informally speaking

THE FORMALDEHYDE NEWSLETTER FROM FORMOX

autumn/winter 2008

South America

Pages 2-7

ILLUSTRATIONS
Upper left: Quito in the Andes.
Lower left: "Casa Rosa" in Buenos Aires.
Below: Duratex HQ in São Paulo.

Perstorp Formox becomes Formox!

See page 12

in this issue...

Just Formox!

Remember the team of formaldehyde specialists called Perstorp Formox? (Yes, our name was always "Perstorp Formox", even though some of you called us "Perstorp".) Well, that team is still here, but now our name is Formox – just "Formox".

As many of our readers have already been informed, we have become a separate legal entity – Formox AB. What's really new is that our catalyst manufacturing, our R&D team, our engineering department and other resources have now become integral parts of the new Formox. So we are the same team, but more so!

This is a fresh start that all of us at Formox are very thrilled about. And I dare to say that we are more dedicated than ever to providing you technological excellence in everything related to formaldehyde, including long-term support. But we hope that you'll soon be discovering that for yourselves!

This issue of ***informally speaking*** covers much more than our new name. We have some interesting reports from Stan's visit to South America, a preview of a new loading machine upgrade, some tips about absorber operation, a special report from our new R&D team and some market updates that we hope you will find informative.

As we enter 2009, we are also entering the 50th year since the world's first Formox® plant went on stream. In other words, it's the golden anniversary of the technology that continues to supersede silver technology as the most effective and cost-efficient way to produce formaldehyde. We hope you'll be able to join us in Malmö in May to celebrate!

Marie Grönborg
President
Formox AB

RETURN TO South America

by Stan Erisman

South America is a continent consisting of 12 countries, at least 9 of which have some form of industrial production of formaldehyde. The total population is around 370 million people, and the area is some 17.8 million km^2 (nearly 7 million square miles). The largest country is Brazil; the world's 5th largest in population (following China, India, the USA and Indonesia), as well as in area (following Russia, Canada, the USA and China). The principal language in Brazil is Portuguese. The rest of South America is largely Spanish-speaking.

At Formaldehyde Americas 2008 in Toronto last spring, Bob Crichton pointed out that South America has a nameplate capacity of around 1.7 million MTPA of formaldehyde, just 3.8% of the global total. But South America is a resource-rich continent in a resource-hungry world. And it is a growing market – in both directions. Recent years have shown strong economic growth, particularly in the "powerhouse" countries. And every year the US exports goods worth some $225 billion to Latin America, which is more than four times what the US sells to China.

Formox has been present in South America for more than 40 years, starting with a plant in Chile. We have also supplied technology and/or catalysts to Venezuela, Colombia, Ecuador, Peru, Argentina and Brazil. This is only the second cover story we've had in ***informally speaking***. The first was in 2000. So it's high time for another!

On this trip, I accompanied Fredrik Rietz, the Formox account manager with responsibility for seeing to the needs of our South American customers. Fredrik was making the rounds of technical support visits, helping to answer questions and solve problems.

Interquimec (Equador) & Interquim (Colombia)

My first interview was with **Luis Fernando Valencia** (Plant Director, Interquimec) and **Felix Bedoya** (Production Manager, Interquim).

The Interquimec plant (elevation 3050 meters) with volcanic mountains in the background.

The interview was held at the Interquimec plant site in the Turubamba Industrial zone 40 minutes south of the center of Quito, the capital of Ecuador. The plant has an elevation of 3050 meters above sea level, probably making it the world's highest formaldehyde/UFC plant*. Adding to that challenge is the fact that methanol is supplied by tank truck from the port of Guayaquil, about 12 hours away…. But there is compensation in the form of a beautiful location among snow-capped volcanic peaks (largely dormant, thank you very much).

Serving downstream…

The two companies have the same owner and similar names (the –ec suffix denotes the company in Ecuador). "We're like brothers," Luis and Felix agree. In spite of these similarities, there are important differences. Interquimec makes resins only. And while Interquim uses somewhat more than half of its HCHO production for UFC resins, the rest goes to a broad variety of downstream chemical applications, from paints and insulation to brake linings and disinfectants.

…and different markets

Another major difference is in the markets the two "brothers" serve. Interquimec focuses solely on the domestic Ecuadorian market. Interquim sells most to its domestic market in Colombia, but also elsewhere in Latin America, e.g. Peru, Bolivia, Guatemala and Mexico. In fact, Interquim used to supply UFC to Interquimec until the latter's new oxide plant went on stream in August. "So now we'll be looking to increase our exports elsewhere in the region," says Luis.

Social responsibility important

How about environmental safety in Ecuador and Colombia? "For us it's not a question of meeting legal demands, which are not very great here," notes Luis. "But AkzoNobel places very high demands on social responsibility and drives our development of suitable programs at both sites [Medellín and Quito], including sound environmental performance, good citizenship towards our local communities and concern for our employees and their families."

Such programs cover everything from extensive healthcare benefits to family relations counseling and participation in local job-creation programs. "There's a real spirit to help families, our workers and the society in general, not to mention upholding the law wherever we are," adds Luis.

**Any readers who can top that are welcome to provide the facts!*

Luis and Fredrik discuss technical matters.

Facts about Interquim

- Founded in 1973
- Based in Medellín, Colombia
- Reports to Casco Adhesives (Sweden), an AkzoNobel company
- 140 employees
- HCHO capacity 35,000 MTPA
- 3 oxide plants

Facts about Interquimec

- Founded 1976 as a Borden company
- Based in Quito, Ecuador
- Reports to Casco Adhesives (sold by Borden to AkzoNobel in 2000)
- 70 employees
- HCHO capacity 25,000 MTPA
- 1 oxide plant (silver plants idle), started 2008

The effects of the current global market unrest

"For us in Colombia it's complicated," admits Felix. "Markets are affected by the unrest and the dollar fluctuations, so you have to stay on top of the situation in order to maintain normal operations."

"In Ecuador the market is more local, and we don't have the same currency problem [Ecuador has no currency of its own, but uses the US dollar!], Luis points out. "But of course raw materials prices affect us all, like a chain reaction."

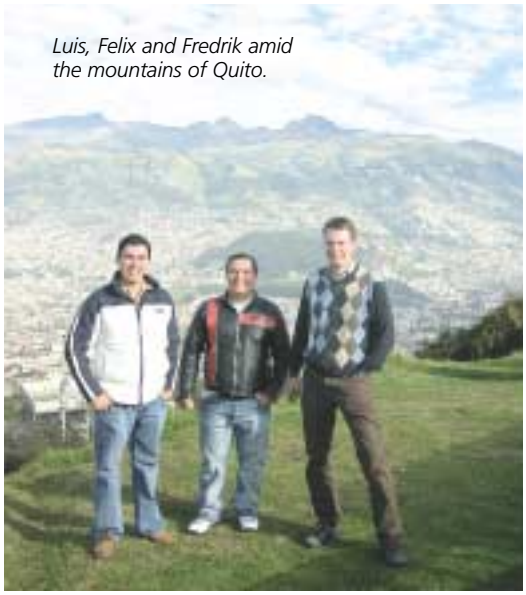
How to deal with it

Luis and Felix are in full agreement on the remedy: "We need to be very efficient and boost our productivity. But we have very skilled people and a supportive organization, so we think we can handle it. And, as always, we're very optimistic!"

Learning with Formox

On their relations with Formox, Luis and Felix also agree: "It's a learning process, and we're finally improving and getting better results day by day. We get good service, but there's still room for improvement. Seeing to our training needs is certainly a step in the right direction, and we feel we're developing good relations."

Luis, Felix and Fredrik amid the mountains of Quito.



Alto Paraná (Argentina)

The next visit was to Alto Paraná in Puerto San Martín, near the city of Rosario, about an hour's flight northwest of Buenos Aires, where I interviewed Plant Manager **Guillermo Rizzatti**. Alto Paraná and the Puerto San Martín site have intertwined histories that would require a special issue of ***informally speaking*** to clarify fully, but the fact box (next page) gives an attempt at a simplified version.

Guillermo

A high-class site

The tidy Puerto San Martín site comprises a methanol production plant (45,000 TPA), the two HCHO plants, a glue plant and a wastewater treatment plant. The site, located along the Paraná River, has the advantage of being a deep-water port with direct access to ocean-going vessels, e.g. for methanol or natural gas, as well as other sea transport.

Strong environmental commitment

The new wastewater treatment facility reflects Alto Paraná's values. "The environment is definitely a priority," says Guillermo. "In fact, it is a key value of our company. We got ISO 14001/OHSAS 18001 certification two years ago, and we strongly believe that you can't be a sustainable company without ecological responsibility. And the environmental safety of Formox plants was one of the reasons behind our investment decision!"

