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Spray Suppression
It’s bad enough to fight perceptions against materials such as metal and steel, which have been around for centuries. But to try and change regulation in your favor? That is indeed a Herculean task, and one Lowell Miles and ACMA tackled with gusto.
By Mike Shuler

Composites Shoot the Moon
Following the Space Shuttle Columbia accident, a new organization within NASA was formed in partnership with industry and academia. Its purpose: to tackle NASA’s toughest technical problems, learn together, and take the new-found knowledge back to their organizations. One of the most important collaborations has been the all-composite crew module.
By Melinda Skea

Bet on Composites
Composites Manufacturing writers, editors and photographers flooded the Mandalay Bay Convention Center in Las Vegas to bring you the most comprehensive coverage of COMPOSITES 2010, the industry’s premier conference and exhibition.
Going on the Offense

As some of you know, my wife Juanita and I own and operate a small composites manufacturing company in Saint Matthews, S.C., where we manufacture and sell swimming pools. Like many of you during the preceding two to three years, we have experienced massive layoffs and significant decreases in sales revenue. The two leading manufacturers of composite swimming pools filed for Chapter 11 bankruptcy, and we have seen numerous smaller companies go out of business. But like most of you, we found a way to survive and stay in business.

I realized that although our business has been hammered over the last three years, I was immensely grateful that I still lived in a country where I could have a business to succeed or fail. That’s what we all have—opportunities to succeed or fail.

The fact that you are here today says a lot about how each one of you has managed the long process of putting to bed the disruptions of the last few years. It says that although things have been tough, you and your company have found ways to persevere and work through it. If you’re like our little company, you can’t wait to get back in the game because you know all the downsizings and cost cuttings have positioned you for a good year and an even better future.

As attendees to COMPOSITES recently learned, there are many educational and technical information opportunities at ACMA events. I encourage you to attend as many as you can. Our industry is evolving quickly and we must work vigorously on Capitol Hill and with numerous regulatory agencies on issues directly affecting our ability to do business. The association is focused on ensuring a level and equitable playing field for our industry. Without ACMA, we might be left having to conduct business in a regulatory environment of unnecessary and restrictive mandates—many of which would put a number of us out of business.

To ensure that our industry is heard on the Hill, the Composites Caucus was formed last summer and is co-chaired by Rep. Rick Boucher of Virginia and Rep. Joe Wilson of South Carolina. It currently has more than 28 congressional members, but this isn’t enough. I ask each of you to solicit your representative to participate on this caucus.

In addition to the Caucus, a Legislative Committee has been formed, chaired by Richard Morrison, CEO of MFG and a past president of the ACMA. The committee’s charter is simple: Do what is necessary to ensure the best interests of the composite industry are more than adequately represented in Congress by mobilizing interested members to actively participate and to leverage our industry’s best interests through the Composites Caucus.

For too many years the legislative best interests of our industry have been tackled onto regulatory issues where we have been forced to play defense. The Council and the Caucus now give our industry a way to play offense and form a truly powerful congressional group dedicated to promoting the best interests of the composites industry through legislative measures.

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Composites aerospace parts manufacturer Kaman Aerospace Corp., based in Connecticut, landed a $53 million contract with Texas-based Bell Helicopter, a subsidiary of Textron Inc., for helicopter blade materials.

According to Kevin Sewell, director of outsourcing and transitions at Bell Helicopters, composites were chosen not because they were less expensive than metal rotor blades, but because they are more reliable, repairable and have a longer life. Mark Tattershall, director of marketing and business development at Kaman, adds that composites also provide better ballistic protection, which is important in military operations.

Under the contract, Kaman will build composite helicopter blade skins and skin core assemblies for Bell. “The skin and skin-core components will make up the aft portion of our composite rotor blades,” says Sewell. “The skins are important because they bond to a composite spar assembly that makes up the structural leading edge of the rotor.”

Kaman will also provide 18 different assemblies for eight different helicopters, including Bell’s 412, 407, H-1 and OH-58D models, which will be used in a variety of settings. “Helicopters differ from some other aviation assets because they are used as integral parts of businesses. You’ll find them transporting offshore oil and gas workers, performing daily patrols for law enforcement and ferrying patients from an accident to a hospital,” explains Sewell.

Bell expects to receive its first production in early 2010. Once Bell receives the skin-cores, it will integrate them into existing motor blade manufacturing shortly after and begin delivering blades with Kaman components in the first half of 2010.

Get Your Foot in the Supply Chain Door

When you’re a big company like Northrop Aerospace Systems, you need an intricate supply chain to make business happen. But what is the chain like, and what is the role of composite companies in this network?

Lisa Kohl, vice president for global supply chain for Northrop, says there are about 1,500 companies in its supply chain and the type of companies within that network run the gamut, from procurement, subcontracting, design work, quality assurance, goods movement, transportation, and strategic sourcing.

So how do potential suppliers get in on the action? Start by submitting some basic information to Northrop, detailing services your company performs. “The only way a company gets turned down at this point is if Northrop already has enough suppliers doing the same exact thing as you. Otherwise, Northrop will perform an audit,” says Kohl. “We do a financial verification, which has been a big thing lately. We do a whole analysis and supplier assessment.”
If a supplier passes that test, the company will receive requests for proposals for in-house work. But it’s not enough to just get on the list; Northrop will also evaluate the supplier’s performance. Companies are rewarded for strong work; four consecutive quarters of performing well from a quality and delivery perspective results in placement in the platinum program, which leads to broader access for job opportunities.

But companies can also fall off the list if they receive failing marks for only two consecutive quarters. Kohl points to such items such as late deliveries, quality issues, and an inability to deliver to plan as the biggest reasons for expulsion. “Those signs indicate a deeper problem in the process,” she says. “We realize everyone can have schedule issues, and they do from time to time, but quality issues in particular can’t be tolerated.”

Of the 1,500 active member supply chain Northrop employs, only 42 companies, or less than three percent, are composite companies. A large part of this is because Northrop places a stronger emphasis on sensors and other non-material elements.

Any wider usage of composites would depend on Northrop’s product needs. “It always comes down to what we’re building that requires composite structures. We’re not going to capitalize for any additional composite structures, so it depends on new business,” says Kohl. “That’s what causes anything to grow. If we’re developing a larger plane that’s an all-composite structure, we’d look for a new contract.”

The company currently utilizes composites for their F-35 plane, but the company only envisions building one model per day. Kohl says if that capacity increases, then so do the opportunities for more composite companies to join the supply chain.

Despite the small representation of composites, the company is making efforts to stay on top of the latest technological developments. “We did a survey a year or two ago, and looked at composites firms to get an assessment as to what was out there. One of the interesting things is the technology curve, which is moving pretty rapidly. It becomes mature very quickly and then it becomes a commodity,” says Kohl. “Time will tell if composites will play a larger part in that maturation.”

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North of the border, a new partnership is underway to beef up usage of composites in the automotive industry. Manufacturing giant Magna has teamed with Canada’s National Research Council (NRC) to open a new laboratory devoted to further research and expansion of composites.

The partnership emphasizes the use of long-fiber thermoplastics, specifically the inline compounding and molding of the material. Martin Bureau, group leader of NRC’s Advanced Polymer Composites division, states that the material already exists, but primarily in pellet form. “Our interest is integrating an inline compounding of all these components and then directly molding them into parts,” he says.

It’s fair to say that NRC’s mandate is to fulfill science/tech policy objectives, which are focused on greenhouse gas mitigation. “At the center, life cycle is a fundamental cornerstone, so it’s no coincidence that focus on lightweight materials and vehicle structures would lead to carbon dioxide reduction in the process,” says William Harney, executive director of research and development for Magna.

For the NRC, the project provides an opportunity to raise its profile. “The NRC has worked with the automotive and transport industry for a long time,” says Bureau. But these were not large and integrated initiatives throughout the NRC, and were not put forward as national priorities. Thus, it’s a change for the NRC to address a large national institution instead of one activity. “We’ve had partners, but nothing that was such a high-level collaboration. We’re putting both cash and resources in the center,” says Bureau.

Right now, cost effectiveness is going to be the biggest challenge for both sides to meet their vision. The NRC would like to apply some of the similar principles used in the aerospace industry related to manufacturing, but Bureau says what’s affordable in the aerospace sector won’t necessarily be for automotive. “Items such as throughput, cost of raw materials and cycle time are very demanding,” he says.

According to Harney, the center and its research will benefit composite manufacturers in the automotive industry. “For suppliers, in terms of resins, additive suppliers, natural fiber, and reinforcements, it means access to a platform whereby some of their innovation ideas and concepts for advancing high-volume composites would be brought to a commercial stage. For our customers, it means access to a center focused on commercializing the same technology to deliver advanced lightweight automotive structures in the near future.”
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The U.S. Department of Energy (DOE) has awarded $104.7 million in funding from the American Recovery and Reinvestment Act to research clean energy and efficiency technologies. Chief among these efforts is carbon fiber, which the DOE says has potential to reduce weight and increase fuel efficiency in automotive vehicles.

“They want to reduce foreign oil dependence by using lightweight materials in vehicles and reduce the fuel required,” says Cliff Eberle, technology development manager at Oak Ridge National Laboratory (ORNL) in Tennessee, where the carbon research will take place. ORNL received $34.7 million to construct a new Carbon Fiber Technology Center, scheduled to open in 2013. The objective of the center will be to investigate new manufacturing processes to lower the cost of carbon fiber from $10 to $20 per pound to below $5 per pound. “If we take 10 percent off the weight of a passenger vehicle, we can save five to seven percent on fuel,” says Eberle.

Work at the facility will focus on converting poly fibers into carbon fibers, or what ORNL calls a conventional conversion line. The team will ideally incorporate lower-cost materials such as lignum into that process. “Lignum is the second most abundant polymer, and we’ve had some encouraging progress in the development of these technologies,” says Eberle.

ORNL is also emphasizing flexibility in the production process. “We have to have much more flexible lines in terms of temperature capacities and transport systems than what is typical in a conventional line. It will allow us to better characterize the process and optimize production for the precursors,” says Eberle.

ORNL’s goal is to achieve penetration into the industry. “All the research for lowering dependence on oil depends on transition into the commercial sector. We could develop the greatest science, but if it stays in the lab, it doesn’t meet our mission,” says Eberle.

