

EcoBuild – a competence centre for eco-efficient and innovative wood-based materials

Message from the Manager

Thank you for the past year and for all the stimulating activities in the centre! A true "EcoBuild feeling" has been built, and it involves a large number of very competent persons, within SP, but above all also externally. We have made strong connections with key competences in the Nordic countries, Europe and North America, not only at universities/institutes but also with many good forces in the industry.

Together we bring the technical development forward within several really hot areas for the future concerning bio- and wood-related materials. SP Trätekt has grown during the last year – in total eight newly recruited researchers, more or less active in EcoBuild, and all eager to take on future challenges. The progress has been tremendous during the second year of EcoBuild. Many project results are close to or even in full industrial application.

We are many who carry the ideas for the basic concepts of the centre. Ideas are abundant, e.g. new and improved concepts for UV protection of wood by nanoadditives in clear coatings, various surface stabilisation methods, particle design for biocomposites, scale-up of acetylations for wood, particles and fibres, increased compatibility between wood and polymers etc.

The vision is that EcoBuild after Phase 2 is a sustainable and internationally competitive meeting place and platform for universities, institutes and industry to develop bio- and wood-based materials, mainly directed towards volume products for construction, joinery and furniture.

The main financiers, Vinnova, the Knowledge Foundation, and the Swedish Foundation for Strategic Research, have made possible good planning in advance by informing us about the requirements for a secured financing of Phase 2 (2010-2013). A new research programme will be formed during the spring of 2009, and a new grant application. The evaluation of Phase 1 begins in September. Talks will very soon be initiated with all industrial co-financiers about the continued research priorities, and during the autumn we must sign new three-year contracts. We certainly feel the effects of the widespread financial crisis, but we remain confident and hopeful about a continued active participation and co-financing by industry.

2009 will doubtlessly be a year when EcoBuild will put to the test in full.

Happy New Year

Magnus Wålinder

EcoBuild Annual Meeting and Seminar

All EcoBuild participants are warmly welcome to EcoBuild's Annual meeting and seminar on February 2. The meeting will be held at Spårvagnshallarna, Birger Jarlsgatan 57 A in Stockholm City.

The meeting starts with registration and coffee at 9.30 to 10.00 am. Thereafter the program will consist of the following oral presentations.

- Seminar Opening and Introduction: *Dr. Magnus Wålinder, Centre Manager, SP Trätekt/KTH Building Materials*
- EcoBuilds R&D activities – a summary: *Dr. Mats Westin, Deputy Centre Manager, SP Trätekt*
- Sustainability benefits related to wood protection & material substitution: *Dr. Ed Suttie, Director, BRE Timber; and EcoBuild Scientific Council*
- Comparing soy protein isolate and wheat gluten as biobased binders for the wood industry (Sub-projects 1 & 12): *PhD student Petra Nordqvist, KTH Fiber & Polymer*
- Clear coatings for wood in outdoor use – project overview (Sub-project 4): *M.Sc. Ylva Kärrfelt, Project Leader, SP Trätekt*
- Nano additives in clear coatings for wood (Sub-project 4): *Dr. Anwar Ahniyaz, Researcher, YKI*
- Air drying polycarbonate-polyurethane dispersions for wood coating applications (Sub-project 9): *Dr. Emma Östmark, Postdoc, SP Trätekt and KTH Fiber & Polymer*
- Furfurylated wood – Quality control & a boat deck case study (Sub-project 17): *Dr. Stig Lande, Research Manager, Kebony ASA*
- Ice formation and liquid condensation in cellulose insulation ECO Vind (Basic research project within project area 5): *PhD Student Thomas Vrana, KTH Building Materials*
- Prediction of Service life and WoodExter (Sub-project 19): *M.Sc. Jöran Jermer, Head of Materials & Products, SP Trätekt*
- Modified wood and some aspects on ecotox effects and new analytical tools based on molecular biology (Sub-projects 22 & 23): *PhD student Annica Pilgård, SP Trätekt/Dr. Gry Alfredsen, Forest & Landscape*

The meeting will end at 5 pm.

ECWM4

The 27-29 April 2009 are the dates for ECWM4, or the 4th European Conference on Wood Modification. The conference is arranged in Stockholm by SP/EcoBuild in cooperation with KTH. A record number of abstracts for papers have been submitted from 30 countries, and the selection of these has just been completed. We also count on a large number of participants, and we look forward to a very successful conference! The intense scientific programme is supplemented by several exciting social activities that will give many occasions for new contacts. There is particularly good reason for many who are active in EcoBuild to register for the conference, which has a special EcoBuild focus during its third day. Read more on the home page www.ecwm4.com, and register already now!

Centre Management



Magnus Wålinder
Centre Manager



Mats Westin
Deputy Centre Manager

Metal free wood preservatives



EcoBuild's sub-project 20 focuses on studies of the durability properties of wood that has been treated with metal free preservatives. The development rate of this group of preservatives has increased markedly during the last five years, depending on expected or already instated restrictions and bans on traditional metal-containing treatments. Partners in this sub-project are some of the globally leading manufacturers of preservatives: Arch Timber Protection (UK), Osmose, Dr Wolman GmbH and Viance LLC.

