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PLASTICS INDIA

AN OFFICIAL ORGAN OF INDIAN PLASTICS FEDERATION

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- RTGS @ 50% concession
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- Online equity trading facility
- Demat account opening charges free
- PAN/TAN facilitation

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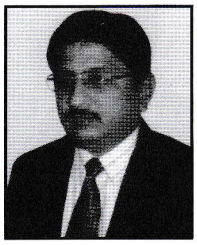
Editorial



Dear members,

In this June issue I would like to discuss about the increasing problem of pollution in our country. Industrialization and urbanization have resulted in a profound deterioration of India's air quality. Of the 3 million premature deaths in the world that occur each year due to outdoor and indoor air pollution, the highest number are assessed to occur in India. According to the World Health Organization, the capital city of New Delhi is one of the top ten most polluted cities in the world. Surveys indicate that in New Delhi the incidence of respiratory diseases due to air pollution is about 12 times the national average.

According to another study, vehicular pollution has increased eight times, while pollution from industries has quadrupled. Apart from rapid industrialization, urbanization has resulted in the emergence of industrial centers without a corresponding growth in civic amenities and pollution control mechanisms.

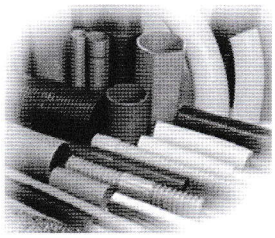
India's high concentration of pollution is not due to a lack of effort in building a sound environmental legal regime, but rather to a lack of enforcement at the local level. Efforts are currently underway to change this as new specifications are being adopted for auto emissions, which currently account for approximately 70% of air pollution. In the absence of coordinated government efforts, including stricter enforcement, this figure is likely to rise in the coming years due to the sheer increase in vehicle ownership.

During the last fifty years, the number of industries in India has grown rapidly. But water pollution is concentrated within a few subsectors, mainly in the form of toxic wastes and organic pollutants. Out of this a large portion can be traced to the processing of industrial chemicals and to the food product industry. In fact, a number of large and medium-sized industries in the region covered by the Ganga Action Plan do not have adequate effluent treatment facilities. Most of these defaulting industries are sugar mills, distilleries, leather processing industries and thermal power stations. Most major industries have treatment facilities for industrial effluents

The wave of industrialisation that began in the late 1970s has changed the complexion of India's once placid landscape. Lakes, streams, as well as the groundwater are laced with toxic heavy metals and chemicals, as proved by several studies by government agencies and research institutions including the National Geophysical Research Laboratory.

In the next issue I would like to highlight more upon the impact of industries on human lifestyle.

Pradip Nayyar
Editor



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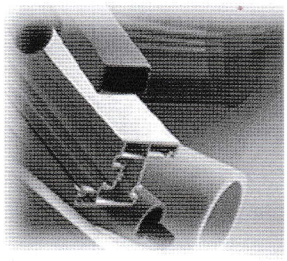
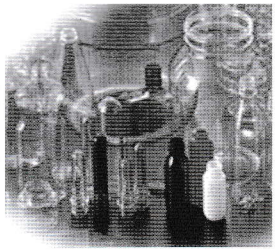




PRESIDENTIAL ADDRESS

Dear Members,

This is my sixth message to you after taking over as President.

On the occasion of **The World Environment Day** on 5th June 2010, I wish to share some of my views on **Bio-degradable Polymers**.

Money surely doesn't grow on trees, but the day isn't far when gasoline, computers, and tennis shoes might actually grow on trees, all thanks to new advances in biotechnology that could allow manufacturers to produce fuel, plastics, and other chemicals from plants instead of petroleum.

Today's plant-based fuels and plastics involve growing crops and then using physical and chemical means to extract sugars that manufacturers transform into the desired product.

However, a large number of plant biotechnology companies are trying to make plants do more of the manufacturing work. Several firms are trying to develop engineered plants, such as switch grass and corn that make it easier and faster to produce biofuels.

Biodegradable polymers are part of the larger biopolymers market. The industry defines biopolymers (bioplastics) as polymers that are either bio-based or biodegradable.

Despite a poor global economy, the market for biodegradable polymers grew in 2009 and will continue to expand due to increasing demand.

The total consumption of biodegradable polymers in North America, Europe and Asia is forecast to grow at an average annual rate of nearly 13% over the five-year period from 2009 to 2014. The **single-largest end use** for this material will be the **food packaging.** Dish and cutlery market will also be a major growth driver in the future. In 2009, demand for biodegradable polymers in North America, Europe and Asia accounted for most of the global consumption. Despite the economic crisis, which hit the chemical and plastics industry, the market for biodegradable polymers grew well in 2009 in almost all regions.

In Europe, the largest global market for bioploymers, growth was in the range of 5-10%, depending on products and applications, compared with 2008. Europe continues to be the largest biodegradable polymers-consuming region, with about half of the global total. North American consumption of biodegradable polymers has grown significantly in recent years. According to the study, the following factors have contributed to and will continue to contribute to growth:

- Biodegradable polymers have become more cost-competitive when compared with petroleum-based products.
- There has been growing support at the local, state and national levels for these products and for addressing needs about solid waste disposal.
- There is increasing public awareness regarding the depletion of petroleum-based raw materials.
- Large retailers and manufacturing companies desire to develop more sustainable raw material sources as well as to impact global warming.
- The properties and processing of biodegradable polymers have improved.

In Japan, there has been some growth in biodegradable polymers' use as a result of government and industry promoting their use. The rising prices for petroleum and petroleum-based products have also contributed to the replacement of petroleum-based polymers with biodegradable polymers

In China, high growth will be due to several factors: an increase in production capacity, demand for environmentally friendly products and the government's plastic waste control legislation. Use of biodegradable polymers continues to grow.

For biodegradable materials, it is generally regarded that the product will degrade into water and carbon dioxide by virtue of a naturally occurring organism, such as micro-organisms. Some industry sources have offered the term compostable in place of biodegradable.

To be considered compostable, three criteria must be met:

- **Biodegradation** - it has to break down into carbon dioxide, water and biomass at the same rate as cellulose;
- **Disintegration** - the plastic must become indistinguishable in the compost; and
- **Nontoxicity.**

Most international standards (such as ISO 17088) require at least a 60% biodegradation of a product within 180 days, along with other factors, in order to be called compostable.

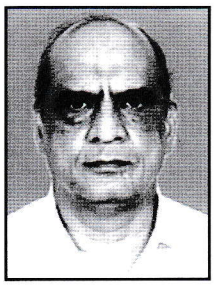
In India, bio-degradable polymers are becoming increasingly popular. There are some reputed companies that have already started distribution of the product. Most of the bio-degradable polymers available in the Indian market are sourced from other countries. This is an area of future growth, in which Indian entrepreneurs may invest. Given the increasing awareness of the consumers and gradual pressure coming from different sources, bio-degradable polymers are destined to play an important role in Indian Plastics industry.

Warm Regards,

Sourabh Khemani
President

From the Desk of

The Hony. Secretary



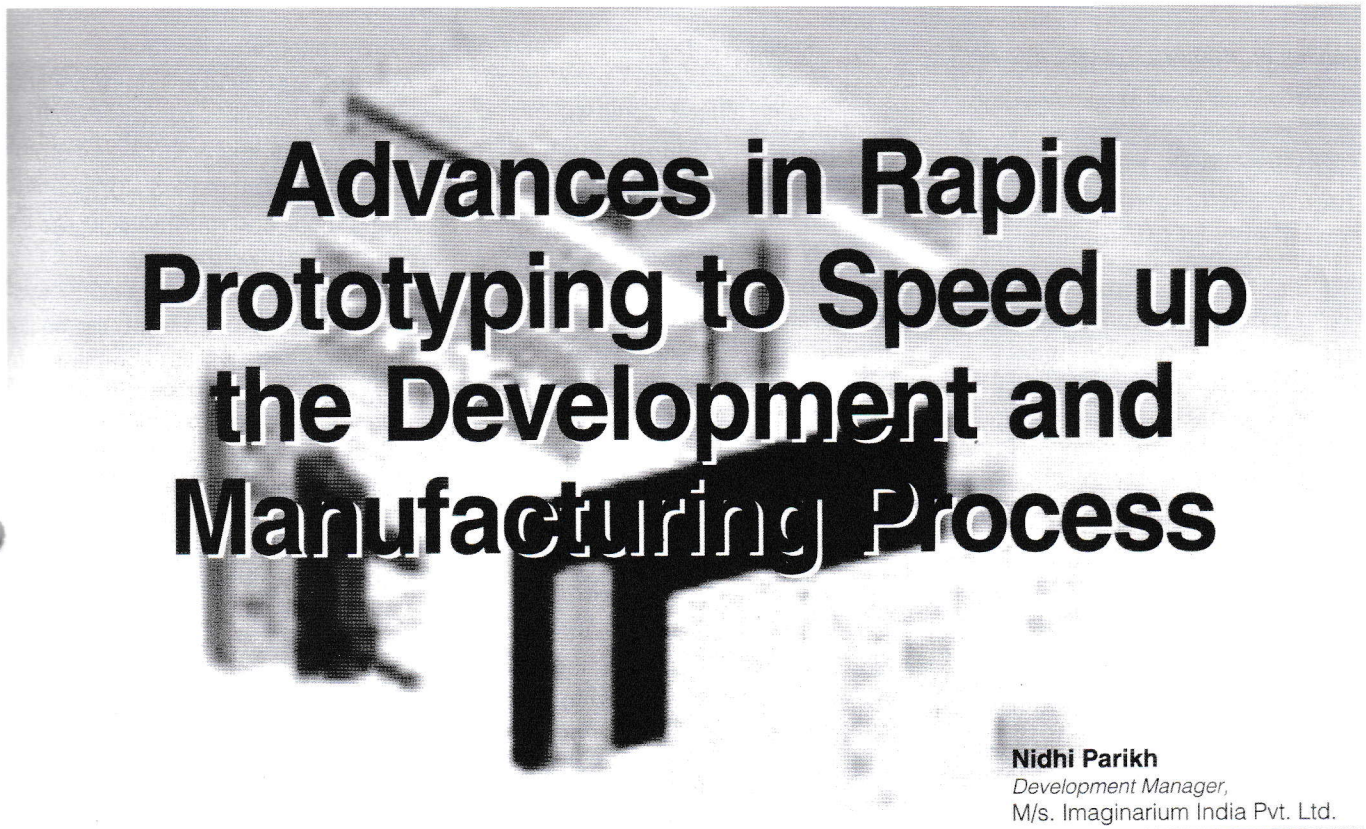
Dear Members,

IPF continued with its activity by providing necessary technical assistance in construction of a 50 metre long X 5.5 m. wide road in Bidhannagar with plastic waste mixed with bitumen. This work was done with the support and cooperation of Bidhannagar Municipality. Bidhannagar Municipality is interested in extending the coverage of roads constructed using plastic waste after seeing the performance of this trial road.

The first North East Plasto Fair was held at Guwahati from May 21 – 24, 2010. This exhibition was organised jointly by Plastindia Foundation, Mumbai and Federation of Industry & Commerce of North Eastern Region. IPF was offered a complimentary stall in this exhibition. Leaflets, advertisement tariff of Plastics India were distributed in the fair ground. AIPD 2009 CD ROM was sold from the IPF stall. The exhibition was a success with over 15,000 visitors visiting the Fair ground. Shri R. A. Lohia, Chairman of the 'Plastics in Environment' Sub-Committee made a presentation on 'Plastics in Environment – Real Issues, Solutions and Challenges' at a Seminar held in the Fair Ground on 24th May 2010.

With best wishes

Ramawatar Poddar
Hony. Secretary



Advances in Rapid Prototyping to Speed up the Development and Manufacturing Process

Nidhi Parikh
Development Manager,
M/s. Imaginarium India Pvt. Ltd.

We live in a world dominated by plastics. More than a 100 million tones of plastic is produced world-wide each year. Plastic components are vital components of many engineered products, frequently representing 20-40% of the product value. Most of these plastic parts are manufactured by way of injection moulding.

Injection moulding is a process for making objects by heating the moulding material to a fluid state and injecting it into a mould. Injection moulds (tools) themselves can be surprisingly expensive. Tooling costs typically vary between 10^4 and 10^6 dollars, dependent of the size and complexity of the application, with corresponding development times typically varying between one month and one year. Accordingly, these costs and delays may be inappropriate if production quantities are less or otherwise uncertain. The time taken for tooling also eats up on the initial lead times and hence the 'time to market'. Additionally, multicavity moulds cost more than their single cavity counterparts and have much higher development times.

Accordingly, injection moulding may not be appropriate for applications that are not guaranteed to recoup the initial costs.

The most appropriate process varies greatly with the desired production quantity and cost/lead time sensitivity.

Though injection moulding is accepted for producing complex parts in large production volumes, manufacturers are now turning to Rapid Prototyping and Rapid Manufacturing for producing complex parts in very low quantities.

