informally speaking

THE FORMALDEHYDE NEWSLETTER FROM FORMOX autumn/winter 2010

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Coping with hardship

As if the recent (and to some extent still ongoing) recession were not enough, some of our clients have recently had to face earthquakes (e.g. Chile, Indonesia), forest fires (e.g. Russia) and another major tsunami and volcanic eruption (also Indonesia). Fortunately, none of our customers have suffered any major damage. And I'm sure you all found the mining rescue operation in Chile to be a source of inspiration – and a good lesson. Sometimes the best way to cope is to take purposeful action!

This issue of ***informally speaking*** brings you an interesting interview with IKEA, a major consumer of particleboard and MDF whose views should not be ignored. IKEA would like to supply low cost, wood-based products – with zero formaldehyde emissions. Although we know this is currently not viable, we do recognize how important it is that we as an industry act responsibly to meet all legislation and ensure that all people, whether working in our industry or using our products as consumers, are not exposed to harmful formaldehyde levels. It's all about balance – in discussions and in evaluations of safety – and on this theme you'll find an interesting FormaCare update in this issue.

We also present the new Formox plant range for 2011 – the result of major re-engineering efforts designed to offer greater flexibility and performance than ever. In fact, the new Formox range is designed to help you cope with the hardship of minimizing cost in a time when financing can still be difficult.

The forthcoming Formaldehyde Americas 2011 in San Francisco in March is likely to give you a lot of information that will also help you to cope cost-efficiently, and I urge you to attend if you have the possibility.

This issue also takes you on a behind-the-scenes look at what the work of a site supervisor involves – those dedicated guys who see that our plant project get off to the best possible start.

One of the biggest news items – particularly in terms of ***informally speaking*** – is that this is the last issue that Stan will be editing (see his farewell message on the back cover). You can rest assured, however, that we will continue to send out our newsletters and continue to keep you, our customers, informed of new developments and trends that might be of interest and have possible effects on your business.

Have a good read!

Marie Grönborg
General Manager
Formox AB

The IKEA viewpoint

IKEA, the Swedish-based global furniture giant, uses a lot of particleboard and MDF in its furniture – a combined total of some 6 million m^3 every year. That fact alone would be enough to make what IKEA does and how IKEA thinks worth the attention of a lot of board producers, resin producers and formaldehyde producers, i.e. readers of ***informally speaking*** – even though it may represent a position you (and we) do not share. But more than simply consuming a lot of board, IKEA takes a very active role in driving the change towards lower and lower formaldehyde limits in board material – a role that IKEA feels our industry should have taken long ago. During the autumn, this editor had a long chat with **Lars Herrlin,** from IKEA's Supply Chain, a man with more than 20 years in the company and one who is passionately involved in the issues. Here's his story, one you might want to read, and then read again ....


Lars Herrlin

IKEA is widely considered to be a great place to work. Why is that?

"IKEA offers tremendous opportunities for our people to grow and move around. We're a very different kind of company, very down-to-earth, with a flat organization based on networks and nearness, with no barriers."

Has IKEA always been that way?

"Absolutely! Ingvar [Kamprad, the founder of IKEA] practices what he preaches. Even now, at the age of 84, he still visits around 50 IKEA stores a year. For him, that means starting at 6 am in the shipping department, seeing that the truck drivers get their coffee, talking with people, giving advice on little things to improve. Even helping to sweep the floor. He's very informal, no fancy office, and people appreciate that. He's a real role model for all of us!"

Are these kinds of values found at all IKEA stores worldwide?

"IKEA's Swedish corporate culture clearly influences how things are run at all of our stores, but obviously there are some local adaptations. Some of our principles are firm everywhere, however, like zero tolerance for child labor. Our principle for working in other countries, whether for our choice of suppliers, production or retail is 'trade, not aid', which means that we go for long-term benefit.

"But it's important to remember that while the upstream industry is very technology-oriented, IKEA is a retailer, and our perspective is the consumer perspective! This is reflected in our mission ('to create a better everyday life for the many people') and our business idea ('We shall offer a wide range of well-designed, functional home furnishing products at prices so low that as many people as possible will be able to afford them')."

Does IKEA purchase board material directly?

"No, our suppliers – the ones who manufacture the furniture we design and sell – buy board material on their local markets all over the world. But we place high demands on the materials used, so we have become more and more involved with the upstream supply chain."

IKEA has been active in driving the use of low-emission board material in the industry. Why?

"We're seeing a lot of scientific reports, often contradicting each other. There are differences in legislation throughout the world, with a gradual sharpening of limit values. Unfortunately, we're also seeing great differences in the quality assurance processes being used in the industry, and very slow progress in the industry, which we feel is in denial, trying to defend old ways instead of trying to understand the consumer. There are all kinds of test and verification methods being used, and no universal standard.

"IKEA is global. A high percentage of our products are the same wherever you go in the world. We simply cannot justify applying different emission levels on different markets. So therefore we have to set the bar at the world's toughest levels. Since the industry wasn't giving us enough assurance that we could safely do this, we decided back in the early 90s to start working towards the complete elimination of all formaldehyde from all of our products. We see this as the only way we can get the issue off the table, once and for all. This is one of the biggest material/substance issues for IKEA!"

Are you talking about eliminating formaldehyde emissions or even the use of formaldehyde in making the resins, even if it has been reacted?

"As I've said, we see this from the consumer perspective, which means we want to assure minimal exposure of consumers to formaldehyde. As to whether formaldehyde had been used or not, we don't really have an opinion about that.

"But historically we've seen that despite 'guarantees' from the industry that all limit values have been kept, the quality controls in the production processes haven't always delivered the quality we expected, so the natural solution would be to eliminate the problem at the source. However, considering the fact that formaldehyde is basically found everywhere, it would be a bit naive to 'forbid' it in the production processes."

Is total elimination even possible?

"Not yet. We are realistic, and we understand that it has to be done in steps. We have to be certain that quality and health are secured – IKEA requires its suppliers to have good working conditions. So we don't want to force a replacement with something that would make a worse working environment. We also realize that we can't demand things that cannot be produced cost-effectively and with good quality. "We're not there yet, but we're getting there. Already in the '80s, we went from E2 to E1 in all of our products. But it wasn't enough."

Why not?

"Back in 1992, there were suddenly a lot of headlines claiming that our popular 'Billy' bookcases were bringing cancer and allergies into

people's homes. The source was supposed to be the formaldehyde in the varnish system we were using at the time. We realized that the facts were taken out of context, that it was sensationalist reporting. But that's not the point. Even if it had been blatantly untrue, it had a huge impact on our customers, the consumers. Our sales in Germany dropped by 25% in one week!

"That is our reality. We can't explain the complex technical information behind it. Consumers aren't interested. They just won't buy.

"So as a result, we've eliminated all formaldehyde from our varnish systems, and now we're working towards that for board as well – bearing in mind that we have to do this in steps."

What's the next step in terms of your board supply?

"I should point out that we don't believe that E1 poses any real hazard to the consumer. But what does that matter if consumers are still anxious? So our policy is simply not to handle hazardous substances! So although we didn't regard E1 as hazardous, we decided in 2008 to lower our global demands on board to E½. Perhaps the next step is E1/3? Then if we solve that, we'll take it a step further, and so on.

"We've been in touch with all the big resin manufacturers, asking if they want to be part of this search. We've also looked at some soya-based production in the US, but today there is no viable global technology for formaldehyde-free [systems]. We've looked at E1/3 but right now capacity and cost are still two big issues. But we're working on it."

Are you working on it yourselves?!

"Yes, in fact we've got three particle board mills of our own in our industrial group Swedspan, producing full scale (over 1 million m3) E1/3, in order to better understand how it might be done on the E1/3 level.

We're still on the edge when it comes to cost, but we're getting closer and closer to cost and capacity neutrality. In the final product, we measure both content and emission, with QA in accordance with the toughest European and California standards, with 3rd-party verification. The maximum formaldehyde contents are 4.0 mg in particleboard and 5.0 mg in MDF."

Aren't some of the limit values being talked about today pretty absurd?

"One might think so. We can see no reason to go below the levels of natural wood, but here's the thing: We don't decide – the consumer does, and consumer opinion drives the legislation.

"For solid wood lamination and veneers, we've replaced the formaldehyde in all the glues we use, so our suppliers are now using PVAC, hot-melt and EPI. Is this better? For the consumer it is, and that's what we have to consider. We wouldn't go out and recommend specific resin systems, but again, we don't decide!

