A formaldehyde business magazine from Johnson Matthey Process Technologies

# Informally Speaking

The Stations

Formaldehyde Asia
UFC collaboration

China project organization

# IR-instrument performance

Trainings etc.

### Safety culture always on the agenda

We recently heard about a terrible accident in China where people were killed at a chemical site. It was not related to formaldehyde, and no pollution to the nearby environment and no secondary disaster was reported in the news. Not knowing the background of the accident, we assume that rigorous safety measures were in place, but that something went wrong. The accident reminds us all that safety must always come first, and be part of a fundamental Environmental, Health and Safety culture.

Johnson Matthey has a long history of developing a safety culture. It is, as we say, "the way we do things around here". A safety culture is often described as assumptions, values, attitudes and behaviors. Incidents are often associated with failures in this culture. It should be accepted that a positive safety culture is the basis for achieving excellent EHS performance.

At Johnson Matthey we have reviewed EHS research to define the critical behaviors that characterize a robust safety culture. Our model helps everyone understand the behaviors they 'should' and 'should not' display in order to play their part in strengthening the safety culture.

We are committed to achieving our EHS aspirations. And because incidents still occur, we are always working to provide safer plants and processes. Excellent performance depends also on our people demonstrating behaviors that make our systems work in practice, and that promote a strong safety culture.

Finally, I would like to promote our upcoming Formaldehyde conference to be held in Houston, Texas, March 21-22, 2017. Of course, EHS and safety culture will be on the agenda.

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Lars-Olle Andersson Business Manager Johnson Matthey Process Technologies

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Saudi Arabian Fertilizer Company's (SAFCO's) UFC plant in Saudi Arabia.

### Integration of formaldehyde/UFC technologies with ammonia and methanol production – a JM synergy

Using the knowledge and experience available across Johnson Matthey, a novel integrated scheme, which is the subject of patent applications, has been developed whereby the ammonia, methanol and UFC-85 (UFC: Urea-Formaldehyde Concentrate) production plants have been combined to provide reliability of supply as well as capital and operating

#### cost savings.

The **FORMOX<sup>™</sup>** integrated UFC process (including methanol and UFC plants) from Johnson Matthey uses the residual carbon oxides in the synthesis gas generated on the existing ammonia plant to produce methanol. This methanol can then be used to produce UFC for the urea plant. The bulk of the syngas remains and is then passed to a standard ammonia synthesis loop to produce the ammonia for urea production.

The scheme described here is proposed as a retrofit to existing ammonia-urea plants. However, it could also be conveniently applied to a new build project.



Figure 1: Arrangement of technologies when utilising the FORMOX integrated flowsheet from Johnson Matthey

#### **Co-production of ammonia and methanol**

The first step in the integration of the three technologies is to produce methanol and ammonia on the same plant. The UFC-85, and hence methanol, requirement for a urea producer is much lower than the ammonia production rate. For example, a typical 2200 mtpd ammonia plant produces enough carbon dioxide to allow around 3500 mtpd of urea to be manufactured. Depending on the specific design of urea plant the UFC-85 requirement for this amount of granulated urea is 20-30 mtpd. To produce this much UFC-85 requires 14-21 mtpd of methanol.

#### FORMOX integrated flowsheet from Johnson Matthey ammonia plant

The **FORMOX** integrated flowsheet developed by Johnson Matthey uses the residual carbon oxides downstream of low temperature shift and carbon dioxide removal to produce methanol. In the process, syngas is heated in a feed/effluent interchanger before entering a methanol synthesis reactor. The gas leaving the reactor is cooled in the feed/effluent interchanger and further cooled before the crude methanol is removed and sent to storage or the UFC-85 plant. The remaining gas passes through a methanator before being compressed to ammonia synthesis loop pressure.

However, if the UFC and therefore the methanol requirements are higher than can be produced by residual carbon oxides (as described above), Johnson Matthey can design the flowsheet to allow more methanol to be produced.

#### **UFC** plant

The UFC plant is of a proven standard design used in plants worldwide with minor adjustments to reduce capital cost by integration with the ammonia complex. However, the capacity is lower than that of a normal **FORMOX** plant to match the UFC requirement for an individual complex and the footprint has been reduced to less than 200m<sup>2</sup>.