New types of preservatives will be evaluated in several ways, both in lab trials and in field tests. One field test is carried out according to the European standard EN 330 (L-joint method). This test was recently started in the test field in Borås, see picture. It will give new experiences to SP Trätekt, since the method is used for the first time at SP. The exposed specimens will be evaluated each year during the course of the project.

Advances in coating projects



In the clear coating project different strategies have been tested in order to protect the wood from UV radiation. In order to obtain maximal effect, various strategies can be used within the same treatment. To find the optimal combinations is the main target in the Masters project just started at UBC. Under the guidance of Phil Evans the Master student Stephan Vollmer will work with optimisation of pre-treatments, clear coatings and additives to clear coatings.

As a start, a big number of combinations will be exposed to accelerated ageing. In this context a new method will be developed in order to quantify the erosion of the wood with confocal profilometry. Former developed methods at UBC are to measure weight loss and loss of tensile strength of thin veneers.

Stephan Vollmer, who is a Bachelor from the University of Applied Sciences Rosenheim in southern Germany, visited the EcoBuild centre in December 2008. Stephan will have close cooperation with the centre in Stockholm, since his studies and development of methods will be very useful for a PhD project on epoxidised oils which will start at SP Trätekt in the spring of 2009.

After initial trials to use coil coating on heat treated wood, the study was expanded to also incorporate acetylated and furfurylated wood. As has been reported before, the solvent used in this product has been partially replaced with methyl esters of fatty acids from renewable resources, which acts as a reactive diluent.

Full activity in the protein adhesive project

There is full activity in the protein adhesive project ("Novel agro-protein based board resins"). The EcoBuild Ph.D. student Petra Nordqvist has just submitted her first manuscript for publication with results from the project. The publication includes a comparison of gluing tests of beech veneers using protein dispersions of wheat gluten and soy protein. The results are clear and show that the protein dispersions have a potential as glue and that there are some differences between the two protein types. Petra is supported by diploma worker Dahlia Eltfat Thedjil who works within the same project. The EcoBuild Ph.D. student and Casco employee Sara Khosravi is working with protein-glued boards in lab scale. Sara has shown that it is possible to make particle boards of good quality glued with protein glue. Within EcoBuild work is in progress on making OSB (oriented strand board) for comparison of different biobased glues for boards.

The scientific council

It is of utmost importance for an excellence centre as EcoBuild to ensure the scientific foundation for the work performed. A scientific council has now been installed, consisting of

- professor Ulla Westermark, Stockholm, with expertise in wood chemistry and ultrastructure of wood
- professor Ton Broekhuis, Univ. of Groningen, Netherlands, with expertise in "green chemistry" and adhesives
- Dr. Ed Suttie, BRE, UK, with expertise in wood coatings and wood durability

The advice from the council will give guidance and support to the scientific operations of the centre. The council will produce a short annual report, and they are expected to visit the centre at least twice a year. An open lecture or seminar is planned in connection with a forthcoming visit.

Upcoming conferences

- 30–31 March 2009: 4th Wood Fibre Polymer Composites International Symposium, Bordeaux, Frankrike
- 27–29 April 2009: 4th European Conference on Wood Modification, ECWM4, Stockholm (www.ecwm4.com)
- 11-13 May 2009: International Conference on Wood & Biofiber Plastic Composites & Cellulose Nanocomposites Symposium, Monona Terrace Community & Convention Center, Madison, Wisconsin, USA (<http://www.forestprod.org/confcomposites09.html>).
- 4-6 June 2009: 7th International Conference "Wood Science and Engineering in the Third Millennium" – ICWSE 2009, Brasov, Rumänien
- 14-17 June 2009: 12th EuCheMS International Conference on Chemistry and the Environment, Stockholm Sweden (<http://www.chemsoc.se/sidor/KK/icce2009.htm>).
- 21-23 June 2009: Forest Products Society 63rd International Convention, Doubletree Hotel Boise-Riverside, Boise, Idaho, USA (<http://www.forestprod.org/confic09.html>)
- 22–23 September 2009: Third International Coating Wood and Wood Composites Conference: "Durable and Sustainable – Today and Beyond", Charlotte, NC (<http://www.coatingstech.org/Programs/index.cfm?event=ACSeriesDetail2>)
- 28-30 September, 2009: International Conference on Wood Adhesives 2009, Harveys Resort Hotel & Casino, South Lake Tahoe, Nevada, USA (<http://www.forestprod.org/confadhesives09.html>)

Area 4: Modified Wood & Fibres

The presentation of active researchers in EcoBuild here continues with the fourth technical area, Modified Wood & Fibres. A few key words are given for each person, giving a glimpse of their professional profile.