Far-reaching company values

"We also believe that you can't be a sustainable company without taking care of your employees," continues Guillermo. "And we have recognized the importance of working in harmony with the society in which we work – and trying to improve it. Honesty and transparency towards all of our stakeholders are our cornerstones."

The Argentine market

"Our construction market has been expanding a lot in recent years," notes Guillermo. "This is partly due to good prices for raw materials, partly because many people see the real estate market as a sound investment.

"We've been growing by 9% or more annually for the past four years. But in fact a lot of this has simply been recovery from our earlier financial crisis. It took us until 2006 to get back to the 1998 level.

Photo left
Alto Paraná's Formox plant.
Photo above
BACK ROW (from left): Edgardo Magadan, Guillermo Rizzatti, Gaspar Charles and Fredrik Rietz (Formox). FRONT: Ezequiel Vallet and Martin Ferraris
Photo right
Fredrik, Edgardo and Gaspar discuss technical matters

"Our recovery has of course been driven by the global economic climate – and by the demand for Argentine goods. With the present raw material prices, we expect a certain leveling off, to around 4% growth for the next few years.

"But we have a strong position here. Our only weakness is the natural gas supply, which is regulated by the Argentine government."

A solid business

Alto Paraná is not terribly affected by other markets," adds Guillermo. "Our owners [Arauco] cover the Pacific markets, and we have the Atlantic side, meaning Brazil and Argentina. Arauco is a large organization with a lot of know-how – a solid business whose aim is to maximize forest utilization in every way, from pulp and sawmills to board production."

A deliberate choice

Guillermo points out that there were other reasons than environmental safety behind the choice of Formox technology. "It was a hard decision – we spent a lot of time studying all of the factors – but we came up with a number of clear advantages of going with Formox.

"One was that we got some good references from others and had the chance to visit your plants. Then there's the fact you're such a major player in the oxide process, with big R&D activities, that you cover both plants and catalysts, and that Swedish industry in general has a very good reputation.

"The biggest thing is perhaps that we knew we were buying a state-of-the-art plant. We were convinced that this would mean value for money, even though your plants are not the cheapest. So we ended up buying a plant that was bigger than we actually needed, because we then get the extra capacity we're projecting for the future.

"Finally, it was important for us to be able to attend your seminars, to get to see how you work, visit your plants and talk to other producers."

A great experience

"The project was really a learning experience for us," recalls Guillermo. "Your people were so professional, and taught us a lot about the need for order and attention to details.

"Then there was the speed. We were in a rush to start up, and we got outstanding response. Jan-Erik [Andersén] went through a complete checklist that enabled us to rectify problems early in the project, so we got no problems when we came to the start-up.

"Formox was always ready to make modifications to get the best results and solve any problems that arose. Plus there was such good personal chemistry. And you're always willing to help. Ronny [Lindström] helped me solve a problem on a Sunday morning. We feel that we are a team working together to get results. And we can have fun together too!"

Facts about Alto Paraná & the Puerto San Martín site

- Founded 1976 as a pulp & forestry company based in Misiones (Argentina).
- Became a subsidiary of Arauco (HQ in Chile) in 1996 a leading forestry & board company that in turn is owned by Copec (also Chile).
- Acquired Faplac (originally called Resinfor, which was founded in 1990) from LDM in 2005, which included the site in Puerto San Martín.
- Faplac Puerto San Martín site changed names to Alto Paraná, Chemical Division, in 2007.
- Employees:
  - Arauco: 35,000
  - Alto Paraná: 1,742
  - Puerto San Martín site: 110
- HCHO/UFC production (ISO 9001 certified): First plant (salt-cooled oxide) at Puerto San Martín site in 1996; new Formox plant started December 2007.
- Total HCHO capacity: 112,000 MTPA
- Downstream products: Resins for board and urea coatings; for the Argentine market.
- Resin plant capacity expanded from 24,000 TPA to 50,000 TPA in 2007.

Duratex (Brazil)

Visit number three was to the headquarters of Duratex in São Paulo, Brazil's biggest city, where I interviewed the Executive Industrial Director, **Mario Colombelli**.

Duratex, part of a fairly complex industrial and banking corporation (see box), is well established in the Brazilian wood business, but is new as a formaldehyde producer. In fact, the site for the first plant is currently being prepared (see photo) just outside São Paulo.

Amazing growth

"We are already the world leader in low-resin-content particleboard production, and last year we signed the contract to build the world's largest MDF production facility," explains Mario. "So at the beginning of this year we also signed for a Formox plant to give us the capacity we need.

"Duratex has an engineering mentality – process control. We maintain a strong technological base in everything we do, and we have the greatest market knowledge of hardwood you'll find anywhere.

"Our drive is towards control of our own production upstream as well. And we're growing – hiring more and more competent people. And in May this year we also ordered the world's largest particle board plant!"

Tough market

"The market for MDF and particle board is very good in Brazil today," continues Mario, "but it will be very competitive." Mario admits that the outlook for the future is dependent on the global situation, but feels that Duratex has some special advantages.

"We're a very vertical company," he says. "We have our own forest, our own resins, our own paper printer machine, our own impregnation lines and our own lamination lines.

"Our goal is to add value to our products – through good products and service, and our capability to offer tailored products to meet customer specs. In fact, meeting special specs is how we intend to do business!"

Mario

Sustainable forestry

"Brazil has a special situation with man-made forests – and the rising demand for certified, sustainable forest products will make us more competitive," notes Mario. "Actually, more restrictions create new opportunities, and we have an edge by following FSC [Forest Stewardship Council] rules for renewable and sustainable wood products."

Sound economy

"If nothing happens to affect employment, we can continue to grow – family incomes will rise and the middle class will grow. But we have to work on our infrastructure in order to continue growing the economy."

Photo courtesy of Duratex.

The site of Duratex' huge new production complex just outside São Paulo. The Formox plant will be built on the cleared area in the foreground.

Mario is also quick to point out a significant difference between South America and Europe. "There are bigger differences between countries here," he says. "You can think of the EU as a whole, like one country, but not South America. Brazil's economy is strong, but that doesn't apply all over our continent. And differences in education play a big role."

Why Formox?

Duratex' choice of Formox to supply the new formaldehyde plant was based on several factors. "Of course the experience of Elekeiroz [Duratex' sister company, who also have a Formox plant] contributed to that. We feel comfortable with our team experience, getting the right answers in our technical discussions, feeling confident. We also appreciated that you talk about your strengths, not about the weaknesses of your competitors!"

Facts about Duratex

- Member of the Itaúsa Group (banking & industry), Brazil's 2nd largest private group
- Industrial division comprises Duratex (wood as well as metal & porcelain fixtures for bathrooms & kitchens), Elekeiroz (chemicals) and Itautec (IT, computers)
- Duratex has nearly 7,400 employees
- First hardboard line in 1955
- First particle board line in 1984
- First MDF line in 1997
- Total board production 1.4 million m^3 (2007) from 4 plants, 26 production lines
- Current project for world's largest MDF plant.
- Current project for first Formox plant to meet HCHO requirements for new MDF line and special resins.

STANDING: Maria Uliana, Lana Ferreira, Fredrik Rietz (Formox).
SEATED: Gerson Pinto, Claudio Manzione, Francisco Guimarães

GPC Quimica (Brazil)

The fourth and final of my visits on this trip to South America was to GPC in Gravataí, near Porto Alegre, an industrial region near the Atlantic coast south of São Paulo. Here I interviewed **Tarso Beck**, the new chief process engineer for three GPC resin and formaldehyde sites in Brazil. GPC is one of Brazil's leading resin producers.

Tarso

Growing market

GPC's main market is in Brazil, but the company also exports small quantities of customized resin formulations to customers in Bolivia, Paraguay and other countries.

"Our market is growing," says Tarso, "so we're hoping to continue our expansion plans. But we're also seeing some verticalization in the market, with some clients starting to produce their own resins. It's our job to stay competitive!

"Environmental issues are also very important for GPC, and we're actively working towards ISO 14001 certification," adds Tarso.

Bright future

"We feel we have a bright future," Tarso continues. "Some of our clients are increasing their capacities, so that increases their demands on us. The housing market is growing, and Brazil has good wood production – including panels, such as MDF."

Switch to CAP

In the beginning of 2008, GPC made the switch to CAP loads. "We increased our capacity from 132 to 158 TPD – a 20% increase in our four plants!" notes Tarso. Our yield is also a little better, and even our power consumption is down.

Tarso and Fredrik getting down to the details at the GPC site in Gravataí.

GPC's two other sites in Araucária (above) and Uberaba.

Photos courtesy of GPC

"We get very good technical support from Formox during the run – from the planning stage to the operation of the load. The good, fast response to questions means a lot!"

