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Welcome to the Summer edition of your Newsletter

Message of the Chair

Looking back at successful Thermoforming Conference in Prague

It has been 3 months since we met at the European Thermoforming Conference in the wonderful city of Prague but I feel it has been only couple of weeks ago - time is somehow moving faster and faster.

Our board members of the European Thermoforming Division are going to meet in two weeks to review the conference and consider the valuable input and comments received from all of you. This review will assist us in deciding the next conference venue to be held in 2016 which will be our 20th Anniversary and 10th European Thermoforming Conference. We are already making plans for this event to be an exceptional celebration and although it seems far away, as we all know, it will be here sooner than we think.

I always enjoy immensely the European Thermoforming conferences – an opportunity to meet old friends as well as new interesting contacts, but also a perfect forum to learn many new technological developments across the thermoforming spectrum. I personally find the atmosphere unique and seldom find the same in other trade conferences, a tribute to the 'spirit of the thermoforming'. I would like to thank all of you for attending our conference, both to our regular guests and also to those who joined our special event for the first time.

You may remember – I mentioned in my opening speech a great Czech, one of my favorite countrymen, Tomas Bata – great entrepreneur, great person. He once said: "Vision without Action is just a dream, Action without Vision merely passes time, Vision with Action can change the world."

My belief is that there remain enormous opportunities to innovate in Plastics Thermoforming. This was proven when I visited the Interpack exhibition and witnessed a number of new and intriguing thermoformed products which hopefully will expand the thermoforming market. With that in mind, the question is – 'ask not what thermoforming industry can do for you, ask what you can do for the thermoforming industry'.

Thank you

Marek Nikiforov
Chair ETD and Conference Chair



Report on 9th Annual European Thermoforming Conference 3 – 4 April 2014

By Conor Carlin, Editor

Over 200 delegates from 27 countries attended the 9th annual European Thermoforming Conference in the glorious Bohemian capital city that is Prague. The theme of the event was billed as “Forming a Sustainable Future” with major topical focus on innovation and competitiveness. Both heavy-gauge and thin-gauge sectors were well-represented in the technical program.

The keynote for the event was delivered by Christian Majgaard, a former top marketing manager at LEGO in Denmark. Mr. Majgaard’s speech was titled, “The Quest for Growth” and he enlightened the audience with insightful comments on brands, logos and the importance of communication during periods of change in business. Perhaps central to his talk was the notion that “the idea should be in the middle” of everything a business does. This is opposed to a company-centric view of the world, which can become problematic when the needs of the customer are ignored or forgotten. By keeping the innovation and business idea at the center of your marketing strategy, you will be more successful in the long term. The Danes were well-represented at this year’s event, with additional talks on the future of plastics in design, advances in 3D printing and building a green company at Faerch Plast, one of the largest thermoforming companies in Europe.

Thin Gauge Panel Discussion

Perhaps one of the more interesting sessions was the thin-gauge panel discussion, featuring experts from six major OEMs: GN, Illig, Kiefel, OMV, TSL and Gabler. The conversation started with a comparison between major global markets, North America and Europe. As has been the case for some years, the difference in machine format (large vs. small) is driven by the needs of the respective markets. Even though “Europe” (as an economic entity) is larger than North America, there is still a great degree of segmentation across nation-states necessitating smaller runs and more frequent tool changeovers.

The difference in platform size also raises interesting points about the economics of thermoforming. For example, faster running machines will generate more scrap which can increase the need for labor. In higher-wage countries in Western Europe, robotic stacking systems and inline grinding are more common than in Eastern Europe (or any developing economy). Larger-bed machines, such as those built by TSL, are frequently used with inline extrusion. The massive output from these systems can reach 8000lbs per hour (3600kg) with downstream trimming, rim-rolling and automated packaging.

The moderator, past SPE President Ken Braney, posed questions generated by the audience while introducing a few slightly controversial topics. “Do you think the thermoforming industry is advancing as fast as other industries?” More specifically, did the industry ‘lose’ the margarine tub to injection moulding due to lack of innovation? The panel was not so quick to agree with this, although it was pointed out that OEMs and converters need to do a better job of establishing strong links with universities and technical institutes, both to develop the future workforce but also to increase awareness of what is possible with thermoforming. There is “a more common awareness” of injection moulding among students. The panel pointed to in-mould labeling and tilt-mould technology as two recent examples of innovation, though they agreed that the rate of innovation could improve. It was also pointed out that thermoforming has a distinct advantage over injection moulding when it comes to multilayer sheet and related applications.

