Johnson Matthey

Informally speaking

30 YEARS OF INFORMALLY SPEAKING 30

A formaldehyde magazine from Johnson Matthey

- From newsletter to magazine – 30 years of Informally speaking!
- A report from Atlanta
- Engineers and simulations – no plants without them
- What's LOPA got to do with it?
- How healthy are your spray nozzles?

www.matthey.com

AUTUMN/WINTER 2025

Thirty years in the making

In this special 30th anniversary issue we pay tribute (and a visit) to the co-founder and long-time editor of this magazine, Mr. Stanley Erisman, who in 1995 made sure the first issue of '*Informally speaking*' saw the light of day. Stan was very customer focused, and also our internal comedian as he always had a good joke to share, which consistently spread a good mood. And he wanted to explain things in a straight-forward, but also humoristic way when possible. This trait could be seen in the 30+ issues of Informally speaking that he produced before saying farewell in 2010, at which time a new graphic layout was introduced. Be sure to read, beginning on page 10, what our current editor and others have shared about Stan, who turned 80 in September!

Two more giants who have served the formaldehyde industry for decades, Paul Walter and Atul Shah, are leaving us in 2026 to settle into retirement. Like Stan, both Atul and Paul have shown a dedication to serving you, our customers, which is something we feel we are doing quite well based on the results from our latest customer survey - see page 4. It's been very rewarding to see the positive feedback we received, and we would like to thank you all so much who took the opportunity to give us comments during the survey. We also want to extend our heartfelt thanks to Atul and Paul, and we wish you both lots of enjoyable times ahead.

Looking back over 2025, we started the year with a modest degree of hope and confidence that it would become a better year overall for the world economy, which should impact formaldehyde demand. Unfortunately, it became a slower or modest year, particularly from a growth perspective.

Finally, please enjoy all the other articles in this issue including our interviews with Bakelite in Europe and Oxiquim in South America. We're proud to have been bringing this publication to you for 30 years and, like always, we look forward to continuing to serve you in all the ways you've told us you appreciate. So on that note, we wish you all a good start to a new year that promises to bring new changes, new opportunities to meet, and hopefully more prosperity for all of us.

Lars Andersson and Ronnie Ljungbäck
Global Market Managers Formaldehyde

Content

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Celebrating our engineers

At Johnson Matthey (JM) our engineers are a crucial enabling force behind the creation and delivery of our products and services, making them essential to JM's success. From pioneering components for clean energy solutions to scaling platinum group metal recycling, our engineers are helping tackle some of the world's biggest challenges.

Engineering is at the heart of everything Johnson Matthey does, and following on from World Engineering Day earlier in 2025, we recently acknowledged the UK's National Engineers Day in November, an annual event to acknowledge the pivotal role engineers and engineering play in driving innovation and sustainable development.

To mark the occasion, we celebrated our talented engineers, exploring the breadth and creativity of their roles in our company.

Some of our many talented engineers working with the **FORMOX** process

We not only have fantastic and skilled engineers, they are also ambassadors for our products in meetings with customers and equipment suppliers during project execution, generating satisfied customers and long-term future relations.

Stefan Wedman

Head of the Detailed Engineering Team for **FORMOX**™ plants

This highly diverse group ranges from the newly graduated to engineers with long lifetime experience in process technologies, creating both a joyful working atmosphere and a capacity for solving unique problems, always with the customer in focus.

Simon Smrtnik

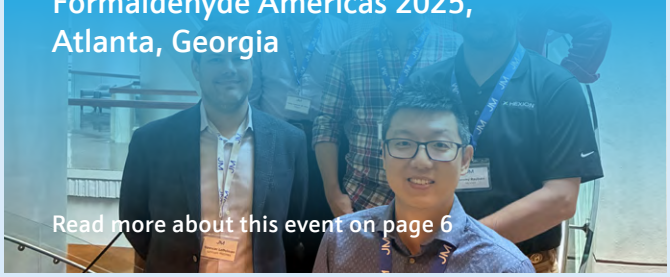
Head of the Process Engineering Team for **FORMOX** plants

BY

Nicole Watson
Marketing Communications Representative

On the front page:

Formaldehyde Americas 2025, Atlanta, Georgia



Read more about this event on page 6

Upcoming conferences...

Formaldehyde Turkey, Istanbul
22-24th June 2026

Formaldehye Asia, Thailand
28th Sept - 1st October 2026

CUSTOMER SATISFACTION SURVEY 2025

Big thanks for your participation, praise and criticism!

In October/November 2025, we conducted our thorough, biennial customer satisfaction survey, to make sure that we record your input and feedback, as well as possible trends on how we and our products are performing.

Much appreciated

In 2023 we noticed that the response rate had dropped compared to previously. But this time it was about the same, which we are happy about. We know that JM also conducts a separate, general survey every year, so we understand if you think we are asking a lot of you. But hopefully you see the value of helping us to improve, and we are very grateful that you are willing to take your valuable time to respond to the questions in our survey. In the end we are trying to understand what we are doing well, but equally, or maybe even more importantly, where we need to improve. Your voice as input to this is extremely valuable.

Overall results

Looking at the overall results, it is very gratifying to see the very high scores that we have received in both the Net Promoter Score (NPS) and Customer Satisfaction Index (CSI). This is something that we are very proud of, as we value our close relationships and many person-to-person exchanges with you.

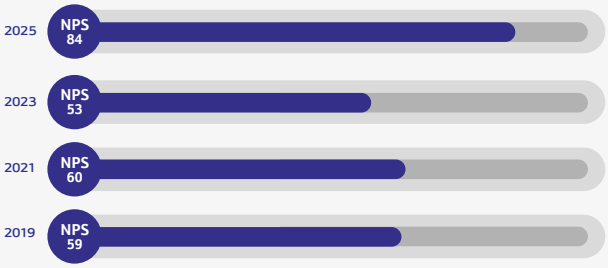
Where we can do better

Through our conferences and interactions this year we have heard that innovation and new products is an area where we could do more, which we are. For example, we work on solutions to provide you with higher yield, longer lifetime and lower CAPEX to mention a few. The main area for improvement identified through the survey, however, is complaint handling. Some complaints are easier and faster to address, such as wrong type or amount of product delivered. Others, especially when there is a performance issue, are by nature more problematic and will usually take longer to resolve due to more time being needed to investigate, and possibly also to visit the plant. This being said, we take your criticism to heart and hope that we can do a better job of managing and meeting expectations in this area moving forward.

Again, we thank you for your important contribution and encourage you to continue reaching out to provide us with feedback without hesitation, since that is the best way we can learn from you how we can improve.

Net Promoter Score (NPS) by year

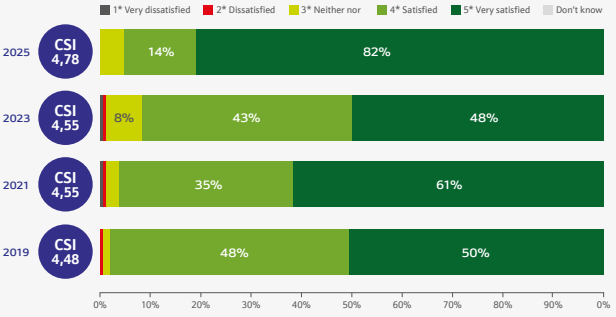
To what degree do you recommend Johnson Matthey Formox to a colleague?