Facts about GPC Quimica

- GPC stands for "Grupo Peixoto de Castro", Peixoto de Castro being the name of the owning family. Group headquarters are in Rio de Janeiro.
- Founded in 1954 as Synteko as a representative company.
- GPC also includes Prosint, Brazil's biggest methanol producer.
- First Brazilian thermofix industry to receive ISO 9001 certification
- Synteko & Prosint join forces under the GPC name in 2008. GPC Quimica is the chemical division of the Group.
- First HCHO plant in 1965 – the first HCHO production in South America – using a low-yield silver plant.
- 2nd silver plant in 1974, but now only operated occasionally due to lower yield than oxide plants.
- Currently 4 oxide plants (salt-cooled), 45,000 MTPA each, at three sites in Brazil: Araucária, Uberaba and Gravataí.
- Plants revamped to run at higher inlet with Formox catalyst; capacity boosted to 55,000 MTPA each.

You DO have an ECS, don't you?! by Lars Andersson

Does your formaldehyde plant lack a system to clean the stack gases? Or has your existing cleaning device become obsolete? Formox can probably help you to retrofit an ECS (Emission Control System) in your plant. Our ECS is available with or without steam production and in capacities to match any plant size.

Your formaldehyde plant and the environment

As we all know, pollution and industrial waste are today no longer a local concern but a global one. All over the world, governmental restrictions are placing increasing demands on industry to eliminate or minimize hazardous waste. Furthermore, environmentally responsible companies are getting good publicity, while public opinion is turning against companies that are not working actively with these matters.

Formaldehyde producers have in modern times always been associated with industrial pollution because of the hazardous gases produced, and because the smell of formaldehyde is easily recognized, even in extremely small quantities.

Today all new plants supplied by Formox are equipped with an ECS. The design of this system enables it to be adopted in any oxide-process formaldehyde plant. In other words, a plant that today has no incineration or other purification system or has a system that needs replacing can be retrofitted with an ECS designed by Formox.

More steam, sir?

Many customers put a high value on the extra steam generated by an ECS, as it can be used for heating purposes, generating of electricity etc. The steam pressure is likely to be the same as the pressure in the rest of the formaldehyde plant, and uses your existing boiler feed water supply facilities, i.e. the export steam is connected to your existing steam network. Typically, an ECS yields some 150 kg of extra steam per MT of 37 % formaldehyde.

This is our ECS

The ECS consists of a heat exchanger, a pre-heater, and a reactor loaded with a noble-metal catalyst specially developed by Formox. In the pre-heater, gases from the absorber are heated to the ignition temperature of the catalyst. The heated gases then enter the reactor, where an exothermic reaction takes place. After leaving the reactor, the cleaned gases pass through a steam generator; this provides steam at a pressure equal to that from the formaldehyde plant. The cleaned gases then return to the heat exchanger, where the remaining thermal energy is used to preheat the incoming gas. The purified gas then leaves via a stack.

The Formox noble-metal catalyst will effect conversion of the hydrocarbons of a typical formaldehyde off-gas as shown in the table.

Interested? Contact your Formox representative for more information.

Gas Outlet	mg/Nm³
Total Organic Carbon (TOC)	less than 35*
Formaldehyde	less than 5
Methanol	less than 15
Carbon monoxide	less than 80
Dimethyl ether	less than 40
*Measured as propane equivalents with an FID detector	

The doctors are IN

Catalyst and technology development at Formox

Most of you have regular contact with our technical support people / account managers or possibly our plant technology experts. However, in order to be a supplier of technology and catalysts that deliver better and better performance, we also have some people working "behind the scenes", in our labs – three holders of doctorates, with specialized knowledge in catalysis and well experienced in catalyst and process development: **Dr Neil Cruise, Dr Johan Holmberg** and **Dr Philippe Thevenin**. Here's a report from them.

Many of the concepts and ideas we work with are based on processes, catalysts or theories similar to those found in the literature. But a great deal of our development work is based on our own previous experience. A distinct advantage here is our long experience of catalyst and HCHO production, as well as plant design.

All of these aspects, plus our own somewhat different backgrounds, come into play when we work on improvements and propose new concepts. Then we have the added advantage of our close contact with the production facilities, where tests can be made on a full-scale, so that improvements can be fully tested before we start marketing them.

What we aim for

There are, of course two main goals with all of our R&D efforts regarding catalysts: to increase the yield, or conversion of methanol to formaldehyde, and to extend the catalyst lifetime (see Philippe's separate article on deactivation, page 10).

Productivity is of course another goal – making more formaldehyde in less time or getting more formaldehyde out of a smaller plant. It's related to both plant design and catalyst – higher inlet demands a catalyst or loading plan designed to handle it – so emphasis is on developing catalyst and plant in parallel. This gives Formox an advantage since we work and develop both!

Lab-scale & simulations

When developing new or improved catalysts, we start by screening potential candidates. And when preparing test materials for screening in our labs, we start by characterizing the material so we know we have obtained the correct material! The typical characterization methods we use are XRD (X-ray diffraction), Raman spectroscopy, atomic absorption spectroscopy, surface area and porosity measurements.

Neil pilots a pilot

Philippe, Neil and Johan confer

We even use high-powered microscopes such as a TEM (transmission electron microscopy) or SEM (scanning electron microscopy) to see down to the crystallite level. The magnification range we can get with an SEM is from x 25 (equal to a regular hand-held magnifying glass) to about x 250,000. This is magnification is about 250 times the magnification of a light microscope. Using a TEM enables us to see particles of a few Ångström (10^{-10}m). This allows us to study small details in the structure of different materials down to near atomic levels.

Once our materials are prepared we need to be able to screen their activity. To do this we use our Altamira screening reactor. This reactor needs just a few grams of the material, so large-scale synthesis is unnecessary – which saves both time and money! The screening reactor allows a rapid turnover of testing many different materials.

Before taking the catalyst to pilot-scale evaluation we also have the ability to make simulations so that we can design a suitable loading plan. Simulations make the pilot-testing more fruitful, since catalysts can be tested under more optimized conditions.

Pilot-scale

During the application development phase, the catalytic material is taken from lab-scale to a commercial product. The most useful tool we have for this is our past experience. But of course we also have other valuable tools: our pilot reactors, at present we have both single and dual reactors.

Pilot-scale testing is used to check that the operational parameters are OK, i.e. that other aspects than selectivity are considered. The basic idea is to also take into account the reactor configuration, reactor environment, catalyst setup etc. Factors desirable to optimize have been the yield, lifetime, production rate (need for the product and cost/steel), energy consumption, steam production and flexibility. This type of development is what has taken us to the current high level – 23-25 kg of 37% HCHO per tube per day – that new plants can now achieve. Examples of

such developments include the ring geometry (which gives us an optimum pressure drop and yield) and the CAP concept for "high inlet" and "high intensity".

Our pilot reactors offer us a great amount of flexibility, since tests can be done under severe conditions. Pilot reactors also offer a high degree of accuracy, since it is possible to maintain control of all parameters. This also means that we have the ability to design loading plans for special conditions, for instance if you operate your plant under non-standard conditions, or if you have any special requests.

Philippe and Neil do their stuff

Full-scale

Basically, before offering a catalyst/concept/idea to our customers, we conduct extensive testing both in the lab and full-scale so that when it goes commercial there will be no risks associated with it. This is why many "great" ideas and concepts never leave our site. Some have even made it all the way to full scale before being stopped and withdrawn due to insufficient reliability.

One of the things that distinguishes our development process is thus our access to full-scale testing, meaning we do not need to launch a concept before it has proven viable.

Here for you

The three of us spend a lot of time in the lab, working to come up with solutions that will ultimately improve the performance of your formaldehyde production. But we're not "stuck" in the lab. If you have a problem, the chances are great that we've seen it before, and maybe can help you do something about it. In other words, our many years of experience are at the disposal of every Formox catalyst customer. So don't hesitate to contact your Formox representative. We'll do our best to assist you!

Ultimate aim: the perfect catalyst

Methanol market update

by Karine Delbarre, Methanex

It has been once again a fascinating year for methanol, where the cyclicality of a global commodity could be an ideal business case study.

During the year we have continued to see the strong emergence of energy applications in Asia. In a high-priced energy environment, the need to extend the gasoline pool and reduce energy costs has lead to increasing methanol usage: it is now believed that fuel blending and DME will represent more than 10% of the 2008 global methanol demand, estimated at 41 MMT. Even if less critical when crude oil prices decrease, the Chinese strategy to lower its dependency on imported oil will keep fueling demand for energy applications.

Karine

During the second quarter, the methanol market also experienced competition against fertilizers. A large price spike occurred in China due to the conversion of units to ammonia, combined with some operational issues for other methanol producers. This caused a large switch to imports to China that was then reversed once this phenomenon ran its course.

