermal and electrical properties,” says Cheryl Richards, business development manager for energy and infrastructure at PPG Fiber Glass. “Composites markets have grown in size and needs and now require performance beyond those traditional offerings.” More end users require properties specific to their niches, whether composites are used in pipes buried underground or roofing high atop new buildings. Yet performance alone isn’t enough in today’s highly-competitive materials market.

“It’s a combination of performance and productivity,” says Chris Skinner, Ph.D., director of product platforms for the Composite Solutions Business at Owens Corning. “Customers are looking at us to bring new solutions to the market that enable them to grow the performance of their products and therefore the application base, but at the same time extend their assets.”

There are hundreds of primary and specialty reinforcements, with suppliers regularly touting new innovations. This article presents a sampling of the latest products that strive to help composites manufacturers improve both the performance and productivity of composites.

Hybrid Yarns

Hybrid yarns, also called co-mingled yarns, are increasingly important as end users seek more functionality from composite materials. Combining two or more distinct reinforcement types allows for certain

Composites manufacturers count on reinforcement suppliers for solutions that enhance performance and productivity.

By Susan Keen Flynn

Calling for Reinforcements
physical or mechanical properties.
One of the newer hybrid yarns on the market is Innegra™ H. Introduced last year by specialty fiber manufacturer Innegra Technologies, headquartered in Greenville, S.C., the product line consists of high-performance olefin yarn co-mingled with other composite fibers, including carbon, glass, basalt and aramid. The combination increases durability and reduces the shattering effect of lightweight composites, according to the company.

BGF Industries, a manufacturer of woven and nonwoven materials from high-performance fibers, has partnered with Innegra Technologies to create Aerialite X fabrics. They join Innegra hybrid fibers with BGF’s custom designs to create robust fabrics for water and extreme sports applications. “Rather than interlayer a solid carbon reinforcement, then a solid Innegra reinforcement, we’ve learned how to intertwine the yarns,” says Denny Liles, technical service engineer for Greensboro, N.C.-based BGF Industries. “Now you have both attributes in one layer – the stiffness from the carrier fiber and the energy dissipation of the polyolefin that will make it more impact resistant.”

The partnership has already yielded results. In September, Dane Jackson won gold in the Freestyle Kayaking World Championships in Bryson City, N.C., riding a kayak constructed from Aerialite X fabrics with Innegra H yarn. Liles hopes success in watersports eventually leads to other markets. “The easiest place to start is in recreational markets, where you can get materials into a water craft in two to five months,” he says. “If it works in a structural laminate there, it can grow into aerospace and automotive, where qualification periods take two to five years and more.”

Non-Crimp Fabrics
The industry is heading toward thinner and lighter plies. Textile company Chomorat developed a new product called C-PLY™. It is a carbon multiaxial product – or non-crimp fabric (NCF) – comprised of unidirectional layers that are mechanically sewn together. It can have plies with a tow spreading process resulting in thickness as low as 75 gsm (grams per square meter) per ply.

John Leatham, director of sales and marketing for Chomorat North America in Anderson, S.C., says C-PLY is different than other non-crimp fabrics because it can incorporate different fiber angles in the multiaxial. Traditional fiber might be ±45 degrees. “Depending on the application, we are able to make shallower angles (±20 to 30 degrees) to tailor the fabric’s properties to meet the customer’s requirements,” says Leatham.

The biggest commercial success for C-PLY to date is in the Audi RS3 Sportback, sold in Europe. Its front fenders were made with a biaxial C-PLY carbon fiber material ±45 degrees. “Shallower angles were not going to provide a benefit in this application,” says Leatham. “Carbon was used for the weight savings, and C-PLY was selected because it could provide a Class A automotive finish.”

Chomorat is excited at the potential for C-PLY, especially in the automotive market with its trend toward lightweighting and improved fuel efficiency. “Because this product is so new and it takes three to four years to get spec’d into a car that’s still on the drawing board, we are working with OEMs and Tier 1 companies,” says Leatham. “I fully expect we are going to be in multiple programs with this product by 2017.”

