

Round Two in Asia



Perstorp Formox's second seminar in Asia. Also in this issue: a second look at the Asian crisis.

Focusing on the Basics

In my presentation at the recent Perstorp Formaldehyde Seminar in Phuket, I looked briefly at a few of the changes that have taken place in recent years: the financial situation, the industry we work in and the company I represent.

The Perstorp Group has made several rather major divestments during the past year in order to focus on its core businesses: well-defined areas within the fields of chemicals, surface materials, flooring and life sciences in which the Group has or will achieve world-leading positions.

Of the total volume of business, something like 70% is based on downstream products of formaldehyde. This means that Perstorp Formox is clearly the "core of the core" in the Perstorp Group. For our customers, it means our total dedication to being the benchmark for the formaldehyde industry. And it means that we focus on what we do best.

The Asian crisis has slowed down (but not stopped) the construction of new formaldehyde plants in the region. Do we pack up and go home? No, we stand by our customers with technical support. This is a time when the inefficient, resource-consuming plants are going to fold. By delivering highly efficient plants and then backing them up with years of close cooperation and technical support, our customers gain a competitive edge. Indeed, most of our customers, even in the worst-affected areas, tell us that they expect to be able to ride out the crisis.

On our own home front, we're expanding our catalyst plant to ensure that catalyst will always be on hand the moment it's needed. We're also expanding two of Perstorp's own formaldehyde plants, taking the opportunity to try out new modifications that we lead to design improvements for all of our customers.

Our ambition is, now more than ever, to offer the best plants, the best catalysts and the best service. If you have a problem, tell us. If you have a question, ask us. You know, and we know, that satisfied customers keep coming back. That's about as basic as you can get.



Claes D. Lundström
General Manager
Perstorp Formox

Expanding Catalyst Production



Perstorp Formox is building an addition to the catalyst plant in Sweden. The expansion means a major increase in production capacity to assure fast, reliable deliveries, as well as increased capacity for recycling spent material. The new facility, which will also house production of new types of catalysts, is expected to be operational by the summer of '99.

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The 2nd Perstorp Formaldehyde Seminar in Asia: Phuket, Thailand, 27-29 October 1998

The island of Phuket, Thailand, was the site of the second Perstorp Formox Seminar in Asia (the first was held in Kota Kinabalu, Malaysia, in 1996). In view of the prevailing financial crisis, it was initially feared that the number of participants would be limited. Those fears proved unfounded. With some 60 participants from 17 countries (and five continents), the seminar was a huge success. Interesting presentations alternated with opportunities to meet others in the business and exchange experiences in an open forum or in private talks.

DAY ONE

A time of change

"There have been many changes on many levels since the last Asian seminar," noted Perstorp Formox General Manager **Claes Lundström** in his opening statement of welcome to the seminar participants. After touching on the changes resulting from the financial crisis, Claes gave a brief outline of the changes that have taken place in the structure of the Perstorp Group, and within Perstorp Formox. "One thing that has not changed, however, is the need to improve profits through more efficient plant operation," Claes pointed out, "and that is why we are all here today!"

Further on the subject of change, **Bob Crichton** provided a comprehensive review of the changes that have - and have not - taken place in the global production and

consumption of formaldehyde during the past couple of years. "We have seen steady growth - even in Asia - despite the economic downturn," he observed. In fact, Asia now exceeds North America for the first time in installed formaldehyde capacity. "Although the global wood consumption is steadily falling, the panel market share is rising, and that means products using formaldehyde. Bob wound up his presentation on a high note: "There's no need to worry about formaldehyde prospects for the next few decades at least!"

