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CURRENT AWARENESS FROM STFI-PACKFORSK WITH PFI

# 1/2007

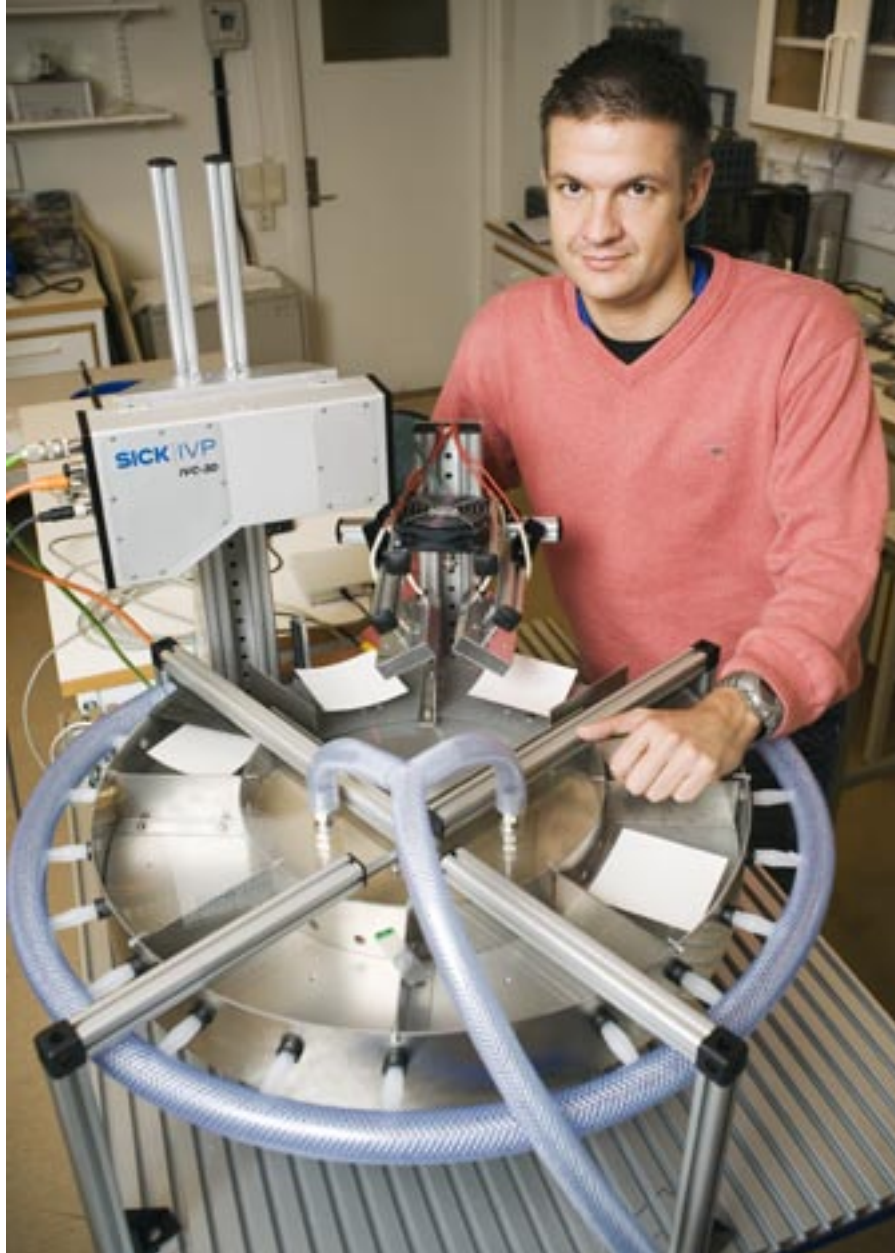


## Fundamental customer-centred research

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The new instrument demonstrated by Marco Lucisano.

PHOTO: CARL JOHAN ERIKSSON

## New twist and curl instrument saves time

STFI-Packforsk has developed a completely new measuring instrument for twist and curl. Three months of trials in a mill environment have resulted in a positive experience and, now, the next stage is to develop this measuring method so that it can be compared accurately with results from the measuring techniques in use today. The new measuring instrument is easy to use and signifies a considerably faster handling of paper samples.