ORNL has tried to get OEMs to use the technology right away, but they meet resistance because the process is unproven and those companies would have to put a lot of capital at risk. Therefore, the next important step for the center is to provide the evidence OEMs and other companies need to feel more confidence in embracing these new technologies.

VS Composites is developing a unibody made entirely of thermoplastic composites for automobiles, which it calls one of the first of its kind. This unibody program is ultimately designed to increase rapid prototyping with thermoplastics, but the means to accomplish this vision are somewhat surprising.

The beginning stages of the project are expected to run through 2010. In this time, VS will use SolidWorks software for mold flow analysis as well as FEA analysis to check the stiffness of the chassis. Once the analysis is refined, VS will make patterns from the data and begin infusing parts.

President Michael Van Steenburg says the thermoplastic process can help smaller companies overcome the barrier to entry in the market. “The cycle time per body panel is reduced from nine minutes to three. The process also incorporates molded-in colors, which eliminates the need for expensive paint materials. We’re basically removing the stumbling blocks that have plagued potential companies from beginning work in the sector,” he says.

Van Steenburg also says thermoplastic models are safer vehicles.
“You have lighter vehicles that absorb more energy. Not only is the drive train advanced, but so is the vehicle. The thermoplastic fatigue is in excess of four times what steel would be.”

But the company says this technology will be profitable by staying in niche model production. This seems to buck conventional thinking that further adoption into widespread, mainstream models is the most beneficial development for the industry. “The industry needs to focus on building cars people want, and what that means is more niche vehicles,” says Van Steenburg. He says thermoplastic composite models can have a higher value on the profit side as an inexpensive process that is able to recoup costs quickly and have a nice profit margin. The objective will be for automakers to see the figures from a small manufacturing run (under 50,000 per year) and grow that output subsequently.

Van Steenburg envisions an environment where, instead of 500,000 copies of one car, 25,000 copies each of 25 slight variation molds would be made. “You have to find a common ground among all these likes and dislikes. The internet has affected mass customization. Customers want to be different and share their own style, but they don’t want to pay a fortune for it,” he says.

The ultimate form of mass customization, Van Steenburg says, would come as a result of the rapid prototyping with thermoplastics: “VS is far off from where we need to be, but we hope to prove the materials and processes we’re doing now can be profitable with niche models. Things such as low-intensive labor and molded-in color can help eliminate excess costs.”

VS hopes to have the program completed by the end of 2010 for an Asian automaker, which the company declined to name.

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Some in the cast polymer industry think it’s time for the cultured marble industry to step-up the green trend. Companies like Monroe Industries are embracing that thought. Monroe developed Robal Glass, an environmentally friendly solutions for such applications as vanity tops, shower bases and wall surfaces.

Monroe’s Robal Glass is made with two types of recycled glass. Some of the glass is used in construction projects, others in post-industrial glass that never made it to store shelves. The recycled glass is cast in a soy-based resin, which has approximately 21 percent bio-based renewable source content.

Despite using the same tools and molds, Monroe Vice President Bonnie Webster says the difference in manufacturing its product comes down to the casting process: “It doesn’t cast like calcium carbonate or aluminum trihydrate-based products. We needed to develop the technology in developing the right particle packing to have a true solid material,” she says.

Monroe is currently working on showcasing Robal Glass to the architectural market. At some shows the company has gone to, there is a lot of interest in the product, “A lot of them crowd around our booth because they simply wanted to know what it was. They had never seen it before,” Webster says. Among the most common questions she gets concern price comparisons to solid surface (it’s less) and whether or not the material is customizable (it is).

In an effort to spread the green trend, Monroe is taking a unique step and licensing the technology to other companies. Luciana Industries and Syn-Mar Products are the first licensees. “This is a product that can set our industry apart from other industries,” she says. “Cultured marble has always had a stigma that everyone does the same thing differently. We have a new product made the same way whether you buy it here or elsewhere,” she says.

It’s no secret that the composites industry faces struggles for acceptance. But it’s another thing entirely to face resistance in the middle of a project. That’s what happened to San Diego-based Infrastructure Composites International (ICI). The company manufactured four longitudinal FRP sandwich panels for a 38-by-34 foot single span bridge to be built in Illinois. The panels are bonded together in the field and placed on standard concrete abutments. It is also part of the FHWA’s Innovative Bridge Research and Construction (IBRC) program, and is designed for AASHTO HS-20 loading.

It seemed like the perfect business situation. However, according to ICI President Geza Nagy, the project had been underway for about a year when it suddenly came to a crossroads. “The DOT doesn’t know how to monitor the performance and progress of composites,” he says. “They want to do a test program, which is great because it
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would generate even more data and information for the industry, but unfortunately there’s no funding for data and equipment. So the state will need to find the additional funding to perform these tests. Hopefully, that will happen. If not, we’ll have to get some quotes for some equipment to perform the tests ourselves.”

Nagy isn’t exactly sure what caused this sudden delay, but it could relate to simple lack of education. He cites that conventional structures have test coupons for steel, crush samples for concrete, something composites don’t have. “I think it’s a matter of disseminating information to state agencies to detail what goes into production of composites. You have to indicate any possible production difficulties ahead of time,” he says.

To prevent these types of confusions, ICI is emphasizing the benefits of composite structures in terms of cost and delivery schedule. “We’re in the process of trying to get investment capital to ramp up operations to build structures. Given a large investment, we could automate our process and build bridges in one month instead of eight,” says Nagy. “240,000 bridges are deficient and the existing substructure could simply be replaced with composite decking. Then, bridges built in the ‘50s could now support twice the load with a fraction of the weight.”

As composite technologies prove themselves, Nagy foresees a modular system will exist to provide larger structures built with the same configurations. “We could build a bridge that is 80-feet instead of 34-feet wide. Fifteen to 20-foot expansions could also be made by using composite panels in added pedestrian walkways to bridges,” he says. Nagy also sees a modular system using prefabricated pieces used for domes and curved structures. “Decking systems that use existing girders could have old concrete taken off and replaced with these composites,” he says.

Can Composite Poles Vault

In the pole segment of the infrastructure market, composites enjoy two unique positions in two different pole variations. Concerning utility poles, composites have growth opportunities. In commercial poles, composites face challenges for similar growth levels.

RS Technologies has had success solely focusing on transmission poles. They’re often asked how composite poles function compared to other materials, particularly with attaching conductor lines. “There is a slightly different set of hardware involved with composite poles,” says Joel Tennison, director of corporate development for RS. When using composite poles, the focus shifts from fitting lines through a pole to fitting them around a pole because of the structural crossbars that run through the pole.

RS designs the poles in a way that they can be distributed in sections. These are held together with jacking lugs in drilled holes, which creates a strong bond. The modular design allows for flexibility in pole height. Skagerak Energi AS, a Norwegian utility company, was able to increase the height of the poles to allow longer spans, an impossibility with wooden poles. This installation option allowed Skagerak to build a section with only six pole installation sites instead of the previous nine.

On the other side, Carsonite Composites sales representative Jim Bob Wiles tries to play up the benefits of installation when selling the company’s poles. He says the biggest advantage composite poles have is being able to be direct-buried. Steel poles require a concrete foundation, the pouring and laying of which adds extra time to the installation process. “With ours, you dig a hole, bury the pole, pull your cable through and pack dirt around it and you’re done,” he says.

But ask Wiles why composite commercial poles are lacking, and he just chuckles. Cost is the primary factor. Even though the installation costs are less for composite poles, the poles themselves cost more. Also, Wiles says the commercial market is used to using an anchor base and has difficulty moving be-
Across the Opposition?

yond that. “It’s interesting that they put up a 100-foot utility pole by dig-
ging a hole and bury it, but they think that approach can’t work for an 18-foot electrical pole,” he says.

As is the case with other infra-
structure applications, acceptance of composites is no easy feat for end-
users accustomed to traditional ma-
terials. To combat this, the company focuses on the positive aspects of composite poles. “An installer can hoist and erect a post with lighter equipment, such as a boom truck instead of a crane,” says Tennison.

Tennison states that composites representation in the transmission pole industry is miniscule. However, he believes there is room for growth. “There needs to be a major North American utility that embraces the commercial deployment of composite poles in their grids,” he says. “But first we, as an industry, need to educate engineers more thoroughly about the benefits composites offer.”

RS attempts to educate through a data library called PLS-Pole, which designs grids and lines to support conductor cables, allowing the company to demonstrate their product more easily. “Instead of taking our word, utilities can buy the file and model up structures using our mod-
ules and doing comparison with other materials,” says Tennison.

RS will continue to install the poles in niche markets, particularly environmentally-sensitive regions ranging from Scandinavia to Seattle. This focus may be a boost to the company as the green culture grows. “The longer life cycle of a composite pole is something we’ll emphasize. The poles are maintenance free, emit no chemicals, don’t need to remedi-
ate soil, and are non-conductive,” says Tennison. RS will face difficul-
ties expanding their market pres-
ence, but it hopes to pole vault over that bar of acceptance.
Composites Embark in New Applications

Kockums AB, Karlskrona, Sweden, is already receiving orders for its new CarboCAT MPV23. The new catamaran will be the first unit in a series that replaces aluminum with composite material.

This new generation of CarboCATs, which is scheduled for its first delivery in August 2010, will be equipped with a hull and superstructure made of carbon fiber. “The new material will allow us to lower weight and reduce fuel consumption,” says Lars Tedehammar, senior vice president of Kockums. “The boat will need less power from the engine to reach the same performance, which will mean approximately 20 percent savings in fuel consumption per vessel.”

Kockums wanted to create a boat that would be usable (ideally, 365 days a year), easily maneuverable to allow safe docking and able to handle heavy sea conditions. After all, the CarboCat will be used within the wind energy market for work boats on offshore wind turbines, and offshore wind parks where wind rages the hardest.

The new vessels will also be used as rescue boats and as ferries for local transportation within the numerous archipelagos found within Scandinavia, or as an open sea trafficier within areas such as the Mediterranean.

Tedehammar states that composites were chosen over other materials because of the material’s lightweight properties. “If you compare composite material with others, such as aluminum, it is possible to reduce the weight by approximately 30 percent and even more compared with steel,” he says. “And if the vessel is lighter it will affect the life cycle cost. If we need to use less energy to power the boats, we can use smaller engines with preserved speed and therefore have the ability to load more cargo per load.”