"But it's not a done deal yet ...."

Why? Are there any new trends?

"In recent months we've been seeing a noticeable reduction in the number of questions consumers have been asking about formaldehyde. It's becoming a much smaller issue."

How about among board manufacturers?

"It's a question of attitude. We're pleased with the progress the board industry has been making lately, and grateful for the close cooperation we've had with many major European glue and board suppliers. We don't know how long the process will take, and we're learning more every day.

"We do feel that if we're able to produce E1/3 in our own industrial group (Swedspan), then surely the big board manufacturers must be able to do as well or better – after all, it's their main business!"

Does IKEA intend to provide factual information about formaldehyde to consumers?

"No. That's not how we communicate. Our message is that 'You can feel perfectly safe with our products.' Consumers should be able to feel that the IKEA name is an assurance of safety."

What is IKEA's view of the efforts of FormaCare to assure that the debate is based on science, not emotion?

"We absolutely agree, in principle. And it would be extremely valuable if scientists were in agreement. But as long as there's disagreement, there are problems. The questions we get from consumers are on all levels – emotional and scientific – and as long as the industry cannot guarantee problem-free materials, we just want to get rid of formaldehyde."

What does IKEA feel the board industry should be doing?

"A lot of the problem arose because the industry had poor QA and didn't do enough on its own to help reduce emissions. We understand that a company has to be profitable, but sometimes that's not enough. I mean, how are we supposed to defend ourselves if a child's bed turns out to have twice the emission levels?!

"We wish there were the same test methods being used throughout the world, but that is not the case today. With different methods and different QA routines, there are going to be unacceptable differences. Many in the wood and board industry are very far from the consumer. They keep discussing the technical side, and that doesn't work. What we really want is that the industry would just give us a board with no formaldehyde emissions. We don't want to have to talk about test methods and get a lot of explanations. Just solve the problem!"

Photos courtesy of IKEA.

The annual IKEA catalogue is read by millions of customers worldwide. In Sweden, many people are known to have a sign on their mailboxes saying "No ads, please – except the IKEA catalogue!"

FACTS ABOUT IKEA (2010)

- Total sales: € 23.1 billion
- Number of stores: 317
- Number of countries: Operations in 41 countries (retail, distribution, trading and industrial group)

FormaCare update

"With France's submission of a re-classification proposal at the end of September, we've now entered a process that will be decisive for the future of the formaldehyde-based industry in Europe," declares FormaCare Chairman Lars-Erik Johansson. And his strong words of caution turn out to be well founded ....

"Back in 2005, FormaCare was very concerned about a new classification proposal by France suggesting stricter hazard categories for formaldehyde," says Lars-Erik. "Our group was still young, just beginning to set priorities and create efficient working structures.

"But thanks to our clear focus on the need for new research into formaldehyde's effects on humans, in combination with our firm commitment to the safety of workers and consumers, we were able to avoid an unbalanced and unwarranted classification. The keys to this success have been the strength of our scientific case and our ability to communicate this to decision-makers at all levels.

"There is one more important difference when it comes to meeting the new challenge: FormaCare has grown and gathered valuable knowledge, resources and experience. We can now build on years of transparent and cooperative science-based exchange, which prepares us to handle the challenge in the best way. Moreover, new scientific work is in progress, closing gaps in knowledge and adding to the weight of evidence.

"It will now be our task to steer through the next months with prudence, precision and a positive spirit. In doing so, we invite the support and commitment of all formaldehyde producers!"

Other noteworthy news from FormaCare

- The new French proposal for harmonized classification and labeling is being subjected to a "conformity check" by ECHA. If the dossier fulfills all requirements, concerned parties (e.g. industry, member states, the general public and stakeholders) will then have the opportunity to comment on the proposal, before ECHA's Committee for Risk Assessment (RAC) review it, probably in late 2010 or early 2011. From a scientific perspective, it's essential to look at two aspects: evidence of nasopharyngeal cancer (NPC) and evidence of a causal association of formaldehyde with leukemia. (In October 2009, IARC concluded that sufficient evidence is available for both types of cancer in humans.) During this time, FormaCare will engage with public authorities throughout the 27 EU member states. Finally, the Risk Assessment Committee [ECHA] will make their recommendation on the classification of formaldehyde to the European Commission.
- Following high-level meetings with representatives of the European Commission during Q2, FormaCare has been continuing exchanges with further relevant players, e.g. the Directorate General Enterprise and Industry's Chemicals unit, about the reclassification and labeling of formaldehyde. FormaCare continues to reiterate demands that all facts are looked at in a balanced way, to assure careful evaluation of all available data and evidence without bias and without premature conclusions.
- As expected, the World Health Organization (WHO) confirmed the current values for formaldehyde of 0.08 ppm = 80 ppb. This will be published in WHO's indoor air quality guidelines for selected pollutants (chemicals). Against the background of IARC's review of formaldehyde this is an important step which can be seen as a source of hope – that we are perhaps not alone in our efforts to promote independent scientific research and to promote balanced evaluations on the safety of formaldehyde in indoor air environment. WHO guidelines consider various levels of economic development, cover all relevant population groups and enable feasible approaches to reduce health risks from exposure to the pollutants in various regions of the world. Existing national and international guidelines, experience in regulating indoor air quality and results of international reviews supported the discussion and its conclusions. Now WHO's stance on classification and labeling will also be crucial ....
- Once all results of the current inhalation study with human volunteers are available – presumably within the next few months – a new evaluation will be made by the Scientific Committee on Occupational Exposure Limits (SCOEL). This could lead to the establishment of new Occupational Exposure Limit Values (OELVs)

ACC's Formaldehyde Panel – new US group to support HCHO industry

In an effort to strengthen product-specific advocacy and increase industry engagement, the American Chemistry Council (ACC), a group that represents the leading companies in the chemistry business, has launched a self-funded product group to support the needs of the formaldehyde industry.

"Our self-funded groups, such as Formaldehyde Panel, provide the entire product value-stream a stronger and more effective voice," says David Fischer, senior director in ACC's Chemical Products and Technology Divisions. "Our industry continues to face unprecedented challenges, and our collective voice helps protect the vitality of the product marketplace," he adds.

Two separate government bodies – the National Toxicology Panel and EPA (Environmental Protection Agency) – are expected to make public health assessments about formaldehyde in the next year. The National Academy of Sciences is also expected to release a study that will have an impact on the industry. The Formaldehyde Panel will work with regulators to make sure all of their findings are based on sound science.

The new Formaldehyde Panel represents North American producers, users and suppliers of formaldehyde, as well as trade associations. Those interested in joining the panel should contact David_Fischer@americanchemistry.com.

NOTE! A representative from the ACC will be making a presentation of the activities of the Formaldehyde Panel at the Formaldehyde Americas 2011 conference in San Francisco in March!

What about FCI?

Has the ACC's Formaldehyde Panel taken over the role of FCI as the North American counterpart to FormaCare? If so, what will be the role of FCI in the future? Does FCI even still exist?

These questions will probably occur to readers of ***informally speaking***, as both FormaCare and FCI have been mentioned in more or less the same breath (or articles) since the organizations came into being some years ago.

The problem is, nobody seems to have the answers. Or nobody is saying. An educated guess is that FCI's role is being transferred to ACC. FormaCare now refers to the ACC Formaldehyde Panel as its North American counterpart. And nothing has been posted on the FCI website since June. Perhaps the answers will be revealed in time ...?

either indicative or binding – at the workplace. SCOEL was set up by the Commission Decision (95/320/EC) with the mandate to advise the European Commission on occupational exposure limits for chemicals at the workplace. SCOEL fulfils this task by preparing scientific recommendations for the Commission. Those recommendations are used to underpin regulatory proposals on OELVs for chemicals at the workplace. During this procedure, draft recommendations from SCOEL undergo a stakeholder consultation to allow interested parties to submit health-based scientific comments and further data. All SCOEL members act as independent scientific experts, not as representatives of their national governments.

- FormaCare has established a new Epidemiology Subgroup to supervise new studies on NPC, leukemia and blood cell counts. The first project, starting in January, will be a re-analysis of the NCI study in coordination with the scientific experts in the US. The study, to determine disposition and pharmacokinetics of rodents after exposure, will be conducted in the US.