Measuring instruments for twist and curl are used for measuring changes in the outer shape of paper, a factor that is very important, especially when it comes to the properties of a product for processing. The new instrument is built to be used for quality control in connection with the production of board and liner board. During the mill trials, STFI-

Packforsk worked with comparing measurement data to the equivalent data that instruments used today give. The results from this will then constitute the basis for developing the new method, so that its results will be totally comparable with those obtained from the old method.

The development of the new instrument began in connection with research done in the STFI-Packforsk Engineering Paperboard Cluster.

"In our research work, we wanted to make a large number of measurements," says Marco Lucisano of STFI-Packforsk. "The quality of the measuring instrument for twist and curl that already exists is excellent. However, this method required us to mount the samples in a properly prescribed way. We thought that the problem of handling the samples should

be solved in a faster way, considering how much measurement techniques and computer capacities have been developed in the last few years."

### Programmable smart camera

Researchers at STFI-Packforsk started out with a commercially available camera, called a smart camera, which measures the shape of a paper sample using a laser line. The camera can be programmed to look for certain shapes and is able to compensate if the paper lies in different ways on the measurement table each time. It is even possible to programme it for different shapes in the samples or to look at particular details.

In all, compared to the measurement techniques in use today, about half the time is saved. In practice, you simply place the samples on the sample table of the instrument, instead of fastening them in a measuring frame, as with the previous instruments. This simple handling of the samples also makes the measurements less dependent on the person making them and the results will therefore be easier to compare, no matter when the tests are done.

The instrument being tested in a mill environment is the second version of the new instrument. The first one was a prototype which, in principal, was built on site and was not meant to be moved nor used in a mill. However, when its industrial potential was recognised, in that it can work fast and with a high level of precision, a second version was built with the aim of developing a new measuring instrument that can be a new standard for board and liner board.

"Naturally, it can be built more cost effectively," says Marco. "From the technical point of view, this instrument has proved itself to work well in an industrial production laboratory, where 80 to 100 tests are done every 24 hours."●

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### STFI-Packforsk har utvecklat

en helt ny twist och curl-mätare för att mäta förändringar i den yttre formen hos papperet, en faktor som är mycket viktig främst för produktens egenskaper vid konvertering. Tre månaders provkörning i fabriksmiljö har gett positiva erfarenheter, och man går nu vidare med att utveckla mätmetoden så att den kan jämföras exakt med resultat från den mätteknik som används i dag. Den nya mätaren är lätt att använda, och innebär en avsevärt snabbare hantering av pappersproverna.

Med en så kallad "smart camera" mäts formen på papperet med en laserstråle. Kameran kan programmeras för att titta efter vissa former, och kan själv kompensera för om papperet ligger olika på mätbordet från gång till gång.

# Damages due to transportation?

## Test products and packaging at an early stage ... save money!

Test your product and packaging for vulnerability to surface stresses at as early a developmental stage as possible. Then you will be in a position to choose the best solution, financially, for establishing safe delivery and a product that can be relied on.

This is an exhortation coming from the Test & Development Laboratory at STFI-Packforsk.

"A minor investment in a product can often save double that in packaging and transit," says Torben Jacobson at STFI-Packforsk. "If a customer from the industry should approach us early on during the development of a product, we can help them find the optimal solution for supplying and delivering that product, which will make the user satisfied."

STFI-Packforsk possesses a great deal of expertise in the company, when it comes to packaging and packaging materials. It also has well established contacts outside of the company, viz. designers and other experts who might be needed to contribute to the optimal solution for a particular package.

The STFI-Packforsk Test & Development Group has a large, well equipped test laboratory, along with experienced, expert staffing. In this laboratory, it is possible to test the durability of products and



The state-of-the-art equipped Test & Development Laboratory can carry out various environmental tests on packaging materials, packages and products, for resilience to temperature and moisture, vibration, dropping, compression and shunting.

packaging against most stresses conceivable. It is also possible to test how products cope with combinations of different stresses. One example of this is being able to run electrical components, while, at the same time, subjecting them to freezing conditions that are then rapidly altered to high levels of heat. This is something that electrical components in cars have to cope with during a cold start.

Heat and vibrations can be a tough combination for equipment used outdoors near machines or railway lines in hot climates. When it comes to such a combination, one of the products tested a

lot by STFI-Packforsk is base stations for mobile telephony.