When drafting the plans for a new CarboCAT, composites not only won out in weight savings, but in maintenance costs as well. “Compared with metallic materials, composites don’t have fatigue problems; therefore, using composites enables us to reduce maintenance costs by up to 25 percent,” says Tedehammar. “Composites also give us the ability to make complex design solutions at relatively low cost by the way the parts are manufactured, not to mention its forgiving nature in structural damage.”

But there are a few disadvantages to a new composite model, Tedehammar states. These include a composite’s inability compared to steel to handle local pressures or loads in a sandwich solution. Yet Tedehammar explains this can be overcome by using a different inlay or a better quality core.
Sleek Designs Seek Sleek Minds

It comes as no shock that the marine industry has been hit hard by the economic conditions of this past year. But there are other forces that limit certain aspects of the marine industry from growing.

“Not only did the economy hurt the racing yacht industry,” says Jason Carrington, owner of Carrington Yachts Limited, a U.K.-based project management company who works with yacht designers and manufacturers. “But also the America’s Cup legal mess between San Francisco-based challenger BMW Oracle and defending champion SNG (Societe Nautique de Geneve), in which BMW Oracle argues it is the rightful challenger over a Valencia, Spain-based group. The nearly three-year Supreme Court battle had brought the 33rd America’s Cup to a grinding halt, and the oldest trophy in international sport and one of the largest yachting events in the world, the lack of an America’s Cup equates to little need for new yachts and little need for new yacht materials.”

Carrington hopes that despite the legal jargon surrounding the America’s Cup, there are hundreds of boat builders, but only a few he could trust to do the job correctly.
Vertical Turbines Indicate Shifting Winds

Central Virginia Wind Energy & Manufacturing and researchers at the University of Virginia (UVA) are designing a new turbine they anticipate will harness wind power in their home state and across the country.

The 9-foot prototype wind turbine, dubbed the Blade Runner 5000, is a vertical axis rotating turbine designed to be smaller, cheaper and more efficient. “The idea is that the turbine could power a farm or maybe half a dozen homes,” says Paul Allaire, a professor of mechanical engineering at

China Opens Up in Effort to Jump Ahead

Recently, China Business News reported that the Chinese government was scrapping restrictions on the use of foreign parts in wind power turbines. China, which relies on coal for more than 70 percent of its energy, is the world’s largest emitter of greenhouse gases. China hopes this decision aids the nation as it seeks access to more advanced technology to meet its clean energy targets. According to Steve Sawyer of the Global Wind Energy Council, “China is the fastest growing market for wind energy in the world, with the U.S. and India not far behind.”

However, according to Roby Roberts, Vestas’s senior VP of external relations, China may soon jump far ahead of the game. “There is a growing demand within China as well as a lot of potential in the U.S. However, it is more difficult to grow within the U.S. because legislation-wise, the U.S. has a harder time looking at long-term energy policy.”

The decision by China’s National Development and Reform Commission (NDRC) means wind farms in China no longer have to source at least 70 percent of turbine parts from the domestic market. The cap was originally introduced in 2005, when foreign companies had approximately 75 percent of China’s wind turbine market.

China’s installed wind power capacity in 2009 was forecast to reach 20 gigawatts (GW) out of a total of 860 GW—a large jump from 12 GW at the end of the previous year. That would lift China past Spain to become the world’s third biggest wind power producer after the United States and Germany. It could also allow China to reach its target of generating 15 percent of its energy from renewable sources—mainly wind and water—by 2020.
UVA and chief of the University’s Jefferson Wind Energy Institute.

Besides the noticeable rotational difference (most turbines have a horizontal rotating axis), the Blade Runner 5000 is designed to generate 50 kilowatts (KW) of power and is meant to harness more moderate winds found inland as opposed to offshore turbines that generate three megawatts (MW) of power and harness stronger wind speeds.

The vertical turbine will use magnetic bearings to eliminate gear box and rolling element bearings, explains Jason Ivey of Central Virginia Wind Energy & Manufacturing. “We are eliminating moving parts, which often create friction and forces that result in turbine failures,” he says.

Eagle Aviation, based in Hampton, Va., was contracted to manufacture the composite helical-like blades in 20-foot sections. The prototype was then assembled in UVA’s Aerospace Research Laboratory, and is currently undergoing testing in the laboratory’s wind tunnel. The tunnel generates wind speeds up to approximately 12 mph and will be used to show how the vertical wind turbine could rotate and work. “We want a year’s worth of solid real-time data, which we can then use to market the turbine to areas where it is hard to get large cranes to install a tower; for example, on remote islands, in small villages and on government military bases,” says Ivey.

Allaire adds that the testing will help the group figure out the optimal blade shape, because just like a wing, the blades have a curvature on top and the bottom which creates lift and drag. “Finding the right combination of lift and drag will be key to a successful vertical turbine,” he says.

The final version is expected to stand 150 feet tall, measure 15 feet in diameter and cost an estimated $235,000. The group is currently looking for sponsors, venture capitalists or others willing to invest in the new technology. “Virginia has not done grants for wind energy,” says Allaire. “Doing a smaller wind turbine is a whole different ball game. We are working with Congressman Tom Periello to see what he can do to help.

So far we’ve talked to several power companies to see if they’d be interested. The feedback we’ve received is that the energy companies would be interested if a certain price break was guaranteed if they produced X amount of dollars from wind energy.”
Composites Make Motorbikes Look Sleeker

Since 1954, LeoVince USA has best been known for its work with motorcycle exhaust fumes and buffers. However, the company is branching out with its new carbon fiber division.

LeoVince had been working with carbon fiber for the past six years, but building an all-carbon muffler for the Kawasaki ZS-6 last year allowed the company to feel confident in manufacturing more individual components. The original part had a compact design, which was difficult to build out of metal into the proper shape they desired. “By using carbon, we were able to get a unique design, get the volume we needed in the shortness of length we had to work with, and have it fit correctly under the bike,” says Executive Vice President Timothy Calhoun.

Calhoun adds that manufacturing with carbon was far less labor-intensive than metal—and that’s just one

Pool Repair Adds Fiberglass Top Coat to Cement

Composites manufacturers are always looking for new ways to stick out from their competition. Peter Gibson, owner of GRC Fiberglass Coatings, has announced a new system he says will represent the next step forward in pool repair.

He has developed a process to use a fiberglass topcoat to resurface swimming pools. Gibson says that instead of using a gel coat material, he uses a specially-formulated top coat that is vinyl-ester based to prevent cobalting and blistering.

“We take an existing swimming pool that’s got a cement-based material on it and then we prepare the surface and spray fiberglass lining into the interior of the swimming pool,” said Gibson. The topcoat is approximately 1,000 micrometers thick and differs from conventional fiberglass methods such as hand lay up because the micro glass reinforcement is incorporated into the resin matrix and sprayed as a homogeneous mass.

Gibson says the biggest challenge was that the materials he needed for the process didn’t exist. “In conjunction with resin scientists and manufacturers, I developed materials that are not off-the-shelf to produce the materials specifically for this application. That was the biggest challenge, that there were no materials that existed historically,” he said.

According to Gibson, the collaboration with the manufacturers was not easy, saying a difference in philosophy proved to be a challenge. “You’re talking to resin manufacturers that are not familiar with field work but rather with a fabrication environment and controlled conditions,” he says. “So you try to talk to them about field work, but they don’t really know what that is. So we keep on using their vernacular and talking about parts. But there’s no such part in what we were doing, so they keep on talking about parts and not knowing what the challenges are in designing resin materials for field work.”

Gibson had to answer their skepticism with concrete evidence as a result of the field work. He addressed such problems as off-the-shelf resins undercuring in the presence of oxygen and yellowing in sunlight. “I consistently heard the objection ‘You’ll never use vinyl-ester resin and maintain color in the presence of sunlight,’ but we made it work,” he says.

It has taken Gibson about four years to tweak the product to proper curing, but he did it. Now, his next challenge is to market the process. “It’s in the infancy stage of approaching other individuals,” he said. “I’m trying to sell it to them not only as a business opportunity but also to increase exposure of the industry as a whole.”
of the advantages he sees. “Compared to metal, composites are affordable, much better-looking, and tend to make less noise,” he says.

The carbon fiber division will allow LeoVince to manufacture aesthetic and functional motorcycle components for enduro and motor cross bikes. These components include front and rear disc covers, brake caliper guards, chain guides, right/left engine protectors, front sprocket covers and skid plates. The range is being launched with fitments for Honda and Yamaha models, and will later expand to include pieces for Kawasaki, Suzuki, KTM and Husqvarna motorcycles.

Calhoun says it could manufacture the parts better than the majority of its competition and at the same or better price because LeoVince’s manufacturing process differs by using technical carbon fiber, which is autoclaved on polished molds. “Most component companies are molding resin with a thin layer of carbon fiber or carbon fiber looking material on each side,” he says. “We use a pre-impregnated all-carbon fiber sheet and then autoclave it to a specific shape.”

The autoclave process is something the company learned to refine as it pushed forward. “A lot of companies utilize a shiny finish, which tends to be a preferred look to a flat carbon fiber piece,” says Calhoun. “We’ve done experimentation with molds and found that if we use a much tighter base material and polish the entire mold, it results in a physically appealing appearance.”

Though the company would like to push carbon fiber-enhanced parts into more mainstream models in the future, it is focusing on the off-road sector right now because of more immediate business opportunities. Even though Calhoun says the market is experiencing a downturn, he believes the $150 components are priced within the buyer’s range.
The composites industry has had to deal with its status as a relative upstart since the 1960s. It’s bad enough to fight perceptions against materials such as metal and steel that have been around for centuries. But to try and change regulation in your favor? That is indeed a Herculean task.

Yet Lowell Miles, founder and CEO of Portland, Ore.-based Miles Fiberglass & Composites, has made it a mission to do just that. He has spearheaded a code-changing mission that has gone on for nearly three decades. The goal: to protect composites manufacturers from aggressive regulation concerning the risk of fire and explosion in composite resin and gel coat spray operations.

And with help from the American Composites Manufacturers Association (ACMA), the National Marine Manufacturers Association (NMMA) and Congress, rewards are finally starting to come.