Global methanol market update

by Sharon de Gannes

During 2010 we have seen the global methanol industry return to a period of strong demand growth after the significant downturn during late 2008 and early 2009. During 2009, the impact of the financial crisis on the methanol market was apparent – global demand was down ~15% year-over-year, and spot prices bottomed out at ~US$150-170/MT levels. However, by the end of 2009, global methanol demand had recovered to 2008 pre-recession levels, driven mainly by the quick recovery seen in Asia Pacific and China, and spot prices had climbed back up to the US$ 300-320 /MT range.

During 2010, demand has continued its steady growth and is projected to reach ~ 45 MMT for the year, an increase of ~15% over 2009. Demand growth continues to be led by Asia (mainly China), and growth has been seen in both traditional (chemical) demand and energy applications as the higher energy price environment has endured during 2010. Demand in Europe, North America and Latin America have also shown steady improvement since the first half of 2009.

Energy-related methanol demand, which remained flat during the financial crisis, continues to grow from strength to strength. With the continued high economic incentive to blend methanol into gasoline in China, the increasing growth of passenger vehicles in China, and the implementation of supporting standards and regulation in China, demand growth for methanol into fuel blending looks promising. The China DME industry is also on track for incremental growth year-over-year as LPG demand and prices remain robust. In addition, there are new DME projects being progressed outside of China, including plants in Egypt and Indonesia.

On the supply side, there have been capacity additions both inside and outside of China during 2010. The four new plants outside of China starting up during 2010 include Methanex Egypt (1.3 MMT), MGC Brunei (0.9 MMT), Salalah Oman (1 MMT) and Metor 2 Venezuela (0.9 MMT). These plants are adding the much needed additional production capacity required to meet rapidly growing global methanol demand. While this new capacity has added additional methanol supply, the rapid growth of demand has also required additional production from China capacity and thus there has been a noticeable increase in operating rates from these units over the course of the year.

Sharon de Gannes – Manager, Marketing Planning, Methanex Corporation

During 2010, methanol industry pricing has experienced some degree of volatility as global supply has experienced periods of high operation and periods of lower operation due to planned and unplanned outages, and feedstock restrictions. As we head into the final months of 2010, global inventories are low and global supply is challenged to meet increasing global demand. This has led to a firmer price environment and the requirement for increased supply from high cost methanol production units to balance the global market.

2011 looks set to be another interesting year for the industry. Demand remains strong and very little additional capacity is coming on-stream ex-China. Methanex's Medicine Hat [Canada] plant is the only new capacity announced and likely for start-up during 2011. Thus, increased global demand for next year will need to be met by new production starting inside of China and increased operating rates from other plants outside of China.

Methanex Egypt plant, September 2010

Photos courtesy of Methanex Corporation

The future of formaldehyde – shock or no shock?

By Bob Crichton

An Arab proverb sees the future as "… a sponge to wipe away the past; a rose to sweeten the present; a kiss to greet the future." Eric Hoffer, a self-educated American social writer and philospher, has perhaps a more suitable parable to introduce this article: "A preoccupation with the future not only prevents us from seeing the present as it is, but often prompts us to rearrange the past."

Hindsight, to put it another way, is a wonderful thing. And this was much in evidence at the Formox conferences in Bangkok (2007) and Toronto (2008), when my presentations featured more than a little *mea culpa*. Fig. 1 is an updated version of the data presented on those occasions. The key error was the failure to pick up on increased Chinese demand – mainly for wood panels, a topic touched upon in the last issue of ***informally speaking***. And as Fig 1. shows, a tendency to understate the rate of growth and hence consumption was a common feature of early forecasts. The question now is: Are we still understating, or, in the light of recent events, overstating?

As there is a strong link between formaldehyde demand and GDP/capita, it is not unreasonable to expect consumption to increase when GDP growth returns. And the view expressed at Formaldehyde Asia 2010 was that the 2007 peak would be recovered by 2011 before increasing to 50 (+/-5) million MTPA by 2020 (+/-1 year). However, given that economic recovery is looking increasingly fragile, it may be Q3/4 2011 before we regain that peak. But eventually formaldehyde usage should rise from the low values seen recently and return to the rising path shown in Fig 1 – upwards and onwards.

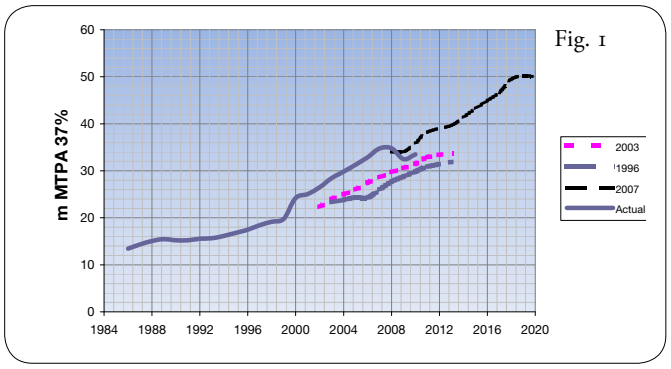


Fig. 1

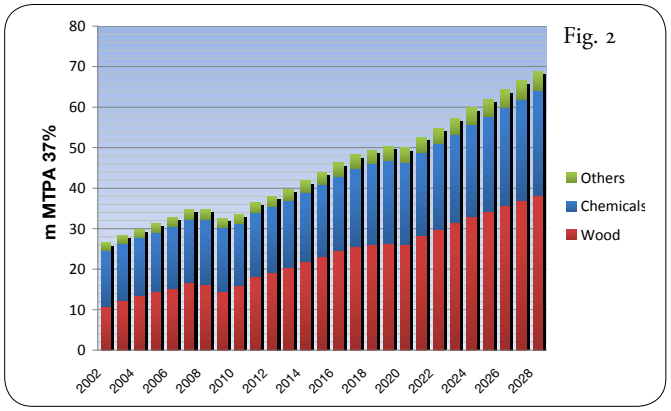


Fig. 2

The reasoning was set out in the last issue ("Behind the smoke and mirrors"). In brief, the argument is that the factors driving formaldehyde are the same as ever. Wood panels substitute for "real" wood; formaldehyde-derived plastics meet the demand for better-performing products. And globalisation has spread this new generation of materials into new markets; panel products in particular have benefited from the way IKEA has changed lifestyles around the world, taking wood into markets where it was not a traditional material. As a result, formaldehyde derivatives are now well established on the world scene; for the most part there is no viable alternative, hence the wood and chemical industries will continue to need formaldehyde; so, more of the same – no future shock?

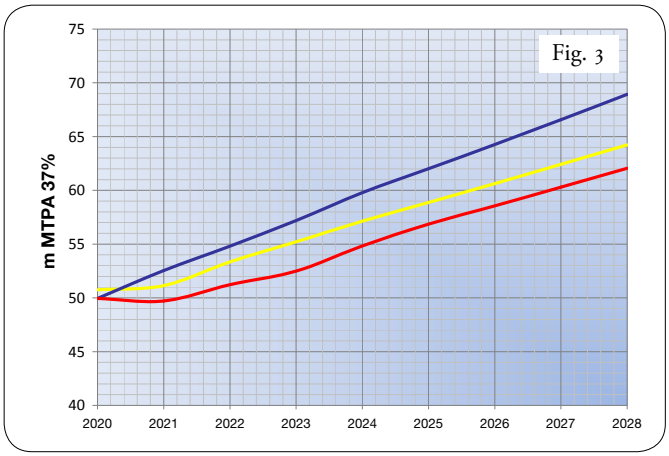
Over the next ten years or so this logic will probably still hold good; but whether it can be sustained in the longer term is another question. If we extend the above reasoning beyond 2020, the consumption pattern is as shown in Fig 2. Though a recession is shown around 2018, this may be premature; all we can say with certainty (unless economists learn how to control human nature) is that it will happen sometime in the next 20 years! Figure 2 also shows another 18 million MTPA over the 10-year period between 2018 and 2028. On its own, this is not excessive compared with what we have seen in the recent past; but is it realistic, especially as the underlying data indicate that over 65% of the growth is in China and is heavily weighted towards the wood sector?

