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COMMENTARY

JOHN BAKER LONDON
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“There has been a sharp downturn in automotive sales and production, especially in Europe and China”

Welcome to this ICIS special publication on adhesives and sealants, produced each year in association with ASC on the occasion of its annual Spring conference. This year sees senior industry executives congregating in Philadelphia to hear all about the latest developments, issues and trends.

Times have changed since last year's meeting in Miami. After a long expansionary run, the US chemicals industry is facing headwinds as it goes into the second quarter of 2019. Slowing US and global economic growth, ongoing trade disputes, notably with China, and inventory destocking at the end of last year have all conspired to unsettle sentiment.

On the demand side, there has been a sharp downturn in automotive sales and production, especially in Europe and China, since the latter stages of 2018, and housing starts in the US fell by over 10% in the last month of the year. Both markets are key ones for adhesives and sealants producers.

On the other hand, US producers have begun ramping up new polymer and basic chemicals capacities. There are more plants expected online this year and plenty of projects still in the pipeline, driven by continuing low natural gas and ethane prices.

On balance, the mood in the industry continues to be relatively optimistic. Sentiment is being buoyed, no doubt, by the undiminished competitive advantage enjoyed as a result of the continuing expansion of shale-based feedstocks. And the feeling that US exports will be able to find a home in still-growing markets in Asia.

To ensure continuing business success, ASC members will be focusing ever-more closely on innovation, improved supply chain effectiveness and better management of their workforce – all topics that will be addressed by the programme in Philadelphia.

This publication gives you a preview of all these topics, through interviews with key-note speakers and industry executives. May I wish you good reading and a successful conference attendance in Philadelphia.



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ASC continues to listen to its members and deliver what they need to succeed in business, with a focus on more educational initiatives this year

JANE GIBSON LONDON

Addressing the new challenges facing the adhesives and sealants industry remains the number one priority for the Adhesive and Sealant Council (ASC) for the next year.

The outlook continues to look positive for the sector on the back of an ongoing economic upcycle and new opportunities for growth in a range of industries. Over the past year, ASC has been listening closely to its members' voices.

From innovation to education, the association is eager to meet the needs of its members while progressing its current Long-Range

Plan, running from 2018-2020.

ASC president Bill Allmond says, "It's going to be an exciting year. Our top priority is to continue to grow the ASC value proposition by expanding our benefits and offerings to our members. Last year ASC celebrated its 60th anniversary – it was a major milestone. We had a great 2018 and that was all because of the participation of our members."

ASC is in the second year of its three-year 2020 Long-Range Plan, which focuses on six key areas: education, community knowledge, innovation, industry voice, growth and organisational effectiveness.

Allmond is pleased with the progress made so far (see panel). "We have accomplished a

lot in the first year of the cycle and we have programmes and services which are being launched this year. We are now due an educational focus. Educational programming is what our members are turning to us to deliver, and we are looking to provide technical educational and certification."

ASC chairman Brian McSwigan, who is also vice president, pressure sensitive adhesives at Henkel Corporation, says, "Many of the initiatives detailed in the Long-Range Plan came out of a survey of ASC members, so we need to stay focused on adding value.

"We have been doing a lot of listening to what our members need from us and we are pleased to say that our certification pro-

gramme has had a lot of good press.”

As part of its educational objective, ASC wants to deliver core fundamentals education and experiential learning throughout members’ careers. Its Training Academy Certificate programme is key in delivering this.

Allmond says ASC is to continue with its current educational plan, but is also looking to provide advanced options; programmes which offer beyond the basics.

“Our membership also asked us to help with developing the workforce in general and we now have a career centre which aims to bridge the gap between career seekers and employers.”

McSwigan adds, “From a Henkel standpoint I can say that low unemployment rates mean that hiring highly skilled employees into the manufacturing industry continues to be a challenge.”

INNOVATION A KEY GROWTH DRIVER

Along with recruitment and education, innovation remains a key driver for growth in the industry. This will be one of the themes at this year’s conference, looking in particular at “Securing the Future with Innovation & AI” (see page 14). The annual ASC Innovation Award winners will once again be announced at the conference.

The idea for the awards came out of listening to ASC members, says McSwigan. “It’s important to celebrate industry achievements in this area and the innovation awards are a great opportunity to highlight a particular innovation.”

“We want to recognise innovation wherever and whenever it takes place. We want to keep it front and centre amongst our membership.”

Allmond points out that this year, ASC had a very good response rate to the awards and applications have more than doubled. “It was tough on our panel of judges,” he adds.

The industry can still afford to be upbeat about growth potential. According to the



BILL ALLMOND
President, ASC

“We will weigh in if the EPA seems to be heading in a direction that could impact our members’ products”

STRATEGY UPDATE JANE GIBSON LONDON

PROGRESS MADE ON THE LONG-RANGE PLAN

COMPLETED INITIATIVES on the 2018-2020 Long-Range Plan include:

- Adding webinar training designed for advanced technologists to ASC’s Training Academy webinar series
- Launching the ASC Career Center to bring academia and job seekers together with career opportunities in the adhesive and sealant industry
- Publishing the North America Market Report, which now includes both quantitative and qualitative data
- Assembling an ASC members-only network that collaborates on international regulatory developments to

stay ahead of changes that could pose a threat to the US industry

- Developing a new guide for ASC members to use with their retail customers that highlights the benefits of adhesives and sealants and chemical management considerations in retail channels
- Publishing a second adhesive and sealant selection guide for automotive OEMs that focuses on the paint, trim and final assembly process

Initiatives anticipated this year include:

- Developing an Emerging Leaders Community, where mid-career employees heading

toward leadership positions can learn the fundamental disciplines that are essential to become tomorrow’s industry leaders

- A new Executive Briefing that provides members with timely macro-economic trends that help them understand movements in the adhesive and sealant markets
- Launching a new certificate programme designed for business development and marketing professionals
- Expanding “Grow the Industry” efforts – from transportation to another key end-use market, such as building and construction, or packaging. ■

International Monetary Fund (IMF), the US economy will continue to expand at a healthy rate, although in 2020 it will slow down slightly as the current fiscal stimulus comes to an end. Shale gas meanwhile has created a competitive advantage for US chemical manufacturers.

Industries such as automotive, aerospace and electronics continue to offer opportunities for sealants and adhesives growth. “If the economy is doing well, then adhesives will be doing well,” McSwigan says.

“Of course, some sectors may be declining, but others are growing. A drive towards sustainability may mean there may be less demand for packaging and therefore adhesives. On the other hand, the industry is supporting the philosophy of replacing mechanical fasteners with adhesives.”

TRADE DISPUTES LOOM LARGE

The US-China trade dispute has the potential to impact the sector, with many companies importing materials and exporting adhesives. However, a truce has been reached, avoiding imposition of a 25% tariff that the US would have applied to \$200bn worth of Chinese imports in January, up from the 10% tariff it imposed on the same goods in September.

The association is keen to provide the tools its members require to assist in their long-term planning. While the ASC will not be producing a new market report this year, the North American report published in 2018 continues to be a relevant source of information for members. ASC also intends to update its other market reports in the future.

Keeping members up to date with sustain-

ability issues is also key for the coming year. “Adhesives end up in our circular economy,” says McSwigan. “Our members are really focused on these issues.”

Allmond says that ASC has launched a new awareness campaign on the value of adhesives and sealants, including a printed “leave behind” for members to use when communicating with buyers and policy writers on chemicals management. This demonstrates how products are a good choice in terms of the circular economy.

The educational leave behind, which was a collective effort by the ASC Retail Task Force, will be published later this month and will help members when dialoguing with “big box” retailers.

Allmond says, “The guide focuses on the size and background of the US adhesive and sealant market, the importance of our industry’s products, and the sustainability benefits of using them. Essentially, the guide is a pro-active approach our members can use to discuss issues such as sustainability with retailers.”

Advocacy will continue to be a major part of ASC’s plans this year. McSwigan says, “Advocacy is one area where we continue to monitor trends on the regulation side so that we can reach out to the right people for advice and then continue to share knowledge with our members.”

Overseeing the implementation of the Toxic Substances Control Act (TSCA) remains high on the agenda. Significant revisions were made to TSCA in 2016, including changing how the US Environmental Protection Agency (EPA) regulates new and existing chemicals.





ASC is putting more emphasis on its online training academy programme in response to its members' feedback

» Allmond says, “We are still monitoring what impact the regulation will have on our members. Our members do not seem to be too worried, but we will weigh in if the EPA seems to be heading in a direction that could impact our members’ products.”