A Set of Problems

In 1983, Miles received a routine visit from the Occupational Safety and Hazard Agency (OSHA). They told him, in essence, that he needed to comply with the OSHA spray finishing code because resin spray operations use, well, sprays. The problem with that request was that the code, designed for paint spray applications, restricts resin spray operations for reasons that do not apply to resins, only paints. “We thought it was a crazy request because we don’t have explosive atmospheres anywhere near what the standard mandates. We needed to do something to protect ourselves,” he says.

Miles filed for an informal hearing and brought along other people that also had fiberglass shops. The group sat down with Darrell Douglas, head of Oregon OSHA at the time, and tried to convince him that it was unnecessary for composite manufacturers to comply with the paint spray finishing code because of the different materials used. “He said he agreed with us, but that regardless, we had to comply with federal OSHA. OSHA standards require that we could be more restrictive but not less restrictive,” says Miles.

Douglas’s idea of a compromise was to implement a statewide leniency, but renge and enforce the limits if the federal officers intervened. This did not sit well with Miles, and he knew he needed to try and get the OSHA standard itself changed.

A year later, Miles joined up with ACMA in Washington, D.C. to meet with federal OSHA representatives. “We knew those regulations were overkill for what the composites industry needs,” says John Schweitzer, ACMA’s senior director of government affairs. They were told that the OSHA codes were patterned after the National Fire Protection Association’s (NFPA) NFPA 33. OSHA suggested that Miles join the NFPA’s Committee on Finishing Processes to see if they could strike at the root of the problem, and change the NFPA standard—and that’s exactly what Miles did.

Convincing the Committee

Miles joined the NFPA committee, but his introduction was not without curiosity. “When I first joined the committee and went to my first meeting, I told them I wanted to modify the code to add something for our industry in order to make it much less restrictive for resin spray operations. That was met with loud laughter,” he recalls.

According to Miles, the biggest resistance came from insurance professionals. “They’re very conservative, probably the most by far on the committee. Their job is loss control, and it’s difficult once a code or standard is in

By Mike Shuler
place for insurance guys to be more lenient. They want to go the other way and be more restrictive," he says.

Miles began his efforts by taking the committee on three field trips to various fiberglass plants to open their eyes to the differences between materials. “It was just a matter of convincing people that the way we use polyester resin and styrene it is not the same as spray painting,” says Miles.

Committee members soon realized you couldn’t put many composite products, like a 100-foot yacht, in a spray booth and do lamination the same way as painting,” says Miles. They also discovered that tests revealed composite manufacturers were generating 25 percent of the lower flammable level. This is important because OSHA’s criteria state that if you have some concentration which results in ignition, you want to maintain a safety factor to 25 percent below the limit.

A New Standard

Over the next 19 years, Miles struggled to get the NFPA standard changed to accommodate spray resins. He found that there were several hoops to jump through just to get serious consideration.

First, he had to convince the electrical code in NFPA that he had a good argument for not using explosion-proof wiring, even though it was within 20 feet of manufacturing operations. Then, the committee met with the NFPA committee on sprinklers to convince them that the composites industry didn’t need extra hazardous sprinklers, and that it was okay to spray in the open without a certified spray booth.

Getting the rest of the people on the committee on board was a challenge within the challenge. “Initially, 10 percent of the committee agreed with us, then 30 to 40, and eventually when we had the final vote to accept the change, we had nearly a unanimous vote, with only one vote out of 30 against us. That vote was by the chairman of the committee, who was an insurance guy. He explained that because he was in insurance and had to answer to his superiors, he had to vote against it. Otherwise, he would have gone along,” says Miles. The change was accepted as chapter 17 in the NFPA 33 standard.

When I joined the [NFPA] committee, I told them I wanted to change the code... That was met with loud laughter.”
— Lowell Miles, Founder/CEO
Miles Fiberglass & Composites, Portland, Ore.
A Little Shove
In 1996, NMMA joined Miles and ACMA in the fight to change the OSHA regulations. John McKnight, director of environmental and safety compliance for NMMA, joined the NFPA committee with a similar purpose: to make regulations easier for boat manufacturers. “For us, this issue came up where one of our members had a fire inspection and they were cited for non-compliance,” says McKnight. “The old standard was written for auto refinishing places where paint fumes are at an explosive level, whereas boats are not going to reach that level.”

McKnight attributes OSHA’s structure as the reason it is difficult to change regulations. “They’re in a pickle between unions, labor and industry. If they open up a regulation, it’ll get attacked on all levels. Everyone who has a concern will comment and that will be part of public record, which they’ll need to address,” he says. This may be why OSHA hasn’t updated their standards since 1969, whereas NFPA sits down every year and goes through a 3-year cycle of amending standards to address the latest technologies in protection and equipment.

Faced with such a stringent situation, the consortium decided to raise the stakes. They approached Michigan Congresswoman Candace Miller. Her family happened to own a boatbuilding company, so she was sympathetic with the consortium’s needs. She introduced a bill in Congress that would require OSHA to update the fire safety standard. “We got 60 sponsors in the House, and that was a wake-up call to OSHA. They realized this was an issue that would get some political support and decided to consider a change to its rule,” says Schweitzer. “We backed off on legislation because OSHA promised to work with us,” says McKnight.

In follow-up meetings, OSHA had technical questions about the NFPA standard and assurance beyond approval by the NFPA committee that protections provided by the NFPA standard were adequately protective of the industry. Thus, the consortium would have to conduct testing to prove their validity.

Testing, Testing
This wasn’t the first time OSHA required testing to prove these theories. In the genesis of the process, Miles conducted a spray test at his worksite in an oven the size of a spray booth to prove that the spray method wouldn’t reach high levels of emissions, even on a hot summer day. “We conducted tests with a number of different gel coat guns and chopper guns and ran the tests in this oven with no ventilation, no fan whatsoever. Then, we started turning the heat up and turning the temperature up to 120 degrees. The highest concentration we could get was 650 parts per million under the worst conditions, which fell way below the limit,” says Miles.

To update their findings, the consortium hired Hughes Associates, a consulting firm from New Jersey who has worked with the composites industry on other fire protection issues. Joe Scheffey, director of research and development at Hughes, looked at many areas during this evaluation.

“We looked at general manufacturing processes, fire suppression and light safety features like sprinklers and exits. All of them had an adequate fire suppression system,” says

COMPOSITES 2010 “Hot Buttons” Gives Safety Insight

Just a few hours before Bill Rudersdorf spoke to COMPOSITES 2010 attendees about preparing for unexpected visits from OSHA officials, OSHA regulators showed up at his company, Composites One LLC in Arlington Heights, Ill. “The good news is they were only there for three hours,” he says.

The story underscored the point of Rudersdorf’s presentation: Be prepared for OSHA visits before representatives arrive at your facility.

Rudersdorf, who serves Composites One as director of health, safety and environment, explained to attendees that OSHA penalties are based on four factors: gravity of the violation, size of the business, good faith of the employer and the employer’s history of previous violations. “The best move is to have documented organized training programs,” he said. “If your program has a ‘wow’ factor and your housekeeping methods look impressive, it’s much more effective.” Rudersdorf also recommended that attendees develop a hazard communication program that workers understand.

He was part of an expert panel that spoke about new developments in environmental and worker safety regulation and enforcement. The gist: Composites firms aren’t just looking to diversify their operations and grow revenue with new products; they seek to avoid trouble from regulators.

Marcus Bingham, vice president of Clarion Bathware, spoke about ways to incorporate safety incentives to help make safety an ongoing thought among workers. “The goal here is awareness—that’s the secret to reducing accidents.” He gave attendees tips and ideas on crafting memorable, fun employee-recognition programs.

Other panelists included Bill Holtzclaw, president of Holtec LLC; Jeff Austad, vice president of specialty unit sales and distribution for Magnum Venus Plastech; Dennis Fink, technical service manager for Syrgis Performance Initiators Inc.; Jack Benton, CEO of Benton & Associates; and Lowell Miles, founder and owner of Miles Fiberglass & Composites Inc.
Scheffey. In addition, the firm looked at the chemicals and additives used, the styrene content of the resins, the electrical equipment, spray guns and equipment, cleanup process, and ventilation systems.

Their findings supported the cause. In these tests, Hughes maintained vapor concentration under various scenarios, ranging from 6.8 to 17.8 percent. In normal conditions, the average concentration was 7.3 percent. In any case, it was well below the 25 percent required by OSHA.

ACMA also borrowed a testing facility at Purdue University and conducted its own testing by replicating worst-case scenario spray operations. “We used the most volatile resins, turned the spray gun pressures way up, we increased temperature and turned off blowers so there was no fresh air coming in,” says Schweitzer. “What we determined was that even under worst-case operations, we couldn’t achieve an explosive mixture in the air.”

Lessons Learned
ACMA sent OSHA the results of both updated tests and in October 2009, OSHA agreed that NFPA 33 was adequately protective. Soon after, OSHA sent a notice to its field offices telling them to adopt NFPA regulations, satisfying fiberglass manufacturers. “OSHA explained that they don’t have resources to change the regulation. They would have to go to Congress, which is uncertain and unlikely, but that it could provide an equivalent level of relief through the NFPA interpretation,” says Schweitzer. “We sent a letter back to OSHA saying we can live with that!” says Miles.

Due to the lengthy struggle, Miles says there were always times when he thought he would give up because of lack of progress. But in the two to three meetings a year he organized in different parts of the country, new people would come and others would go. “Despite the changes, we would usually gain at least some support each year and things would slowly get more encouraging. So we just kept at it,” he says.

Miles thinks he might have reached an impasse in trying to change the OSHA standard. But, the acceptance and substitution of the NFPA standard by OSHA has been worth the long fight. “With that ammunition, composite manufacturers shouldn’t have a problem being unfairly cited for fire spray standards from now on,” he says. And after the years of scorn, skepticism and struggle, the result was worth it.

Mike Shuler is assistant editor/production coordinator for Composites Manufacturing. Email comments to mshuler@acmanet.org.
Innovative Technology

Composite

Shoot the Moon
And could soon help NASA land among the stars

In 2003, following the Space Shuttle Columbia accident, a new organization within NASA was formed from the ten NASA centers and its headquarters. It became known as the NASA Engineering and Safety Center (NESC). The purpose of this new group was to institutionalize teams where expertise from each center, along with industry and academia, were combined in order to tackle NASA’s toughest technical problems, learn together, and then take the new-found knowledge back to their home organizations.