As the UFC plant is simple to operate, existing operators on the ammonia-urea complex will be able to manage the small UFC



plant installed as part of the Johnson Matthey **FORMOX** integrated flowsheet. Johnson Matthey will provide training for these operators along with providing regular operating recommendations based on plant operating data to ensure optimal performance and reliable production.

Occasional UFC-85 plant shut-downs are required to replace the catalyst. The catalyst lifetime is dependent on the plant operating rate with a change-out duration of around 5 days.

The UFC plant is designed to minimise emissions to the environment. There is no liquid or solid waste from the process as condensate is used to dilute urea solution or dissolve solid urea while the spent catalyst can be sent back to Johnson Matthey for reprocessing. Gaseous waste, in the form of tail gas, is treated in a proven proprietary emission control system ensuring that stack emissions meet any government requirements worldwide (including the new EU standards).

#### Flexibility and reliability

As the methanol synthesis unit can be bypassed, there is no impact on ammonia plant reliability. Instantaneous methanol/ UFC unit capacity and intermediate storage tank size allows sufficient inventory to be built up to cover a formaldehyde catalyst change without affecting ammonia or urea production.

#### Conclusions

Johnson Matthey has combined its knowhow in ammonia, methanol and formaldehyde production to deliver an innovative new way of producing UFC-85 which will generate significant cost savings when compared to the alternative of purchasing UFC-85 from third parties.

The FORMOX integrated UFC process,

which is the subject of patent applications, is now offered commercially.

For further information, please contact john.pach@matthey.com or andreas.magnusson@matthey.com

#### BY



John Pach Technology Manager Johnson Matthey Process Technologies



Andreas Magnusson, Product Manager Plants Johnson Matthey Process Technologies

# Published in **Topics in Catalysis**

The scientific paper **"Process Improvements in Methanol Oxidation to Formaldehyde: Application and Catalyst Development"** by Andersson, Holmberg and Häggblad has now been published in Topics in Catalysis, Volume 59, Issue 17, pp 1589–1599.



#### On frontpage:



Cleaning of a reactor tube sheet at Bachiller, one of our vessel manufacturers in Spain.

## Formaldehyde Asia 2016

This past spring, we gathered around 50 of our customers at the beautiful Indonesian island of Bali for our Asia conference, April 5 - 7.

The theme throughout all 3 days was "Create Customer Value". Besides bringing the latest information about the formaldehyde and methanol markets, there were good opportunities to network with colleagues in the business as well as to enhance one's skills at our training classes. Our Regional Sales Manager, Eddy Lee, did a great job of arranging this conference combining days packed with information with a short tour to some of the island's many historical sights.

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Formaldehyde technology customers came from all around the world to learn about the latest market and technology developments, as well as each other's problems and solutions.

After an introduction to Johnson Matthey

and the **FORMOX™** range, the rest of day one was filled with information about Johnson Matthey products and processes, plants and upgrades, CAP 3.0 (CAP: Catalyst Activity Profile) and our technical support. On the first day we also reviewed the formaldehyde market outlook. Our guest speaker, Wang Xiaoshu from MMSA, gave us an outlook on the global methanol market, and Damerla Prasad, Oman Formaldehyde Chemical Co, gave us valuable insight into metallurgy and safety considerations in formaldehyde storage tanks. Ola Erlandsson, Senior Process Specialist, wrapped up the day with a presentation about the question of sustainability in this business.

Day two featured presentations on the



#### FORMALDEHYDE ASIA 2016

- Theme: Create Customer Value
- Location: Bali, Indonesia
- Johnson Matthey representatives: 8
- Participants in total: 58
- Companies: 22, of which 5 suppliers/partners
- Countries represented: Australia, Finland, Indonesia, Japan, Korea, Malaysia, New Zealand, Oman, Philippines, Singapore, Sweden, Taiwan, Thailand, UK & USA



World leading conference about formaldehyde









topics of Process safety and Innovations. After 1½ days filled with facts and information, a sightseeing tour on the beautiful island provided a nice break. We visited Tirta Empul, a Hindu Balinese water temple built more than 1000 years ago, with holy spring water. We also had a stop in what is regarded as the cultural center of Bali – the city of Ubud.

The third and last day of the conference we were back in the conference room – or should we say classroom? It was time for training! We had classes in process description, operational problems – and how to avoid them, deeper understanding of how our catalysts work, optimization of plant and catalysts and also process safety. During the day we also enjoyed a partner exhibition that was very much appreciated. Invited representatives from Aerzen, Howden, Eastman, Tracerco and Solenis all had stations where the participants could get to know more about different products and news.