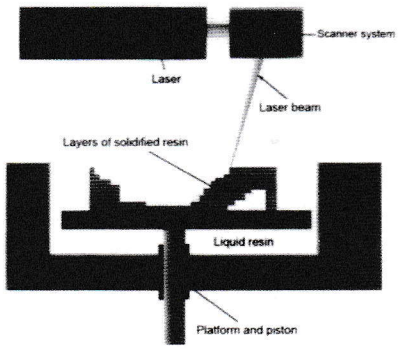
Rapid Prototyping is automatic construction of physical objects using solid freeform fabrication directly from CAD data. It is also known as additive fabrication, three dimensional printing, solid freeform fabrication and layered manufacturing. You can get outputs in epoxy based resins, grades of nylon, metals, ABS, and many more materials for low volume production feasibility.

The appropriate use of RP models in conjunction with injection mold tool making has a positive impact on the following.

Communication and Verification

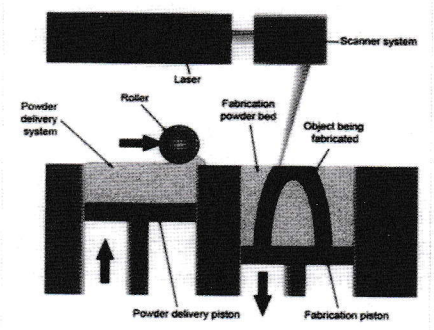
Visual aids as provided by "real parts," made through an additive process can be an invaluable tool in the communication process. This handy translation from the two-dimensional screen to an actual three-dimensional representation of the item of interest can make explanations of mould making considerations clear—even for relative novices—and verifies that the client will be getting the results that he desires prior to the cutting of metal. *More complex the part, higher the value of three-*

dimensional additive model in client interaction.



Stereo Lithography (SLA®) –An additive fabrication process utilizing a vat of liquid UV-curable photopolymer "resin" and a UV laser to build parts a layer at a time.

Styling and Ergonomics While it is very easy to wrap your hand around the grip or handle of a physical part, it is profoundly difficult to do so virtually. RP additive models provide enormous value in allowing designers, mould makers and potential customers to touch, feel and manipulate the envisioned parts prior to the creation of production tools. *More that your end user will need to physically manipulate your injection or blow molded product, the higher the value of an additive model in the early stages of product development.*



Selective laser sintering–An additive rapid manufacturing technique that uses a high power LASER to fuse small particles of plastic, metal, ceramic, or glass powders into a mass representing a desired 3-dimensional object.

Fit and Function Almost never, is a single injection molded part a "stand-alone item;" nearly all injection molded or blow molded articles will be part of a larger assembly, perhaps requiring threaded closures, drain-back caps, snap fits, living hinges, sonic welds and other features. Current automated assembly methods make an in-depth understanding of fit and function issues absolutely essential. Other automated post-molding considerations include decorative operations such as labeling, hot stamping, painting, and others—and these too can be better understood though the of RP models. *More complex the assembly and decoration process, more value there is to be gained through the use of RP models in combination with injection mold design.*

RP is basically a visual aid that allows the mould maker to evaluate the design and know it is correct before the process moves to the hard tooling stage. From the model he can accurately determine where parting lines in the mold can and should be set up. If minor modifications need to be made, it can be done to the original SLA master.

Thus, like CAD and finite element analysis, Rapid Prototyping is now fast becoming a product development tool.

A lot of companies are first making Prototypes of all their design parts for design validation, before going into the expensive and time consuming tooling process straight away.

Company	Product type	Percentage
Bose	Audio Equipment	95%
F HP	Inkjet Printers	>95%
F SC Johnson	Consumer Products	100%
Allen Bradley	Electronic Controls	>90%
Chrysler	Automotive	85%
Appro. Average		95%

Reasons for acceptance of RP as a Product development tool

- The cost of making additional concept models is insignificant compared to the total cost of product development, making it easier to evaluate a greater number of alternative designs
- As materials continue to improve and more closely simulate injection moulded plastics, the number of functional prototypes built have increased significantly, allowing more and more design issues to be resolved prior to tooling
- Also, as materials improve, RP systems are being used to build initial production parts allowing companies to get products to market while waiting for production tooling to be built
- As materials reach production quality, the market for very low-volume production has increased rapidly, greatly increasing the average number of parts per design built.

Reduce the time and cost of jigs and fixture manufacture

Mold manufacturers see a benefit during the build process due to the use of jigs and fixtures. With rapid prototyping used as rapid manufacturing, the toolmaker can create plastic fixtures for use as drill guides and to locate slide actions.

The product development of many (plastic) components involves the creation of quality control tools and methods. In the automotive industry in particular, quality control is an essential part of product delivery. It often means that the component is measured on a CMM to prove that the components (or batch of components) have dimensions within the specified tolerance fields. To perform an accurate CMM inspection of plastic parts, it is often mandatory to mount the part on a fixture that holds the component on predefined points in a specific location (RPS points). Measurement fixtures are particularly essential when the components are flexible.

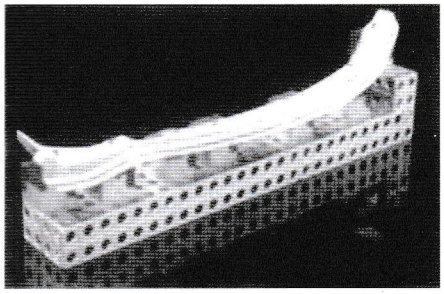
What we often see, is that the development and manufacture of measurement fixtures is postponed until final production parts are available. There

are two reasons for this:

It is too often forgotten that plastic parts need proper fixing before a decent quality control (e.g. CMM inspection) can be performed. If a component is not properly fixed, it may deform or it may just perform differently from when it is placed in its final assembly position (and this is the moment when the real quality of the component becomes visible).

The cost of measurement fixtures. These fixtures are not cheap. But even more important than the cost of the fixture itself is the cost of modifying the fixture. If a design change to a component is required after the measurement fixture has been manufactured, the cost of modification may end up in the same order of magnitude as the manufacturing cost of a new fixture.

Thanks to RP, it is possible to make measurement fixtures during the design process of the component. This means that in an early design stage, quality control can already be performed and potential design issues can be tackled.



An example where additive fabricated measurement fixtures really show their value is a car door seal. The door seal is a TPE-injection molded component. In order to perform quality control on such a component, a measurement fixture is required to support the component in an adequate manner. Originally, this was performed in a simple way, by clamping the part on three points (as is conventionally done). The measurements of the component subsequently showed that all the dimensions of the parts were within tolerance. In fact, it appeared that the manufacturer had done a very good job, that's until the component was mounted on a car and rain tests were performed. These tests showed that there was leakage of water in the corner where the sealing element was mounted.

The problem had to be investigated. A new measurement fixture was made by using additive fabrication. Thanks to additive fabrication, the complexity of the fixture was not a concern. So it was decided to integrate snap fits in the fixture, in the same way that they are used in the car assembly. The fixture was made using laser sintering. The snap fits perform like a standard plastic snap fit. Mounting the door seal on the newly designed fixture showed torsion in the component. With this information, the product developer could make modifications to the component to eliminate the torsion.

The advantage of using additive fabricated fixtures in this example is obvious. Thanks to the freedom of complexity in laser sintering, it is possible to integrate the snap functions without extra cost. Of course, the fixture requires some engineering, but because the engineer does not have to worry about manufacturability of the fixture, the engineering cost is limited.

Apart from cost, another advantage is the throughput time to make such fixtures. The engineering & fabrication of the fixture takes only two working days. Within less than a week, a representative fixture is available on which quality control can be performed. On top of that, a modular approach to fixtures was chosen, which means that if a design change occurs in one area of the component, only one or a few fixture locators need to be re-engineered and produced in laser sintering. This allows the customer to co-develop the product and the quality control tools, which eventually results in a shorter time-to-market and an increased accuracy.

Using RP as a tool for Low Volume Manufacturing (Rapid Manufacturing) to give 'Parts without limits'

Design Flexibility In RP the part will be made from the bottom up, layer-by-layer hence, a lot of design constraints like undercuts and thin walls are completely eliminated. Since parts made with digital manufacturing have no tooling commitment, they can be improved on the fly, continuously, based on customer or performance feedback. This continuous product improvement leads to higher customer satisfaction and market responsiveness.

On-Demand Inventory Digital Manufacturing also enables on-demand inventory of the improved design, since the improved units can be manufactured within a few days of conception. With this method, the days of obsolete inventory are gone, since existing designs are made just-in-time, and new, improved parts can be manufactured quickly. This increases the efficiency of your development process, as you can manufacture new, slightly different parts in just a few days.

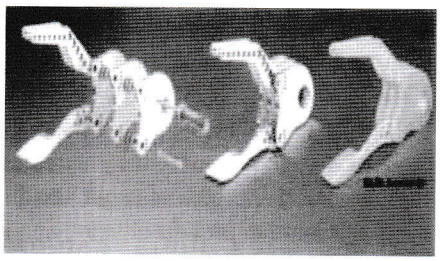
No Penalty for Changes Digital manufacturing cleans up a product manager's dirtiest word: change. Parts with tooling investment become locked in time and unchangeable, since the cost of re-working on the tooling, or worse making new tooling altogether, prohibits the weak part from being changed.

Focus on Part Consolidation

To take advantage of digital manufacturing effectively, designers must shift their design paradigm to take advantage of part consolidation. Simply put, part consolidation is the act of combining several parts in an assembly

into a single part that can easily be manufactured using LVLM. Multiple parts currently only exist because of the constraints imposed by the process used to manufacture those parts.

Since digital manufacturing removes those constraints, the designer can consolidate the parts into far fewer parts, which can then only be made using DM. For example, consider the robotic arm shown here. Notice that the original design for the wrist consists of three plates, three standoff posts and two adapters for a total of eight parts—not including the screws.



With RP, that assembly is combined into a single part, easily made with RP, but impossible to make with CNC or molding methods. The benefit is that you have reduced eight unique parts to one. Tooling for those eight parts is eliminated. And the bill-of-materials is reduced by seven parts. This illustration effectively shows one of the benefits in using LVLM for part consolidation.

With customers placing repeat orders that tend to be low volume and takes time and resources away from in-production projects, it makes sense for mould makers to look for fast, efficient alternatives to hard tooling.

Vacuum Casting for Low Volume Manufacturing

Vacuum Casting is a form of RTV moulding used for producing accurate silicone tools for casting parts with fine details and very thin walls

It is an alternative technique for the production of prototype castings which mimic injection moulded parts such as ABS, PP, PMMA, PA and different grades of rubber. The casting materials that are used consist of a broad range of different polyurethanes that are similar to rubber, PP, ABS, PC.

Thus, vacuum casting can serve two purposes

- It can economically bridge the gap between design concept and hard tooling
- By enabling to take out 20-25 outputs, and it can be useful for a small volume production

Conclusions

RP helps in maintaining supply chain flexibility by minimizing initial cost and lead time

Companies need to develop a multi-stage manufacturing methodology that utilizes low volume processes during the uncertain product start-up phase followed by higher volume processes to thereby maximize profit and minimize risk over a product lifetime.

Companies should also consider the combination of high volume standard components and low volume custom components to maximize profit and minimize risk across a suite of products.

Imaginarium (India) Pvt. Ltd. is one of Asia's largest service bureaus providing Rapid Prototyping and Manufacturing services to the engineering industry with state-of-the-art SLA, SLS, 3D Printing and vacuum casting machines under one roof. The directors at Imaginarium believe that the power of digital manufacturing needs to be available to every forward-looking manufacturer. With over 200 person-years of experience in offering the Indian engineering industry the very latest in CAD/CAM technology, the company's infrastructure in SEEPZ Mumbai has over 100 dedicated professionals, who are helping large engineering houses as well as small- and medium-sized businesses. The firm now boasts of 9 RPT (rapid prototyping technology) machines and enjoys a client base of over 100. The company firmly believes that the future is digital. Hence, it continues to make significant investments in the future of CAD/CAM to ensure that the Indian manufacturers remain competitive in the business, despite the economically challenging time.

Designing for thinner walls, gauges

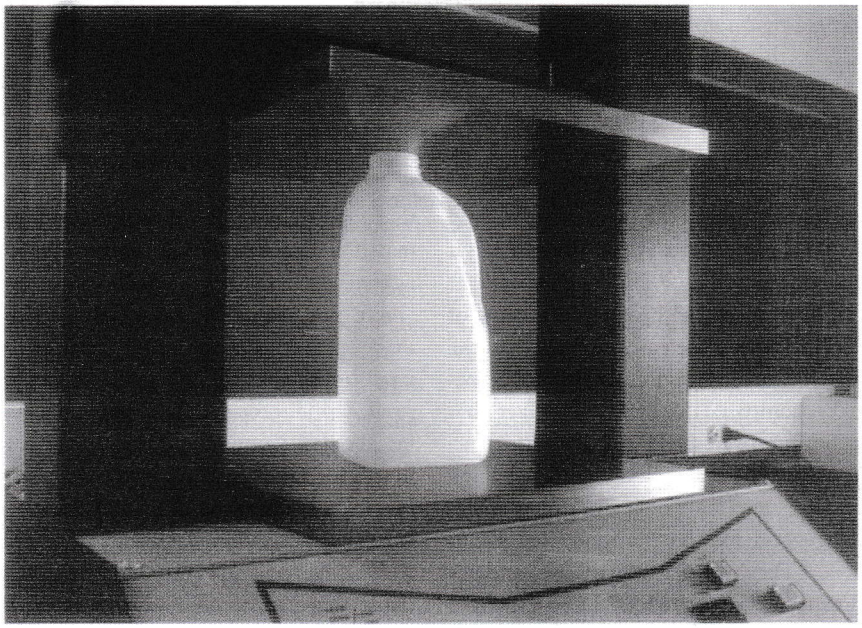
By Tony Deligio

Forced on a diet, many plastics products have already shed excess, unnecessary grams through design alteration, but to lightweight, thin-wall, and downgauge to the max, new resin grades might be necessary.