What drives the Fig 2 forecast beyond 2020 is the assumption that GDP/capita in China will continue to grow and that panel usage will increase in tandem – to approach the regional norm. And while it is true that the balance of global economic power is moving east, regaining ground lost over the past 300 years, eventually the rate of growth in China and other developing economies will slow as markets mature. Also, there is a doubt regarding access to timber. Though reforestation is proceeding rapidly, China will remain heavily reliant on others to meet the demand. Some of its requirements could be met by panel imports from countries with better access to wood; but as deforestation is a hot isssue, this cannot be guaranteed.

But maturing economies and a scarcity of wood are not the only uncertainties; fashions can change; laminate flooring, which has underpinned formaldehyde's growth in the panel sector, may become outmoded; even the IKEA generation(s) might move on to something else. And given that there are, as yet, very few new applications for formaldehyde, a loss in one area cannot be offset by growth in another. We can also expect continuing pressure on energy prices; this will inevitably impact on methanol, and formaldehyde derivatives will become relatively more expensive. There is also the endgame – formaldehyde becoming increasingly unacceptable.

While I do not subscribe to the doomsday scenario, there is enough uncertainty around to suggest caution when advancing the forecast beyond 2020. And the effect of several different assumptions is shown in Fig 3. The upper line is taken from Fig 2 – GDP/capita continuing to grow at post-2000 rates. The yellow line takes a less optimistic view of GDP growth, while the red line shows the effect of a maturing panel market. What will actually happen is anyone's guess, but given the tendency of this author to understate, maybe the upper line is the best bet – but perhaps not!

Maybe you should heed another Arab proverb: "He who predicts the future lies, even if he tells the truth."



On the conference trail

Right:
In September, Formox GM **Marie Grönborg** gave a presentation about Formox technology at a conference hosted by Hende Machinery and Equipment in Hangzhou, China.

Below from left:
Ronnie Ljungbäck addressed the China National Formaldehyde Producers Association in Ningbo in late October.

Eric Li, the Formox Commercial Manager in Beijing, assisted both Marie and Ronnie in their presentations.

Ola Erlandsson talked to the delegates at the 2010 CMAI World Methanol Conference in Barcelona in November.

New refresher training opportunity

If you operate a Formox plant, here's an opportunity to join a special refresher training course! If enough people sign up, the course will be held in Sweden during **the week commencing 4 April 2011,** covering subjects like process review, safety, absorber operation, trouble-shooting etc. The target group includes experienced operators and other key personnel who may need to refresh their skills, as well as any new operators who may have joined the staff since the initial start-up training.

Would anyone from your company like to participate? Then please contact your Formox representative without delay! **Note!** Please also let us know if there is a particular topic you want us to include in the program!

Consistent catalyst quality

by Ronnie Ljungbäck

One of the fundamental features of a quality product is that when you buy it the second time, it should be no different from the first time. Consistency is in fact one of the keys to success for any supplier, since the customer needs to be able to rely on getting the same thing every time.

For Formox it is essential to know that the products we deliver – whether plants or catalysts – are top quality, safe, consistent within tolerable limits, and do not fail. This is why customers keep coming back for more. An added benefit, of course, is the high level of technical support we offer for plants and catalyst alike.

It starts with spent

As you probably know, all Formox catalyst is manufactured batch-wise in Perstorp, Sweden. Production starts with the sorting of the spent catalyst and recovery of the dry iron-molybdenum catalyst material. (See article in ***informally speaking*** 2004 autumn/winter edition for more details) This is a critical step, since any foreign material or other types of catalyst might cause major problems unless identified and handled properly. Over the years, we have fortunately established good procedures and we have dedicated production people, so we can avoid such problems.

The next step is to separate the ceramic rings in one fraction and the molybdenum in another. The pure molybdenum is isolated in a clear solution, which is then used together with a portion of virgin molybdenum solution in the next step. Iron-salts are added and react with the molybdenum solution under fixed conditions to obtain a yellowish-green iron-molybdenum precipitate.

The main issue with the raw materials is to assure adequate purity, since different impurities and non-conforming quality can cause changes in selectivity and activity of the catalyst – which could mean lower yield and higher (or lower) methanol in product.

Improvement without compromise

Apart from raw material purity, we need good control, e.g. of temperatures, pH and molybdenum concentration. And we are constantly finding ways to improve. Until the late 90s, for example, we saw that our process water was varying in quality over time, which also influenced the properties of the manufactured catalyst. In order to address this, we had to install appropriate water treatment equipment and then we eliminated the problem.

During the past 3–4 years, we've also learned more about the interactions of the different raw-material properties and have improved our dosing control.

We don't compromise on the quality of the catalyst – in spite of variations (within certain limits) in raw materials. How is this possible? Because we have developed the techniques and built up the experience to handle these variations, and adjust our production parameters accordingly.

From drying to testing

The next steps in the process involve drying the precipitate, crushing it into powder, mixing in some additives, and tablettizing the powder into catalyst pellets (rings). The accuracy of the additive mixing and the punching power of the tablettizing machine play a big role in determining the properties of the end-product. But there is a paradox: the more compact the catalyst pellet is, the higher the crushing-strength – but then the selectivity (yield) will be lower. And we all want both to be high! You've probably correctly guessed that we're working on it.

The following step is the activation (heat-treatment; calcination) of the catalyst, which of course also influences activity and selectivity. This is followed by the final screening, before the product is ready for final inspection.

Why consistency?

There are many reasons why it is so important to get a consistent, high-quality product. For example, when we sell the same type of CAP (catalyst activity profile) repeatedly to one or more customers, the catalyst performance should be the same every time. Uniformity of catalyst enables uniformity of operation – the same high yield, the same pressure drop, the same MeOH in product. Just because one batch of catalyst is produced at a different time from another, there must not be any significant variations in size, activity or any of the other parameters that determine the overall performance.

When we design new loading plans, we need to have models of the catalyst properties that match the products we are selling, since the simulations of new CAPs are based on these values. Consistent values enable us to achieve closer to the same results in pilot- and full-scale testing that we get in our simulations.

In our final testing, we analyze a number of key catalyst properties: conversion, yield, losses, density, surface area and crushing strength, to mention a few.

Essential interaction

The close cooperation between our R&D and production departments has resulted in more ideas for improvements and changes in both departments. After all, producing 50 g of catalyst is completely different from producing 50 tons! This is where valuable information and experience from our production people is very important in our R&D work, and it also enables new catalyst formulations to be scaled up much more quickly.

There is also a great deal of interaction between our catalyst development, our process development, plant design and technical support. Our unique combination of experience as a supplier of every aspect of formaldehyde technology contributes a great deal in turning theory into consistently good practice – and consistent catalyst quality.

More to come

Despite thinking that we should know all there is to know about the manufacturing of catalyst (which we've been doing for more than 50 years), we still can and must learn even more and improve further. Our total experience, knowledge and working methods are, of course, increasing and improving all the time. Working towards improved and consistent quality means learning from the past and present, applying the knowledge we gain each day to all that we do in the future.

Mo prices? Fairly stable…

As reported in the previous edition of ***informally speaking***, the Mo price was quite stable in the end of 2009 and had increased up to US$ 17/lb until beginning of April. Since then, the price has fallen back slightly and has hovered around US$ 15/lb since June.

It seems that the analysts were a bit mistaken – having predicted that the price would reach somewhere between US$ 20–24/lb by the end of 2010. (They had also predicted a further slow increase during 2011, up to around US$ 28/lb.) This predicted increase in molybdenum price would be very much related to expected higher production demand for stainless steel and alloy steel.

Of course, no one can tell for sure what lies in the future, but what you can rely on is that Formox will keep reasonably stable net prices, thanks to you returning spent catalyst and thanks also to our efficient catalyst recycling system!

CAP 2.0 update

also by Ronnie Ljungbäck

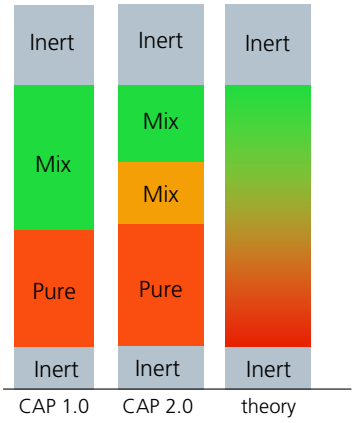
The CAP 2.0 concept was launched in Malmö in May 2009 at a time when most formaldehyde producers were running at low rates due to the recession. Had the economy been better, we probably would have seen more users of CAP 2.0 by now, but in spite of the slow economic rebound in many parts of the world, the number of CAP 2.0 users is increasing all the time. And most of them are very happy. Why? Read on and you will be enlightened!