McSwigan adds, “We are an association which works with its competitors. It’s an important focus to collaborate where we can and bring our members together to work with other associations and their members.”

STATE REGULATION CONCERNS

Allmond says that the ASC is also watching some state issues, which are small yet complex. New York State has certain procurement requirements whereby the state will ban materials unless they meet certain requirements or if they are on the California Proposition 65 list.

“This does hold some concern for us as many of the materials do go into the building and construction sector. Proposition 65 wasn’t meant to ban chemicals, but our members have told us that this is a concern for them, and so this year we are going to engage with this issue.”

In terms of events, aside from the spring conference, ASC’s annual Executive Leader-

ship Conference will be held in South Carolina, from 21-23 October. The event draws together senior leaders from ASC’s member companies to network and collaborate among their peers as well as to participate in high value programming on topics relevant to their senior company position.

On the horizon for 2020 meanwhile is the World Adhesive and Sealant Conference

(WAC2020), which will be held in Chicago next April and will replace the annual US Spring ASC conference.

The conference is held every four years and rotates between Asia (the previous hosts), the US and Europe. The convention was last held in the US in 2008.

McSwigan says, “This is a big event for us. We started the planning and preparation almost a year ago and have been to visit the venue. Everything is on pace for next year. Each region will be responsible for 4-5 different trends – it will be interesting to see what they put forward.”

The theme for 2020 is “Securing our future” and will focus on the global developments that will influence the market. Allmond says, “This will be a very unique event for us. Our goal is to attract a large global presence and discuss the issues relevant to the global industry so that we can stay ahead of the game.”

“Globally we share a lot of the same challenges in the areas of regulation and sustainability as well as innovation. There will be many common topics for us to discuss. It will be good to see how people across the regions are approaching these common issues and create some synergies there.” ■



BRIAN MCSWIGAN
Chairman, ASC

**“If the economy is doing well,
then adhesives will be doing well”**

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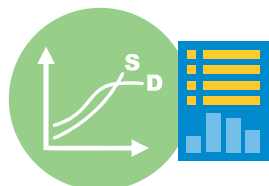
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Managing across the generation gap

Understanding the generational types in your workforce and learning how to manage them can bring dividends in terms of recruitment and retention, as well as business success

CYNTHIA CHALLENGER VERMONT

To be successful today, companies must be mindful of the differing needs and expectations of employees from a multitude of perspectives. At the same time, while recognising these differences, it is important to determine and focus on what makes them more alike than different, according to Matt Thornhill, founder and managing partner of SIR's research-based think tank Institute for Tomorrow.

In his keynote presentation at the ASC annual meeting, Thornhill will talk about important trends impacting the adhesives and sealants industry using a generational lens.

"Trends don't happen by themselves, whether demographic, cultural or specific to the adhesives and sealants sectors; they are created by people acting as change agents. It is essential to understand not only the trends, but the mindsets of the people that are shaping and influencing them," Thornhill asserts.

It is important for leaders in any organisation to understand differences across the generations, but to provide a work culture and environment that meets everyone's needs. For example, workers of all ages want to be engaged and treated with respect, according to Thornhill.

DIFFERING VIEWS ON LEADERSHIP

Knowing the expectations of workers that are similar across the generations enables leaders to be more effective in managing and retaining top talent.

For employees of different generations, one difference can be found in their views of leadership. "People from the baby boomer generation typically believe that one needs to pay their dues and put in time and effort to earn leadership positions. Most Gen-Xers feel that leadership should be based on competency, not tenure; people with the appropriate skills and abilities should be leaders, regardless of how long they have been working in the industry.

"Millennials generally have an egalitarian view and believe that everyone's opinion is equally valid and important and therefore all should have an equal say," Thornhill explains.

The challenge is to find a leadership approach that satisfies everyone. "As a leader today, it is important to engage with workers – Baby Boomers because they have wisdom and years of experience, Gen-Xers because they are competent, and Millennials because it is the right thing to do. Pure top-down decision-making is not acceptable – at a minimum, employee input must be sought first," Thornhill observes.

Establishing a culture of engagement is essential to attracting and retaining employees in a highly competitive marketplace. "The reality today is that across all industries there



MATT THORNHILL

Founder and managing partner, SIR's Institute for Tomorrow

"In 2019, companies need to be organised around learning, innovation and customer impact, with employees treated as talent to be managed"

is a war for workers because the supply is limited. There aren't going to be many new workers available, and it will be necessary to steal employees from somewhere else to fill many open positions," says Thornhill.

"Every company needs to be finding, recruiting, hiring and most importantly retaining workers of all ages," he asserts. Thornhill adds that one of the best human resource strategies today is to keep the people you have.

Attracting and retaining employees of all

generations requires a work culture that is aligned with modern culture – one that feels like 2019 and not 1999. Workplaces of 20-30 years ago were organised around efficiency and effectiveness, with employees seen as cogs in the machine. That approach is not acceptable today.

"In 2019, companies need to be organised around learning, innovation and customer impact, with employees treated as talent to be managed," Thornhill notes. Successful workplaces today are collaborative hives rather than having a conventional organisational chart. Companies should cultivate an environment that seeks the positives rather than avoids the negatives and focuses on innovation, safety and sustainability, according to Thornhill.

TEN KEY TRAITS FOR SUCCESS

The Institute for Tomorrow has identified 10 key traits of successful organisations, and at the top of the list is the need to be open and transparent. "With access to the internet and social media, existing and potential employees know a lot more about companies today than they ever did before. It is essential that companies be open and transparent on their websites or potential employees will look elsewhere.

Thornhill points to job postings as an example. Many companies provide only a standard description of their organisation and the job, but do not provide the compensation. The same job postings including average salary data can be found two clicks away on websites such as Glassdoor.com and Indeed.com.

"Companies that are uncomfortable posting salary information should make it easy for potential candidates to get to these other postings by providing a link," he says.

The key message, Thornhill stresses, is that the future of any organisation will depend on the choices made today. "It is important to be proactive and make decisions that will shape the future, rather than just let it happen.

"Adhesive and sealant companies that take time to understand the trends impacting their employees, customers and consumers will be better-positioned to make the right decisions," he concludes. ■

CYNTHIA CHALLENGER, VERMONT

Over the next 5-10 years, blockchain technology will lead to a more rapid rate of change in how business is conducted than has ever occurred before, according to Jack Shaw, co-founder and executive director of the American Blockchain Council.

Just over 10 years ago, a paper was published anonymously describing how a combination of advanced cryptographic and synchronisation technologies could be used, along with appropriate structured incentives, to create for the first time a viable digital currency.

The digital currency was called Bitcoin and the underlying technology enabling it quickly became known as blockchain. Bitcoin is the most famous of a multitude of digital currencies using blockchain technology. However, Bitcoin and blockchain are not synonymous.

Over the past 5-6 years, the uses of blockchain technology have expanded well beyond digital currencies. Fortunately, says Shaw, it is not necessary to understand the detailed technical underpinnings to be able to use this immensely valuable tool to add value and create competitive opportunities and a strategic edge for businesses and industries.

What is important is to understand what blockchain technologies enable. Blockchain allows the creation of permanent, immutable, signed and time-stamped records of ownership of assets of various types, identities, transactions and contractual commitments.

This information can be shared between and among all relevant parties in any given business ecosystem in near real-time. Only those who are authorised to see the information can have access. Similarly, authorisation is required to make updates, which can be made quickly and easily.

For all practical purposes, blockchains are essentially unhackable for anyone not given authorised access. This is because the information is not stored on any one computer, but on dozens to hundreds or even thousands of computers located all over the world.

SINGLE ECOSYSTEM FOR BUSINESS

In the adhesives and sealants industry, a business ecosystem could comprise the sealant manufacturer, its first-, second- and third-tier suppliers, distributors, business customers and retail stores. Any of these parties could be authorised to see relevant information and view any changes within minutes if not seconds.

"The ability for everyone in the ecosystem to access a single common pool of data offers great value in terms of supply chain transparency. Everyone can know immediately, rather than hours or days later, if there will be an issue somewhere in the supply chain," Shaw asserts.

In addition to greater transparency, block-

Blockchain will improve efficiency

A safe, secure and transparent internet-based system for sharing data along the supply chain could give huge efficiency gains in time and money in just a few years time

chain technology provides a clearer understanding of the provenance of materials from the time they are created or extracted to when they are used, according to Shaw.

"Whether it is contaminated lettuce or a specialty sealant, blockchain technology can enable rapid identification of the source of the

(IoT) and blockchain technology are used for transferring ownership of assets within international trade transactions, the time to completely close a deal can be reduced from 10 days to 10 minutes, according to Shaw.