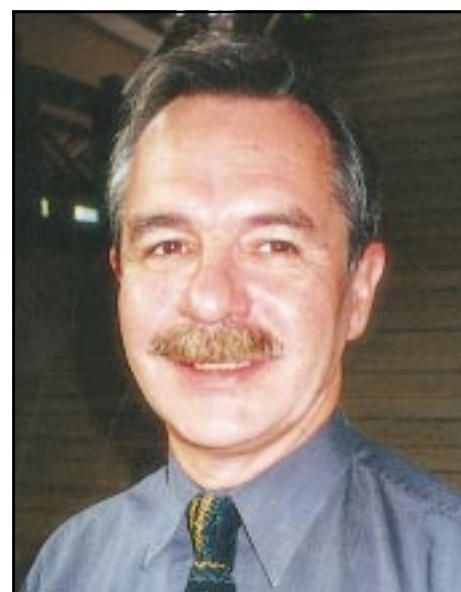
Next to take the podium was **Ben Iosefa**, the Methanex representative based in New Zealand. His presentation covered the current situation in the methanol market, a



Ben Iosefa, Methanex, New Zealand.

subject close to the heart of every formaldehyde producer. "The over-supply situation has methanol plants running at below 80% of capacity. This will probably lead to the shutdown of the high-cost plants, primarily in Eastern Europe, China and the US. Gulf coast, even as new plants will be going on stream," Ben predicts.

The current methanol demand is 26 million tons. There are 110 production plants operated by 70 different players, six of whom account for 43% of all production. Some 35% of this production is for the captive consumption of the producers, while the remainder goes to the merchant market. So what's the outlook? "The over-supply will continue as the new plants start up," says Ben, "but the levels we had in 1997 are expected to return in 1999. Price cycles will, of course, continue; we're at the bottom right now."



Bob Crichton, Perstorp Formox, Scotland.

The importance of good measurements

Mikael Ekblad reviewed the topic of how catalysts work and why different types and different loading plans are used, based on the producer's production requirements and product specifications.

But the only way to know at what point your operation is at the peak of economy is accurate measurement, a point emphasized by **Chris Kahn** in his presentation. What should you measure? The methanol content in the product, the HCHO concentration, the catalyst pressure drop, the HTF pressure curve and the hot spots. "And if you're operating with two reactors for one absorber,



Chris Kahn, Perstorp Formox, USA.

a gas chromatograph is a must," says Chris. "It's the only way to avoid pure guesswork about which reactor to adjust." What about the cost? "I guess you just have to ask yourself whether a US\$30,000 investment is worth saving up to US\$150,000 a year!"

Chris also advised producers to use measurements to plot trends - or to take advantage of Perstorp Formox's offer of free operating data analysis. "Accurate measurements and careful documentation also give you the chance to see what you're doing right," claims Chris. "You can then benchmark your best catalyst runs and eliminate much of the guesswork."

As a practical example of the importance of good measurements, **Edy Sudasta** reported on the results of a "round-robin" test in which an identical sample of formalin was analyzed by seven different labs (3 in Sweden, 3 in Thailand and one in Singapore).



Edy Sudasta, Perstorp Formox, Singapore.

Minimizing start-up, maximizing production

Paul Triplett reviewed start-up procedures, showing how to minimize the start-up time with high-performance catalyst loads. "There are short-cuts," he explains, "but they require frequent, careful controls to prevent overheating." Paul recommends 5-10 thermocouples (each with 8-10 measuring points), strict quality control of catalyst loading and confirmation of vaporizer and O₂-analyzer operation. "A start-up time of 7-10 days is acceptable," says Paul, "and under certain conditions even less. But it will take 14-21 days if you have not made the necessary inspections and probes." Paul concluded with a look at the pros and cons of different loading methods (extend-



Many ideas were exchanged and contacts created during the coffee breaks at the beautiful Sheraton Grande Laguna Beach hotel.

The results revealed a considerable range of deviations. "The point is," says Edy, "you could be selling a 50% concentration that is really 52%, and thus losing a lot of money. Accurate measurement is the only way you can know what to charge your customers."

loading time, clean-up layer and adiabatic bed).

