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Urethanes TECHNOLOGY INTERNATIONAL

Arabian heights: a region on the rise



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- 6** **Kingspan** quits UK panel deal, **NIO** includes **BASF** solvent-free PUDs in electric vehicle seating, Piling begins at **BASF** TPU plant in Guangdong, **Covestro** adds third online store in China
- 7** **Huntsman** Q1 sales fall... and rebrands spray foam business, **Carthane** profits tumble and bets on NEV, **FoamPartner** sale continues, **PIMA** and **SPFA** want federal subsidies
- 8** Subdued Q1 for **BASF** as low iso margins hit results, **Faurecia** sales slip down by 20% in Q1, **Sonderhoff** adds compact robotic dispenser for CASE applications
- 10** **Covestro** cuts forecast in light of coronavirus, **Perstorp** sales down 15.5% in Q1, **Recticel** faces falling profitability, Earnings down at **Lanxess** in Q1
- 11** **Dow**, **H&S**, **Orrion** collaborate on post-consumer mattress project, OEM stops hit **Grammer** revenue
- 12** **Dow** slows PU manufacturing to avoid product stockpiling, Coronavirus depresses demand for **Chemours'** fluorocarbons in Q1, **Covestro** and **Teknor Apex** collaborate in TPU project
- 14** Sales up at **Tempur Sealy**, **Casper Sleep** beats retreat from Europe, Sales remain solid at **Amerityre**, **SPFA** encourages professional certification
- 15** Sales down 5% in Q1 for **Honeywell**
- 16** Restructuring outpaces pandemic as **Adient** continues turnaround plan, **Lear** profits down almost 14% in Q1 2020, Coronavirus drives online sales at **Purple**, **CPI** highlights PU's contribution to sustainability
- 18** **Sinomax** earnings plummet after US-China trade battle, **Huafon** Q1 sales decline by 24%
- 19** Profits slashed as TDI maker **Dahua** slumps, **Wanhua** and **SKSHU** launch PUD for waterproof coatings, **Hongbaoli** Q1 sales down 21%, profits up
- 20** **Hengguangda** expands in PU additives, Mattress-maker **Milily** Q1 growth as market turns down and renews fundraising plan for overseas plant, **Superfoam** donates mattresses in Nairobi
- 21** **Pricing:** Isocyanates markets tumble as the world fights coronavirus pandemic

features

18-29

- 22** **Growth in the GCC offers potential for polyurethanes** Dubai and the other GCC nations are at one of the world's commercial crossroads. What does the region offer the polyurethane industry? Simon Robinson finds out.
- 25** **The Gulf: a unique market with unique demands** There are huge variations in the way polyurethane is specified and used around the world, and geographical differences are particularly stark. Simon Robinson takes a look at what makes the Middle East and African PU markets tick
- 28** **Flexible foam: rising to the challenge** A panel discussion at the recent Sleep Expo event in Dubai got to the heart of some of the key issues facing the flexible foam industry in the GCC and East Africa. Simon Robinson reports
- 31** **Towards the circular economy for PU foam** Polyurethane foam is a big challenge for recyclers. It's bulky, and its thermoset nature makes it difficult to reuse. Sarah Houlton takes a look at some of the initiatives that are under way to create a useful future for old foam

departments

35

- 34** **Dates and Data**
Key events for the PU industry



The GCC: a gateway to the Middle East and Africa



A far cry from carpets, PU takes hold in the Gulf market



The Middle East and Africa offer opportunities



Not going to waste: a brighter future for end-of-life foam?

Front cover picture:

A doorway in the Sheikh Zayed Mosque, Dubai. The UAE, including Dubai, is a gateway to the Middle East, as we discover in this issue.

23 The share of PU rigid-faced sandwich panels is still relatively low, but the market is expected to grow at a fast rate

Philipp Propst, IAL Consultants

24 The standards are getting stricter and greater k value, better insulation capacity, is needed

Akil Sahiwal, Dow

26 There are some large producers in Jeddah... Kuwait and Qatar are very small producers

Mahmoud Karime, Hennecke

26 To sustain a healthy operational model, we had to diversify our product mix

Anthony Aboujaoude, Ajafco

29 Raw material prices affect our production costs and they affect our ability to provide our customers with the best mattresses at a price they can afford

Habin Waldu, Rainbow Foam





Simon Robinson
Editor

Strange times

The statistics point to just how disruptive the effect of the coronavirus pandemic has been on the global economy. Taking the UK automotive industry as an example, the number of cars sold in April 2020 only slightly exceeded the number sold in February 1946. Production was down a stunning 99.7%, at just 197 vehicles.

The wider effects have been stark, too. Our major cities have become as quiet at night as they do with very heavy snow fall, and wildlife is venturing into the deserted streets. Then there are the big deals: the physical constraints of quarantine, and the mental issues that can result. When we look back on this in the future, it is surely these emotional impacts of the lockdown that people will remember most vividly.

These impacts have been all the greater because societies have not had to do lockdown for a very long time. Vaccines, modern medicine, access to clean water, sanitation and even soap helped consign epidemics to history in many parts of the world.

Lockdowns and quarantine measures have been crucial, of course. They have helped governments, whatever their levels of competence, slow the spread, flatten the peak and buy time.

Governments have been active in ways that have become unfashionable of late. They have shown that they have real and positive power, when they choose to use it. They can, if they wish, fund wages of people who are unable to work for periods of time because their businesses have been closed.

This is important. Although trickle-down economics has been repeatedly shown to help only the most wealthy, it is still true that well-paid people are able to buy more, and better, things than the poorly paid, and the unemployed buy least of all. Keeping people in jobs has, therefore, been the thrust of the policy in many countries.

Saving lives and saving jobs this way will come at a price we will all have to pay. There are worries that inflation will rise in the coming weeks and months, and that this will reduce people's buying power. And, of course, the polyurethane industry's two largest sectors, flexible and rigid foam, ultimately rely on consumer spending, whether that's on furniture, or fresh foods where reefer trucks underpin the cold chain.

It's going to get difficult. But if the policies have saved lives and jobs, then surely the pain will have been worth it.



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Kingspan quits UK panel deal

London, UK – Ireland-based insulated panel giant Kingspan has withdrawn from its proposed purchase of the UK sandwich panel supplier Building Solutions. The UK Competition and Mergers Authority (CMA) broke the news on 21 May when it said it was cancelling its in-depth investigation into the purchase that had been announced on 23 April.

On 28 April, Kingspan and

Building Solutions told the panel they were considering whether to continue with the proposed deal or abandon it. Kingspan told the CMA on 20 May the deal was off.

If the deal worth £37.5m (\$42.5m) had gone through unaltered, only Tata group and limited imports of the panels would offer competition for rigid PU panel supply in the UK, according to the CMA.

Colin Rafferty, senior director at the CMA, said in April: 'Kingspan is by far the largest player in the market, and this deal would involve it buying up one of its only two meaningful competitors. We're concerned that the deal could damage competition, resulting higher prices or lower quality products.'

This is the second European takeover attempt that King-

span has walked away from in just over a year. It withdrew an offer for Recticel in May 2019. That deal would have seen Recticel dismembered. Kingspan planned to keep the rigid foam business, and sell the flexible foam business to Austria's Greiner.

In April, Greiner became the sole owner of the previously 50:50 Eurofoam joint venture between it and Recticel.

Piling begins at BASF TPU plant in Guangdong

Zanjiang, Guangdong – BASF has announced that piling work has begun for the TPU plant at its new verbund site in Guangdong. As well as making thermoplastic polyurethanes, the site will also make a range of engineering thermoplastics for China and other markets in Asia.

The company put the engineering polymer capacity at 60kT/year. However, it declined to comment on the overall size of the new plant's TPU capacity.

'We are confident to bring the first batch of products to the market by the end of 2022 as planned,' said Haryono Lim, SVP for the verbund site project.

The company signed its first memorandum of understanding for the site less than two years ago. 'The project has been progressing steadily,' Lim added. Ground was broken for the project in November 2019.

BASF said it intends to implement a smart manufacturing concept at the site, based on cutting-edge technologies. The site is scheduled to be completed in 2030.

In 2019, BASF had sales of \$8.1bn in Greater China, up 2% on 2018.

NIO includes BASF solvent-free PUDs in electric vehicle seating

Shanghai, China – BASF Haptex, a solvent-free PUD, is being used as the seat cover material in carmaker NIO's ES6 model. 'Our passengers will enjoy their journey even more in the upgraded ES6 model, owing to the assured interior air quality, and the material's superior appearance and texture,' said Kris Tomasson, VP design at NIO.

Chinese company Greentech makes the coated fabric material, where Hongbo Li is the general manager. He said: 'Haptex significantly simplifies and speeds up the production process of synthetic leather as organic solvent are no longer needed. This helps car makers



Solvent-free comfort inside the NIO ES6

meet increasingly stringent VOC standards, especially for car interior applications.'

BASF said the material has

good peel strength, durability, abrasion and hydrolysis resistance. It can be used at temperatures down to -30°C.

Covestro adds third online store in China

Quanzhou, Fujian – Covestro opened its third online store in China in June. Customers will be able to use distributor Silan's Aperfect supply chain management app.

The app is designed to be a one-stop portal for services for the footwear industry.

Covestro is offering its T80 grade of TDI on the app. Local clients can make orders and inquiries 24/7, and apply for low-interest loans from Silan, the company said.

This is the third online store

Covestro has opened, following its own flagship Covestro Direct Store, and a second one on Alibaba's e-commerce site 1688.com.

Silan started working with Covestro more than 20 years ago. 'Our cooperation has been iterating in different stages with continuous innovation and development since the last century. [It ranges] from hazardous chemical logistics to sustainable development and digitalisation,' said Silan chairman Ding Zongyin.

'China is the bellwether in the global digitalisation area... Covestro hopes to seize this digital opportunity and lead in value and innovation in both the local and global chemical industry,' said John Dou, Covestro's vice president of PUR Commercial Operation Great China.

Silan was set up in 1986 and is headquartered in Quanzhou, Fujian. It also has a polyurethane leather subsidiary, Lanfeng Leather, with capacity of 30,000 km/year.

Huntsman Q1 sales fall...

The Woodlands, Texas – Huntsman had total net sales of \$1.6 bn in the first quarter of 2020, down 6.24% on the same period last year. Adjusted EBITDA across the business fell 19.1% and declined to \$165m in the first quarter of 2020.

In the company's polyurethanes business, net sales fell by 3.9% between the first quarter 2019 and the first quarter of 2020, to \$888m from \$924m. Adjusted EBITDA in the division fell 32.3% to \$84m in the first quarter of 2020. This compares with \$124m in the equivalent period in 2019.

Sales were down because of lower MDI prices and modestly lower overall polyurethanes sales volumes, the

company said. Price falls were most noticeable in China and Europe. Although lower prices led to hi

gher volumes in MDI, these could not offset lower prices. The effect on the sales line fed through to the adjusted EBITDA level, it added.

Looking to the rest of the year, Huntsman said it will reduce capital expenditure by about 30%, to \$225–235m. It is pushing \$120m of spending on the splitter expansion in Geismar, Louisiana into 2020 and 2021, and plans only to commit \$40m to the project this year.

'The transformation of our business made us a much better company,' said CEO Peter Huntsman. 'Our balance

sheet is stronger than ever before with significant cash and robust liquidity. We have reduced inventories, suspended share repurchases.'

He added that the company will squeeze more synergies from its recent and pending purchases. It will buy more of the right downstream companies and keep diversifying and filling portfolio gaps when the time is right.

In addition to being active in an attractive market sector, HBS also plays an important part in its parent's materials strategy.

Hankins added: 'HBS will consume significant volumes of our lower-margin polymeric MDI to produce higher margin specialised SPF systems.'

