

## PolymerPlace Notes

*A plastics technology newsletter*  
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Volume 4

September 2003

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### News from Polymerplace.com

We hope you had a great summer. In September we attended the [TPE Topcon](#) in Akron Ohio. One of the principals of Polymerplace, Maggie Baumann (G.H. Associates) presented a paper on "Supply Chain as a Competitive Tool". The theme of the presentation was to discuss why strategic supply chain management is quickly becoming a competitive advantage in the increasingly global marketplace. <http://www.polymerplace.com/> click on New Presentation.

The conference was well attended with over 300 attendees and 33 table tops. The success of the conference underscores the value proposition offered by TPEs. The key characteristics of TPEs are recyclability, design flexibility and ease of colorability while exhibiting rubber-like properties. The growth of TPEs has continued through the last three years of the economic downturn. We believe that TPEs have been accepted as a mainstream material solution. The market has truly embraced TPEs as an innovative and cost effective family of materials. One of the obvious areas which has contributed to the growth of TPEs is in the increased use of soft touch, two –shot molded or insert molded components in many markets including personal care, appliance, sporting goods and automotive.

The opening presentation was an economic outlook presented by Bill Wood of Mountaintop Economics. Bill Wood anticipates that the plastics market and overall U.S. economy will post growth of 4.5-5 percent in 2004.

Although he anticipates a cyclical rebound in 2004 plastics will finish 2003 down 7-8 per cent from the 2000 peak. This is due to the fact that a lot of increased demand for plastics products is being filled by products not made in the United States.

Wood predicts that resin makers will be helped in 2004 by natural gas prices, which should drop to the \$3.50-\$4.00 range.

Several new products and developments were presented at the conference:

- ❖ Goodyear has formed rubber modifier entity called Eliokem which will bring emphasis to their rubber modifier businesses including Chemigum™ and other rubber modifier families.
- ❖ Dow-Corning/Multibase introduced TPV-SiV- a family of TPEs based on Silicone rubber which attempts to fill the performance gap in TPEs especially in the area of chemical resistance and heat resistance.
- ❖ Kraton Polymers introduced Kraton A, a new clear styrene block copolymer.
- ❖ GLS presented a paper on compounded Clear TPEs and overmolding grades which have been where they have been concentrating a lot of their R&D activity.
- ❖ Bayer introduced Aliphatic isocyanate based TPUs to broaden the range of TPU performance properties- i.e. softer, more color stability.
- ❖ Schulman presented an update on their flexible ionomer- based TPO for automotive and appliance applications
- ❖ Ferro presented data on their new impact modifier for Polyolefin systems

A copy of the proceedings of the conference can be ordered through SPE.

Visit <http://www.4spe.org>.

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*Strategic Management for the Plastics Industry* was written by Roger F. Jones, one of Polymerplace.com's founding partners. It was published in September 2002 by CRC Press. Endorsed by the Society of Plastics Engineers, this book covers all of the bases in the plastics industry, from polymer manufacturing, through compounding, distributing, processing – even machinery and additive suppliers are included – in a thoughtful, down-to-earth discussion of the particular problems faced by managers in this industry in running their businesses. Worried about globalization? Can't decide how to staff and organize your business? Do general management texts fail to cover your special problems? Look no further – it's all in here. Order your copy today – use our link to <http://www.amazon.com>.

We've been showing highlights from each chapter in our monthly newsletters. This issue will cover **Chapter Seven – Tools for Management**. This chapter starts out by dissecting the commonly accepted idea of obtaining maximum profitability through market dominance, and how to determine when new product introductions are really successful or not. The chapter goes on to show how to evaluate your product lines and predict the effect of reallocating resources among them. The method used was first conceived by management guru Peter Drucker, and he personally reviewed the author's use of his work in this book before approving it, as fairly representing what he (Drucker) advocates. This methodology is more operations-oriented than typical accounting methods and the results can be quite surprising. Examples and charts abound; a hypothetical molder is shown how to improve earnings by focusing more on some product lines, putting others on milking status, and even abandoning others.