In the test laboratory, STFI-Packforsk simulate specific stresses, such as repeated applications of braking and shaking that trains are subjected to in a shunting yard. It is also possible to test resilience to earthquakes. Salty mists, shocks, shaking and vibrations, moisture etc. are tough challenges to technical components used near the sea coast or in boats or that travel on the ocean.●

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### Only Swedish laboratory with an ISTA Certificate

The STFI-Packforsk Test & Development Laboratory is the only one in Sweden that has gained approval in all 17 standards by the American organization, ISTA, the International Safe Transit Association. This organization has members from among haulage contractors and companies that purchase haulage. This certification means that STFI-Packforsk is allowed to be seen on the ISTA website as a test laboratory that you can approach for all kinds of tests for resilience to transportation.

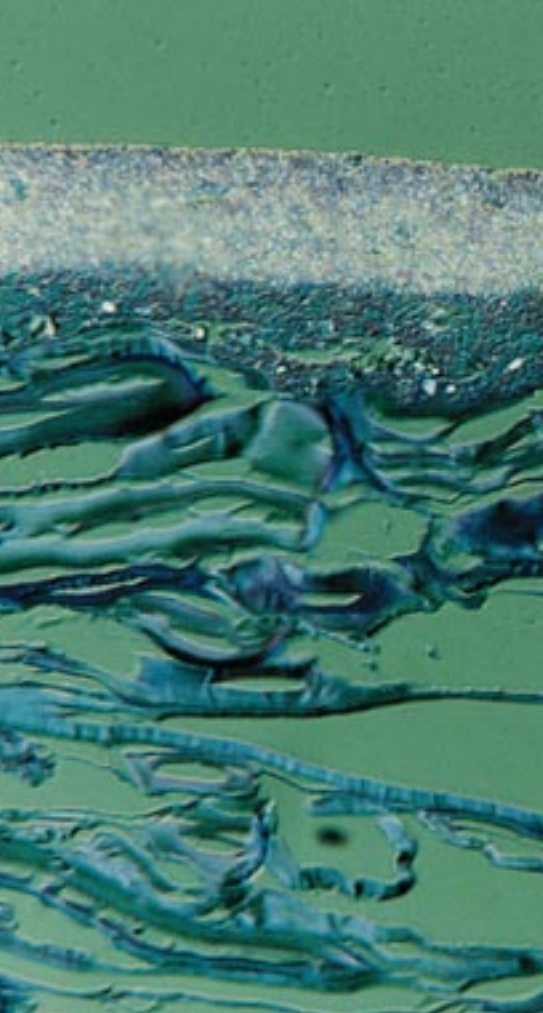


"This is certainly a feather in our cap," boasts Torben Jacobson. "It proves that we stand up to the enormous demands that ISTA makes, so that it is able to recommend our laboratory to its members."

 **Att testa** en produkt med förpackning mot yttre påfrestningar i ett så tidigt utvecklingskedje som möjligt ger den ekonomiskt bästa lösningen för att skapa en säker leverans och en tillförlitlig produkt. STFI-Packforsk har mycket kunnande om förpackningar och förpackningsmaterial. Man har även väl etablerade kontakter med formgivare och andra experter som kan behövas för att bidra till en optimal förpackningslösning. Bolaget har ett stort och mycket välutrustat provningslaboratorium där man kan testa tåligheten hos produkter och förpackningar mot de flesta tänkbara påfrestningar.

STFI-Packforsks laboratorium är dessutom det enda i Sverige som har blivit godkända för alla 17 standarder av den amerikanska organisationen ISTA, International Safe Transit Association.





Cross section of a double coated paper:

# Fundamental customer-centred research

Many of the calls that come in to STFI-Packforsk concern problems with the surfaces of paper and board, very often coated surfaces. Surface treatment, e.g. coating, has been an established field of research in the company for many years and interesting contract work comes with this.

Well-known contacts from the paper industry phone Göran Ström, the Group Manager of Surface Treatment, requesting special characterisations or wanting a problem solved. At other times, completely new customers, perhaps from a new field, will call, looking for specialised know-how.

“We have the expertise and we’ll give priority to working on such a request, when it’s called for.”

“It’s not an unusual occurrence for

companies to have problems with the stability of coating colours, such as lumps in the colour that lead to quality problems, to give an example. It happened that when we were carrying out a routine analysis for a customer, we discovered that the customer’s coating colour contained agglomerate in the form of tiny clumps. Further discussions with that customer resulted in us being requested to investigate this in more detail to find a solution.”