FoamPartner sale continues

Zurich, Switzerland – Conzzeta, the Swiss holding company that owns FoamPartner, has hinted that a sale or disposal is getting close. It said in an update that it has completed the preparations to divest two business units, subject to market conditions, and continues to engage with potential buyers.

The businesses include FoamPartner, and also the Mamut outdoor clothing business. The disposals will allow the company to focus on metalworking, it explained.

Conzzeta said it has implemented a 'Cash, Cost, Complexity' programme to counteract the effects of the coronavirus pandemic. By the end of 2020, this programme should have increased EBIT by CHF40m (\$42m).

Business has been hard in the first two quarters of the year. Although the company made CHF45m by selling a business in the first quarter, this will not be enough to offset the significant drop in operating result in the first half of 2020, it said.

...rebrands sprayfoam business

The Woodlands, Texas – the company has rebranded its spray foam operations. The Demilec and Icynene-Lapolla businesses have been put together under the new brand name, Huntsman Building Solutions, or HBS.

It remains part of its polyurethane division.

Tony Hankins, president of the division, said: 'Integration of the two legacy companies is progressing well, and the selection of the new name is an important milestone for the

business. SPF is a highly attractive growth business; we have a product offering which is second to none.'

Huntsman created the business by buying Demilec in 2018 and, in February this year, Icynene-Lapolla.

Huntsman Building Solutions will continue to be jointly run. Simon Baker, previously president of Demilec, and Doug Kramer, formerly Icynene-Lapolla's president, are both at the helm of the newly combined business.



Hankins: rebranded the businesses

Carthane Q1 profits tumble, bets on NEV

Shanghai, China – Shanghai Carthane, which specialises in polyurethane NVH and pedal assembly products, posted a 76% year-on-year decrease in Q1 net profit. The company made net profit of CNY9.8m (\$1.4m) on revenue that was down 38% to CNY88m. This compares with a 36% drop in its 2019 annual profit, and represents a 10% drop in revenue.

Carthane sold 30.2m units of PU-based NVH products and 1.7m units of PU-based

lightweight pedal assemblies in 2019. This includes 1.9m units of PU NVH and 164,000 units of PU pedal assemblies to the new energy vehicle segment.

Across China last year, a total of 4.83m PU-based NVH products were sold and a further 1.2m PU pedal assemblies for new energy vehicles (NEV). These numbers are up 19% and 20% from 2018, according to Carthane's annual report.

This was despite a disap-

pointing year for the global automotive industry in 2019. Last year, China's NEV sales shrunk 4% to 1.2m units. But the growing share of PU products has countered the market headwinds, the report said.

The company also expects its NVH products, including bumper stops and spring aids, to expand into new applications. They could be used as suspension elements for NEV motors, batteries, and traditional suspension systems.

PIMA, SPFA want federal subsidies

Washington, DC – Two key US PU associations have joined the 'Back to Work on America's Roofs' campaign. The pressure group aims to secure federal funding and tax cuts to help the US roofing industry post-coronavirus.

It hopes to encourage business owners to invest in capital improvement, and support homeowners.

The 13-member group includes the PIMA and the SPFA.

It wants congress to keep incentivising and rewarding businesses that keep employees on their payrolls,



Subdued Q1 for BASF, low iso margins hit results

Ludwigshafen, Germany – BASF generated group-wide sales of €16.75bn in the first quarter 2020, up 7.42% on the same period last year. Across the business EBITDA fell by 12.3% to €2.43bn in the quarter, and the company has withdrawn its financial guidance for 2020.

Martin Brudermüller, the company's CEO, was pragmatic. He said: 'BASF's diversified portfolio offers advantages, especially in difficult times. Not all of our industries are equally affected by the pandemic. They show different degrees of resilience. For example,

pharma, detergents and cleaners and food, are experiencing additional demand.'

In the company's materials business, sales fell by 1.9% between the first quarter 2019 and the first quarter of 2020, to €2.87bn. This compares with €2.93bn in the equivalent period in 2019. EBITDA in the division fell 15.8% to €415m, compared with €493m in the 2019 quarter.

BASF blamed lower margins year-on-year in the ethylene and propylene value chain, as well as for isocyanates and polyamide precursors. Earnings in these segments were



Brudermüller: diversification helped in Q1

lower, and fixed costs were higher than in Q1 2019. Considerable earnings growth in the performance materials division did not compensate for

the decline in monomers.

The company has withdrawn its earnings guidance issued on 28 February. It said: 'It is currently impossible to reliably estimate both the length and the further spread of the coronavirus pandemic.'

Shutdowns in the automotive and other business areas will hit the company, it added, and there will be considerable falls in sales for the second quarter. However, the company expects a slow recovery for the third and fourth quarters. '[The situation is] extremely uncertain and not predictable,' it concluded

Faurecia sales slip down by 20% in Q1

Nantes, France – The first-quarter sales of Faurecia, the French automotive seating and interiors company, dropped 19.7% to €3.7 bn this year. However, the company is moderately upbeat about this, because automotive production is down 23.6%, according to consultancy IHS Markit.

'Our sales in the first quarter was strongly impacted by the global coronavirus pandemic. This hits China throughout the quarter, with a peak in February and then the rest of the world from March,' said CEO Patrick Koller.



Koller: corona virus impacts

Sonderhoff adds compact robotic dispenser for CASE applications

Düsseldorf, Germany – Sonderhoff, the machinery company that is part of Henkel, has developed a new dosing cell for a large number of CASE applications. The dosing cell makes it possible to apply two-component polyurethane systems for adhesives, sealing foams or potting compounds directly to parts. It has a typical repeating accuracy of 1mm.

At the heart of the machine is a linear robot. This controls an MK 425 mixing head. The mixing head has a traversing range of 2.5 x 1.25 x 0.25m, and it can produce between 0.5 and 5 g/s of polyurethane. The mixing head can handle ratios between 10:1 to 1:2 in infinite steps. This allows approximately 80% of the current applications for this type of machinery to be covered, the company claimed. The machine has a maximum traverse speed of 15 m/min.



The new Sonderhoff 3E dosing cell is delivered full assembled

The 3E system is transported and delivered as a completely assembled system in a 20-foot container. Sonderhoff said that it only needs to be set at its destination, and connected to power, compressed air and water supply. Then, when the conditioned material in

its pressure tanks is ready, so is the machine.

The machine uses high-pressure water to clean the mixing chamber and head instead of solvents. Finally, there is an optional shuttle table, which allows the single-level processing of parts on two worktops.

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Covestro cuts forecast in light of coronavirus

Leverkusen, Germany – Covestro has cut volumes and earnings projections for 2020, and is increasing cost-saving measures in response to the coronavirus emergency.

In a statement, the company said that core volumes are expected to shrink in 2020 compared with 2019. It said the first quarter volume was 4.1% smaller than the same period in 2019. EBITDA is likely to be

between €700m and €1.2bn – down from the earlier guidance of €1bn to €1.5bn. The drop is because of lower volume sales.

Group EBITDA is likely to be about €245m in the first quarter of 2020, but the company said it would confirm the number in its quarterly statement. Cost savings include reducing capex by €200m to around €700m in 2020. The compa-

ny's short-term savings programme has been increased by €100m to €300m.

Covestro said it has a strong balance sheet and significant extra liquidity if it needs it. This includes €1.2bn in cash and a further undrawn revolving credit facility of €2.5bn. The company said it currently expects 'a recovery of the current situation starting in Q3 2020.'

Perstorp sales down 15.5% in Q1

Malmö, Sweden – Polyols producer Perstorp had total net sales of SEK2.7bn (\$247m) in the first quarter 2020, down 15.48% on the same period last year. EBITDA across the business rose 1.5% and reached SEK419m in the first quarter of 2020.

The company's various business areas are delivering stable results, according to CEO Jan Secher. Sales were lower because prices and volumes fell in the quarter.

The weaker Swedish krona helped to offset this. The lower exchange rate and cost reductions helped EBITDA across the business.

In the speciality polyols &



Secher: high degree of uncertainty

solutions business, net sales fell by 17.9% between the first

quarter 2019 and the first quarter of 2020, to SEK1.5bn. This compares with SEK1.85bn in the equivalent period in 2019.

EBITDA in the division rose by 3.5% to SEK322m in the first quarter of 2020. This compares with SEK 311m in the 2019 period.

'Despite the coronavirus situation, supply of raw material, production and delivery to our customers have during the first quarter worked well,' Secher said.

'Due to the high degree of uncertainty, it is still too early to estimate the financial impacts on Perstorp from coronavirus,' he added.

Earnings down at Lanxess in Q1

Cologne, Germany – Lanxess had total net sales of €1.7bn in the first quarter 2020, down 1.96% on the same period last year. EBITDA across the business fell by 9.9% to €245m in the first quarter of 2020. Exchange rates helped, but this benefit was offset by falling demand from the automotive sector in the quarter.

'So far, we have been able to keep the economic impact of the coronavirus pandemic within limits,' said chairman Matthias Zachert. 'We know we have not reached the peak of the crisis. However, we feel well prepared, as we have stable positioning and have taken extensive measures for crisis management.'

Only plants in China, Italy, India and Argentina were temporarily shut down.

In the company's engineering materials business, net sales fell 9.2% between the first quarter of 2019 and the first quarter of 2020, to €347m. This compares with €382m in the equivalent period in 2019.

EBITDA in the division fell by 24.6% to €49m in the first quarter of 2020, from €65m in the 2019 period. Weak automotive demand during the coronavirus pandemic took the shine off the numbers in this business, the company added.

Lanxess has stopped share buy-backs, and will cut €50m from its investment budget by postponing projects. It will also save between €50m and €100m in costs over the course of the year.

Recticel faces falling profitability

Brussels, Belgium – Recticel faces 'significant' hits on sales and profitability in 2020, CEO Olivier Chapelle said in a trading statement.

Looking at Q1 2020 numbers, he said: 'Compared to the first quarter of 2019, our top line decreased by 6.2%. The first negative consequences of the coronavirus crisis became apparent in February in China, and from mid-March in Europe.'

He added that the lockdown

in Europe meant many factories had been closed, and others we are currently working at reduced levels.

'In China, we observe a gradual recovery to pre-crisis levels, which gives some confidence for the future evolution in Europe,' he said.

'While the negative impact on sales and profitability will be significant this year, Recticel's strong financial position will allow [us] to pass through this crisis.'

He added that it has binding agreements in place to sell its automotive interiors business and its share of the Eurofoam joint ventures.

Both of these deals are expected to complete by the end of the quarter, and will further strengthen the company's financial position, he continued.

Recticel said that it plans to use the proceeds of all of these transactions to help it grow in several different business areas.

News in Brief

Arpadis to distribute Pflaumer products

Antwerp, Belgium – Arpadis is to distribute Pflaumer Brothers' Tetraspartic materials in Europe and the Middle East. They have applications in high-solid polyurea top-coats.

Dow, H&S and Orrion collaborate on post-consumer mattress project

Semoy, France – Dow Polyurethanes plans to build an industrial-scale recycling facility at the Orrion Chemicals Orgaform site.

The facility will use Dow's Renuva process to convert the foam from post-consumer mattresses into polyols. The polyols can be used in flexible or rigid foam.

Dow is working with H&S Anlagentechnik as part of a collaboration that was first reported on *UTECH-polyurethane.com* in 2018.

At the time, the companies announced that they were partnering in a project to develop a commercially viable recycling method for polyurethane mattresses.

Dow said that the project would help recycle some of the 30m mattresses that are



Post consumer mattress ready for recycling

istock photo

discarded at their end of life in Europe each year.