The CAP 2.0 is a further development of the CAP (catalyst activity profile) concept successfully launched in 2003. In CAP 2.0 we have introduced more layers with different activities in order to be able to better control the reaction rates and the reaction temperatures in the catalyst, compared to the old CAP.

The anticipated benefits from this new concept were thought to include more even hotspot temperatures and a slower pressure drop development. An improvement in yield and a longer lifetime were also expected achievements of this development. Depending on the plant design, there were hopes that an initial lower start-up pressure drop might be possible to achieve, a possible result of shortening the total loading height. Thanks to the better control of the reaction rates, it seemed like it should be possible to operate at higher inlets.

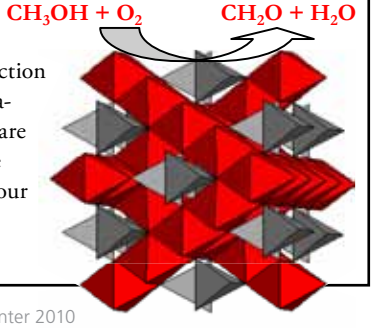
In practice?

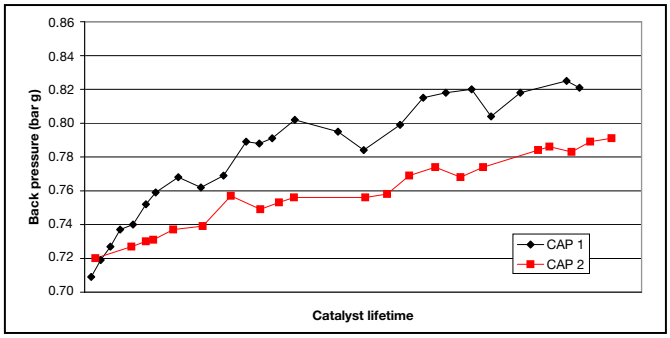
The drawing here shows how CAP 2.0 takes us a further significant step towards the theoretical ideal in which mixed and pure are not in layers at all, but a continuum. But CAP 2.0 is a reality today, and the results so far are excellent. So why are we striving for CAP 3.0? Because we still have a way to go to that theory....



Promising new metal-oxide catalyst in the pipeline

A new type of metal oxide catalyst, with a spinel-type structure, has been developed by Formox (patent pending). A true spinel is a naturally occurring oxide mineral (formula $MgAl_2O_4$). Catalysts with this structure have now been developed by Formox, but instead of magnesium and aluminum, we're using different elements, e.g. iron, molybdenum and/or vanadium, which gives the structure very interesting catalytic properties in methanol oxidation for producing formaldehyde: high structural stability during the reaction and a low degree of volatilization. Although these results are promising, we are still in the early stages investigation in our research laboratory.
Stay tuned ....





The points above were our main arguments when launching the CAP 2.0 in 2009. So how did we come out in the real world? Well, at the present time, we have about 20 customers using CAP 2.0 in some 25 reactors. The results we can see so far are very good!

The pressure drop development is slower and the yield is better or the same as before, which means savings and improved operational economy. These things together give an overall better lifetime performance. In addition, the hotspot temperatures are lower and more evenly distributed, which should promote a longer lifetime of the catalyst. As I noted above, for the past couple of years, most plants have been operating at a slower rate, and therefore we do not have too much evidence about longer lifetime – yet. Quite simply, too few loads have been terminated at this point in time. Due to the lower worldwide demand, there has not been much incitement to push the inlets harder, so this still remains to be proven.

The graph shows a comparison between CAP and CAP 2.0 from one of Perstorp's Formox plants in Sweden, and thanks to the slower pressure drop development, thousands of euros have been saved.

Further development?

We are continuously working on improving our products, and CAP 2.0 is no exception. Next year you will see an improved version of CAP 2.0 and perhaps also the next generation – CAP 3.0? To give you a hint what this will be about, let us say that the CAP 2.0 upgrade enhances the yield, and the new generation CAP 3.0 will push the limits of your formaldehyde plants even further. But you'll be hearing more about this in 2011!

New ECS catalyst

Formox is developing a new ECS catalyst that will give Formox customers even better opportunities to increase capacities and push the limits of their plants. The interest in the new ECS catalyst is mainly related to two things:

1. It is desirable to be able to operate with a higher delta temperature, but without exceeding the maximum allowable temperature in the ECS reactor. This means that the inlet temperature to the ECS needs to be allowed to go lower than with the present ECS catalyst.
2. When increasing plant capacity, it is desirable to not be limited by the CO content, which is the case with the present platinum-containing ECS catalyst. By using another noble metal, such as palladium, this can be avoided.

We have made several lab-scale and pilot-plant tests, in order to be able to find and produce the right product composition.

We are happy to report that already in mid-2010 we were able to send the first batch of palladium-containing catalyst to one of our customers, and it's running well so far.

We're still fine-tuning the composition of the catalyst, but we count on being able to supply this new ECS catalyst to the market during 2011.

The 2011 plant range

– more, better, cheaper? by Fredrik Rietz

At the Formaldehyde Asia 2010 in Bali in March, Lars Andersson gave a few hints on a number of process improvements planned for 2011. This article reveals a bit more, but for the full story you will need to attend Formaldehyde Americas 2011 in San Francisco in March….

In the recent past, process development has concentrated on two aspects of the design:

- Higher productivity
- Operating flexibility

These topics, and the role played by catalyst development, have been spelled out many times in these pages.

However, the inherent flexibility of the modern Formox process can also be utilized at the design stage. And as explained in the last issue of ***informally speaking*** (and set out at the Bali conference), this change in thinking was incorporated into design procedures earlier this year. But in parallel with this change, we embarked on an intensive critical examination of the process; the aim was a new design for 2011.

This review investigated and re-evaluated many different aspects of the process. The exercise, a joint venture between the Formox process, project and engineering groups, was recently concluded and, as hinted in the Bali presentation, it came up with a lot of good ideas – some of which will have to wait until 2012!

Better capacity coverage

The first issue the study addressed was capacity; the aim was reactor sizes that could seamlessly cover a wider range, and it was achieved by slightly adjusting reactor sizes. This, plus the inherent flexibility of the Formox process and the ability to use different CAPs, will allow the 2011 plant range to span a wide range of capacities with relatively few designs (Fig 1).

Process guarantees will also change; these will relate to the operating rate rather than, as previously, the nominal capacity. In some cases (see examples later) this will result in even better process guarantees.

Blowers & turbos

Blowers were also a key issue. Over the years, the setup has changed many times; as a result, we have a great deal of experience of how different types of machines perform in a given situation. For recirculation we have used high-speed centrifugal fans, Roots blowers and two-stage fans; we have pressurized with both fans and Roots blowers. More recently, we have tended to use centrifugal two-stage radial fans for recirculation, coupled with a Roots blower for pressurization (in order to achieve 0.5 barg).

This combination is well-suited to speed control and gives lower specific power consumption. It will work over a very wide operating range, which gives the plant excellent operational flexibility. However, machines of this type can be relatively costly and may not be economical in all cases. For example, Roots-type machines are available "off the shelf", especially for smaller plants, and can be a more economical long-term proposition – though much depends on your local power cost.

Another way of reducing power consumption is to use the process steam either directly, by driving the blower with a turbine, or indirectly, via a turbo-generator. In certain cases a turbo-charger (see box) may also be a possibility. However, advanced solutions of this type are not cheap, and whether or not it makes sense to invest in them depends critically on local power costs and steam values. Hence, as in previous designs, heat and energy recovery remain an option; these will tend to be adopted only in premium versions (see below) where operating economy and flexibility are paramount.

Flexibility in action

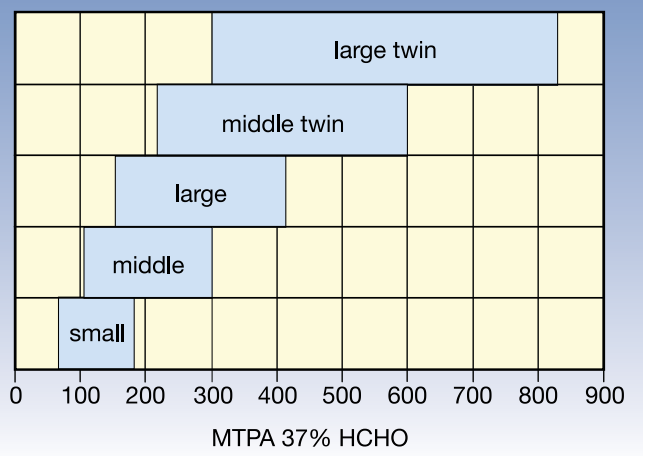
To illustrate flexibility in action, the table shows how we might meet a capacity requirement for let's say 300 MTPD (37 wt% formaldehyde) basis – with and without expansion capability.