Next, the chapter shows financial benchmarks for different segments of the industry, so that the reader can compare his or her own company to others. The rest of the chapter deals with how to measure results in the company's business plan, determining customer satisfaction, and obtaining commercial intelligence by widely available – and legal – means.

### **Customer Perception Studies- What's the value?**

OK, so you have survived the recession. Over the last three years you have done a lot to improve your productivity. Perhaps you have introduced some new services or products. Do your customers know that you have made these improvements? Do you know how they view you versus your competition? Is there a new source of competition in your market? Are there any unmet needs that are waiting to be served by an astute supplier?

Sometimes we are so internally focused that we assume our customers have perceived these improvements. Most of the time this is not so.

G.H. Associates would like to help you gain your fair share of the recovery. We believe very strongly in the methodology of Customer Perception Studies to help gain insight. There are usually readily implementable improvements that result from the study which quickly bring you ROI on the investment in the study. In addition the information gathered from the effort and analysis provides data for

improvement of market communications for the website, press releases and company literature.

For a free consultation please call 1-800-207-Poly or send us a note at [info@polymerplace.com](mailto:info@polymerplace.com).

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## Polymer Markets

### Food Processing

When Tokyo-based Yamakyu Chain Company was designing [conveyor belt chains for high-speed beverage and food processing lines](#), they chose [VICTREX® PEEK](#) polymer for its high temperature and superior chemical resistance properties. According to Andrew Ragan, Victrex Global Leader polymer slat band chains are proving an ideal fit for the food processing industry where high heat resistance and superior chemical resistance are an essential requirement. Traditionally, this industry has used intermesh, low friction transfer plates made from acetal. But acetal's operating temperature limit of 176°F (80°C) prohibits its use in high-temperature environments. Chains made with PEEK polymer, on the other hand, can withstand exposure to temperatures as high as 482°F (250°C)." In addition, the PEEK polymer chains offer superior long-term resistance against detergents such as chlorine and hydrogen peroxide as well as antistatic properties.

Stainless steel has typically been the material of choice for chains requiring high heat resistance. However, stainless steel chains need lubrication to ensure smooth operation and this creates adhesion problems and product contamination. "PEEK polymer is naturally lubricious," says Ragan. "The chains can run at a rate of 11 ft/sec (200 m/min) without lubrication." In addition, the chains are a third of the weight of stainless steel chains. This allows for motor downsizing that saves power and reduces operating noise."

Yamakyu is a leading manufacturer of slat band chains for conveyors. The company focuses on offering customers a total solution from chain selection to the design and manufacture of a complete conveyor system to meet individual requirements.

1-(800) VICTREX or visit the Victrex website at <http://www.victrex.com>.

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### Transportation

[Until recently, carbon fiber composites only appeared on concept cars or very high priced "supercars"](#). But this year, GM introduced some versions of the Corvette with a carbon-fiber hood and BMW put a carbon-fiber roof module on

the M3 CSL. Ford Motor Company will introduce the GT sports car which uses carbon fiber as a structural system in the rear deck lid.

Japanese automakers have also adopted it. There is a composite hood on the Acura NSXR, the hood of the Nissan Skyline GT-R V (sold in Japan) and the Mitsubishi Lancer Evolution which is available in North America.

[Carbon fiber composites offers tremendous design freedom.](#) The other potential benefit use is to protect passengers from front or rear crashes. The safety standard which can be achieved using the carbon fiber composites is high.

Of course the key toward wider use of the carbon fiber composites is cost and some feel that the aftermarket may be the area where the wider usage of these composites will occur. Because of the design latitude possible, younger consumers may look to use carbon fiber as they customize their cars. This will increase the usage and hopefully help lower composite prices over time...