Traditional applications such as Acetic Acid, Methylamine or MethylMethacrylate were enjoying growth rates higher than GDP in the first part of the year. Strong growth was experienced in Asia – China specifically – and the European and American industries were also performing well. Formaldehyde has been the first methanol derivative showing some signs of weakness as the new housing starts were declining in North America and this house decline and lower furniture production spread to parts of Europe.

During the summer of 2008, a new "megaplant", 1.7 MMT/year capacity, came on stream in Saudi Arabia. This plant's net incremental volume was appreciably limited due to restricted natural gas availability. This demonstrates one of the key drivers in the methanol industry: access to affordable natural gas, which continues to be a challenge for methanol producers in a high energy environment.

Then, in the autumn, the credit crunch and the financial turmoil that started in the US spread extremely rapidly to the rest of the world. Crude oil prices plummeted, derivative demands linked to housing and automotive industries have been appreciably impacted, as all customers reduce production and start drawing into their inventories. In this environment, the 3-month-long Force Majeure declared by a major methanol producer did not create the price spikes we experienced last year.

Going forward, the industry is facing some interesting challenges, as two significant capacity additions are scheduled for the first half of 2009 (Petronas in Malaysia and Zagros in Iran). At the same time, the high-cost producers (mostly in China and Europe) face ongoing pressure to shut down as prices have weakened. Some flexible assets may be switched to more profitable fertilizer production, and winter gas curtailment, as well as high coal prices, could limit methanol production. At the end of the day, supply and demand will balance out once again.

Understanding deactivation

by Philippe Thevenin

Ideally, catalysts last forever. In reality, they die with use, victims of many "diseases" that rob them of their ability to function. Depending on the process, it can go quickly, in a matter of minutes, or slowly, taking up to 10 years.

The causes of deactivation are many. For instance, the catalyst may be poisoned by a contaminant present in the methanol feed and/or the air stream. At the same time, the surface pores and voids of the catalyst may be fouled by carbon produced by condensation reaction of hydrocarbon reactants, intermediates or products. The formation of volatile species of the active phase will be followed by transport from the reactor.

Except for a very few high-temperature applications, the metal loss through direct vaporization is typically an insignificant route to deactivation. On the contrary, the loss of metal through formation of a volatile compound, such as metal carbonyl, sulfide or methoxy (in our case) can be significant at relatively mild conditions.

In our specific formaldehyde process, the main cause of loss of activity is the formation of volatile molybdenum. This typically results in a decline of the catalytic performance (reduced activity and lower selectivity) as well as mechanical deterioration of the catalyst rings (entailing a significant increase in the back-pressure).

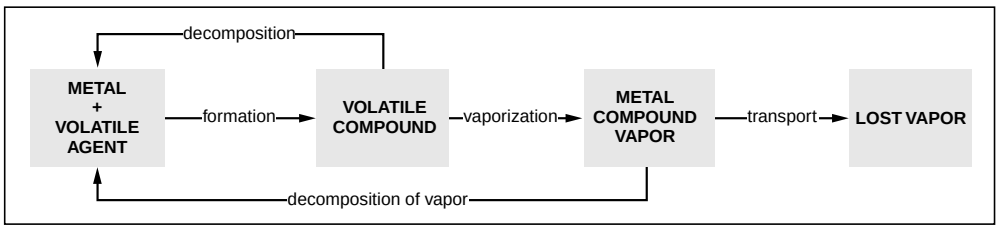
Very little information has been published about the rate of formation of these volatile compounds. Nevertheless, a general mechanism of deactivation by formation of volatile metal compound can be postulated and is depicted in the figure above.

From our own previous work, it is also evident that, besides temperature and gas phase composition, the physical properties of the catalyst play an important role in determining the rate of metal loss.

In the case of the oxide process, e.g. the Formox process, for producing formaldehyde, the catalyst is made of iron and molybdenum and typically consists of a combination of MoO_3 and $Fe_2(MoO_4)_3$.

Methanol is a strong enhancer of the sublimation of molybdenum. For instance, the lifetime of a catalyst load is shorter when operating at high inlet than of similar a load subjected to a lower methanol inlet.

We are presently investigating the exact influence of methanol on the loss of molybdenum in our commercial catalyst. The objective is to acquire a better understanding of the exact parameters affecting the loss of molybdenum during operation and quantify the influence of oxygen, methanol concentration and temperature with respect to the catalyst life time. Our final objective is to be able to provide our customers an improved (optimized) way of operating the catalyst and get the most out of a catalyst load.



General kinetics

1. Rate of volatile compound formation
   = rate of formation – rate of decomposition
2. Rate of metal loss
   = rate of vaporization – rate of decomposition

- At low temperatures and partial pressures of the volatilization agent (VA), the overall rate of the process is limited by the rate of volatile compound formation.
- At intermediate temperatures and partial pressures of the VA, the rate of formation of the volatile compound exceeds the rate of decomposition. Thus, the rate of vaporization is high, the vapor is stable and metal loss is high.
- At high temperatures and partial pressures of the VA, the rate of formation of the volatile compounds equals the rate of decomposition, i.e. equilibrium is achieved. However, the volatile compound may be too stable to form or may decompose before there is an opportunity to be transported from the system.

MSDS update

Please note that the Material Safety Data Sheets (MSDS) for Formox Formaldehyde Catalyst are in the process of being updated. New versions will soon be distributed to Formox customers.

Besides formal updates, the new versions will reflect the EU reclassification of the ingredient molybdenum trioxide (MoO_3) and contain clarifications on the return and recycling of the spent material.

The EU reclassification of molybdenum trioxide was agreed in 2004, as discussed during Formox seminars, and it is now going into effect. The risk and safety phrases are changed, which means that the text on the drum labels will be modified. The MSDS hazard description is unchanged and the information on exposure controls and personal protection is not impacted.

Did you know...

- **...that the "savings" you get by buying catalyst 5% cheaper are lost in a single day of standstill?**
- **...that you stand to lose 10 times that amount if your downstream production must shut down for one day?**

THE RUN-UP TO OUR 50th

What a start!

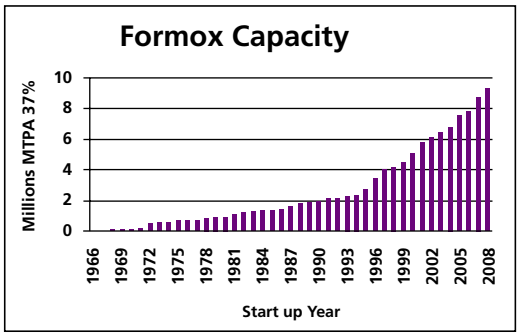
by Bob Crichton

Bob and Max in the good young days

Earlier this year, Stan asked me to make a contribution to this issue on the topic of the upcoming 50th anniversary. He said he was looking for key events/memories from the last 50 years. I don't know whether he meant to imply that I had been involved over 50 years ago, but no offence was taken. However, I am willing to admit that I can go back 30 years.

That first visit to Perstorp, Sweden, was to prepare a bid for a plant at the Haverhill site of The Chemical Supply Company – later Blagden Chemicals and subsequently taken over by Borden (now Hexion)[1]. The company I worked for then secured the contract and Blagden went on to buy two further plants; one through Adaibra, a Spanish fabricator used by Formox at that time. The final plant, built in Rotterdam, was after the "watershed" in 1992 – meaning when Formox started to supply complete plants rather than only licenses.

I say "watershed" because for me this change – from Licensor to Plant Provider – was the key event in the last 50 years. It was the moment that the business really took off. Moreover, the customer involved in the very first step on this new[2] road was one of our oldest customers – dating back to 1972.



Though we had been preparing for the policy change through the latter part of 1991 and into 1992, it was August before we were able to put it into effect. And for some reason, now lost in the mists of time, the negotiation took place in the Regent Hotel, Kuala Lumpur. The potential client was Norsechem, a Malaysian company that had bought its first plant from Formox some 20 years earlier. Indeed Max Henning, who led the negotiation for us, had been a commissioning engineer on that first plant.

The Regent proved to be a good venue for Norsechem but not so good for us – the price for the plant was well below the target given to us by management back in Sweden. Nevertheless we thought it could be done; Max made a call to Perstorp and after some arm-twisting (there was a lot of that in the early days) it was agreed.

It did not stop there; we heard that another plant was required in Sabah so we changed our plans and went over to Borneo – with my long-suffering wife in tow – I was supposed to be on vacation! To cut a long story short, we had another negotiation, typed the proposal in the hotel and the three of us collated the copies in the hotel's business center. A few weeks later we had another signed contract and the new era was truly up and running.