"The implications for removing costs and reducing delays associated with interactional transactions are immense," he says. Similarly, smart contracts can be used to reduce costs, delays and errors in manufacturing and distribution systems.

BLOCKCHAIN SOFTWARE ON ITS WAY

Of course, members of the ecosystem who wish to have access to this shared data must have systems incorporated into the blockchain in order to access the data. This is a separate issue that is rapidly being addressed. "All major application software companies – Oracle, SAP and all leading specialty app developers – are in the process of enabling their software for blockchain technology," Shaw observes.

Blockchain technology itself has been evolving over the last 10 years, with the internet facilitating advances. It has recently become much more widely used for commercial applications, and Shaw expects the next decade will be very exciting.

"The way in which businesses operate will be very different within 10 years, particularly once blockchain is routinely combined with the IoT and artificial intelligence (AI)," Shaw states. AI depends on having valid accurate information, and blockchain is ideal for validating the inputs used by AI programs.

"When people talk about a digital transformation, they are referring to the combination of AI, augmented and virtual reality, the IoT and 3D printing with blockchain technology," Shaw notes. "Adhesive and sealant manufacturers should be very excited about the potential benefits they can gain by leveraging this paradigm-shifting technology," he concludes. ■



JACK SHAW
Co-founder and executive director, American Blockchain Council

"The implications [of blockchain] for removing costs and reducing delays associated with interactional transactions are immense"

problem and all of the locations where a defective product was shipped within seconds rather than days to a week or more. Manufacturers can use blockchain technology to manage quality and also to investigate the flow of inventory through the supply chain to identify areas for improvement," comments Shaw.

Blockchain technology also enables smart contracts, which are software programs created from a series of if-then statements that allow the sharing of validated data in real time. When smart contracts, the Internet of Things



The primary duty of the architect should be to serve the interests of the client

Putting the client back in control

If architects begin to observe the rules of fiduciary duty, it will give clients more say in what materials are used in buildings. As a result, they will need to be better educated about what is available and the risks and benefits of materials to be specified

CYNTHIA CHALLENGER VERMONT

Like doctors and lawyers, architects and engineers are learned professionals. Similarly, like doctors and lawyers, architects and engineers, including specifiers, have a fiduciary duty to protect their clients' interests.

Both the theory and law regarding this

issue are fairly straightforward, although they have not been well understood in the past, according to Ujval Vyas, principal at Alberti Group.

"Architects and engineers cannot advocate for their own personal causes or openly or covertly make any decisions that are not in the best interests of their clients," he states.

Unfortunately, the practice of architecture

has become one focused on negotiating contracts with clients based on standards established by the American Institute of Architects (AIA).

"In many cases today," observes Frederick Butters, attorney at law, "critical decisions that should be made by the client are being made by architects and engineers without educating or consulting the client."

Specifications for adhesives and sealants, for instance, are often set with regard to the architect's preference for "greener" materials, even though they may not perform as well and could have significant long-term negative impacts.

The fundamental economic value of a transaction between a client and a doctor, lawyer or architect is destroyed if the professional has an arms-length relationship with the client, according to Vyas.

"This type of relationship is characterised by massive information asymmetries, which place the client at a distinct disadvantage and provide the opportunity for the professional to take advantage.

NEED FOR INFORMED CONSENT

"These transactions only work if the primary duty of the professional is to use knowledge and expertise to exercise judgment and serve the interests of the client. In the world of architecture, that means educating the client and gaining informed consent for all material aspects of the project," he explains.

Building projects involve many more decisions than even very complex lawsuits, adds Butters. "Architects are not expected to confer with clients on basic choices like the types of nails that will be used, but they do need to educate clients about major building systems and let the client decide," he says.

UJJVAL VYAS

Principal, Alberti Group

"Architects will no longer be able to select adhesives and sealants simply because they perceive them to be greener"



While the structure exists with respect to both procedural and substantive law – six states have legislation containing fundamental language regarding the fiduciary duty of architects to their clients – these laws have been largely ignored, and the practice of architecture has continued as usual.

"Until the mindset of architects is changed and they come to understand that their role is not to 'take care' of their clients, but to act as the outsourced brain power for particular services rendered to society, the required legal shift won't occur," states Vyas.

The way architects are taught must change. Architecture schools need to communicate the importance of serving the best interest of clients rather than focusing primarily on the design process, according to Vyas.

Butters adds, "The common approach today is for architects to spend a large amount of time



Existing laws established for doctors, lawyers and accountants can equally be applied to the architectural profession

in a design studio learning from an experienced architect. But architecture and design are not interchangeable. Design is the ability to create something that would be useful if constructed – this is not unique to architecture.

"The architect provides a total package of services to the client including the design and all information necessary to construct that design. Much more time should be spent teaching architects how to practise – how to deliver quality services for their clients."

In addition, Butters notes, they also need to understand that fiduciary obligations are equitable in nature and there is no fix in the form of a contract clause.

Furthermore, says Vyas, architects need to be taught about the physics and chemistry of common construction materials. Most architects today have little knowledge about the physical materials used to construct the buildings they design – from basic materials such as glass and steel to complex technical materials such as adhesives and sealants – and do not believe they need it.

Specifiers are also typically not trained sufficiently. What information architects do have on materials generally comes from the manufacturers, who clearly have a vested interest in selling their products and not necessarily in helping the architect determine the pros and

cons of all options.

The situation is complicated by the fact that AIA has policy statements, including canons of ethics, that place obligations on architects, according to Butters. "One of those obligations is to advocate for sustainable design," he notes.

FREDERICK BUTTERS

Attorney at law

"Much more time should be spent teaching architects... how to deliver quality services for their clients"



"Since architects have a fiduciary duty to educate their clients and do what is in their clients' best interests, they in fact can't advocate for particular causes in a manner consistent with that duty," he explains.

He adds that form contracts promulgated by AIA, some of which are 40–50 pages long, exculpate architects and limit their liabilities, all of which runs contrary to the notion that architects are professionals.

"These types of clauses in attorneys' contracts would never be accepted, but

» architects use them as a matter of course and at least as often as clients allow it,” comments Butters.

So new thinking must take hold in the architectural arena. “This concept is clearly not new – it will simply be applied to a different profession. Architects cannot be recognised as learned professionals unless they shoulder the obligations that come with that appellation. The existing law established for doctors, lawyers and accountants can be applied to the architectural profession,” says Butters.

“And while there is limited case law that supports this legal shift, there doesn’t seem to be any that runs contrary.”

GOOD MORAL CHARACTER PROVISION

In addition, he observes that most states in their licensing statutes for architects have a “good moral character” provision. In some, these licensing laws actually state that the purpose of the good moral character obligation is to ensure that architects take on their

fiduciary responsibilities.

For adhesives and sealants, the most pertinent aspect of this discussion relates to the common practice of architects to select “green” products without educating the client about these decisions.

Says Vyas, “Adhesives are complex products, and to make proper product selections it is necessary to understand at a minimum their chemistry and toxicology. Architects and engineers, however, often deselect sealants and adhesives based on little information and certainly without any risk assessment because they see themselves as beneficent experts that can make the right choice for the client, while at the same time using their clients’ money to serve their personal views.”

Regulations, such as the US Department of Commerce green marketing rules, do not have an impact because if an issue arises, action is taken after the fact. They are appropriate for standard commercial, arms-length transactions, but not for the asymmetrical relationships

between architects and clients that necessitate an affirmative duty, according to Vyas.

For adhesive and sealant manufacturers, the eventual acceptance by architects of their fiduciary duty will have a revolutionary impact and result in a reconfiguration of the marketplace, according to Vyas.

“Architects will no longer be able to select adhesives and sealants simply because they perceive them to be greener or more sustainable and without any proof as determined by a proper risk analysis,” he asserts.

“Architects who refuse to provide an affirmative duty will eventually go away. No lower court will rule against the clear legislative language that exists today in important states such as Nebraska and Illinois, where many large A&E firms are headquartered and their architects are licensed – and thus subject to fiduciary duty.

“Because these firms practise all over the world, any legal decisions will have global implications,” he concludes. ■

SOFTWARE CYNTHIA CHALLENGER VERMONT

DOCUMENTING DESIGN AND EXECUTION FOR FIDUCIARY COMPLIANCE

CONSPECTUS, AN independent specifications consulting firm, is trying to address some of the practical aspects architects must address when pursuing that affirmative fiduciary duty.

The company is putting together two existing documentation systems to enable the tracking of all aspects of a design and construction project, according to founder and owner David Stutzman.