### **Polymer Developments**

[Polyolefins](#) had grown to the level of about 88-89 million tons globally in 2002. Although North America and Europe are recovering from a dull 2001 and lackluster 2002, [the Asia Pacific region continues to grow mainly because of the insatiable appetite of China.](#)

In fact, China is the third largest consumer of polyolefins after North America and Europe (EU region). Currently, China accounts for almost 16 % or about 14.5 million tons of the total polyolefin consumption. This tremendous growth is not only due to China's manufacturing strength, but also due to the increasing standard of living of the population of 1.25 billion. It is estimated that more than 75% of the polyolefins consumption is used internally, that is to meet domestic requirement. The balance 25% is being used for direct as well as indirect exports, particularly where polyolefin products are used for packaging, etc.

China's domestic per capita consumption of polyolefins has reached a level of almost 9 Kgs. compared to the World average of about 15 Kgs. China has recorded almost 10.5% average growth between 1992 and 2002 for polyolefins.

Most of the experts around the globe believe that China's growth in polyolefins from now until 2007 will be about 7%. However, there are two clear positive economic signals that could enhance the growth beyond 7%. Firstly; China's entry into WTO would definitely improve its share in global trade and we have commented on the increased imports of polyethylene bags from China into the North American Market in past newsletters.

In addition, the prestigious 2008 Olympics in China and the resulting economic expansion would see an increase in the domestic demand.

The following table compares the consumption of polyolefins in the Asia Pacific (especially China) versus the world consumption.

Polyolefin Consumption -2002 (MMT)				
Region	PE	PP	Polyolefins	% Share
Asia Pacific	16	12	28	32
China	8.4	6	14.4	16
World	54.5	34	88.5	100

Source: PE Plus.co

Last month we mentioned that we have a partner in China that can provide polymer import data for China. We have a sample for Polystyrene on the Polymerplace site.

If you are interested in data on PE, ABS, PP or any other polymer group contact us at [info@polymerplace.com](mailto:info@polymerplace.com) for availability and a quote.

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Midland, Mich.-based Dow is forging ahead with growth plans in 2003 and 2004 for PP-based products using its Insite-brand (metallocene) technology. Basell, with North American headquarters in Elkton, Md., will begin production of its Oxypolypropylene-brand PP in Varennes, Quebec, by mid-October.

The Polypropylene market is growing above [gross domestic product] which is primarily being driven by interpolymer substitution.

The new Inspire grades can be used in blow molding, thanks to improved performance in breakage resistance and visual appeal according to Dow. The move is intended to build PP's 2 percent share of the North American blow molding market, which is dominated by high density polyethylene and PET.

Dow also is also developing a new line of Insite-based elastomers and plastomers that could be commercialized as early as the second half of 2004. The materials are designed to fill several "technology gaps" for those materials with improved processability, clarity and heat resistance.

Since entering the PP market in 1996, Dow has grown to become the world's seventh-largest producer, with annual capacity of 2.6 billion pounds at seven plants.

Basell's new OxyPP line consists of PP with active oxygenated molecules made by introducing a low percent of oxygen during radiation treatment.

Basell reports that the materials can improve loadings of flame retardants and pigments in PP resins by 10-15 percent. They also can provide 10-25 percent higher strength and more consistent colorability in PP/nylon blends. In glass-reinforced grades, OxyPP provides better tensile and flex strength.

Basell, the world's largest PP maker, also is commercializing four new grades of its Adstif-brand PP for end uses including deli and ice cream containers, stadium and yogurt cups and corrugated sheet.

### **Process Developments**

Long glass reinforced plastics especially those based on polypropylene are being used more and more in the automotive industry. Unfortunately, the penetration of composites has been at a lower rate than originally anticipated primarily because of cost. [A new process has been introduced which could significantly reduce the cost associated with long or short fiber applications.](#) A presentation on the process was given at the SPE Automotive Composites Conference September 9-10 in Troy Michigan.