You may think I am exaggerating when I talk about "watershed" and "new era", but have a look at the graph. The capacity added in the 15 years after the 1993 start-ups was over 3 times that added in the first 35 years of the process. It is for good reason, therefore, that the events in the Regent Hotel in Kuala Lumpur all those years ago are at the top of my list.

[1] Editor's note: Clearly we are not the only ones to change names!
[2] Technically, this was not the first time Formox supplied a plant. In addition to those built in Perstorp, Sweden, there was one other plant supply project – but it was not part of the official policy at that time.

Two groups for training

In June, this delegation of trainees from Shaanxi BDO came to Sweden from Weinan, China to learn how to operate their new Formox formaldehyde plant, which is in the final stages of preparation.

In August we hosted this group of trainees from Formosa Plastics, whose new Formox plant will soon be ready to go on stream.

Perstorp Formox becomes Formox!

"What's in a name?" Shakespeare wrote. "A rose by any other name would smell as sweet." OK, perhaps sweet smells are not something most people immediately associate with formaldehyde, but to be standing on our own two feet as a separate company again – well, how sweet it is!

But all change raises questions, makes people wonder what's going on etc. So we have tried to anticipate some of your questions – and to provide you with some answers.

Why did Perstorp Formox become a separate company – Formox AB?

Formox has always been fiercely independent; we had a different type of product from the rest of the Perstorp Group, a different business model and different customers – more so recently as the Group focused on Specialty Chemicals. We were and still are single-minded – concentrated on formaldehyde and serving any and all formaldehyde producers who are interested in what we have to offer – even competitors of the Perstorp Group. Some years ago this independence was recognized and we became a separate legal identity. But for various structural reasons it suited our parent company to change that status; now we have it back.

What does the new legal entity mean for me as a Formox customer?

The only difference is that it will now say "Formox AB" on your contracts, orders, invoices etc, instead of "Perstorp Specialty Chemicals AB". Hopefully, you have already been informed about this.

What does the new Formox organization look like?

Several key functions that Perstorp Formox used to "borrow" from Perstorp Specialty Chemicals AB are now integral parts of Formox AB. These include the catalyst production team and plant in Sweden, our own dedicated R&D team (a sub-team within our Technology department), our own engineering team and our own financial team.

We've also employed a number of new people to increase and enhance our coverage in key areas. This means that Formox AB is now about 80 people – twice as big as in recent years. And we hope you'll soon discover that we're even better at meeting your needs!

On the next page you'll find photos taken when most of us were able to attend our "company kick-off"!

What will happen to *informally speaking*?

No change apart from the slightly modified logo. It will continue to be published twice a year – in early June and early December – with articles about safety, process developments, catalyst developments, reports on formaldehyde producers worldwide, and many other topics that are hopefully of interest and enjoyment for our readers. And Stan will continue to welcome your comments!

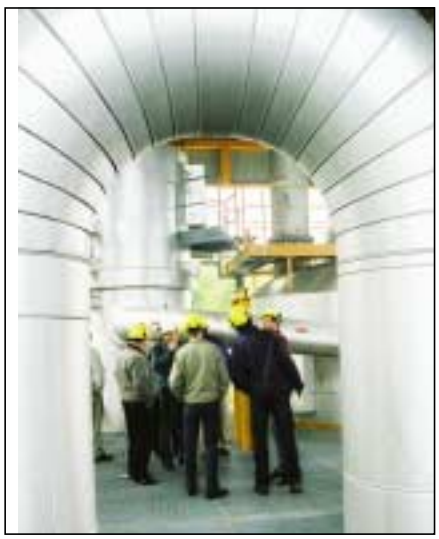
Note that the Chinese version comes out about one month later than the English version.

The logo is still "Perstorp Formox"...?

Formox AB is owned by the Perstorp Group, and Formox headquarters are located in the village of Perstorp in southernmost Sweden. So, for the time being at least, we are retaining our "old" logo, and our "Perstorp" email addresses. But please just call us "Formox"!

Same flexible Formox® ***plants***

Same high-performance ***catalysts***



Same dedicated, long-term ***technical support***

This is us!

PICTURE LEFT
Seated: Marie Grönborg (president)
Others from left:
Stan Erisman (market communications),
Lucia Bengtsson (assistant),
Bob Crichton (business development),
Jan Lundborg (finance).
Not shown:
Sandra Werner (controller)

PROJECT TEAM (ABOVE)
Seated: *Jonas Lindborg (manager)*
Back row from left: *Ronny Lindström, Jan-Erik Andersen, Per Fridlund, Gert Svensson.* Next row: *Fjalar Holmström, Mats Kellgren, Lorentz Rensfeldt, Tommy Johnsson.*
Next row: *Tommy Nordstedt, Erland Andersson.*
Front row: *Ingvar Linderberth, Erik Timander, Helen Lundström, Monica Marntell.*
Not shown: *Dave Palmer, Fred Thuresson, Claes Ekelund, Richard Moore*

MARKETING, SALES & TECHNICAL SUPPORT TEAM (RIGHT)
Seated: Lars Andersson (manager).
Back: Anders Malmborg
Next row: Fredrik Rietz, Atul Shah, Eddy Lee, Jennifer Wu, Zhang Chenggang, Ronnie Ljungbäck.
Front row: Paul Walter, Anne Eliasson.
Not shown: Cao Ping, Zhao Dayang

TECHNOLOGY TEAM (LEFT)
Seated: Ola Erlandsson (manager).
Back row: Neil Cruise, Philippe Thevenin.
Next row: Lars Schuler, Arne Andersson, Johan Holmberg.
Front row: Maria Yngvesson.
Not shown: Peter Haack and Kim Wong.

PROCESS ENGINEERING TEAM (ABOVE)
Seated: Anna Wemby Björk (manager).
Back row: Andreas Wickman, Daniella Cheng, Mattias Fridolf.
Front row: Martina Skantz, Christian Andersson.
Not shown: Michel Bellais, Henrik Lendrup, Eva-Lena Ekblad.

CATALYST PRODUCTION TEAM (RIGHT)
Seated: Eva Lindgren (manager).
Back row: Michael Svensson, Peter Harrysson.
Not shown: the factory staff.

FOOD FOR WOOD?

An update of formaldehyde's prospects in the wood sector

Bob

by Bob Crichton

It has been suggested, in response to price pressures and concerns regarding emissions, that natural products based on proteins derived from milk and/or soy, could replace formaldehyde based resins in composite panels. This article argues that this is unlikely to happen to any significant extent and that formaldehyde-based resins will continue to dominate for the foreseeable future.

This one has wood for food

I have been promising to carry out another comprehensive market survey for some time now – the last one was published in 2003. And as you may have seen at recent seminars, the 2003 forecast underestimated demand. For example, at the Toronto seminar earlier this year (see previous issue of ***informally speaking***), annual formaldehyde demand in 2015 was estimated at 43 m – way ahead of the earlier forecast (Fig 1).

I am pleased to say that the 2008 review is almost complete but if you want to know more you need to wait for the next issue of this newsletter – or get yourself along to the 50th Anniversary Seminar in Malmö – Formaldehyde Europe 2009! What I want to address in this article is only one aspect of the review: prospects for the wood industry. And with good reason, as (a) consumption within the Chinese wood industry (see Fig 2) – was one of the main reasons why the previous forecast undershot; (b) recently "panels", rather than "chemicals" have driven formaldehyde demand; and (c) there continue to be doubts surrounding formaldehyde-based resins following the 2004 recommendation by the IARC (International Agency for Research on Cancer), to place formaldehyde in the severest category of carcinogen.

Though the IARC recommendation is a concern, it is important to retain a sense of perspective; we have been here before. In fact, the formaldehyde issue first emerged in Sweden in the 1970s; the introduction of particleboard into domestic houses had the misfortune to coincide with tighter insulation standards. And though formaldehyde took the blame, the problem was inadequate ventilation and had much wider implications than formaldehyde alone. The publicity bandwagon was fuelled by problems with poorly specified foams in both Europe and the US. To cap it all, mobile home dwellers started to show the Swedish symptoms. It was soon established that certain individuals were particularly sensitized to formaldehyde, even in very low concentrations.

The story might have ended here except that a study by the Chemical Industry Institute of Technology (CIIT), published in 1980, showed that inhalation of high concentrations of formaldehyde over extended periods of time could cause nasal tumours in rats – though in a part of the nose not found in humans. Despite this, in 1987 the IARC classified formaldehyde in Group 2B (probable human carcinogen). Prior to the next classification (1994), several epidemiological studies were carried out comparing the incidence of cancer in exposed occupations with occupations not exposed to formaldehyde. No statistical difference was detected but the classification was retained. It remains to be seen what will happen now following the latest IARC pronouncement but it undoubtedly contributed to the adoption by the California Air Resources Board in April 2007 of new limits for the acceptable levels of formaldehyde for panel products sold in that state. These restrictions, to be phased in by mid-2012, reduce allowable formaldehyde emissions from composite panels to around half the current US industry average.