#### Some views from participants:

- "The topics were excellently chosen"
- "Lots of useful information and training for both plant operators and plant equipment suppliers"
- "Highly informative for me as a rookie"
- "Would like more presentations on troubleshooting and methanol consumption"
- "Good idea with the vendor stations, we would like even more time for this"

#### ΒY



Anna Rundblad Communications Manager Johnson Matthey Process Technologies





This year marked 20 years since the first Formaldehyde Asia took place. That called for a celebration and cake!

Interview with our customer Mr. Jerry Looi, CEO at AstaChem, during Formaldehyde Asia 2016.

# Award with focus on sustainability

Our customer in Malaysia, Asta Chemicals Sdn. Bhd., received the "Top SMEs in Asia" award at the 2015 Asia Corporate Excellence & Sustainability Awards. As basis for its decision, the jury cited Asta Chemicals' excellent management of resources that are governed by policies of transparency, integrity and sustainability.

- Part of our "Corporate and Social Responsibilities" is our commitment to promote and integrate the Green agenda into our daily operations, says Jerry Looi, CEO of AstaChem. We are very proud of winning this award; this brings a lot of encouragement to manage our resources in a sustainable way, which also reduces costs and improves productivity.

This is not the first time the company has been awarded.

- We were also the proud recipient of the "Newcomer MY Carbon Award in 2014" presented by the Ministry of Natural Resources and Environment of Malaysia, Jerry adds.

#### **Facts about Asta Chem**

Asta Chemicals Sdn. Bhd. was primarily established in 1974 as a producer of formaldehyde, adhesives resins, hardeners and fillers to service the timber processing industries in both local and export markets.

The first manufacturing site commenced operation in 1975 and is located at Prai Industrial Estates in the State of Penang. It has manufacturing facilities for the production of formaldehyde, liquid resins, spray dried powder resins, compounded powder resins, specialty resins, hardeners and fillers. In 1992, the company opened its second manufacturing site at Gebeng Industrial Estate located at Kuantan Port in the State of Pahang. Production facilities there consist of a formaldehyde plant, a resin plant, a tank farm with direct receiving facilities from the port, as well as other ancillary supporting tanks and equipment.

After years of progressive growth, the company is one of the leading synthetic resin and adhesives manufacturer in Malaysia today, catering not only to the forest product industries, but also to a wide spectrum of other industries including automotive, foundry, abrasives, and textiles.

#### ΒY



Anna Rundblad Communications Manager Johnson Matthey Process Technologies



### Projects & start-ups

#### **New Projects**

- An agreement for supply of an upgraded reactor to South America has been signed.
- An agreement for an FT3 plant to KOLON BASF innoPOM, INC (joint venture between KOLON PLASTICS and BASF) has been signed. The plant will be located in Gimcheon-Si, South Korea.

#### **Ongoing projects**

- The new **FORMOX** FS3 plant for a client in Asia is in the construction phase.
- The project with an FS3 plant for a client in Eastern Europe has been shipped and installation is ongoing.
- The new FS2 UFC plant to PT Dover Chemicals in Merak, Indonesia is approaching shipping.
- The new FT3 plant to be supplied to Wanhua Chemicals Group Co.
   Ltd. in Yantai China is proceeding well with shipping scheduled for later this year. This will be their second FORMOX plant at this site.
- The **FORMOX** FT3 plant for a client in Eastern Europe is in the construction phase.
- The installation of new FS3 plant for **SI Group Crios Resinas S.A.** in Rio Claro, Brazil is proceeding well.
- The FS3 plant for **Xinjiang Xinye Energy Chemical Co.**, Ltd, located in China, is in the installation phase.

- The project with two FT3 plants to be located in China is proceeding with installation.
- Works on an FT2 plant in the Middle East is in the construction phase.

#### Start-ups

- The FS1 UFC plant for **Masisa Mexico** in Durango successfully went on stream in August.
- The project for **BASF PETRONAS Chemicals Sdn Bhd** in Malaysia smoothly went on stream in late August.
- We are pleased to confirm that the FS3 plant to JSC METAFRAX in Gubakha, Russia successfully went on stream in July. This is their fourth FORMOX plant at this site.
- The project with two FS3 UFC plants in Eastern Europe went on stream during the summer.