Ana Haracemiv, commercial director EMEA at Dow Polyurethanes, said: '[This] is a significant step towards achieving circularity for a product which traditionally poses significant challenges for recycling. Our ambition is to address some circular economy goals set out in the EU's Green

Deal and national waste management strategies.'

'This will be a major investment that fits with the growth strategy of our company,' added Christian Siest, president at Orrion Chemicals Orgaform.

Plant construction should be complete by the end of the year, and product should be available in the first half of 2021, according to Dow.

OEM stops hit Grammer revenues

Amburg, Germany – Automotive seating to interiors group Grammer expects to make a loss in its earnings before interest and taxes of €2m in the first quarter of 2020.

This compares to earnings of €24m in the first quarter of 2019. Revenue in the first quarter is likely to be €455m, compared to €534m that was achieved in the previous year.

The company said that the predominant cause of this loss and fall in revenue were the significant reductions in customer orders and the worldwide production stops of many OEMs in the light of the coronavirus pandemic.



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Dow slows PU manufacturing to avoid product stockpiling

Midland, Michigan – Dow was running its global polyurethane assets, including propylene oxide and MDI, at reduced rates in the coronavirus pandemic. '[This is because of] government-mandated shut-downs around the world,' said Jim Fitterling, the company's CEO. He was speaking in a conference call with investors as the company reported financial results for the its first quarter of 2020.

Fitterling said polyurethanes are suffering because lockdowns had shut production in downstream industries such as automotive, furniture and bedding, appliances and construction. 'We are dialling back the capacity,' he said. 'We don't really feel like in this environment, ploughing a lot of material into inventory is the right thing to do.'

Polyurethanes & construction chemicals, part of the industrial and intermediates

division, reported sales down in the first quarter of 2020. Prices fell because oil became cheaper over the quarter. Volumes fell everywhere apart from EMEA, where they were up slightly. Demand fell in furniture and bedding, automotive and appliance applications. Markets in the Asia Pacific region, particularly in China, had the biggest falls.

In the industrial intermediates & infrastructure business, net sales fell by 12.7% between Q1 2019 and Q1 2020, to \$3bn. This compares with \$3.5bn in the 2019 period. Operating EBIT in the division fell by 36.8% to \$175m in the first quarter of 2020, down from \$277m in the 2019 quarter.

Fitterling set the scene when he said: 'We experienced margin compression in our upstream polyurethanes and silicones chains on weaker industry fundamentals.' Sales fell because prices and vol-



Fitterling: margin compression

umes fell in the quarter, but it was not all bad news. Volumes were up slightly in EMEA; however, everywhere else, coronavirus lockdowns stifled demand.

Taking the company as a whole, total net sales were \$9.8bn in the first quarter 2020, down 11.31% on the

company's *pro forma* numbers for the same period last year. Operating EBIT across the business fell by 26.2% in the quarter to \$843 m.

For the rest of 2020, Fitterling said: '[Dow is] assuming a gradual and sustainable return of global economic activity and reopening of economies in May and June. We expect a recovery will begin to take hold as the year progresses. We are further reducing our capital expenditure target to \$1.25bn. [This is down by] \$750m on 2019, trimming operating expenses by \$350m, and unlocking another \$500m from working capital.'

However, Dow is still planning for new polyurethane businesses. Fitterling said: Downstream, expansions in our industrial solutions are still continuing. Systems house[s] will come back as automotive business, insulation and construction return, he said.

Covestro and Teknor Apex collaborate in TPU project

Leverkusen, Germany – Covestro and US compounder Teknor Apex have announced a joint project to produce new thermoplastic polyurethane (TPU) compounds. These will be specifically tailored for specific applications.

Covestro said that the link-up is designed to enhance the properties of Covestro TPUs. It will produce Desmoflex-branded compounds for a wide range of industries. These include the automotive, sports, electronics and medical sectors.

By combining Covestro's expertise in polyurethanes and Teknor's custom formulation capabilities, they aim to create customised products for new and existing customers.

Like many thermoplastic polyurethanes products of the collaboration will have an attractive balance of properties.

They will have high resistance to abrasion, wear, chemicals and weather, and can be compounded with various properties, such as soft, hard, stiff and elastic.

The companies explained that the compounding process will also aim to enhance the properties of the polymers. These include flame retardancy, adhesion and appearance.

Thorsten Dreier, global head of the TPU business at Covestro, said: 'Together with Teknor Apex, we want to develop customised products to grow together with our existing and new customers.'

Coronavirus depresses demand for Chemours' fluorocarbons in Q1

Wilmington, Delaware – Third-generation PU blowing agent manufacturer Chemours generated net sales of \$1.3bn in the first quarter 2020, down 5.16% on the same period last year. Adjusted EBITDA across the business fell by 1.9% to \$257m in the quarter.

'Our Q1 results were consistent with our expectations thanks, in part, to improved operating performance across our network. At the same time, we did begin to feel the early impact of coronavirus in some areas of the business,' said CEO Mark Vergnano.

In the company's fluoroproducts business, the effects of coronavirus in the Asia-Pacific region helped push volumes down in the first quarter. Consequently, net sales fell

12.7% between the first quarter of 2019 and the first quarter of 2020, to \$600m. This compares with \$687m in the equivalent period in 2019.

The company said that adjusted EBITDA in the division fell by 11.9%, to \$140m in the first quarter of 2020. This compares with \$159m in the 2019 quarter.

The company said illegal imports of its materials into Europe are depressing prices for its refrigerants. However, it said that improved efficiency at its plant in Corpus Christi, Texas, lower costs and greater business efficiency helped to offset this.

Vergnano added: 'In light of the uncertainty created by this pandemic, we are withdrawing our full-year 2020 guidance.'

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Casper sleep beats retreat from Europe

New York, New York – Casper Sleep, the bed-in-a-box company, had total sales of \$113m in the first quarter of 2020, up 26.40% on the same period last year. Adjusted EBITDA fell from a loss of \$14.3m in the first quarter of 2019 to a loss of \$22.9m in the first quarter of 2020.

CEO Philip Krim said: 'I am pleased with the solid financial results in Q1 and strong early performance in Q2.' First quarter revenue grew because the company sold more products directly to consumers and gained market share at its 59 stores in the US until they were closed by coronavirus.

Also in the first quarter, the company changed its logistics provider, which should save money in the longer term. It also dropped prices to clear the decks for new products at the end of the quarter. Both of these moves hit EBITDA.

The coronavirus emergency has had 'only a minor impact to our inventory availability and deliver capacity', according to Krim. Casper also confirmed that it is pulling out of Europe, with the loss of 78 jobs by the end of 2020. This will save the company \$10m/year in costs.

The company is starting the second quarter on the up. Krim added: 'We achieved preliminary growth of over 15% year-over-year in April, led by e-commerce growth of over 35% and retail partnership growth of over 20%.'



Krim: exiting Europe

Sales up at Tempur Sealy, decline expected in Q2

Lexington, Kentucky – Tempur Sealy, the bed and mattress maker, generated sales of \$822m in the first quarter 2020, up 18.96% on the same period last year. EBITDA across the business rose 49.0% to \$143.5m in the first quarter of 2020.

Sales in the North America business segment were up 24%, and the international business was down by 1.2% on the first quarter of 2019, said the company. US sales grew from \$544m in the first quarter of 2019 to \$677m in the 2020 quarter. The numbers were helped by the amount of sales generated in company-owned stores.

International sales were down to \$145.2m in the quarter. This 1.2% fall was a result



Tempur Sealy photo

of the effects of coronavirus lockdowns in the company's international markets.

CEO Scott Thompson said: 'We are especially pleased with these results in light of coronavirus having a material impact on our Asian business throughout the quarter. It impacted our North American and European markets

during the second half of March. While there are significant challenges ahead, our strong operating momentum heading into this crisis gives us confidence.'

Sales in the second quarter could be down by 55%, and Tempur expects to make a loss in the second quarter, said Thompson.

Sales remain solid at Amerityre

Boulder City, Nevada – Amerityre, which makes several ranges of polyurethane industrial and agricultural tyres, generated total sales of \$1.1m in the third quarter of 2019. This was up 21.04% on the same period last year.

Gross profit across the business rose by 22.1%, and

reached \$352,900 in the third quarter of 2019.

Stable raw material costs and new customers helped the company to gain operating profit in the quarter.

The company has been able to keep working during the coronavirus crisis, as a supplier to essential busi-

nesses. However, it warned: 'The US economy is facing a major downturn in the coming few months.'

Due to the coronavirus pandemic, weakness in the overall economy remains a significant risk factor in the last quarter of fiscal year 2020 as well as 2021.'

SPFA encourages professional certification

Stafford, Virginia – The Spray Polyurethane Foam Alliance (SPFA) is encouraging SPF contractors to participate in professional development activities if they have down time because of coronavirus.

It is offering online exam preparatory courses for its Professional Certification Program (PCP) free to members, and companies with employees enrolled in the programme. Others can enrol in the PCP, and gain full access to all the

courses as they are released.

Three online certification courses are already available: one for roofing installers, one for insulation installers, and an exam preparatory course for SPF assistants. Four more are under development, for master installers and project managers for both insulation and roofing.

'The SPFA is always looking for ways to enrich its members and their businesses, and the Professional Certification Pro-

gram is an important piece of that,' said Kelly Marcavage, the PCP's director. 'This is a perfect time for all contractors who find they have some extra time on their hands to work on their certifications and improve their professional standing.'

Those eligible for free courses will be contacted via email. Others who would like to attend the should contact certdirector@sprayfoam.org for more information.

Sales down 5% in Q1 for Honeywell

Charlotte, North Carolina – Honeywell, the diversified conglomerate whose portfolio includes blowing agents, generated sales of \$8.5bn in the first quarter of 2020. This is down 4.74% on the same period last year. Pre-tax income across the business rose 5.0%, and reached \$1.9bn in the first quarter of 2020.

'Honeywell delivered our original earnings commitment for the first quarter, despite the substantial challenges we faced due to the coronavirus pandemic,' said CEO Darius Adamczyk.

'As the pandemic rapidly escalated and the global economy deteriorated, we faced headwinds across our businesses. There were rapid changes in our supply chain and, constraints at customers. These challenges drove an organic sales decline in the quarter.'

In the company's performance materials and technologies business, which houses blowing agents, sales declined by 6.8% to \$2.4bn between

the first quarter of 2019 and the first quarter of 2020. This compares with \$2.5 bn in the same quarter last year.

Pre-tax income in the division fell by 9.2% to \$512m in the first quarter of 2020. This compares with \$ 564m in the equivalent period in 2019.

Aside from the effect of the coronavirus pandemic, sales were down in the division because of illegal imports of HFCs into a number of regions.

Looking ahead to the rest of the year, Adamczyk said his company is well-prepared to manage the downturn with

a strong balance sheet. '[The company has] nearly \$9 bn of cash and short-term investments on hand,' he said. 'In March, we further enhanced our financial flexibility with a \$6 bn two-year term loan and refinanced €1bn of bonds at attractive rates.'



Adamczyk: well- prepared to manage the downturn, with cash on hand

Coronavirus forces cuts at Ingevity

North Charleston, South Carolina – Ingevity, which bought Perstorp's Capa business in 2018, said reduced demand is causing it to cut costs.

It will reduce headcount and staff benefits, streamline processes, and furlough some production workers.

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Restructuring outpaces pandemic as Adient continues turnaround plan

Plymouth, Michigan – Automotive seat giant Adient expects the benefit of its turnaround plan to outstrip the impact that coronavirus-driven shutdowns have had on its business in the second quarter of 2020.

Revenue in the quarter is likely to fall by approximately 17% to \$3.5bn. This is a drop from \$4.2bn in the second quarter of 2019. However, adjusted EBITDA is expected to be between \$200m

and \$210m. This is despite a \$100m hit from the coronavirus-driven expenditures in the quarter.