A good NPS rating is usually one of 29, a rating above 50 is an excellent world-class rating!

Customer Satisfaction Index (CSI) by year

Overall, how satisfied are you with Johnson Matthey Formox as your supplier and partner?



BY

Ronnie Ljungbäck
Global Sales & Market Manager Catalysts

New lab inaugurated

The new micropilot lab was officially inaugurated in June, with Catalyst Technologies R&D Director Mike Bainbridge and R&D Associate Director Matt Lunn joining the Perstorp R&D team for the occasion.

> "The first micropilot has now been moved to the new lab and more equipment will be following in the coming months as we ramp up the lab."
>
> – Kaisa Kisko, R&D Manager in Perstorp

Kaisa and the R&D team during the inauguration, joined by Catalyst Technologies R&D Director Mike Bainbridge (front left) and R&D Associate Director Matt Lunn (front right) cutting the ribbon

Formaldehyde Americas 2025

29th September – 2nd October 2025, Atlanta, Georgia

JM hosted its Formaldehyde Americas 2025 conference in Atlanta, Georgia this past September/October, marking its return three years after the 2022 event in Houston, Texas. The conference brought together 17 participants from 7 companies across the Americas for technical, regulatory, and market discussions in the formaldehyde industry. It began with a meet and greet reception on Monday, September 29 prior to the presentations and discussions from Tuesday to Thursday.

Day 1

Day 1 kicked off with a warm welcome from JM Business Manager Atul Shah and new Regional Sales Manager Spencer Leffelman. The agenda opened strong with a safety-focused session from Senior Process Specialist Ola Erlandsson on oxygen analyzer issues, followed by a Johnson Matthey business update from Jo Godden, Formaldehyde Managing Director.

The morning continued with a comprehensive three-part overview of JM's **FORMOX** offerings—covering plant updates, catalyst performance and future developments, and technical services and support. After a coffee break, we then dove into emission control systems and a session on fugitive emissions.

After lunch, our first guest speaker, Jesse Neese, Director of Strategy and Regulatory Affairs of Bakelite Synthetics, and presenting on behalf of the American Chemistry Council (ACC), presented an engaging topic on ACC New Emission Levels including EPA TSCA Risk Evaluation of Formaldehyde, the IRIS Assessment, and the relationship between the TSCA and IRIS. Attendee discussions followed with how these regulatory requirements may impact customer plants and how best to mitigate and inform regulatory bodies of the need for sensible formaldehyde regulations.

Next, our second guest speaker, Ryan Skelley, Senior Process Engineer with Delrin, led a customer experience topic featuring a discussion on a tank rupture collapse of a formaldehyde storage tank that Ryan's team experienced. The account included a timeline of events, findings of the damage, and the factors that contributed to the rupture. Both Jesse's and Ryan's segments were much appreciated by the attendees, receiving very high ratings. The day wrapped up with EPA highlights, a look at future formaldehyde technology developments, and closing remarks from the JM leadership team—followed by a relaxed networking dinner at Alma Cocina, a nearby Mexican restaurant in downtown Atlanta.

Day 2

Day 2 continued the highly interactive tone, opening with updates on JM's upgraded Pilot Hall in Perstorp and the latest catalyst development progress, including high-yield and long-life catalysts. Ola then led an in-depth session on absorber operations for formaldehyde and UFC, covering design, operation, cooling, and startup/shutdown practices.

Following a break, absorber and UFC discussions continued with strong customer participation, and Lucas Freitas, Technical Services Engineer, presented Nine Operational Problems seen across customer plants, prompting lively exchanges and shared experiences. Xiaoming Lu, Principal Process Engineer at Arclin, is one delegate who shared real life plant experience bringing valuable insights to the discussions. The afternoon, also led by Lucas, focused on optimising plant operation at varying capacities,

with a deep dive into the impact of HTF temperature. Both of these segments by Lucas were the most highly rated of the entire conference.

The day concluded with closing remarks from Spencer and wrapped up on a lighter note with an evening outing to Puttshack, a tech-infused mini-golf experience where dinner and networking was combined with a bit of friendly competition.

Day 3

Day 3 featured fewer topics but sparked lively customer discussions beginning with a presentation by Philippe Thevenin, Global Technical Services Leader, entitled Making Data Sharing Easy: A Path to Formaldehyde Efficiency. Philippe highlighted the value of process data and monitoring, showing how sharing plant data via the **JM-LEVO**™ Formaldehyde Portal enables stronger technical service and support. A key highlight was Automatic Data Ingestion (ADI), which allows customers to securely and automatically send plant data to us for faster analysis.

After an engaging discussion on customer experiences and a short coffee break, Ola presented real-world deflagration examples, covering hot spots, gas velocity, and reactor tube backfires. Lucas then continued with Part 2 of Optimizing Plant Operation at Varying Capacities, focusing on critical control variables such as methanol flow, reactor gas flow, and system pressures.

The day concluded with Lucas's talk on Three Unlikely Problems in a Formaldehyde Plant, exploring rare but impactful events and the countermeasures and maintenance practices that help prevent them.

This concluded the Formaldehyde Americas 2025 conference agenda as Atul provided a final heartfelt thank you and farewell prior to his upcoming retirement. We thank all the conference attendees for their shared experiences and input throughout the week, our guest speakers for their excellent contributions and presentations, as well as a big thank you to Atul for his 25+ years of service to our customers.

Words from some of the delegates:

> "Great conference, very educational. Really appreciated the real world examples from different sites."

> "Congratulations on retirement Atul!"

BY

Spencer Leffelman,
Regional Sales Manager
Americas

Bakelite achieves milestone: Ready to produce green formalin

Bakelite's Rotterdam plant is stepping into the future of sustainable chemistry. Under the leadership of Production Supervisor Bart van Grootveld, the site is now ISCC PLUS certified and ready to deliver green formalin, meeting growing customer demand for low-carbon solutions.

Bart, who joined Bakelite in 2023, shared his perspective during the Formaldehyde Europe Conference in May 2025.

Bart oversees operations at the Botlek facility, one of Rotterdam's key industrial port areas. His role spans production, projects, EHS, and overall site management—a responsibility he approaches with a clear vision for the future.

"Our team is small but well skilled," Bart explained. "We coordinate across all areas to keep the plant running efficiently and to prepare for what's next. Sustainability is an important part of that."

Driving collaboration and innovation

Bart attended the 2025 Formaldehyde Europe Conference, where he emphasized the importance of collaboration and technology:

"Meeting JM colleagues face-to-face strengthens partnerships and helps us tackle future challenges. I'm always looking for innovations that improve performance and sustainability—your long-life catalyst, for example, is something that could make a real difference by extending catalyst lifetime."

Certified for a greener future

Built in 1997, the Botlek plant has undergone multiple upgrades to boost capacity. Today, both the plant and its methanol supplier are ISCC PLUS certified, enabling the production of formalin from renewable methanol.

"We're proud to offer green formalin today and scale up as demand grows," Bart said. "Customers are asking for sustainable options, and we're ready to deliver."

When asked if green methanol is part of Bakelite's long-term strategy, Bart was clear:

Sitting down with Bart van Grootveld at Formaldehyde Europe 2025

Botlek plant helps Bakelite earn prestigious EcoVadis Gold Medal

In November 2025, Bakelite was awarded the EcoVadis Gold Medal, placing the company among the top 5% of more than 130,000 businesses assessed worldwide for sustainability performance.