It might also be an area, where the industry recognises the need for more knowledge, e.g. how latex, an expensive, oil-based binding agent, can be utilised in a more cost effective way.

“It’s exceedingly important to us to understand the problems and developmental needs of our customers. This forms the basis of our work.”

The Company has invested a great deal of its resources in developing measurement methods for characterising the



Advisory board meeting of the Coated surfaces cluster

paper science. Furthermore, the company benefits from participating in fruitful discussions with the most skilled researchers and representatives from other companies in the pulp and paper industry.

“STFI-Packforsk Cluster Research enables companies from the whole industry to focus their human and financial resources in the cluster. Cluster Research activities reach an overcritical mass, which creates the potential for fundamental and break-through findings.”

As Cluster members, companies are able to influence the direction of the research and it is possible to take advantage of the joint results, either by developing and implementing them or by asking STFI-Packforsk to take on an assignment.

Ulla Jansson, Senior Specialist at the Stora Enso Pulp Competence Centre, is able to confirm that her company often uses the results as a basis for its own development projects.

Ulla says, “They can also be utilised in specially designed assignments, where one of the units at Stora Enso will participate actively in the work.”

To be able to participate in a cluster, you have to be a Partner Customer. These are customers that sign a contract for financing research for at least 3 years.

A Cluster consists of several projects that are run under the banner of a com-

## Joint research strengthens the focus

“As a customer and participant, there are enormous advantages to the Cluster Research Programme. You diminish your risks and share the investment by collaborating with others, while obtaining significantly more from it than if you carried out the research purely for your own benefit,” states Anders Pettersson, the man responsible for the Cluster Research Programme at STFI-Packforsk.

Leo Arpa of Mondi Packaging says that participation in the Cluster Research Programme offers his company the advantages of access to the most relevant basic research findings in the fields of pulp and

uniformity of a paper surface. This is very important since uniformity in surface properties is a solid foundation for print quality.

Another field, where high priority is given, is to printability and the interplay of inks with paper surfaces. During the past years, the Company has built up systematic knowledge in this field. For example, there is a big difference as to how a surface should be constructed, depending on whether it is to be printed with inkjet or offset. When it comes to printability, the group members work together with other specialists in the company.

"We are involved in significant international collaboration work in this field too. We are very involved in an EU COST programme that deals with paper surface properties in relation to printability. Moreover, co-operation with Imerys, one of the world's major suppliers of pigments, led to a paper that was awarded the "Best Paper Award" at the latest Tappi Coating Conference. We have recently entered into collaboration with Omya, another supplier of pigments. This entails us starting a new doctorate project in this field. Omya finances few doctoral candidates worldwide and we are very proud that they selected STFI-Packforsk for one of them."



### Ytbehandling av papper och

kartong är ett sedan länge etablerat forskningsområde inom STFI-Packforsk och med detta följer en intressant uppdragsverksamhet. Det kan gälla att göra speciella karaktäriseringar, lösa något bstrykningsproblem eller ta fram helt ny kunskap.

Ett prioriterat område är tryckbarhet och färgers samspel med pappersytan. Under årens lopp har bolaget byggt upp systematisk kunskap inom detta område.

– Det är utomordentligt viktigt att förstå våra kunders problem och utvecklingsbehov. Det utgör basen i vår verksamhet, säger gruppchefen Göran Ström.

– Vi har också ett betydande internationellt samarbete på området. Nyligen har vi gått in i ett samarbete med Omya, en pigmentleverantör, med ett doktorandprojekt inom området.

Göran Ström points out that he and his colleagues are eager to safeguard the industrial benefits of the research without forgoing scientific standards. This is best done through close contact with customers and other research groups in combination with solid commissioned research work. ●

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## Profile



Göran Ström

Hello Göran Ström. What's your specialty?

"My special field is surface chemistry, coating and printing," replies Göran Ström from Surface Treatment at STFI-Packforsk.

He formerly worked at Stora Enso Research in the field of printability on coated fine paper.

"During my time at Stora Enso, I was responsible, among other things, for a large project that aimed at improving the drying of the ink and reducing the slurring of printing inks from a printed surface onto a white unprinted one, a phenomenon called ink scuff. That project resulted in a patent," continues Göran.