MasterFormat, a standard for organising specifications and other written information for commercial and institutional building projects, is a widely used tool for describing construction work results.

For the early phase of a project, *Uniformat*, which is systems-based by functional element, not material or product, allows designers to describe solutions so the owner, contractor, and estimator can understand the design intent.

“The advantage of *Uniformat* is that the design and performance criteria and owner project requirements can be captured before the design is even started, or at least concurrent with the design – and this information can be tracked through to completion of the project,” Stutzman says.

Conspectus has developed *ConspectusCloud*, enabling web-

based access to a single version of both programmes for all of the people involved in a project.

“This new web-based tool provides a transparent, proactive process and access to a unified project documentation database to effectively fulfill fiduciary duty obligations,” asserts Stutzman.

The software records the owner’s project requirements, performance criteria, design criteria, design decisions, system selections, product specifications, commissioning and operations requirements.

The owner can observe, comment and edit project requirements and specifications developed throughout the design and construction process, ensuring that the owner’s interests are preserved.

CONFIRMING COMPLIANCE

In addition, the software allows the design solution to be continuously and proactively measured and evaluated against the owner’s project requirements, including budget, to confirm compliance, according to Stutzman. It also provides documentation of all decisions and the owner’s informed consent.

Stutzman notes that as a specifier he has seen many things go horribly wrong, resulting in the need for extensive rework and much

wasted effort. These issues can arise due to a change made by the design team or a switch in materials as part of a cost-cutting effort to get a project back on budget.

As an example, he notes that at the outset of a project architects often specify the most expensive rubber flooring as a means for building cost into the project,

architects on behalf of their clients,” he observes.

With *ConspectusCloud*, the company is trying to make the entire process transparent, inviting the entire project team including the owner to participate in conversations about the selections and choices being made – and keeping a record of them.

DAVID STUTZMAN
Founder and owner, Conspectus

“We often end up challenging architects on behalf of their clients”



knowing that it will eventually be replaced with a less expensive material, but not explaining to the owner these intentions.

The owner expects a rubber floor but gets vinyl, and from his/her perspective believes the value of the project has been decreased. The same situation could be applied to any material, including adhesives and sealants.

As a specifier, Conspectus’ clients are the architects, but Stutzman is in a difficult position, because he is also a registered architect and recognises his fiduciary duty to the owner.

“We often end up challenging

The software is still under development, but is in active use on current projects. At the present it is capable of document version control, but will eventually also include a complete audit trail of who did what when.

Stutzman is focused on educating owners and design builders about its benefits because he believes the system can provide them the greatest value because they bear the ultimate risk of any project.

“We still have a ways to go, but we are actively discussing the concept of fiduciary duty with all groups involved in building projects and are generating a lot of interest,” Stutzman concludes. ■

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Innovate to accelerate

Innovation is a proven approach to boosting top line performance and maintaining competitiveness in the marketplace, but how can companies improve their execution in this vital area?

JANE GIBSON LONDON

Innovation has become a buzzword across many industries and is seen as a way to stimulate top line growth. But how can a company achieve its innovation goals?

New technologies such as big data and machine learning offer new opportunities, as does the adoption of open innovation. There also needs to be a strong innovation culture within a company.

Marc Benevento, president, Industrial Market Insight, says, “There is a lot of emphasis on innovation at the moment. Cost cutting and share buybacks are limited in the value they can create and reach a point of diminishing returns, whereas organic growth has no bounds.

“Within the sealants and adhesives industry, in general the feedback I get is that innovation projects lack definition, and companies lack the tools and resources to adequately assess customer and market needs. Some companies do this well – many do not.”

Robert Wanat, president of Innov8 Chem, says, “Companies are hindered by spending too much time copying the competition’s products. They see these ‘me-too’ products as

an easy way to compete, but in reality, me-too products are a pathway to price competition.

“To develop a competitive advantage, companies need to see where they can provide value to the customer both for today and for tomorrow.

“Businesses need to develop the best possible innovation strategy for them. Companies need to ask ‘where do I want to go and how do I get there,’ and then align their resources accordingly. The other side of these decisions is determining ‘what am I not going to do?’ because you can’t do everything.”

FOCUS ON THE BASICS

Benevento says that a good start is to focus on basics, such as clearly articulating and developing supporting documentation for the value proposition of each innovation project. “Taking the time to do this up front has been shown to lead to more successful projects. This requires a disciplined – but not difficult – approach to product development.”

He adds, “You need to remove bottlenecks within a company by not just relying on a few people to carry innovation forward, but by empowering everybody to do it. Most customer-facing resources in adhesives companies are focused on today’s issues, not tomorrow’s growth. It takes a different mind-set to listen and identify longer-term growth opportunities.”

Wanat points out that it is critical that companies employ the right people. “Experience isn’t always the best qualification – the experienced new hire might be excellent, but they also might hit the ground walking and never get to running.”

It is often better to hire someone with outstanding potential even if unexperienced, and let them quickly grow into a star performer. In terms of the team, he says, the best approach is to have a multi-functional one with good communication and coordination.

“Put together people who don’t usually work with each other, or put someone into a different area and unleash their creativity.”

Wanat says that there is clearly innovation

MARC BENEVENTO
President, Industrial Market Insight

“Companies lack the tools and resources to adequately assess customer and market needs”





occurring in the sealants and adhesives market, but there is room for much more.

“Aside from developing higher performing materials, there are always methods to use innovation to drive cost out of the customer system (and not simply by cheapening products). This could be by creating products with a longer shelf life or products leading to less waste.”

Innovation in smaller companies needs to happen faster, according to Wanat. “Many companies are slow at producing samples and carrying out trials; not because the people working on the project are slow, but because they are possibly working on too many projects.

“Some companies have also introduced their own bureaucratic processes, which slow things down. Further, most companies don’t have enough understanding of the customer and their needs.”

Benevento believes that maintaining a customer focus is key. However, this does not simply mean doing everything that is asked.

“It means engaging customers in a way to understand what they are trying to improve and how they measure success. This allows the identification of implicit needs and affords the opportunity to create new value for the customer.”

One way of innovating is through using new technologies to increase quality and connect the manufacturing and supply chains more closely to customer demand. Mark Travis, CEO, Mark Travis & Company, says that we are now in the fourth industrial revolution.

ROBERT WANAT
President, Innov8 Chem

“There are always methods to use innovation to drive cost out of the customer system”



“Big data, machine learning, the Internet of Things, sensors/chemistry. They need to be used to find new ways of doing things. Blockchain – a distributed, shared ledger – also ties a lot of these technologies together and provides provenance for parts and products throughout their lifecycle, among other things.

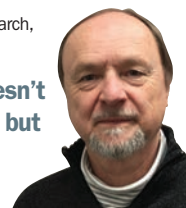
“We now have ways to collect data in much greater detail and have many more places to collect it. This overwhelming amount of data is referred to as big data. With all of this new data, we have more information to make better decisions. Machine learning recognises the patterns in the data and then artificial intelli-

gence (AI) can tell you what to do with it. We need the machines because there is too much data for a mere human to find the patterns.”

Travis believes that the problem for many companies is that they already have technology in place, and it currently works. “They don’t want to mess with it. So fear, uncertainty and doubt prevents them from moving forward. Executive education is needed on the benefits of using new technologies.

GENE SLOWINSKI
Director, Open Innovation Research,
Rutgers University

“Open innovation doesn’t help you this quarter, but maybe in six or more months’ time”



“Another problem is finding the right talent. You may need to recruit some of your top performers and provide them with the right training and education. These new technologies can elevate them to higher levels of productivity and quality and bring new levels of success to the company, internally and externally.”

Travis estimates that the top 20-30% of global manufacturers are pursuing innovative technologies, but smaller companies are not.

“They will be passed by by their competitors if they rely on their current, outdated technologies. The problem is that directors don’t want to spend money unnecessarily, but rather make money for investors.

“There needs to be a trigger to make them realise they need to get involved. You might not want to be a first adopter of a new technology, but if you are a fast follower, and learn from others’ mistakes, you will make money.”

BRAINSTORM DATA IDEAS

Companies need to embed machine learning and AI in their devices and processes, says Travis. He adds that they need also to decide on the business-driven outcomes they want to achieve through big data and machine learning/AI.

“Brainstorm 20 ideas and come up with the best five. You can rent data analytics through the cloud from Google, IBM Accenture, etc. Don’t boil the ocean or dream up some moon-shot project. Start small, have success, and then expand out.”

Travis points out that having good data scientists is key. “Try and find these people within your company if you cannot find enough talent on the open market. Then give them the actual outcomes that you would like to see in terms of quality, output, or customer satisfaction.