This achievement reflects Bakelite's commitment to advancing sustainability through new policies, operational improvements, expanded public reporting, and initiatives such as Responsible Care and ISCC PLUS certification. Key actions include:

- Botlek (Netherlands): Installation of a steam turbine to improve energy efficiency
- Barry (UK), Lantaron (Spain), Kitee (Finland): Deployment of solar panels
- Eugene & Albany (Oregon, USA): Advancing water reuse systems
- Louisville (Kentucky, USA): Implementing a new chiller system to reduce water consumption

The Gold Medal underscores Bakelite's leadership in sustainable operations and its ongoing commitment to a greener future.

"We want to be future ready. Interest is already there, and we expect it to increase. This certification shows customers we can make it happen."

About Bakelite

Founded in 1907 by Leo Baekeland, Bakelite pioneered the first thermosetting resin—widely regarded as the world's first synthetic plastic. Today, headquartered in Atlanta, Georgia, Bakelite is a global leader in thermoset specialty resins, engineered molding compounds, and advanced solutions serving diverse industries worldwide. The Botlek plant in Rotterdam is one of 22 Bakelite sites across 13 countries. It primarily produces formaldehyde for customers in the Netherlands and Germany.

About ISCC PLUS

ISCC (International Sustainability and Carbon Certification) provides globally recognized certification systems to advance sustainability through transparency and credibility. ISCC PLUS enables companies to demonstrate their commitment to sourcing alternative feedstocks and is the leading certification system for the circular economy and bioeconomy. ISCC PLUS certified companies are at the forefront of using renewable and recycled raw materials.

BY

Marion Kugler
Regional Sales Manager
Europe

Oxiquim develops sustainable resins for the board industry

IIgnacio Diez Cifuentes was a participant at the 2025 Formaldehyde Conference in Atlanta, Georgia. We recently had a chance to speak with him about his thoughts on the conference, the role of this newsletter, and the work his division at Oxiquim is doing to enable more sustainable wood panel products.

Located in Concepción, Chile, Oxiquim has more than 70 years of history in the Chilean market. Today the company holds robust positions in each of its three business units, one of which is the Resins division. Ignacio began his career here as a trainee engineer in 2013, and has been the Operations Manager for the division since 2018. I was curious to hear whether Oxiquim was doing anything in the area of sustainability that he could share.

"Yes, there is one very strong initiative that we're excited about," says Ignacio. "We're developing sustainable resins for the board industry by replacing fossil-based phenols with lignin."

As I'm not a chemist, I asked him to tell me more about it.

"Lignin is the natural glue of the tree," he explained. "It's extracted from wood as a byproduct during various industrial processes. Now it is commercially available, so we are using it to generate a new additive for the plywood industry."

"For us," says Ignacio, "we see sustainability as a generator of business opportunities." According to Ignacio, Oxiquim currently consumes thousands of tons of lignin annually and some customers are now implementing the new alternative resins into their board products for sustainability purposes.

They know the formaldehyde plant better than you!

Oxiquim's history with FORMOX dates back to 1995 when the first plant was installed. A twin reactor for the same plant was added in 2003 and the plant was pressurised in 2007. "JM has always been helping us with the engineering and also the construction," says Ignacio. "Now we have an ECS project together, where they are also helping with the engineering and construction."

Ignacio says he really appreciates the relationships he has developed with various people at JM over his thirteen years with Oxiquim. "JM has been there throughout my whole career in Oxiquim," he says. "It started with Atul Shah, who I've worked with from the beginning. Whenever we have questions they're always very responsive. Lars (Andersson), Tomas (Nelander), Philippe (Thevenin), Claes (Lundström), Fredrik (Rietz) – all are very reliable for me."

"One of the things that is always impressive is that when you speak with JM they know the plant better than you! I remember working with Fredrik when I was new here and he knew everything about our plant. I learned that he helped to build it in 1995!"

"That expertise, that knowledge is absolutely important. To have the opportunity to work with people who know because they are part of it – it's unusual, but also valuable."

The conference and getting back to basics

Asked about the recent conference in Atlanta Ignacio says, "I like how they went straight to the technical stuff, starting the meeting off with a safety experience. It was nice to set the mindset right away. It reflects the values of JM and the professionals." He continued, saying:

"One of the most valuable things for us is to listen to the experts on basic topics – an amazing experience. When everything is wrong it's important to come back to the basics, and they speak with clarity and simplicity. That's always valuable."

He also enjoyed the opportunity to spend time with different colleagues from all over the Americas. "It's a good experience to exchange with everyone, even just discussing trivial issues with Ronnie (Ljungbäck) and Lucas (Freitas) – it was a lot of fun."

Asked if he finds Informally speaking valuable Ignacio says, "Of course! I always have the printed version in my office for anyone to read. I also hand it to both the production manager and to the head of the formalin plant. Personally, I find it a very useful tool because..." (Read Ignacio's full remarks about Informally speaking on page 13).

About Oxiquim

Founded over 70 years ago, Oxiquim is a leading Chilean company in the areas of maritime terminal services for bulk liquids, the commercialisation and marketing of chemical products and specialties, and the production of resins for the wood board industry. The Resins Division is the main supplier of resins for the manufacture of wood boards such as plywood, particleboards and MDF in Chile. Its plant in the Biobío Region produces formaldehyde-based resins to serve these manufacturers.

Ignacio (right) with colleagues Juan and Patricio (middle) during a visit with the JM team in Sweden

BY

Charles Hodgdon
Editor

Happy Anniversary to this newsletter!

This issue marks the 30th anniversary of the first-ever Informally speaking newsletter! Something to celebrate? Definitely!

Over the course of nearly 60 issues, we've been able to write about dozens of FORMOX conferences and customers worldwide. We've introduced you to new developments, and to the people who make up our teams. Together with you we've celebrated record-setting capacity and endured economic slowdowns – even a world-stopping pandemic.

From time to time, we've also looked back on our history and the people who helped us to get here. Which brings us to Stan Erisman, the father of Informally speaking who celebrated a milestone of his own in 2025 when he turned 80. Although I'd heard of Stan a few times over the years, I'd never met him. So, when the opportunity arose to interview him for this anniversary issue, I was thrilled to be invited to his home.

A trip back in time

Situated along Sweden's west coast, about an hour north of Helsingborg, Glimminge Plantering is a small cluster of cottages and year-round homes nestled in a forest of tall pines. The trees were planted some 125 years ago to keep sand from blowing onto nearby fields, and over time summer cottages—and later permanent houses—followed.

Hidden among the trees stands the home of Stan and his wife, Karin. She first brought him to Glimminge in 1988, a place she cherished since childhood, when her father built a summer cottage there. In the 2000s, Stan bought an adjacent lot to secure their future in the area. After carefully planning around the pines, he designed their dream house himself. A local builder completed it in 2007, and they've lived there ever since.

Who is Stan Erisman?

As he gave me a tour of the inside, I noticed several large paintings in a very distinct style. All I knew about Stan prior to my arrival was that he had once been 'the editor', so I was surprised when he began our interview by telling me, "I consider myself first and foremost an artist – a painter."

