

Table Talk at GPEC 2014

All issues about plastics sustainability are fit for discussion at this annual meeting

By Mike Verespej

Opportunity, change, and innovation couldn't be coming together at a better time for engineers and executives tackling the issues of sustainability, recycled and bio-based materials, and green products.

"We have had as much change over the last five years in the plastics recycling industry as we have had in the previous twenty," says Mike Biddle, president and founder of MBA

Polymers Inc. Biddle is addressing the pressing need for the industry to address marine debris in his keynote address at the Global Plastics Environmental Conference, March 13-14, in Orlando, Florida, USA. (The GPEC event is sponsored by SPE's Plastics Environmental Division; this article summarizes GPEC's scheduled content available before the conference.)



Exemplifying GPEC's emphasis on innovation, Mack Molding and furniture manufacturer Emeco developed a material for molded chairs made from a combination of recycled polypropylene and post-industrial wood fiber waste.

“There has been a dramatic change in the amount of plastics being collected the past five years because of single-stream recycling, and a huge increase in demand for recycled plastics,” says Biddle. “Companies are trying to create a green market and are looking to close the loop so they can have a more secure supply of materials.”

“[GPEC] is a great opportunity to network, see and hear what people are doing, and learn about the latest innovations,” adds GPEC chair Susan Kozora, engineering manager in the materials department of International Automotive Components. The event is expected to attract 300 attendees—25% of them international visitors—as a slate of 30 speakers addresses technical processing issues with recycled and bio-based materials, and challenges involving sustainability and recycling.

Composting Controversy

“You can’t just look at a material—whether it is a plant, a piece of plastic, or a chip of wood—and know whether it is sustainable in isolation,” says GPEC speaker Mark Jones, a research fellow in corporate R&D at Dow Chemical Co. “You have to apply good science, do a life cycle assessment of where it came from, how it was used and where it will go, and look at what will happen over time. Only then can you say what is the best use of those resources.”



Emeco's "Broom" chair not only incorporates recycled resin and wood, but it's also made with an efficient one-shot molding process for mass production.

This is underscored by the controversy that continues to surround biodegradable additives, for example. While several speakers will discuss the benefits and use of biodegradable additives, Susan Selke, keynote speaker and associate director of the school of packaging at Michigan State University,

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says that “companies need to look into claims for any material, ask for evidence, look critically at that, and not just buy into the hype.”

At the conference, Selke plans to present the results of a just-completed study of the effectiveness of five additives promoted as biodegradable. “We carried out tests under composting conditions, in anaerobic digestion and buried materials in soil on MSU grounds and found no evidence of substantial degradation,” she says. “There was nothing to lead us to believe that they behave as is claimed.”

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Eggs and Chairs

But as biodegradable additives continue to arouse skepticism, companies continue to develop new products that enhance sustainability through the use of bio-based or recycled materials. Here are two examples from U.S. companies making presentations at GPEC:

- Aspen Research Corp. used post-industrial PLA and developed a recycled resin—in five pastel colors—that Minneapolis wholesale chocolate company Maude Borup Inc. is using to make pastel-colored plastic Easter eggs that will be sold at nationwide retail chains this spring.
- Custom molder Mack Molding—in partnership with Pennsylvania-based furniture manufacturer Emeco—developed both a recycled resin that is a combination of recycled polypropylene and discarded wood fiber from industrial operations, as well as the one-shot molding process for making Emeco’s “Broom” chair.

The chair application “was a risk,” says Gene Birmingham, plant manager for Mack Molding, “because there was little to no data and no mold flow analysis for wood-filled recycled polypropylene.” But, he adds, “it was extremely intriguing to

us, and we liked the fact that we were getting into something ground-breaking [because that] gives us the opportunity to do more things down the road.”

Because the two materials are so dissimilar, Mack had to experiment with blending the material in different proportions so it could be processed effectively and efficiently. “Wood is sensitive to burning so we had to develop a melt temperature for the process well below what’s used for just polypropylene, so the material would flow properly and yet not burn the wood,” says Birmingham.

“This blend is very moldable, conveys well, flows well, and has tremendous outdoor applications because of its weatherability and durability,” he says. “We are already working on other furniture applications.”

Birmingham believes this is just the beginning of a greater use of recycled materials in molding. “You are going to see more environmentally friendly, sustainable materials down the road.”

For similar reasons, Aspen Research bought recycled post-industrial PLA as soon as it was available. “We took a chance and bought material right away because we knew it would sell,” says Paul Rothweiler, vice president of technology development for Aspen. “We worked with a number of formers on potential applications.”

He continues: “For the Easter eggs, having a tough and flexible material was important, but the most important criteria for success was to be able to supply it in five pastel colors. Recycled plastics (beyond PLA) have a variation in color from the top of the box to the bottom. Therefore producing a reliable and predictable color, from a source with varying color, was a bit of a challenge.”

Rothweiler is optimistic that recycled post-industrial PLA will find its way into even more applications. “I can see it as a resin for everything from putty knives to clear outer cases to ice scrapers and things around the house,” he says. “We are working to help commercialize all of those right now. There are great opportunities for companies who own a brand, converters who develop products for brand owners and molders who want to provide their customers a recycled material as an option.”

Greener Autos and More

Similarly, automaker Toyota is looking to use more bio-based and recycled materials for automotive parts, says Eric Connell, senior engineer in materials engineering for paint and plastics materials at the Toyota Technical Center in Ann Arbor, Michigan, USA.

“There are a number of applications [in the automotive industry], but there are a lot more that could be out there,” Connell says. “There are a lot of areas in the interior of a car where we could readily adapt recycled and bio-based materials. We are looking for solutions from material suppliers, equipment suppliers and parts suppliers.”

Another focus of GPEC 2014 is on how companies can improve the processing of recycled and bio-based materials, for instance:

- AEC addresses material feeding issues for reclamation extrusion lines and explain how companies can improve efficiencies and lower costs with a properly configured feeding system.
- Cumberland Recycling Inc. offers a look at new developments in motor efficiencies, PLC functionality, and feeding and operating techniques that can reduce power consumption.
- Struktol Co. of America discusses how additives it has developed permit higher loadings of filler and recycled content into compounds without sacrificing their end properties.
- Dow Chemical explains how its compatibilizer technology will enable film manufacturers to recycle

post-industrial barrier film scrap containing EVOH and PA back into film production.

- And Eindhoven University of Tehnology professor Benny Luijsterburg describes how a solid-state drawing process can improve the stiffness, strength or ductility of recycled isotactic polypropylene.

The diverse lineup of speakers at GPEC, plus its student awards and awards for environmental stewardship, offers attendees the perspective of everyone in the supply chain—and from a variety of industries, says GPEC chair Kozora.

Lastly, she says, a panel discussion on the state of plastics recycling is scheduled to provide GPEC attendees the opportunity to see how different organizations and companies—Dennis Denton of plastics reclaimer Denton Plastics, Jonathan Levy of the Institute of Scrap Recycling Industries, Lou Tacito of research, engineering, and testing company Plastic Forming Enterprises LLC, and Robert Peoples of the Carpet America Recovery Effort—assess today’s recycling climate.

Note: Learn more about the GPEC 2014 event at sperecycling.org/conference/gpec-2014.

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