Other questions concerned form/fill/seal technologies and whether or not it was receiving enough attention from OEMs and converters. Can FFS be seen as a hedge against injection molding? The role of biopolymers was discussed. The panel suggested that processing biopolymers on existing thermoforming machinery is happening around the world, but the challenges relate to the cost of the materials. There were no representatives from major bioplastics companies available to respond to this, but the growth in biopolymers (see “Thermoforming & Sustainability” on p.4) suggests that there will be more innovation in this sector. The panel briefly took up the topic of tool interchangeability (having the ability to run different tools on different machines). While some OEMs offer master tooling sets to accommodate moulds originally designed for a different machine, the panel suggested that interchangeability can be seen most explicitly when converters run multiple types of machinery in their plants. Competition among suppliers, integration of robotic systems and recent advances in the application of IT to thermoforming (data acquisition and analysis tools) all suggest that the technology is advancing.

Heavy Gauge Panel Discussion

Representatives from MAAC Machinery (USA), Frimo (Italy) and Illig (Germany) were invited to participate in a heavy gauge panel discussion. The first question addressed the impact of heater selection on energy use and efficiency. As a rule of thumb, the ratio is 70-90% of energy cost is influenced by heaters. The position of the heater bank and the ability to turn on/off banks during production can also help reduce cost. Certain machines have more heater banks and initial start-up pulls a bigger draw and can set demand charges for the month.

There is more to heating the sheet than the element alone, i.e. radiant energy = square of distance travelled. The proximity of the heating element to the sheet is quite important. Quartz elements allow for changes in temperature during the cycle and these elements can be closer together.

According to the panel, the trends in heating technology seem to be application-specific. The energy retained by ceramic provides an advantage over quartz, though this point might be challenged by manufacturers of quartz panels. Halogen heaters were discussed and the panel identified certain advantages for specific applications but they are not used in as many environments as ceramic or quartz panels. The color of the sheet can influence the efficacy of the halogen heaters. The panel acknowledged that Geiss, a German heavy-gauge machine builder who uses halogen heaters, has been at the forefront of halogen use. Indeed, Andy Eavis, a thermoformer who was among the biggest users of Geiss equipment, spoke up to clarify some of the benefits of halogens:

“[During our use] the only downside to halogen was max demand. They get a huge amount of heat into the sheet very quickly. It’s more of an on-demand system – they can be turned off. Fewer electrons are used. The wavelength penetrates the sheet (more like a microwave). Color changes can be mitigated. Overall, much less energy is used in the total picture.”

Material Developments

When asked about material developments, the panel discussed the automotive industry as a driving force. Many car makers are using TPO foam and generally speaking, there is a very large variety of materials that must be processed on heavy gauge machinery (10-15x more than thin gauge). Machines must be able to process all types. Polyolefines such as TPO and HMW materials are being used more frequently.

SPE CEO Wim de Vos launched a provocative question at the panel when he asked if OEMs have looked at using thermoformed parts on their machines. “BMW and Boeing are replacing functional [metal] parts with plastics. Have you considered the same?” While Illig has one section of a machine made from thermoformed plastic (a water tank), the heat and pressure requirements of pressure forming mean that plastics or composites are simply not compatible. In addition, the economics of switching from steel would be prohibitive. Paul Alongi of MAAC Machinery stated that his company rarely makes two identical machines: “We have eight models and 29 different sizes.” He did, however, also state that electrical enclosures are one section of the machine where plastics might be substituted.

Economics & Growth

While energy was identified as the largest cost in heavy gauge forming, labor was identified as the second largest factor. Tool changeover time is a big contributor to labor cost, especially on very large machines with heavy tools. While some European machines can be changed over in less than 30 minutes with automated systems, the costs for such systems can be 30-40% of the machine price for larger (MAAC) machines. According to Alongi, “A different ROI analysis is required for changeover systems, but the technology is evolving.”

Cars in developing markets represent higher volume opportunities for thermoformers. The BMW 3-series and the Audi 4-series are relatively mass-produced, but with more models being designed, more tools are required that can be run on the same machine. The economics of heavy-gauge forming are very application-specific and require close financial management. For example, how is cash flow being managed, e.g. inventory of stock sheet vs. inventory of formed part, is instrumental in business decisions. Runs of 150-200 can be quite profitable.

Between Eastern and Western Europe, some differences remain. Supermarkets are more uniform as distribution centers spring up in new hubs. This leads to more similarities in packaging as multi-nationals expand. The number of thermoformers in Western Europe has decreased as production has moved east and labour cost has been the primary reason for this shift. The panel stated that more machines have been sold or moved to Eastern Europe.

Turkey

Recent data shows that Turkey is now the third largest converting market in Europe, behind only Germany and Italy. The panel suggested that increasing numbers of machinery builders and toolmakers from Turkey represent a price point that is in-between Europe and China/Taiwan. This does represent a new competitive threat to many OEMs, although the North American market has yet to be affected. TSL did announce a new strategic arrangement with a Turkish OEM, though no details were discussed. SEM Plastik, a converter from Turkey, presented some interesting data on plastics and thermoforming in their domestic market: 9% growth in the value of thermoformed goods.