The question is, if this trend is repeated worldwide,

Fig 1 Toronto Forecast

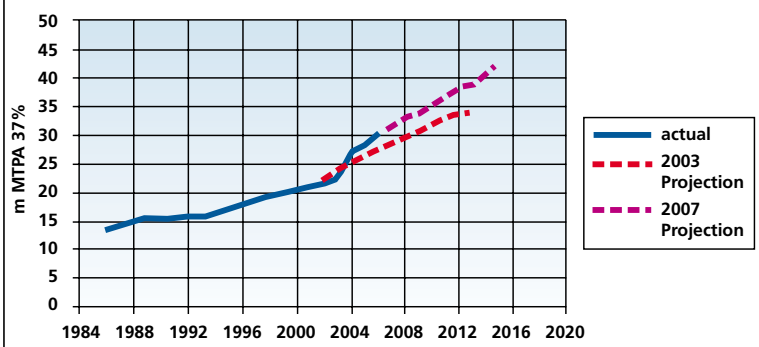
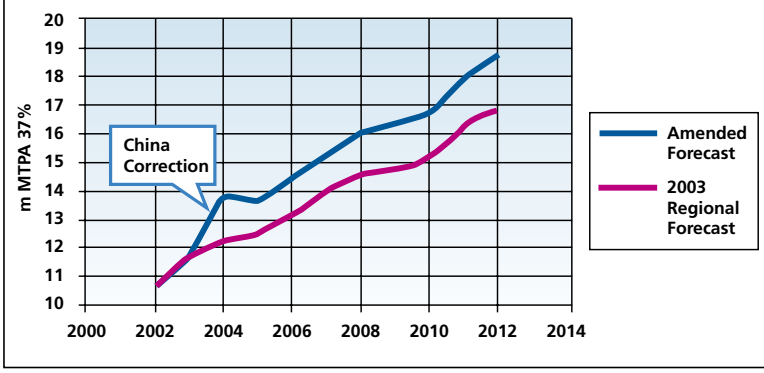
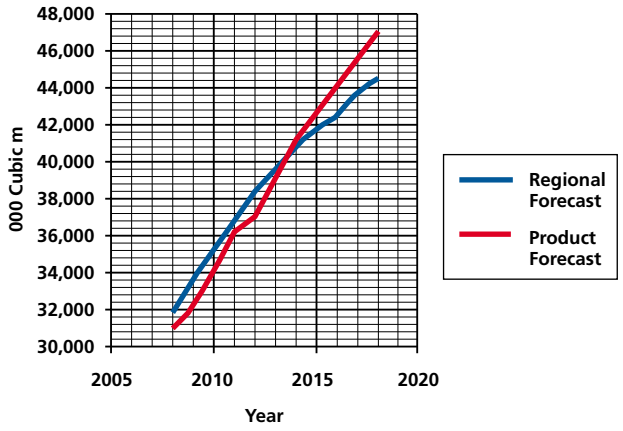


Fig 2 Wood Industry Forecasts Compared



what is the likely impact on the demand for formaldehyde? However, before we try to answer this question, perhaps we should look at prospects for the board industry in general. And to do this we can make use of a simple fact – that the demand for materials – when

Fig 3 Projected Panel Volumes



expressed per unit of population has not changed very much over the years[1]. What has changed is the way in which the demand is satisfied – plastics have substituted for wood and metals and wood panels have substituted for real wood[2]. So the expected pattern is a small fall in wood consumption but an increase in the share enjoyed by panels; it is the increased market share in combination with population growth that drives demand forward. However, as we saw earlier, projections based on a shift between "real" wood and panels are not reliable in regions where wood is not a traditional material. Here other factors are at work,[3] and to get a true picture you need to look at each region/country individually.

Forecasting from these two different directions – general world trends and those in particular regions, is a key aspect of the latest market review. Though this is "work in progress", available results (Fig 3) show better agreement than at the last review.

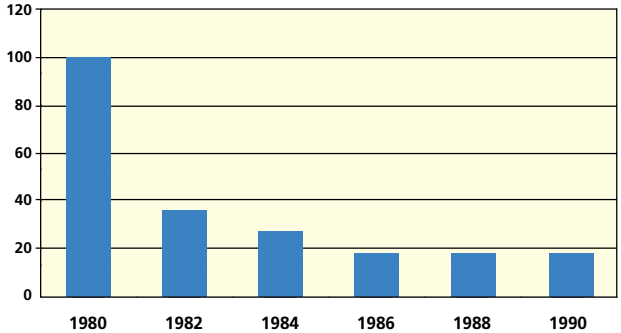
As these forecasts are based on well established trends, there is no reason to suppose that the future will be fundamentally different; demand for panel products will continue to increase, at least on the timescale of this projection. Formaldehyde's future, therefore, will depend on the resin industry's ability to deliver adhesive systems able to meet concerns over emissions. To put it another way, will formaldehyde-based binders continue to be the system of choice or, as has been suggested, will older adhesives based on proteins derived from milk or vegetable material such as soy, make a comeback?

As we have seen, formaldehyde emissions are not a new problem. In the 70s particleboard resins were formulated with relatively high levels of formaldehyde; this gave good press performance (fast cure speeds and high board strengths) – but high emissions. In response, emissions from urea-formaldehyde-bonded products were reduced dramatically (Fig 4) to meet progressively lower standards, e.g. the E1 and E0 standards in Germany and the more recent F**** standard in Japan. This was achieved by improved formulations and changes in the board manufacturing process. There is no reason why this cannot continue and indeed resins to meet California's standards are already on the market. It will, however, require ever closer integration of the resin and board-making processes – altering one without the other is not enough.

This does not mean that there is no place for other products; but it is fallacious to suggest that proteins, for example, will somehow replace formaldehyde because of high methanol prices and concerns over formaldehyde. When UF resins first appeared on the market they were a premium product and competed with proteins, not on price but on performance – better water resistance. And it would have stayed that way if methanol had remained a by-product of charcoal production. In fact it is not an exaggeration to say that the panel industry could not have developed the way it did had it not been for the large-scale production of "synthetic" methanol and urea. Apart from quality issues, there was simply not enough protein to support the market's rapid rate of growth. And even today methanol and urea are still relatively cheap by historical standards. Having said this, there will always be a market for so-called "formaldehyde-free" boards, and protein resins may have a part to play. However, the volumes, by necessity, will be small as (a) there is not enough protein to go around and (b) prices will be high due to competing demand from food and biofuels. So to cut a long story short, proteins are unlikely to dent formaldehyde's market share.

But even as I write, the world stock markets are heading further south and the "R" word is much in evidence. As a consequence we can expect to see a slower rate of growth in the short term and – if past experience is anything to go by – it could be 2011 before demand recovers. And long term (beyond 2020) there is also a threat. The market in China and other developing economies, the driving force in recent years, will reach equilibrium in the next 20 years; unless another product like laminate flooring emerges, the rate of growth will slow. All these factors will be considered in the upcoming review; but as stated at the beginning of this piece, you will have to wait until Formaldehyde Europe 2009 for the next update.

Fig 4 Panel Emissions: 1980 = 100



1 This is only true on average, the actual value moves up and down according to the general economic situation.

2 And a whole range of other materials through the use of laminate flooring.

3 "IKEA" is one such factor, exporting Scandanavian style and patterns of wood use around the world.

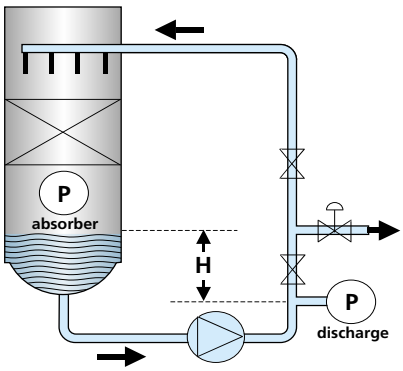
Do YOU have the correct absorber pump flows?

by Ola Erlandsson

A good working absorber will maximize the absorption of formaldehyde and minimize the maintenance requirement. The absorber pump flows to the packed sections is one parameter that has a high impact on the absorber performance. It is important to maintain the *correct* pump flow over the packed sections in the absorbers – neither too low nor too high!

Low flow can result in:
- dry spots in the packing (causes paraformaldehyde formation)
- low temperature after the heat exchangers (also causes para formation)
- poor methanol evaporation (if a prevaporizer is installed)

High flow, on the other hand, can result in:
- flooding of the absorber and high pressure drop
- increasing entrainment, giving poor absorption
- movement of the packing material



Pump discharge pressure

$P_{discharge}$ = (Head + H) x Density x g + $P_{absorber}$

The **correct** flow is determined by the absorber cross section area, regardless of the plant load. A typical design flow is 35m³/h/m². The flow can be checked by using the pump curve and the pump discharge pressure (see EXAMPLE). The liquid level on the packed section distributor is also an indicator of the flow. The normal distributor liquid level is ~150-250 mm, depending on the design.

