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Q&A-Recycled Composites Used to Benefit the Economy

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Richard Cubeta, President & CEO, SolidCast Polymer Technology

Richard Cubeta is a self-proclaimed "black-and-white" guy – straightforward and practical. So when his Houston-based company, SolidCast Polymer Technology, discusses "green" composites with clients, Cubeta approaches the topic with a rational, down-to-earth perspective. He explains how his firm can help companies solve a business challenge, not just save the planet.

Cubeta's matter-of-fact approach has helped him serve as a corrosion-resistant composites leader for more than 30 years. The basis of his company's technology is the use of non-hazardous raw materials in combination with an environmentally friendly manufacturing process. At COMPOSITES 2013, he led an educational session on using recycled fiberglass for pipes, manhole covers, utility boxes and railroad ties.

The Best of COMPOSITES 2013 Webinar Series launches on Wednesday, May 29, 2013. Cubeta's webinar, *Utilizing Recycled Fiberglass for Affordable Green Composite Technology*, will be held on Wednesday, June 12, 2013. Register for the series today!

Q: You approach the green marketplace from an interesting angle – discussing the potential economic benefit of using recycled FRP. Can you talk about that viewpoint?

"Green" is something I've been apprehensive to proclaim. When I do a presentation for a client, I talk about the overall benefits of SolidCast Polymer Technology and then add the green angle at the end, as a bonus. A few years ago, I thought the eco-friendliness of recycled FRP was going to be a great hook. But the first thing that happened when I said, "This is green" is clients would say, "Whoa, so then how much is this going to cost?" To most people, green equals expensive. I had to find a different way into the conversation, to focus on a business issue that mattered to them.

Q: How did you do that? What issue are clients and prospects dealing with that your company can help to solve?

The problem is that FRP is not biodegradable and therefore not easily recycled, so the FRP industry is facing growing sustainability problems regarding increased hazardous landfill costs. Also, even the best available FRP manufacturing technology generates a significant quantity of waste.

Employment of lightweight FRP designs have improved the auto and aerospace industries' fuel efficiencies, while simultaneously giving rise to an entire alternative wind-energy market. Consequently, each industry has succeeded in reducing their carbon footprint. Ironically, these same FRP materials, which have countless energy and environmental benefits, have looming issues regarding disposal and reclamation.

We offer the marketplace a viable cradle-to-cradle remedy. Advancements in our green technology are credited with overall lower manufacturing costs, including permitting, waste removal and raw materials.

Q: How does using recycled FRP financially affect your clients?

The greatest motivation for recycling FRP is overall cost. FRP recycling financially impacts fabricators in two ways: opportunity costs and disposal costs. Opportunity costs are overlooked

scrap cost of materials thrown away that might have been used to produce a saleable product. Disposal costs are what people are considering when the topic of waste cost is mentioned. Disposal costs include transportation and landfill fees. Hazardous landfill costs continue to climb due to increased government regulations, oversight and limited hazardous landfill storage.

Q: Can you talk about the physical process of recycling FRP? What options do companies like SolidCast Polymer Technology have, and which do you prefer?

Basically, there are three common FRP recycling processes: mechanical shredding, incineration and reclamation. In recent years, these haven't been as economically feasible as sending FRP scrap to a hazardous waste landfill. But population, demographics, environmental awareness and increased landfill cost are forcing FRP fabricators to utilize different waste disposal methods that are economically feasible and also include a beneficial public relations outcome.

The incineration process burns off resin binders and leaves glass fibers. It's extremely expensive, with exorbitant capital equipment costs. Incineration also triggers consequential air emission issues. Along with the high cost of ash disposal, incineration can degrade the physical properties of the remaining glass fibers by as much as 50 percent, and leaves residue that inhibits bonding of most thermosetting resins systems.

The problem with conventional shredding is it produces inconsistent reclaimed fiber sizes, which results in fiber particles being too large or too small. The consumption of these recycled fillers is limited. Also, inconsistent fiber sizing ultimately results in unpredictable physical properties and various resin-to-fiberglass loading, making it difficult to establish fixed raw material and manufacturing costs.

Reclamation harvesting is what we prefer because it lends itself to generating greater uniformity and consistency in fiberglass sizing. This process also allows for greater predictability of physical properties and resin-to-fiberglass ratios. More importantly, the harvested FRP preserves its original physical properties and provides for a more suitable reusable composite product. We rely on a machine called the ECO-WOLF Grinder/Muncher, which acts similarly to a hammer-mill that is built to withstand abrasive fiberglass.

Q: How does the machine works?

It takes waste material and makes recycled needles out of it. When I went to view how it worked for the first time, I was amazed. We took fiberglass and placed it in a hopper area, and the material basically vanished as fast as you could blink your eye. It has a collection bag underneath to grab the fibers, and another bag that sucks up powders and dust. The machine turns fiberglass into impregnated needle fibers that already have resin cured in them. The material doesn't suck up resin, and we soon realized we can use a certain percentage of the recycled FRP material from reclamation harvesting – usually about 2.5 percent to 5 percent – to help save clients money.

The real question for all methods of recycling is how much money can be made or saved from the recycling process and how much FRP waste can be disposed of.

Q: SolidCast Polymer Technology uses recycled FRP for applications such as manhole covers and railroad ties. Why target those kinds of projects for this solution?

The process of manufacturing either large structures, like manholes and tunnel segments, or structural components in large volume, like railroad ties, allows for the significant consumption of recycled FRP. The development and improvement of large-scale material handling and mixing equipment have greatly advanced the production of solid cast polymer products. Solid cast polymer manufacturing technology is now capable of producing over 360 yards or 720 tons of solid cast polymer matrix daily. Extremely fast cure times also allow manufacturers to purchase fewer molds. Combined with the elimination of post-curing, the cost of manufacturing a solid cast polymer product compared with that of a precast concrete product is significantly lower. Recycled FRP fibers can be blended into the solid cast polymer matrix at a loading level of about 5 percent-10 percent by weight without negatively affecting the manufacturing process or the physical integrity of the composite matrix.

The blending of FRP reclamation-harvested fibers with solid cast polymer composite offers a cost-effective alternative for overall FRP disposal costs, landfill issues and the consumption of large quantities of FRP waste. We have discovered the merging of these two innovative technologies has created an improved solid cast polymer and a superior material for construction.

The FRP industry is feeling more secure because we're taking recycled fiberglass materials and putting it into something that encapsulates it, so it won't be an environmental issue anymore. If you have something that's virtually impermeable, and it's green, and you can take that and encapsulate it into your matrix, you've solved an issue.

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