“You can’t tell them ‘here’s my data lake – go and find some trends’. If a set of companies all have the same generic formulations, you need

INNOVATION AWARDS JOHN BAKER LONDON

ASC REWARDS INDUSTRY INNOVATORS IN PHILADELPHIA

ASC WILL recognise outstanding innovation in adhesives and sealants product development when it announces the winner and runners up in Philadelphia at its annual Spring conference. This is the third year ASC has run its awards programme and entries numbers and quality are up, reports Steve Duren, ASC senior director.

The awards, he adds, “identify significant impact chemistries that contribute to downstream industries’ unmet needs and advancements in technology. The award is intended to foster and encourage innovation across the adhesive and

sealant industry and academia.”

This year’s winners will receive their awards at a lunchtime ceremony on the Tuesday and deliver a short presentation on their innovations on Wednesday morning.

Raw material suppliers, manufacturers of adhesives and/or sealants, and academics are eligible to enter the awards, which can also be submitted collectively by raw material supplier and manufacturer, raw material supplier and academia, or manufacturer and academia.

Winning entries will have to demonstrate the value proposition of

the novel chemistry and added value in a field application or improvement in design and chemical process. They will also have met a significant milestone in development within the past five years.

ASC has assembled a three-strong panel of experts to judge the entries this year. They are: Dr Greg Schueneman, a supervisory materials research engineer and project leader of the Forest Biopolymer Science & Engineering group at the US Forest Service’s Forest Products Laboratory in Madison, Wisconsin; Dr Robert Wanat, president of Innov8 Chem;



and Dr Christopher White, a research chemist in the Polymeric Materials Group based in NIST’s Engineering Laboratory.

Leading entries this year include those from: 3M, Avery Dennison, Bostik, Cardolite, DAP Products, Dow Chemical, Eastman, H.B. Fuller, Henkel, MAPEI, Sartomer Americas, Sunstar Engineering Americas, Synthomer and Wilsonart. ■

» to find out what else is important to the customer so that you can differentiate your offerings. Is it product packaging for example?”

Benevento adds that big data analysis can also help to mine databases of customer interactions and identify common problems and complaints. However, industrial markets often have a small number of customers and you can engage them directly to find out what the deeper issues are.

OPEN INNOVATION APPROACH

Big data analysis has yet to be taken up significantly by the sealants and adhesives sector, with its use more prevalent in sectors such as the automobile industry. Open innovation, meanwhile, is increasingly being used by manufacturing companies. This is the use of resources outside the organisation to develop technology or bring products to market.

Gene Slowinski, director, Open Innovation Research at Rutgers University, says, “If there is one in 100m people on this planet that know the most about your business, there are 73 of those people. Do you have the email list?”

“A company wants to access these 73 along each segment of the value chain. Whatever the expertise, from R&D to product development to manufacturing experts, you want them on your team. They are not employees – they come and they go and deliver their expertise.”

According to Slowinski, the model for open innovation is the “Want, Find, Get, Manage” model, but the biggest problem companies have is deciding what they want that will change the nature of competition in their market segments.

“We have been doing ‘voice of the customer’ (VOC) forever. This tells us what custom-

ers and consumers want. But the ‘voice of the supply chain’ (VOSC) tells us what is possible. If you were to draw a Venn diagram, then the near-term high value products live in the crossover point of VOC and VOSC. Is your strategic planning group using VOSC?”

“It’s not about incremental innovation – adjusting the products you have. Open innovation is designed to create new products. But one problem is margins – you are likely going to have to share margins with another company.”

Benevento agrees that companies are uncomfortable when they do not own things themselves. However, he realises that open innovation can be a great progress accelerator, especially if the technology or market being explored is outside of the company’s direct experience.

MARK TRAVIS
CEO, Mark Travis & Company

“Executive education is needed on the benefits of using new technologies”



“It still requires resources dedicated to identifying unmet market and customer needs, areas where many companies underinvest. It also requires the development of trusting relationships with partners and may require licensing vs owning technology, which is a new concept for many B2B manufacturers.”

The federal laboratory system is the best partner to work with in the US, says Slowinski, but he adds that experts can be found at universities and that independent consultants can also be used. “All of them are highly respected

and many of them will be retired industry experts. And some will be your competition.”

Many chemical companies have created their own open innovation groups – within a company there may be a role for an external research director or a licensing director, says Slowinski.

So once you have found your experts, how do you manage them? According to Slowinski, they tell you what you need. “It’s not difficult, it’s just different. When I am talking to a world expert, I listen to what they have to say. When you bring them into your company they may redefine your ‘Want’ in different ways and you may end up with a better ‘Want’.”

The big issue for open innovation is the reward system, according to Slowinski. “Senior executives are rewarded for making their quarterly numbers. But open innovation doesn’t help you this quarter, but maybe in six or more months’ time.

“You need to convince the CEO to put in a bonus structure that recognises a longer-term activity. And tell the shareholders that the company has a portfolio that addresses near, mid- and longer-term growth.”

Smaller companies are the perfect partner for larger companies, says Slowinski, as they tend to have a patent that fills a hole in the larger entity’s product portfolio. He adds that when looking for a partner it is important to ask, “who has the most patents in the key area of my business interests?”

Slowinski encourages managers to understand that intellectual property (IP) issues can be sticky, but they can be overcome. “Experienced managers worry about right to use IP. Once each side understands their rights-to-use needs, the lawyers can determine ownership. It’s a big discussion, but it’s a problem that is solvable.” ■



4 ADHESIVES AND SEALANTS: CHEMICAL MANAGEMENT AND SUSTAINABILITY IN THE RETAIL MARKETS

Getting the message out

ASC's Retail Task Force is ready to reveal its educational materials designed to inform retail buyers and consumers of the benefits and safety of adhesives and sealants

STEVE DUREN ASC

ASC and its members active in the Do-it-Yourself (DIY) and Big Box channels formed a Retail Task Force in 2018, as part of the "Unified Industry Voice" objective set out in the 2018-2020 Long-Range Plan. This calls for ASC to develop educational resources, in collaboration with industry partners, that can assist ASC members in providing education on chemicals management.

"With the ever-changing landscape of NGOs and anti-chemical groups, we decided to be proactive and try and influence policy

writers and buyers in the retail markets," notes Steve Duren, senior director at ASC.

ASC and its members have outlined a business case that will:

- Reduce confusion of end users and retail buyers of ASC member products
- Communicate the health and environmental benefits of ASC member products
- Showcase actions of ASC member products that benefit the workplace and environment
- Develop a "leave behind" for policy writers within the big box channels
- Create a DIY web page on www.adhesives.org dedicated to videos, webinars, white papers, resources and links for stakeholders.

"The primary focus for this educational initiative is retail buyers, including those writing chemical management policies or making purchasing decisions, and the end-use consumer," explains Duren.

"The benefits guide represents a brief overview of ASC, our members and the critical role that adhesives and sealants play in supplying the retail environment with safe products that provide hidden functions in thousands of applications," notes Duren.

STEVE DUREN
Senior director, ASC

"We decided to be proactive and try and influence policy writers and buyers in the retail markets"



"The guide also describes the processes in which adhesives and sealants are featured as well as the type and function of adhesives and sealants used," he adds.

"The guide allows downstream users to further understand the value that adhesives and sealants bring in critical applications. Risk assessment needs to be made using a multi-attribute, science-based approach and not a single, hazard-only request for transparency from retailers."

Through this initiative, says Sharon Papke of Covestro and past chair of the ASC Retail Task Force, sourcing stakeholders in the big box and retail marketplace should be aware of the efforts within ASC to help policy writers within the retail environment better understand the impact that adhesives and sealants have on key applications.

"Increased energy savings and reduced air and water infiltration are just a few of the benefits adhesives and sealants provide," she explains. "This new benefits guide has been an industry effort by ASC members and addresses important adhesive/sealant applications along with the need for exposure considerations by retailer policy writers when it comes to risk assessment."

ASC will launch its new DIY landing page in April 2019. It will continue to promote the benefits of adhesives and sealants and publish information on its new landing page.

Buyers, purchasing agents, sourcing personnel and policy writers will benefit from the resources and education opportunities ASC is presenting with its new "leave behind" guide and the DIY landing page at adhesives.org.