Ron Hawley had founded the former Polymer Composites Inc in Winona, Minnesota. This company was acquired by Ticona and had created the Celstran™ long fiber pellets business in the 1980's. In 2001 Mr. Hawley was issued a patent for the D-LFT (Direct long fiber thermoplastics) manufacturing process. He and Steve Bowen (the former president of the Ticona subsidiary) have formed Plasticomp and have called the D-LFT process Pushtusion. The Pushtusion process pulls standard, continuous-length fiber from supply reels at rates of 400-600 feet per minute, embeds the fibers into molten resin under high pressure, chops the fiber and maintains the temperature through the die. The mixture is then passed through the injection screw and into the press.

This process has the potential to reduce material costs and offers greater potential to replace semi-structural steel and aluminum parts. It also has the potential to affect demand for other compounds such as Vertron, Celstran or StaMax Long-fiber pellets of Azdel Long-fiber Polypropylene sheet. There is a trend in automotive to more back integration or in-line compounding. The Pushtusion process can enable that trend.

Owens-Corning, Milacron and Dow Automotive have all expressed interest in licensing the process.

According to Steve Bowen, creation of a compound during the molding process constitutes a fundamental industry change that can remove the compounder step from the traditional value chain.

Future newsletters will track the progress of the D-LFT technology.

### **Thermoforming**

[Major resin companies are paying a lot more attention to the thermoforming process.](#)

GE Plastics and Dupont are paying more attention. DuPont estimates the thermoforming business as about \$6 billion dollars worldwide and believe it represents a lot of opportunity. At the recent SPE 2003 Thermoforming Conference in Cincinnati, GE made it clear that they believe there will be significant growth in the heavy gauge thermoforming process. They are encouraging thermoformers to look at larger parts. GE has recently introduced

some thermoformable resins designed to eliminate paint while achieving the class A finish. Injection molding has already tackled that issue by developing in-mold decorating systems, for example, the Dodge Neon has had in-mold decorated bumper fascias for several years. Those use DuPont's Surlyn nylon. GE's new line of thermoformable resins included a more-weatherable Gelyo ASA resin and the Noryl PPX blend that improves surface finish.

Under development at GE is a higher-gloss Lexan SLX resin that can withstand temperature extremes, as well as a new Lexan film for in-mold applications.

DuPont introduced a new family of thermoformable resins. Achieving good color match without paint is a DuPont priority. The SPE thermoforming show was where DuPont introduced its Delrin Acetal decorating materials, providing a metallic finish with the necessary scratch resistance. DuPont also exhibited some new nylon grades.

Along the uses being touted for thermoforming include outdoor siding for building and construction, rooftop vehicle panels for ski equipment, door panels on heavy trucks and boat housings. Scratch resistance and gloss are key performance requirements. There are some real economic benefits. Due to less expensive tooling thermoforming costs are less than injection molding. Other large part processes like SMC and fiberglass have their issues as well. SMC needs to be painted and Fiberglass is a messy process.

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### **Technology/Design**

Economics drives the adoption of a new technology...

The high gas prices this summer have had a very positive impact on the acceptance of some newer technologies. We recently read that the 2004 Toyota Prius (hybrid vehicle) has a 10,000 unit customer waiting list. This vehicle is able to run on electricity or gasoline.

The August 17<sup>th</sup> power blackout on the East Coast and the blackout in Italy this past weekend have had a very positive impact on another emerging technology- [Fuel cells](#).--Although the infrastructure to establish economic feasibility of the widespread use of fuel cells in North America is still a ways off, applications like fuel cells as power supplies for laptops and cell phones are very close to reality. The potential for fuel cell systems as remote power generation or back up systems may be closer than we think as well especially when we lose power on a hot weekend!

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**References:** The stories in *PolymerPlace Notes* come from a variety of sources including Company Press Releases, Interviews, and trade publications, e.g. *Plastics News* and newswires. <http://www.PolymerPlace.com>

September 2003