One of the most important collaborative efforts to come out of the NESC has been the all-composite crew module (CCM), which can be found inside the conical section at the top part of a rocket (envision where the astronaut would be). While testing has only recently been completed, the knowledge the group gained and was able to implement came throughout the process.

The Genesis

In January 2007, NASA’s Exploration Systems Mission Directorate chartered the NESC to design, build and test a full-scale crew module primary structure, using carbon fiber-reinforced epoxy-based composites. This charter was scheduled to coincide with the baseline Orion Project, a metallic crew exploration vehicle contracted out to the Lockheed Martin team.

However, this charter originally began in 2006. At the time, NASA was soliciting proposals from prospective companies for design and development of the Orion crew exploration vehicle. Also at that time, NASA formed an internal team to create an independent design of the vehicle so NASA would be more composite savvy when it looked at the companies’ proposals. In other words, the team was becoming NASA’s “smart buyer.” “Our team came up

By Melinda Skea
with a metallic crew module, but the Administrator challenged us to look at composites,” says Mike Kirsch, NASA’s NESC principal engineer. “We did a two-month parametric study and found that we could perhaps save 20 percent weight using composites. Then, NASA’s Dr. Mike Griffen and Scott Horowitz advocated the use of composites and charted a six-month feasibility study, ending in September 2006. “We concluded that an all-composite crew module (CCM) was feasible and could save on both weight and manufacturability. But if we wanted to quantify advantages of a composite crew module, we’d have to test one. So, three months later we were charted to build a CCM.”

The CCM team, made up of both government and contractors operating over four time zones, mostly communicated through a virtual environment. It was this diversity, strong in fresh perspectives, that created many of the challenges the group faced within the timeframe they were given. “It took a while to develop the personal relationships because we hadn’t always been one big happy family,” says Kirsch. But, he says, they made it work. “Early on, we approached Apollo experts to see if they had any suggestions on how we could fast track this collaborative effort. They suggested we lock everyone in the same room until the preliminary design review began (roughly six months), which definitely would not work—especially if we wanted to keep good people!” he says. “However, we did co-locate seven of the first nine weeks, conducting lots of team building exercises that enabled everyone to get to know each other and feel comfortable working together. After the first nine weeks, we would co-locate for two weeks every other month and converse daily through teleconferences, instant messaging, and web-based meetings (Webex). Webex allowed us to simulate being in the same room and design together even though we were thousands of miles apart.”

Uniqueness of Composites Emerge
When Lockheed Martin won the Orion project, the CCM team adopted Lockheed’s interfaces, but used composites where they used metallic materials. “We were drawing a line in the sand as we tried to work at a faster pace than the Lockheed team,” says Kirsch. “We weren’t trying to

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maintain compliance with their system; our purpose was to get in, get it designed and fabricated and feed the knowledge back into the baseline program.” This allowed the team to use pre-published information, relying on aluminum honeycomb and traditional composites solutions within the structure instead of trying to develop products and processes.

The design was completed over a period of 12 months, and manufacturing development five months later. With a plan intact, the group began manufacturing the test article in October 2008. The CCM was manufactured in two parts: an upper and lower shell. They first placed the composites on a composite cure tool, and then cured it in an autoclave. Next they put on the adhesive and core and cured it in an oven. Then they put the outer skin and cured it in an autoclave. “We did the upper and lower shells at the same time and it took almost three months to create those shells. On average, from design through manufacturing, it took 50 people working on the CCM to complete it,” he says.

The team also adopted Lockheed’s backbone approach so they wouldn’t have to come up with their own packaging solution. The backbone is an internal structure intended to help manage the packaging challenges and to manage the location of the center of gravity for the spacecraft particularly during reentry into the earth’s atmosphere. “The main difference,” says Kirsch “is that the CCM integrated the backbone system into the primary load bath, and in addition incorporated lobes in the floor between the webs of the backbone, whereas the Orion crew module backbone was nonstructural. Because composites can easily accommodate complex shapes, such as the lobes, it has the potential for a mass savings over a non-lobed shape. Additionally, integrating the floor to the backbone provided an external hard point for the heat shield to interface with, allowing for a more structurally efficient heat shield design. This was one of the knowledge bites we were able to feed back into the Orion program, dropping approximately 1,000 pounds,” he says.

The team also collaborated with experts to refine joint production. “We collaborated with the Air Force Research Laboratory, Lockheed Martin, and Northrop Grumman,
and tapped into their experience with the F-35 joint strike fighter by adopting a 3 dimensional woven preform—aptly named for its mathematical Pi symbol shape—called a Pi-joint,” Kirsch explains. The Pi-joint looks like an inverted Pi symbol. The continuous fibers from the composite materials give the Pi-joint its strength, making a very robust and easily manufactured orthogonal joint. Additionally, the team was able to leverage the Pi experience and rapidly develop a four-sided variation, called a cruciform, to enable the orthogonal intersections of the backbone webs.

Because the team was working on an entirely new concept, they also needed new tools to work with. “We approached Janicki Industries, the same company that supplied tooling for the Boeing 787. They told us that they had a fairly new product that utilized chopped fiber impregnated with resin and then machined to the desired shape, but it hadn’t been tried on large parts yet,” says Kirsch. “Janicki is also known for their ability to machine large parts to very high tolerance, and it was because of Janicki’s precision that we were able to build both the upper and lower parts of the CCM to the same dimensions, with an accuracy of .010 in critical zones and .030 in non-critical zones. This is enabling, considering there is no autoclave for the larger heavy lift rocket-sized parts.”

Another unique design aspect that came from an all-composite crew module was the instrumentation system. Instead of using a large suite of traditional uniaxial, bi-axial, and rosette strain gauges, the CCM team used a fiber-optic strain gauge system containing 3,500 strain measurements spaced one centimeter apart. This allowed them to characterize the linear strain gradients, such as around each window, and made individual strain placement much less sensitive for location of peaks.

Despite the team’s impeccable communication and group effort, there were times that they had to prepare the manufacturing team for the next step, even though the design information had not been released, resulting in a just-in-time engineering release. At other times, the systems they put in place wouldn’t work. They would cure a part, but it would later warp or a disbond would occur. They would have to retrace their steps to figure out what happened; all while maintaining a fast track schedule.

### Pi Preform Comparison

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NASA collaborated with the Air Force Research Laboratory, Lockheed Martin, and Northrop Grumman, tapping into their experience with the F-35 joint strike fighter by adopting a 3 dimensional woven preform called a Pi-joint.
Engineers preparing the digital full field measurement system prior to testing at the combined load test system at Langley Research Center. The composite crew module is installed in a self reacting test frame upside down to facilitate access to the load train components.

Technicians install fabric plys on the Janicki tooling prior to autoclave cure of the inner mold line skin.

Film adhesive is installed on the cured inner mold line skin prior to installing honeycomb core.

The honeycomb core was cured to the inner mold line skin as step two of the sandwich process.

Technicians install composite fabric representing the doubler for the out of autoclave splice.

Engineers preparing the digital full field measurement system prior to testing at the combined load test system at Langley Research Center. The composite crew module is installed in a self reacting test frame upside down to facilitate access to the load train components.

Tom McCabe (ATK), Dan Polis (NASA) and Mike Kirsch (NASA) in the CCM manufacturing demo, used to identify and resolve manufacturing risks.
Constructive Purpose and Criticism

The team’s main goal in building a CCM was to determine if they could accurately predict, using analytical models, how the various composite components would hold up. “We wanted to know if we could predict the weight accurately from a computer aided design (CAD). We predicted the weight of the CCM at 1,441 pounds and then actually measured it two years later at 1,496 including 50 lbs of strain gauges—that’s pretty close!” says Kirsch. He says one reason they were able to get that close was because they didn’t have to accommodate changes that might be required for other subsystems.

The team also wanted to characterize the damage tolerance of the design. The CCM was also pressurized to design limits while critical interfaces, like the landing system main parachute, were pulled to simulate the combined loads a future crew module might experience during launch and a return to earth. “We then impacted parts that might get damaged, and then subjected it through four times the design life. In that test, we learned that none of the damage grew, demonstrating composites structural integrity and an ability to tolerate damage,” he says.

Yet the experience was not all positive. “Composites generally shine in applications where the design is driven by stiffness, fatigue or thermal stability. For example, on the new Boeing 787, they wanted composites using precision tooling, the CCM team was able to build both the upper and lower CCM parts to the same dimensions, with .010 accuracy in critical zones.
because they have high fatigue life, meaning cracks don’t grow, which enables them to double the life of a part and inspect half as much. Or on a satellite, composites keep the shape of the satellite as it passes between drastic temperature differences,” explains Kirsch. “However, one of the criticisms of composites is that they look really promising on screen, but by the time you look at the finished product, the weight savings have dwindled in order to make up for different problems created by using the material.”

So will NASA adopt an all-composite crew module in the future? Probably not. “Unfortunately none of the usual composite benefits are seen on a CCM. It won’t experience thermal extremes, people are in it. And it will only ever be used once, so fatigue is not an issue. “But we learned invaluable lessons for future NASA applications; primarily, how to make, inspect and repair composite materials. Running parallel to the Orion program also allowed us to make mistakes where they couldn’t. And although the Orion pressure shell is not composites, other parts of the Orion, 40 percent by weight, are composites. Now, NASA and other team partners can benefit from the CCM lessons.”

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COMPOSMITES 2010 Show Coverage

At COMPOSMITES 2010, held at Mandalay Bay in Las Vegas, February 9-11, focused attendees sought specific solutions. They didn’t come to Las Vegas to simply “kick tires.” They came to find answers—ideas and solutions they can apply once they returned to their facilities.

Attendees found those answers in droves, as COMPOSMITES provided a spark of revitalization to an industry that has taken its licks from the struggling economy. Aisles were packed soon after the show opened—registration soared above last year’s total—and many vendors said they were pleased at the number of decision-makers who discussed specific applications and new markets.
Find Economic Prosperity in Forgotten Ingenuity

Keynote speaker and 2008 presidential candidate Mitt Romney drew chuckles and applause from COMPOSITES attendees. He explained that, at the moment, he preferred to be in Las Vegas over the White House. After all, as the saying goes, what happens in Vegas, stays in Vegas. According to Romney the same can’t be said about politics in Washington D.C.—something he knows a great deal about.

