



GLOBAL PLASTICS LETTER

DEC. 1999

Dear Colleague:

Since this is our last issue of the century and millenium, we will look ahead not backwards.

We see a robust economy in 2000 with a 5-6% increase in GDP. This, when coupled with a 3-4% inflation factor continues to drive the economic engine that we have ridden during the last decade of the 20th century.

Look for a couple of quarter-point rate hikes by the Fed - first by spring, second by early summer. Also crude oil should stabilize at \$29/barrel, auguring a slowdown in plastic price inflation estimated at 9% for 2000.

Speaking of 2000 - will Y2K computer glitches cause widespread economic disruption? No, but make sure your computer staff is on hand this Jan 1 weekend. Figure on small bugs in billing.

Pricing forecasts: We expect continuing increases in PP, PVC, MMA. Why?

Acrylic acid has been in short supply and planned capacity expansions will take a year to catch up affecting MMA. Similarly supply-demand ratios will drive continued PP and PVC and ABS pricing upticks, in that order. Strong naptha prices in Japan will drive this. See CHEMICAL WEEK Price Commentary for early warnings on all resins.

TRENDS: The Y2K buzzword has been replaced! Our next focus - INTERNET/ E-COMMERCE! This is moving so fast that by the time you read this (approximately 10 days from word processor to your desk) the business model may have changed. WEBSITE or wither!

Watch the following: e-chemicals.com; chemconnect.com; dow.com. All of these B2B sites represent mfr-user channels - where is the distributor? But wait - this trend just changed. No longer direct selling - now it's auctions and buyer sets the price - look at freemarkets.com. -sellers bid to undercut each others' prices, until the buyer sees the desired terms. Now in resin - how soon in sheet, rod, tube, film? 2Q 2000 we predict.

Consider this : The plastics distributor of the future (year 2000 and beyond) will primarily provide: cut-to-size -and the means to deliver the product to the local customer(logistics). No longer will the traditional warehousing function be required by the manufacturer.

Another giant merger, :this time in PP and PE. BASF and SHELL combine their polyolefins business, creating the No.1 PP producer and No.4 in PE , on a world wide basis. This combines the Montell, Targor, Elenac units of both companies. Headquarters will be in the Netherlands. Watch for continued price increases in these resins -and thus sheet in 3Q 2000, as competition is once more pared.

New products continue to proliferate. Eastman announces a new family of transparent copolyester called PCT ; trademarked DuraStar. Improved chemical resistance places these semi-crystalline polymers closer to PC. Speaking of PC, pressure to increase prices due to high demand

for the resin in DVD's, continues. Copolyester sheet sales will continue to grow at double digit rates. Check out Eastman's Provista, copolymer used in extruded shapes.

On the European front, Ford announces the first thermoplastic-bodied electric vehicle, named *Think*. It will be built at its plant in Norway and distributed and serviced by Ford's Hertz subsidiary. (More on this subject in *Industry Interviews* on page 4). European distributor news - Plastics Plus Ltd, with two locations in the UK, is specializing in transparent materials such as MMA, PETG, PC for the POP and POS markets. A trend to watch as distributors begin to specialize in a sub-group of products rather than a market basket. Watch for our May 2000 Special European issue featuring: New sources of supply, K2001 preview, and marketing and pricing trends originating in Europe.

New Product News: Atoglas Div. Of Elf Atochem announces Plexiglas Frosted which is an impact modified acrylic containing tiny microbeads that scatter light, giving a haze value of 95% or more, but retains 84% light transmission. Concerned with bad PR for plastics? The first annual Plastics in Automotive Safety Conference, sponsored by SPE, takes place 7 Feb 2000 in Troy, Michigan. This will go a long way to address how proper design makes plastics a material of choice and a safe one as well. A blow molded PP fan shroud used on Dodge Dakota and Durango, wins the top SPE design award. Further, BASF Plastics announces that gf nylon 6 is the material of choice for the air-intake manifold on the 2000 Chrysler Neon. Credibility for engineering plastics takes another leap with these breakthrough automotive applications.