I asked him about one of the paintings that spoke to me in a particularly powerful way. "Funny you should ask," he says. "It's from Voltaire's Candide, based on a resonance I felt between my own life and Candide's."

◀ It was a spectacular day as I approached Glimminge Plantering, stopping occasionally to admire the view of the countryside and of Kullaberg Nature Reserve across the bay. At the end of the road lies a remote beach, a tranquil summer playground since as far back as the 1930s.

▲ We sat down with a thick folder Stan keeps containing the 30+ issues of Informally speaking that he produced during the first 15 years. On the wall behind him is one of his paintings, many of which have been shown at various venues over the years, including the foyer of Malmö Opera.

> "I consider myself first and foremost an artist – a painter."

In Voltaire's novella, the main characters try to make sense of life, despite having to face one disaster after another. Eventually they end up in a place of peace and beauty.

"I named it after the famous last sentence and conclusion of the story," says Stan: "'Mais il faut cultiver notre jardin', meaning 'One must cultivate one's garden'."

Over the next several hours Stan shared with me some of the twists and turns of his own life journey while Karin spoiled us with a delicious pasta and mushroom lunch, followed by a stack of warm, homemade cinnamon buns. Among other things, Stan described for me how he had 'escaped from an extremely restrictive childhood' growing up in Oak Park near Chicago. From there he'd fled with a friend to San Francisco, California -- the very hub of American counterculture at that time.

We talked about how he managed to get settled, then plunged into studying for his degree in English at San Francisco State University. Life was intense, but he loved the freedom and the challenges to everything he'd believed before. As America's involvement in Vietnam intensified, however, Stan elected to continue at graduate school at UBC in Vancouver, Canada. From there, in 1968, he took off for Europe to discover another life.

An exciting new start in Sweden

After settling in Malmö, Stan landed a part-time job at a private language school, teaching intensive English courses to individuals sent by corporate clients. That gave him the chance to paint full-time. One client company was Perstorp AB, which is how, at the age of 25, he first came into contact with the company that had a small unit devoted to developing the Formox process.

By the end of the 1970s, Stan was hired by Perstorp and soon became the company's first remote employee, working mostly

> "It was the 1960s, and San Francisco was the polar opposite to Oak Park."

from home. His teaching assignments quickly evolved to include translating, text revision, presentation material and speeches. From there, it would be just a small step – relatively speaking – to writing a newsletter.

The birth of Informally speaking

"I'd been doing more and more of my Perstorp work for Formox and got to know the business and the people rather well," says Stan. "So when the plant sales manager Max Henning approached me in the spring of 1995 with the idea of doing a newsletter specifically for the formaldehyde business, I was on board immediately. From there, it didn't take many minutes to come up with the obvious name: 'Informally speaking' – a play on words of course! We published the first issue that same autumn."

▲ The first issue – Autumn 1995

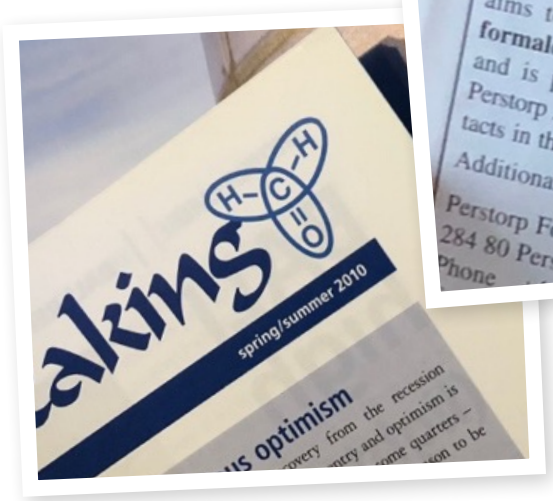
When working on that first issue, Stan came to realise that meeting and interviewing customers would be a very important part of providing relevant, interesting and valuable information within a well-defined field, in a market that was small but global.

Continued on next page ▷

Sometime in the early nineties I recall going into Max Henning's office with a client's newsletter; this raised a question, could this type of publication assist in promoting the new Formox? Remember, this was a time of major change; Formox was transitioning from being a formaldehyde process licensor and catalyst supplier to offering complete plants. The aim was a limited range of standard plants using tried and tested components. A newsletter, in combination with the annual seminars, seemed an effective way to disseminate this new market approach. Moreover, Max knew just the man to realise the project – Stan Erisman who, in characteristic style, brought Informally speaking to life with that first edition in the Autumn of 1995. The back issues speak for themselves; not only technical advancements - process, catalysts, operational and safety issues – but the evolution of the Formox family. Even today they make interesting reading – a tribute to Stan. His push for new "copy" for every issue was legendary – and may even have contributed to the pace of development.

Bob Crichton
Formox consultant for 22 years (1991 – 2013)

▼ The logo created by Stan for the Formox group was used at the top of the newsletter for over a decade.



◀ Printed on the back of every issue was the newsletter's mission and explanation of the meaning behind its title: "Informally speaking aims to provide **inform**ation about **formal**dehyde in an informal forum...."

▼ Stan's wordplay and talent as an artist could be seen in many of the humorous cartoons that he created for the newsletter. Do any of our readers recognize Max Henning here?

◀ The second issue marked not only the first Formaldehyde Seminar in Asia, held in Kota Kinabalu, Malaysia, but also the first of many seminars that Stan would attend for the purpose of getting to know the customers and reporting directly from the events.

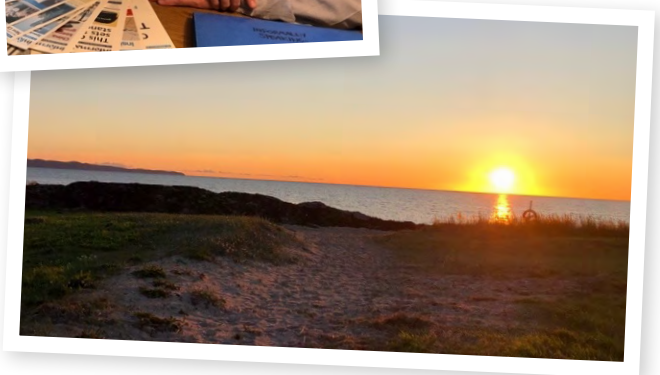
On behalf of everyone who works with the newsletter today, as well as our readers at sites across Asia, Europe, the Middle East and the Americas, I tip my hat to you. Happy Birthday, Stan, and thanks for creating something that has continued to serve its original purpose for three decades!

"Hey! I want the last word here," says Stan. "I'm the one to be saying thanks – for an exciting, thoroughly enjoyable 15 years of being able to work with such a delightful and competent team. And for giving me the opportunity to meet so many of the world's leading formaldehyde producers! And not least for keeping Informally speaking alive and well."

A new era

Stan soon became a familiar face with Formox customers around the world and served as the newsletter's editor, creative director and cartoonist(!) for a decade and a half. "I consider myself very fortunate to have worked so closely with Formox until I retired in 2010," says Stan. "It was a small enough group, so I got to know them all as individuals and to understand how passionately service-minded they were. Plus, they've got demonstrably the world's best formaldehyde process, plant design and catalyst."

▼ What better way to cap off my wonderful visit with Stan and Karin than with a stunning sunset over the picturesque bay?