The former Massachusetts Governor touched on topics ranging from healthcare and education reform to the need for an energy strategy. Romney explained that though his career experience has varied with time in the private, public and volunteer sectors, he recognizes two things they have in common: Americans are willing to sacrifice to make things work, and Americans work hard to make things successful.

He explained that, while many think the solution to the economic crisis is out of their control, that’s not the case. He encouraged business owners to focus on those attributes that have made America great from its inception. “The key ingredient to success in all of these areas is a step back to good ol’ American ingenuity. If you look at Alexander Graham Bell, Thomas Edison, Bill Gates and countless other unsung success stories, what defines our country is an innovative and pioneering spirit,” Romney said. “Their ingenuity helped make America an economic success story.”

He urged business owners to take a stand. “In no industry anywhere in the world, can a country have a Tier 1 sector if it first does not have a Tier 1 economy.” He encouraged attendees to get involved in government. “In the competition of nations I am optimistic. I believe in the future of America. Sure we face tough competitors in the world, but our future remains bright as people stand up and say what they want, which lends itself to our continued economic freedom and success.”

Economic Update

Preceding Romney’s keynote address, industry veteran and business analyst Ray MacNeil gave attendees an overview of the current economic climate and how it affects the composites industry. Since 1960, the U.S. composites industry has had six downturns, he said, but the one that continued last year was “very severe.” The good news: Composites companies have compelling reasons to be optimistic this year and beyond.

The composites industry—along with many others during the recession—has been “hammered” since late in 2007, MacNeil said, but he predicts it will grow 3 percent to 5 percent this year, then 8 percent to 12 percent annually from 2011-2014.

MacNeil pointed out that history is on the industry’s side. Using economic charts as illustration, he showed that U.S. growth in composites has far outperformed GDP, as well as competing industries such as steel and aluminum—and it’s not even close. “We can still safely say it’s a growth industry,” he said. “We’ve certainly slowed down, but we haven’t observed the peak and rapid decline associated with a mature industry. Better yet, we’ve always ratcheted back up after periods of decline.”

He showed that two indicators from the Conference Board’s Leading Economic Index predict economic growth in the second quarter of 2010. “It’s more reinforcement that recovery is on the way,” he said.

MacNeil also discussed how trends and developments in industries important to composites manufacturing, such as automotive, construction and wind, should help the industry rebound. “We’re not a one-trick show, and we’re not dependant on one sector of the economy,” he said. Also, the inherent advantages of composites (lightweight, strong, non-corrosive) should help to spark new applications, he said, but it’s also important to monitor issues such as regulation and offshore competitors.

“Remember, we are in quite a hole,” MacNeil said. “We took a nosedive in 2009, and we’ll be struggling to get out of that for a couple years. But we will get there.”

Then again, he might be among the first to admit that predicting economic matters isn’t an exact science. In a touch of levity that drew audience laughter, he presented his definition of an economist—“an expert who will know tomorrow why the things he predicted yesterday didn’t happen today.”
Most composites manufacturers, suppliers and distributors can rattle off the advantages of the material—it’s stronger than steel, lighter than aluminum, more corrosion-resistant than both and so on. But John Busel believes the industry still struggles to define itself and answer a simple question posed by engineers and others in the marketplace: “Why composites?”

Busel, director of the Composites Growth Initiative of the American Composites Manufacturers Association (ACMA), stressed in his session that the composites industry has plenty to promote. “Our materials protect troops, make bridges resistant, reduce pollution from coal-burning plants, makes homes beautiful and affordable and convert wind into electricity to power millions of homes,” he said. “The question is, how can we explain our value more effectively?”

Part of the industry’s challenge was exemplified by a show of hands. Only a few of the approximately 60 composites professionals in the room said they have been in the industry for more than 15 years (the vast majority had less than five years’ experience). And, of course, the composites industry itself is relatively new compared to traditional industries such as steel, aluminum and plastics.

Busel’s point: Collecting momentum in the composites industry (and getting customers to adopt composites instead of traditional materials) requires first connecting with itself. As companies develop key talking points about the benefits of composites, he said, they should consider simple questions such as, “Who’s the competition?” and “What is the real problem you’re trying to solve?”

Busel also said composites professionals should better prepare answers that challenge the perceived limitations of composites. “For example, when prospective customers talk about high materials costs, we should bring up lower installed costs. When they bring up lower stiffness, we need to explain how it’s less expensive compared to other fibers.” He also told attendees the industry needs to reconsider codes, standards and specifications, and to consider new designs that don’t simply imitate the form and function of conventional products such as the steel I-beam.

Tom Delay has a 2009 Pontiac G8. Like many car owners, an issue often pops up when his headlights turn on—a haze appears on the cold part (a polycarbonate pane) inside the headlamp. The issue, called “fogging,” occurs when conventional internal mold release agents face migration and sublimation.

Composites firms can lift (well, prevent) the fogging issue by using advanced multifunctional processing additives, Delay told a packed room at COMPOSITES 2010. That’s just one example of how composites firms can optimize SMC/BMC formulations and improve the entire compounding/molding process. “Traditional mono-functional internal mold release agents are difficult to disperse, and they do not contribute anything positive to the compounding process and merely provide a release from the tool,” said Delay, closed mold market manager at BYK USA, a supplier of adhesives for plastics, coatings, inks, sealants and paper surfaces.

In standard formulations, zinc stearate works as internal release agent and is essential to remove the molded part from the form. Newer technology improves the appearance of the molded part and guaranteed the thorough release, Delay said. “New multifunctional liquid processing additives allow the user to eliminate typical sources of scrap, improve overall quality and eliminate a nuisance material.” Other benefits include decreased shrinkage, enhanced gloss, better color of finished parts and improved anti-separation properties of the compounds, he said.
Swing to Higher Branches

In the minds of those the Emerging Market Panel was how to best preserve their business, retain valuable personnel and maintain a positive mindset. ACMA’s director of Composites Growth Initiative (CGI) John Busel encouraged owners to go beyond their comfortable borders and look for growth. “It’s our prediction that all the low-hanging fruit has been picked. It’s time to get out, explore and find what’s out there,” he said. “And the best way to do that is through emerging markets.”

To aid in industry exploration, panelists Habib Dagher from the University of Maine, Jonathan Trovillion from the U.S. Army Corps of Engineers, and Matt Garran from the American Wind Energy Association (AWEA) each addressed issues and areas of growth within their industry segments.

Dagher encouraged manufacturers to change their mindset on how to break into new markets. “Instead of trying to replace other materials such as steel, wood and concrete, try to coexist with them,” he said. “There is a lot of potential for hybrid applications. For example, in bridge construction, composites can aid and strengthen concrete. Within building construction, composites can support wood and offshore wind.”

Garran echoed Dagher’s sentiments as to the untapped potential, within the U.S. and globally, of offshore wind energy. While many sectors of the industry saw a downturn in 2009, wind energy remained relatively unaffected. “Everyone knows that wind energy is moving forward. Last year, we had our best year for installation ever. Within the U.S. we have a goal of generating 20 percent of the energy by 2030. Currently, we are at eleven percent of that total, so we have a long way to go,” he says. “However, right now the turbines that are being installed are those done on older technology. We need composite manufacturers to look and see how—and if—they can fit into the wind energy market. This market isn’t for everyone. On average it takes a company three to five years to successfully enter into the market.” Garran also encouraged business owners to do their research, and to see where they can fit in, in the future. “Don’t look at the target today and aim for it. You need to look at the future and see where you and the market could be. The technical revolution is just beginning; it’s a great time to get involved.”

Next, Trovillion addressed the vast potential available for composites within corrosion. “In 2002 a law was passed to develop a long-term strategy to reduce corrosion in military applications. It is estimated that currently $10 billion is spent a year on military maintenance, and of that 15 percent is used on corrosion maintenance,” he said.

He also acknowledged the vast opportunity for composites within military protective systems, including helmets, body armor inserts and overall armor systems. “In the Army, we are looking for the next generation of technology. We need technology, such as multi-functional composites,” he says. “For example, nanoparticle additives that enhance productivity like EMI shielding. Or self-healing micro-capsules that can repair when damaged and self-decontaminating surfaces useful against biological attacks.”
Will Composites Firms Take the LEED by Going Green?

More consumers are asking for environmentally friendly product options, so savvy manufacturers are creating and marketing new green products. A similar trend is growing in the building and construction industry, where an increasing number of architects and building designers are using sustainable materials and methods to achieve LEED (Leadership in Energy and Environmental Design) building certification, as developed by the U.S. Green Building Council.

Kirsten Dangaran, Ph.D., a research scientist at the Ohio BioProducts Innovation Center at The Ohio State University, shared results of a recent survey of 160 architects in Ohio. Nearly 90 percent of them reported their clients were interested in using bio-based, sustainable products.

She and Bob Moffit, a product manager for Ashland Performance Materials, spoke to attendees about the value proposition of eco-friendly composites, providing insight on how composites firms can position those products to resonate with green consumers and green builders.

“People are willing to pay more for green products, but those products must work,” Moffit said. “Also, at some point, you have to market it, and don’t sell just the green aspects—sell the performance aspects, too.” Green building initiatives and eco-friendly organizations can help companies market green products, he said.

Exhibit Hall Opens

ACMA President Monty Felix cuts the ribbon at the COMPOSITES exhibit hall, signifying its official opening.

COMPOSITES 2010 Stats

Participants: 3,000
Countries represented: 42
Educational sessions: 51
Technical papers: 41
Committee meetings: 50
Exhibitors: 181
New CCTs: 9
Universities represented: 36
Speakers: 110
ACE winners: 3
Pinnacle winners: 7
Building Up Housing Abroad
While North American and European markets have suffered in the current economic crisis, the future looks bright for the composites industry in Asia and the rest of the world in the next decade and beyond according to Norman Timmins, director of consulting for Lucintel.

In China especially, the impact of the recession has been muted, and a latent demand for housing and infrastructure has created double-digit growth in construction and an increased demand for all types of consumer goods. While a lack of awareness of the availability and advantages of composite products is a challenge in that market, massive increases in demand will force more acceptance, Timmins said. Specific products that are seeing increased demand include cooling towers, bathtubs, pools, FRP panels, bridge decks, grating, doors, windows, grating and rebar.

Other potential markets include Brazil, Russia and India, which all have a built-up need for housing and energy efficient materials. A rise in urbanization and more government housing creates more demand in these areas. Natural disasters such as floods and earthquake have created a need for prefabricated construction in undeveloped areas, but more happily, international showcase events such as the Olympics and expos create an urgent need for construction and cost efficiency.