In the second quarter of 2019, adjusted EBITDA was \$191m.

Adient is looking at additional funding options to strengthen its balance sheet because the company said that it is currently spending \$175m per month to maintain its business.

Consequently, the company is taking action to resize

its cost structure because it thinks that sales after lockdown ends, and the coronavirus pandemic is under control, will be lower than before the pandemic.

'The preliminary Q2 results demonstrate the improvement phase of the company's turnaround plan,' said Doug Del Grosso, president and CEO. 'The team is acting quickly and decisively to reduce the company's cash burn rate and increased liquidity.'



DelGrosso: the team acted quickly

Lear profits down almost 14% in Q1 2020

Southfield, Michigan – Automotive seating giant Lear managed to turn a profit in the first quarter of 2020. This was despite a significant impact on production from the global coronavirus outbreak.

The company generated total sales of \$4.5bn in the first quarter of 2020, down 13.6% on the same period last year. Core operating earnings across the business fell by 45.8% to \$204.9m in the first quarter of 2020. In total, coronavirus

sliced \$900m off sales and \$200m from core operating income in the quarter, the company said in a press release.

'We experienced plant shutdowns in China beginning in late January that were followed by shutdowns of almost all our global operations beginning in mid-to-late-March,' said CEO Ray Scott.

He added: 'Excluding the impact of coronavirus, Lear's results reflect solid financial

performance in both of our business segments. While significant near-term challenges remain, I am confident in the strength of our underlying business, long-term competitive position and liquidity.'

The effects of coronavirus will hangover into the second quarter, Scott added, because automotive production will still be down.

In the first quarter of 2020, Lear said, global vehicle production was down 23% on the

first quarter of 2019. Production in China was down 47%, Europe down 19% and North America down 10%.

To manage the economic fallout, Lear drew down \$1bn of its total available \$1.75bn in credit, suspended its share repurchasing programme, and issued \$650m in new bonds. It also deferred non-plant employee salaries by 20%, reduced Scott's salary by 10%, and other executives' salaries by 5%.

Coronavirus drives online sales at Purple

Lehi, Utah – Sales at bed-in-a-box company Purple Innovation were up 46.4% in the first quarter of 2020 and Q2 looks good for the company, partly because of coronavirus lockdowns in the US.

CEO Joe Megibow explained: 'We entered the new year with great momentum in our business and strategies in place to build on our recent performance. The outbreak of coronavirus in mid-March significantly disrupted our plans, particularly for our wholesale channel.'

However, people in the US sheltering at home started shopping for mattresses online. He explained that the company moved the majority

of its time and resources to its digital channel to capitalise on the accelerated shift towards online purchasing.

Megibow added that the company could change its direction quickly because it is vertically integrated, with entirely domestic production facilities.

In the quarter, sales were \$122.4m and, compared with the period in 2019, adjusted EBITDA across the business rose 71.0%. It reached \$10.6m. Purple is optimistic for the second quarter of the year because of a strong start in online sales in April.

Direct-to-consumer orders were up more than 170% to about \$54m in April 2020,



Megibow: optimistic for Q2

Megibow added. The company has ended staff furlough to meet demand. The company said it expects to bring on more production capacity.

CPI highlights PU's contribution to sustainability

Washington, DC – The Center for the Polyurethanes Industry has launched an online brochure outlining the ways that the material contributes to global sustainability goals.

The CPI stresses the long lifetimes of many PU products. It said: 'most polyurethane products and product components are durable and long-lasting, often lasting for the life of the product... rigid polyurethane used to insulate refrigerators last the lifetime of the refrigerator.'



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Sinomax earnings plummet after US-China trade battle

Hong Kong – Sinomax, the flexible foam to sleep products company, generated sales of HK\$2.997bn (\$386m) in 2019, down 29.7% on the previous financial year. This translated into a post-tax loss of HK\$147.6m in 2019, compared to a profit of HK\$27.5m in 2018.

The numbers come from the company's unaudited financial results. Normally, the figures would have been audited before release to the Hong Kong Stock Exchange, but the audit process has been halted by the impact of coronavirus in the region. The company's audit committee has checked the numbers.

Sinomax said that it may have been hit twice by US trade sanctions on Chinese products in 2019. Its direct

sales to the US were definitely hit, it said.

'Some of our PRC customers who were buying our foam to produce products for their customers in the US might also have been affected by the US-China trade war,' the company added. 'Accordingly, our sales in the China market decreased as well.'

The company's gross profit margin did grow in 2019. This is because it managed to benefit from the lower cost of TDI, but this was offset by the cost of a trial run at a new factory in Vietnam.

The post-tax losses came from the fall in value of the intangible assets and goodwill related to Sinomax's acquisition of Dormeo North America in 2016.

'Sales of Dormeo was highly concentrated with several key customers to whom the sales in 2019 dropped significantly,' the company added.

'Having considered that the financial performance of Dormeo would not turn around in the coming few years, we made impairment provision of goodwill, brand name and customer relationship directly related to Dormeo. This all added up to about HK\$137m, and it was included in the profit and loss account.'

It said that during 2019 its plant in Vietnam had started making foam for customers in south-east Asia. This, new production stream, its plants in China and the US plant in Tennessee should give it additional flexibility.

Huafon Q1 sales decline by 24%

Wenzhou, Zhejiang – Huafon Spandex has had a 24% year-on-year drop in Q1 sales to CNY2.6bn (\$372m). The company is the Shenzhen-listed elastane and PU resin arm of Chinese polyurethane heavy-weight Huafon Group.

It achieved CNY273m net profit during the Q1 period, down 17% from a year ago, according to its regular financial report.

Huafon's R&D expenditure in Q1 slipped by a third to CNY103m.

Huafon's 2019 sales dropped 9% from 2018 to CNY13.8bn. Net profit fell by 5% to CNY1.8bn, said its annual report in April.

The company claims to be China's largest, and the world's second largest, elastane maker. Its current capacity is 150kT/year, and 100kT/year more is in the pipeline.

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Profits slashed as TDI maker Dahua slumps

Cangzhou, Hebei – Cangzhou Dahua, one of China's largest TDI makers, recorded a CNY38m (\$5.4m) net loss in Q1 2020, compared with CNY16m net profit in Q1 2019. Revenue during the period arrived at CNY203m, down 64% from a year ago, according

to the company's Q1 report in April.

China's TDI downstream market was halted in February, resulting in high inventory at TDI makers, the report said. In March, as the coronavirus outbreak was curbed, downstream clients showed more

willingness to reopen, but a majority were still closed. TDI price fell significantly from a year ago, it added.

In Q1 2020, Dahua produced 29 kT TDI and sold 13kT, generating CNY125m revenue.

The company achieved

CNY2.1bn sales in 2019, down 52% from 2018. Net profit in 2019 dipped by 95% to CNY46m. Dahua produced 149kT TDI in 2019, accounting for 14.8% of the country's total production, the report said. China's TDI demand in 2019 fell by 1.6% to 758kT.

Wanhua and SKSHU launch PUD for waterproof coatings

Shanghai – Wanhua and Chinese coatings maker SKSHU Paint have jointly launched new water-based PUD materials for waterproof coatings, after five years of research. This is the first time such a PUD has been used in waterproof coatings, Wanhua said.

The coatings include five materials made with three types of systems: aliphatic

polyesters, aliphatic polyethers and aromatic polyethers. They exceed existing water-based materials in durability with 2,500-hour resistance to accelerated weathering, the company said.

The new coatings have at least 4.7MPa tensile strength, 600% elongation at break and 1.7MPa bond strength, the company said.

Hongbaoli Q1 sales down 21%, profits up

Nanjing, Jiangsu – System house Hongbaoli posted CNY473m (\$67m) sales in Q1 2020, down by 21% compared with Q1 2019.

'This is mainly caused by a drop of sales volumes [because of the] coronavirus impact in the China market, as well as a decrease in product prices amid falling feedstock prices,' said the company's Q1 report, published in April.

Nevertheless, net profit during the period jumped 20%

year on year to CNY25m. Net profit less non-recurring items rose by 33% to CNY24m.

Hongbaoli attributes the rise in profits to lowered selling expenses and growing product profitability. Selling expenses in Q1 2020 fell by 26% from a year ago to CNY19m. Net cash flow generated from operating activities during the period was negative at CNY51m, compared with a negative CNY70m a year ago, said the company.



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Hengguangda expands in PU additives

Chizhou, Anhui – Additive-maker Hengguangda plans to build a new plant with 18kT/year PU additives and 10kT/year PU systems capacity at its existing site in Chizhou.

The plant will cover 56,000m² and the project will cost CNY300m (\$42m), according to an environmental impact report released in

April. Construction is expected to take 18 months.

It is being designed with capacity for 3 kT/year amine additives, 10 kT/year silicone additives, 5 kT/year tin additives and 10 kT/year PU systems. The plant will create 100 new jobs when in operation. It is expected to generate CNY92m annual profits after tax

Originally, the project also included capacity to make high-speed train and airplane seating. It was expected to have capacity for 100,000 unit/year, but this was cancelled because of market conditions and restraints in at the site.

Hengguangda has been supercharging its expansion over the past few years, with

40kT/year capacity for additives. It has recently added capacity for both POP and modified MDI. The company had CNY500m sales in 2018, up 50% from 2017.

It currently claims a 63% China market share for its tin additives, a 23% share for silicones and a 10% share for polyurethane systems.

Mattress-maker Mlily Q1 growth as market turns down

Nantong, Jiangsu – Revenues at Chinese mattress maker Mlily climbed 34% year-on-year in Q1 2020 to CNY1.1bn (\$150m). Net profit rose by 7% to CNY80m. Net profit less non-recurring items jumped 73% from Q1 2019 to CNY84m, according to the company's

first quarter report in April.

Mlily attributes its raised revenue to the growth in sales volume. Selling expenses during the period more than doubled to CNY187m.

In 2019, Mlily generated CNY3.8bn revenue, up 26% from 2018. Net profit doubled

to CNY374m, its annual report said. The company sold 4.4m mattresses and 10.4m pillows, accounting for 55% and 13% of total sales respectively.

With plants in the US, Serbia and Thailand, sales to overseas markets, mostly the US and Europe, jumped 23% last

year and contributed to 82% of Mlily's annual sales. Exports had a 39% gross profit margin, up by 9% from a year ago.

For mattress products, the company was able to reduce the ratio of materials costs to total costs from 83% to 77% in 2019, the report said.

... renews fundraising plan for overseas plants

Nantong, Jiangsu – Mlily, also known as Healthcare Co, announced a revised plan in April to raise up to CNY693m (\$98m) through a private share placement. Capital raised by the share placement will be used for its US plant and the third phase of its plant in Serbia. The funding plan was first disclosed in December 2018, and initially aimed to raise up

to CNY800m.

The plan was paused for regulatory approval because of Mlily's earlier acquisitions, but it has now resumed, the company told *Urethanes Technology International*. The coronavirus pandemic had little impact on the plan, it said.

Mlily inaugurated its US plant in Winnsboro, South Carolina in December 2019, and

it has been operating during the crisis. The Serbia project's phase three is also on the way.

In 2018, Mlily reported CNY2.5bn overseas sales; this was up by nearly a third from 2017. Overseas sales have been an important part of the company's business and account for at least 82% of Mlily's total revenue each year since it was listed.

News in Brief

Superfoam donates mattresses in Nairobi

Ruiru, Kenya – Superfoam has donated 50 mattresses to the Kenyatta National Hospital in Nairobi. In April, the company also donated a number of masks to healthcare workers in the country.

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Isocyanates markets tumble as the world fights coronavirus

Report by Regina Sousa,
consultant, Orbichem

Just as isocyanates started to see a light at the end of the tunnel after months of weakness, coronavirus arrived and dampened any hope of growth.