> **"I didn't have to exaggerate a thing. Wow!"**

Stan's wit and personal touch added flavour to the newsletter which maintained its informal yet informative style until 2010, when he published his personal farewell after 15 years and more than 30 issues. Asked to participate in this 30th anniversary issue, Stan needed no persuasion.

When the first issue of Informally speaking came out in 1995, we didn't know how it would be received, or how valuable it would be to the business. Stan was a driving force and undoubtedly had a clear vision that the newsletter would become a way to keep in touch with our customers, and also useful for marketing purposes and for conveying technical information. Stan was for many years "Mr. Informally Speaking", where he did an enormous amount of work as editor and idea generator. Always with care for our customers and rooted in his passion for Formox and helping us to develop our English.

Thank you so much for your great commitment, Stan!

Birgitta Marke
Formox employee 1987-2007 and JM Formox Consultant since 2017

Informally speaking has always meant a great deal to me. We were, in a sense, born at the same time—both the newsletter and my journey as a Formox member began in the autumn of 1995. Looking back, I still feel deeply honoured to have been one of the 41 Formox members presented in that first issue.

I remember the Autumn 1996 issue, in which the editor, Stanley Erisman, kindly highlighted my work and service in Asia. At that time, my Indonesian name was Edy Sudasta Lie, before I became a Singaporean in 2006. In one issue around that period, Stan jokingly wrote, "Goodbye Edy, and welcome Eddy." The memory remains very vivid.

Stan was truly remarkable. We spent a great deal of time travelling together across the region, interviewing customers and arranging conferences. Those trips gave us many fond and lasting memories with our customers, both during work and beyond.

Congratulations once again on Informally speaking's 30th anniversary. It is a wonderful milestone, and I'm delighted to be able to celebrate it with you while also remembering Stan and his lasting impact.

Warm regards, Eddy

Eddy Lee
JM Formox colleague for 29 years (1995 – 2024)

Personally, I find it a very useful tool because it refreshes many important things about the plant regarding operations and catalysts, market topics, methanol, and tips. I also enjoy reading about the expansion of formaldehyde, like in China – that's always interesting to follow up on – and also about different applications around the world. And, really interesting to me is that the articles are written by someone you know. So, when Philippe writes something, for example, I think, 'I know him and he's really knowledgeable, so this I want to read!'

Ignacio Diez Cifuentes
Operations Manager at Oxiquim, Resins Division

As a JM Formox customer, Informally speaking has been an invaluable source of practical know-how. It is my go-to reference whenever I need quick, reliable information related to operations and troubleshooting. The content is clear, experience-driven, and directly relevant to real plant situations, making it easy to apply in day-to-day work. I frequently refer back to the magazine, and it has consistently helped shorten response time and improve understanding when issues arise. Overall, Informally speaking is a highly appreciated knowledge resource that adds real value to our operations.

Soon Wai Loon
Production Section Manager at Polyplastics Asia Pacific

From another customer:

*The Informally speaking magazine provides useful updates on what is happening in the wider industry, what JM Formox is working on to improve its offerings and timely reminders on how customers can improve their **FORMOX** plant operation. The articles in the magazine help to connect us as customers to JM Formox in a passive but just as important way. Relevant articles shared within the company has also helped to trigger valuable discussions.*

BY

Charles Hodgdon
Editor

How simulation models ensure the best **FORMOX** plant for your needs

At JM, simulations are at the core of FORMOX plant design. They allow us to predict outcomes, optimise performance, and fine-tune processes - ensuring performance, safety and efficiency.

Over the years, we have developed a wide range of simulation tools. Some are highly detailed and designed to model very specific parts of the process. Others are simpler and faster. We do not see the simpler ones as less important - what matters is using the right tool for the right task.

General simulations

We use industry standard flowsheeting software such as Aspen Plus® or PRO/II™ to calculate mass and heat balances across the plant. These powerful platforms include databases of physical and thermodynamic properties for chemical compounds, along with advanced models for reaction and separation units.

Pipe geometry from 3D models, vessels, heat exchangers, valves, rotating equipment such as recirculation fans and pressurisation blowers are all included in a single simulation. We have developed our own custom models for specific equipment, such as the turbocharger or the honeycomb ECS reactor.

These simulations provide a complete view of the plant performance at different capacities, calculating formaldehyde production, power consumption and steam production. They allow us to fine-tune equipment, optimise power consumption, check operability, and reduce investment costs.

Safety questions, such as scenarios arising from HAZOP studies, are also addressed in these simulations.

Fast models

Not every situation requires detailed computation. Sometimes simple models that are easy to start and modify are more than enough. They give fast answers that, while not 100% accurate, are just what you need at that moment. For that purpose, we use simplified simulations in VBA for Excel or Python. They are perfect for quick checks on a laptop during a discussion with colleagues, calculating examples for operators during commissioning, or fitting some parameters to a large dataset. These models can provide a good initial guess that helps advanced models to converge more efficiently.

Advanced reactor simulation

At the heart of the **FORMOX** process is the reactor, which deserves its own dedicated model, coded in FORTRAN, the reference language for fast scientific computing. This model, which simulates the reactor, consists of a set of differential and algebraic equations solved over a 3D mesh. It combines several sub-models that describe physics at both microscopic and macroscopic levels:

- Microscopic: diffusion, adsorption, and reactions inside the pores of catalyst rings
- Macroscopic: gas flow through the different catalyst layers, interaction between the catalyst rings and the bulk flow, heat transfer and cooling at the tube surface with boiling HTF on the shell side.

These models are based on experimental results from **FORMOX** Innovation. The outcome is a detailed picture of temperature profiles and chemical compositions along the reactor tubes, providing insights that help our catalyst experts design the optimal loading plan for each customer. Despite its complexity, the simulation program is easy to use thanks to a dedicated Excel interface.

Computational Fluid Dynamics

For special cases requiring a deeper understanding of fluid dynamics, we use CFD (Computational Fluid Dynamics). This allows us to capture complex flow behaviours that other models cannot. Carried out by specialists at JM, these simulations can be quite costly in terms of time and resources. CFD is used to address very specific questions, for example how to design gas mixers with low pressure drop.

Training

Developing simulation tools is not enough. We want to ensure that they are deployed and used throughout the organisation. Each year, the Process Engineering group hosts a dedicated week of training, featuring cross functional workshops with the Technical Support team. This event is a chance to share experiences, exchange knowledge, and bring valuable feedback from the field into our daily practice.

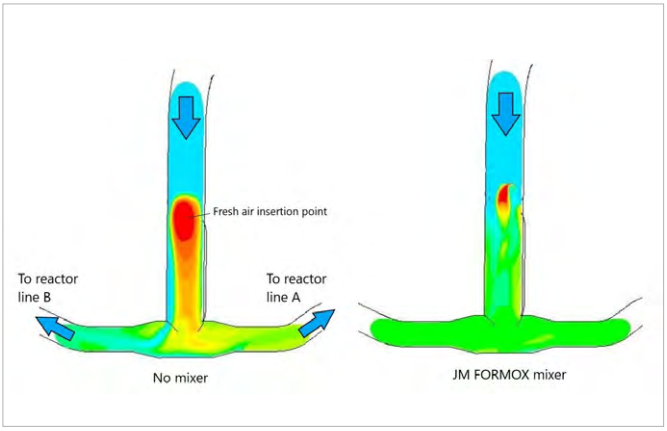


Figure 1: CFD simulation of the mixing of fresh air with recycle gas from the absorber in a twin plant. The color scale depicts oxygen concentration, from light green (process gas to the reactors at 11% O_2) to red (fresh air with 21% O_2). It is crucial that the oxygen concentration is balanced between the lines going to reactor A and B to mitigate deflagration risk. The simulated pipework on the left is without a mixer, while the simulated pipework on the right is equipped with a **FORMOX** mixer. The challenge is to achieve a satisfactory mixing level while keeping the pressure drop over the mixer as low as possible.