Specialty Fibers
Reinforcement suppliers respond to market demand for longer wind blades, fuel-efficient cars, thinner circuit boards and more by creating special-purpose fibers.
new advancement at PPG Fiber Glass is its INNOFIBER® glass fiber compositions. INNOFIBER CR is a boron-free modified e-glass engineered to enhance the performance of composites in corrosive environments. INNOFIBER XM is an alkaline earth aluminosilicate glass designed to provide up to 15 percent higher modulus performance, making it well suited for wind blades and auto parts.

“By changing glass chemistry we can provide new features, and who knows where the composite fabricators will take things or what future applications might be?” says Richards. “We tailor reinforcing fibers by using the periodic table and combining that with melting technology and organic chemistry.”

Owens Corning will launch the third generation of its Ultrablade™ fabric solutions this month at JEC Europe. Skinner says the proprietary glass fiber reinforcement system can reduce the weight of wind blades by six to 10 percent. “The focus [in wind energy] is on getting the initial capital cost down, and one of the ways we can contribute is by offering the capability to make a longer blade with the same amount of material or the same size blade with less material,” says Skinner.

While suppliers are hesitant to reveal details about their proprietary systems – or what new fibers are under development – they agree that making advancements is a delicate balancing act. It combines chemistry, extrusion processes, secondary operations such as chopping and more. “We’re playing with all those variables all the time to meet the requirements of our customers,” says Skinner.

The Audi RS3 Sportback features biaxial C-PLY carbon fiber material in its front fenders. Chomorat, which manufactures C-PLY, is opening a new 80,000-square-foot facility in Anderson, S.C., by the middle of this year to produce the material.

The Future of Reinforcements

Chomorat is a 100-year-old company with 50 years of experience in composites. Its recent foray into advanced composites for the automotive industry is exciting – and challenging. “Everyone is trying to pursue this market, so we are working with RTM equipment manufacturers, resin suppliers and others to identify what set of properties can best meet the end use application,” says Leatham. “You’re looking for a Class A finish, durability, non-warpage – a host of attributes that everyone is trying to solve. It’s a big puzzle at the moment.”

And then there’s the issue of the high cost of carbon fiber. “[The industry] needs to look to the future with experts like the Oak Ridge National Lab on things like lowering the cost of carbon fiber,” says Leatham. “That’s going to be integral to market acceptance.”

Suppliers of glass fiber face challenges, too. “Many applications are 30 to 40 years old,” says Skinner. “There’s a lot of pressure from customers to provide solutions that enable them to drive productivity in their processes.” Last year, Owens Corning launched OptiSpray™, reinforcement solutions for spray-on applications in marine, sanitary, transportation and other industries. Skinner says OptiSpray enhances productivity by reducing scrap, resin loadings and consumables.

Richards of PPG Fiber Glass says bringing new reinforcement products to market is a tricky marriage between market needs and production volumes. “It is a chicken-egg scenario, bringing a new glass technology to the market, then gaining qualifications while developing product breadth to meet multiple needs on large production volume furnaces,” she says. “Often times the volumes start out low, and we need to be patient while those volumes scale up. But this is an exciting time.”

Whether reinforcement suppliers are branching into new areas or trying to improve upon existing ones, corporate partnerships within the industry are key. Says Liles, “There’s still a lot of collaboration that needs to be done to make better composite materials and push into areas where composites haven’t ventured yet.”
The American Composites Manufacturers Association offers a full spectrum of new and exciting initiatives this year to advance the composites industry. Perhaps the most highly anticipated addition is CAMX – The Composites and Advanced Materials Expo scheduled this fall at the Orange County Convention Center in Orlando, Fla. Produced jointly by ACMA and the Society for the Advancement of Material and Process Engineering (SAMPE), CAMX features educational programming Oct. 13-16, with the exhibit hall open Oct. 14-16. CAMX aims to connect and advance all aspects of the world’s composites and advanced materials communities, including research and development, engineering, manufacturing, service providers and end users. The expo will cover all end user markets, such as transportation, aerospace, automotive, marine, wind energy, construction and infrastructure. CAMX will replace both organizations’ primary annual events, including ACMA’s COMPOSITES Exhibition and Convention and SAMPE’s Annual Spring Convention. The groups will continue to hold other conferences, workshops and exhibitions, but CAMX is sure to be the go-to event of 2014.