"We hope to continue to enhance and bolster existing content with additional resources from sister trade associations as 2019 advances," notes Duren. ■

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Understanding raw material markets

Changes in crude oil prices underlie much of the price variation in adhesive and sealant raw materials, but understanding how this impacts costs and margins is sometimes difficult to gauge. But there are ways to approach the problem

JAMES RAY & STEPHANIE KIRBY HOUSTON

When we talk about market pricing, it is important to consider that a seller's market price is comprised of cost + margin, pure and simple. However, understanding the drivers of these two otherwise simple components is necessary to understand market interactions.

Often we hear about or see market prices doing "crazy things", yet markets are driven by a collection of logical economic-based decisions by sellers and buyers. When prices seem to perform irrationally, it is because we lack the market intelligence or transparency to realise what drove this apparent unusual market price movement; but in the end, it is two components: cost and margin.

The cost for the marginal producer is typically the largest driver of market prices and this is driven primarily by crude oil, which is the basis of the majority of value chains. Products made from natural gas or coal usually follow the market price of crude oil, the dominant global feedstock.

When crude oil prices go up (or down), so will the market price of most products, but to varying degrees. The further the products are from oil in the value stream, the less influence oil has, as multiple layers of operational costs and profits build up.

Margins are driven by the supply and demand balance or utilisation. Buyers cannot avoid cost-driven market price increases



Crude oil supply and demand has a big impact on pricing right along the value chain

(unless they are over-paying), but do have some leverage over margins, making it their biggest opportunity.

In the first quarter of 2014, Brent crude oil prices were at \$109.98/bbl. In Q1 2016, they were \$35.26/bbl. Why the drastic drop? Because global crude oil was over supplied by 2-3%. Yes, only 2-3%, which demonstrates how sensitive the supply and demand balance can be.

Further, it demonstrates that not only does supply and demand drive margins, but it also drives crude oil prices, and therefore our cost, making supply and demand the single most import factor in understanding market prices.

Let us look at market prices for some of adhesives' raw materials. Starting with Brent crude oil, prices for which are expected to stabilise around \$62/bbl, +/- \$5/bbl. If OPEC cuts production, US shale producers will increase production. Beyond this, the supply and demand balance will largely determine future prices.

OVERSUPPLY IN THE US

Olefins are over-supplied in the US, with substantial exports occurring and some temporary logistical bottlenecks that are not uncommon with large expansions. This is already leading to lower prices.

However, ethylene is fairly balanced globally, as international producers have been reluctant to invest in additional capacity with the rapid growth of low-cost ethylene coming on line in the US. Note that low cost does not necessarily mean low price, as the marginal producers set the market price at a level that keeps them in business.

Now let us look at some other products of interest in the adhesives industry. In the chart on page 20, we see that in the solvent market, where methyl ethyl ketone (MEK) and mineral spirit prices move more independently than crude oil prices, the supply and demand

UNDERSTANDING SELLERS' MARKETS



SOURCE:ICIS Advanced Purchasing Course

» balance (margin) is the driving factor of price movement. Toluene and xylenes, on the other hand, follow oil more closely, indicating that changes in cost (oil) predominately drive the market price movement.

MEK – Prices follow oil with a three-month time lag, and the market has been over-supplied for a long time as more environmentally friendly options gain market share – although that may be changing in the next few years.

Mineral spirits – Prices follow oil closely, often with a two-month lag, adding a degree of predictability.

Toluene – An increase in operating rates is expected in 2020 in order to meet consumption. However, no new capacity is expected in the foreseeable future.

Xylene – Operating rates are rather low but increasing fast with increased consumption. North America consumes the majority of its production and has been near parity until 2019 when utilisation rates are set to increase further.

TRADE IMPACTS IN STYRENE

Polymer prices (bottom chart) are generally more balanced with cost (oil) driving roughly 60% of the market price movement, while supply and demand drives the remaining 40%. A significant exception is styrene, which is made from benzene, much of which is imported from Asia or Europe and therefore follows those markets – depending on trade flow volumes.

Polyester is driven by oil slightly less than average, because the market has been heavily over-supplied globally, but is on the road to recovery, which is likely to lead to higher seller margins – in an industry where there has been little or no margin in the recent past.

Acrylonitrile – Increased utilisation rates are indicators of a tightening market and likely rising producer margins.

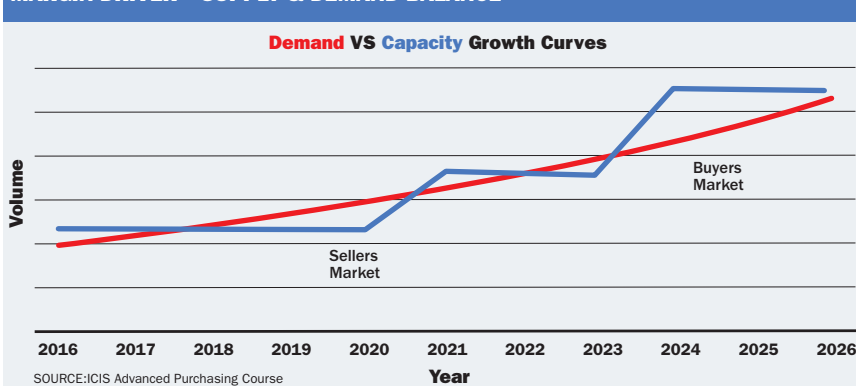
Melamine – In 2018, melamine faced tight global supply due to heavy turnaround schedules. Supply did start to improve in the fourth quarter and prices rolled in Q4 2018 before decreasing in Q1 2019. Looking forward, to Q2 2019, chatter has been muted so far. Sentiment is steady-to-soft and some market players are expecting offer levels to be competitive as supply is lengthy, with expectations that prices will roll over or decrease slightly.

Polyester polymer – US utilisation rates are going down as new capacity comes online in 2020, but globally, utilisation is increasing. New US capacity is expected to increase every year through 2024 to keep up with demand growth, putting buyers in a stronger negotiating position.

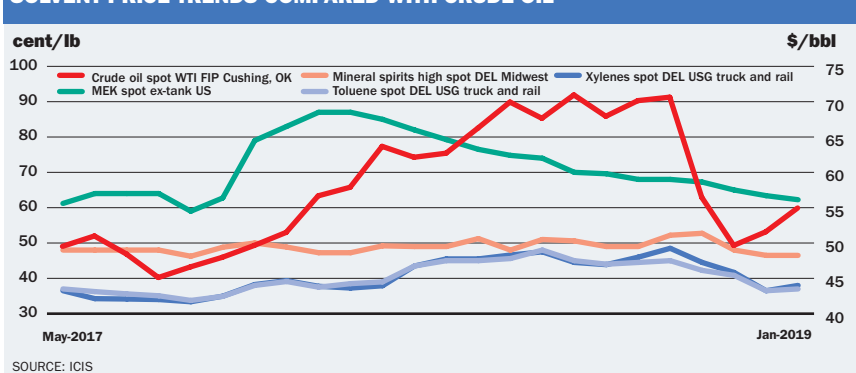
PU feedstocks – Continue to be tight with rising demand and limited capacity growth.

Styrene – The styrene market is rather stable in the US. No new capacity or production or consumption change in either direction is forecast for the foreseeable future.

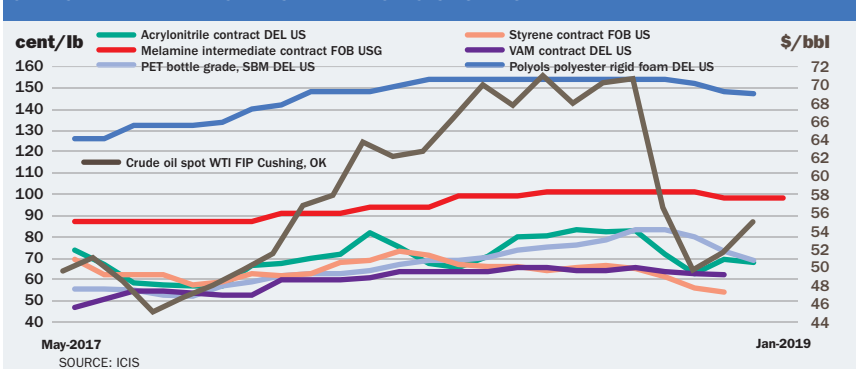
MARGIN DRIVER – SUPPLY & DEMAND BALANCE



SOLVENT PRICE TRENDS COMPARED WITH CRUDE OIL



SELECTED MATERIALS PRICE TRENDS VS CRUDE OIL



Vinyl acetate monomer – Utilisation rates have increased year-on-year since 2014, despite increased capacity. However, consumption did not increase alongside production, so excess product is most likely produced for the export market.