Jonas Lindborg, Chief of Projects, Johnson Matthey Process Technologies

### Visit at...



#### Markor

**From left to right:** Mr.Yin (operation director of Markor Chemical); Mr. Zhang Feng (purchase & EHS director of Meiou); Mr. Lars-Olle Andersson; Mr. Jeff Tao; Mr. Mark Danks; Mr. Sun Ji Guang (Vice GM of Markor Chemical); Miss. Vivian Wang; Mr. Duan Chunping (Plant manager of BDO phase I); Mr. Ji Xiucai (Purchase director of Markor Chemical); Mr. Wu Changjin (Buyer)



#### Xinjiang Tianye

From left to right: Mr. Jeff Tao, Mr. Lars-Olle Andersson, Mr. Mark Danks, Mr. Gang Guan (Vice president of Tianye Group), Miss.Vivian Wang, Mr. Jiankang Deng (BDO Plant Manager), Mr. Guodong Li (Chief Engineer and PVC Plant Manager), Mr.Yongtao Wang (FA Plant Manager)



### Project organization in China – enables more local supply

**FORMOX™** has been represented in China for over ten years through local engineers and sales managers who began serving our clients on the Chinese market with technical support and sales. During that time, the number of plants started and catalyst customers in China has increased dramatically. With nearly 30 plants today, we consider this development clear proof that our technology is world leading.

We measure customer satisfaction on a regular basis. And while receiving consistently high ratings, we have noticed a growing trend over the last couple of years indicating that customers would prefer it if even more work would be done locally in China. Requests for Johnson Matthey equipment designed to follow local Chinese standards have also been received. "During the last couple of years we are happy to recognize that oxide technology is asked for in an even broader segment of the Chinese market. At the same time, we recognize customers prefer to do business locally in RMB and that all documentation and engineering materials need to be in Chinese," says Fredrik Rietz, Commercial Manager Formaldehyde Plants.

Based on our customers' feedback, Johnson Matthey has therefore decided to dedicate a local organization in Beijing that will handle the engineering, commissioning and equipment purchase of plant projects not only for FC1, but also for the larger FS/FT standard range plants. We can thereby serve our plant customers better and continue to be the world leader in formaldehyde technology. Starting from the beginning of this year, Mr. Sun Guofeng has therefore been appointed as project manager to lead the project team in Beijing.

"We are very confident and pleased with the local organization, which has extensive experience of plant commissioning in China," says Jonas Lindborg, Chief of Projects Formaldehyde Plants. "With the support of the experts in Sweden, whenever needed, the new arrangement will combine the best available technology with a highly competent project team in China."

#### The team

After more than four years at Johnson Matthey, Mr. Sun Guofeng is one of our most experienced process engineers in the Beijing office. He has been involved in both engineering work and



the commissioning of many of the projects in China, and is a well-known face at many of our Chinese customers. "I'm really looking forward to this challenge. My long experience within Johnson Matthey and with a strong support from the whole organization is a perfect combination to make this a success," says Guofeng. The project team also includes two process engineers, Mr. Carlos Du and Mr. Bolin Qu. Both have been working at Johnson Matthey for nearly 4 years and have broad experience within technical support and plant design.

Since the team is part of the formaldehyde business within Johnson Matthey, it has direct access to all the support and knowledge offered by their experienced colleagues around the world. In addition, Mr. Martin Bengtsson, Project Manager, has been appointed to serve as Mr. Sun's mentor during the first projects to ensure a successful start for the team.

Because engineering an entire formaldehyde plant is a lot of work, our dedicated project team will also be working closely with a highly experienced and well-known engineering company in China. Through an agreement with the company, we can now offer our Chinese customers detailed engineering that follows local Chinese standards approved for construction, as well as locally sourced equipment designed according to local standards. Previously, Johnson Matthey only offered locally sourced vessels. Furthermore, the engineering company can offer our customers construction and installation services as well as Outside Battery Limit equipment, enabling installation and erection of the plants to proceed as smoothly as possible.

#### Summary

By listening to customers and expanding our offering we hope to better serve them in the way they wish. The timing is also favorable as we have a number of well-educated and experienced colleagues at the Beijing office. In addition, we have found an engineering partner that we are convinced will deliver the quality one expects from **FORMOX**, so that our customers may continue to enjoy a "good night's sleep."