What does that mean for ACMA’s loyal COMPOSITES attendees and exhibitors? They can expect more networking opportunities, joint

CAMX At-a-Glance
What: CAMX – The Composites and Advanced Materials Expo
When: October 13-16, 2014
Where: The Orange County Convention Center in Orlando, Fla.
Why: ACMA and SAMPE, the two leading composites and advanced materials industry organizations, have created a new super industry event that connects and advances all aspects of the world’s composites and advanced materials communities. CAMX is America’s go-to marketplace for products, solutions, networking and advanced industry thinking.
How: Get more details at theCAMX.org. To reserve an exhibit space, contact Sean Nodland at snodland@acmanet.org or 703-682-1673.
With more than 8,500 attendees, 500 exhibitors, and 250 technical and business conference sessions, there will be more chances to network and connect with other like-minded individuals than we’ve had in the past,” says Kevin Spoo, senior research associate at Owens Corning, who has attended ACMA’s COMPOSITES show and SAMPE’s Annual Spring Convention in the past. Spoo is also contributing to the educational planning process for CAMX.

According to Spoo, CAMX will be a great place for companies to send new hires to quickly get up to speed on industry products and processes. The expo also is ideal for companies transitioning into new areas, such as those considering a move from open molding to resin transfer molding (RTM) or vacuum assisted resin transfer molding (VARTM). “The technical and educational sessions focus on processes and materials, things that can be used today and not ten years from now,” he says.

This year, the convention will run for four days instead of three, giving attendees an additional day to network and attend education sessions. ACMA and SAMPE are determined to use this industry event as a catalyst to connect and drive all aspects of the world’s composites and advanced materials communities. CAMX also will feature the ACMA ACE Awards, SAMPE Fellows Awards and University Research Competition, and CAMX Student Poster Competition. Each award and competition recognizes innovative products, research or individuals dedicated to the industry. In keeping some of the COMPOSITES traditions alive, ACMA will hold an awards lunch to present membership awards (the Lifetime Achievement Award, Presidents Award, Hall of Fame Award and Volunteer Award).

As October approaches, both attendees and exhibitors are excited for CAMX. “This show looks to be a great opportunity for companies to present their products and services to a much broader audience through booth displays or technical presentations,” says Spoo. “And it provides the opportunity to expose employees to a diverse assortment of products and services.” CAMX will have all of the wonderful things COMPOSITES attendees love and much more!
Battleground 2014:
How Will Pro-Composites Politicians Fare in November?

By MJ Carrabba

It may still be early in the year, but the 2014 Congressional elections are already heating up. The entire House of Representatives and a third of the Senate is facing elections in November. Between the IRS scandal, the fumbled roll out of the Affordable Care Act and the government shutdown, both parties have raised significant public ire. The economy is on an unsteady path toward recovery and unemployment remains relatively high. In the campaign world, this is the stuff dreams – and attack ads – are made of.

For the composites industry, this election is crucial. Many of our key supporters on Capitol Hill are facing tough re-elections and look to us to support their re-election efforts. Changes in control of either chamber or in party and committee leadership can drastically alter our legislative horizon.

The race for control of the House of Representatives is not likely to be the premier attraction this November. While polls show Americans are largely disgusted with Congress, their disgust is bipartisan in nature. The Republicans’ significant 33 seat majority, coupled with historic trends that favor Republicans in non-presidential election years, is probably too much for Democrats to overcome.