TROUBLE-SHOOTING GUIDE		
Manometer reading	**Distributor level**	**Action**
OK	**OK**	—
Low	**High**	**Close pump discharge value more**
High	**Low**	**Open pump discharge value more**
OK	**High**	**Stop and clean distributor**
OK	**Low**	**Clean pump suction pipe**

Check the pump discharge manometer and the distributor level once every shift. Compensate for possible fouling of heat exchangers etc by slightly opening the discharge valve to keep the correct pressure.

Note that the manometer reading will be lower during start-up due to lower density and absorber pressure. Do **not** adjust the valve for this! You should instead wait until normal operation is achieved.

What if you have two discharge valves in series?

In this case, Use the first valve only for starting and stopping the pump and leave the second untouched with the correct throttling. This will also automatically give you the correct flow and a higher pressure to any bleed streams.

EXAMPLE:
Absorber diameter = 2.7 m
Absorber flow = 2.7^2 x 3.14 / 4 x 35 = 200 m³/h
From the pump curve: 200 m³/h → Head = 35 m
55% formaldehyde density = 1142 kg/m³
Liquid leg on manometer H = 2.0 m
Absorber pressure P_{abs} = 0.45 bar g

$P_{discharge}$ = (35+2) x 1142 x 9.81/10^5 + 0.45 = 4.6 bar g

If your pump discharge manometer shows 4.6 bar g, you have the correct flow and should expect a distributor liquid level of ~200 mm.

Questions & answers

about REACH, catalysts and formaldehyde by Paul Walter

What is REACH?

REACH stands for the regulation for Registration, Evaluation, Authorization and Restriction of Chemicals. The REACH Regulation entered into force on 1st June 2007, with the aim to streamline and improve the former legislative framework for chemicals within the EU. REACH places greater responsibility on industry to manage the risks that chemicals may pose to health and the environment. REACH has also created the European Chemicals Agency (ECHA), which has a central role in coordinating and implementing the overall process.

Among other things, REACH means that manufacturers and importers of chemicals must identify and manage risks linked to the substances they manufacture and market in the EU. For substances produced or imported in quantities of 1 ton or more per year per company, manufacturers and importers need to demonstrate that they have appropriately done so by means of a registration dossier, which shall be submitted to ECHA. All substances on the European market today need not be registered at once, but must follow a certain time schedule running until 2018 – provided that they were *pre*-registered before December 1, 2008.

Taking a load off your mind

by Ronnie Ljungbäck

Formox has for many years been offering loading service to our customers. Over the years, there have been a lot of changes – huge improvements even – in the loading machine itself. In the late 80s and early 90s we used 2-layer loading machines, reflecting the most common loading plans back in those days: a traditional combination of ceramics and pure catalyst comprising the two layers loaded by machine, and followed by a layer of top ceramics that were either spread out by hand or poured out on the top of the reactor tube sheet and spread around by broom.

Continuous improvement

In the early 90s we found that it would be possible to achieve some significant performance benefits by introducing mixed catalyst loads - inserting a mixture of ceramic rings and catalyst between the top ceramics and the pure catalyst. This, of course, called for the development of a 3-layer loading machine. (It was, of course, also helpful for those reactors where the top ceramic rings didn't need to be filled all the way to the top).

In the mid 00's, Formox introduced a new reactor design with longer tubes, making it a must to have a 4-layer loading machine for filling. Quite apart from the time factor of filling thousands of tubes manually when each tube consists of four layers, the most critical factor was accuracy. A good machine can eliminate much of the "human factor" and achieve the consistency that is essential to attaining optimal load performance.

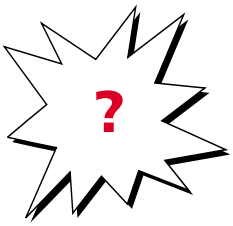
Pushing towards the edge

But it hasn't stopped there, and last year we managed to make some further design improvements in the 4-layer loading machine, resulting in fewer hours required for manual loading by the customer. There are always tubes along the edges of the reactor that machines just can't reach. For a ~15,000-tube reactor of the modern Formox design, this used to be a question of some 800 tubes – with the previous loading machine model. But now, thanks to the more flexible design of the new loading machine model, only some 200 tubes need manual loading.

The most obvious benefits of this improvement to the customer are reduced loading time and resources, since fewer tubes have to be manually loaded. But an added benefit is that it allows our supervisor to fill even more tubes of the reactor with the same consistent accuracy. It may mean a little more work for our supervisors, but this difference is marginal compared to the overall time for the loading of the reactor. And we don't charge you anything extra for the rental of the improved new machines! Why not? Because we feel that this is simply part of our continuous improvement program – and you cannot measure everything. If something benefits the performance of your load it will also – in the long run – benefit us by earning your confidence and loyalty.

Faster unloading too?

As mentioned above, accuracy, not time, has become the main issue in loading. But time still plays a key role in emptying a reactor. We have therefore put some effort into trying to reduce this time by developing an unloading machine. The first tests on our new machine are being carried out as this issue of ***informally speaking*** goes to press, so we are unable to say anything about the outcome. But if all goes well, our intention is to offer the unloading machines for sale to our customers – a different approach compared to our loading machines. And who knows, you may get a chance to see the new unloading machine when you come to Formaldehyde Europe 2009 – and the 50th anniversary of Formox – in Malmö in May….



What are the obligations of non-EU companies?

Non-EU manufacturers do not have direct obligations under the REACH Regulation. But importers who are established within the EU must comply with REACH obligations. Non-EU companies exporting substances on their own, in preparations or in articles to the EU, may (but are not required to) appoint a "sole representative" within the EU to fulfill the obligations of importers.

What are Formox and other formaldehyde industries doing?

European formaldehyde, aminoplast, polyol and resin industries are cooperating in the REACH platform within FormaCare (www.formacare.org), a CEFIC (www.cefic.be) sector group. See the FormaCare update on page 18.

Formox is currently not subject to its own REACH obligations related to UFC (urea-formaldehyde condensate) but we are closely following the developments in order to provide up-to-date advice to our customers.

All REACH-relevant substances for Formox products have been pre-registered, and the pre-registration numbers will be available in early 2009. All such substances will be registered prior to the applicable deadline. This ensures that our supply of catalysts and other products will continue virtually unaffected from the perspective of our customers.

REACH will cause no complications to our customers in terms of the return of spent catalyst to Formox for recovery (nor any return of surplus unused Formox catalyst).

How can I find out more?

Further information about REACH can be found on the ECHA homepage (echa.europa.eu). The legislation as well as guidance documents and useful FAQ's on how to fulfill REACH obligations can be found there. You are as usual most welcome to contact your Formox representative should you have any specific questions and we will do our best to assist you.

FormaCare update

by Stan Erisman

Due in part to the virtual impossibility of ever proving a negative, FormaCare is likely to have a permanent role in the never-ending, Herculean task of defending formaldehyde against a series of attacks that have little foundation in science. I was about to write "Here's a brief update on challenges FormaCare is currently facing", but then it hit me. It's not just FormaCare that's facing these challenges; it's every one of us in the formaldehyde-related industry! It's just that FormaCare is doing something about it – on our behalf. The following report comprises excerpts from FormaCare's own news bulletin.

Indoor air

FormaCare has taken several key steps to establish a dialogue with EU bodies involved in indoor air regulation, in order to help assure that a scientific approach is maintained in every decision-making process. The first was a meeting with the Director General of the European Commission's Joint Research Centre (JRC) back in April. This was followed by a meeting with the head of the Institute for Health and Consumer Protection (IHCP), Prof. Elke Anklam. This will soon be followed by FormaCare's participation in a technical workshop to study the available science, probably early next year.

The so-called "Index Report" from the IHPC, dated 2005, had listed formaldehyde as "the most important sensory irritant among the chemicals assessed because of its high reactivity." Building on this report, a new EU study is now not only calling for reduced emissions but also "mechanisms to effectively monitor and manage indoor air quality," i.e. EU indoor air guidelines.

In this process, FormaCare is undertaking to present the industry's position, "with special emphasis on both new science that challenges the conclusions of the Index Report as well as socio-economic facts." It turns out that some of the limit values being suggested for the EU are far below what the WHO currently recommends! Let's hope FormaCare's participation in the workshop will serve as a voice of reason.