US MDI markets usually see an uptick in demand as spring arrives, but as Q2 comes to an end it is very clear this is an unusual year. Markets continue to soften, and there is talk of producers lowering operating rates due to lack of demand. Most sectors which shut down in April have now begun to get back to business as usual, but they are operating at lower levels as demand slowly starts to gather some strength. The construction sector is reported to be better than expected and activity is increasing, albeit at lower levels. Demand from the automotive sector is slow, but is expected to gather pace soon as plants are now reopening.

Maintenance turnarounds

The European MDI market is not dissimilar, and is currently trying to get moving and regain some sort of normality. Overall market sentiment is beginning to improve as businesses resume production, albeit at lower levels due to social distance measures. Demand has been declining significantly since April. It is still low but showing improvement. Construction, usually strong at this time of the year, has been sluggish in most European countries, but started to restart in May.

Demand for pure MDI has seen a bigger decline due to weakness in the automotive market. This sector is also resuming production, but it will be a very slow process to get things up and running again. Automotive markets take time to readjust, and the sector was already under pressure before the pandemic started.

In China, the MDI market started to recover around April/May, but demand has been below normal levels. Currently there are several maintenance turnarounds taking place, and some regions saw prices rise as a result. As international markets started to reopen, export levels improved in May, adding to further upward pressure on prices.

The North American TDI market weakened further because of the coronavirus pandemic. Demand is still at low levels as markets slowly restart operations. Some players said the automotive and comfort sectors began a staggered restart from May, but will take time to go back to previous levels. Automotive performed better in May but is still well below previous levels. Production was completely shuttered in April. TDI, which goes into construction, is doing well as the sector is providing a small lifeline to players.

The European TDI market is also seeing some improvement, but at lower rates than MDI. Demand from automotive and foam plants is growing but at a slow pace. Most European automotive industries have now resumed production, but social distancing measures must be observed. Some foam plants are also reopening but running at low levels due to lack of demand. Shops are beginning to reopen, and demand for comfort products could see small improvements. Countries like Germany and Austria have reopened shops, but it is noted that buyers are not venturing out. Central European countries, such as Poland, are doing better as people seem more open to going out to shop.

In China, the domestic TDI market firmed under the strong drive from suppliers to increase prices. Despite the Labour Day holiday, most downstream buyers had filled their warehouses when

TDI was at a low price. Major producers showed strong determination to push the price up. By mid-month, BASF and Covestro went into maintenance turnarounds and major producers continued to increase their listing prices. Demand remained low, and some traders lowered their prices in order to get sales.

The North American domestic polyether polyol market is still weak due to the pandemic. Domestic demand has changed significantly over the past few weeks. Demand is beginning to see some improvement, depending on the sector. The construction sector is seeing better activity, but levels are still low.

The automotive sectors were better in May compared to April, but are still at low levels. Demand from the comfort industry depends on the reopening of retail facilities and a greater easing of quarantine measures around the US.

Reopening businesses

The European polyether polyols market is reported to be improving after its closures in April. Like MDI and TDI, polyether polyols sentiment is better as economies start to reopen businesses and demand is picking up, albeit at lower levels than those seen in previous years. At the moment, the view is that June will see an uptick in demand but at modest levels.

The Chinese flexible foam polyol market showed signs of improvement. The Labour Day holiday triggered demand all the way to the foam market. Feedstock PO was in short supply, and helped to support prices.

Most markets are expected to see further demand improvement but at low levels. Social distancing measures, as well as people's health and safety fears, could have a negative impact on demand and keep markets weak over the next few months.

Growth in the GCC offers potential for polyurethanes



Dubai and the other GCC nations are at one of the world's commercial crossroads. What does the region offer the polyurethane industry? **Simon Robinson** finds out.

There has been spectacular population growth in the Gulf Cooperation Council (GCC) nations over the past 25 years. The overall number of people across the region increased almost three-and-a-half times between 1983 and 2018. Population growth rates spiked in about 2008. They are now slowing in countries other than the UAE, which grew between 2013 and 2018, according to World Bank figures.

The largest nation in the trade group is Saudi Arabia. During this period, its population has grown from 11.7m people to

33.7m. Its increase in population outstrips that of all the other GCC nations combined, which added 13.2m people from a base of 4.8m.

Increasing wealth

The region also got richer, in some cases remarkably so. World Bank statistics show that the region had an average GDP of \$35.2bn in 1983. The top of the pile was Saudi Arabia with \$129.2bn, and Bahrain, with \$3.7bn, brought up the rear.

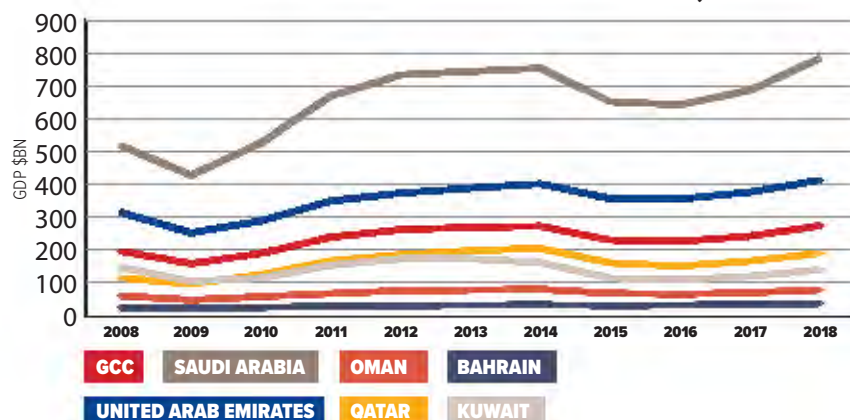
By the end of the period, Bahrain's GDP had grown slightly faster than the aver-

age for countries in the region and was 10 times larger at \$37.7bn. Qatar, however, is the standout. Its GDP has grown to almost 30 times its size in 1983 from \$6.5bn to \$191bn. In the same timeframe, the UAE increased from 33% of Saudi Arabia's GDP to 53%.

This has to be good news for the use of polyurethane. Typically, the demand for polyurethane grows by about three percentage points more than the rise in GDP. Industry leaders in the region confirm this.

But the market in the Middle East is largely undeveloped, with great poten-

HOW GDP CHANGED ACROSS THE GCC NATIONS, 2008-18



adhesive market is significant, despite being much smaller than other PU segments such as rigid and flexible foam.

'It is one of the segments that we have been developing and promoting globally since 2017,' he said. 'We have a specialised business unit to push technology and commercial development. It's going quite well. We have sold products all over the world, from Vietnam to South Africa to the CIS to the Dominican Republic.'

The demand in the GCC and other nearby countries is split between rigid and flexible polyurethane formulations and applications. IAL's Propst believes the UAE is at the forefront in terms of thermal insulation usage in the region. 'Polyurethane insulation is already common for new construction projects,' he said.

'The Abu Dhabi Planning Council's Estidama programme has made sustainability of urban planning and construction compulsory, and consequently the market for rigid polyurethane panels is growing at

Bawab: pushing new technology



tial for future growth, according to Philipp Propst, project manager and head of PU research at IAL Consultants. As history has shown, some countries suffer from political instability, and the fluctuating price of oil could be seen as a disadvantage. But, Propst argues, this is helping countries diversify their industrial base into other areas, which could help polyurethane and other industries.

A lot of each nation's potential for

growth comes down to the size of its population, wealth and rate that the wealth is growing. Wassim Bawab, managing director Baalbaki Group, based in Sharjah, UAE, said that Egypt has around 100m people; there are about 35m in Saudi Arabia and 10m in the UAE. UAE is the best location to serve this market.

Bawab said that the UAE provides a good hub for serving the region, and also the rest of the world. He explained that the

▶ Continued on page 24



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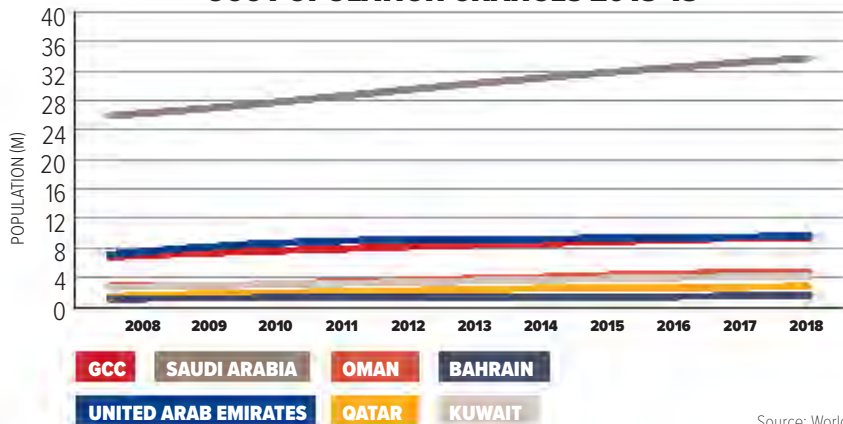
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GCC POPULATION CHANGES 2018-18



Source: World Bank

temate that this is in excess of 25kT/year in the Middle East – UAE, Saudi Arabia, Qatar and Yemen. Spray foam has been growing because of energy efficiency standards that are being implemented across the region. As these standards get stricter, thickness of the spray foam used increases.'

Varying standards

However, the situation is quite complex. 'The standards can vary across the Emirates,' he said. 'Abu Dhabi has the strictest standards. It aims to be more sustainable and is more LEED driven, with more LEED-compliant buildings. Spray foam in this region is HCFC 141-b blown. While this has been phased out in many countries, it is still used here. There are projects in Abu Dhabi that require zero ozone depletion potential blowing agents and less than 5 GWP.'

He added that third-generation blowing agents are now becoming more common in the region. 'Dow has developed some premium formulations based on these,' he said. 'The choice of material depends on the project specifications and who is writing them. While there is no government mandate in the other Emirates for third-generation blowing agents, there are many projects in Abu Dhabi that require them.'

Binding answers

The CASE sector is not very big in the region, Sahiwala said. 'But the foam binders business is growing,' he said. 'We supply a lot of binders for underlay and also Arabic seating such as majlis seating. Rebonded foam with a layer of memory foam on top will make a good mattress.'

There are two sides to the binders business: flexible foam and rubber-crumb binders. These are used mainly in playgrounds. While this is a growing market, it remains smaller than flexible foam binders, he said. 'There is a growing need for children's playgrounds and running tracks across the region,' he claimed. 'This is driving growth. It's difficult to quantify percentage growth but it is higher than GDP. It also depends on markets.'

Returning to Saudi Arabia, there is strong growth in the construction industry, across both residential and commercial. 'The share of PU rigid-faced sandwich panels is still relatively low, but the market is expected to grow at a fast rate for the forecasting period,' IAL's Propst said. 'The developments in Saudi Arabia are likely to spread.'

Correction: An error appeared in Table 1 of the Machinery feature in the last issue. We should like to clarify that Cannon employs 1060 people with 700 dedicated to PU, not a stated.

Continued from page 23
a very fast pace.'

He added that Saudi Arabia is the next country that is expected to follow in the footsteps of the UAE in terms of sustainable building practices. 'The government has introduced a scheme in which sustainable building designs will play a vital role in the attempt to reach the country's 2030 energy goals,' he explained. 'Polyurethane rigid-faced panels are expected to be mainly used in roofing applications and wall insulation for warehouses and other commercial applications.'

Dubai-based Akil Sahiwala, sales director for PU Middle East & Africa at Dow, said that a large volume of polyurethane insulation in the Gulf is used in roofing applications. 'Often this is used as spray-foam or in combo-roofing systems,' he said. 'These are roofing systems with a layer of waterproofing, a layer of spray foam, a layer of screed and cement. It is a fully finished roof.'