While control of the House may not be significantly in question, there are several matters at hand that impact our industry directly. Jim Matheson, a moderate-to-conservative Democratic representative from Utah, has decided not to seek re-election this year. Matheson has been one of the few Democrats calling for substantial regulatory reform and has taken objection to overly invasive chemical assessment programs like the Report on Carcinogens (RoC). Republican Buck McKeon of California is retiring this year as well, creating an opening for the chairmanship of the influential House Armed Services Committee and an open seat in an increasingly Democratic California.

Freshman Jackie Walorski, an Indiana Republican, is facing a very tough re-election campaign this year. Her district in north-central Indiana has more composites manufacturing facilities than any other in the United States. She has been one of the few Democrats calling for substantial regulatory reform and has taken objection to overly invasive chemical assessment programs like the Report on Carcinogens (RoC).

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our industry’s greatest champions in promoting composites to the Federal government as a solution to major national priorities in energy, infrastructure and defense. Mike Simpson of Idaho, another longtime industry supporter, is facing a tough battle in the Republican primary for his seat. As a member of the powerful House Appropriations Committee, Simpson has played an important role in directing funding for oversight of federal programs that impact our industry.

One would be remiss in discussing the future of the House of Representatives without mentioning the retirement of California political mogul Henry Waxman. As the lead Democrat on the House Energy and Commerce Committee, the panel with jurisdiction over the bulk of our most important legislative efforts, Waxman has had significant sway over the issues that count. A new face at the helm of this important committee could significantly alter the future of our endeavors.

While control of the House of Representatives is not likely to change, the leadership of the Senate is very much up for grabs. Approximately one third of the body is up for re-election this year with Democrats defending 21 seats and Republicans defending 15. Nearly all of the Republican seats are safe, either with incumbents well-placed for re-election or retirements in states with significant Republican electoral traditions.

On the other hand, many Democratic seats are in jeopardy. Mary Landrieu of Louisiana and Mark Pryor of Arkansas, two of the more conservative Democratic senators, are facing very difficult re-elections this year. While the south was once the bread and butter of the Democratic Party, the region is now almost completely red at the federal level. Republicans are aching for an opportunity to flip the lone Democratic hold-outs in the region. The same goes in North Carolina, where Democrat Kay Hagan is polling behind popular North Carolina House Speaker Thom Tillis. West Virginia and South Dakota are two other states currently in the blue column that are trending Republican in advance of the elections this fall. Added to this is a vulnerable incumbent in otherwise severely Republican Alaska and a surprisingly competitive race in Michigan to replace retiring Democrat Carl Levin. One key industry ally, Lindsey Graham, is facing a battle in South Carolina. While his seat is all but guaranteed to stay Republican, he is facing a potentially tough primary election. As one of our key supporters, his campaign is an industry focal point.

ACMA is proud to take an active role in this year’s elections. Our Political Action Committee, ACMA PAC, is dedicated to electing pro-business and pro-composites candidates. Contributions from many ACMA member company executives allow ACMA PAC to help shape the outcome in congressional races across the country. Everyone in the composites industry is encouraged to learn more about ACMA PAC, as electoral outcomes can dramatically impact the business climate.

If you’ve never gotten involved in an election before, consider doing it this year. Voting is essential, but active involvement in the political process can build deep relationships that matter in your community and on Capitol Hill. Invite candidates to tour your plant and speak with your employees. Ask questions at candidate debates about important issues for your business. Volunteer on the campaign of your favorite candidate. All of these are opportunities to highlight the critical contributions you make to your community every day.

ACMA is your resource for political engagement. For ACMA’s regular updates about the status of the elections and for more information about ACMA PAC, visit acmanet.org/pac.

This year we’re in it to win it. Are you?