He has a solid background in surface chemistry. Before coming in to the industry, he worked for a little more than 20 years at the Institute for Surface Chemistry (YKI) in Stockholm, where he defended his doctor's thesis, which dealt with the phenomenon of wetting that occurs during offset printing.

"I had a lot to do with surface and colloidal chemical processes during my time at YKI, where I was responsible for the Forest Products Section. My work consisted of surface chemistry matters throughout the entire production chain, everything from cooking the pulp to printing."

Today, he sees that having a broad area of expertise and very good experience in the industry as valuable assets. His scientific interests have even meant that, over the years, he was both guest professor and co-opted professor at the Royal Institute of Technology Stockholm (KTH). He currently holds a part-time position at KTH.

"In addition to working with concrete industrially related production issues, it's also interesting work ascertaining the physical-chemical interplay between ink and paper on a fundamental level." ●

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Anders Pettersson, Mondi Packaging



Ulla Jansson, Stora Enso

mon theme for 2 to 4 years. The research is spread over several areas of expertise with groupings of companies, preferably with similar or complementing operations. Most of the companies are in several Clusters, which is an opportunity that both Mondi Packaging Paper and Stora Enso take full advantage of.

The aims are to produce new know-how and knowledge or to combine previous knowledge with new technical solutions. Each Cluster has a clearly defined aim.

Anders Pettersson continues, "It's completely natural and logical that this kind of research should be part of STFI-Packforsk."

"We're the link between technical institute research and applications in the



### Klusterforskning

innebär stora fördelar. Risker och investeringar delas genom samarbete med andra, och utfallet blir mer omfattande än om företaget forskat på egen hand för samma insats. Aktiviteterna inom klusterforskningen når en överkritisk massa som skapar potential för grundläggande och banbrytande resultat. Deltagande företag kan påverka inriktning på forskningen och utnyttja resultaten i egen utveckling eller i speciellt utformade uppdrag. Ett kluster består av flera projekt som drivs med ett gemensamt tema under 2–4 år. Forskningen spänner över flera kompetensområden med grupperingar av företag med likartade eller kompletterande verksamheter. Syftet är att ta fram ny kunskap eller kombinera tidigare kunskap till nya tekniska lösningar.



# Wood for the future

The forest industry is a very important Scandinavian industry. The market potential for wood-based products is vast, owing, not least, to an increasing demand for renewable raw materials. Meeting these demands and better utilising forest resources requires the development of new products and an increase in knowledge about the significance of the properties of wood for products and production. This was the aim of the Norwegian SSFF Project, *Norsk trevirke som råstoff – Verdiskapingspotential og industrielle muligheter\**, which has recently been completed.



Ingebjørg Leirset and Anne Reitan at an instrument for extracting pulp. The laboratory staff at PFI actively participated in the realisation of the project, viz. chemical analyses, together with paper, pulp and fibre analyses.

The project started in 2001, with participants from the whole Norwegian forest industry. Research involved elements from the entire chain of supply, from the forest to the end product, organized into 3 sub-projects, viz. Forest, Paper and Wood.

“It was a strong point having all the industry coming together in one project, with a joint dissemination of information and strong ties among the industry and the 3 Norwegian research institutes that work with wood and the processing of wood,” commented Oddbjørn Eriksen, who is a researcher at the STFI-Packforsk subsidiary in Trondheim, the Paper and Fibre Research Institute (PFI), and who was the project manager of the Paper sub-project.

Knowledge about fibres optimises production

The PFI was responsible for work done with pulp and paper in the project. A great deal of this work had the character of building-up knowledge, in order to map out the different properties of fibres among the various kinds of Scandinavian wood that are significant, when it comes

to production processes as well as the end products. Studies such as these are important, so as to be able to optimise the allocation of resources to the different production units in the industry. The results from the trial runs and analyses have pointed, among other things, to new possibilities of using pine as a raw material in mechanical pulp production. This is something that will significantly increase the competitiveness of this abundantly occurring Scandinavian raw material.

One example of this building-up of knowledge was Hilde Lyngstad's doctorate thesis on the effect of seasonal variations on the quality of mechanical pulp. Her investigation showed that changes in temperature are thought to be the major cause of variations in quality over a year. According to Hilde Lyngstad, who has just been awarded her doctorate at the Norwegian University of Science and Technology (NTNU) in Trondheim, it is the heat that makes the colour of lignin dark as well as changing the composition of the extractive compounds in the process water. Reduced brightness in the pulp increases the need for bleaching chemicals. This effect, together with the shift in the composition of the extractives, coincides with an increase in the tensile index in the paper.