Another major step for the shapes business - Strongwell completed supplying FRP products EXTREN and DURAGRID for a 420 foot suspension bridge in Kentucky - the world's longest FRP suspension bridge. Talk about credibility!

Ineos Acrylics makes its debut with the Lucite sheet product line, purchased from ICI last month. A clarification as to the Ineos-Barlo relationship. They are separate companies - Barlo did purchase the Perspex extrusion business from ICI (now INEOS) and previously purchased Resart, an acrylic sheet producer in Europe. Today Barlo and Ineos do compete in Europe. Bayer AG purchases Laserlite in Australia (PC and PVC sheet mfr).

If you are interested in news of any company in our industry, go to prnewswire.com

Check out NSW Corp in Roanoke, Va. They have a complete line of extruded netting and sleeving made in PP, PE, and nylon. This is a growing shape for industrial applications. Netting and sleeving applications abound in most plants and these are MRO product leaders.

Another significant application: female condoms made of polyurethane are now being used in Brazil with an initial order for two million. And in Finland, Nokia, the world leader in cell phones is supplying face plates in many colors, made from Cycoloy resin from GE.

Here are more websites of interest:

GE Plastics - www.geplastics.com

Eastman Chem - www.eastman.com

Dow Chem - www.dow.com

DSM Engineering Plastics - www.dsmep.com

King Plastics - www.kingplastic.com

European Plastics Distrib: www.epda@btinternet.com

Assoc. of Plastics Mfrs Europe: www.apme.org

Some personnel news of note: Bayer Plastic Division (now owning Sheffield) has a new president of the newly formed Plastics Division; Nicholas Cullen.

Watch for Degussa-Huls to make some top level changes in Europe.

A recent management change at MA Hanna saw Kent Darragh (formerly head man at Cadillac Plastic) to join Goodyear.

Whatever happened to Consolidated Electrical Distributors, the west coast (US) company that bought Amari in the UK? For a while earlier this year it looked as if they were going to be buying up U.S. plastics distributors - but so far no new shoe has dropped.

Look into Thermoview Industries in Ky - mfr of ABS profiles; now owned by GE (Equity). Will we see more investment in companies to provide captive customers? Distribution next?

Information overload? We read it all so you merely spend 10 minutes a month reading this newsletter at \$3.125/page and keeping up. Among the publications we monitor are :Modern Plastics, Plastics News, Plastics Engineering, Industrial Distribution, Financial Times, Plastics Rubber Weekly (UK), Kunststoffe, Plastics (Australia) Plastics (India), Plastics (China), Plastics (Japan) and many more from all corners of the globe.

Pricing forecasts? Look at the forecasts made in Feb. 1999 : what a difference nine months makes!

Oil Will fall below \$11/bbl NOW AT \$29

Gasoline. Regular at all-time low of \$1.00/gal and due to go lower. NOW AT \$1.35/gal

Thermoplastics. Down 5% . NOW UP 10%

Engineering plastics. up 1% . NOW UP 7-8%

We promised not to look back but the perspective of short term history tells us Not to expect much accuracy in prognostication in these volatile, fast-moving global times we are experiencing. As an example PS has gone up 14% during that same 9 month period with further upward movement expected. Once the inflationary mind set is in place: expect more.

How to grow with the times? Focus on cost not price when dealing with your customer. Surveys have shown that the customer is now interested in reducing the total transactional costs of bringing the product from point of manufacture to point of use.

Also innovate . introduce new products such as Plexiglas Elit - the new edge-lit acrylic sheet from Atoglas. Customers using websites to order won't know about these new cost-saving products .It remains for distribution to fill that need. Manufacturers can't send samples over the internet! Distributors must supply that link.

Plastics is a \$370 billion-per-year business, growing at a 55% clip since 1991 , and represents the fourth-largest manufacturing segment in the U.S.. More than 5000 plastics suppliers cater to more than 18000 plastics processors and account for \$85 billion in revenues for raw materials and equipment. An integral part of this economic matrix is the distributor (resin and shapes) who manage inventory for geographic regions. Getting the product to the user on time is still paramount.