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Composites manufacturers and suppliers often attend end user conferences. They may even exhibit or participate on panels about materials. But never before have a group of more than three dozen industry leaders banded together to exhibit en masse and wow show-goers with everything composites have to offer. That will happen for the first time ever at the 2014 American Institute of Architects (AIA) Convention June 26-28 in Chicago thanks in part to ACMA’s Architectural Division. The AIA Convention will draw more than 20,000 attendees in the architecture industry.

The Architectural Division, one of 12 ACMA Composites Growth Initiative (CGI) committees, has organized a 4,500-square-foot Composites Pavilion at the AIA show. The pavilion will showcase innovations that composite products can bring to the architectural world and feature booths from more than 35 ACMA member companies. A large hanging composite sculpture, created specifically for the convention, will draw attention to the pavilion.

The CGI committees, which strive to promote the use and understanding of composites, are in the middle of yet another extremely active year filled with projects and activities.

This June marks the 15th year the Transportation Structures Council will exhibit at the International Bridge Conference in Pittsburgh. By networking with bridge engineers, business owners, contractors and government agencies, members of the CGI have educated the industry and promoted the use of composites in bridge applications such as rebar, decks, girders and more.

From outreach to education and the development of standards, the CGI committees are working hard to grow the composites market. Here is an update from a few of the committees:

The Composites Pavilion at the AIA show may be the big news for The Architectural Division, but it’s busy with other projects, too. It plans to complete its “Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products” this year.

The Pultrusion Industry Council met in December at CCP Composites in Kansas City, Mo., to discuss ongoing projects, such as work on the ASCE Load Resistance Factor and Design Standard (LRFD). The LRFD, currently undergoing balloting and
The Utility and Communication Structures Council (UCSC) conducted a series of meetings last fall with key entities – including the American Public Power Association (APPA), the House Energy and Power Subcommittee, and the Department of Energy – to explore establishing partnerships and collaborating on several projects. The UCSC hopes to develop a series of educational webinars with APPA on the benefits of composite utility poles. The council also will partner with the Department of Energy’s Deputy Assistant Secretary for Infrastructure Security and Energy Restoration to develop a multi-material study to determine the robustness, cost/benefit and life cycle cost analyses of several utility pole options.

The Green Composites Council created four task groups to tackle different problems in the world of composite recycling. The task groups will:

- Establish a glossary of terms and definitions related to composite recycling to simplify and standardize the nomenclature.
- Compile a set of statistics on composite recycling.
- Conduct surveys to determine the amount of scrap fiber that is wasted annually and the reasons that this waste is being generated. The group ultimately hopes to find ways to transition that waste fiber into other uses.
- Establish a demonstration project to show real world uses for composite recycling.

The Transportation Structures Council (TSC) will attend the International Bridge Conference in Pittsburgh for the 15th consecutive year. The TSC will have an exhibit booth and conduct a technical workshop at the conference June 8-12. Additionally, the TSC is updating its website (compositesinfrastructure.org) to include a searchable database of composite bridge installations that will feature more than 400 structures.

In addition to these individual projects, several committees have teamed up on initiatives. For instance, the Pultrusion Industry Council, Corrosion Control Division and High Performance Council are working together to develop a briefing to the Congressional Composites Caucus to report on the state of the industry and the challenges that composites can solve. The CGI has also partnered with ITECS Innovative Consulting to deliver a weekly newsletter detailing government grant opportunities that are of interest to member companies.

ACMA’s Composites Growth Initiatives are one of the most important tools the industry has to grow the use of composites. If you want to learn more about the CGI or join a committee, contact Andrew Huber, manager of the CGI committees, at ahuber@acmanet.org.
Associations exist because companies want to come together to do what they can’t do individually. A prime example of this is ACMA’s Composites Growth Initiatives (CGI). No single company has the resources to grow a market. It takes the whole industry working together to expand the composites market. ACMA member companies move and build markets by participating in our CGI committees.