When to turn the knob, i.e. what is realistic for good operation and how to achieve it, was the theme of **Anna Helmersson's** presentation. Anna pointed out three primary tools for optimal operation: follow



Paul Triplett, Perstorp Formox, USA.

the standard HTF temperature ramp; control the content of methanol in product; and control the hot-spot position and temperature. She also looked at three important secondary tools: the ΔT in the ECS (or over the adiabatic bed); CO measurement; and gas chromatographic analysis of the process gas.

Olle Johnsson then took a close look at hot-spot temperatures and positions, and the advantages of using thermocouples. "Thermocouples not only help you control

your start-up," he says, "they serve as early indicators of the need for fine-tuning and are important in terms of safety." During the start-up phase, Olle advises an average hotspot temperature (i.e. the average of the measuring points in a given thermocouple) of 330-350°C and a maximum (the highest at any measuring point in any thermocouple) of 380°C. After start-up, the average hotspot temperature should be 80-110°C above the HTF temperature. Olle also took a look at "wild" hotspots and how to deal with them.

Marie Grönberg focused on optimizing the performance of plant equipment, providing useful advice on how to minimize power consumption, maximize steam production and secure good methanol distribution. And how do you run optimally if



Marie Grönberg (formerly Marie Karlsson), Perstorp Formox, Sweden.

you need to run at lower capacity? For a 30% decrease, you should also cut your methanol by 30% and your airflow by 20%.

What are good absorber conditions? There are four main factors, according to **Birgitta Marke**: keep a low top temperature; cool as much as possible (but note that the use of chilled water may not be economical, even in tropical climates); add caustic if your downstream production allows; and maintain the correct HTF temperature to assure low methanol in the product. "If you need a product with a higher methanol content, you should still aim for as high a yield as possible, then add pure methanol to the tank afterwards," says Birgitta. "This can save you a lot of money, since otherwise you'll be burning up a great deal of methanol in your emission control system!"

Phuket Seminar (continued)

Day One of the seminar concluded with a presentation by **Eberhard Mann** of Ticona, who outlined how the first of Ticona's Perstorp Formox plants (from 1972) had recently been expanded and retrofitted with pre vaporizers, boosting the original plant capacity by 50%. The modifications, based on the new Perstorp Formox plant design, included four additional methanol evaporators, the removal of trays to make room for a packed section in the absorber, an external HCHO cooler, and upgrading to a catalytic emission control system. "Based on three months' experience, we have achieved our capacity goal and everything looks good so far," notes Eberhart with satisfaction.



Eberhard Mann, Ticona, Germany.

DAY TWO

Day two led off with a brief but interesting discussion of the effects the ongoing financial crisis is having on Asian markets (see "Asian Update", page 7). **Tomas Allansson** then introduced the theme of the morning session: how to profit through upgrading and maintenance. He also reminded participants that Perstorp Formox can be of assistance in acquiring spare parts.

Act in time!

The first presentation was by **Herbert Stadeus**, representing Aerzen Blowers, who reviewed the company's new 3-lobe rotary blowers. He also recommended certain maintenance routines, commenting in particular on problems arising from incorrect tension on the V-belts. Further, he advised checking the oil level more often than before, as oil suppliers have modified their

formulas and may behave differently than the blowers were originally designed for.

Another "timely" subject was **Jörgen Annell's** review of Perstorp's progress on the year 2000 adjustments being made. A general rule, he notes, is that "the more complicated the equipment, the greater the risk of failure. As a result, some hardware upgrades will be necessary."

As related to formaldehyde plants, the focus is on the DCS



Torbjörn Wendt, Fisher-Rosemount, Sweden.