#### ΒY



Martin Bengtsson, Project Manager Johnson Matthey Process Technologies

### **Technical support**

### Formic acid – How to keep it low in your formalin

Most of the formic acid is formed after the catalytic reactor, i.e. in the absorber and during storage. The Cannizzaro reaction between formaldehyde and water leads to formation of formic acid.

#### $2CH_2O + H_2O \rightarrow CH_3OH + HCOOH$

The Cannizzaro reaction is more rapid in alkaline solution, but it also appears slowly in acidic formaldehyde. The most stable formalin solution is maintained at pH 2.8 - 4.2. The reaction is accelerated by too high storage temperature.

The presence of paraformaldehyde increases the formation of formic acid. Any paraformaldehyde should therefore be removed. After reloading the reactor, the catalyst dust collected in the bottom part of the reactor should be removed. Formation of formic acid is catalyzed by metal ions such as iron. Stainless steel should therefore be used in all equipment that is in contact with formaldehyde.

Formic acid itself is known to be a catalyst for formation of formic acid. The self-catalytic effect becomes exponentially worse at formic acid concentrations above 0.03%.



### Storage of Formalin – A few things to remember

Formalin can be a bit tricky to store, especially if the concentration is high. Here are a few rules worth considering to minimize hassle.

• Use correct temperatures. Too high temperatures promote formation of formic acid and shorten shelf life. Too low temperatures enhance the risk of paraformaldehyde (solids formalin) formation.

#### Recommended storage temperatures \*)

Concentration [wt%]	Temperature [°C]
37	33 – 37
45	48 – 55
50	57 – 64

\*) no stabilizer, < 1% MeOH, insulated and agitated tank

 Note that the maximum recommended temperature for formalin containing less than 1% methanol is 72°C. This is to maintain a sufficient safety margin to the flash point. Local rules or higher methanol concentration may limit the temperature further. Higher temperatures might be allowed by using an inert environment storage facility. Correct agitation is essential to achieving optimized storage conditions. The agitation should keep the content in movement, but not be too vigorous. Depending on the tank geometry and the formalin concentration, the agitation should preferably be slow and continuous. A slow moving, large diameter agitator and a well-designed baffle system minimize para formation.

 Insulation will prevent cold surfaces and the build-up of paraformaldehyde. The tank itself, as well as the tank foundation, should be adequately thermally insulated. Don't forget protruding pipes, nozzles and valves!

There is more to consider when operating a formalin storage tank, but these three tips will take you a long way. You are always welcome to discuss your specific situation further by contacting your Johnson Matthey representative. We will do our best to assist you!





### Spare parts supply

When you work with maintenance on your **FORMOX™** formaldehyde plant, it is important to use original spare parts from the different manufacturers. However, it can be difficult to get the right parts, depending on where in the world you operate.

If you sometime feel that you are in this situation do not hesitate to get in touch with your Johnson Matthey representative for forwarding to the Technical Support Department. In our archives we can in most cases, find both the details and the suppliers of those and we have good contacts with our suppliers.

Sometimes it can be difficult to find the right spare part, especially if it is old factories where the supplier is not active anymore. But in those cases, we can usually find a suitable replacement that does not require too extensive reconstruction.

#### Do you need technical information? Check out the Customer Center!



If you are interested in formaldehyde related topics, then you should take a closer look at our Customer Center. All professionals for whom knowledge of formaldehyde technology is essential will benefit from the information made available there. As a customer of Johnson Matthey Process Technologies, you can sign up and get access to your own password-protected section.

- Available 24/7 at www.formox.com
- Loads of information at your fingertips
- 10 different topic categories to choose from
- Maintenance recommendations
- Optimize operations in the plant
- Safety recommendations

### Trainings and meetings during 2016



Training for Ibn Sina in April, 2016, at Al-Jubail in Saudi Arabia.



Training in Perstorp, Sweden for the SI Group in September 2016.



Training at Hexion, Australia in April 2016.



Training at Masisa, Durango in Mexico, August 2016.



Training at Prefere Resins in Hamina, Finland, March 2016.



Training for Metadynea on site in Orekhovo Zuyevo in Russia, in August 2016.



#### **Refresher training** September 27 - 29 in Perstorp, Sweden

In response to requests from several European customers a refresher training was set up in Perstorp for all customers that might be interested.

The training included topics like process description, process safety incidents, **FORMOX™** high performance catalysts, plant and catalyst optimisation and operational trouble shooting. Also, visits to the R&D unit and the Perstorp formaldehyde plants were organised.