Stacy Fields, rigid packaging marketing manager for Dow Chemical Co.'s North American Basic Plastics business, says using less material is a concern for more and more customers. "Probably in eight out of 10 opportunities we have had with our customers, they are concerned with or have interest in trying to lightweight," Fields says, "and a lot of this is driven by sustainability initiatives."

That sustainability push has one well-known proponent that can affect sweeping change throughout entire supply chains. "At the end of the day, when you look down the value chain, a lot of these customers have Wal-Mart as their customer," Fields explains, "so they're trying to respond to the Wal-Mart scorecard. I think with traditional materials that have been on the market, they've done all they could from a downgauging perspective, but to get to that next level, they're looking at how to do it even more." Among other things, Wal-Mart's initiative calls for an across-the-board 5% reduction in material usage in primary and secondary packaging.

At NPE2009, Dow launched several materials that promote the ability to further thin-wall, lightweight, and downgauge injection molded, blowmolded, and extruded applications. For blowmolding, Dow introduced Continuum EP high-density polyethylene (HDPE), a new generation of bimodal HDPEs that Dow believes bridges the gap between conventional unimodal HDPEs and bimodal ones by offering enhanced performance and processing in blowmolded bottles and drums. At this time, the product family includes two experimental grades: XDMDA-6630 EP for bottles, and XDMDA-6670 EP for larger blowmolded parts like drums.



Offering higher modulus than conventional unimodal HDPEs, Dow's bimodal Continuum EP HDPE resins offer improved top-load performance in bottles and drums.

By pairing augmented environmental stress crack resistance (ESCR) with high flexural modulus for greater stiffness, Dow believes the resins have the potential for significantly improved performance in existing applications, or equivalent or better performance in lightweighted containers.

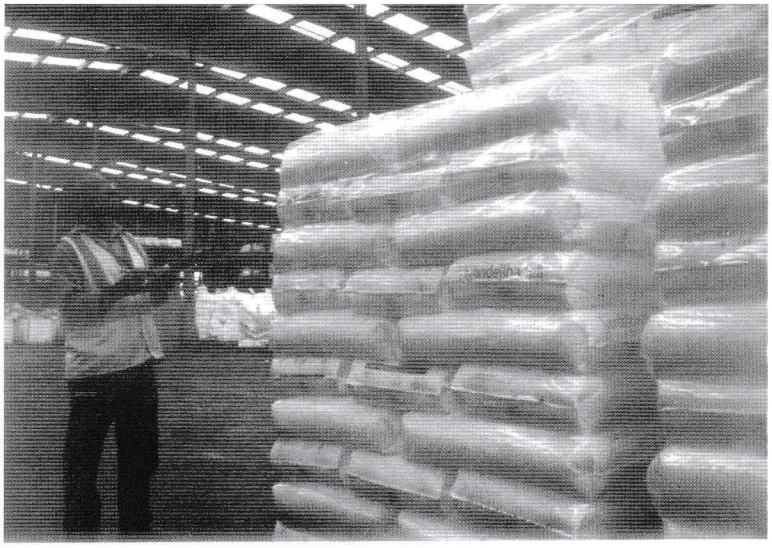
Fields says the fact that the materials are bimodal vs. unimodal is key to their performance, with bimodal referring to the use of two reactors instead of one in the polymerization process. "With these two different reactors, we're able to better control how [bimodal] material is put together," Fields says.

Dow sees big opportunities for Continuum in the household and industrial chemical (HIC) segment, where some source-reduction strides have already been made. Perhaps most notably, the amount of plastic used for 96-oz HDPE laundry detergent bottles has been reduced by 7-8g, or 10% of their weight, in recent years. Elsewhere, applications in areas such as edible oil could also be slimmed, particularly larger jugs that are often accompanied by a corrugated cardboard box. "We can thin-wall and lightweight with our new resin to make the bottles thinner, but still have the same stiffness and performance integrity that they have today," Fields says. "In some cases, they could even choose to reduce the extra package on the outside."

Dow says Continuum allows container weights to be cut 5%-10% while maintaining or improving end-use performance. In addition, the company has seen that the resins allow increased incorporation of post-consumer recycled (PCR) content.

Also at NPE2009, Dow launched a

'At the end of the day, when you look down the value chain, a lot of these [companies] have Wal-Mart as their customer.'



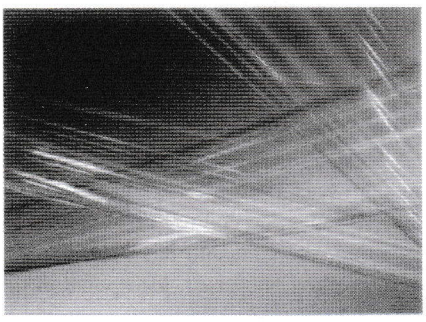
LyondellBasell says shipping sack and stretch hooder applications can be downgauged in part by using its Starflex mLLDPE.

highly clarified polypropylene (PP) for use in rigid thermoformed packaging. Inspire 222 is the first commercially available grade, promising clarity and stiffness for applications like cold drink cups.

In that particular arena, the shift by companies like Starbucks from polyethylene terephthalate (PET) to PP for cold drinks is providing a boost. Since PP has a lower density than PET, the cups' weight can be reduced, with material savings of 20%-25% in some cases. Advances in the material have also improved its look, especially compared to PET. "The fact that we've improved the PP to have better clarity means customers don't mind switching because they realize they're doing something good for the environment," Fields says. "They're using less plastic, and it's similar in clarity to PET." Dow tests have shown that clear 12g 16-oz cold-drink cups using Inspire 222 can match the performance of 16g PET cups.

New material, same tooling

Fields said Dow has worked to ensure the new grades offer a drop-in solution, allowing processors to swap out materials without changing molds. "For the most part, there's not a lot of variation in design, because we don't want to require new tooling," Fields explains. "We're hoping that converters see the advantages with our material because you can downgauge or lightweight, so you get thinner parts, but you're not sacrificing any of the performance properties of the resin." Offering die swell, melt strength, and other properties similar to chrome-catalyzed unimodal resins, the new Continuum family reportedly makes for easier startups, improved pinch-off welds, and more uniform wall thickness vs. conventional bimodal resins.



LyondellBasell's new line of metallocene linear-low-density polyethylene (mLLDPE) materials target high-performance film applications.

The company is also working on a grade that can accommodate a range of machines, since most blowmolding systems on the market were designed to run previous-generation unimodal materials. "With the various types and ages of extrusion blowmolding equipment throughout the North American market," Field says, "some applications were easier, while others offered a little bit more of a challenge."

Dow says XDMDA-6630 EP HDPE works on a variety of extrusion blowmolding (EBM) equipment, including reciprocating screw/intermittent extrusion, continuous extrusion shuttle, and wheel lines, while XDMDA-6670 EP HDPE works on accumulator head machines for improved processing of drums and other large industrial containers.

Polyolefins push thin-wall limits

Elsewhere in polyolefins, Borealis says its injection molding PPs combine flow, impact resistance, and stiffness. It recently launched three transparent grades especially for thin-wall packaging: Borpact SG930MO, BJ356MO, and RJ470MO.

Borpact SG930MO is intended for high-transparency, deep-freeze applications like ice cream packaging, where transparency and cold-impact resistance are required. The material passes a 2m drop test at -20°C for a filled 700-ml container, compared to 10 cm for a standard transparent PP with a melt flow rate (MFR) of 20 and 1.2-mm-thick wall. The company says in a 15g container with 0.38-mm wall thickness, the material allows an 11% reduction in cycle time vs. a material with an MFR of 45.

BJ356MO is a heterophasic PP engineered to flow into molds easily. Borealis says despite the flow, BJ356MO has low taste and odor characteristics, with a white-based tint, making it a good option for portion-pack thin-wall food containers such as 250g margarine tubs. The material can withstand filling of multicavity molds even at wall thicknesses of 0.6 mm. As an example, the company cites a 1.5-liter ice cream container with 0.6-mm walls that runs in a two-cavity mold at a 260°C processing temperature. In this instance, the customer experienced a 16% reduction in cycle time due to easier demolding and a 15% reduction in injection pressure due to better flow.

RJ470MO is a high-fluidity 70 MFR random copolymer that's specially designed to provide flow while maintaining the stiffness/impact balance of a typical random PP.

In films, LyondellBasell announced the North American commercial launch in September of a new line of metallocene linear-low-density polyethylene (mLLDPE), targeting high-performance film applications in food and medical packaging, shrink

wrap, and heavy-duty shipping sacks, among others. Stephen Imfeld, LyondellBasell's new business development manager for polyethylene flexible applications in the Americas, told MPW that compared to conventional LLDPE materials, Starflex resins allow processors to downgauge flexible packages and realize material savings and improved sustainability.

Imfeld said that at this time, there are six commercial products available based on three reactor grades, and the company is actively pursuing opportunities for additional grades. The key differences between the grades, which are based on Univation metallocene technology, are melt index, density, and additives. Two grades feature slip and antiblock additives, with another only offering antiblock. Base resin density ranges from 0.912 to 0.918.

PET's thin-wall push to extend from bottles to thermoformed products

PET was an early target of the lightweighting push, particularly in 500-ml water bottles, whose ubiquity made them an easy mark for conservationists. Those containers, which formerly used preforms intended for carbonated soft drinks (CSD), recently weighed in the mid-20g range, according to George Rollend, senior technical marketing manager at PET resin and fiber supplier DAK Americas.

DAK has since designed a PET grade especially for water bottles, with the material featuring high flow at low melt temperatures for injection molding as well as good reheat performance for high throughputs in stretch blowmolding. Many bottlers and converters now use a preform specifically designed for lightweight water bottles, helping to cut mass in half or more, with 500-ml bottles now in the 10g or less range. "We call this substituting orientation for gram weight," Rollend explains.

These half-gallon industrial round bottles produced on a continuous extrusion shuttle blowmolding machine use Dow's Continuum EP HDPE resins, allowing the converter to lightweight the bottles by up to 10% while maintaining performance.

Given the drastic reductions that have already occurred, how much more can be reasonably expected? "I think technically feasible and commercially viable are two different terms one needs to consider," Rollend says, when asked how low bottles can go. "Pragmatically, in the field, the consumer is going to judge whether it's going to work commercially. If this thing is a rigid bag and its product gushes out when you open it, it's not going to be well accepted."

Perhaps counterintuitively, Rollend also points out that thin-wall bottles actually require a thick-wall preform with a short, fat appearance that allows the bottle, when stretch blowmolded, to become thin via a concept called self-leveling. Rollend says PET is one of the only resins that achieves self-leveling in the wall thickness. This occurs when the proper orientation levels are reached by using the design-intended blow-up ratio (BUR) from the preform to the bottle.

PET has also made a push into thermoformed packaging of late, targeting polyvinyl chloride (PVC) and polystyrene (PS) for the most part. In addition to clamshell deli-style packaging, PET paired with paperboard in non-food packaging results in a package that has large, proven recycling streams.

In this segment, however, DAK has not seen the same downgauging push. "I think the thermoforming segment is still a relatively young market in PET," Rollend says, adding that the first candidate for reductions would likely be thermoformed cups.

Tom Sherlock, resins business director at DAK, sees a similar landscape. "I think most thermoform packaging is pretty lightweight to be begin with," he says, "and when you're lightweighting deep-draw cups and large clamshell trays, there's a limit to what you can do."

"Just realize in the thermoforming process, you're not getting the same level of biaxial orientation that you do in a bottle," Rollend says. "You're drawing warm with only axial orientation, no hoop, so you get very little strength through orientation. So trying to lightweight just by downgauging doesn't allow the material to reach the optimum self-leveling point that converters can achieve with the stretch blowmolding process."

Another segment where DAK is seeing lightweighting occur is in beverages like sports drinks, with companies switching from multilayer hot-fill containers to monolayer cold-fill bottles, with brand owners reformulating the product to change the filling process.

"Cold-fill actually opens up the design freedom of the package," Rollend explains. "Because you're not restricted by the hot-fill requirements anymore, the walls don't have to be as thick, they don't have to have vacuum panels, and you can get more creative with your bottle design."

PolyOne reformulates healthcare solutions

The Trilliant HC line of engineered compounds showcased at the Compamed show in Düsseldorf, Germany (Nov. 18-19) reflects the company's efforts to focus on healthcare customers' performance needs in challenging medical applications.

The Trilliant HC portfolio specifically addresses performance characteristics within the context of healthcare application and regulatory requirements (USP Class VI, ISO 10993, FDA), and is produced in accordance with the U.S. Food & Drug Administration's current Good Manufacturing Practices (cGMP) for medical devices.