Forecasters see a future of robust growth in international markets of 7 percent by 2015, Timmins said, while domestic recovery in North America will be gradual. Demand for construction will remain low while raw material prices will increase but there will be less ability to pass those costs on to the financially-pinched consumer.

Opening Reception
The exhibit hall opened Wednesday, February 10, and the day ended with a lively Opening Reception at Mandalay Bay’s Rum Jungle.
To Avoid OSHA Citation, Firms Must Deal with Dust

Many composites industry professionals—even ones well trained in the safety routines of their facilities—are unaware of the hazards of dust, said Perry Bennett, Health, Safety and Environmental director at Molded Fiber Glass Companies. He spoke to COMPOSITES 2010 attendees about mitigating and controlling combustible dusts in FRP processes.

Bennett warned attendees that regulatory agencies are getting more serious about the topic. The Occupational Safety and Health Administration (OSHA) will soon release changes to its principal dust document, “NFPA 654, Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids,” and Bennett recommended that composites professionals realize they can be cited for noncompliance with NFPA 654.

Part of the problem with regulating dust explosions is the confusion about which dusts can explode and under what conditions, Bennett pointed out. Even the amount of dust that’s a hazard is still unknown. Generally speaking, the smaller the dust particle, the bigger the hazard. According to OSHA, an often-used rule of thumb is that dust of 420 microns particle size (40 mesh sieve) may serve as the fuel in a dust explosion.

During his presentation, Bennett provided tips and methods for mitigating and controlling dust within facilities. Repeated points throughout his presentation include: Test your own dust with equipment that’s currently on the market. And because layers as thin as 1/32 of an inch (0.8 millimeters) or 1/16 of an inch (1.6 millimeters) can be problematic, “if you see dust, don’t ignore it. Instead, clean it, and examine where it’s coming from,” he said. Also, seal all openings in equipment to prevent the release of dusts into the work environment,

Technical Paper Winners

The Technical Papers Awards are presented each year at COMPOSITES. Forty-one final papers were reviewed by the committee this year, which were narrowed to the best of six categories. A team of engineers from Ford Motor Company, Multimatic Engineering Services Group, and General Motors won Best Overall Technical Paper for The Influence of Bond Stand-Offs and Adhesive Cure Temperature on Bond-Line Read-Through Severity. Winners in each of the following categories were presented plaques:

**Fire Resistance**

Property Estimation for Pyrolysis Modeling Applied to Flame Retarded Modified Acrylic FRP Composites
By Nicholas Dembsey, Ester Kim, Worcester Polytechnic Institute; Charles Doré, Abate Fire Technologies LLC

**Infrastructure and Construction**

Vacuum-Infused Composite Deck Plate Replacement for Deteriorated Steel Deck
By Kurt Feichtinger, Russell Elkin, Edison Ospina, Alcan Baltek Corporation; Wenguang Ma, Fabwell, Division of Owens Corning

**High Performance**

Damage Assessment in FRP through Digital Imaging and Computed Tomography
By Mohammad Abdelghani, Kari Arnston, Michael Doschak, Pierre Mertiny, YuChin Wu, University of Alberta; Renke Scheuer, Leibniz Universität Hannover

**Manufacturing and Processes**

Investigation of a Composite Repair Method by Liquid Resin Infiltration
By M. Hautier, D. Lévêque, C. Huchette, Onera, The French Aerospace Lab
Reducing Emissions Improves Safety and Quality

Bob Lacovara, president of consultancy Convergent Composites, led a presentation about ways composites firms can reduce emissions and thereby improve the quality and safety of their facilities. He presented an overview of technology available to make that happen, and how it can be applied to different processes. “Environmentally friendly materials translate to low styrene materials, styrene alternatives and additives such as styrene suppressants,” he said.

The emissions from fiber reinforced plastics processors can be major sources of volatile emissions, including styrene, the volatile component of polyester resin and gel coat; and acetone, a solvent used to clean tools and other surfaces contaminated with resin.

Some discussion during the presentation was about the potential for converting open molding into close molding, which sometimes is a possibility and other times isn’t cost effective because of production cost and volume, Lacovara said. He added that no single option is likely to replace the plant-wide use of solvent or completely eliminate the source of volatile emissions, so it’s best for composites companies to examine alternatives that combine several options.

The benefits of reducing volatile emissions include less concern about OSHA regulations and air pollutants, reduced disposal cost of solvents, and reduced risk of fires. Furthermore, when considering a substitute, firms should consider if it poses a health or safety risk, what experience others have had with it, and what the effect will be on product quality and production levels.

Materials

The Influence of Bond Stand-Offs and Adhesive Cure Temperature on Bond-Line Read-Through Severity

By K.D. Fernholz, K. Lazarz, Ford Motor Company; H. Fuchs, & P. Deslauriers, Multimatic Engineering Services Group; C.S. Wang, General Motors

Pultrusion

Comparison of Composite Properties from Different Test Standards - A Case Study from the Development of a Load and Resistance Factor Design (LRFD) Standard for Pultruded Composites

By Ellen Lackey, James G. Vaughan, The University of Mississippi; Kevin Spoo & Chris Gill, Owens Corning Science and Technology

All technical papers are maintained in an electronic library (www.compositesresearch.org).
A WINDow of Opportunity

Habib Dagher from the University of Maine spoke to a swelling audience on the window of opportunity available to composites manufacturers within the wind energy market.

Within the U.S., the largest concentration of people is within the northeast corridor, roughly the size of a misshapen Texas. Approximately 55 million people live, work and burn through high energy bills, all while untapped potential lies nearby.

However, the U.S. now has a goal: generate 20 percent of the nation’s electricity from wind energy by the year 2030. This includes not only land turbines but offshore ones as well. Currently the U.S. has several proposed offshore projects, mostly within the Northeast, but zero installed. Whereas the U.K. alone is pushing forward, contractors and all, on a $12 billion offshore project. Dagher estimates that within the U.S., $200 billion will be spent on offshore wind, with blades alone accounting for 10 percent of the cost—a huge opportunity for the composites industry. “Offshore wind turbines offer a great deal of opportunity because they require different things compared to land turbines,” he says. But Dagher also pointed out some obstacles that impede progress. “Offshore turbines need to be longer and more durable within salt water to limit maintenance costs. After all, who wants to go 15 miles offshore and fix a broken turbine that’s 300 feet in the air?”

Dagher emphasized that the offshore market is slowly evolving. It’s new and has room for vast improvements.
within product use, installation capabilities and maintenance. If the composites industry can find a more durable solution and an easier way to install these turbines, it’s not just a window of growth opportunity for the market: it’s a wide open door.

USDA Seeks Green Thumbs
The United States Department of Agriculture (USDA) developed the BioPreferred program to establish new markets for bio-based products. Ron Buckhalt, program manager for BioPreferred, says that even as the industry is turning to greener ingredients, oil dependence is still a detriment. “Soybeans are being used more, but they’re a food, and when the oil prices go up, so do food prices,” he said.

The program is currently set up into five categories: acoustical panels, interior panels, plastic lumber panels, structural interior panels, and structural wall panels. But this is where the USDA is reaching out directly to the composites industry to help structure this area in such a way that benefits composites. “We need input from you as to how to categorize these,” Buckhalt said.

The program currently comprises 4,500 products from 1,000 companies in markets such as construction, food service, transportation, and facility operations/maintenance. Manufacturers currently involved include Agri-board, which manufactures structural panels from straw, and BioFoam Tech, which produces green surfboards.

For more blog coverage, visit www.composites2010.com

The Most Creative Application Award
Bridge-in-a-Backpack – AEWC Advanced Structures & Composites Center

Superior Quality (In an Open Molded Part)
Composite Swimming Pool with Renewable/Recyclable Content Resin System – Alaglass Pools

Technical Innovation for Corrosion Application
(Left) FRP Pilot Carbon Capture – Scrubber & Ductwork, (Right) AEP Mountaineer Station – Ershigs Inc.

The Process Innovation Award
One Way Flap Valve Using MIR Technology – Composites Solutions Pty Ltd.
Pinnacle Awards

Best of Show and Residential Category
Robal Glass – Monroe Industries

Commercial/ Specialty Category
ISIS Luxury Bath – International Marble Industries Inc.

President’s Awards

For his many years of contributions and leadership to the composites industry John Tickle (right, photographed with wife), president of Strongwell, Bristol, Va., received the 2010 President’s Award from ACMA President Monty Felix (left). Tickle was honored because of his ability to develop future leaders and his compassion for those less fortunate.

Lifetime Achievement Award

Royce Newsome (left), president of Venetian of Lubbock in Lubbock, Texas, received ACMA’s Lifetime Achievement award for his long-standing industry and association leadership. To be considered for the Lifetime Achievement Award, nominees must have been involved in the composites industry for at least 20 years and must have made a significant and lasting contribution.

Hall of Fame Inductees

Bob Lacovara (left), Convergent Composites, Perkasie, Pa., and Fred Dierks (not in attendance), Composite Solutions Consulting, Adamsville, Tenn., were inducted into ACMA’s Hall of Fame.

Outstanding Volunteer

Cheryl Richards (left), global market development manager of wind energy for PPG Industries, received the first-ever Outstanding Volunteer award. She received the honor in large part because of her extensive work on committees supporting green composites.

Raffle Winners

Two lucky attendees won a vacation package of their choice to the sun or slopes with appropriate composites sports gear, valued to $5,000, during the closing moments of the show. Crowds gathered to hear that Daniel Bannon of Advanced Infrastructure Technologies and Sorin Roccolta of Southwest Fiberglass won the grand prize give-away.
Save the Date!

February 2–4, 2011
Ft. Lauderdale, Florida

www.acmashow.org
If you wonder whether a trade association can ever get the government to change unfair regulations, there’s a story in this issue of the magazine that proves it can. After 28 years of lobbying for change, ACMA has successfully changed OSHA’s interpretation of a fire standard. Keep that in mind when you read about the upcoming regulatory challenges that the industry faces. The association is already tackling important issues this year that threaten to make doing business harder for you and your company.