The feedback received by the customers was in general extremely positive, where organisation, hospitality and content of the course were very much appreci-

ated. Suggestions for future trainings were things like increasing the amount of trouble shooting/operational experiences and also more information about the **FORMOX** catalysts.



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#### PROCESS & CATALYST TRAINING

Maximize profitability, safety and reliability when running a formaldehyde plant.



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### **Participating at conferences**



15<sup>th</sup> China Methanol & Derivatives Forum Enmore, Xian in China, March 9 – 11.

■ **7<sup>th</sup> Methanol & Emerging Derivatives Conference** AsiaChem, Chengdu in China, April 21 – 22.



**DMMn Seminar** held by China Coal Processing & Utilization Association, Zibo in China, May 19 – 20.



7<sup>th</sup> Wood Products & Chemicals Conference, Ho Chi Min City, Vietnam, June 20 – 21.



China Formaldehyde Association Annual Conference and worldwide Technical Seminar 2016, in Xian city, China, on July 17.



■ WMF 2016 The 16th International Exhibition on Woodworking Machinery and Furniture Manufacturing Equipment in Beijing, China, June 1 – 4.

## New instrument

improves accuracy of plant performance and production cost monitoring



Some years ago we introduced the Performance Package as a standard feature in all new formaldehyde plants, and as an upgrade option for existing plants. Now we can help you to get an even clearer picture of your plant's performance and production costs.

#### Performance package

The purpose of the Performance Package is to provide accurate, up-to-date plant performance data using in-line instrument data and special algorithms. Any change in process conditions or point of operation is evaluated in real time regarding yield, DVC (Direct Variable Cost), power consumption, etc. This enables process operators and management to take correct actions and to determine whether a specific adjustment was good or bad, e.g. to verify that a recent adjustment in HTF temperature was correct.

#### IR instrument gives clearer picture

The yield calculation provided by the Performance Package, however, is based on lab rather than in-line measurements, as well as ECS delta temperatures. Therefore, in order to obtain an even more accurate calculation of production cost, we have now introduced an infrared (IR) instrument to measure methanol, DME and CO in the process gas.

The first IR instrument for measuring

DME, CO and methanol in a **FORMOX<sup>™</sup>** plant was commissioned by Johnson Matthey Process Technologies in 2015, at a customer site in North America. It has now been in operation for over a year. The IR measurements have been checked by JM Process Technologies against both tank-to-tank and GC (Gas Chromatograph) after one month and six months in operation. The results were so good that the customer, who now gets real-time information about the yield, has ordered a second IR instrument for another of its sites!

#### Performance Package – How it works

The Performance Package and the IR instrument can now be combined, providing a very efficient tool for process control and optimization aimed at reducing your operation costs. Although it requires process data and the instruments mentioned below, it can be adapted to local conditions in a smaller scale, depending on your wishes. The algorithms implemented in the Performance Package incorporate parameters such as oxygen concentration, methanol feed, process gas flow and product flow, absorber top temperature and pressure, ECS temperatures, etc., normally monitored and provided by transmitters. The IR instrument provides additional and valuable information on actual concentrations of CO, DME and methanol, values that previously were

estimated based on mass and energy balances in the performance package algorithms.

The complete Performance Package requires also data from installed flow meters measuring the boiler feed water to the HTF condenser and ECS steam generator respectively, in order to monitor steam production. The current to the blowers can be recalculated into power, and additional power meters installed for pumps and heaters will enable the total power input to the plant to be determined. And, to determine the DVC, the local cost of methanol and power, as well as the value of steam, must also be provided.

Key results such as yield, DVC, specific production and losses in carbon monoxide, methanol and DME are shown on screen as real-time values. The same is true of steam production and power input to blowers, heaters and pumps. Other important parameters such as process gas flow, methanol flow, product flow, etc., are shown as average values for the most recent eight hours of operation in order to cancel out any disturbances.

#### The bottom line?

Implementation of the IR instrument with the Performance Package essentially improves measurement accuracy and enables robust, real-time monitoring of your process performance.





Simon Smrtnik Regional Manager Technical Support Johnson Matthey Process Technologies



Andreas Magnusson, Product Manager Plants Johnson Matthey Process Technologies



Providing Insight Onsite

Tracerco is a Johnson Matthey brand providing unique and specialised detection, diagnostic and measurement solutions.

# Absorber insight!

Johnson Matthey offers formaldehyde producers the Tracerco range of advanced diagnostic techniques to overcome paraformaldehyde problems in the absorber.