A conference focused on the need for knowledge

It is possible to read about Dr Lyngstad's investigation and other studies in the project in the final report that can be

downloaded at [www.tretekensk.no/ssff](http://www.tretekensk.no/ssff).

In connection with the completion of the project, a conference titled *Tre for fremtiden\*\** (TREFF) was held on 24 and 25 November, 2006, in Oslo. This conference, organized in collaboration with the Research Council of Norway, Innovasjon Norge, Skogtiltakfondet and SSFF, a research organization, attracted many visitors but only 180 places were available. A major issue at the conference was “If logging is going to increase, what types of new knowledge and R&D are required?” As a key speaker, Norway's Minister of Agriculture & Food, Terje Riis-Johansen, gave a presentation of the government's investment in forestry and wood processing. ●

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**I det nyligen avslutade** SSFF-projektet "Norsk trevirke som råstoff – Verdiskapingspotential og industrielle muligheter" medverkade aktörer från hela norska skogsnäringsen för att möta marknadens krav på utveckling av nya produkter och ökad kunskap om olika vedegenskapers betydelse för produkt och produktion. Forskningen har omfattat element inom hela näringskedjan från skog till färdig produkt organiserade inom tre delprojekt: Skog, Papper och Trä.

STFI-Packforsks dotterbolag PFI hade ansvaret för aktiviteterna inom massa och papper i projektet. Flertalet av dessa aktiviteter har varit av kunskapsuppbyggande karaktär för att kartlägga olika fiberegenskaper hos de skandinaviska träslagen som har betydelse för såväl tillverkningsprocess som slutprodukt.

## SSFF

Skogbrukets og skogindustrienes forskningsforening (SSFF) is a co-ordinating body for research and development in the forest, wood and wood processing industries. Members of the association are The Norwegian Forest and Landscape Institute, The Norwegian Institute of Wood Technology and the Paper and Fibre Research Institute.

\* *Norwegian timber as a raw material – the creative potential of wood and its industrial possibilities*

\*\* *Wood for the future*

# New Trade & Industry Group formed

A Trade & Industry Group directed at companies that are in the fibre-based value chains for packaging and printing is being formed. The Group's aim is to provide companies with the tools for their work with sustainability.

"Together with the companies, we have to agree to a mutual vision of and approach to what sustainability in practice means from financial, environmental and social aspects," says Maria Enroth, Project Manager at STFI-Packforsk.

She continues, "As researchers, we consider that, in the future, companies have to be able to measure and com-

municate that they are thinking along the lines of sustainability. There are, as yet, no demands from the end users, but that process takes time. And when the demands are made, it will be necessary to have established a concrete way of working by that time."

The Trade & Industry Group has a European base and includes both large and small companies. Any company wishing to join the Group has until 31 March, 2007 to do so. ●

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## Prestigious scholarship to STFI-Packforsk researcher

The 2006 Alf de Ruvo scholarship has been awarded to researcher Johan Alfthan.

According to the Memorial Foundation, Johan Alfthan's research is an important example of the application of research in the area of solid mechanics, known as the mechanics of materials.

His doctoral thesis at the Royal Institute of Technology (KTH) and his current research work at STFI-Packforsk are important contributions to an understanding of the mechanisms that cause mechano-sorptive creep in paper and board.

## COMING EVENTS

### MARCH

- 5-7 Packaging Diploma Course, IV
- 20 Annual Meeting of Normpack
- 21 Innovood Seminar
- 22 Symposium in celebration of the 50th anniversary of Gunnar Sundblad's Research Fund

### APRIL

- 16-17 Two-day packaging education
- 24 Course: Packaging and the Environment

For further information on coming events, see [www.stfi-packforsk.se](http://www.stfi-packforsk.se)



Kerstin Ölander at STFI-Packforsk has been appointed as Chairperson of the international technical committee, ISO/TC 6/SC 2 Test methods and quality specifications for paper and board, for the period 2007 to 2009. She succeeds Ing-Lisa Svensson, who was the chairperson after the SIS took over the secretariat for SC 2 from the BSI in February, 2001. ●

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# Swedish & Korean researchers working jointly on tomorrow's biopolymers

On 11 and 12 December last year, 60 or so people came together for a symposium titled "Tomorrow's Renewable Biopolymers" at STFI-Packforsk. This was the second conference in a Swedish-Korean collaboration to promote exchange of knowledge in the field of using biopolymers in packaging. This symposium was financed by The Swedish Research Council (Vetenskapsrådet) and the Korea Science and Engineering Foundation.