- a topic close to the heart of **Torbjörn Wendt** of Fisher-Rosemount. FR estimates the global cost of dealing with "Y2K" at US\$650 billion, and that 1-5% of companies will fold. So what are the alternatives? "You can do nothing - but that is not a realistic alternative. You can take corrective action, but that is risky. Or you can turn your preparations into a business opportunity." All FR hardware sold since '94 is essentially compliant, and all software since this August. In a special deal for Perstorp Formox customers using the RS3, FR is offering the necessary upgrades at a minimal cost. If you are not already compliant, you are advised to contact Perstorp Formox immediately!



Herbert Stadeus, Aerzen, Sweden.



Jörgen Annell, Perstorp Regeno, Sweden.

The high cost of low maintenance

Fred Thuresson gave a comprehensive outline of the advantages and disadvantages of various maintenance strategies: those based on equipment condition, equipment failure, time and design modifications. One thing is certain, he emphasized: "Waiting for breakdowns to happen leads to constantly increasing breakdown costs!" Conversely, regular checks and actions prevent failure, while maximizing equipment availability and lifetime, particularly if maintenance is well documented. Fred also spoke about the importance of "opportunity maintenance", i.e. taking advantage of shutdowns to perform important inspections, measurements etc. "Any maintenance plan you choose is going to cost you a little," Fred cautioned, "but not having a good maintenance program could end up costing you a fortune!"



Fred Thuresson, Perstorp Formox, Sweden.

Maintenance of formaldehyde, i.e. not letting it turn into paraformaldehyde, was the theme of the presentation by **Carl Lindqvist**. His findings and recommendations are summarized in the box below.

5 STEPS TO PREVENT PARA

1. Avoid cold surfaces (use insulation).
2. Maintain temperature at HCHO concentration plus 5°C.
3. Use agitation (we recommend top-mounted).
4. Perform regular maintenance and inspections.
5. Base your tank design on your storage procedures.

The pressure's on!

Perstorp's own plant #5 has now been running with pressurization for 1½ years, and **Marie Grönberg** reported on how things are going. "Basically, what we're seeing is about 27% higher capacity at a lower investment cost," says Marie, "and that means improved production economy!" At Perstorp's plant, the pressure increase on the fresh air intake is 0.3 bar. Why not more? "A greater increase shows signs of reducing yield, but we're looking into it!" remarks Marie. Pressurization, which can be retrofitted on most Perstorp Formox plants, means only minor adjustments in operating procedures and a payback time of about one year (give or take six months, depending on plant size and operation). Customers are invited to contact Perstorp Formox for a feasibility study and all other assistance.

Past & future

Since the seminar also marked 40 years since the foundation was laid for Perstorp Formox's first oxide plant, **Max Henning** took the opportunity to recap how the process and plant designs have been modified, altered and improved over the years, in many stages. "Yield, steam production and product quality are all way up, power consumption is down, emissions are virtually eliminated and plant safety is a benchmark for the industry," notes Max. "The actual start-up of our first plant took place in August '59, so we intend to go on celebrating throughout the year!"

Supplementing Max's stroll down memory lane was an anecdote from **Bob Walker**, who was on hand both at the seminar in Phuket and at the start-up of that first plant nearly 40 years ago.

Shifting to the future, **Birgitta Marke** was doubtful that Perstorp Formox could ever achieve the Perfect Plant: "That would be one with 100% conversion, endless operation and no power consumption!" But she did expect to see some important improvements in the next few years. "I don't think it's unrealistic to expect 1% better yield, 25% longer catalyst lifetime and 30% less power," she predicts, noting that Perstorp Formox's active development work is supported by some key tools: process simulation programs such as Columbus (see separate article, page 7), numerous pilot plants and full-scale testing in Perstorp, "our way of ensuring that our customer get proven technology."

Time for fun

Following **Bob Crichton's** quick summary of the main part of the seminar, the participants headed for the buses, the buses headed for speedboat waiting at the beach, and the speedboat headed for Coral Island and a few hours of sunshine, swimming, snorkelling and socializing (a.k.a. networking). Back at the conference center, the day was rounded off by Perstorp Formox's 40th Anniversary Dinner, complete with entertainment from local Thai dancers.