Some of those challenges are chronicled in the following pages, including the National Toxicology Program’s (NTP) proposal to classify styrene as “reasonably anticipated” carcinogen. NTP’s proposal is based on a flawed process and bad science. ACMA is working on your behalf to push NTP toward a fair review process, but a widespread grassroots effort from the industry is critical to affecting positive change. Please lend your support by getting involved in ACMA’s government affairs committee.

Tom Dobbins, Chief Staff Executive

Industry Campaigns for NTP Styrene Review
Rep. Mike Thompson (D-CA) and Rep. Rick Boucher (D-VA) co-signed an Aug. 31 letter to NTP Director Linda Birnbaum, asking her to explain the agency’s proposed classification of styrene as a “reasonably anticipated” carcinogen. Birnbaum’s Sept. 30 response to these Congressmen failed to address critical issues including: A conflict of interest for a key member of an NTP expert panel, failure of the agency to follow its own policy on peer review, and refusal by NTP to address the reports of several independent expert panels that determined styrene is not a human carcinogen.

ACMA and industry representatives are working with Congressional sponsors on a second letter to Birnbaum and will work over the coming weeks to recruit additional signatures from other House and Senate offices. A key component of this effort will be ACMA’s National Lobby Day, April 14-16 in Washington, D.C.

Texas Styrene Concentrations Are Below ESL
The Texas Commission on Environmental Quality (TCEQ) recently posted reports of air monitoring data. In 10 of the 11 monitoring regions, the concentration of styrene in the ambient air was found to be below the TCEQ’s screening...
Inside ICPA

ICPA General Session Update
At ICPA’s General Session, President Jamie Myers, Hoffman Fixtures, acknowledged that everyone is feeling the strain of the economy and working harder than ever. The keynote presentation by ACMA President Monty Felix centered on how his own company faced challenges and benefited by being involved in association committees.

President Myers reported to attendees that the Board decided to bring back an alliance publication, MasterCast Connections, which is intended to serve as a central communication tool for members in all regions. He also informed members that the Board is exploring the establishment of chapters to reduce costs associated with maintaining regions.

Technical Committee Update
New ANSI/ISO standards for solid surface materials (not products) were discussed and were also covered at the Solid Surface Council meeting. Committee member Klaus Fromme will attend the ISO meeting in Rome to discuss an international standard proposed for engineered stone materials, which this committee and ICPA’s Solid Surface Council will help draft. The Quality Assurance subcommittee was reactivated to work on standards/criteria for MasterCast. The education subcommittee is collecting and will be reviewing “how to” videos and DVDs for committee review and potential use. Contact committee chair Ken Lipovsky at Ken.Lipovsky@reichhold.com, for more information.

Marketing Committee Update
Chris Hurdleston, Marbleon, became the new committee chair. The public relations subcommittee reported that it is working on the first of a series of press releases promoting MasterCast. It will focus on ADA options and go out at the end of the month. The group approved the initial format/topics to be covered and set an April 30th deadline for producing the first issue. For more information, contact committee chair Chris Hurdleston at marbleon@comcast.net.

New FRP Bridge Standard Released
The American Association of State Highway and Transportation Officials recently released and made available for purchase the LRFD Bridge Design Guide Specifications for GFRP-Reinforced Concrete Bridge Decks and Traffic Railings, First Edition. The Transportation Structures Council (TSC) will work closely with the authors of the bridge deck standard on fixing issues identified in the first drafts. For more information, contact John Busel, ACMA’s director of Composites Growth Initiative, at jbusel@acmanet.org.

Help the Boy Scouts “Think Composites”
ACMA needs volunteers to work the Composites Merit Badge Booth at the Boys Scouts National Jamboree, July 26 – August 4, 2010 in Fredericksburg, Va. Volunteers don’t need to be a Boy Scout; they just need to be industry professionals committed to promoting composites to future leaders. For more information and to sign up, contact Jim Scholler at jscoller@trek7.com.

levels (ESL) for health or odor effects. ACMA is in a long-running debate with TCEQ over the odor-based styrene screening level. To learn more, visit http://acma-regulatory.wikispaces.com.

Composites Manufacturing 45

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Composites Growth Initiative, at

ACMA Magna, Inc.

• Mike Barkley, CCT
Composites Technologies Inc.
Goderich, Ontario, Canada
• Dierk Belschner, CCT
Composites Technologies Inc.
Goderich, Ontario, Canada
• Linas Bilunas, CCT
Hadlock Plastics Corporation
Mentor, Ohio
• James Bish, CCT
Midwest Towers Inc.
Chickasha, Okla.
• Matt Bidler, CCT
McClarin Plastics Inc.
Hanover, Pa.
• Ronnie Bolick, CCT
North Carolina A & T State University
Trinity, N.C.
• Christopher Brooks, CCT
Astro Manufacturing
Garnett, Kan.
• Jason Buttle, CCT-C
ZCL Composites Inc.
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• Hugo Castillo, CCT
Best Bath Systems
Boise, Idaho
• Joe Chapman, CCT
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• Jim Chase, CCT-VIP
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Brunswick, Maine
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• Dennis Clark, CCT-VIP
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Southport, Maine
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• Sean Crossen, CCT-C
Maine Advanced Technology Center
Winthrop, Maine
• Sean Crossen, CCT-VIP
Maine Advanced Technology Center
Winthrop, Maine
• Skylar Cook, CCT-M
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Eastport, Maine
• Courtney Derr, CCT
Best Bath Systems
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Cleveland, Ohio
• Jason Dylack, CCT-CM
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• Benjamin Floor, CCT
Composites Technologies Inc.
Goderich, Ontario, Canada
• Peter Foerster, CCT
McClarin Plastics Inc.
Hanover, Pa.
• G. William Green, CCT
Best Bath Systems
Boise, Idaho
• Jason Greene, CCT-M
Boat School-Husson University
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Kohler Co.
Kohler, Wis.
• Richard Hadlock, CCT-CM
Hadlock Plastics Corporation
Geneva, Ohio
• Joshua Halar, CCT
Saint-Gobain Tech. Fabrics
Seattle
• Laurie Haley, CCT-C
ZCL Composites Inc.
Edmonton, Alberta, Canada
• Steve Haslett, CCT-M
Custom Composite Technologies Inc.
Bath, Maine
• Kelly Haug, CCT
Space Age Synthetics Inc.
Moorhead, Minn.
• James Hayes, CCT-CM
Hadlock Plastics Corporation
Geneva, Ohio

("New CCTs" continues on p. 46)
Spring 2010
Events Calendar
We Can Fill Your Days!

March

March 16
Worker Training for Cost Savings (Webinar)

April

April 6
Which Closed Mold Process is Right for You? (Webinar)

April 14-15
Lobby Day, Washington DC

April 22
Quarterly Industry Review: ACMA Members Only (Webinar)

Week of April 26th
Ohio Regulatory Forum, Ohio Training and Certification Workshop (location TBD)

May

May 3-4
CCT-I Training, Washington DC

May 18
Mitigating and Controlling Combustible Dust (Webinar)

Look for more upcoming events, including:

May: Infrastructure, Transportation and Energy Conference (tentative)
June: Business Leaders Forum

Unless otherwise noted, all events are open to members and nonmembers.

For more information, visit www.acmanet.org/meetings

• Michael Hobbs, CCT
  Turtleflex LLC
  Eclectic, Ala.

• Joseph Hockensmith, CCT
  McClarin Plastics Inc.
  Hanover, Pa.

• Justin Hott, CCT-M
  Boat School-Husson University
  Eastport, Maine

• Rick Hunt, CCT
  Ashland Distribution
  Oswego, Okla.

• Richard Irving, CCT-VIP
  Mid-Coast School + Technology
  Waldoboro, Maine

• Manuel Jaquez, CCT
  Best Bath Systems
  Eise, Idaho

• Casey Jordan, CCT
  McClarin Plastics Inc.
  Hanover, Pa.

• John Judge, CCT-VIP
  Maine Advanced Technology Center
  Kennebunkport, Maine

• Dmitri Kabakov, CCT
  Texas State University-San Marcos
  San Marcos, Texas

• Todd Kennedy, CCT
  McClarin Plastics Inc.
  Appoquinimink, Pa.

• Mitchel Knox, CCT
  McClarin Plastics Inc.
  Hanover, Pa.

• Jason LaHara, CCT
  PPG Industries Inc.
  Atlanta

• Paul LaPenna, CCT-M
  Custom Composite Technologies Inc.
  Bowdoinham, Maine

• Thomas LeVeen, CCT-VIP
  Maine Advanced Technology Center
  Portland, Maine

• James Markos, CCT-M
  Boat School-Husson University
  Eastport, Maine

• Justin Maynard, CCT
  Saint-Gobain Vetroex America
  Sylvania, Ohio

• Kevin McPhelim, CCT-VIP
  Maine Advanced Technology Center
  Freeport, Maine

• Edward Mendez, CCT
  Texas State University-San Marcos
  San Marcos, Texas

• Craig Menkes, CCT-VIP
  Maine Advanced Technology Center
  Auburn, Maine

• Jim Nguyen, CCT-C
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  Edmonton, Alberta, Canada

• Jesse Nenmaker, CCT
  McClarin Plastics Inc.
  Hanover, Pa.

• Kathy Nunn, CCT
  Composites One LLC
  Rock Hill, S.C.

• Cory Olson, CCT-M
  Boat School-Husson University
  Warren, Maine

• William Palmer, CCT-M
  Boat School-Husson University
  Topsham, Maine

• Dennis Pavolko, CCT-CM
  Haysite Reinforced Plastics
  Erie, Pa.

• Timothy Prister, CCT-CM
  Haysite Reinforced Plastics
  Erie, Pa.

• Stephen Phillips, CCT-VIP
  Maine Advanced Technology Center
  Damariscotta, Maine

• Christian Quintilvan, CCT
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  Hanover, Pa.

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  ZCL Composites Inc.
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• Mike Roberts, CCT
  Interplastic Corporation
  Broken Arrow, Okla.

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  Best Bath Systems
  Boise, Idaho

• Kevan Rusk, CCT
  LM Glasfiber of Grand Forks
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• Donald Scheck, CCT
  Shelter Works
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• Jared Sidwell, CCT
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This year, COMPOSITES 2010 held a variety of specialized industry network receptions designed to help attendees mix business with a little bit of pleasure—it is Las Vegas after all. Following a full day on the show floor, attendees participated in new networking receptions including: emerging markets, pultrusion, infrastructure, building, ICPA and international.
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