According to Stephen Schlegel, healthcare marketing manager, PolyOne Specialty Engineered Materials, in response to questions from MPW, "The technology platforms in the Trilliant HC portfolio were developed previously for a broad range of applications under several different brand names—Edgetek, Stat-Tech, Lubri-One, and Gravi-Tech, for example. But rather than newly marketing them for medical applications under the Trilliant HC brand, we have reformulated the compounds and the process steps so that we can provide a solution to healthcare customers' critical requirements. The additional development includes using USP Class VI raw materials, FDA-compliant colorants and additives, processing according to cGMP standards, and formulation lockdown. These steps mean that Trilliant HC materials are formulated differently and carry a 'brand promise' that corresponding non-HC grades do not."

PolyOne says that among the critical performance areas targeted by the line are X-ray shielding and radiopacity (high-specific-gravity compounds for lead replacement in X-ray shielding and weight balancing for surgical equipment, along with production of radiopaque materials); structural performance (high-strength and -stiffness compounds for metal substitution); electrical conductivity (conductive and dissipative materials); thermal conductivity (insulating as well as conductive forms); high lubricity (reduction of force needed to move gears, pumps, switches, and buttons, and extension of device life); and flame retardance (available in various polymer systems, and in halogenated or nonhalogenated forms). Schlegel says that lots can be as small as 50 lb (22 kg).

PolyOne, Avon Lake, OH, USA; www.polyone.com

Sticky stuff: Double the adhesion for TPE to HDPE

Thermoplastic elastomer (TPE) compounds with double the adhesive strength of standard TPEs when overmolded onto HDPE are new from this custom compounder.

The super-sticky grades will be available in the company's Medalist range of medical-grade elastomers, a reflection of the North American medical device market's broad adoption of multishot injection molding as a way to eliminate assembly.

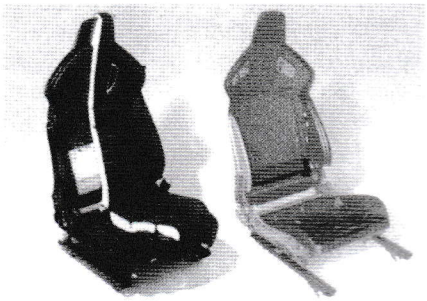
In a 180° peel adhesion test that compared HDPE samples overmolded with an HDPE-bonding Medalist TPE and samples with one of the company's own standard hydrogenated styrenic block copolymer (HSBC) TPEs, the median adhesion, or peel strength, of the Medalist TPE was twice as great as that of the HSBC—42.086 lb per linear inch compared to 21.412. In addition, the variation in peel strength among different test samples was less than half as great with Medalist as with HSBC.

According to the company, the new grades will not only provide stronger bonds to HDPE but also exhibit less variation in bond strength. The new compounds officially debut at the MD&M West show next month in California.

Teknor Apex, Pawtucket, RI, USA; www.medalistmd.com

Plastics make moves in automotive, airline seating

Recent discussions make clear that engineering thermoplastics potentially could shake up the airline and automotive seating industries, as developments speed ahead in a bid to replace more metal in these high-volume applications.



Opel's Insignia seating makes use of BASF materials.

The most vivid example was displayed by plastics supplier BASF at the Fakuma trade show last October. The company highlighted the use of a number of its materials in the new Opel Insignia OPC passenger car, including components in the vehicle's front seats. Opel worked with Tier One supplier Recaro on the seating.

The seats are made of two of BASF's Ultramid polyamide (PA) materials and its Neopolen expanded polypropylene (EPP) foam. BASF assisted with its Ultrasim simulation software in the design of the seat pan, backrest shell, and crossbar. The plastic parts are replacing steel frames.

The seat pan is molded of Ultramid B3ZG8, a stiff PA6 that ensures high energy consumption values. Ultramid B3G10 SI was specified for the freestanding backrest shell as well as in the crossbar. The insert for the backrest shell is made of Neopolen P 9225 K (EPP), energy-absorbing foam that also covers edges and serves as a module carrier for motors and seat components such as the spinal column support.

Prototypes of the seats were shown back in October 2007 at the K trade show, with the same trio (Opel, Recaro, and BASF) involved.

One company working closely,

Contd. to page 19

IPF PARTICIPATION AT NORTH EAST PLASTO FAIR AT GUWAHATI

Report on Plastofair

The **IPF Team** led by our **President Shri Sourabh Khemani** and office bearers participated in the **North East International Plasto Fair 2010** organised by **Plastindia Foundation** and **FINER** from **May 21 – 24, 2010** at **Maniram Dewan Trade Centre, Guwahati**. We distributed leaflets about **IPF's organisation** and advertisement tariff of **Plastics India magazine**. IPF also sold **AIPD 2009 CDROM** from its stall. The fair was **inaugurated on 21st May 2010 by Shri Tarun Gogoi, Hon'ble Chief Minister of Assam** in presence of **Shri Anand Sharma, Hon'ble Minister of Commerce, Govt. of India, Shri Pradyut Bordoloi, Hon'ble Minister Power, Public Enterprises, Industry & Commerce, Govt. of Assam, Shri Ravi Capoor, Commissioner & Secretary, Dept. of Industries and Commerce, Govt. of Assam, Shri Ashok Goel, President Plastindia Foundation, Shri R. S. Joshi, Chairman FINER,**

Shri J. K. Singh Teotia, Managing Director – Brahmaputra Cracker Polymer Limited and other dignitaries. Several exhibitors participated from various parts of India viz. Delhi, Gujarat, Maharashtra, West Bengal and North East India. There were **128 stalls** and some had live demonstration of machines. Around 15,000 visitors attended the 4 day exhibition. **This was the first plastic fair in North East India. Shri Pradyut Bordoloi**, Hon'ble Minister of Power, Public Enterprises, Industry & Commerce, Govt. of Assam, **presided over the closing ceremony held on 24th May 2010. The fair was a grand success.**

Plastic Auxiliary Equipments from World Leaders

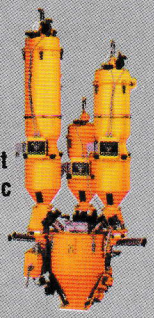
KOCH TECHNIK Joint Venture with Koch Technik - **GERMANY**

Dehumidified Air Dryer
Capacity from 25M³/hr to 3000M³/hr

Hopper Loader
Out put from 8 kg/hr to 1200 kg/hr

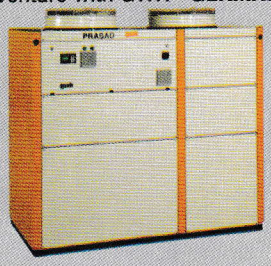
Hopper Dryer
Capacity from 15 Ltrs. to 3500 Ltrs.

Multi Component Gravimetric Blender



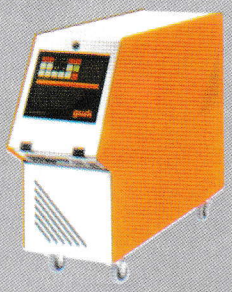
gwk Joint Venture with GWK - **GERMANY**

Compact Chiller
(Air/Water Cooled)
Energy efficient compact water chiller
Cooling capacity from 10 KW to 360 KW



Air Chiller
Direct cooling air chillers for blown film plants

Mould Temperature Controller
Oil / Water based with microprocessor control

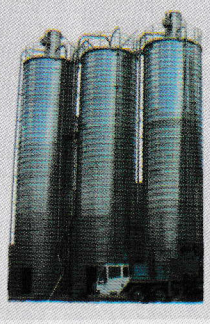


moditec
Technical Collaboration with Moditec - **FRANCE**

Granulator
Low speed, Low noise

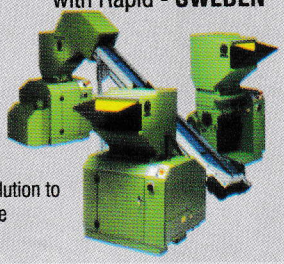
ARIOSTEA
Technical Collaboration with Ariostea - **ITALY**

Silo
Silo feeding system & Material handling system for PVC Resin



Rapid Technical Collaboration with Rapid - **SWEDEN**

Granulator
The efficient solution to all your wastage

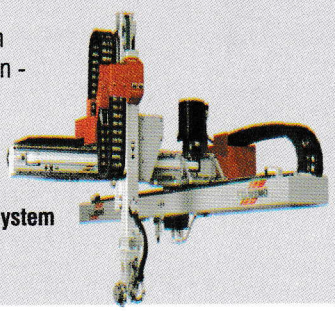


crizaf Technical Collaboration with Crizaf - **ITALY**

Polymer Conveyor Belt

WEMO Joint Venture with Wemo Automation - **SWEDEN**

Robot System



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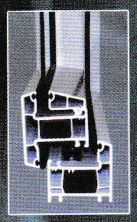
East: Kolkatta : 9331264120

Economy Through Automation

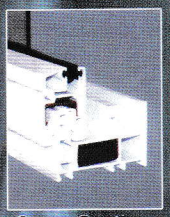
Outward Opening

Sliding Window

Sliding Door



Cross Section



Cross Section

Casement Door

o p e n i n g a w i d e r h o r i z o n

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though not exclusively, with BASF, specifically of late on development of fiber-reinforced polyethersulfone (PES) compounds, is PlastiComp (Winona, MN). One of PlastiComp's customers recently developed airline seating using one of these PES-based compounds in which those parts passed the 16G crash test (other seating components not made of the fiber-reinforced PES did not pass). Airline seating still is largely metal. If some of the airline developments eventually move into automotive seating, "it could be a game changer," reckons Stan Verbraak, business development manager for PlastiComp Europe GmbH (Steenbergen, the Netherlands).

Verbraak says many of the company's most recent developments have been with carbon-fiber-reinforced compounds. The price of these fibers has dropped as supply has increased, making them a more viable economic option. Also, although glass is still offered in more tow sizes, carbon-fiber suppliers are expanding their product range.

Carbon fiber is more difficult to work with than glass or aramid, he notes, as the rovings are more difficult to open and impregnate. Poor carbon-fiber wet-out leaves loose fibers that can float in a facility and even short-circuit electrical systems. "So you need to get it [the compounding] right," he notes.

Beyond seating, opportunities could appear in military applications, sports and leisure products, and more; replacement of metal EMI (electronic magnetic impulse) shielding also is possible.

At the IAA automotive trade show in September, Tier One supplier Johnson Controls (Boeblingen, Germany) revealed its new seating concept, the Synergy-Seat, which it hopes to bring to market in 2012. The seats, slimmer than standard seating so that rear passengers have about 5 cm more legroom, make heavy use of recycled plastics, especially PP. The amount of PUR foam in the seats has been reduced and is based on biopolyols. An **MPW** editor who sat in it said it seemed fine, but would need a long roadtrip to pass final judgment on its comfort. The seats weigh up to 30% less than comparable current ones.

BASF, Ludwigshafen, Germany, www.basf.com; PlastiComp, Winona, MN, USA, www.plasticomp.com

Long-term PC prospects remain positive

While the global recession might have dented polycarbonate (PC) demand substantially, the impact was apparently less severe than on other materials, and long-term growth rates double that of GDP growth are expected, according to Günter Hilken, global head of the Bayer MaterialScience polycarbonates business.

Speaking to **MPW** via a video call from Guangzhou, China, where he was officiating at the inauguration of the company's latest Color Competence and Design Center, Hilken recalled that in early 2009 the company mothballed 300,000 tonnes/year out of its global capacity of 1.3 million tonnes/year of PC capacity in North America and Europe. Since then, 100,000 tonnes/year have come back onstream. "We will bring the remainder back online in coming years as demand recovers," he said.

Hilken adds that although demand from one of the key applications, optical media, had peaked, "We expect only a moderate decline going forward, but solid growth in auto, IT, and electronics is anticipated. We definitely see continued growth at double the GDP growth rate."

Commenting on the influence of publicly announced capacity additions from the likes of Sabic Innovative Plastics and the joint venture of Mitsubishi Chemical and Sinopec, Hilken said, "The global market is in the range of more than 3 million tonnes and growing. If you do the math, additional capacity can be absorbed within one to two years, but it does depend on individual actions of suppliers."

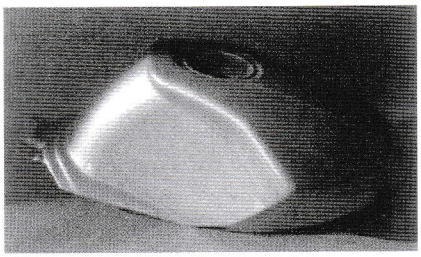
While acknowledging that PC precursor bisphenol A (BPA) continues to have a prominent, negative profile in the mainstream press, Hilken said, "Very clearly, BPA is one of the most evaluated materials in the chemical industry. . . . Based on the principles of sound science, if you use products made from BPA, in the appropriate way, they are safe to use."

Bayer MaterialScience, Leverkusen, Germany, www.bayerbms.com

Rhodia introduces new materials for fuel containment jobs

With strict regulation of gasoline vapor emissions already in place, and even stricter rules for some applications set to take effect in 2011, polyamide supplier Rhodia bets new grades, part of its Technyl PA6 range, could be the answer to some processors' concerns. Not only will the materials, as mono-layer fuel cans or small gas tanks for offroad vehicles and the like, satisfy stricter emissions limits, but they also can be readily processed on standard extrusion blowmolding machinery, with optimum results returned if a PA-specific screw is used.

Alan Dubin, business development manager in the supplier's Cranbury, NJ



Processors of small fuel tanks such as this one can benefit from the new materials.

offices, says the as-yet unnamed materials also can be run on multilayer blowmolding machinery, and on existing molds.