For the 2011 design (approx 24 kg/tube per day), the required 300

300 MTPD case →	1A	1B	1C	2A	2B	2C
Version	Single-stream, standard steam	Twin-stream, one reactor deferred	Full heat recovery	Single-stream, standard steam		Full heat recovery
Methanol inlet, vol %	10	10	10	8.5	10	10
Steam pressure, barg	0.5	0.5	0.5	0.3	0.1	0.1
Average yield, mole %	92–92.5	92–92.5	92–92.5	92.5–93	92.5–93	92.5–93
Power cons., kWh/MT	57–70	57–70	25–35	57–70	45–60	20–30
Run time, months*	5–7	5–7	5–7	10–12	10–12	10–12
Maximum rate, MTPD	300	300 (600 Twin)	300	420	420	420

*NOTE! This assumes that the catalyst is reloaded at the end of its economical lifetime. (The technical lifetime will be longer.)

Figure 1 – reactor sizes



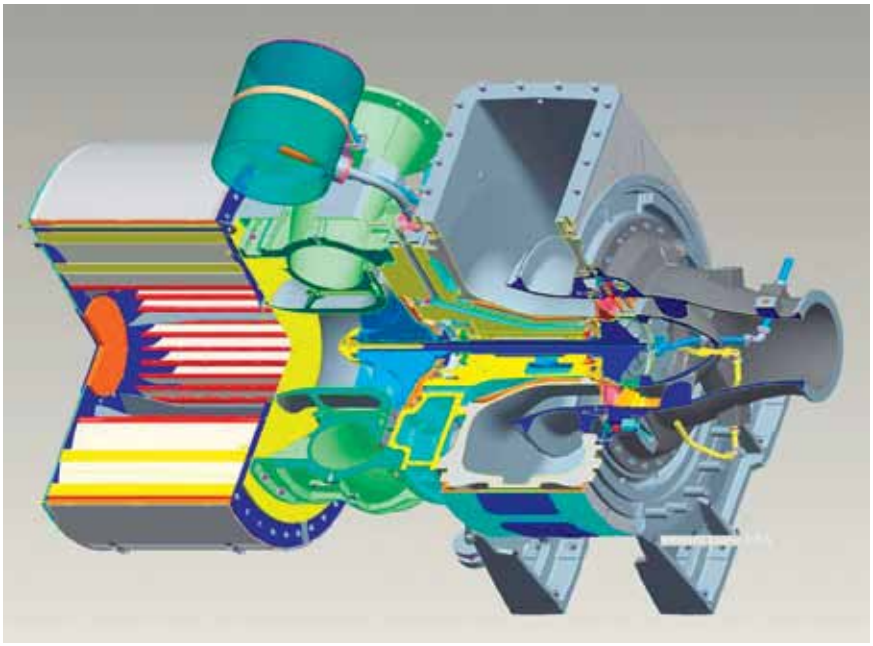
MTPD can be achieved with a 12,500-tube reactor. The standard plant (Case 1A) would have a power consumption (IBL) of 60 - 70 kWh/MT, but the time between catalyst changes would be rather short – in the range 5 to 7 months*. Furthermore, the reactor would be operating at the limit with almost no spare capacity. The only expansion possibility for this case would be to upgrade with a dual reactor at a later stage.

Alternatively, an expandable design (Case 1B) – a twin reactor stream design with a common absorber and ECS system, but with one reactor stream deferred – could be used. However, this would generally only be economical if there were seen to be a need for additional capacity within 5 years.

Case 1C shows what would happen to Case 1A if full use was made of the steam and energy recovery options; the result is a very low power consumption figure.

Relaxing the tube loading means a 17,400-tube reactor is required; either (Case 2A) at 0.3 barg and with 8.5% methanol, or alternatively (Case 2B) at 0.1 barg and with 10% methanol. Both would achieve around 10 to 12 months [*see footnote on previous page] between catalyst changes at 300 MTPD capacity. But with Case 2A showing the lower power consumption, it is likely to be the preferred option. The long-term benefit of both cases is the ability to operate at 420 MTPD, should it be required.

Case 2C shows the impact of using full energy recovery – as with Case 1 the effect is pronounced.



As can be seen, Cases 1A and 2A show very similar performance – the significant difference is the time between catalyst changes. Which of the various cases is best for a given situation – your situation – very much depends on your local conditions; in particular the value you place on steam and energy, expectations for the future and, of course, the cost of capital!

In addition to the equipment details, other aspects of the design were reviewed. The overall aim was to reduce the cost of ownership. Some of the resulting modifications, such as a change in the required cooling water pressure, are minor; yet others, such as simplifying and reconfiguring the absorber into one vessel rather than two, are probably better described as major. The latter not only changes the visual aspect but, more importantly, results in a considerably smaller footprint – without compromising performance or accessibility.

The best-for-everyone approach

The 2011 range came about following a review of the market; this indicated a need for more choice – a broader capacity span and a wider range of performance options. We also learned that we had to recognize that investment criteria varied widely from company to company.

Everyone wants low cost, of course, but sometimes the focus is on the short term: lower capital cost. Others have a different perspective and place equal or more emphasis on achieving low operating cost in the longer term. And this is equally valid given the continuing pressure on energy and raw material costs. Hence the Formox plant range is not only available in a standard set-up, where the focus is on capital and the plant is run at very high utilization rate, but also as a premium version.

The standard plant would normally be the smallest plant able give the desired capacity. There would still be good performance, by historical standards, but no additional investments to enhance performance.

Turbocharger update

A turbocharger in a formaldehyde plant works on the same principle as a turbo in a car. Hot exhaust gases are expanded through a turbine that is connected to a compressor feeding the fresh air to the process. Using a turbocharger means that you can pressurize your plant without any increase in power costs. Instead you are using the pressure inside the plant and the heat generated in the catalytic incinerator (ECS) to pressurize your plant. The plant is started using the recirculation blowers only before the reaction gets going and the turbocharger starts to work. The application of a turbocharger in a formaldehyde plant is patented by Formox AB.

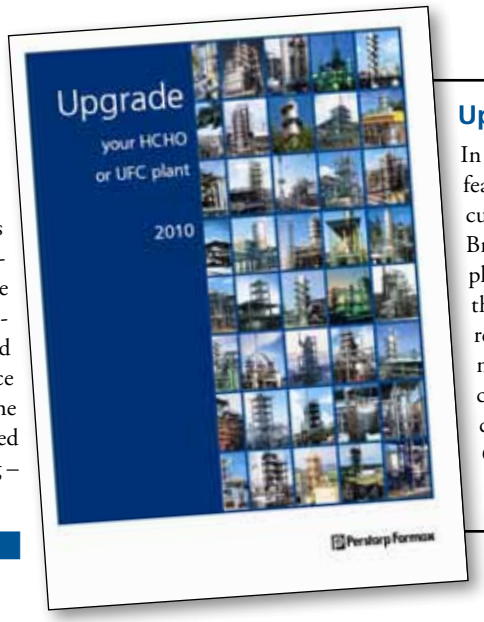
A turbocharger option is available for the 2011 range. As explained previously in ***informally speaking,*** the turbocharger can be used to recover energy from the stack gas, thereby reducing power consumption. As the exhaust turbine is directly coupled to a compressor, the turbocharger takes the place of the pressurization blower. An additional benefit is that most of the thermal energy is preserved and heat recovery options can still be used. In the longer term, it offers the possibility of economical operation at even higher pressures – and hence even higher productivity.

Improved absorber design

Formox is constantly working to improve plant designs in order to enable more, better and cheaper formaldehyde. For the 2011 range, the single most visible change is that the absorber system has now been combined into a single vessel. But the design inside the shell has also been improved. In cooperation with leading equipment vendors, Formox has reevaluated the design and by placing more efficient cooling higher up in the tower, we have been able to improve absorber performance further. This also increases the liquid flow on the trays, which allows replacement of the old bubble-cap tray design with valve trays (see photo above). Replacing the bubble-caps gives significant savings on absorber diameter, as the smaller valves can be fitted much closer together.