Figure 2: Simplified simulations created in Python provide fast answers in some situations

Throughout the week, participants work on real case studies, applying simulation tools together. The sessions highlight how to avoid common pitfalls and how to unlock the full potential of the software.

Beyond simulations, the training week also provides an opportunity to explore key engineering topics in greater depth, strengthening expertise and building competence across the group.

What about AI?

We have entered a new era with the advent of AI and there is no doubt that it will transform the way plants are designed. The day has not yet come when we can choose between ten designs suggested by a virtual engineer assistant which has been given a specification sheet. Probably this will happen with the increasing interaction between virtual assistants and design software.

AI nevertheless assists and quickens the engineering work in many small tasks such as writing code and documentation, summarising technical literature, formatting and analysing data.

Conclusions

From high-fidelity reactor simulations to lightweight models for rapid checks, JM strives to develop efficient simulation tools that meet our technical requirements, keeping user-friendliness in mind. This approach is aligned with our way of working, which should be smooth and agile, resulting in plants with a reliable design, top performance and tailored to your needs.

BY

Michel Bellais
Associate Specialist

What is a LOPA and why does it matter in Process Safety Management?

In modern process industries, ensuring safety is not just about meeting regulatory requirements. It's also about building confidence that every layer of protection in a system truly performs as intended. Many facilities perform a HAZOP (Hazard and Operability) study as their primary risk identification tool. While a HAZOP is essential for discovering potential hazards, it does not always quantify risk or validate how effective each safeguard really is.

That's where LOPA (Layer of Protection Analysis) comes into the picture and adds tremendous value.

What is a LOPA?

A Layer of Protection Analysis (LOPA) is a semi-quantitative risk assessment method used to evaluate whether the safeguards identified during a HAZOP provide enough risk reduction to meet company or industry risk tolerances.

In simple terms:

LOPA connects the dots between a hazard, its frequency, the safeguards in place, and the level of risk that remains. It answers the critical question:

"Are our existing safeguards enough to reduce risk to an acceptable level?"

How LOPA works

After a HAZOP identifies a potentially hazardous scenario, LOPA takes the next step by evaluating:

1. **Initiating event frequency**
   How often could the hazardous event reasonably occur?
2. **Independent Protection Layers (IPLs)**
   What safeguards exist—and are they truly independent, reliable, and effective?

   IPLs may include:

   - Instrumented systems (e.g., alarms with operator action, interlocks)
   - Physical protections (e.g., relief valves, containment)
   - Procedures or operating practices
   - Design features that reduce hazard likelihood
3. **Probability of Failure on Demand (PFD)**
   How likely will each safeguard function when needed?
4. **Residual Risk**
   After accounting for safeguard performance, it calculates if the resulting risk is below your company's acceptable threshold.

If the residual risk is still too high, LOPA identifies the need for additional safety measures—such as an enhanced Safety Instrumented Function (SIF) or procedural controls.

How JM uses LOPA

We don't stop at identifying hazards—we analyse and verify the integrity of each safeguard using the LOPA methodology. After a HAZOP is done, we identify the scenarios that impose major Health & Safety risks (Consequence Category 4 or above) based on our EHS risk matrix and we perform a LOPA on those scenarios (see Table 1).

Our LOPA reviews provide:

- A clear, traceable rationale for risk reduction decisions.
- Confirmation that each Independent Protection Layer is independent of each other, reliable and auditable.
- Detailed evaluations of SIF (Safety Instrumented Function) requirements (if needed) and what SIL (Safety Integrity Level) it must meet.
- Actionable recommendations where risk reduction falls short.
- Transparent documentation for audits and regulatory reviews.

This approach ensures that your facility's safeguards are not just present—but proven effective when it matters most.

CONSEQUENCE CATEGORY (CC)									
(5) CATASTROPHIC	Environment	Major / readily identifiable environmental damage >10 kilometres from the site boundary.	5H	5G	5F	5E	5D	5C	5B	5A
	Health & Safety	"Multiple onsite fatalities. Exposure to workplace health hazards with a high incidence of occupational illness cases with one or more fatality." **CC5 – Multiple fatalities**								
	Financial	Replacement cost / loss, Fines, reputational losses > EUR 2.5 million.								
(4) MAJOR	Environment	Major / readily identifiable environmental damage upto 10 kilometres of the site boundary.	4H	4G	4F	4E	4D	4D	4B	4A
	Health & Safety	"Fatality, life threatening injuries, permanent loss of sight or hearing. Any number of fatalities. Exposure to workplace health hazards with a high incidence of occupational illness cases resulting in permanent disability." **CC4 – Single fatality**								
	Financial	"Replacement cost / loss, Fines, reputational losses EUR 1 - 2.5 million."								
(3) SEVERE	Environment	Observable >1 kilometre from the site and measurable off-site environmental impact within a kilometre of the site boundary.	3H	3G	3F	3E	3D	3C	3B	3A
	Health & Safety	"Fractures, other than fingers or toes. Amputation of fingers or toes. Significant injury to eyes requiring corrective surgery. Crush injury to head or torso. Burns that cover more than 10% of the body or cause significant damage to respiratory system. Any number of fatalities due to head injury or asphyxiation. Any number of fatalities with more than 24 hours. Any number of offsite fatalities. Exposure to workplace health hazards with a high incidence of occupational illness cases without permanent disability." **CC3 - Major injury**								
	Financial	"Replacement cost / loss, Fines, reputational losses EUR 0.5 - 1 million."								
(2) SERIOUS	Environment	Measurable on-site environmental impact. Major breach of regulatory consent and/or observable off-site.	2H	2G	2F	2E	2D	2C	2B	2A
	Health & Safety	"Medical treatment injuries/first aid. Any number of offsite first aid injuries. Exposure to workplace health hazards with a high incidence of occupational illness cases without permanent disability." **CC2 - Lost time accident**								
	Financial	"Replacement cost / loss, Fines, reputational losses EUR 50,000 - 500,000."								
(1) SIGNIFICANT	Environment	Minor breach of regulatory consent with no measurable environmental impact.	1H	1G	1F	1E	1D	1C	1B	1A
	Health & Safety	"A first aid incident. Exposure to workplace health hazards with a high incidence of occupational illness without permanent disability." **CC1 - First aid incident**								
	Financial	"Replacement cost / loss, Fines, reputational losses EUR 10,000 - 50,000."								
(0) INSIGNIFICANT	Environment	Minor breach of regulatory consent with no measurable environmental impact.	0H	0G	0F	0E	0D	0C	0B	0A
	Health & Safety	"A first aid incident. Exposure to workplace health hazards with a high incidence of occupational illness without permanent disability." **CC0 - First aid incident**								
	Financial	Replacement cost / loss, Fines, reputational losses < EUR 10,000.								
EVENT FREQUENCY (YR-1)			10-7 (H)	10-6 (G)	10-5 (F)	10-4 (E)	10-3 (D)	10-2 (C)	10-1 (B)	1 (A)
Unacceptable risk			EXTREMELY UNLIKELY	VERY UNLIKELY		UNLIKELY		POSSIBLE	PROBABLE	REGULAR
Intolerable (Risk must be reduced)			Theoretically possible but extremely remote chance of occurrence.	Foreseeable event but very remote chance of occurrence during the lifetime of the plant.		Incidents known in industry. Unlikely events not expected during the lifetime of the plant.		Possible during the lifetime of the plant.	Event likely during the life time of the plant.	Event occurs regularly on the plant.
Tolerable if ALARP (As Low As Reasonably Practicable)										
Broadly acceptable										