Rhodia has offered similar materials outside North America for some time. The two new materials now being introduced to the North American market have been improved upon, especially in terms of their cold impact strength, which he said has been tested down to at least -20°C "and can probably go lower." Scrap from blowmolding can be ground and reintroduced into the process with no loss of barrier performance, he added. Experience in production applications and in industrial trials has shown no cycle time loss vs. high-density polyethylene.

Most jerry cans and small fuel tanks for motorcycles, lawn mowers, snowmobiles, and other vehicles are made on multilayer extrusion blowmolding machinery with between three and six layers used. Barrier layers of ethylene vinyl alcohol may be embedded between polyethylene

layers, for instance, or fluorination can be used to provide a vapor barrier.

According to Rhodia, the two grades offer gasoline permeation performance on fuels like E10 that exceeds that of existing blowmolding materials like HDPE and PBT, and equals or exceeds multilayer material solutions. Rhodia is now in the final stages of product optimization and prototype testing on a number of new applications. Dubin says the supplier is still in the process of characterizing the new grades' processing windows, but that results so far point to significantly wider processing windows than standard PA6.

Testing by an external North American lab and on customer parts has proven the ability of these materials to meet or even exceed permeation regulations from CARB (California Air Resources Board) and the U.S. EPA, meaning processors can satisfy permeation performance requirements without investing the $3 million-$6 million a multilayer blowmolding machine might cost. Processors also need not send parts out for fluorination, another means of improving a part's permeation performance. The materials may also be injection molded and can be hot plate and vibration welded.

Rhodia, Cranbury, NJ, USA, www.rhodia.us

ADDITIVES & FILLERS

Songwon opens Middle East, Africa headquarters in Bahrain

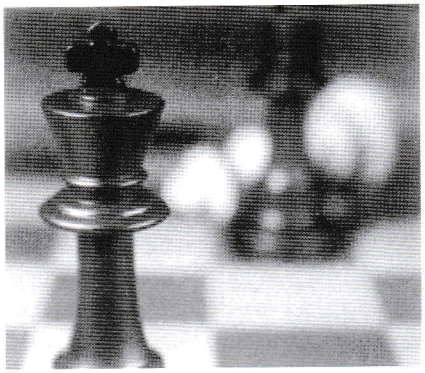
Korean additive supplier Songwon Industrial Co. Ltd. has opened its Middle East and Africa headquarters in Bahrain, saying demand for its core products in the region is growing rapidly as it becomes "one of the most important markets for us," according to Jongho Park, chairman and CEO of Songwon Industrial. The new regional facility, which also includes recently established local warehouses, will be led by Peter Fleming, who was named sales director Middle East and Africa effective Nov. 24. Fleming's prior experience includes stints with Chemtura, where he led its Asia-Pacific business, as well as at Polysar, which was acquired by Bayer. Most recently Fleming worked as a management consultant at Oriental Pacific Consulting PTE Ltd.

The move into the region continues the company's efforts to expand its geographic reach. In May 2009, it announced the creation of a new Japanese subsidiary, Songwon Japan KK. Last January, the company added two new distributors in India: Jayvee Organics Private Ltd. and Qualichem Specialties Private Ltd. Songwon supplies antioxidants, light stabilizers, UV light absorbers, heat stabilizers, plasticizers, lubricants, surface coating agents, polyurethane, alkyl phenols, biphenol, flocculants, and other chemicals.

Songwon Industrial Co. Ltd., Ulsan, South Korea, www.songwonind.com

Royal Blue pigments get that desired effect

Lumina Royal Blue and Lumina Royal Exterior Blue pigments are said to be of use in creating eye-catching effects for standard and high-end products. The



Checkmate: New pigment outperforms current interference blue effect pigments.

industrial version of the pigment can be used to visually enhance mobile devices, consumer electronics, appliances, sporting goods, and cosmetic and personal care packaging. The exterior version of the pigment is coated with the supplier's chrome-free surface treatment (CFS) for improved durability in applications that require humidity resistance and excellent adhesion, such as automotive, coil, and powder coating applications.

Royal Blue is the first high-chromaticity effect pigment being launched as part of the company's extension to its Lumina effect pigment portfolio.

BASF, Florham Park, NJ, USA, www.basf.us/luminaroyal

Bio-based modifier provides FR, enhanced properties

A group of patent-pending bio-based polymer modifiers reportedly enhance flame retardancy and add flexibility to otherwise rigid plastic products. Jemini 100 is the first in a line of nonhalogen flame-retardant additives that are RoHS, WEEE, and REACH compliant. Described as an "agri-derived liquid," Jemini 100 modifiers are ignition resistant, thermally stable up to 280°C, and allow high loadings of fillers in compounds, many of which cannot be processed without the addition of a modifier.

Bill Hamilton of Jemini developer JJI Technologies told MPW that he couldn't divulge the exact composition of Jemini 100, but said that more than 90% of it is derived from naturally occurring substances. "While it is not a flame retardant itself, it does not add to the fuel load like other polymer modifiers, which are mineral based," Hamilton explains.

While mineral-based flame retardants can impact physical properties, making compounds brittle in some instances, Jemini 100 is said to improve elongation, flex modulus, and impact resistance due to its plasticizing effect. The Jemini line was originally developed as a way to impart superior flexibility to nonhalogen flame-retarded polypropylene wire and cables, without compromising the flame rating or other key properties.

Hamilton says the modifiers have thus far been used with PE and PP, with the liquid injected directly into the barrel, although JJI believes it could also be added at the feedthroat. Letdown ratios have ranged from 2%-5%, depending on the application and desired result, whether it's process improvement or enhanced magnesium hydroxide flame-retardant performance.

Speaking to MPW in early November, Hamilton said Jemini 100 was at that time in the final stages of commercialization. Several companies were using it in scale-up situations involving highly filled materials such as magnesium hydroxide, he added.

JJI Technologies, Painesville, OH, USA, www.jji-technologies.com

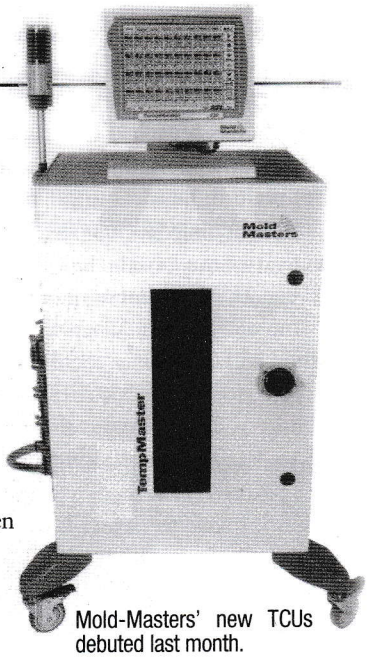
INJECTION MOLDING

Mold-Masters introduces new hot runner temperature control at Euromold

Mold-Masters launched its new TempMaster K-Series hot runner temperature controls at the Euro-Mold event (Dec. 2-5) in Frankfurt, Germany. Made possible in part by the company's recent (October 2009) acquisition of PMS Systems, the company describes the modular controls as compact and economical, especially for hot runners with a high number of temperature zones (up to 240).

Benefits include a proven design borne out by an installed base that's been in the field for 10 years, plus an easy-access design for simplified service. The unit has a full-color 10.4-inch touch-screen control, which includes the latest software improvements. Dirk Echtermeyer, VP sales Europe at Mold-Masters, said this system will prove reliable and economical for any applications with 60 or more control zones.

Mold-Masters Ltd., Georgetown, ON, Canada, www.moldmasters.com



Mold-Masters' new TCUs debuted last month.

Haitian shifts European HQ to Germany; Mercury's rising

Acknowledging that Germany is the continent's leading machinery market, and taking a pronounced step into the backyard of its leading competitors, the world's most prolific manufacturer of injection molding machinery is shifting its European HQ from Italy to Germany.

From June 2010, Haitian Europe will operate in Germany. The move is designed to help Haitian capture more of the German market, it says, with both its Haitian-brand machines as well as with its high-end Zhafir machinery, which is designed and assembled in Germany and wholly owned by Haitian and its management. This is something of a switch from the company's announced strategy when it formed the Zhafir business unit; at that time it said the Zhafir presses most likely would be marketed only into Asia. But market interest prompted the change, say officials.

Zhafir Plastics Machinery is based in Ebermannsdorf, Germany. Haitian Europe will be based near Nuremberg, about two hours from Ebermannsdorf.

Haitian Europe is one of parent company Haitian International's five regional offices worldwide and for years has been based in Italy, a layover from when the company was a Haitian distributor owned by Italian management. Eric Taveau, general manager of Haitian Europe, said, "After all, Germany is the largest and most significant European market. The advantages of positioning yourself as close as possible to the client are clear. By relocating our place of business we are guaranteeing optimum sales and service support."

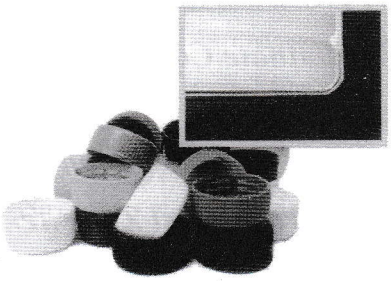
The Zhafir facility recently expanded its assembly capacity, and the parent company predicts its Venus series of all-electric machines will find favor in Europe's molding community. Haitian already has a market-leading presence in Turkey, it says, and also sells well in some Eastern European countries. Zhafir expects to start assembly of a high-end all-electric molding machine, to be called the Mercury Series, at the site in Ebermannsdorf this year.

Haitian, Ningbo, China, www.haitian.com

Coinjection allows barrier caps, closures in one step

After hinting at the capability at NPE2009, coinjection technology specialist Kortec Inc. will formally introduce a system to injection mold one-piece barrier caps and closures, potentially eliminating the need for closure manufacturers to add butyl rubber discs or aluminum seals after molding of thermoplastic closures Kortec says the caps and closures will better preserve food and beverage freshness and be less expensive to produce than traditional two-piece closures.

Russell Bennett, VP of sales and marketing at Kortec, told MPW that at this point, the company has not undertaken any performance testing of the caps. "We really are at the early stages of our development work," Bennett said, "but it is showing a lot of promise from the perspective of capability to place the barrier in the cap." The current target markets for the technology are those served by two-piece closure systems, including plastic caps with aluminum heat-sealed foil. "That naturally leads us to sterilized or pasteurized foods and juices, vitamin-enriched beverages, and hot-filled foods," Bennett said, adding that Kortec plans to work with cap makers to test efficacy. Initially,


These polypropylene caps feature a thin, coinjected layer of EVOH for barrier, resulting in one-piece, one-step closures that could replace two-piece systems on the market today.

EVOH has been applied as the barrier material, but others are on Kortec's "radar for evaluation," according to Bennett.

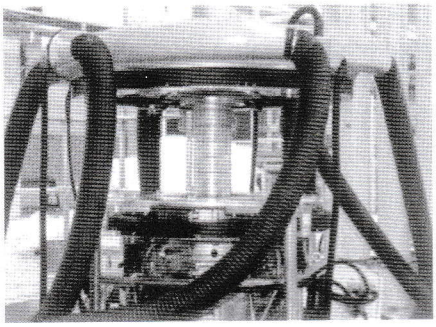
Kortec has branched out from its multilayer, barrier polyethylene terephthalate (PET) preform business to extend its coinjection technology to new markets, most recently thin-wall containers. In terms of the benefits of its latest offering, Kortec says multilayer caps, when used in conjunction with multilayer containers, extend the protection of product freshness across the entire package. Kortec also points out that packaging manufacturers can now look at Kortec as a single-source supplier that can provide the know-how and technology for an entire barrier package.

Kortec, Ipswich, MA, USA, www.kortec.com

EXTRUSION

New blown film lines use a single air ring

New from this company, formed last summer through the fusion of Kiefel Extrusion and Reifenhäuser's blown film division, is a cooling concept for blown film extrusion lines based on a cooling ring that can be adjusted in height. The "counter cooling process" used for this air ring design means that the cooling



New cooling concept for blown film extrusion lines.

air is not only conveyed upward to the air lips, as is the case in conventional air rings, but also downward to an additional air exit. As a result, only one air ring is needed to achieve stabilization of the film bubble.

The manufacturer says the end result includes not only higher output but—depending on the film structure—also improved film with regard to properties such as transparency, gloss, and strength.

In related news, Reifenhäuser has completed its move to a new 10,000-ft^2 North American headquarters in Danvers, MA, closing its previous office in Ipswich, MA, as well as newly acquired Kiefel Inc.'s Hampton, NH site. All but one Kiefel employee was transferred to the new building, which was renovated to accommodate the company. Kiefel Technologies, the thermoforming division still held by Brückner, remains in Hampton.