Epoxy – Like most products, epoxy follows oil, but margins have been low in recent years, with low utilisation that is not expected to improve much. However, recent economic growth in the US has increased demand and enabled producers to rebuild margins slightly. With continued strong economic growth, driven in part by the 49-year record low US unemployment rate, this trend would be expected to continue.

In summary, markets are mixed in the adhesives industry, which is not uncommon. This drives a need for good market intelligence, including supply and demand data, to fully understand both the cost and margin components of market prices, and to get the best prices possible. ■

James Ray is a senior consultant with ICIS and **Stephanie Kirby** is a senior analyst with ICIS. Together, they author the monthly ICIS Polypropylene USA and Polyethylene USA price forecast reports. James also contributes to the Methanol Global price forecast report, while Stephanie contributes to the Benzene Global price forecast report. To find out more about ICIS price forecast reports, visit www.icis.com/priceforecasts

Lengthening supply sees prices soften

US markets for adhesive and sealant raw materials have been enjoying lengthy supply in recent months, putting downward pressure on pricing

JESSIE WALDHEIM & ZACHARY MOORE
HOUSTON

The US olefins and polyolefins markets are struggling with supply length during the opening months of 2019, a situation that may well persist over the coming months. The length in the polyethylene (PE) market is the result of a large build-up currently underway in ethylene and ethylene derivative facilities along the US Gulf.

The advent of cheap ethane gas discovered as an associated gas in shale oil wells has

given US ethylene producers a dramatic cost advantage relative to European and Asian producers, who continue to make ethylene from naphtha, a higher-cost feedstock whose prices are closely linked to crude oil prices.

Significant infrastructure investments are required to export ethane and ethylene, so US producers have sought to maximise their cost-advantaged position in ethylene production by building derivative plants aimed at export markets.

In 2017, the US started up 3.5m tonnes/

year of new PE capacity. Most of these new plants reached regular operating rates during the second half of 2018, pushing PE inventory levels towards record levels as product flows from the new plants.

The rise in production is set to continue over the coming years. More than 2m tonnes/year of new capacity is slated to come online in 2019, with more plant start-ups anticipated into the 2020s.

US exports of PE were up over 30% for most grades in 2018, although the rise in exports has

ISOCYANATES ZACHARY MOORE HOUSTON

POLYURETHANE RAW MATERIALS SEE LOOSER SUPPLY

SUPPLY FOR most of the key raw materials in the polyurethane (PU) chain witnessed significant loosening in 2018 after a year of persistent supply tightness in 2017. This year looks set to continue the trend of longer supply, due to capacity expansions as well as slower demand growth for PU systems.

The toluene diisocyanate (TDI) market has shifted from undersupply to oversupply starting in the summer of 2018 when BASF resumed full production at its 300,000 tonne/year TDI plant in Ludwigshafen, Germany.

The plant had started up in 2016 but suffered a damaged reactor and was either offline or running at reduced rates from November 2016 until July 2018.

WANHUA START-UP

The second half of 2018 also saw Wanhua starting up a new 300,000 tonne/year plant in China. Both plants are world-scale facilities, with each capable of covering around 10% of global TDI demand.

While production levels have

moved significantly higher, demand growth for TDI has been disappointing. Some buyers had shifted to alternatives to TDI during the 2017 run-up and have been slow to take up TDI again.

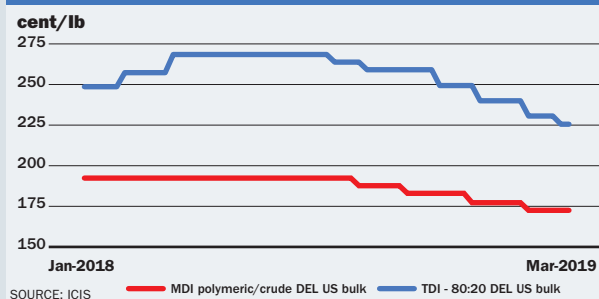
In the furniture and bedding sector, the advent of new "bed-in-a-box" formulations saw several applications shift from TDI to methylene diphenyl diisocyanate (MDI) in their formulations. A slowdown in automotive demand globally also limited demand growth for TDI.

Isocyanates are reacted with a polyol to produce PU foams, with TDI generally preferred for flexible foam applications and MDI usually preferred for rigid foam applications.

MDI supply has also improved significantly relative to tight period seen in 2017. Polymeric MDI (PMDI), which accounts for more than 85% of North American MDI sales, has been kept long by ample availability of imported cargoes from Asia.

Asian markets have seen slower demand relative to North America while the North American has also offered more favourable netbacks

US ISOCYANATE PRICES BEGAN TO SOFTEN LAST AUGUST



to Asian producers relative to their own regional markets over much of 2018 and the first months of 2019.

CHINA IS KEY SUPPLIER

Participants are closely tracking the status of trade talks between the US and China to monitor future availability of imported MDI. China is by far the largest exporter of MDI to the US, accounting for over 70% of all imported MDI in 2017 and 2018, according to ICIS supply and demand data.

Tariffs on MDI imports from China were set to rise by 25% in March.

This tranche of tariffs has been at least temporarily delayed and may alter trade flows if the additional tariffs end up being implemented.

Monomeric MDI (MMDI) supply has been the only PU intermediate to see supply tightness persisting through 2018 on improved demand for this product.

The early months of 2019 have seen greater balance between supply and demand of MMDI, although supply may tighten again once the construction season gets underway. MMDI is heavily used in construction applications. ■

» yet to counterbalance the expansion of production. Bagging facilities and warehouses across the Gulf Coast are operating close to full capacity, with the additional supply resulting in downward pressure on prices.

Trade tensions between the US and China have not yet resulted in a noticeable slow-down in export growth, although a resolution of the trade dispute that would permit greater PE export to China would help producers keep inventories in check as capacity growth continues.

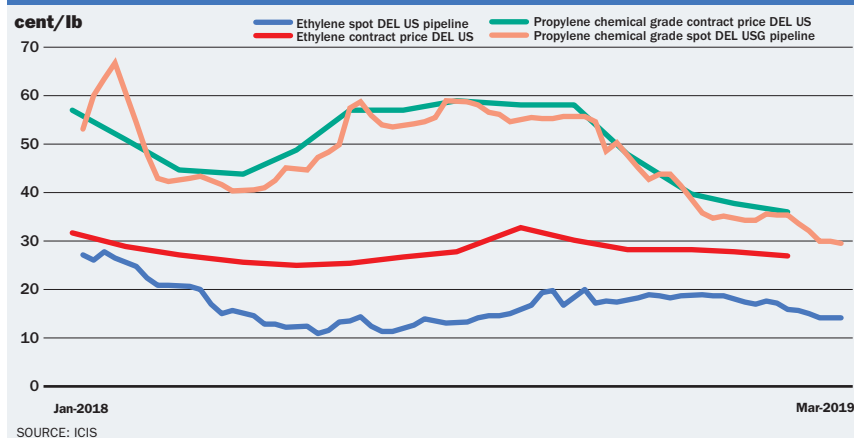
The domestic PE market in the US is considered mature and is not likely to expand beyond GDP growth.

Upstream, the US ethylene market remains lengthy as production continues to outpace demand despite the recent increases to PE capacity. Nearly 5m tonnes/year of ethylene capacity, including new crackers or expansions to existing crackers, has come online since the beginning of 2017.

ETHYLENE BALANCING OUT

Ethylene supply is expected to remain lengthy in the coming months. Two derivative units started up in the first quarter and two cracker turnarounds in the second quarter may move the market into a more balanced position by mid-year, although this will be balanced against the expected start-up of two

US OLEFINS PRICE DEVELOPMENT 2018 TO DATE



more crackers in the first half of the year.

In the fourth quarter, a new export terminal is expected to be online and could further balance the market. However, the ethylene market awaits further increases in PE exports that would increase consumption into the PE sector.

The US polypropylene (PP) market has also opened 2019 with high inventories and supply length, a marked contrast with 2018, a year in which supply was restricted, sending

US prices well above global averages.

New PP builds are much more modest in scope than the large new additions being made in the PE industry as the US lacks a consistent feedstock cost advantage for propylene and propylene derivatives.

However, the industry has been expanding to meet demand growth and added around 500,000 tonnes/year of new capacity in 2018 through debottlenecking projects.

ACRYLATES LARRY TERRY HOUSTON

UPWARD PRESSURE EXPECTED FOR ACRYLATES

US GLACIAL acrylic acid (GAA) and acrylate esters demand is expected to trend upwards with moderate year-on-year gains in paint volumes this spring, though a winter marked by snow and extremely low temperatures is delaying some seasonal buying interest.