We have 12 committees representing nearly every market, from high performance to corrosion control. (See a complete listing of the committees on page 29.) Each is growing their portion of the composites market. And those committees have the support of ACMA’s marketing committee, made up of the top marketing professionals from the association’s largest companies.

In addition, ACMA has the CGI fund, which raises nearly $200,000 per year to fund projects to grow the industry. Last year, the projects we subsidized ranged from development of a Life Cycle Inventory calculator to an exhibit booth at the International Bridge Conference.

Our 12 CGI committees are going strong, but there’s more work to be done. If the ideal CGI committee doesn’t already exist for your company, you can create one! ACMA is a member-driven organization, which means the members lead our Composites Growth Initiative, set the course for its programs and staff its committees. Want to learn more about our CGI committees? Contact John Busel at jbusel@acmanet.org.

Tom Dobbins, CAE
ACMA President

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Earn 4 CCT Designations in 3 days

April 2-4, 2014
Bristol, RI

This three day seminar combines rigorous classroom training with hands-on lab experience to prepare participants to sit for the following CCT certifications:

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• Light Resin Transfer Molding
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Or contact Clark Poston: cposton@iyrs.org - (401) 848-5777 x210

IYRS
253 Franklin St., Bristol, RI
April is CCT Month

The Certified Composites Technician (CCT) program is the industry’s gold standard for composites training. If your employees aren’t certified, you’re missing out on increased productivity, lower production cost, enhanced product quality, improved safety and a more skilled workforce. During the month of April, be on the lookout for discounts, promos and learning opportunities for you and your staff. To learn more about the CCT program, visit compositescertification.org.

Visit the “Composites Pavilion” at the AIA Convention

The ACMA Architectural Division has organized a 4,500-square-foot Composites Pavilion at the 2014 American Institute of Architects show June 26-28 at McCormick Place in Chicago. The Pavilion will showcase the innovations that composite products can bring to the architectural world and feature booths from 38 ACMA member companies.
companies. Stop by the ACMA information desk or any of our members’ booths to learn about how the Composites Growth Initiatives and the Architectural Division are expanding opportunities for composites manufacturers in the architectural industry.

Create a Profile to Receive MORE Benefits
All of ACMA’s resources are right at your fingertips! We’ve updated our website so that ACMA member companies and their employees can manage their individual profiles online. Not only can you check and update your contact information, but you also can manage your membership benefits and access your members-only committee page participation. Also, member company primary contacts can invite staff to create their own profiles online.

Assure that you are receiving all ACMA benefits by visiting myacma.acmanet.org. When you update your profile, select the publications and Composites Growth Initiative committees and areas that interest you. Make sure you visit your pages frequently to receive timely resources. If you have questions or need assistance, contact membership@acmanet.org.

High Performance Council Leads the Way for Advanced Composites
If you work with advanced composite materials like carbon fiber or aramid, or if you make materials for high-performance applications in aerospace and automotive, then ACMA’s High Performance Council is the group to join. The High Performance Council has big plans to grow the use of composites in demanding applications. Its projects include a briefing to the Congressional Composites Caucus, booths at several trade shows, an educational webinar series, technical sessions at CAMX – The Composites and Advanced Materials Expo and development of standards and guidelines for the industry.

If you want to take an active role in shaping the advanced composites industry, contact Andrew Huber at ahuber@acmanet.org to join the High Performance Council.

New Members
Emerald Performance Materials, LLC
Crystal Lake, Ill.

North Idaho College
Hayden, Idaho

Sur Quimica S.A.
La Uruca, San Jose
Costa Rica

Web Industries, Inc.
Alpharetta, Ga.

For more information on becoming a member of ACMA, email membership@acmanet.org or call 703-682-1665.

New CCTs Online: The Certified Composites Technician (CCT) program is the industry’s gold standard for composites training. For a list of the newest CCTs, visit compositesmanufacturingblog.com and click the tab marked “Training/Education.”