Reifenhäuser Kiefel Extrusion, Worms, Germany; www.reifenhauser-kiefel.com

FORTHCOMING IMPORTANT NATIONAL AND INTERNATIONAL EXHIBITIONS AND CONFERENCES

1ST POLYMERUPDATE GLOBAL PETROCHEMICAL CONFERENCE will be held at Mumbai from August 19 – 20, 2010. For further details contact: Mr. Vivek Pareek, Marketing Manager, Polymerupdate, 344, Level 3, A-Z Industrial Estate, Nr. Peninsula Corporate Park, Lower Parel, Mumbai 400013: Tel: +91-022-30408821-25; Fax: +91-22-30408826; Email vivek.mktg@polymerupdate,com; web: www.polymerupdate.com

PLASTEC MIDWEST – September 28 – 30, 2010 at Donald E Stephens Convention Centre. For details contact : Canon Communications, Los Angeles, USA. Tel: 310-996-9454, 310-4-454200; Fax: 310-4-454299; E-mail: plminfo@cancom.com

K – 2010 – October 27 – November 03, 2010 at Dusseldorf Exhibition Centre, Germany. For details contact : Tel: Messe Dusseldorf GmbH, Messeplatz, Germany. Tel: (49)-(211) 4560900/4560175; Fax: 4560668/4560740, E-mail: k-online@messe-dusseldorf.de; Website: www.k-online.de

Industry down, clearly, but plastics' long-term future still bright

By Matt Defosse

Held in Frankfurt, Germany in mid-September, the IAA (Internationale Automobil-Ausstellung) remains the world's largest car show, but this year's version showed the signs of the prevailing market conditions.

Almost 30% fewer exhibitors booked space, with some leading brands—Honda, Mitsubishi, and Nissan—passing on the event. Compared to the previous show in 2007, this year's also was tellingly absent of many top Tier One and Two suppliers. The ones who did exhibit were not shy to say that their presence proved their support of the industry, naturally, and despite the sales slowdown, it remains a mammoth market. Many at the event commented that in fact sales in Asia and India hit a minor bump in late 2008 but just kept going. In Europe and North America, car demand may turn worse in 2010 as the artificial impetus of various "cash for clunkers" programs runs its course.

Electric vehicles drew film crews' attention. Will they make it off the reels and onto the roads?

In 2007 the mega-trend at the IAA was reduced carbon dioxide emissions, at the time very much under the microscope as then-pending European Union regulations (since watered down) were expected to force drastically improved gas mileage requirements on carmakers. With green carpeting, wallpaper, and mood lighting the prevailing shade at the 2009 IAA, there was no overseeing the "environmentally responsible" marketing movement at many exhibitors' booths, punctuated by the display of more alternative-energy vehicles than likely are actually on the road in Frankfurt.

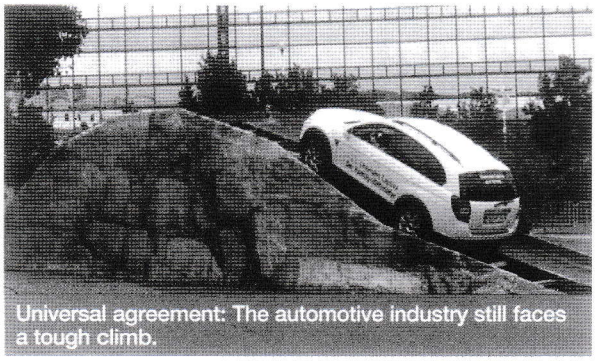
For plastics processors, alternative energy for car propulsion could eventually prove a bonanza, opined experts at two plastics suppliers, Rhodia and Lanxess, competitors in the polyamide market. At Rhodia (Lyon, France), Jean-Claud Steinmetz, VP automotive/transportation for nylon (PA6 and PA66), predicted that hybrid gas/electric engines would be good for his company and its processing customers, as the smaller gas engines in these often run at higher temperatures and with a turbocharger, prompting the need for high-heat-stable plastics.


Johnson Controls' instrument cluster for the BMW 5er series.

Jürgen Selig, application development manager, transportation, for semicrystalline materials at Lanxess's R&D facility in Dormagen, Germany, sees opportunity on the battery-powered side of the engine as well. The company is cing on a molded ybrid plastic/metal development for a circa 70-kg battery, he said, with the plastics key to parts integration. He also expects the surge of interest in electric cars to develop into proving grounds for flame-retardant thermoplastics. "Not much can go wrong with a 12V battery, but with the powerful ones being developed, flame retardancy will be critical," he noted.

Lanxess continues to see application potential for hybrid plastic/metal structures, a field it helped develop. In 2008, said Selig, 78 different cars were fitted with hybrid front ends molded with the supplier's Durethan polyamide. Newly designed versions using PA with 60% glass-fiber reinforcement, double that on most now commercial, will reduce the front end's weight by almost 40%, he said. He says such hybrid moldings also are finding their way into other parts of the car, notably door panels and dashboards. "In about 2011 there will be commercial applications of both of these," he said.

In a car's fuel tank and fuel transport system, Steinmetz sees a potential growth area for PA, especially for small city cars, hybrid vehicles, or those running ethanol or other bio-fuels. Polyamide from Rhodia is already being blowmolded for

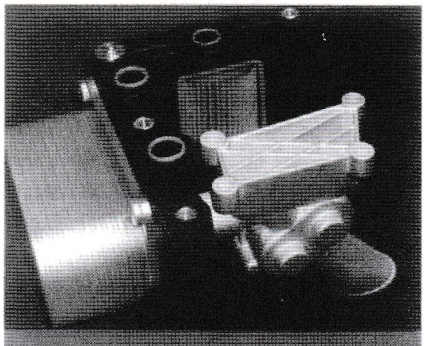

Universal agreement: The automotive industry still faces a tough climb.

single-layer motorcycle fuel tanks, and he said ongoing tests "look promising" for PA's use in monolayer tanks for cars running bio-fuel. Smaller cars could be made much lighter if fuel tanks carried only 40 liters (about 10.6 gal) of gas, he said, and at that size a monolayer blowmolding may make more economic sense and be just as efficient in combating emissions as the multilayer PE/EVOH tanks currently used.

Oil filter modules learning new tricks

Tier One supplier Mann+Hummel (Ludwigsburg, Germany) commercially introduced the first plastic modules some five years ago, and since then these PA moldings have made significant inroads into what was once exclusively a stamped aluminum application. The first of what the tier supplier is calling its second generation of oil filter modules is already being installed commercially on BMW's new six-cylinder inline diesel engines, molded with PA66 with 35% glass-fiber reinforcement.

A prototype of this second generation of thermoplastic oil filter modules was displayed at M+H's stand at the IAA and included an integrated oil filter housing and filter, an oil pump integrated into the molding, and a newly developed filter with an anti-drain membrane that can reduce the anti-drain pressure by a factor of 10, thus increasing the efficiency of the oil pump, according to Pius Trautmann, director of fluid filter development.


Mann+Hummel's second-generation oil filter module will integrate more components.

Rhodia's Steinmetz said the first oil pans using his company's PA66 are entering commercial use on Mercedes' new 2.2-liter diesel sedans. "Every OEM is looking at plastic oil pans," he noted. One of the few tier suppliers exhibiting, ElringKlinger (Dettingen, Germany), displayed some of the PA oil pans it has developed next to the firm's more established aluminum ones.

The most formidable tier supplier stand belonged to Johnson Controls, where officials also shared that the company expects to at least break even for the year. In what the Tier One supplier says is a world novelty, it is negatively thermoforming 3D instrument cluster panels for BMW using a black sheet it developed that allows warning lights and other displays to brightly shine through it, with no sign of distortion and no need for a secondary anti-reflective coating. The parts also show no sign of polarization at their sharp edges.

Patrick Nebout, director of product management and strategic planning for Johnson Controls' Global Driver Information unit, told **MPW** that by placing the film face down in the tool, the texture of the tool gives the film's surface an embossed structure that eliminates the need to add an anti-reflective coating to the surface of the cluster. The result is an instrument cluster with much sharper resolution.

He also said the company has optimized its thermoforming so as to reduce the reflection/interference known as Newton's rings at the sharp thermoformed edges between the flat printed analog speedometer and tachometer, and the surrounding digital information display.

The company showed off a broad range of instrument clusters, most of them drawing attention to the individual "looks" it can achieve on injection molded decorative rings that could be added to, for example, the speedometer to give it a carbon-fiber-printed surface appearance or a chrome appearance. "This lets our customers differentiate their brands without a big investment," explained Nebout. Also on display were some prototypes revealing how the instrument cluster of the future might appear, with a TFT (thin film transistor) display integrated into the speedometer and tachometer so that a driver would see not only speed or RPMs but also entertainment system information, navigational advice, and more.


Rhodia's Jean-Claud Steinmetz (top) and Hubert Ruck, OEM global account manager: Still plenty of opportunity for PA.

Johnson Controls has been actively processing natural-fiber-reinforced plastics for more than 50 years, but took this experience to the next level with a concept car it displayed at the IAA on which almost all of the visible interior surfaces were processed from these materials. The look was actually quite attractive, a clear step down the value chain from real wood surfaces, but nonetheless as attractive or more so than standard polypropylene and ABS interior components. The company's PP Thin Film, a cast multilayer structure, is used to protect the natural-fiber-reinforced surfaces from scratching and from fading/discloration caused by the sun's rays.

It seems likely, based on these and other discussions, that plastics processors still have many opportunities in the automotive market, and that car OEMs' own financial travails could create opportunities for those processors with the financial and technical wherewithal to be chosen for these forward-looking projects.

Bioplastics on the uptrend

In four years, Asia will lead the bioplastics sector with PLA to dominate the scene. Already, improvements are being made to PLA grades and companies are trying out non-food crops as feedstocks for bioplastics.

In its latest report, market research firm *Freedonia* says that the Asia Pacific region will be the growth driver of the bioplastics (resins that are biodegradable or derived from plant-based sources) market in 2013. By then, the Asian market will have a 39.1% annual growth rate, with strong growth coming from Japan, compared to 27.2% in North America, 30.8% in Western Europe and the global average of 35.1%. In 2008, Western Europe was the largest market for bioplastics accounting for 40% of the world demand.

The worldwide demand will increase to 900,000 tonnes in 2013 or US$2.6 billion. The growth will be fuelled by the rising costs of crude oil and natural gas, with consumer demand for more environmentally friendly products playing a secondary role in driving demand. The report also says that biodegradable plastics such as PLA currently account for nearly 90% of bioplastics. While new applications and innovations in the automotive and electronics industries are helping fuel the boom, consumer packaging still garners the most attention.

Meanwhile, US-based manufacturer of bio-based plastics *Cereplast* expects the US bioplastics market to top US$10 billion in sales by 2020. As of 2007, the US bioplastics market accounted for approximately US$1 billion in sales. Some estimates point to bioplastics capturing up to 30% of the total plastics market within ten years. New green initiatives by the Obama administration and increasing consumer demand for compostable and renewable plastics are pushing the market, says the company.

Innovations on the PLA front

Futerro, a 50:50 joint venture established in 2007 by *Galactic* and *Total Petrochemicals*, has started up a pilot plant for PLA in Escanaffles, Belgium. The demonstration unit is at *Galactic*'s facility. The latter is a supplier of lactic acid and lactates that also has facilities in China and the US.

The technology entails first preparing the monomer – the lactide – and its purification from lactic acid, as part of the fermentation of sugar from beet. The second part is the polymerisation of the monomer to produce biodegradable plastics of vegetable origin.

With a capacity of 1,500 tonnes/year, the unit will be used to test and improve the successive steps in this process during an internal evaluation, which is expected to last around six months. By that time, *Futerro* will be able to offer a full range of products made from lactic acid, including lactide, oligomers and PLA polymers for the food packaging market. Lactic acid can be extracted from other plants, including cane, maize (corn) and wheat. Renewable resources like biomass (forest waste) are also envisaged in the future.

In related news, emerging UK biopolymers company *Plaxica* has expanded its investor base and raised £1 million in funding to develop PLA. *Plaxica* has sought out funding from its current investor *Imperial Innovations Group* and new investors like *Carbon Trust Investments* and the *National Endowment for Science, Technology and the Arts* (*NESTA*).

Plaxica is working on producing variants of PLA that are stronger, more flexible and with better heat and hydrolysis resistance and barrier properties than the current PLAs. It is also looking at reducing energy input in the process and reducing production costs so that PLA can compete with mass volume oil-based plastics.

In other news, since the current common technique for producing PLA involves an expensive and complex two-step process, involving bacterial fermentation and then chemical polymerisation, companies are working on improving the method. A collaboration between *Korea Advanced Institute of Science and Technology* or *KAIST University* and *LG Chem* in South Korea, led by Professor Sang Yup Lee, has developed a new process for producing PLA. It is based on a one-step direct fermentation utilising the common bacteria component E. coli. If the process is successfully commercialised, it is expected to reduce production costs drastically.

Seeking out non-food crops

Though making bioplastics from food crops may be good for the environment, it is not a viable solution in the long term especially in the event of rising food prices. It is for this reason that industry majors are looking at using non-food crops as feedstocks for bioplastics.

One such company is *Cereplast* that has developed a technology to transform algae into bioplastics. It intends to launch, in the coming months, a new family of algae-based resins that will complement its existing line of Compostables and Hybrid resins.

Cereplast says the algae-based resins could replace 50% or more of the petroleum content used in traditional resins. Currently, *Cereplast* is using renewable materials such as starches from corn, tapioca, wheat and potatoes and Ingeo PLA.

"Based on our own efforts, as well as recent commitments by major players in the algae field, we believe that algae has the potential to become one of the most important green feedstocks for biofuels as well as bioplastics," stated the company's Chairman Frederic Scheer. He also said that for the algae-based resins to be successful, the production of substantial quantities of algae feedstock is required.