Good food and Thai dancers were on the program of celebrating 40 years since the foundation was laid for Perstorp Formox's first oxide plant.

DAY THREE

Complete with extras

A brief "extra session" had been added to the program to accommodate an interesting presentation by **Paul Foerst** of Solutia, suppliers of Therminol VP-1 heat transfer fluid. Paul gave a quick but thorough review of the product, the safety aspects and Solutia's comprehensive technical service program.



Paul Foerst, Solutia, USA.

Following this presentation, many of the Perstorp Formox licencees in attendance at the seminar reconvened for a two-day refresher training program for plant operation. "Ask-about" tables were set up for Y2K questions and maintenance questions. And for those who wished private, individual discussions, Perstorp Formox's staff was on hand for two days to answer any questions.

“An ounce of prevention is worth a pound of cure,” as the old saying goes. Perstorp Formox plants may be the safest in the world, but safety must never be taken for granted! Here are a few simple things to remember – at all times!



The 10 Plant Safety Commandments

1. Always wear a safety helmet, safety shoes and safety goggles in the plant (and a gas mask or fresh air mask when required).
2. Bear in mind the potential fire hazard in the plant and act accordingly.
3. Never neglect an alarm – always deal with the cause before switching it off or resetting the safety system.
4. Never enter process vessels without safety verification, i.e. that the CO and oxygen concentrations are verified to be acceptable.
5. Test the safety shower and replace the eye wash solution regularly.
6. Check the safety system and fire extinguisher system of the plant regularly.
7. Calibrate the oxygen analyzer every two weeks.
8. Make HAZOP/what-if analyses in connection with process changes in the plant.
9. Perform all necessary maintenance on equipment, including preventive maintenance.
10. Contact Perstorp Formox whenever questions arise.

In other words, safety is something you must do!

Projects & Start-Ups

It's only about two years since Perstorp Formox built a new formaldehyde plant for captive consumption in Toledo, Ohio, USA. Now the installation of a second reactor system is nearing completion and will be on stream by the end of '98.

The yield in the original line has averaged around 93%, and the methanol content (in 50% HCHO) 0.4%.

Plant #2 in Perstorp, Sweden is undergoing a major revamping (see picture below). Reactor lines 5,7 and

8 are being replaced by a single large reactor of even greater capacity.

New HTF and steam utilization equipment, along with a new type of blower, are being installed and a new reactor design is being tested.

The reactor is also equipped with quite a few new instruments which are expected to provide answers to some interesting questions.

Other customer projects are underway, but we are not at liberty to divulge information about them at this time.



GC Service Goes Global



When Anna Helmersson unpacked the new GC, *Informally speaking* was there.

The autumn/winter 1997 issue of *informally speaking* included an article about a portable GC (gas chromatograph) being used by the Perstorp Formox team in the Americas. We have now acquired a second GC of the same type in order to extend this improved technical service worldwide.

The GC enables analysis of all gas compounds in a formaldehyde plant. Although Perstorp Formox will mainly use it for trouble-shooting, the GC is a very useful tool for the daily operation of a formaldehyde plant. We will therefore be happy to demonstrate the GC to customers interested in buying a unit of their own.

“The GC itself is very quick, accurate and easy to use,” says technical service engineer **Anna Helmersson**. “The tricky part is the gas sampling method, since the quality of the gas sample is crucial for the accuracy of the measurement. The sampling method [with a heated syringe] that we use in the US works very well, but it is partly homemade, i.e. not commercially available. For the GC based in Europe we will use a heated hose system that connects the GC directly to the reactor. And all the components are readily available on the market.”

The new GC is expected to be ready for service in the beginning of 1999. For details, please contact Anna. ■



Are you telling me Columbus didn't discover America - that it was all a simulation?!