In short, the lowest cost per installed MT of capacity (though upgrades may be available – see box). With the premium product, the focus is more on operating economy. More often than not, this type of product would be operated less intensively and thus have built-in spare capacity as well as options to further improve the production economy and performance of the investment.

The aim of the exercise, quite simply, was to offer formaldehyde producers the cost benefits of a standardized design, but with the convenience of a tailor-made package of equipment. But it goes further than that; for 2011 the process was completely re-engineered. As well as being more self consistent, the new design is not only more energy-efficient and more compact, but also less expensive and easier (and cheaper) to install. The net result is a design that can be more closely tailored to meet your needs – and to match your required performance characteristics – but with the same operating flexibility and the same range of performance enhancing options – all at a reduced overall cost. The answer to the question posed at the beginning – "More, better, cheaper?" – is an emphatic YES!



Upgrade options

In many cases you can add features later; indeed, as discussed in the "Upgrade Brochure" many can be applied to older plants. Indeed this brochure itself was recently "upgraded" and the new version released in conjunction with the Bali conference. Interested? Contact your Formox representative for a copy.

The role of a SITE SUPERVISOR

Every time Formox supplies a new plant, the contract includes the services of a "site supervisor". To give all of our readers a glimpse of what site supervision entails, your editor interview our two principal site supervisors, **Fred Thuresson** and **Jan-Erik Andersen** – two very different individuals, both very committed to making sure that when it's time for commissioning, the plant will be ready.


Jan-Erik


Fred

How do you prepare for site supervision?

Jan-Erik: "I study the drawings, find out about special solutions and possible customization. I also try to learn a little about the country and its culture – we don't want to seem to be impolite! It's important to be humble, to have an open mind and a willingness to learn about new cultures."

Fred: "I talk with our Formox people about the project, and of course I have my own experience in my baggage. But if there are any special considerations, we have our routines for seeing that we're informed about them.

"And my visa! A multiple-entry business visa! One must never forget that!"

What does "site supervision" cover?

Fred: "Basically it's about helping the customer build a plant as quickly and correctly as possible. As most of our customers have no experience of building formaldehyde plants, they usually have a contractor who we work closely with, and we help to see that everything moves in the right direction.

"Our work starts with making the schedule and planning what's going to be needed – the man-hours, what size cranes for the lifting of vessels, platforms etc. This planning work can be done before we arrive at the site, if the customer wishes.

"Then we have our first meeting at the customer's site, where we meet everyone who's going to be involved in the construction. In most places we have an interpreter as well, which of course requires some extra time. Establishing personal relations – with the customer, the contractors, the interpreter and even the driver – is also a very important part of this first period!

"Together we go through the plan in detail, so that everyone is clear about who is going to do what, and when. We make sure that everything is ready for the OCI [open-case inspection] – who is going to participate, what forklifts and cranes will be needed, dry areas where equipment and other materials can be kept until needed etc. We usually get a lot of technical questions to answer at this time as well."

Jan-Erik: "The first actual on-site task is the OCI, when we, together with the customer, go through everything that has arrived at the site and check it against the packing list, making sure nothing is missing or damaged so that there will be no delays in the project. Any deviations we find are listed in a report that will be signed by us and by the customer. This work is very important, and even though it takes time, it ends up saving time and money later in the project. OCI usually takes around one or two weeks, depending on the size of the plant."

Fred: "During this first phase we also inspect the site work – for example, check that the foundations for the vessels are correct in terms of placement, size and quality. If there's a problem, it doesn't cost a lot to fix at this point, but if the problem isn't discovered until the vessels are in place, it can cost plenty! We also check the locations and sizes of any buildings or building work that may have been done in advance."

What are the next steps?

Jan Erik: "Erecting the vessels comes directly after OCI, and our role here is to make sure they are in the correct positions. Imagine the problems later on if a vessel is turned the wrong way! This actually happened once, but fortunately we were able to put it right in time.

"The number of days of site supervision is normally included in the contract, and beyond that it's the customer's choice how to divide the total amount of days in suitable periods over the different phases. But we try to be flexible and stay on if needed. Many customers find it worthwhile to buy a few extra days of our time, since preventing mistakes at an early stage almost always ends up saving a lot of money."

Fred: "There are frequent meetings with the customer and the contractor during this period, which usually takes around one week, but in some cases we meet with the customer and the contractor throughout the project, and can have daily progress reports and problem-solving. We often get a lot of questions that are really outside the scope of Formox' supply, but we try to be helpful and answer such questions too."

Jan-Erik: "Phase two is the piping construction, which is done by the customer or his contractor, under our supervision. There are some different approaches to this phase. A certain number of 'piping days' with a Formox supervisor, depending on the size of the plant, are specified in the contract. The customer decides how and when these visits should be made, but there are certain 'milestones', where it's a good idea to have the Formox site supervisor present:

- In the early part of the piping, when there are many questions about interpreting the drawings correctly. This part, a week or so, is sometimes done directly after phase 1.
- In the middle part, to check and inspect in detail that everything is proceeding in the correct way. For this part, the Formox supervisor is on site for 3–4 weeks.
- In the final part of the piping (starting about 3–4 weeks after the middle phase), when Formox does a 'mechanical checkout' –

meaning a thorough inspection, possible 'approval' of any changes the customer has made, provided they comply with the calculations. We make a list of every deviation, together with what actions must be taken to make it acceptable. I call this a 'punchlist', and it's usually longer than the customer might expect... Once when I'd made a punchlist of nearly 300 items, the customer began calling me 'Mr Punchlist'! Still, we both know that it's better to take care of the problems before you start running! This final phase takes another 3-4 weeks. This is followed by the 'mechanical takeover', when we verify that all the actions on the punchlist have been completed.

- "Finally there's phase three – the pre-commissioning, which is the preparations for commissioning. During this phase, normally 2-3 weeks, we inspect all rotating equipment, the reactor, the process gas system, HTF, blinding, instruments, conduct leak tests, etc, in preparation for plant operation – and for the arrival of the Formox commissioning team as well as final inspections by sub-suppliers. These checks are normally integrated in the final check-out of piping and mechanical take over. We do a 'dry' run with water to check the flows and pumps and clean out the piping system. The last things are heating the reactor, running the HTF to check for leaks.
  "Commissioning will then involve a dummy start-up, checking 'live' that everything works."

Fred: "The whole site supervision is a question of about 6 months, adding up the different phases, so it's quite a long time to be away from home. But it's usually split up into several longer (5-week) and shorter (2-week) visits. And sometimes it adds up to more than 6 months, depending on what problems arise. On one project we had to spend an extra three weeks helping to get customs clearance, but then we built the whole plant in record time and started up only about four months after clearance. "

Don't you get lonely – new people, new place, new language, new food etc?

Jan Erik: "Yes, sometimes it's definitely lonely. But we usually have good contact with the customer's people. Customers are generally very helpful and this is appreciated. Sometimes we meet with the customer or the contractors socially, we get to know the hotel staff, sometimes there's even a little time for sightseeing. When you establish good personal relations, you can manage just about anything – including food you're not used to!"

Fred: "All the new stuff is what makes it so exciting! It's fun! You never know who you're going to meet – that's the spice of it. The bigger the challenges, the greater the thrill when you succeed!

"OK, it can sometimes get lonely in your hotel room, but you usually have so much to do. You just prepare yourself mentally to be away from home for a certain amount of time, and there's no problem. But of course I miss my wife and kids!

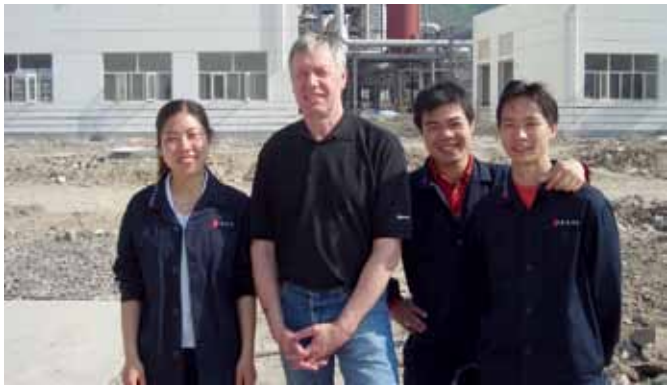
"In some places there's a lot of social contact with the customer, in others there isn't. It doesn't matter, you adapt. And sometimes you get to learn a lot about the country, things you'd never know from reading the newspapers or watching TV. And you can also pick up a little bit of the language."