Sustainable Growth, 3D Printing & the Importance of Design

Innovation was a key theme throughout the conference and the Danes were at the forefront of the conversation again with speakers on both 3D printing and industrial design.

Nille Juul Sorensen of the Danish Design Center posed some awkward questions after sharing some gloomy statistics about resource depletion. What does exponential growth (in technology, primarily) mean for thermoformers? Sorensen gave examples of how companies like Blockbuster, SAS Airlines and Nokia failed rapidly due to major disruptions in their business models. The lesson is that there is no time to change in an exponential world.

On the topic of resource management, Paul Scheers of Pactiv also asked some tough questions: “What if we can’t count on boundless volume growth, extraordinary amounts of cash to invest and cheap raw materials, especially in Europe?” How do we know where we stand in terms of the economic cycle?” The time and climate in which you operate should influence what it is you actually produce. Pactiv’s growth was fuelled by the population expansion of the baby boom generation, a.k.a. an economic supercycle. Scheers outlined seven success factors for packaging converters:

1. Managing raw material inflation
2. Waste reduction
3. Effective capex
4. Operational performance measurement
5. Product and customer profitability management
6. Innovation
7. Global supply chain management

Scheers went further: “The demands of an ageing population are not the same as those of a younger population. Older people already have most of what they need. Supermarket profits have halved in the US since 2006. There was zero growth in the European chemicals sector output in 2013, leaving output for the period 6.4% below the previous year.” In sum, companies cannot continue to operate the way they have been. In order to change the curve, businesses (and the individuals who run them) must understand where they stand and actually choose a strategy instead of plodding along following outdated models.

3D Printing

Is 3D printing hype or a technological revelation? Several speakers and audience members engaged on whether or not the technology is a threat or an opportunity for thermoforming. Speaker David Bue Pedersen of Denmark Technical University (DTU) informed the crowd that “3D Printing” is actually a registered trademark.

Pedersen took the audience through the evolution of the technology from wire-based printers to powder deposition to the resin-based (acrylic, epoxy or polyester) systems of today. Initially used for prototypes, 3D printing technology is now being used for tissue engineering where cells are grafted from a patient, then incubated and put through a 3D printer so the cells are attached to a biodegradable structure. The first functional liver created by 3D printing is expected to be complete this year. We’re only limited by our imaginations, according to Pedersen.

Other examples of innovative applications include topology-optimized components, aluminium castings being replaced by 3D prototypes for strengthening and light-weighting, conformal cooling in injection moulding that uses numerical simulation for cooling lines that dramatically increase cycle times, e.g. the cycle time of Lego bricks went from 30 seconds to 7.



The economics of 3D printing continue to become more and more attractive. For example, system prices have plummeted from €100,000 to €10,000 in 4 years. Approximately 500,000 machines were sold into the industrial market last year. The primary reason for this increase in sales and decrease in price is the end of patent protection (it was originally filed in the late 1980s): the last one expired seven weeks ago [from the date of the conference]. This “democratization of technology” is fuelling the rate of adoption. The entire industry is forecast to grow to \$10.8bn by 2021. And it isn’t just businesses that are exploiting this new reality: the Singapore government is investing \$500MM over the next five years.

For more information on the 2014 conference, readers can visit www.e-t-d.org.

Keynote – “The Quest for Growth” – A tale from reality on business development, innovation and branding

by Christian Majgaard, former global top manager at LEGO®, Denmark

Abstract/ quotes from Majgaards presentation

“There are other tools in the world than those shaping plastic. They’re called Management Tools! Management tools are standard recipes for - sometimes - unknown diagnosis. They provide answers. Yet, what we need in order to grow - is questions! Management tools appear to come and go like fashion, quite unrelated to reality!”

“Corporations either overemphasize the soft side or the hard side of their growth formula: They apply poetry and value words about wanting to be the biggest, dynamic, ethical, innovative, change-ready. Or they overemphasize planning and budgeting. We have enough poets and planners, but lack analysers, thinkers and doers!”

“If business innovation happens on a one-day-session out of office, shaped by an on-the day-self-made swot analysis, then it gets too much of all the false inside-out perceptions that human beings tend to generate automatically. Garbage in = garbage out!”

“When companies see themselves as the centre of the universe, the end is near. Branding, in it’s popular meaning, suffers from this deadly self-centration: Branding in its core should be about customers’ perception of those who fulfill their needs, yet we see an overemphasis on company-expressions instead of customer-impressions.”

