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PolymerPlace Notes

A plastics technology newsletter

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Happy New Year from all of us at Polymerplace.com, the destination for plastics application development. 2001 has been a challenge in many ways-certainly manufacturing had one of the most difficult years that we can remember and the events of September 11 will leave its mark on us for a very long time. The burst of the dot com bubble was another occurrence that didn't surprise us but certainly had a significant impact. We just want to comment on a couple of good things that we believe will be learned from 2001-

- We are in this together
- Having a good sound business plan is still key
- Market research is still extremely important and can save a lot of money and time in the long run
- Collaboration and partnerships will be key to the advancement of newer technologies
- The customer is still "King"-don't forget it!

Feature Story- "Some thoughts on how to approach 2002"

It's no secret that the advertising climate is in terrible shape. Merrill Lynch, in fact, says ad spending hasn't been this tight since The Great Depression. Yet one segment -- event marketing -- continues to grow.

A recent survey of 120 U.S. marketing executives from a range of industries -- automotive, technology, media/entertainment, consumer electronics, and health care -- found that 38 percent

of them expect to boost their marketing budgets for events by an average of 23 percent in 2002. That includes such events as trade shows, conferences, and speaking engagements. Most respondents (68 percent) said they typically spend less than $50,000 on specific marketing events; 48 percent said they typically spend anywhere from $50,000 to $250,000, and a handful of companies spend more than that.

The study was conducted by independent research firm Intellitrends for the George P. Johnson Co., an event marketing agency. Many companies see such events as a valuable way to connect with customers during the downturn. Trade shows help keep current customers loyal, and their effectiveness, in terms of sales, can be easily measured.

Bill Quinn, director of marketing at ONI Systems, a San Jose-based manufacturer of optical telecom hardware and software, says his company is keeping event marketing high on its budget priority list, even as it slashes spending on print advertising.

While mass marketing tactics such as direct mail and email campaigns "are getting less and less personal," trade shows "are becoming more important because they are the last hold-out for meeting customers in person."

Companies should still do the obvious like sending out mailings and setting up buyer meetings in advance of the show. Otherwise event marketing can be a giant waste of money. This was particularly evident during the dotcom boom, when "a lot of marketers just showed up because they had venture capital money and were told to spend it. A lot of companies sign up for the show, go and expect results. It is always advisable to attend a show you are considering in advance and walking the show to determine if your target customers are likely to attend.

Event marketing, like other types of marketing has felt the pinch of a sour economy. Comdex, the giant computer show in Las Vegas, had 2,000 exhibitors at its fall show, down from 2,300 the previous year. Events that popped up to cater to last year's deluge of Internet startups have also folded. In the case of the K show in Germany exhibits were up but attendance was down overall from the 1998 show. However most plastics technology and IT technology vendors recognize that complex technology sales are best accomplished face-to-face. Trade shows and conferences still remain a core marketing technique for today and into the future.

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Polymer Market Trends

What happened in 2001 and what to expect in 2002?

First-half optimism in 2001 gave way to second-half uncertainty as anticipated late-year comebacks either stalled or have not met expectations. Sales of most major U.S./Canadian plastic resins were down between 2 percent and 14 percent through the first six months of 2001, with only polypropylene eking out a modest 2 percent gain, according to the American Plastics Council in Arlington, VA.

Yet application and development work seems to be continuing in the resin world, as producers want to make sure their products have plenty of uses when the market rebounds.

CMAI ,an industry analyst, has tried to shed some light on one of the more odd sales developments that has hit the PE market this year. Namely, why have PE sales into film and bag applications tumbled so much in 2001? Being disposable products, demand for such items should not be affected much by short-term economic events. But a CMAI analysis of government and proprietary data showed that the amount of finished PE bags and film imported into the United States has doubled in the last five years, resulting in a drain of as much as 1.2 billion pounds of PE demand from the North American market.

CMAI estimated that 91 billion finished PE bags made their way into the United States last year, equaling more than 900 million pounds of PE. Imported film totaled another 300 million pounds of material subtracted from the United States.

China provided 38 percent of the imported PE bags, according to CMAI, with Canada at 15 percent and Mexico at 7 percent rounding out the top three bag importers.