This construction method can give a durable roof and protect polymers from UV rays.

He added that the big question is how much insulation is actually needed in practice. 'At first it was minimal, now the standards are getting stricter and greater k value, better insulation capacity is needed,' he said. 'The goal is to reduce energy consumption and improve waterproofing.'

Roofing is an area of particular interest to Dow, and it is working with partners to devise the next generation of combo roofs. 'Combo-roofs are designed with the waterproofing buried within the structure,' he said. 'The key question is how to reduce the weight on top of the roofs.'

Setting standards

Although the GCC is a trading block, it has yet to harmonised standards in quite the same way as the EU, Sahiwala added. 'This is shown in the way that different insulation levels can be acceptable within the same nation,' he said.

Propst explained that most panel manufacturers in the region still produce panels using discontinuous processing. 'Continuous production will increase as soon as the demand grows to a significant level,' he said.



Sahiwala: combo roofing systems

Compared to Saudi Arabia, the demand for PUR/PIR rigid foam is significantly smaller in most countries in the Middle East and Africa, and PU rigid-faced panels are no exception. Bawab has a slightly different perspective. His company has been operating in the UAE since 2005

supplying PU systems, polyester polyols and PU specialties.

'Rigid foam is used mostly by panel makers,' he said. 'The country is highly regulated for fire and smoke performance of insulation products used in construction. We have developed systems that meet the highest European standards.'

Safety first

Some of these changes in regulations were introduced in the aftermath of a serious hotel fire on New Year's Eve 2016. 'The authorities have taken a long look at regulations,' he said. 'Abu Dhabi and Dubai lead the legislation on fire safety requirements.'

In the spray foam market, he added, customers are starting to ask about alternative blowing agents he said. Saudi Arabia is already moving towards third-generation blowing agents, he said, while in nearby non-GCC Jordan, regulations are now in place to force this change. Egypt, a large market outside the GCC, has also moved from 141-b to alternative blowing agents, he added.

Dow's Sahiwala agreed that spray foam is an attractive regional market. 'It has been growing across the board,' he said. 'We es-

The gulf: a unique market with unique demands

There are huge variations in the way polyurethane is specified and used around the world, and geographical differences are particularly stark. **Simon Robinson** takes a look at what makes the Middle East and African PU markets tick

The UAE stands at a geographical crossroads between Africa, Europe, and South Asia. And as the wind blows over the country, so do the different influences of each of these regions.

The market for flexible polyurethane foam for comfort applications is driven

by divergent forces. For example, at the big-buying international-standard and super-luxurious hotels, owners demand their beds and furniture can only be made locally by suppliers from other regions. But at the other end of the spectrum, there are local box-foam operators making low-tech foams. A number of

other foamers also are interested in importing into the mid-range markets. And then there are foreign foamers based in north and east Africa who are interested in sourcing raw materials and, possibly machinery, in the region.

The scene is vibrant and as complex as

► Continued on page 26



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► Continued from page 25

the design of a Persian carpet. Baalbaki Group, for example, is based in Sharjah and has been operating in the country for a number of years. Its managing director, Wassim Bawab, said that there is not as much demand in the UAE for technically advanced foams as there are in some other regions. 'But the region imports regrind foam,' he said. 'This could be used as carpet underlay or seating in communal areas of mosques, for example.'

Shake out

Bawab believes that six companies make flexible foam within the UAE. 'Before the price spike in 2018, there were a further 20 making foam in boxes, but these have closed,' he said.

Mahmoud Karime, sales manager at Hennecke, said that there are numerous flexible foam makers elsewhere in the GCC nations, some of them quite sizeable. 'There are some large producers in Jeddah,' he said. 'Kuwait and Qatar are very small producers. Yemen has 22m people and there is as much production capacity as Saudi Arabia, but purchasing power is much less and has fallen further in the civil war.'

However, there are significant problems with logistics. 'Pay-offs to local militia could be needed to allow goods to pass along roads,' he claimed. 'You can imagine how this affects the price of the final product.'

Philipp Propst, project manager and head of PU research at IAL Consultants, agrees that Saudi Arabia and the UAE are the major foam-manufacturing countries in the region. 'Saudi Arabia is the leading slabstock foam producer in the Middle East, and the market there has been relatively buoyant in spite of the low oil prices,' he said. 'The increasing population and economic performance have driven this buoyancy.'

Disposable mattresses

'There is significant demand for low-cost mattresses in Saudi Arabia due to large religious events such as the Hajj,' he said. 'Viscoelastic foam is expected to experience above average growth in medical applications, but from a small base.'

Hennecke's Karime explained that, as markets develop, the smarter manufacturers move from box to continuous foam. 'Discontinuous foaming is not very efficient,' he said. 'Egypt, for example, had a lot of discontinuous foamers in the past. A couple of them realised that if they moved to continuous production they would stay in business. Now, most of the foamers that are doing well and are profitable are continuous.'

He said that in the GCC/North and East Africa regions, commodity foams tend to

be between 10 and 35 kg/m³ (10oz- 2.18 lbs/cuft). 'There are some people making viscoelastic or HR foam,' he said. 'But these are very rare. Most is imported from Turkey, where they are on a different level. They are much bigger in terms of production volumes, and have completely different infrastructure and know-how than Saudi Arabia or the UAE.'

Bring it in

This import market is interesting to a number of companies located in neighbouring countries. A number of flexible foam manufacturers at the recent Sleep Expo Middle East event in Dubai (9-11 Feb 2020) attended the event to talk with local mattress and furniture makers.

Ajafco's managing director, Anthony Aboujaoude, for example was at the event to see if there was a market for his company's range of flexible foams in the region. Lebanon-based Ajafco has been

There are some large producers in Jeddah... Kuwait and Qatar are very small producers
Mahmoud Karime, Hennecke

producing flexible foam production and bedding since 1967 at a plant in Deir el Haref. It makes about 800 tonne/year flexible foam, including conventional, HR and viscoelastic grades. The company makes short 2.4m blocks using a Hennecke continuous machine, and has Baumer as well as Fecken Kirfel cutting equipment.

While it started out purely as a foam maker, Aboujaoude explained that as new foamers entered the industry, they needed to evolve, and add value to the supply chain. 'To sustain a healthy operational model, we had to diversify our product mix,' he said. 'In the mid-1970s, we considered both horizontal and vertical integration,' he said. 'We aimed at the specific needs of the bedding industry, and started making high-quality mattresses and pillows. We also bought a flame laminating machine to supply products for the textile and automotive industries.'

The company, which employs 50 people, exports specialty products to Greece, Cyprus, Egypt and Saudi Arabia. 'These are small volumes because specialties in this part of the world are not very common,' he said. 'There is a lot of low-density polyether foam filled with

calcium carbonate in the GCC. Viscoelastic foam is becoming more and more popular but, the Chinese and Turkish producers are dominant.'

A growing market

Oman's Syed Anwar Aahan, general manager of Raha Oman, gave the keynote at the conference attached to the exhibition. He said that the GCC market for PU foam is growing. 'Thirty years ago everything was imported,' he said. 'Slowly people started manufacturing, and because there is a lot of volume with polyurethane foam, there is little competition from far away.'

His business is a little different to the local producers in Dubai. 'We make 13kg/m³ density for a throw-away mattress up to 60kg/m³ for HR foams,' he said. 'We decided we would not just look at the mattress business, which is at the cheap end of the market. We went for furniture applications. We do not use fillers, and we are geared for different furniture foams.'

At the bottom of the market, Aahan said, it is all about hardness, density and price. 'We don't want to be in that market,' he claimed. 'We also make moulded foams, and we have a long-block peeling system, profiling and cutting machinery. The company makes 60m blocks and peels them.'

The company has been in operation since 1980. At first, it made box foam with a Hennecke BF100 machine. 'In 1982, we bought our first 150E machine from Cannon Viking,' he said. 'We sold that to a company in Kenya, and bought a Max-Foam750 from Cannon Viking.' The company now also has a high-pressure moulded foam machine from KraussMaffei, and a moving head cutter from Baumer.

Most production goes into furnishings, upholstered furniture, polyester fibre and sprung mattresses. 'Since we had the distribution, we kept adding products,' he said. It employs 450 people in Oman, and counting those in Kuwait, Qatar, Saudi Arabia there are about 600 involved in the business. It also has a testing laboratory.

A question of taste

Companies looking to supply the region will have to come to terms with a range of different aesthetics and opportunities.

To sustain a healthy model, we had to diversify our product mix
Anthony Aboujaoude, Ajafco

For example, as Aahan of Rana Oman explained, there is a line of business where initial hardness is good. 'If it's hard it is good, but that defeats the whole purpose of foam,' he said. 'But there is a market segment where quality is determined by hardness.'

This was reflected by Dow's Akil Sahi-wala, sales director for PU Middle East & Africa, speaking away from the exhibition. He explained that the preference for hard foams is built into the formulations.

'Standard polyols are blended with high solids polyols at typically 10, 15 or 25%, although some applications call for 40% high-solids material in the mixture,' he said.

'It depends on how hard people want the final mattress to be. Mattress manufacturers use copolyols based on flexible polyols, which Sadara produces, and high solids polyols because there is a varying degree of hardness is needed in the foam.'

The region has a preference for slightly harder mattresses, he believes. 'Dow is mulling over whether to

install a high-solids blending unit in the region,' he said. 'But it would benefit from having locally produced blends.' He added that there is a lot more growth in the flexible side at this stage.

A view from Europe

Two Iberian flexible foamers were present at the event: Torres Espic from Spain and Flex 2000 from Portugal. Both were there to talk to local mattress specifiers and buyers.

'We have some business in Dubai, North Africa and Senegal,' Rafael Torres Sanchez, CEO at Torres Espic CEO, said. He added that his company is well positioned to supply the region because of its network of agents in North and South Africa, the Middle East, Singapore and Turkey.

The company has 75 employees on its 50,000 m² site Valencia, Spain and converts around 10 kT/year flexible foam. It is 100% family owned, and makes foam for bedding and furniture using machinery from a range of suppliers. It has a LaaderBerg foam line, cutting machinery from Fecken-Kirfel, racking and curing facilities supplied by IPF, and wrapping technology from Dolphin Pack.

The investments in cutting and storage facilities that it made in 2019 will allow it to

increase production to between 20-25 kT/year. 'We are aiming to become a €50m/year company,' Sanchez said. 'We only make foam; we respect the supply chain.'

Carlos Pereira, manager for products and operations at Flex 2000, explained that his company was at Sleep Expo Middle East as the first step to understand the market and develop a strategy to meet its demands.

He said that the company exports to France, Italy and a number of other countries from its site in Ovar, Portugal. It exports are as rolled, compressed block mattress cores.

The company is based in an industrial region to the north of the country on the Atlantic coast. With 50kT/year capacity, it makes polyether, polyester viscoelastic and HF foams on Hennecke equipment. There are 96 racks to store foam on the site, Pereira said.

Products are supplied as rolls and blocks which are customised to client requirements. It also has a technical laboratory that can test formulations as small blocks.