According to Scheer, big players have entered the algae production business, such as *ExxonMobil* that has invested US$600 million in algae producer *Synthetic Genomics* and *BP* that has invested US$10 million in *Martek Biosciences*.

Algae from a typical photo-bioreactor is harvested daily and may be treated as biomass, which can be used as biofuel or as a raw material source for biopolymer feedstock. The company is also in direct communication with potential chemical conversion companies that could convert the algae biomass into viable monomers for further conversion into potential biopolymers. "Algae as a biomass makes sense in that it helps close the loop on polluting gases and can be a significant renewable resource," added Scheer.

Another US company *Metabolix* has completed tests using genetically engineered tobacco to produce polyhydroxyalkanoate (PHA) bio-based polymers. *Metabolix* obtained the necessary permits from the *US Department of Agriculture Animal Plant Health Inspection Service* (*APHIS*) to perform an open field trial in March this year and field trial experiments were completed in early October.

The trial was performed on 0.8 acres of land and provided valuable data and information relating to polymer production, with the best plants producing 3-5% PHA. This furthers the development of *Metabolix* crop technologies for the co-production of bio-based plastics in non-food bio-energy crops.

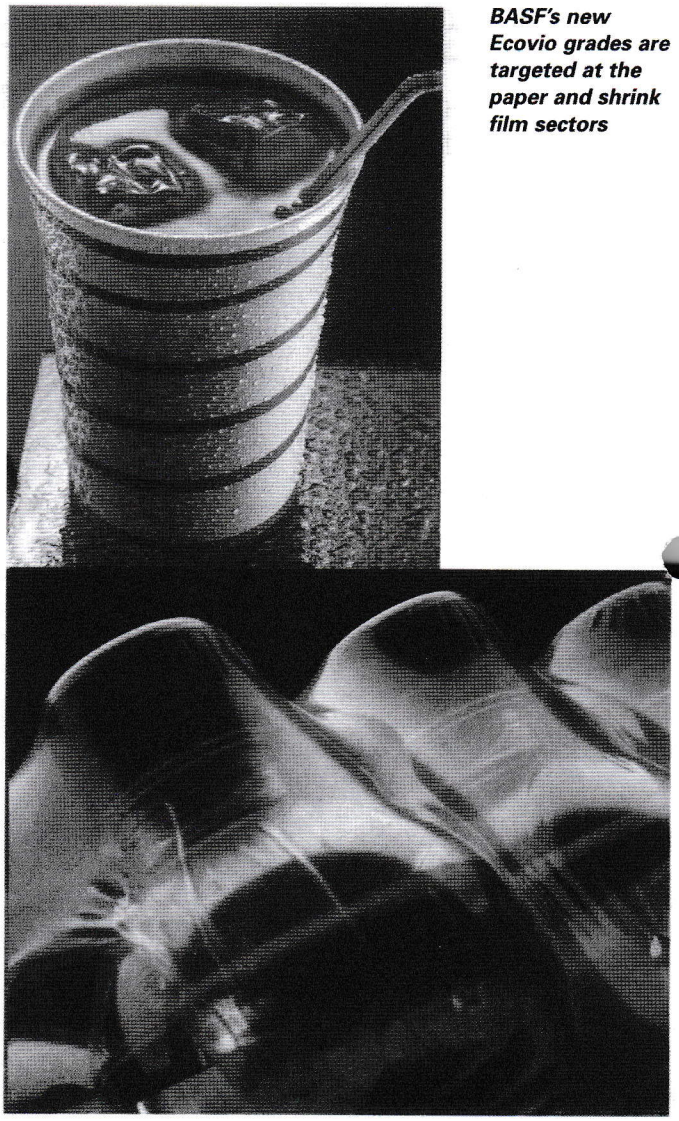
Dr Oliver Peoples, Chief Scientific Officer of *Metabolix*, commented, "The experience and knowledge we have gained during our tobacco field trial is laying the groundwork for planning and permitting activities for field trials in bioengineered, non-food oilseed and biomass crops producing PHA. We believe that our crop programmes offer a number of commercialisation options and hold significant potential."

However, tobacco is not the only plant *Metabolix* has tested. Last year, it tested switchgrass, resulting in 3.72% dry weight bioplastic in the leaves and 1.23% dry weight in the switchgrass plant as a whole.

But genetic engineering itself is surrounded by a high level of controversy. However, *Metabolix* says the technology has been used to successfully produce life-saving medicines such as insulin and cancer therapies. Plus, it also says that there are standard validated protocols recognised as safe in genetic engineering, similar to other new technologies.

More join the foray

German chemicals company *BASF* has expanded its biodegradable Ecovio range to include Ecovio FS. Two new grades of the material, which consists of petrochemical-based polyester Ecoflex and PLA, are targeted at the coating paper and shrink film sectors. Sample material is already available and the company says that initial production tests at customers' facilities have been successful. Introduction into the market is scheduled for the first quarter of 2010.



BASF's new Ecovio grades are targeted at the paper and shrink film sectors

"The use of the new Ecoflex FS raises the proportion of bio-based material in Ecovio FS Shrink Film to 66% and that of Ecovio FS Paper to a full 75%," explains Jürgen Keck, who heads *BASF*'s global business with biodegradable plastics.

The resin for shrink film has a selected ratio of shrinkage to strength so that its mechanical load capacity at a film thickness of 25 micrometers is greater than that of a conventional PE film that is 50 micrometers thick.

Over in France, chemicals company *Arkema* has extended its range of Pebax thermoplastic elastomers with a grade made entirely from renewable resources. The Pebax Rnew100 is made by combining a bio-sourced polyol with castor oil chemistry. Benefits are its light weight, resistance to heat, UV ageing and flexural and tensile stress, says the company. The new resin is designed for use in the automotive, electronics and sports equipment sectors. Other grades in the Pebax range have a bio-material content of between 20 to 95%.

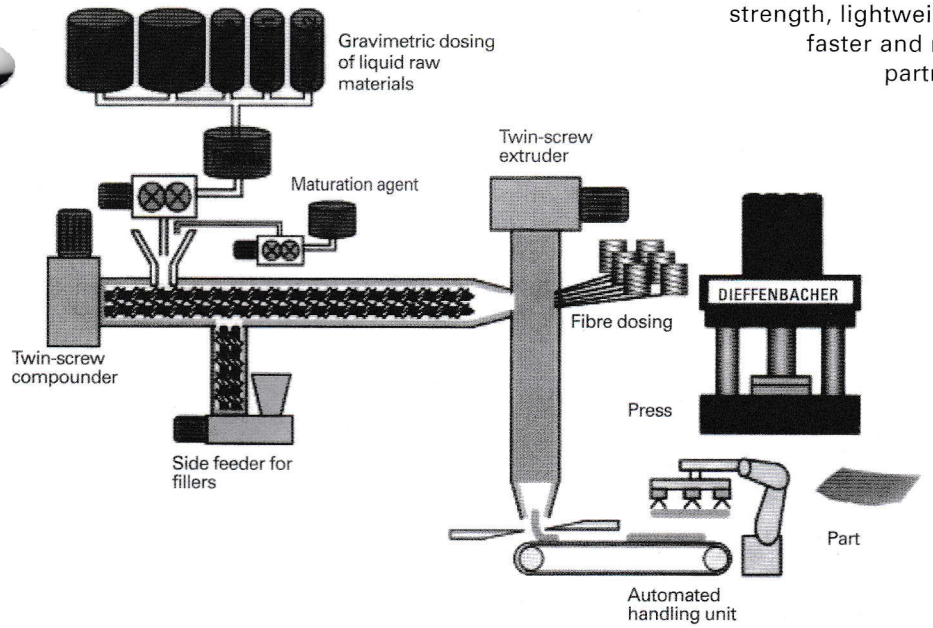
Thermoset technology breakthrough

Resin producer DSM Composite Resins, machinery supplier Dieffenbacher and industrial research institute Fraunhofer ICT have combined their efforts in a direct compounding technology that extends thermoset composites to high volume, complex and large parts production.

The new direct compounding technology – from raw materials to composites and parts – is reported to have extended the production of thermoset composites into high volume, complex and large parts. It also opens up new market opportunities for composite applications that are not feasible with the current thermoset processing technologies.

This technology, which entails both a new compounding process and new raw material developments, is the result of many years of R&D in direct compounding technology. The strategic partners include *Dieffenbacher*, a manufacturer of plant and machinery for forming fibre-reinforced plastics, *Fraunhofer ICT*, the Germany-based industrial research institute, and *DSM Composite Resins*, the European producer of structural resins.

For the new technology *DSM Composite Resins* has contributed resin formulation expertise and know-how including the development of a dedicated technology-enabling product portfolio of non-thickening resins. *Dieffenbacher* has developed the hardware systems and expertise and *ICT* has provided dedicated R&D and commercial-scale pilot processing capabilities.



The new thermoset process

Large part manufacture

The new direct compounding technology is designed for the production of large structural parts and is set to open up new application opportunities for lightweight thermoset composites, replacing conventional metal materials such as aluminium and steel. It is particularly suited for the production of geometrically complex large parts greater than 3 sq m and in high volumes of approximately 700,000 units/year.

The new technology can also produce moulded thermoset compound materials in a continuous and flexible extrusion process. Key features include a computerised dosing system yielding better quality consistency and reproducible fibre impregnation, say the companies. The process results in shorter cycle times through just-in-time production and eliminates a range of incremental steps in between, such as paste mixing, thickening and storage compared to conventional thermoset compounding processes, saving time and making part manufacturing more economical.

The technology is expected to open up new application areas in key markets like the automotive industry but also energy or building and infrastructure, producing high strength, lightweight and complex parts in high volumes faster and more economically than before, say the partners.

According to Heinrich Ernst, Director of the Composites Division of *Dieffenbacher*, the new technology was previewed at the JEC show earlier this year and was officially launched at the Composites Europe show recently. "It is a revolutionary technology that will create enhanced value and new opportunities for the composite manufacturing industry and we are highly confident about its potential," he said.

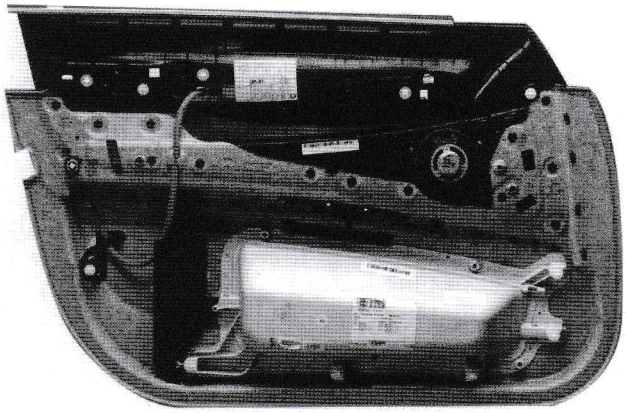
The three partners are now preparing the first production line that is planned to be operational in the second quarter of 2010. ◆

Sustainability drives sector

The Automotive Division of the Society of Plastics Engineers (SPE) 2009 awards in the US had a number of nominations from materials companies highlighting the use of environmentally friendly materials. This mirrors the industry's stand to create far more "greener" cars, which are lightweight and also have a lower carbon footprint.

Opening the door to "green" composites

One of the winner's in the Materials category was *BASF*'s Acrodur thermosetting acrylic copolymer. Acrodur is a new class of resin that has been used to form a highly loaded, natural-fibre prepreg material. This was compression moulded into a lower door inner panel by *Dräxlmaier Group* for *BMW*'s 7 Series luxury sedan.



This door panel is made from BASF's acrylic copolymer with a high loading of natural fibre

The composite material comprises 70% natural fibres (jute, kenaf and hemp) and 30% Acrodur. The resin matrix is a unique acrylic polymer that is initially thermoplastic, allowing for the production of prepreg/ semi-finished roll stock or blanks and then crosslinking at temperatures above 120°C to produce the thermoset material.

The resin's high wet-out of natural fibres and the ability to form chemical as well as mechanical bonds to the reinforcement allows for the production of composites with high fibre loadings, yielding lightweight parts with high stiffness in thin walls. The resulting panel saves 20% in weight and costs, thereby reducing VOC emissions. Furthermore, its rapidly renewable natural fibre mat reduces the vehicle's carbon footprint without sacrificing performance, says the material supplier.

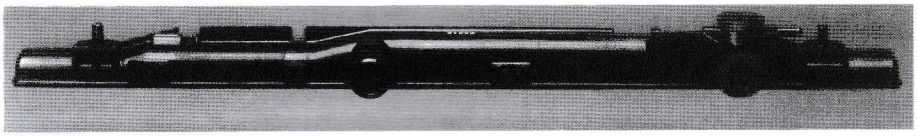
First use of materials

A number of materials, made from renewable resources, had their first use in the automotive sector.

A winning entry in the competition was the nylon radiator end tank that has been fitted in *Toyota Motors*'s 2010 Camry sedan model. This is also the first commercial use of *DuPont*'s Zytel RS, a nylon with 40% of its content made from renewable resources – in this case, oil from castor bean plants. The tank was moulded by *Denso* that also made the tooling. *DuPont* says that this is the first use of its renewably sourced resin in a chemically aggressive and mechanically demanding application. The resin is now being used on radiator tanks for Camry models made in Japan and *Toyota* will soon use it for cars manufactured in Russia, India and China.