Sub-projects:

Dp14 Modified wood

Dp15 Modified wood fibre products

Dp16 NMR studies of modified wood

Dp17 Quality control of furfurylated wood

Dp18 NIR for modified wood

Area coordinator: Pia Larsson Brelid, Ph D, SP Trätekt
Wood modification, Wood protection, Mechanical/
chemical/biological properties, Process development



Mats Westin
PhD, Sp Trätekt and
centre management
Durability, Wood modifi-
cation, Chemical analysis,
Wood material science



Lars Nordstierna
PhD, SP Trätekt/Chalmers
NMR-spectroscopy
Controlled release of actives



Per Persson
PhD, Perstorp Specialty
Chemicals AB
R&D: Engineer, Coatings
binders, Organic synthesis



Roger Rowell
Professor, Forest Products
Laboratory, Madison
Wood chemistry, Wood
modification, Polymer chemistry,
Composites



Daniel Holmberg
Eng., SP Trätekt
Test methodology,
Mechanical properties,
Durability



Jonas Danvind
PhD, SP Trätekt
Wood drying, Heat treat-
ment, Wood physics



Johan Oja,
PhD, SP Trätekt
Metrology, Process control
engineering, Multivariate
statistics



Emma Östmark
PhD, SP Trätekt
Polymer synthesis, Macro-
molecular architecture,
Grafting, Renewable materials



Tomas Andersson
M.Sc., CEO Röggletröskeln



Ulf Andersson
Scandinavian Finewood
Product development,
Market aspects



Mark Lawther,
Professor, Biovelop
Polysaccharides (non-starch),
Proteins, Enzymes, Lignin-
cellulose cross-links, Fibre
modifications, bio-based binders



Henrik Egnell
M.Sc., Bergs Timber
Wood protection,
Oil impregnation of wood



István Furó
Prof., KTH NMR-centrum
Physical chemistry, NMR and
MRI, Interactions of polymers,
Moisture dynamics



Stig Lande
Dr., Research Manager, Ke-
bony ASA
Wood modification,
Furfurylation, Durability



Rune Simonsson
Prof. em.
CTH Skogindustriell kemiteknik,
CEO A-Cell Acetyl Cellulosics
Process development, Chemical
modification of wood



Jan Ahlby
Guteform

Key facts about EcoBuild

EcoBuild is a competence centre for cooperation between universities, institutes and industry. The centre is located in the Stockholm campus site of KTH and SP Technical Research Institute of Sweden. The 35 industrial partners cover the whole range from small and medium-sized enterprises to large international corporations, and several of them are based abroad.

The centre is estimated to have a turnover of ca. 100 MSEK during the period 2007-2012. VINNOVA, the Knowledge Foundation and the Swedish Foundation for Strategic Research contributes with 40 MSEK. The industry co-finances with 60 MSEK, half of which is as cash contributions and the rest with their own work.

At the moment ca. 107 persons are connected on to the activities of EcoBuild. Around 80 researchers are directly involved in the projects. 42 of these are senior researchers, out of which 34 have a PhD degree. Ca. 56 pursue their research mainly at institutes or universities and ca. 25 at the partner industries. The cooperation is reinforced by several cases of double affiliation. 5 PhD students work directly as EcoBuild students, and another 3 external students work within connected projects.

Industrial partners and financers

AB Bitus, A-Cell Acetyl Cellulosics AB, Akzo Nobel Industrial Coatings AB, Akzo Nobel Nippon Paint AB, Arch Timber Protection, BioVelop A/S, Byggelit AB, Casco Adhesives AB, DanAcell Danmark A/S, Dr. Wolman GmbH - BASF Group, Guteform AB, IKEA of Sweden AB, Karlson Husindustrier AB, Kebony ASA (tidigare WPT), KIRAM AB, Lammhults Möbel AB, Norrskogs Forskningsstiftelse/NWP, Ofk Plast AB, Osmose Denmark A/S, Perstorp Specialty Chemicals AB, Primo Sverige AB, Røgle Tröskeln AB, Scandinavian FineWood AB, SF Marina Wallhamn AB, Slottsbro AB, SSAB Tunnpå AB, Sveaskog, Swedish Cable Channel System AB (SCCS), Svenska Lantmännen, Corporate R&D, Södra Skogsägarna, TanumsFönster AB, Vest-Wood Sverige AB (Swedoor), Viance (tidigare CSI), VIDA Packaging AB.

Centre Board

Ralph Nussbaum, Research Manager Coatings IKEA
Lars Stigsson, CEO KIRAM
Eva Hörwing, CEO Byggelit Holding
Ulf Odda, General Manager Casco Board Systems (Akzo Nobel)
Hans Thulin, (ordf.) CEO TanumsFönster
Per-Erik Petersson, CTO Chief Technology Officer/Prof SP
Istvan Furó, Prof KTH
Per Brynildsen, Research Director Kebony

Main financers of the Centre



Knowledge Foundation <<



Newsletter from EcoBuild
Editor: Finn Englund
Phone: +46 (0)10-516 50 00 • E-mail: finn.englund@sp.se

Sender: SP Träteknik
Box 5609
Visiting address: Drottning Kristinas väg 67
SE-114 86 STOCKHOLM

EcoBuild 
Institute Excellence Centre for eco-efficient and
durable wood based materials and products