Target Frequency for CC4=1X10^{A-5}

Table 1: EHS Risk Matrix for JM FORMOX Licensing; LOPA performed only on scenarios identified as CC4 or CC5

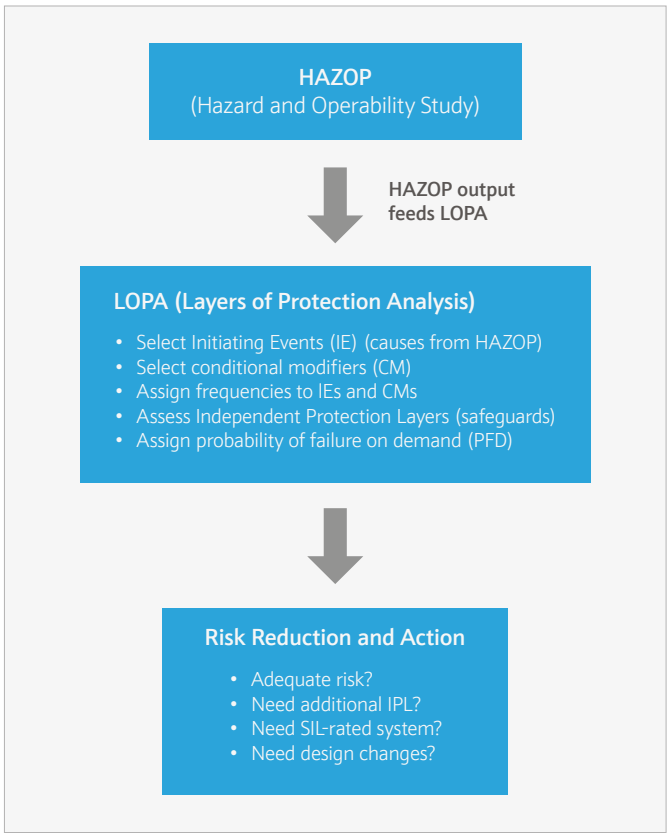


Figure 1: How a HAZOP study is used to do a LOPA

Conclusion

A LOPA is a powerful complement to the HAZOP process. HAZOPs are qualitative; LOPA introduces numerical values for frequency, reliability, and risk and in addition, it considers the occupancy in a plant. By introducing a structured, semi-quantitative evaluation of safeguards, LOPA helps validate whether risks are truly under control. By identifying gaps before they become incidents, LOPA highlights scenarios where safeguards may not provide enough protection—giving teams the opportunity to implement improvements proactively.

When you perform LOPA after HAZOP, you demonstrate a higher level of diligence, responsibility, and commitment to the safety of people, assets, and the environment. LOPA helps to gain confidence knowing that your risk decisions are not just based on engineering judgment but supported by a structured, recognized methodology.

If you would like to know more about how we can assist you with a LOPA, please contact your JM representative or reach out to me at Debopriya.Das@matthey.com.

BY

Debopriya Das
Senior Process Engineer

Methanol spray nozzle routine maintenance

In a formaldehyde plant, methanol spray nozzles may seem like minor components, but their function is critical. These nozzles ensure proper atomisation of methanol, which directly affects vaporisation efficiency and reactor performance. A well-maintained spray pattern helps prevent issues such as liquid methanol accumulation in the process gas system—an unsafe condition that can lead to deflagration. It also minimises the risk of paraformaldehyde formation on the vaporizer shell side and uneven methanol distribution causing inconsistent reactions.

Although modest in size, these nozzles are not maintenance-free. Over time, their performance can deteriorate due to blockages or fouling from methanol impurities, wear from continuous operation, and erosion—one of the most common problems observed.

"Keeping at least one set of spare nozzles in stock requires minimal storage space but can make a significant difference when replacements are urgently needed"

Monitor the pressure drop across the spray nozzle during normal operation

The pressure drop across a spray nozzle directly influences atomisation efficiency. A higher pressure drop produces finer droplets because the liquid accelerates more, resulting in better atomisation and a more uniform spray pattern. Conversely, low pressure drops lead to larger droplets and poor atomisation, which can cause uneven methanol distribution. Photos 1 & 2 show the good and poor atomisation of methanol.

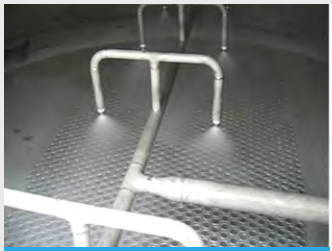


Photo 1: Good methanol spray pattern

Photo 2: Poor methanol spray pattern

Methanol flow rate also affects pressure drop. An increase in flow rate raises the pressure drop, while a decrease lowers it. We recommend monitoring and comparing pressure drop at the same flow rate and system pressure to identify early signs of potential issues.

Inspection of spray nozzle during catalyst replacement

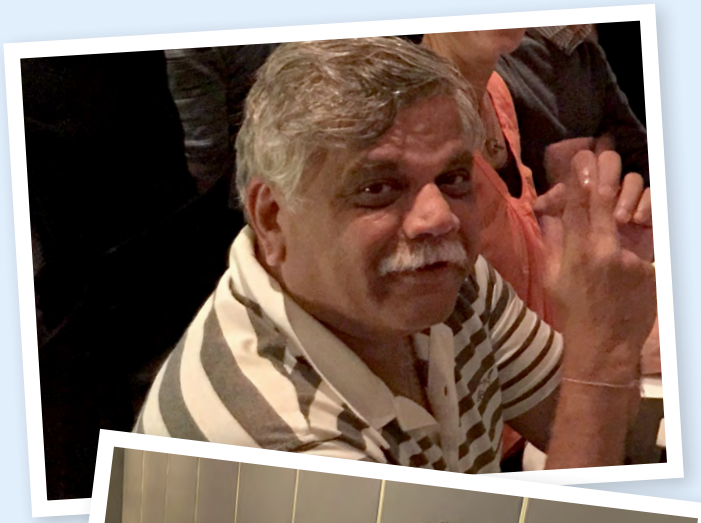
In the header picture, notice that the passage diameters are different between the first four and the last one on the right. All of them had their own problems. For the first four, the passage diameter has become bigger due to erosion while the last one was clogged during operation.

Take the opportunity to inspect the spray nozzle at least during the catalyst replacement or once per year. JM provides detailed guidelines for this process via Technical Information: Methanol Spray Nozzles – Troubleshooting and Testing Procedure. If you want to learn more about spray nozzle integrity, please contact your JM representative or write to me at Aizaq.Syazwan@matthey.com.