In related news, *Nissan Motor*'s Infiniti QX56 crossover vehicle is fitted with a fender flare made from a post-consumer recycled resin, which is the first exterior use of the resin. The Xenoy iQ1103 PC/PBT compound that is supplied by *Sabic Innovative Plastics* consists of PBT that is sourced from depolymerised PET water bottles that have been repolymerised and compounded into the resin. The company says that the use of the resin in one car means that 200 water bottles are diverted from landfills and reduces carbon dioxide emissions by 80%, compared to using virgin PBT.

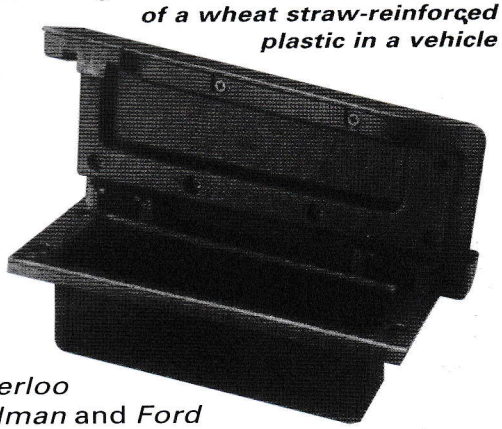
Post-consumer recycled PET is also the ingredient of tufted PET carpeting, which has been used for the first time in an automotive application. Supplied by Australian automotive interior solutions manufacturer *Futuris Automotive Interiors*, the carpeting is used in *GM Holden*'s 2010 VE Commodore sedan model. Though the carpet contains 20-80% post-consumer recycled content, there is an option to use 100% recycled PET. Besides its sustainable feature, the company claims that the tufted carpet exceeds or meets all major OEM carpet specifications and is 12-15% less expensive than traditional tufted nylon.



This radiator end tank is the first use of DuPont's renewably-sourced nylon in a chemically aggressive application

The lower bumper fascia/air dam of *Ford Motor*'s F250-450 pick-up trucks is also the industry's first to be made from post-consumer recycled resin, which is a TPO supplied by *KW Plastics*. The American company, which was formed in 1981 to reclaim and recycle PP used in automotive battery casings, claims it is the world's largest producer of custom-engineered, recycled PP copolymer resins. The moulded-in-colour bumper is colour matched in two shades. The base resin is derived from recycled battery casings, including those from hybrid electric vehicles and bottles.

Another novel use of a material comes from *Schulman*'s wheat-filled PP that has been applied in *Ford Motor*'s 2010 Flex crossover vehicle and was a finalist in the environmental innovation category of the competition. The AgriPlas wheat straw fibre bio-filler is a PP-based additive and has been used to injection mould the storage bin and inner lid in the car. The company says AgriPlas not only offers increased dimensional stability, than unfilled resin, but is also more sustainable than talc-filled PP and results in 10% weight savings and a lower carbon footprint. The system supplier *International Automotive Components* and the *University of Waterloo* in Ontario, Canada, worked with *Schulman* and *Ford* on the project, which is the first industrial application of a wheat straw-reinforced plastic.



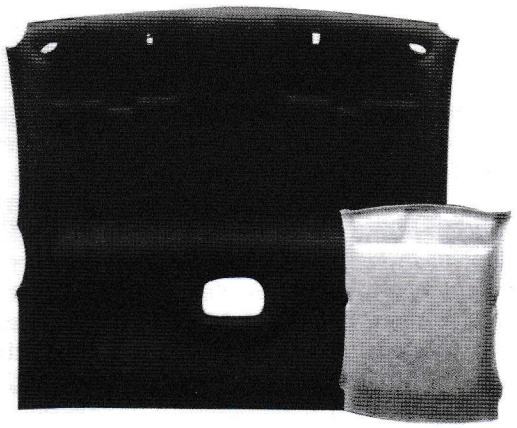
The storage bin is the first industrial use of a wheat straw-reinforced plastic in a vehicle

Environment takes precedence

Other novelties that were nominated in the competition included the door trim of *Ford Motor*'s Lincoln car. The ABS door trim substrates for this vehicle use 100% post-industrial scrap. No virgin resin is used in this application that is deemed to save US$4 per vehicle and required a specification change, since the previous part only allowed 20% regrind content.

Meanwhile, the HDPE tailgate liner of *Ford Motor*'s F150-450 pick-up truck is made from a recycled HDPE and a thin anti-static/anti-slip layer, to dissipate static electricity in the event of container refuelling on the tailgate. The thicker HDPE layer was sourced from post-consumer recycled bottle scrap.

A finalist in the body interior category was the headliner in *Ford Motor*'s Escape, Edge and Lincoln models that has been made from foam based on soy-based polyols, which is supplied by *Cargill*. The Bioh soy-based PU is used to manufacture an open-cell acoustic foam with lightweight properties. The headliner also features permeable thermoplastic adhesives and felt fabrics, resulting in improved noise, vibration and harshness performance and lower weight. ◆



Soy-based polyol from Cargill is the basis of this PU foam in the headliner

Proactive maintenance reduces downtime and costs

This article by Joyce Guo, Marketing Manager of Henkel Loctite Asia Pacific, points out that the key to preventing failures and reducing maintenance costs is to implement proactive maintenance processes instead of relying on traditional reactive processes.

In the manufacturing industry, maintenance typically contributes to more than 25% of the total cost of finished goods. Just a 2% reduction in costs can equate to a 7.5% gain in sales. Recent studies have shown that the majority of unplanned downtime is caused by mechanical assembly failure. Equipment analysis shows the following as the top reasons for equipment repair: fastener loosening, key wallow, PTFE tape fouling control valves, fitting leakage and spun bearings. But there is a proactive solution to prevent these from happening – proactive maintenance practices taught in Loctite maintenance reliability workshops.

These workshops teach a series of practices that provide maintenance personnel with ways to increase the reliability of mechanical assemblies and minimise maintenance costs. This process begins with formalised "hands-on" training and the maintenance personnel transfer skills and knowledge they have learned in the classroom to the plant floor. The training objective is to promote a shift from reactive maintenance methods, techniques and procedures. This new approach should become integrated into the daily work routine. After going through the proactive maintenance training, employees will begin to question the status quo, asking questions like, "How can we change this in order to operate better?" Success is achieved as they look for more proactive ways to solve problems.

A good example of the success of proactive maintenance workshops involves a major lumber and plywood manufacturer. Like in a lot of plants, a leading cause of unscheduled downtime related to mechanical failures was typically due to fastener loosening. This lumber manufacturer was experiencing these "tap root" cause failures with their limit switch arms. Limit switches translate motion into switch actuation. The maintenance department found the screws were loosening in the arms, which allowed them to fall out or become misaligned. A maintenance person was assigned to tighten all the screws. This task took about 5-10 minutes per occurrence with two occurrences per shift. Each time the task was completed, the equipment was "tagged out," tightened and brought back on line. In one year, it was found that over 91 hours had been spent on labour and downtime.

The company implemented a proactive maintenance process as a response to the labour and downtime problem. In just two months, the maintenance personnel identified 29 "tap root" (mechanical assemblies) that caused failures. If left uncorrected, these failures would have cost the company over US$53,000. The corrective actions that they learned in the formalised training portion of the process were submitted during the maintenance reliability workshop. Management approved the ideas, they were implemented and the failures ceased.

The workshop also provided product suggestions to employees to stop the screws from loosening proactively. Based on what they had learned in the workshop, the maintenance personnel of this manufacturer chose the appropriate threadlocker to remedy their limit switch situation. The threadlocker unitised the screws within the assembly and prevented them from loosening. Since implementing this technique and product, the manufacturer had forecasted that in one year it would prevent 91 hours of downtime and labour costs. This translated into a saving on maintenance costs of over US$57,000.

Solving air leaks

Air leaks are another one of the biggest contributors to needless costs in any facility. A leak is more than a minor inconvenience. It is a costly drain on overall operating costs. A single leak in a plant's air line can siphon off as much as US$8,286 every year. This hole looses 35.73 cu m/minute (cmm) of air at a line pressure of 100 psi. Figures similar to this are why an automotive components manufacturer looked to a proactive maintenance workshop for ways to decrease costs associated with air leakage.

In a Loctite stop leaks programme, state-of-the-art ultrasonic equipment is used to identify air leaks. Every identifiable leak, including fittings, valves, flanges and hoses are tagged with a number, its location, severity and cost. From this, total estimated savings are generated within a corresponding report. The report provides a detailed format for a targeted approach and allows monitoring of progress by cmm and dollars saved. Additionally, workshop information is incorporated to provide maintenance personnel with techniques and recommended chemical tools to overcome future leaks. Employees transfer skills and knowledge gained in the "hands-on" training from the classroom to the plant floor. The training objective is to promote a shift away from reactive to proactive maintenance practices.

The maintenance team of this automotive component manufacturer was trained to remedy the fittings and avoid the problem from reoccuring. This saved the company over US$37,000 in air leaks per year.

Give maintenance mechanics the know-how

Oil leaks are the biggest contributor to needless costs in any facility. A one-drop oil leak every 10 seconds produces 153 l of fluid per year that must be recycled or disposed of. Multiply this number by several leaks in the facility and it does not take long to realise that hundreds of thousands of litres of oil are lost every year. Disposal costs can range from US$500 to $1,000 per 208 l drum. In addition, safety hazards exist when oil leaks on to the shop floor.

A Midwestern paper mill that processes round wood operates four large log handlers in their yard that were prone to oil leakage. The mechanic in charge found he was spending a substantial amount of time cleaning the oil and caked-on dirt from the vehicles before starting the actual maintenance work. Because the vehicles couldn't be shut down for long periods of time, this cleaning was taking time away from the normal preventive and proactive maintenance he was supposed to be doing.

The mechanic started using a liquid anaerobic thread sealant on a proactive basis from what he learned in several modules of the maintenance reliability workshop programme. Every time there was a broken fitting or flange surface on one of the vehicles, he would reassemble it using an anaerobic sealant. This stopped the oil leakage so that the vehicles remained dry and yard dirt dust did not cling onto the equipment. The mechanic found it was becoming less necessary to clean the vehicles prior to working on it.

"Now I can truly do long-term, preventive maintenance on these vehicles rather than wash them and fix leaks all the time," said the mechanic. The vehicles have higher productivity and maintenance is done more effectively. In addition, the mill management is happy because they no longer have to be concerned about safety and environmental problems due to oil in the yard.

Here is another story told by Brian Elliot, the Maintenance Manager of *BFGoodrich Tire Manufacturing* about one of their breakdowns: "We had a pump that recycled soap mix back to the machine tank that stopped working. We took the pump apart and found the key and keyway worn and needed to be replaced. We had no spares and to rebuild the pump would have taken three days. The machine cannot function without this pump. My mechanic suggested taking the key and using Loctite to temporarily fix it. We did the job and the pump worked until we were able to get a replacement pump on site (one week). We took the pump apart later and the Loctite was still holding the key in. It costs about US$55 a minute to have this machine down."◆

WELCOME TO NEW MEMBERS OF THE FEDERATION

The following New Membership has been accepted by the Federation at its Executive Committee Meeting on 14th May 2010 :

1.	M/s S. K. Plastocrats & Engineers Pvt. Ltd., Kolkata,	–	Life Manufacturer member
2.	M/s Dhanbad Fuels Limited, Kolkata,	–	Life Manufacturer member
3.	M/s Ashay Marketing Pvt. Ltd., Kolkata,	–	Life Manufacturer member
4.	M/s Ganpat Industries, Bilaspur,	–	Manufacturer member
5.	M/s Arunil Commerce Pvt. Ltd., Kolkata,	–	Manufacturer member
6.	M/s Bharat Plastic Works, Kollkata,	–	Manufacturer member
7.	M/s Everest Polyfillers Pvt. Ltd., Kolkata,	–	Manufacturer member
8.	M/s Plastomech, Howrah,	–	Manufacturer member
9.	M/s Sinha Multilevel Mktg. Pvt. Ltd., Howrah,	–	Manufacturer member
10.	M/s Molex Mafatlal Micron (P) Ltd., Gandhinagar,	–	Manufacturer member
11.	M/s Fortius Impex (P) Ltd., Kolkata,	–	Life Dealer member
12.	M/s Sols 4 All Consultants, Kolkata,	–	Life Dealer member
13.	M/s Raghav Agro Products Pvt. Ltd., Kolkata,	–	Dealer member
14.	M/s Prem Chemicals, Kolkata,	–	Dealer member
15.	M/s Abhayam Trading Co., Kolkata,	–	Dealer member
16.	M/s Motors & Controls, Kolkata,	–	Distributor member

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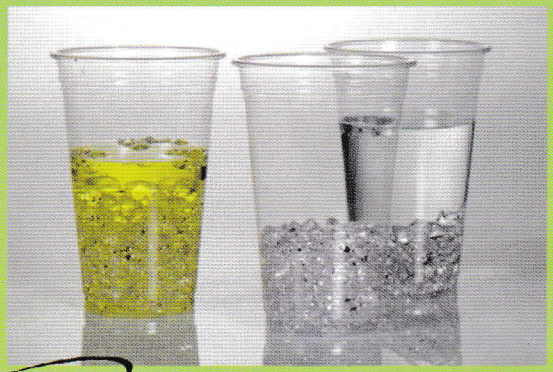

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