PP stood alone for the first half of 2001 as the only commodity resin showing a positive growth rate. Most of this growth was from drastically lower PP prices and came at the expense of other, more costly resins. Polypropylene is still actively penetrating new end uses to a greater degree than other resins. Dow anticipates PP making inroads against HDPE and PS in rigid packaging and against PS in food-service ware. Basell expects additional opportunities for PP in displacing PVC in medical and construction markets and epoxies in steel coatings.

Market leader Basell North America estimates there is currently 2.5 billion pounds of excess capacity in North America, with demand growth between zero and 1 percent.

One positive sign for PVC makers is that sales of smaller, starter homes have been outpacing sales of more high-end housing units. The smaller homes are more likely to use vinyl siding, windows and floors. Even in this sluggish market, sales of PVC into fencing and decking have remained strong, offering a ray of hope. We can expect to see double-digit growth in that segment again next year.

The construction industry has proved to be a double-edged sword for the PS industry in 2001. Increased home building boosted sales of PS into construction-related markets to climb 3 percent in the first half, but those sales were for foam insulation used in residential units. The industrial construction market actually was down, which caused domestic sales of expandable PS to tumble 13 percent in the first half.

North American PET growth could hit 8 percent growth next year. There's still some glass replacement going on. Markets like milk and juice are playing catch-up with carbonated soft drinks in the single-serve market. Even though carbonated soft drink growth stayed in the 2-3 percent range as it has been in for the last couple of years, growth of bottled water could be as high as 20 percent, and it shows no signs of slowing down. Niches like juices, ketchup and hot-fill containers for soup also are growing, but there are still some genuine concerns out there for PET makers. In particular there is the threat of a flood of new Asian capacity could have on the market when it comes on line in 2003 and 2004. What the PET industry really needs is a success in beer. PET bottles currently hold only about 1 percent of the global beer market. CMAI estimates beer will account for just 3.5 percent of total PET demand by 2005. Part of the issue is that there's no one process - whether it's coatings or multilayer or something else - that stands out in the crowd.

ABS maker Dow Chemical Co. plans to keep its applications focused on the appliance and auto markets, where growth prospects are strongest. GE Plastics already is seeing cases where automotive OEMs are moving back to ABS as a lower-priced alternative to polycarbonate blends in some applications. A clear ABS/acrylic blend introduced earlier this year also has helped spur sales. The new blend is popping up in applications ranging from vacuum-cleaner housings to dispenser-type products.

DuPont has deployed more resources to developing market applications in new areas. Sales of high-performance nylons introduced this year are up 20-30 percent as the materials replace thermoset plastics and metals. The firm also is adding capacity for high-performance nylon compounds in Parkersburg, W.Va., and Maitland, Ontario. However the first quarter was the worst for nylon's automotive prospects. Sports utility vehicles' declining sales, which use bigger nylon-based engine manifolds, also have left their mark. Nylon producers need to keep looking ahead in this down part of the business cycle, even though it will continue to be difficult with the 18-24 month approval processes needed in the auto market. There's still a lot of application work to be done in under-the-hood applications as well as in steering wheel applications and brake levers.

With regard to Polycarbonate there is still a lot of growth in packaging applications like 5-gallon blow molded water bottles, but optical media, business equipment and computers are still uncertain. PC is becoming a commodity in these markets. GE singles out nontraditional PC uses like auto brackets and internal switches in the telecommunications sector as potential growth segments. Rewritable DVDs also are generating a lot of interest.

Thermoplastic Polyurethanes' strength is in being diversified so that when one of the market segments is down, another is doing well, but automotive, footwear and coated fabrics are all

down. Noveon plans on focusing on extrusion molded applications rather than injection molding as it moves into 2002.

New applications could take TPVs into automotive cup holders as well as into nonautomotive uses, such as bottle caps and closures on Gatorade bottles and baby food jars, where TPV could displace PVC. Overall, AES looks to return to its five-year double-digit growth average in 2002. This could be done by making further inroads into automotive weather seals, the colossal target of the TPV industry. TPVs currently account for 2-3 percent of global weather-seal use, which is dominated by thermoset rubber.

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Automotive

Robert Eller Associates of Akron Ohio has recently introduced two studies.