Sanchez: business

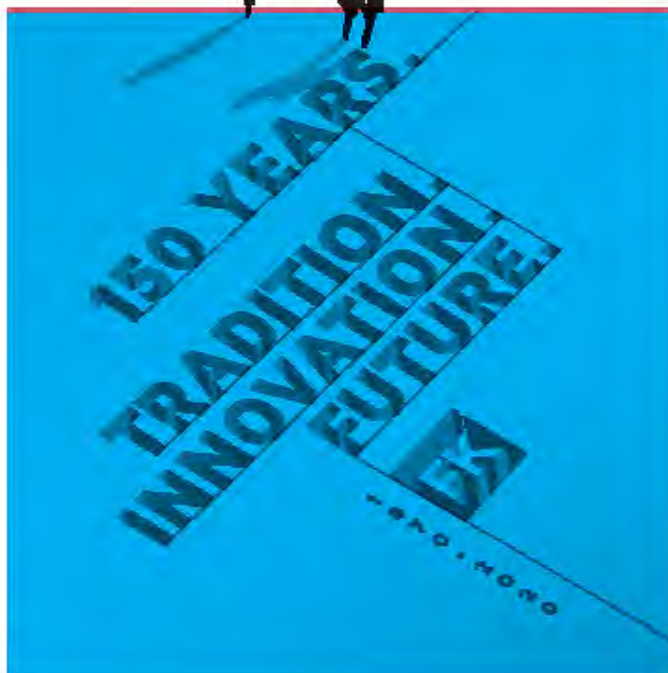


Pereira: exports

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Flexible foam: rising to the challenge

Sleeping under the star: demand for advanced mattress foam is shooting up in the Middle East and Africa

A panel discussion at the recent Sleep Expo event in Dubai got to the heart of some of the key issues facing the flexible foam industry in the GCC and East Africa. Simon Robinson reports.

The price of raw materials, the difficulty in finding good staff, and making a profit in challenging markets are issues that polyurethane professionals around the world are familiar with. But wherever you are in the world, people will pay good money for a good night's sleep.

As Habin Waldu, director operations at Rainbow Foam in Ethiopia explained, more people are starting to understand the connection between sleep and health. 'They want us to create products that are cost-effective and give health benefits,' she said. 'The research in this

area is reaching east African consumers. We have worked to try to give customers what they want, but it is a price-sensitive economy.'

The markets may be price sensitive, but there is demand for technologically advanced foams for mattresses, according to Rakesh Shah, CEO at Nairobi-based Vitafoam Kenya. 'In east Africa, we have seen memory foam coming into the market, and right now we are seeing a lot of people asking for foam encased with copper or containing ions,' he said.

'We all know that our bodies are made up of positive and negative ions. At Vi-



tafoam we have introduced fabrics with scents such as lavender, and vitamins A, C and E for anti-ageing. These are the sort of trends we see coming into the market.'

Alaa Shraim, general manager at Dow, agreed. 'Consumers want more from their mattress – they want a sleep experience,' he said. 'They take foam density, hardness and ergonomics as a standard. Now they are looking for the micro-environment like the temperature around the body and they want to know more about what's in the mattress.'

Mattresses are more than just support,' he added. 'I believe that foam manufacturers who sell a mattress with the pillow as sleep system are going to succeed in the market far more than those who just sell a mattress based on specification. Selling a mattress on specifications can be confusing for consumers.'

Beyond the short term

One of the biggest problems facing flexible foam makers in East Africa can be access to raw materials and the price of materials. 'Access to raw materials and ever-changing chemical prices are definitely a challenge,' said Rainbow's Waldu. 'Raw material prices affect our production costs and our ability to provide our cus-



Raw material prices affect our production costs and our ability to provide our customers with the best mattresses at a price they can afford."

Habin Waldu, Rainbow Foam

tomers with the best mattresses at a price they can afford.'

People have little or no control over prices in other parts of the world, but Waldu's company faces another level of complexity. 'The problems are often external, and we can't control them,' she said. 'This includes prices and, in our country, the availability of foreign currency. Limited access to foreign currency hinders our access to raw materials when we need them for production.'

Rainbow Foam's approach is to combat these problems by pre-planning, forecasting, looking at demand and supply, and planning ahead. 'It is easy to control internal factors, but external factors are out of your control,' she said. 'We look at our long term, not our short-term needs.'

Price volatility can have a big effect on the commercial success of some

small foamers, according to Vita's Shah. 'In Kenya, we had six big foamers and about 10 box foamers before prices rose in 2017,' he said. 'After the price rises, the box foamers disappeared. This was good for us.' But, he added, the market could not sustain the situation because the box foamers serve one part of the market, and larger foamers supply another.

His company's way of dealing with supply volatility is to ensure there is sufficient material in stock in your factory or on the high seas. 'And make sure you are buying from good suppliers that will get you the material when you need it,' he said.

To market!

As a raw material supplier, Dow tries to get the material where it is needed, Shraim said. He explained Dow has invested a

► Continued on page 30

THE LEADING POLYURETHANES
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► Continued from page 29

great deal in its Sadara joint venture. 'We have invested a minimum of \$1bn in TDI,' he said. 'These are very expensive assets. You have to run them to the max to have a viable investment.'

The company covers the global market. 'After material is made, it can be shipped from anywhere in the world to anywhere else in the world,' he said. 'But we face supply chain challenges once we are making product – where to store and distribute it.'

The supply situation is being made more difficult because of the trade tension between the US and China,' he added. 'This is reshaping the market, and playing with the very delicate balance between supply and demand. For us it is very important to be able to predict where demand will be. We need to know how many tonnes we should ship to the hubs in Africa or Jebel-Ali or to Europe or India.'

As a result, they have implemented an AI forecasting tool. 'This will collect three years of past demand and customer account manager feedback,' he said. 'It will then try to predict demand in the next three to four months. This will help us distribute the product from our different locations. Having product in the wrong location can be a problem for us. We may have to sell it at a lower price because we can't get it to where the market needs it more.'

Ever more sophisticated

Mahmoud Karime, sales manager at Hennecke, explained the traditional view of the flexible foam market in the GCC and East Africa. 'The Gulf market is very price sensitive; everyone is under price pressure and we always hear that price drives sales,' he said. 'This is why we experience low density and a lot of calcium carbonate in the foam.'

The spike in prices in 2017 led to a number of changes in the market for polyurethane foam in the region, claimed Vita's Shah. 'We have moved on to higher grade, high resilience foam, foam that is temperature regulating,' he said. 'Our grades start at 35kg/m³ density, and go to 45 or 50kg/m³.'

He added that the company's products have become more sophisticated, and they collaborate with Spain's Torres Espic. 'We have introduced different mattresses with different layers with Torres our partners in Spain,' he said. 'This has helped us grow in the market.'

Brand recognition is also important. Waldu explained that Rainbow Foam has been in existence for 25 years. 'We are a brand people trust,' she said. 'Customers want more from us. We educate people on the benefits of sleeping on a foam mattress without fillers. But there is limited



You can have a hybrid with different layers for foam and springs. The idea is to make more and more responsive mattresses. We also see phase change and gels becoming more popular for mattresses in the region."

Alaa Shraim, Dow

disposable income in Ethiopia.'

There is a balance between educating people on the benefits of sleeping on foam and understanding the nature and needs of the community and balancing that with pricing. 'People respond positively to this,' he said. 'They value [us] doing things in a quality way in a price-sensitive area. This shows in our sales and following. When people think of foam mattresses, they think of our business. Our long-term vision has paid off in a community where most people are thinking about their short-term needs.'

Dow's Shraim said that when the price of TDI was high, customers moved more into sprung mattresses. 'Now they realise you can have the beauty of both worlds,' he said. 'You can have a hybrid with different layers for foam and springs. The idea is to make more and more responsive mattresses. We also see phase change and gels becoming more popular for mattresses in the region.'

He believes this is giving more hope to the industry. 'Rather than going into more fillers, it gives more differentiation and value for the customer and driving the customer to invest the right amount of money in the sleep system,' he said.

Hennecke's Karime agreed that the market for mattresses in the GCC is changing. 'We see a growing trend of e-commerce, bed, mattress and furniture in a box to reduce costs,' he said. 'The logistics are simpler than traditional supply chains.'

When companies make foam flexible polyurethane foam products like mattresses, pillows and upholstery, they also make scrap. The Middle East is a big market for waste foam scrap for the large local rebonded foam markets.

Import market

'Saudi Arabia and Oman are the biggest regional markets for shredded foam, and this is often imported from Europe,' Shraim said. But, he warned, European circular economy legislation will demand complete recycling of material. 'If a mattress is used, it cannot be shredded or sent to landfill,' he said. 'The legislation foresees a mattress being converted into a polyol and reused in the industry.' This could have a big effect on the source of a key raw material for the type of stiff, high density cushioning that is popular in

the GCC and other locations in the vicinity.

Waldu explained that they recycle almost all of their materials. 'Production scrap is rebonded and sold into the market,' he said. 'We have educated the market about the health benefits of rebonded foam. As a company we have go-green initiatives, and are part of the country's go-green initiatives. We are pro environmental regulations, and recycle back into foam.'

Recycling markets

Shraim said that Dow has a project to extract polyol from the foam. 'We are looking at ways of generating polyols from used mattresses,' he explained. 'Currently, we have polyols that can be used in rigid formulations, and we are trying to develop polyols from end-of-life mattresses that can be reused in mattresses.'

Progressive companies like Vita and Rainbow Foam have invested in automation to differentiate themselves from the local competition. Vita's Shah believes that automation is very important.

'We lose a lot of revenue in Africa by not having processes automated,' he said. 'Having set up a new factory with a Laader Berg machine, I have seen a huge improvement in our foam manufacturing process. It is automated from receiving the raw materials to the end of production. We have three people running the entire plant.'

Waldu spends a lot of time looking at efficiency. 'Labour costs are low in Ethiopia, but it is hard to find good skilled people,' she said. 'You can't always rely on people, so automation has helped us to become more efficient and raise our revenue.'

Shah explained that automation has had a great number of benefits to his company. '[It has] reduced time, manpower, and the blocks are numbered and labelled,' he said. 'Coming to the cutting side, since all the blocks are labelled and numbered, we know what is due to go into production, and when and we know how to cut it.'

Waldu said that a big benefit is the way it helps them to make more accurate predictions of supply and demand. 'For the past couple of years, we have been relying on machinery and automation, rather than focusing on cheap labour,' she said.

Towards the circular economy for PU foam



Household goods on rubbish heap at refuse collection site

Polyurethane foam is a big challenge for recyclers. It's bulky, and its thermoset nature makes it difficult to reuse. **Sarah Houlton** takes a look at some of the initiatives that are under way that might create a useful future for old foam

Recycling is now routine for many types of plastic, particularly those such as PET and HDPE commonly used as packaging. The same is not true for polyurethane foam. The fate of a large proportion of end-of-life foam is to rot – very, very slowly – in landfill. While some is burnt, only a very small fraction is currently reused or recycled. If the dream of a circular economy for furniture is going to become a reality, some significant advances in PU foam recycling will be required first.

Without legislation that mandates some form of alternatives, the sheer difficulty in recycling bulky items such as mattresses and sofa cushions is likely to mean landfill will continue to predominate. France is ahead of the game, where the Extended Producer Responsibility scheme has already been implemented, and its Ecomobilier scheme organises collection and recycling services for furniture. There will be similar EPR implementation rules in Belgium and the Netherlands next year.

Recticel, for one, is planning ahead. 'We don't want to wait until the directives come or wait for legislation,' said Bart Haelterman, innovation manager for corporate sustainability at the company.

In Belgium, he said, about 1 million mattresses are discarded every year. But with foam products, it's not just the weight, it's the volume that creates an issue – piled on top of each other, this would create a 90km high tower, he said. Around Europe, the total is more like 30m every year; in landfill, he added, this would fill the Great Pyramid of Giza twice over.

We need to move from a linear economy to a circular one, Haelterman said. And there are many elements on the circular economy 'wheel' that can be addressed. 'We are working on all the elements in parallel,' he said.

Spinning around

For waste foam, there are several potential recycling streams that can prevent the foam from ending up in landfill, but currently mechanical recycling is the only realistic option other than incineration. Haelterman cited figures from 2016 indicating that, of the 160KT of mattresses that were discarded in the year, a whopping 60% ended up in landfill. Of the rest, 39% was incinerated, and just 1% was mechanically recycled.