“The biggest mistake in branding is to regard it as a communication discipline. Branding is about the impressions we make in the minds of customers. And in most industries the determining thing is what we do and not how we sing!”

“Marketing managers “roll out” their new big plans, instead of “rolling-in” what the customers need. They all measure customer satisfaction by getting answers to pre-designed standard questions instead of allowing the customer to decide which questions are the important ones.”

“The quest for innovation has lead to think-out-of-the-box-psychology. I prefer get-out-of-the-box-travel budgets!”



“The biggest show-stopper in the pursuit of innovation and growth is inside the company - it’s called c-u-l-t-u-r-e, which is the fine word for bad habits.”

“If you want a new mission I shall write one for you now, but how will you make people change?”

3D Printing the Next Industrial Revolution and onwards to The Democratizing of Manufacturing

Abstract by David Bue Pedersen, Technical University of Denmark

3D printing is the common name for a collection of manufacturing processes known as Additive Manufacturing(AM). It is a family of manufacturing processes that are classified by employing a numerically controlled, layered and additive material deposition strategy.[ref.1] Hereby, physical objects such as mechanical components can be built, layer-by-layer, and given this inherent constitution of objects from thin layers, an unrestrained geometrical freedom and production flexibility is achieved. The geometrical freedom of design given from these processes has not been equaled but that of artisan craftsmanship. This relates especially to geometrical intricacy. Unlike craftsmanship, Additive Manufacturing processes are nearly autonomous numerically controlled processes, requiring minimal human effort. Furthermore the flexibility comes at no cost in terms of tooling or reconfiguration efforts. The platforms are readily capable of starting up production of new geometries, at the click of a button.

For these reasons, the field of Additive Manufacturing is in rapid advance to become the flexible manufacturing process of the future, and has by many been accredited to be a driver for crossing the frontier into the third industrial revolution. [ref. 2] This revolution is to be identified by a reckoning with mass-production by means of series-production, and to have extreme focus on production flexibility by mass-customization where products are tailored to the consumer. High requirements are put on the additive manufacturing technologies in order to make this possible. These requirements not limited to only materials and processes, are in these years being met, allowing for a new industrially accepted method for the manufacture of products in a quality that is superior to conventional manufacturing technologies. Throughout the presentation, the latest development within the field of Additive Manufacturing will be presented and studies will be given to show just how imperative it is, not to be caught by surprise from these new technologies.

References:

1. Wohlers Associates. Wohlers Report 2012 - Additive Manufacturing and 3D Printing State of the Industry Annual Worldwide Progress Report. Wohlers Associates, 2012.
2. McKinsey Global Institute, Disruptive technologies: Advances that will transform life, business, and the global economy, 2013

Winners of the 5th European Thermoforming PARTS Competition 2014

This Award stands for first-class innovative achievements in originality, creativity, mould complexity and technical ability in order to promote advanced design and developments of thermoformed applications.

For the 5th time, in 2014 the European Thermoforming Parts Award once again highlighted applications selected by the jury at the recent European Thermoforming Conference in Prague from 3 – 4 April 2014.

The Members of the Jury Committee were: Niklas Magnusson (Chair Parts Committee, Sweden), Marc Ommeslagh (Belgium), Hannes Jacob (Germany) and Karel Kouba (Czech Republic)

1st Prize Winner: Thick Gauge - Automotive Applications

Company Walter Pack, Spain with "Door assembly for Renault Twizy electric car"



*Jury's motivation:
"High quality cosmetic part respecting tight tolerances set by the highly demanding automotive applications"*

1st Prize Winner: Thick Gauge – Point of purchase/Display

Company LOGOFORM AB, Sweden with part "TELIA SIGN"



*Jury's motivation:
"An innovative tool design enabling undercut parts that are cosmetically perfect, creating new design possibilities for smaller volumes in thermoforming"*

1st Prize: Thin Gauge – Electronical Applications

Companies Protective Packaging Systems, UK and Top Clean Packaging Group, France with part "LO-G Retail Carry Pack"



Jury's motivation: "An innovative fragility packaging design incorporating impact absorbing thermoformed features to protect sensitive electronic parts during storage and transit."

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SPE European Thermoforming Division

Yetty Pauwels - Newsletter Editor
Eric Sasselaan 51, BE-2020 Antwerpen, Belgium
Tel: +32 3 541 77 55 - Fax: +32 3 541 84 25
spe.etd@skynet.be - www.e-t-d.org

Mission Statement

It is the purpose of the European Thermoforming Division to stimulate and diffuse knowledge of all aspects of the Thermoforming industry. This will be achieved by providing conferences, training seminars and regular topical news bulletins. It will provide a dynamic network platform and encourage and promote technical and scientific participation by its members

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