TPOs have gained share in the declining market for thermoformed skins at the expense of PVC . The decline in thermoformed skins is due in part to the higher grain reproduction quality possible from slush molded TPU and spray polyurethane skins.

These trends over a 15-year period were reported in a unique new photo/supplier database presented by Robert Eller Associates, Inc. The REA study provides photos of European instrument panels over the 1980-2001 period and a supplier/materials database for skin/foam and substrate through 2005. The study is designed to aid instrument panel designers and materials engineers to visualize and compare features, materials selection, and supplier shares for the European instrument panel fleet. The price of the photo/supplier database in sortable compact disc form is $2,000.

The second study is entitled “Automotive Interior Soft Trim: Skins, Foams, Coated Fabrics, Textiles and Acoustic Barriers”. This study updates and extends the widely subscribed 1997 Automotive Interior Skins and Foams multi-client study.

More information on both these studies including pricing and subscription details can be located at :http://www.robertellerassoc.com/ or phone: 330-670-9566;fax:330-670-9844

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Polymer Developments

Celcon® UV140LG acetal copolymer from Ticona, the technical polymers business of Celanese AG, met a challenging 2 percent gloss match required by TRW for HVAC slider knobs in 2001 and 2002 Chrysler and Dodge minivans. Nylon 6/6 had been selected initially but could not reach this gloss level. The acetal that Ticona developed for this application also retained the durability and feel of the knobs and flowed better than the nylon during overmolding, so the raised lettering on the knobs was not distorted.

The knobs, which come in driver- and passenger-side versions, are insert-molded. The undermold is made of white Celcon® MC90 acetal copolymer and has either “PASS” or “DRIVER” on it in raised letters. The original design was overmolded with 1.5 to 2 mm of 20 percent glass-bead-filled black nylon. The nylon had 6 to 8 percent gloss, even with the knob’s light stipple texture, well above the specification. It also generated significant shear heat during molding, which deformed the raised lettering.

Ticona modified its standard Celcon acetal copolymer, which also has too high a gloss for this end use, to create a grade with a uniquely low gloss. The new material, grade UV140LG, flows well, so it keeps the lettering sharp and clear and easily passes through 0.0015-inch holes to fill the interior spaces of the letters P, A, D and R. It also has greater scratch resistance than the nylon, a comfortable touch (e.g., it does not feel greasy), and the specified durability, dimensional stability, chemical resistance and UV stability.

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We learned at the K-2001 show in Düsseldorf, Germany that there is a lot of automotive interest in long-fiber reinforced thermoplastics (LFTs) both in Europe and the U.S. LFTs have the

structural rigidity and strength to go after steel and aluminum applications offering weight savings and consolidation of parts. Ticona demonstrated several applications at their exhibit. The German EVO Bus is reported to be specifying a Celstran nylon 66LF GF50 (50% glass filled) for a roof strut that ensures the internal luggage rack is held firmly in place. The LFT nylon offers a 30% weight savings over the 1.9kg aluminum part and with 30 of them on each bus the weight savings becomes significant.

Volkswagen's Skoda Unit is using LFT Celstran PP GF30 for dashboard mounts on its Fabia model. The mountings passed tests conducted at –35C in which the dashboard mount was invisibly integrated with the airbag module with a strap retained cover that had to guarantee to function properly every time.

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"A New Generation of High Performance TPV's Suitable for Dynamic Automotive Sealing Systems " was presented by Juergen Gloeckler, Worldwide Director of Automotive Weatherseals for Advanced Elastomer Systems at the K show.

The author notes that the current sealing system profiles (weatherseals) in vehicles are mainly in thermoset rubber. About 12 kg of different profile systems are typically used in a single vehicle. The most important elastomer is EPDM, which is compounded with thermoset rubber materials in varying hardnesses to provide the required performance attributes.

According to Gloeckler, all automakers today recognize the features of TPVs as a suitable replacement material for thermoset rubber in weatherseals and most have asked their suppliers to offer alternative sealing designs using TPVs. This, he says, is forcing changes in the supply chain where once large thermoset rubber sealing suppliers are finding their business threatened by new innovative system suppliers using novel polymer chemistry. Gloeckler says the supplier network is currently in a state of flux with takeovers, mergers, JVs and some aspiring new players.

Typically weatherseals are extruded. Today, however, with new exterior lighting systems and the emphasis for system design integration, more and more seals are being injection molded.