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Hire the Best with the ACMA Job Bank

When you need to hire the best, turn to your trusted industry source:

The ACMA Job Bank. Through this online tool, you’ll reach qualified and experienced applicants who know the composites industry. ACMA members get a special discounted rate of $50 for a 30-day posting, which is half the non-member rate. To learn more, contact ACMA at 703-682-1674 or jobs@acmanet.org.

Your Regulatory Champion

ACMA is working with the Occupational Safety and Health Administration (OSHA) to develop a control program that will allow companies to take steps to be in compliance with its proposed rule on occupational exposure to respirable crystalline silica. Our goal is for members to avoid costly testing and process customization. Additionally, ACMA is advocating with OSHA for an industry exemption from the agency’s burdensome process safety management standard, in light of a proposed expansion of that program.

We are also engaged with the Toxic Substances Control Act, the guiding legislation on the Environmental Protection Agency’s (EPA) regulation of chemicals in commerce. We are active with EPA’s Integrated Risk Information System (IRIS) as well, pressing the agency to use the full breadth of high-quality science in its expected upcoming evaluation of styrene.

ACMA continues to provide guidance to the Security Exchange Commission’s conflict minerals reporting requirements, and we remain active in the legal and legislative campaigns to reform the rule.

ACMA is proud to represent your company and your employees on the issues that count. Contact ACMA’s government affairs staff at leg.affairs@acmanet.org to learn more.

CM Green

ACMA is proud to be a part of the global mission to improve environmental and forest stewardship through the printing of this publication. The Forest Stewardship Council (FSC) – the global leader in forest conservation – encourages forest owners, managers and suppliers to follow the best social and environmental practices. Composites Manufacturing magazine’s printer, HBP in Hagerstown, Md., has been certified by the FSC as following printing guidelines that reduce our magazine’s environmental impact. We are proud to display the FSC seal in our masthead on page 2, and we encourage you to learn more about this international membership organization, leading efforts in environmental sustainability. Visit https://ic.fsc.org.

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BC=Back Cover
IFC=Inside Front Cover
IBC=Inside Back Cover
Introducing a new super industry event - produced by ACMA and SAMPE - that connects and advances all aspects of the world’s composites and advanced materials communities

With 8,500 expected attendees, 500+ exhibitors, 250 technical and business conference sessions, cutting edge technology and innovation, product displays and demonstrations, plus the largest industry marketplace, CAMX is the must-attend industry event in the U.S.

Call for Abstracts -  
Due April 4
CM by the Numbers
Our writers unearthed these fascinating figures while researching articles for this issue of Composites Manufacturing magazine.

65-75%
Composites account for at least 65 to 75 percent of the primary structure by weight of the Scorpion tactical military jet. Read about the development of the aircraft on page 10.

166,000 passengers
The Haramain high-speed railway in Saudi Arabia is expected to transport 166,000 passengers a day between the Muslim holy cities of Mecca and Medina. And they will all pass under fiber reinforced plastic roofs at four rail stations, such as this one in the city of Jeddah. For details on construction and installation of the FRP roofs, turn to page 8.

15%
According to PPG Fiber Glass, its INNOFIBER® XM fiber glass outperforms standard e-glass in modulus up to 15 percent. It’s just one of several specialty reinforcements introduced by suppliers in the last couple of years to meet exceedingly demanding end user needs. Learn about the latest in reinforcements on page 22.

36 million pounds
The total weight of CFRP components within the automotive market is expected to grow from 16.5 million pounds last year to 36 million pounds in 2016. This means demand by OEMs will supersede their current 3.5 percent share of the market and grow to a whopping 25 percent. The article on page 14 provides a glimpse into how automakers are using CFRP in their latest models.

40,000 miles
Houston-based Hobas Pipe USA has installed more than 40,000 miles of centrifugally cast, fiberglass reinforced, polymer mortar pipes around the world. Check out page 12 for details on a sewer rehab project in Milwaukee.