Mikael Gällstedt, who was responsible for organizing it, explains, "Two years ago, a symposium was held in Korea and the concept was that a symposium should take place every second year. A symposium summarises what has taken place during the previous two years."

This symposium focused on biopolymers in packaging, films and integrated food-stuff capsules of nano-composites, such as pharmaceuticals, but also processes and production methods, in which various types of renewable raw materials are used. Other things discussed were the use of biopolymers, such as chitosan in coating paper, as well as a section on fibre composites.

Apart from STFI-Packforsk, the collaboration includes The Royal Institute of Technology Stockholm (KTH), the Swedish Institute for Food and Biotechnology (SIK), the Institute for Surface Chemistry (YKI), Karlstad University, Korea University, Sangmyung University, Mokpo National University



and Biocoats Co. Ltd. It was noticeable that there was enormous interest shown by the industry, since the participant list included representatives from 18 different companies. ●

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## Have you changed address?

Let us know by sending an e-mail to [info@stfi.se](mailto:info@stfi.se).

# B



Slightly more than 30 participants from the forest and packaging industries gathered for the 2 day conference in the STFI Hall to take the first steps together towards a single RFID Standard for fibre-based packaging.

# Standardisation of informative packaging

STFI-Packforsk and GS1, the standardisation organization, have taken the initiative to instigate work for an international RFID Standard for fibre-based packaging. The first EPCglobal Discussion Group Meeting for the Packaging Industry was held on 1 and 2 February, with people invited from the forest industry, converting companies and GSI offices worldwide. The aim of the discussions was to form a work group called the Business Action Group that is to produce common guidelines for promoting the development of RFID.

Thomas Trost explained, "There are many in the trade already working with RFID, however, for the technology to gain global legitimacy, international co-ordination is required. This is where STFI-

Packforsk has the advantage of working throughout the entire chain from the raw material to the end product, while our customers are spread around the world."

With an international standard in common, available to all companies in the entire supply chain, this technology can be utilised fully so that functions, such as traceability, are obtained in every stage, from producers of packaging materials to consumers at the store shelves.

One of the major advantages of RFID is, of course, that the technology ensures traceability. Since every tag is individual, a marked product has its own particular identity.

"This, amongst other things, is very significant for reducing the amount of counterfeit products on the market," commented Bo Raattamaa, the President of GS1 Sweden. He mentioned especially the pharmaceutical market, where, over time, an increase in traceability will signify greater patient safety.

"Traceability is an important issue for packaging companies too," continued Thomas Trost. "By integrating RFID at an early stage in the packaging material, logistics can be improved and producers can rapidly obtain information on all the steps and products in the chain, for exam-

ple, the paper bale under use and where it was produced."

In the STFI-Packforsk laboratory for the testing and development of packaging, the different hardware systems can be assessed, when it comes to readability, environmental durability and wear and tear. ●

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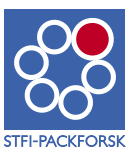


**Tillsammans med** standardiseringsorganisationen GS1 har STFI-Packforsk tagit initiativet att inleda arbetet för en internationell RFID-standard för fiberbaserade förpackningar. Den 1–2 februari hölls den första "EPCglobal Discussion Group meeting for the packaging industry" med inbjudna från skogsindustrin, konverteringsföretag och GS1-kontor över hela världen.

Många inom branschen arbetar redan med RFID men för att tekniken ska få global legitimitet krävs internationell samordning. Med en gemensam internationell standard som är öppen för alla företag i hela näringskedjan kan tekniken utnyttjas fullt ut så att funktioner som t ex spårbarhet fås i alla steg, från tillverkaren av förpackningsmaterialet till konsumenten vid butikshyllan.

## RFID

RFID stands for Radio Frequency Identification and it involves information about an object being stored in a tag attached to a product or directly on the packaging. A tag, consisting of a microchip and aerial, is activated by radio waves transmitted from a scanner. When a tag is activated, its information is transmitted to the scanner.



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