For a copy of his paper call AES's "answerline" at 800 305-8070.

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We have reported in the past newsletter that Bayer is working in the "hybrid (metal/plastic) technology" area. Rhodia introduced their hybrid material at the K show in October. Rhodia claims that it offers high load-bearing strength along with savings in cost and weight over metallic materials.

Rhodia engineers divide existing plastic/metal technology into open or closed rib structures. In open rib designs, thin metallic sections are molded over with thermoplastic ribs. While these provide a good strength-to-cost ratio, their mechanical strength and stiffness are usually isotropic (going in one direction) and they often require complicated molds with hot runners.

Closed rib and hollow designs have a more balanced stiffness, according to Rhodia, and their properties are balanced in all directions. The hollow sections can be used to integrate other functions as well.

Rhodia has been examining three types of closed hybrid technologies called metal over metal (MOM), plastic and metal assembling (PMA), and metal and gas or water assisted injection molding (MGAIM or MWAIM).

These techniques can involve the creation of a dual use for some under-the-hood parts like using a structural member to convey or store fluid. Using MGAIM or MWAIN, Rhodia says the hybrid component is manufactured in a single process by overmolding a metal part and then coring the plastic material by use of gas or water. The result, Rhodia says, is a very stiff and lightweight, energy absorbing structure with outstanding surface appearance. Manufacturing steps are reduced as are joining and assembly steps.

Rhodia says it sees a wide range of automotive applications for the three types of closed hybrid technologies, including structural front ends and instrument panel carriers and highly integrated door modules, seat shells and even things like brake pedals.

For more information on the Rhodia technology, go to their web site at www.rhodia-ep.com.

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Process Developments

Also at the K-2001 trade show held in Düsseldorf, Germany, French nylon producer Rhodia unveiled a new technology for producing nylon parts that is expected to open up even more under-the-hood applications for nylon.

It is called WIT (water injection technology). It is similar to gas injection, which has been a process typically used to manufacture hollow parts such as intake manifolds. In water injection, the gas is replaced with water, which Rhodia says results in a variety of advantages such as using the water to cool the part. This can reduce cycle times and improve productivity by as much as 70% according to the company. WIT also offers a reduction in part weight because walls can be made thinner. In pipes and ducts, parts made with WIT have smoother internal surface characteristics, an important factor for intake manifolds.

Rhodia says the process is ideal for making heating and cool ducts, structural parts such as front-ends and roof rails and even handles and pedals. For more information, contact Christine Bourguignon at +33 4 72 89 27 53 or send e-mail to christine.bourguignon@eu.rhodia.com.

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Trexel, Inc., Woburn, Mass., has chalked up another licensee for its MuCell microcellular foam process with the addition of Demag Ergotech GmbH. The license allows Demag to sell the MuCell microcellular foam process and components on its machines or the Ergocell system which is also a microcellular foam process patented by Demag .

Trexel has virtually every major North American machinery maker on its list of licensees and interest in Europe and Japan is running high. A Volkswagen part recently went into production in Germany using the Trexel process.

The Ergocell system was designed to provide mixing and control after the screw, while the MuCell process provides it through enhanced screw design and precise metering of supercritical fluids into the barrel. The Trexel system requires a supercritical fluids unit while the Demag system does not. We cannot predict which of the systems will work better at this point however we applaud the decision of Demag to cross-license the Trexel system. This gives the customer their choice of systems for foamed parts.

We are pleased to see that these two companies have avoided the patent infringement issues that have slowed down the commercial acceptance of newer technologies in the past, notably gas-assist technology, powder injection molding and long-glass fiber composites.

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On another note, Polymer Concepts Inc. of Randleman NC has invested in MuCell technology and is offering product development as well as test specimen samples of microcellular foam grades for major resin manufacturers. Their intent is to offer that necessary link between new technology and application expertise.

For more information about Polymer Concepts and their Mucell-related services please contact Thomas Boyer at 336-495-7713 or go to their website: www.polymerconceptsinc.com .

References: The stories in *PolymerPlace Notes* come from a variety of sources including Company Press Releases, Interviews, and trade publications, e.g. *Plastics Daily News*, *E-Business*, *Modern Plastics* and *Plastics News*.

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