Asia Update

The feature story in the last issue of *informally speaking* (spring/summer 1998) was devoted to the effects the Asian financial crisis is having on the formaldehyde business in that part of the world. The feelings and opinions of those who participated in the interviews covered most of the spectrum from optimism to pessimism. Now that another half a year has gone since then, are those views still the same? We conducted a brief follow-up interview, mostly by fax, to find out.

Cautious optimism

There was less variation in the responses this time around. Last spring's most enthusiastic optimists were still optimistic, but more cautiously so. And most of the pessimists had become slightly optimistic, even in the face of continuing uncertainty.



Dr Fok.

One worst-case scenario: by the time Asian wood-producing countries get out of the woods, consumer countries might be in recession. **Dr Thomas Fok** (Borden Chemical, Malaysia), however, is seeing “better profits due to lower raw material and operational costs,” and markets that are “similar to the situation before the crisis.”

Mr Yeo Sek Hue (Norsechem Resins, Malaysia) notes that while production is

steady, profits are “at low levels in view of the over-capacity situation.” **Mr Phumsakdi** (Vanachai Chemicals, Thailand) has noticed that “for the domestic market, the sales volume has just started increasing,” while export volumes have been on the rise throughout the crisis. Their strategy? “To improve efficiency, control and reduce costs and develop new products.”

Timetable consensus

There was remarkable agreement among those responding to the question about the timetable for recovery. Most felt that Singapore, Thailand and Malaysia would turn the corner in '99. Indonesia would be a bit slower, 2000-01. Full recovery (“business as usual”) would come first for Singapore ('99-'00), followed by Thailand ('00), Malaysia ('01) and Indonesia ('02?). But, as Dr Fok puts it, “all Asian countries have to resolve their current internal crises (political and financial) before any significant recovery can take place.”



Mr Phumsakdi did not attend the seminar in Phuket, having got married 3 days before. Congratulations!

Other Updates

on the last issue of *informally speaking*:

RADAR: The tests with a radar device for measuring methanol levels in storage tanks are now concluded. “After reinforcing the mounting bracket, we have been getting results that are accurate to within 5 mm,” say **Yngve Carlsson**, “so we're now prepared to recommend this device to our customers.” Contact Lennart Frost at Perstorp Formox for assistance in ordering.

DEFLAGRATION: The comments from Borden and Perstorp Formox were apparently exhaustive. No further comments have been received on this subject.

CORRECTION: The General Manager of BAC (Malaysia) is none other than **Mr Tan Tiong Kai**. Sorry about the error! ■

Solid support

There was also consensus on the level of technical and other support. “We have got good support from Perstorp Formox,” says Mr Phumsakdi.

“Your technicians have provided us the suggestions for our efficiency improvements.” Mr Yeo adds that “Perstorp has always been responsive to our needs and requests.”



Mr Yeo.

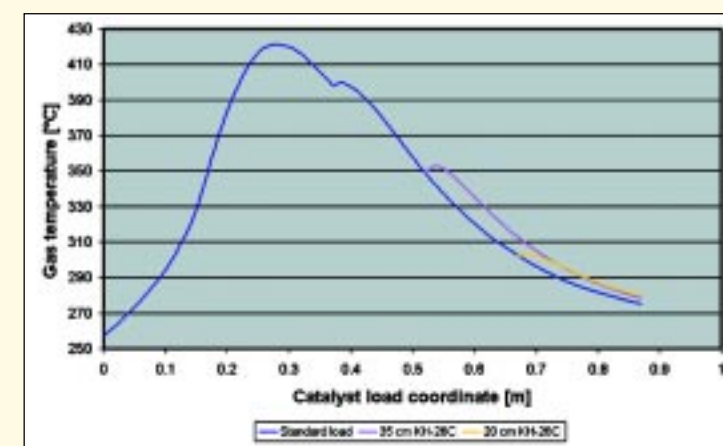
Simulator Beats Real Life

Back in 1991, Volvo became the first commercial user of a powerful simulation tool called Columbus. For the past couple of years, Perstorp Formox has been using the same tool to calculate stationary states and time-dependent processes in catalytic fixed-bed reactors and monoliths. One of the advantages is the opportunity to combine high-speed simulation with extensive catalyst experience to quickly determine what ideas are worth pursuing in pilot- and full-scale tests. Columbus runs on UNIX computers or equivalent and resolves the temperature, component concentrations, and even the component and heat flow rates for each point of the catalyst load.