Demand for acrylic monomers, which are intermediates, tends to track paint and coatings markets, and draws heavily from the adhesives markets via 2-ethylhexyl acrylate (2-EHA). Coatings buying interest typically peaks in the second quarter of the calendar year.

While paint blending began in February and could continue through mid-summer, weather permitting, the weather has been contrary; freezing temperatures have persisted throughout much of the US throughout January and February.

FIRST QUARTER MOMENTUM

That has not necessarily diminished a sense of urgency among coatings makers, but the weather has slowed expected monomer sales activity

usually seen by March.

Acrylates markets tend to gain momentum late in the first quarter as paint makers prepare for heightened sales beginning in April, especially if weather and the economy are conducive to home building and repairs of older homes or structures.

Acrylates availability, which has seen a mix of ample GAA and snug 2-EHA, will begin to tighten more broadly within the next few weeks as seasonal demand begins to increase, albeit slowly.

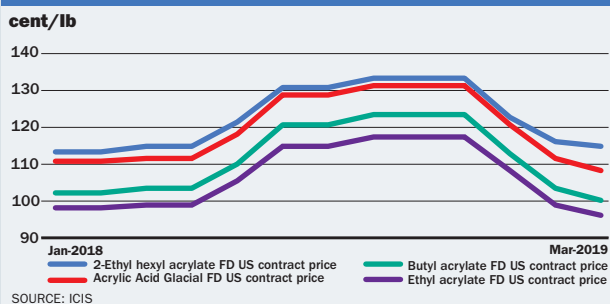
Additionally, upstream planned maintenance will begin in April at Dow Chemical's Texas City oxo-alcohols plant in Texas. The project is expected to last 30-40 days.

Another factor likely to exert upward pricing pressure as volumes increase is transportation.

Truck-driver shortages have been increasing, reaching crisis points after major events such as Hurricane Harvey, and worsening with the retirement of older drivers and fewer younger job applicants.

On the economic front, however,

US ACRYLIC ACID AND ACRYLATE PRICES ARE FALLING



an outlook for the first half of this year indicates a slump in global automobile production and weaker conditions in Europe and Asia.

FALLING HOME SALES

Already in the US, existing home sales trickled lower again in January, according to the National Association of Realtors (NAR).

Feedstock propylene's fourth consecutive decrease in February and the weaker economic outlook will offset supply and demand factors, exerting enough downward pressure

to hold acrylates prices flat in March.

Also on the feedstock front, US March oxo-alcohols price sentiment was trending toward rollovers. Counterbalancing February propylene, factors including restocking activity and likely stronger near-term demand argue for flat pricing. No oxo-alcohols price-increase initiatives emerged for March.

In February, butyl acrylate (butyl-A) free-market, small-buyer contract prices were in a range of \$1.00-1.14/lb FD (free delivered), as assessed by ICIS. ■

Additional PP production and record high propylene inventories have caused a shift in the position of US prices relative to global averages, with the US now among the world's lowest priced regions for PP.

US PP prices are typically agreed on a monomer plus basis, so volatility in feedstock costs is quickly and fully reflected on to PP pricing.

The decline in US PP prices has encouraged greater export activity after the US had primarily been an import rather than an export market throughout 2018.

Most exports have been moving to Mexico and Central America, although traders are showing greater interest in deepwater markets as sellers seek ways of paring down inventory levels.

RECORD PROPYLENE LEVELS

Upstream, propylene inventories have reached record levels amid increased production from crackers and propane dehydrogenation (PDH) units.

New crackers built over the last two years to increase ethylene capacity have increased propylene capacity as well, but most new

units are designed for ethane-only feedstocks. Ethane produces the least amount of co-products like propylene when cracked.

The oversupply of ethylene and recent declines in crude oil values, which lowers the cost of heavier feedstocks like propane and butane, have encouraged more flexible crackers to increase the use of these heavier feedstocks. Propane and butane feedstocks are among the higher yielding feedstocks for propylene co-products.

Propylene production from crackers increased in late 2018 remained strong in early 2019 and is expected to remain strong as ethylene supply remains lengthy.

Propylene production from PDH units also is improved in recent months. A new PDH unit had reached full operating rates in early 2018, but had several production issues during that year. Since 2019, the unit has had fewer outages.

Propylene supply also has been bolstered by downstream outages and difficult export conditions. A phenol unit was offline from mid-January into February, and an acrylonitrile (ACN) plant was taken offline in mid-February.

Propylene exports have been slowed by foggy weather in the Houston ship channel, limited export logistics, tight shipping availability and limited demand for US exports in other regions.

Although Europe is expecting a heavy spring turnaround season, several downstream outages have led to supply length in the region. Demand in Asia is low with ample supply in the region.

INCREASING EXPORTS

During the second quarter, weather in the Houston ship channel is expected to improve and European demand for US exports may increase, as the region's turnaround season is underway.

Increased exports, along with US cracker and refinery turnarounds in the second quarter, may begin to allow the market to work through the propylene overhang.

However, this will take some time as inventories are at double their level of the prior year. Also, cracker start-ups scheduled throughout 2019 will continue to increase propylene production. ■

STYRENICS ADAM YANELLI AND AMANDA HAY HOUSTON

US STYRENE VALUES ON THE RISE; BEARISH SENTIMENT IN SBR MARKETS

US STYRENE prices are beginning to recover after trending lower throughout most of 2018, while bearish sentiment persists in US styrene butadiene rubber (SBR) markets amid ample supply levels, sluggish demand and stable production costs.

US February styrene prices settled higher, largely because of gains in upstream benzene values, which rose by 10 cents/gal.

Benzene values will likely keep upward pressure on styrene contracts going forward, as March contracts settled higher on 28 February, supported by stronger spot prices on the back of tightening supply during refinery maintenance season and slightly higher crude prices.

SPOT MARKET UP

Another sign that March styrene contracts could rise is higher prices in the spot market. Recent activity in the spot market has been up by about 4%. The increase in spot prices is likely because of tighter supply, which has tightened for a couple of reasons.

One US Gulf styrene plant is undergoing a turnaround, and another plant is expected to begin

maintenance in March. AmSty began a planned 45-day turnaround at the end of January on one of two styrene lines at its Saint James facility in Louisiana.

A second styrene plant turnaround is expected to begin in March, when LyondellBasell, the second largest styrene producer in North America, begins a turnaround at its 1.27m tonne/year styrene plant in Channelview, Texas.

Styrene supply has also been negatively impacted by the weather. Fog season on the Houston ship channel and high water levels on the Mississippi river have kept the attention of market participants.

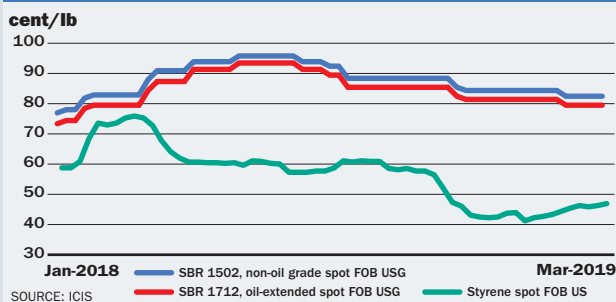
One producer said that styrene movement has been hampered a bit, and that they are watching barge movements closely.

In the SBR markets, the bearish sentiment is largely because SBR supply is expected to outpace demand through the first half of the year.

Any price pressure on SBR will likely stem from changes in feedstock costs, which may rise on tightened supply of butadiene (BD) and styrene.

March contract prices for key feed-

US STYRENE AND SBR PRICE TRENDS 2018 TO DATE



stock butadiene, SBR's primary price driver, were flat. Styrene's decline in January added some downward pressure. Spot prices remain steady amid limited offers and weak demand.

AMPLE SBR SUPPLY

SBR supply is ample across regions, and demand has not yet picked up. Much of the bearish sentiment is driven by Asia, where trade tensions, a sluggish automotive sector and overall economic uncertainty have dampened buying appetite in Asia thus far this year.

China's automotive market entered its first slump in more than two decades last year, and conditions have persisted into 2019.

Downstream tyre factories in Asia have largely reduced operating rates amid declining vehicle sales, which weighed on spot SBR demand.

US tyre companies anticipate flat to slight growth in light vehicles this year, with greater growth in truck tyres. SBR demand is expected to grow during the spring, while costs are expected to rise as feedstock supplies should tighten.

The global BD turnaround schedule is heavier than usual this year, and feedstock will tighten in Europe and China. The US has a lighter maintenance schedule, and domestic BD supply levels should remain healthy, as should supply of BD feedstock crude C4 (CC4). ■



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