What personal qualities should a site supervisor have?

Jan-Erik: "You have to be adaptable and know how to improvise! You have to have ideas, how to solve problems in new and different ways, maybe with limited technical resources. It also helps if you can work alone, but you also have to be easy to cooperate with."

Fred: "You have to be thorough and follow the documentation, but you also have to be flexible, creative and open-minded. You have to be a good listener and understand the customer's wishes. You can't only be Swedish, even though you have your own personality. I realize, for example, that I'm much more 'Chinese' when I'm in China than when I'm in Sweden.

"Good personal relations mean everything, quickly becoming part of the customer's team, so that everyone is working towards the same goals. Then the actual job almost does itself. That includes good relations with the interpreter. After all, when an interpreter is needed, everything goes through him or her!"



What kind of educational background do you need?

Jan-Erik: "I think the main point is that the more knowledge you have, whether from formal education or experience, the easier it is to improvise and find reliable solutions. I would say that all of our people are extremely positive. We see challenges, not problems. And we work as a team!"

Fred: "What you need can vary. My training is in mechanical engineering, but I think it's more a question of what kind of person you are!"

How many site supervisions have you been on?

Fred: "I started counting them and gave up after I reached 20. It's a lot more than that! And it's given me very valuable experience."

Jan-Erik: "I've been with Formox since 1997 and have already done around 15 site supervisions, on three continents. I'm always finding new ways to solve problems. I've also recognized how important it is not to take things for granted. I've helped build many formaldehyde plants, but the customer hasn't. So I try to see things through the customer's eyes, so I can explain things better, more clearly. It's really fun!"

What's the most difficult part?

Jan-Erik: "As long as you have the right documentation, nothing is particularly difficult. In some locations it can be hard to find the right parts if for some reason something is missing or damaged. It can also be tricky to follow different standards and how they are implemented in different countries. So it's important that the customer knows what his own national standards require.

"If things aren't done properly, there can be a bigger risk of problems and safety hazards. We are safety-conscious at all times, and we tell the customer about anything we feel could jeopardize personal, material or environmental safety – and how to avoid it. We have a lot of experience here, and we gladly share it."

Fred: "A lot of tough situation may arise, but once you've solved them, you move on. Sometimes you get a question you can't answer directly, so you have to do a little research first. But the hardest thing of all is when the site supervision is over! You've come to know a number of people quite well and then you have to leave, knowing you might not meet them again…."

Have you had any funny experiences?

Fred: "There are endless things – many wonderful memories! But most of the work is serious, which is fun it its way, but not exactly funny. Still, there's the people, the sightseeing, the problem-solving – that's fun and very pleasant. One thing that wasn't very funny at the time, but is funny now, was a trip to the site on a plane – and it was raining in – inside the plane. Hmmm. It was also kind of funny once when we found a huge anaconda behind the plant we were working on. It took four or five of us to lift it – I think it was pretty full – and I remember its skin was soft as velvet."

Jan-Erik: "Well, there was the time when we were going to prepare a plant that for various reasons had been delivered some years before, but never erected. There turned out to be a problem with a flow meter, and when we opened it up, we found it was blocked up by lizard eggs!"

What's the best part of being a site supervisor?

Jan-Erik: "You meet so many nice people! It makes you want to go back – and sometimes you get to go back in connection with trouble-shooting. With good contacts with the customer and being able to solve problems and improvise, that's what makes it such a great job!"

Fred: "Working together closely with people from all over the world, from different cultures, and meeting each other with respect and honesty – that is a tremendous privilege!"

Projects & start-ups

New Projects

- Kolon Plastics in Kimchon-Si, South Korea, has signed an agreement for a Formox plant.

Ongoing projects

- The new project for an FT3 plant for Xinjiang Markor Chemical Industry Co., Ltd. in Korla, China, is pending certain official approvals.
- The new Formox FS3 plant for Egger Technologia SRL in Radauti, Romania is now in the shipping phase.
- Work on the basic engineering package for a Formox FT2.5 plant for a client in Asia is in progress.
- The new plant for Ticona in Germany is approaching mechanical completion, with the expected start-up in 2011.
- The Formox UFC plant for the Q5 complex in Qatar, in cooperation with Saipem and Hyundai, is continuing to make good progress.

Start-ups

- The new Formox FT2.5 plant for CNOOC TIANYE Chemical Ltd. (part of the China National Offshore Oil Corporation) went on stream successfully in August in Huhhot, Inner Mongolia, China (see photo).
- The new Formox FS2.5 plant for Kanoria Chemicals & Industries Ltd., in Visakhapatnam, on the east coast of India, is going on stream about the time of the publication of this issue of ***informally speaking.***
- The first reactor line for a Formox FT3 plant for Ningbo Wanhua Polyurethanes Co., Ltd, China is also going on stream about the time of the publication of this issue of ***informally speaking.*** This will be their second Formox plant on this site.

Faces & places

There have been two staff changes at Formox since the last issue of ***informally speaking***:

- **Andreas Magnusson** is returning to Formox to fill a new position as Business Development Manager, Plant Sales, after a few years as Sales & Marketing Manager at Alfa Laval.

- **Stan Erisman** has retired (see box, right).
- **Tommy Nordstedt** has also retired after many years as an instrument engineer. We wish him a long and happy retirement.

Everyone at Formox takes this opportunity to wish our customers, suppliers and other readers of ***informally speaking*** a joyful holiday season and a prosperous and peaceful 2011.

This year we have decided to help others help themselves through a donation to the Swedish chapter of "Hand in Hand", whose objective is "to eliminate poverty through enterprise creation and an integrated development approach."

Find out more at www.handinhand.nu

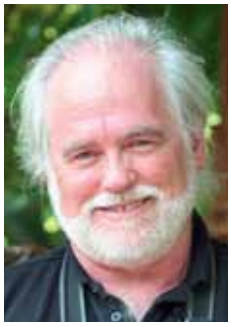
A personal farewell

This is goodbye for me – my last issue as editor of ***informally speaking***, which I started back in 1995. The journey actually started way back in 1970, when I was teaching at a language school where Perstorp was the principal customer. Eight years later, I was hired by Perstorp to help out with teaching, translating and editing. That evolved into a part-time job to handle market communications at Formox, always my favorite part of the Perstorp Group. It also led to the launch of ***informally speaking***....

For the past 20 years or so, I've also had my own company, in parallel with my employment at Perstorp, providing market communication services for a number of major Swedish companies. This has enabled me to see Formox from the inside and the outside – and to understand what a special team Formox is.

I've seen how my Formox colleagues really do lose sleep when one of you has a problem. They really do bend over backwards to solve it, to make sure that you get exceptional performance both today and tomorrow. And they're very good at it!

I've already retired as a Formox employee, in early October, so nobody's paying me to say all this. I'm planning to continue with my own company for another two years, and Formox has asked to stay on as a consultant (which is why I'm still the editor of this issue), but only until the end of 2010. I reluctantly leave you – all of you I've met, all of you who I've understood actually read and enjoy this newsletter, which pleases me very much.



I don't know in what form the news from Formox will be sent to you after me. But Formox will continue. Because Formox means dedication to your achieving the most cost-effective, long-term HCHO production available anywhere. It's something worth bearing in mind if you're thinking of your own need for long-term reliability.

Well, enough of my words. Except for this: Good luck to all of you and best wishes for your future prosperity!

www.formox.com

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The Formox website is now available in Chinese!
Just click on the Chinese flag!

Seminar news

Formaldehyde Americas 2011 will be held in **San Francisco, California, USA on March 15–16.** This year's conference spans two whole days to give more time for discussions and networking – and contributions from you. There will be a lot of focus on plant safety, as well as efficient operation. We'll be sending out invitations soon, but feel free to ask your Formox representative at any time.

Looking further into the future, the conference rotation program looks like this:

- **Formaldehyde Europe 2012**
- **Formaldehyde Asia 2013**
- **Formaldehyde Americas 2014**

The dates and venues have yet to be decided.
Watch our website (www.formox.com) for further details!

informally speaking

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