Recent applications include:

- trouble-shooting in the technical service
- optimization of loading plans for our catalyst customers
- development of operating modes for very high methanol inlet concentration (above 10%)

The graph here shows the calculated temperature profiles in a reactor with a typical catalyst load including a



mixed layer, and also with two alternative loads including extra active catalyst (KH-26C) in the bottom. This “clean-up” layer serves to accelerate the conversion of the residual methanol. The simulation study predicts that a standard load giving 0.8% methanol in 55% HCHO can be improved to 0.5% or even 0.3% methanol by using the clean-up layer.

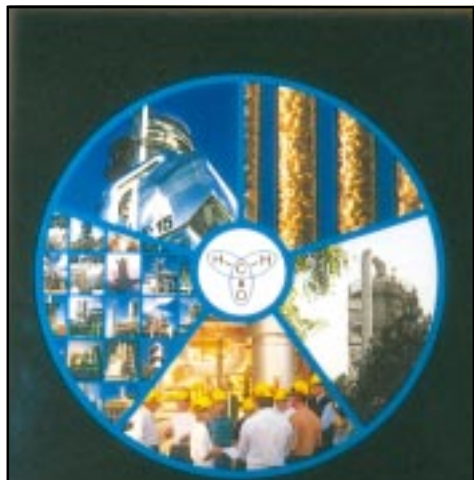
It might have been possible to show this in months of real-life testing, but Columbus does it so much faster! ■



Two groups from Kronospan in Lampertswalde, Germany came to Perstorp, Sweden for training this autumn.



A refresher training course for Perstorp Formox licencees was held in Phuket in October in connection with the Perstorp Formaldehyde Seminar.



New website too!

Along with our new brochure, we are pleased to invite you to our new website (www.perstorp.com/formox), still largely under construction. Stay tuned!

Faces & Places

Five new people (see the photos below) have joined us since the last issue of *informally speaking*:

- **Lennart Frost** fills the newly created position of Purchaser. He will not only coordinate our orders for new plants, but will help our licencees acquire spare parts etc.
- **Carl Lindqvist** has joined the team of Technical Sales Engineers.
- **Ola Erlandsson** is providing reinforcement to our staff of Process Engineers.
- **Jonas Lindborg** will be spending a lot of time on site as a new Project Engineer.
- and **Per Grönberg** is holding down the fort at home as our new Production Supervisor.



Lennart



Carl



Ola



Jonas



Per

Season's Greetings!

The people at Perstorp Formox would like to take this opportunity to wish all readers of *informally speaking* a wonderful holiday season and a prosperous 1999 - the last year of the millennium!

informally speaking

aims to provide information about formaldehyde in an informal forum and is published twice annually by Perstorp AB for its customers and contacts in the formaldehyde business.

Additional copies are available from Perstorp Formox
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Editor: Stanley Erisman
Publisher: Max Henning



Layout: Bodil Samevik
Photos: Gert Högström et al
Printer: Perstorps Tryckeri

Next Seminar in America

Every two years for the past decade, Perstorp Formox has been hosting a seminar primarily intended for North American Formaldehyde Producers. Although the 1999 seminar will again be held in New Orleans, the scope is expanding to comprise the entire Western Hemisphere. The 2001 seminar may well see a Latin American venue We are also looking into the idea of offering a refresher training course for our licencees in connection with the seminar. More details in the next issue of *informally speaking*. Your comments and suggestions are welcome!