Manufacturers acquiring distributors? Yes, it's happening in the TFE- coated fiberglass business as Chemfab buys its fourth distributor in Europe.-HCC SA of France. Who do you buy this product from ? What is their distribution policy?

As we leave this decade and ... century ... and millenium , it's well to ponder who built it for us.: Nathaniel Wyeth, brother of painter Andrew Wyeth, inventor of the PET soft drink bottle. Gilbert Eggleston, inventor of PVC pipe extrusion, William Cruse, founder of the SPI. To name just a few.

We've gone from wood, straw, brick, glass to rubber and plastics -. from 10000 BC to 2000 AD. Where do we go from here? Stay tuned and keep reading !

INDUSTRY INTERVIEWS:

BERNARD L. ROBERTSON, Sr.V.P.- Engineering Technologies,General Manager- Truck Operations, DaimlerChrysler(DC) Corp. has been with Chrysler (now DC) for 34 years. A member of the National Academy of Engineering, Mr. Robertson is responsible for all Chrysler Development Systems and Vehicle Engineering Operations which includes the Liberty Group which is engaged in developing the plastic bodied cars. We caught up with Mr.Robertson at his offices in Auburn Hills, Michigan.

GLOBAL PLASTICS LETTER(GPL): Recently both your company (DC) and Ford have announced new initiatives in plastic-bodied vehicles. Why the sudden interest? Or is it sudden?

Bernard L. Robertson (BLR): *In our case it isn't sudden; we've been working on the concept for 4-5 years. We recognized the need for lighter weight, lower cost vehicles with improved fuel efficiency. Most ways of improving fuel efficiency add weight or raise costs Using plastic composites is one way we hope to meet our goals.*

GPL: What are the plastic materials of choice?

BLR: *Most of the composite materials are thermosets such as Rtm and Smc, used on exterior body parts on vehicles such as the Viper.*

GPL: Tell us about the Project Liberty program and the newly announced Jeep plastic hard-top.

BLR: *Liberty is our skunk works, separated from our corporate r&d, with a flexible charter to work on anything of an advanced nature. The Jeep hardtop emanated from there and is a spinoff from the CCV which was the China Concept Vehicle. The idea was to injection mold an entire body in thermoplastic for a small, light weight, low cost vehicle for third world countries. That idea was shelved because of the difficulty in doing business in China. However, the 50-60 lb plastic top for the Jeep Wrangler is a result of that work.*

GPL: What is the Pronto Lite and when will it be commercialized?

BLR: *It will be a thermoplastic body in a matte or satin finish which people accept in computers. The Pronto Lite and Pronto Spyder will be on the auto show circuit so we can gauge the consumer reaction well before building them in production.*

GPL: How does recycling affect the use of plastic bodies in the future? Further, are the economics of the scrap metal industry holding back development of plastics vs steel and aluminum?

BLR: *Any plastic vehicle needs to be completely recycleable, including the adhesive. Thermosets are not a problem currently. As far as scrap metal economics are concerned, the issue is commercializing the surface finish of plastics versus painted metals as well as using metals to reinforce the plastics structure which defeats the purpose of plastics in the first place.*

GPL: What about plastic side glazing such as polycarbonate - when will it become a commercial product?

BLR: *It will come in less than 5 years.*

GPL: On a personal note, what do you consider your greatest achievement during your career in the automotive business?

BLR: *A definite highlight was recently being inducted into the National Academy of Engineers. Most of my career was spent in developing powertrains and I'm particularly proud of having played a part in meeting emission regulations at lowest costs.*

GPL: How many countries have you visited and how many miles have you travelled?

BLR: *Just about every country but not South America ... and millions of miles.*

GPL: How is the auto business most likely to change in the next century?

BLR: *Everything will change. Powertrains; Fuel efficiency; and indeed fuels will change. The material change will be to recyclable thermoplastics.*

GPL: What advice would you give to a plastics engineer starting out today?

BLR: *The best advice, not just to an engineer, but to everyone in the plastics industry is this: the biggest disservice you can do is overpromise and under-deliver.*