There have been improvements since then – landfill is reducing while mechanical recycling has increased to 5–10% – but there is a limit to how much can be usefully repurposed in this way. Chemical recycling will also be required.

Mechanical recycling broadly encompasses two separate processes: bonded foam and fibre-bonded foam. The bonded foam process has been used for at least a couple of decades, he claimed, and Recticel has two facilities that does this. 'At first, this was only trimmed foam waste from production, but as of the middle of last year we started using end-of-life foam too,' he said. The new products are typically used for acoustic insulation in buildings, and in industrial and automotive applications.

In the bonded foam process, the foam

is first shredded into flakes, and then it is glued together to create a new material. In fibre-bonded foam, instead of using a glue, a polyester fibre is added in which a middle core confers strength, and the outer layer becomes soft and acts as the glue. 'We acquired an industrial line in Angers in France in 2017 with a 3 kT capacity ahead of the start of the French Ecomobilier scheme,' he said. They have since installed a pilot facility at the facility in Wetteren, Belgium, in advance of a similar scheme starting in the country in 2021.

Taking the initiative

There are various initiatives looking at different aspects of the problem. One of these is the PURSmart project, which is backed by €6m of funding from the EU's Horizon 2020 Research and Innovation scheme. It is being coordinated by Recticel, with Haelterman as project coordinator. The consortium has eight other members, including chemical producers Covestro and WeylChem, recycling specialist Redwave, consultants and project managers Eco Innovazione and Ayming, and three academic centres: KU Leuven, Ghent University and the Universidad de Castilla La Mancha.

One of the biggest challenges that needs to be addressed is sorting the foam. 'We need to sort the foams for chemical recycling, mechanical recycling, or to be burned,' Haelterman said. It's not as simple as the sorting process for materials such as PET bottles. End-of-life foam from mattresses and sofa cushions

► Continued on page 32



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► Continued from page 31

ions is bulky, and needs to be shredded. But whereas PET or HDPE shreds still have some weight to them and move in a fairly stable fashion on a conveyor belt, foam shreds are light and bouncy. This motion makes it difficult to scan them to determine their chemical composition – something that will be essential for chemical recycling.

Sorting is being addressed by Redwave, as R&D specialist Katharina Ander explained. 'Redwave has the key role of ensuring there is a well-defined input to the chemical recycling,' she said. 'We need high quality of foam to go into chemical recycling, and with sorting, we can do that.'

The different types of polyurethane have to be separated before they can be chemically recycled. While it is still very early days for the project, and intellectual property considerations limit what can be disclosed at this stage, Ander is optimistic that a solution will be possible.

The material detection is done via sensors, without touching the material. It is irradiated with a suitable light source, and the sensor detects the reflection, essentially like a large spectrometer.

'At the outset, no-one knew how we would be able to distinguish between the different foams,' she said. 'We tested different sensors, and worked in cooperation with the universities in the consortium, who have different types of sensors from the ones we use. We tried to find the best solution, and we are still working on this. We have made good progress, but there is still some way to go.'

'Material handling gives us headaches,' she added. 'Usually, the sorting machines for plastic applications are like a conveyor

belt which passes the sensors, the material is detected, and it either passes or is rejected. That movement on the conveyor belt is quite tricky [for foam shreds] as it can jump up and down, moving with the air not the belt.'

Another important question that will have to be addressed is where the separation should be done. 'When you transport mattresses, you are transporting a lot of air,' Ander said. 'Looking at the whole process chain, you have to look at where it makes sense to put the sorting and recycling. Is it best where the mattresses are collected, or is it best where the chemical recycling is done? Do you try to minimise the transporting of materials? That is a big question mark.'

Chemistry innovation

Haelterman explains that one of the other aims is to invent a new kind of chemistry that bridges the worlds of thermoset and thermoplastic material. 'Packaging is thermoplastic: you can remelt it and make something else out of it,' he said. 'Polyurethane is thermoset; you cannot remelt it and reshape it as it burns.'

Would it be possible to build in chemistry that allows a thermoset material to be temporarily turned into a thermoplastic one, so that it can be melted and then 'refrozen' to a thermoset? 'This is the most challenging and high-risk part of the consortium,' he said. It's also likely to have the longest timescale, and it's not even clear if it will be possible.

They are also looking at splitting the PU into smaller chemical components that can be reused. 'The chemistry route we are following was first explored by Huntsman in the 1990s, but they never succeeded in making it happen industrially,

and there was no interest in recycling PU then,' Haelterman said. 'We are building on that knowledge.'

Since that early work by Huntsman, Rampf and H&S have developed ways of using acidolysis to chemically recycle PU and create new polyols from it. However, he said, mass balance is a problem. 'From 1kg of PU they make 3kg of polyol, which makes 30kg of foam,' Haelterman explained.

'What we want to do is go from 1kg foam to 1kg of [new] foam. We don't make a new polyol: we recycle the polyol and the isocyanate put in originally.' The ability to recycle the isocyanate part of PU, not just the polyol, will have a real impact on the circular economy, he added.

Another potential route to recycling comes in the form of pyrolysis. This is not just burning waste to generate energy: it can be done in a less destructive manner to create useful chemical fragments more upstream than polyols.

'The goal of PURESmart was to have a pilot plant running as an outcome, but the pilot will be there this year, so we are two years ahead of schedule.' For chemical recycling, he believes, there will be a solution within four to seven years, and for new chemistry, within a decade.

As he concluded, there will not be a single solution to the foam recycling dilemma. 'We believe that in the future, there will be a combination of solutions,' he said. 'We are not looking at one element of the circular economy.'

In the longer term, there is an initiative in the Netherlands looking at 'passports' for mattresses. This would mean that at the point of dismantling there is a label that includes information about the type of foam included.

ANOTHER RECYCLING OPTION FOR PU

A way of up-cycling polyurethane foams has been developed by scientists at Northwestern University and the University of Minnesota in the US. They take waste polyurethane foam, and mix it with a solution of a carbamate exchange catalyst that renders the foam more malleable. It is then fed into a twin-screw extrusion process that removes the air from the foam, and creates a new material. This can be either a hard, durable plastic, or a soft, flexible film.

Previous upcycling efforts relied on simply compressing the foam to remove the air. However, the result was cracked or unevenly blended materials. By using two intermeshing, co-rotating screws to simul-

taneously mix and remould the foam, they got better mixing and air removal.

These new materials have many potential uses. They could be used as cushioning in shoes, as wristbands for watches, or as hard, durable wheels for skateboards and shopping trolleys. They might even have automotive applications.

'Polyurethane foam waste has historically been landfilled and burned or down-cycled for use in carpeting,' said Northwestern's William Dichtel, who co-led the research. 'Our latest work effectively removes air from PU foams and remoulds them into any shape. This could pave the way for industry to begin recycling PU foam waste for many applications.'

The extrusion process removes air simultaneously, as the catalyst enables the polyurethane to flow like a liquid, added Christopher Ellison, one of the University of Minnesota authors of the study. 'This reactive process is similar to those already used in the plastics industry for other purposes meaning the technology could have impact quickly,' he said.

Marc Hillmyer, director of the Center for Sustainable Polymers based at the University of Minnesota, is excited about the research because of the potential for recycling PU materials that are typically considered waste. 'It shows how powerful combination of polymer chemistry and polymer processing can be,' he said.

Diary

Readers are strongly advised to confirm details with event organisers before making travel arrangements.

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IEX Europe 2020
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Tel: +49 211 90191 496

26-28 August

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Earnest N Morial Convention Center
New Orleans, Louisiana
Contact: Kerri Bellias
Tel: +1 336 945 0265

8-10 September 2020

Polyurethanex
Expocentre Fairgrounds
Moscow
Contact: Konstantin Fateev
Email: info@polyurethanex.com
Tel: +7 495 988 1620

17-19 September

PU Tech 2020
India Expo Centre,
Greater Noida, New Delhi
India
Contact: secretary@ipua.in
Tel: +91 11 4155 6163

5-7 October

CANCELLED
CPI Polyurethanes Technical Conference
Marriott Rivercenter
San Antonio, Texas
Contact: Mary Novack
mary@novackmanagement.com

19-21 October

ASC Executive Leadership Council
Hilton La Jolla Torrey Pines
Mirage, California
La Jolla, California
Contact: Malinda Armstrong
Tel: +1 301 986 9700 x1106
Email: malinda.armstrong@ascouncil.org

28-29 October 2020

PU Tech Africa 2020
Landmark Centre
Lagos, Nigeria
Tel: +66 2 933 0077
Email: technobiz.polyurethane@gmail.com

4-5 November

PFA Fall Meeting
Omni La Mansion del Rio
San Antonio, Texas
Contact: Kay Wright

Tel: +1 865 657 9661

4-6 ASC Annual Convention & Expo

Omni Louisville Hotel,
Louisville, Kentucky
Contact: Malinda Armstrong
Tel: +1 301 986 9700 x1106
Email: malinda.armstrong@ascouncil.org

4-7 November

Greenbuild 2020
San Diego Convention Center,
San Diego, California
Email: info@greenbuildexpo.com

18-19 November

PU Tech Asia 2020
Putra World Trade Center
Kuala Lumpur, Malaysia
Email: expo@technobiz-asia.com

24-25 November

EuroPUR Annual Meeting
Amsterdam, the Netherlands
Contact: Raffella Salerno
Tel: +32 2 741 82 81

February 2021

Simac
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Key Events



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MECC, Maastricht, the Netherlands
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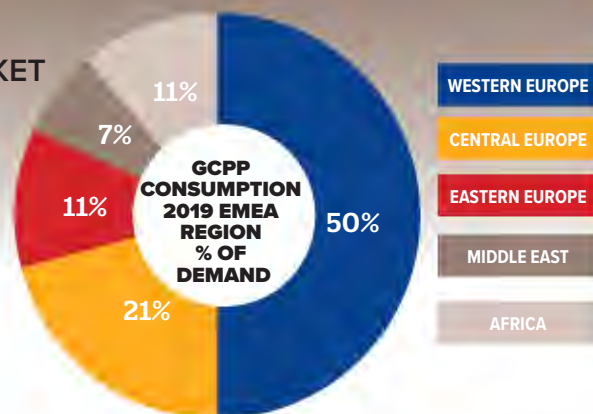
- TPU (Thermoplastic Polyurethane)
- TPU Hot Melt Adhesive
- TPU Adhesives (granules, powder)
- PU Adhesives for Shoes
- CPU (Casting Prepolymers)
- PUR (R-HM) Adhesives
- WPU Adhesives (Water-based)
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About the graph

SNAPSHOT OF THE GCPP MARKET



SOURCE: IAL CONSULTANTS

London – The 290 kT/year market for polyether graft co-polymer polyols (GCPP) should grow at around 1.1% each year in the EMEA, according to IAL Consultants.

Western Europe consumes about 50% of demand, but the fastest growth over the next five years will be in West Africa, IAL said.

GCPP polyols are added at between 10-20% to flexible foam formula-

tions, it explained. They are used to increase stiffness, increase elasticity, improve surface finish and increase durability.

In central and Eastern European markets, demand comes from conventional slabstock foams. In Western Europe, HR/CMHR applications drive the market.

In Eastern Europe, Turkey is the key end user, and accounts for about 45% of demand. That re-

gion is price-sensitive, and consumers tend to favour low density foams-filled with calcium carbonate to increase hardness.

The relatively high cost of GCPP compared to calcium carbonate is slowing adoption.

The report, Overview of the Polyether Graft Co-polymer Polyol Market in Europe, Middle East & Africa, is available from IAL Consultants. It is priced at €9500.



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