OEL

FormaCare is continuing to make every effort to influence the EU's OEL-setting process. This was scheduled for completion by the end of 2008, but it seems likely that it will take a bit longer. FormaCare is working in close collaboration with downstream users of formaldehyde, on whom a significantly tighter OEL (occupational exposure limit) would/will have a very negative impact.

One of the difficulties in getting the EU Commission to show a bit more flexibility is that the limit values in question are *indicative*, not binding. [Editor's comment: Apparently the feeling is that the need to justify a recommendation is not as great as the need to justify an actual regulation. The problems start when one governing body uses another's recommendations as the basis for their own regulations. We've certainly seen this happen before!] But, as FormaCare points out, "the fact that member states can decide [whether to] adopt the suggested indicative values still leaves room for [manoeuvring] at national levels…."

France & ECHA

French authorities are currently working on a proposal for "harmonized classification and labeling for formaldehyde" which is scheduled for submission to ECHA (the European Chemicals Agency) by the end of 2008. Calling this "a challenge that deserves our full attention", FormaCare's main goal is "to make sure that during the discussions on a new classification labeling for formaldehyde, all recent science is taken into account for an unbiased and well-balanced evaluation."

REACH

FormaCare offers a platform solution to members as a way of dealing with the relevant substances under REACH – to ensure registration, optimize the use of resources and guarantee the safety of all data. This has proven to be a highly effective and convenient approach for the 26 companies that have signed up for the platform.

Common goals, shared efforts

As reported numerous times in ***informally speaking***, FormaCare maintains close relations with FCI (Formaldehyde Council Inc.) in the US, as both organizations have a common goal: to keep science on the table whenever formaldehyde is discussed, debated – and legislated (even if different legislatures are usually involved!). There are also a number of projects and research initiatives involving joint efforts.

Now FormaCare has taken discussions to a higher level in another part of the world as well. Lars-Erik Johansson, chairman of FormaCare, was recently invited to speak at a meeting of the Brazilian Formaldehyde Producers' Association – Associação Brasiliera dos Prodotores de Formol e Derivados (ABRAF). As Lars-Erik puts it, "It is absolutely vital to engage in an open dialogue with the formaldehyde industry all over the world, as global markets are more and more affected by global regulation."

This is in fact one of the reasons why a speaker from FormaCare will be making a presentation to many of the world's formaldehyde producers in May – at least all of those who attend Formaldehyde 2009 in Malmö!

Who's toxic now?

One of the most toxic substances known to man is botulism toxin. It can cause swift and agonizing death in improperly preserved food. But in recent years, this toxin has not only escaped having a bad image, it has become a very "in" drug in cosmetics. Of course it's not called botulism toxin any more, but "Botox". And the authorities permit people to actually inject it into the body (usually the face) to eliminate wrinkles. Maybe we need a new name for formaldehyde? Any suggestions?

PROJECTS & START-UPS

New Projects

We have the following new projects to report since the previous issue of ***informally speaking***:

- **Kanoria Chemicals & Industries Ltd.** has ordered a basic engineering package for an FS2.5 plant for their site in **Visakhapatnam** on the east coast of India. Kanoria already has 3 plants of Formox design at their site in Ankleshwar in northwestern India.
- **CNOOC TIANYE Chemical Ltd.** (the China National Offshore Oil Corporation) has ordered an FT2.5 plant for their site in Huhhot, Inner Mongolia. The start-up is planned for the end of 2009.

Ongoing projects

We also have exceptionally many ongoing projects, previously mentioned in ***informally speaking***. Here's an update on the status:

- Installation work has begun on the plant for **Formosa Plastics**, Taiwan. The start-up is expected to take place in the beginning of 2009.
- Installation of the new FS2.5 plant for **Shaanxi BDO**, in Weinan, China, is underway. The plant is scheduled to go on stream in early 2009.
- The new plant for **Nafta Petrochem**, in Lendava, Slovenia, is in the installation phase, and will probably go on stream in the beginning or middle of 2009.
- Installation work is ongoing on the **Karbodin** plant in Russia, with the start-up scheduled for the middle of 2009. (Karbodin is a joint venture between Metafrax and Dynea.)
- The new FS2.5 plant for **Yunnan Yunwei**, in Zhanyi, China, has completed the open-case inspection. Current plans are for a start-up during the middle of 2009.
- The major project for a client in Europe is in the process and detailed engineering phase. The start-up is expected in early 2010.
- A project for a client in the Middle East is running on schedule for the planned start-up in 2010.
- The retrofit of an ECS for a client in Europe is running on schedule.
- The formaldehyde and resin plant for **Duratex** in Brazil (see separate article) has reached the engineering and procuring phase. The new facility is scheduled to go on stream in December 2009.

Start-ups

- The new plant for **Lucite** in Singapore was successfully started in September. (See photo below.)
- The FT3 plant for **Yuntianhua** in China went on stream in late August. (See photo below.)
- The FS3 plant for **Silekol** in Poland started in July.

This photo was taken at the signing of the contract between CNOOC and Formox in October. The banner in the background reads "The signing ceremony of formaldehyde project 600 MTPD of CNOOC TIANYE Chemical Ltd." Mr Yu Shen Yang, the General Manager of CNOOC POM project is seated in the middle. Standing directly behind him is Mr Tan Jun, the representative of the formaldehyde project.

They say that a picture is worth 1000 words. So then here you'll find 2000 words that mean "successful completion of Formox plants". Aren't they beautiful?! On the left is Lucite's new beauty in Singapore. On the right is the latest – the third! – Formox plant for Yuntianhua in China.

Faces & places

We've had lot of changes since the last issue of ***informally speaking***! Most of them are thanks to the addition of people who previously belonged to other parts of the Perstorp Group and whose skills we had access to. Now they are part of Formox AB. These include catalyst production, engineering resources, R&D resources and finance. You can see many of them on page 13. The faces you see here are either new employees or members of our team who now have new positions.


Anders


Martina


Christian


Erik


Ola


Henrik

- **Anders Malmborg** has transferred from the Process team to become an Account Manager.
- **Martina Skantz**, a new process engineer with a degree in Chemical Engineering from Lund University of Technology, has previous experience in the Norwegian oil industry.
- **Christian Andersson**, after graduate studies on completion of his degree in Chemical Engineering at Luleå University of Technology, has also joined our process engineering team.
- **Erik Timander** has transferred from our process group to become a project manager.
- **Ola Erlandsson** has become our new Technology Manager, having taken over many of the duties of **Birgitta Marke**, who left us early last summer, as previously announced.
- **Henrik Hansson** is back! After three years as a process engineer at Formox, Henrik took time out to work for Perstorp Polyols in Toledo, but has joined our team again as the manager of our new engineering group (mechanical, electrical and instrument).
- **Andreas Wickman** has also joined us as a new process engineer. He has worked as a project manager within R&D at Perstorp and has completed graduate studies in Chemical Engineering at Lund University of Technology.
- **Kim Wong** is our new lab technician. Kim comes from Scandinavian Electronic Systems AB and has also previously worked at Pergo.


Andreas


Kim

All of us at Formox would like to wish all of our customers, suppliers and other readers of ***informally speaking*** a joyful holiday season and a prosperous and peaceful 2009.
This year, we'll be making a donation to Doctors without borders (a.k.a. *Médecins Sans Frontières*) in recognition of the outstanding job they do to alleviate human suffering under difficult conditions (see www.doctorswithoutborders.org).

Seminar news

The upcoming **Formaldehyde Europe 2009** will be special in many ways. It will be the first conference ever hosted by Formox AB. It will be the first ever held in Malmö, Sweden's third largest city (with very easy access to the Copenhagen airport). And it will also be the occasion of the 50th anniversary celebration of the world's first Formox® plant! The dates? May 5-6, with a welcome reception the evening before (May 4th). Please also note that licensees will have the opportunity to attend a 1 ½-day training session, starting in the afternoon on Wednesday the 6th and continuing through Thursday.
So mark your calendar and register early! We would like to remind you that *all* of our customers are welcome to attend!
The same applies to our other forthcoming seminars:

- **Formaldehyde Asia 2010** – the exact time and venue have not yet been decided. There are some rumors that Bali is under consideration…?
- **Formaldehyde Americas 2011** – the time and venue have yet to be decided, but eastern Canada in early May might be a good bet….

Watch our website (www.formox.com) for further details!

informally speaking

The newsletter ***informally speaking*** aims to provide **inform**ation about **form**aldehyde in an **informal** forum and is published twice annually by Formox 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.
Additional copies are available from:

Formox AB
SE-284 80 Perstorp, Sweden
Phone: +46 435 38 000
Fax: +46 435 388 90
E-mail: formox@perstorp.com

Editor: Stan Erisman
Publisher: Marie Grönborg

Perstorp Formox

Layout: Gösta Mårtensson
Printer: Perstorps Tryckeri AB