BY

Aizaq Syazwan
Senior Technical Service Engineer

A personal farewell



After 25+ years at Formox under Perstorp and JM, the time has now come to bid my farewell to all my present and past colleagues in the two companies and to all my customers around the globe that I was glad to meet. I have learned a lot from all the travel and from meeting all of you. It has helped me to broaden my horizon not only in the Formaldehyde industry but in life in general - culture, food and personalities. I cannot thank you enough for all these experiences.

What can I say about the job at Formox? It has been an absolute pleasure working with my colleagues to see how we have grown together over the past 25+ years, and I hope the business continues to flourish under the soon to be new ownership of Honeywell. I sincerely hope that Honeywell continues with the Perstorp and JM tradition of customer focus and growing the business together with the customers to new heights.

Lucas and Spencer – I wish you the very best to continue watering the plants that were planted a long time ago that I was caring for these past few years at JM, and now it is for you to ensure that they continue to reap the fruits.

I now look forward to the next journey in my life – enjoying grandparenthood in April with our first grandchild and hopefully one or two more in the future; traveling to places I have not yet been to or to those places I have visited and would like to see again with my wife and family; and cooking my favourite cuisines a little more frequently.

Wishing all my customers and colleagues the very best and hoping to see you when I am in the region to say a quick hello.

I look forward to seeing you soon and thank you again for the wonderful support and relationships that were built along my journey.

Best regards, Namaste, Ciao, Obrigado, Gracias and Adieu, Atul

BY

Atul Shah
atul.shah@sbcglobal.net

Projects and start-ups

▲ Following plant 1 start-up earlier in 2025, the other plant built in Sichuan Yongying, located in Nanchong City, Sichuan Province, China was put on stream in June. Currently two FT3 plants are in operation with a yearly production capacity up to 240,000 metric tons (37wt% basis) each.

▲ Two FT3 plants built in Hualu Hengsheng located in Jingzhou, Hubei Province, China, have been started up successully in April and June 2025 respectively.

► The FT3 plant, main picture and right, built in Nantong Jiangtian, located in Nantong city, Jiangsu province, China was put on stream successfully in August 2025.

New projects

Agreements have been signed with customers in:

- Shijiazhuang City, Hebei Province, China for an FT3 High Pressure plant.
- Zhangqiu, China for an FT3 High Pressure plant.
- Malaysia for an upgrade of vaporizer.

Ongoing projects

In the design phase:

- One FS3 plant and one FT3 plant for a customer in Shandong Province, China.
- One FS3 plant for a customer in Fujian Province, China.
- New Emission Control System (ECS) for an Existing Formaldehyde Production Plant in Chile.
- One FT3 plant for a customer in Inner Mongolia, China.
- Three FT3 plants for a customer in Yumen, Gansu, China.
- Two FT3 plants for a customer in Quintongxia, China.

In the shipping or construction phase:

- One FS1 UFC plant to Turkmenistan.
- One FS3 plant to Australia.
- One FS2 UFC plant to Egypt with **Suez Methanol Derivatives Co** as the end user.
- Two FT3 plants to Shanxi Province, China with planned start-up in spring 2026.
- Three FT3 plants to China, with planned start-up in spring 2026.

Start-ups

- The two FT3 plants for **Sichuan Yongying** in Nanchong, Sichuan Province, China had the first plant successfully on stream in January 2025, and the second plant in June 2025.
- An upgrade of an FT3 plant in Changshou, Chongqing, China, went on stream in June 2025.
- The FT3 plant to Tangshan City, Hebei, China went on stream in July 2025.
- An upgrade and equipment replacement of an FS2 plant for a customer in Germany went on stream in August 2025.
- The FT3 plant for **Nantong Jiangtian** in Nantong city, Jiangsu province China, was successfully started in August 2025.
- The replacement of an ECS Steam Generator to Thailand went on stream in August 2025.
- An upgrade with a new ECS start-up heater in Singapore went on stream in 2025.
- The second FT3 plant for Hualu Hengsheng located in Jingzhou, Hubei Province, China was successfully started up in June.

Training

In November 2025, JM conducted a training with focus on the CAP 3.0 concept for PT. Dover Chemical, in the city of Cilegon, Banten province, Indonesia. The one-day training was held at the customer's site. The aim was to train the customer's engineers and operators on how to operate CAP 3.0 as they are using this new loading profile for the first time. Representatives from JM were Van Fu Shen, Philippe Thevenin and Aizaq Syazwan.

New Regional Sales Manager for the Americas

After graduating with a Bachelor's of Business degree in Marketing at Western Illinois University in 2011, Spencer Leffelman has worked in the Sales and Marketing field for the past 13 years.

"My most recent position was as Sales and Marketing Manager for a thermoset plastic injection molder of phenolics and unsaturated polyester and vinyl ester BMCs in which we molded a variety of safety-critical electrical components. In my spare time, I love spending time with my wife and two boys, whether it be going on nature walks, visiting new places or restaurants, or attending local sporting events and concerts. I'm an avid sports fan, rooting for the Chicago Bears, Cubs, Bulls, and Blackhawks along with Notre Dame college football."

New Project & Engineering Lead for China

Guofeng Sun began his career in 2011 as a Technical Support Engineer and further as a Process Engineer. In 2016, he became a Project Manager, and he was promoted as a Project & Engineering Lead in May 2025.

"I am very grateful that JM offers this opportunity to me and I am also very excited to take this role as a team leader. I have been with JM for more than 14 years where we are acting as a family. I have also been with our customers for more than 14 years where we built up long term good relationships. My aspiration is to be a good team leader that is not only focusing on team delivery, but also on team development. Beyond work, I enjoy hiking, swimming, cooking and singing."

New faces

Perstorp

Johannes Haadem
Supply Chain Coordinator

Susanne Lindvall
Regulatory Affairs Advisor

Johanna Östlund
Legal Counsel Commercial

Emilia Landgren
EHS Advisor

Filip Elofsson
Process Engineer

Scan the QR code above for access to previous editions of Informally speaking

A formaldehyde magazine from Johnson Matthey

The newsletter Informally speaking aims to provide information about formaldehyde in an informal forum and is published twice annually by Johnson Matthey for its customers and contacts in the formaldehyde business. The information included herein is part of our customer service and in no way entails or implies any undertakings, legal responsibilities or liabilities.

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JM Johnson Matthey
Inspiring science, enhancing life

Johnson Matthey

Trouble meeting sustainability goals?

Johnson Matthey offers several design solutions that make formaldehyde production more efficient than the competition. One example is the turbocharger, integrated into our plant design to reduce specific power consumption by up to 30%. Another is the pressurisation of the process gas, used in modern high performance formaldehyde plants to increase output.

With 20 years of development, along with new specialised catalysts and CAPs, the turbocharger makes it possible to pressurise the plant without requiring extra energy. How? By utilising the energy from exhaust gases to drive a compressor that in turn pushes more fresh air into the formaldehyde plant. Meaning more formaldehyde from the same amount of installed steel, or from a smaller plant footprint for the same production capacity. And still with low energy consumption.

To further boost sustainability, at JM we buy back spent Formox KH and other iron- molybdenum catalyst and reuse the molybdenum to produce new KH catalyst.

Contact your Johnson Matthey representative to discuss how we can help you to meet your sustainability goals.

www.matthey.com

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