Paraformaldehyde build-up in the bottom packed bed is a common problem amongst formaldehyde producers. Once paraformaldehyde has started to form in the packed bed, the situation often worsens due to blocked distributors and liquid maldistribution. This can lead to higher pressure drop, a risk of flooding and, in the worst case, damaged internals. The key to avoiding paraformaldehyde build-up in the first place is to have good control of the liquid distribution over the packed bed. Therefore, having some way to look inside the absorber during operation and ensure everything is working as intended would be good.

Johnson Matthey has a technique that enables you to understand what is going on in the packed bed during operation. With the Tracerco Tru-Grid<sup>™</sup> Scan we can detect problems such as crushed packings, paraformaldehyde, overflowing distributors, and flooding or foaming inside the bed when the plant is running. A gamma source and a detector are used to perform a real-time scan of the internals. To obtain the best results, a base line scan should be done when the packed bed is clean and known to be in good mechanical shape. Subsequent scans after some time of operation will then reveal any paraformaldehyde build-up or other problems in the packed bed at an early stage, allowing you to take corrective action such as caustic cleaning of the packed bed.



**Figure 1**. The results from a Tru-Grid<sup>™</sup> scan can reveal uneven liquid distribution or paraformaldehyde in the packed bed.



**Figure 2.** A ThruVision<sup>™</sup> 360-degree scan can give information of the liquid distribution in the distributor, or in the packed bed.

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Figure 3. Problems with paraformaldehyde build-up in the packed bed can easily damage the absorber internals.

Once small paraformaldehyde lumps are formed, they can easily block the holes in the distributor leading to maldistribution and consequently to dry packing material and fast paraformaldehyde formation. This can be difficult to detect even with sight glasses on the distributor. For this case, ThruVision<sup>™</sup> technology, also provided by Johnson Matthey, can be used to generate a density profile image with 360-degree coverage at one elevation in the bed or distributor to identify real time liquid maldistribution.

If you are interested and would like to learn more about different absorber scans or other types of Tracerco process diagnostic techniques provided by Johnson Matthey, please contact your Johnson Matthey representative.

#### BY



Tomas Nelander Global Manager Technical Support Johnson Matthey Process Technologies

### Mo update

During 2016, the price of molybdenum has gradually increased from just above 5 USD/lb to slightly above 7 USD/lb at the end of September, which is in line with our previously announced expectations.

Why has the price increased? Well, several circumstances have affected the supply-demand balance and consequently the price. One is a decrease in output after some primary mines were shut down in 2015. Another is absorption by the market of previously existing surplus. A third is the production of special alloy steel in China, the main consumer of molybdenum, which remains high despite slowed growth in China. Should the world BNP "recover", and especially if growth in China should surpass 7%, the demand and price level would be pushed further upwards. However, new mines and capacities are to be brought on stream over the next 10 years, so this will very much depend on timing and how positively the markets develop. Hence, it is difficult to predict the price levels for the next few years. According to some analysts, there is still belief in an increased price level, whereas others believe the output will increase faster, leading to a lower price level.

Based on this year's development and the different views from various analysts, I believe we will see similar price levels next year (5-8 USD/lb), which is a somewhat more pessimistic view than I had earlier this year.

As always, we continue to strive to maintain reasonably stable net prices regardless of possible market changes. Your efforts to return spent catalyst in good condition to our catalyst recycling system cannot be emphasized enough. By treating it as a valuable raw material and according to our specifications, you help keep catalyst prices stable!

#### BY



Ronnie Ljungbäck, Commercial Manager Catalysts Johnson Matthey Process Technologies

### New...



Rickard Astner, Maintenance coordinator



Stefan Lesseur, Accountant



Lee Pihlström, Financial Assistant



Mike Brown, Process Engineer

### ...& left

Viktor Björk, Process Engineer Bengt-Arne Hagsten, R&D Engineer Johan Holmberg, Catalyst Specialist Glenn Svensson, Tableting technician Filip Vrgoc, Process Engineer Åsa Yhlén, Process Engineer

We are very glad to have had you as our colleague and wish you the best of luck in the future.

#### A formaldehyde magazine from Johnson Matthey Process Technologies

The newsletter Informally Speaking aims to provide information about formaldehyde in an informal forum and is published twice annually by Johnson Matthey Process Technologies 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 Process Technologies

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