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

EcoBuild
NEWSLETTER 2008-1

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

Message from the Manager

The first year of EcoBuild can be summarized simply: The basic organisation of the centre is now established and the research is running well. A big challenge has been to find an efficient structure for the all-important communication and administration of information within the centre. The newsletter and the home page are two important channels for information, both internally and externally. In addition, the internal web forum is crucial for the handling of the information within the various sub-projects. The web forum has taken time to build, mainly because it is based on new software that EcoBuild has been a pioneer user of within SP. The high security requirements have also required particular care in distributing the rights to share information in the complex system of activities.

Regarding the research within the centre, the activities of the original programme have been successfully started. In accord with the plans, practically all of the 22 defined sub-projects have been launched, and ca 3/4 of them are progressing at full speed.

The centre has been well marketed. The home page is increasingly well visited, and we have received several inquiries from large and small companies, showing interest to join. Scandinavian Fine Wood entered as a new partner in EcoBuild in the beginning of 2008, and the board has approved another two producing companies in the wood sector and a large company with a wide spectrum of interests. The names of these will of course be published as soon as all formalities are settled.

In early March this year EcoBuild was subjected to its first evaluation by an external panel, commissioned by the governmental financing agencies. The panel visited the centre in Stockholm and was received by the centre management and four other representatives from the EcoBuild partnership. Mats and I gave a quick overview of the development during the year, and the panel then posed their examining questions. The evaluation was chiefly aimed at the efficiency of the centre organisation, and a report with the conclusions of the panel is presently being prepared by the panel. Our impression is that the panel reacted very positively to our description of the centre.

An annual report has been compiled by the centre management, and it is now going through its final editing. It will be ready and published on the internal web forum in the beginning of April.

Magnus Wålinder

Centre Management

Magnus Wålinder
Centre Manager

Mats Westin
Deputy Centre Manager

The transatlantic link is strengthened

Prof. Roger Rowell is back in Stockholm during the period 22 March - 7 May for a new session of work at EcoBuild in Stockholm and Borås.

Prof. Phil Evans (U of British Columbia) paid a new visit to Stockholm 18-20 February. New contacts were established during a project meeting with Dp4 Clear Coatings and in other meetings with researchers at SP Trätek, KTH and YKI. We look forward to future opportunities to even better take advantage of Phil's broad and deep competence. During his stay he also held another seminar at KTH, Fibre and Polymer Technology, with the title "Wollemi Pine, Warts & New Approaches to Making Wood the Eco-friendly Material of the Future".

Phil gave glimpses of the broad research he has been involved in during the past 20 years. The seminar reached over a wide range from the discovery of the world's oldest tree species, the Wollemi Pine in Australia, over product improvement of wood cement composites, to plasma treatment of wood.

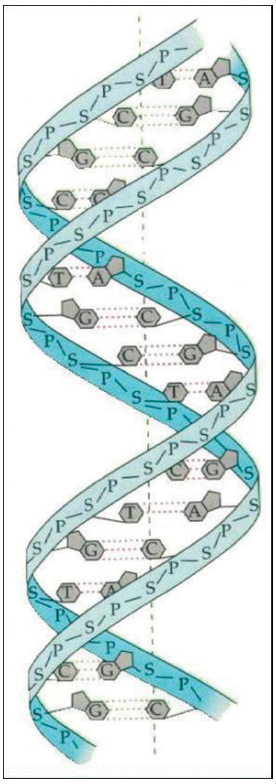
A fascinating study on the microanatomy of the tree genus Callitris, chiefly growing in Australia, showed hitherto unknown variations in the structure of the wart layers. He also showed the effect of fibre surface roughness on cell wall wettability. These findings might be helpful when developing low energy systems for transport of liquids.

The theme of his seminar in October was revisited in discussions of outdoor exposure of wood and different methods to protect it from degradation. Also shown were results from x-ray studies of distribution of adhesives in particle boards. All of us who saw the illustrative pictures and movies shown by Phil, will agree that there is a big potential for making more efficient use of adhesives in such products.

Home page statistics

Starting this year, an internal evaluation of the use of the EcoBuild home page is performed after each month. The statistics are very detailed, and the use can in fact be monitored day by day. All of this will not be accounted for here, but after three months it can be noted that on an average the number of visits is ca 10 per day. The traffic is increasing from other web sites that have links to EcoBuild, which can be interpreted as a growing number of people setting their eyes on this site, but it can also be a sign of an increased use of the internal web forum. The visitors are of course concentrated to Sweden, but in total the visitors of *ecobuild.se* represent 30 countries, with an increasing share in Asia, North America and South America.

Molecular methods for better understanding of decay in modified wood

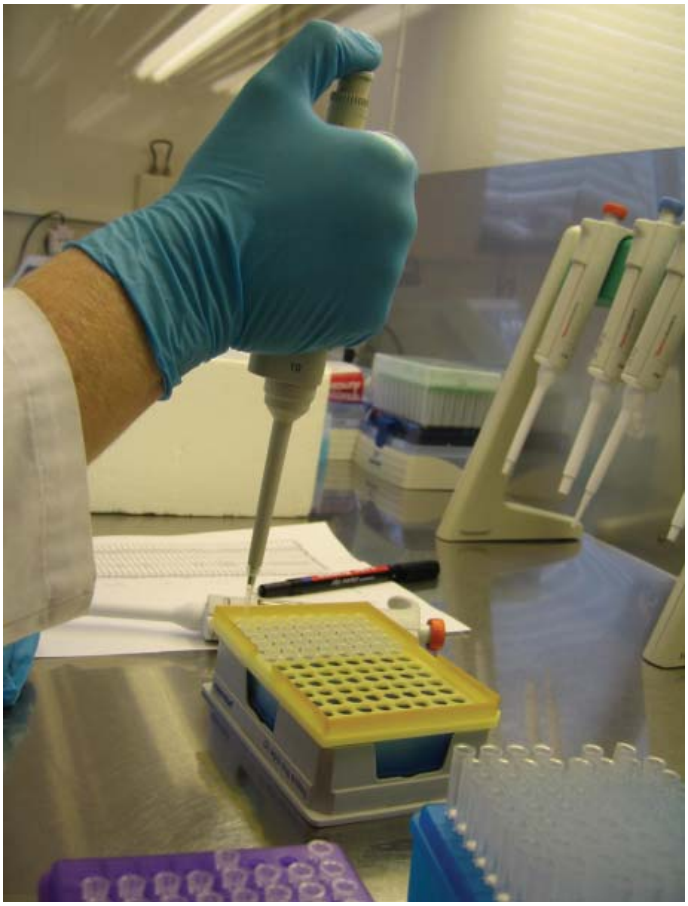


The area of wood protection is in a period of change. New wood protection systems have been developed, while their mode of action remains insufficiently understood. Also, the ongoing development of new wood protecting systems is hampered by the current dependency on long-term field tests. New accelerated test methods and novel methods for early detection and quantification of decay are therefore needed. The development of molecular methods provides potential tools to investigate the effects of decay fungi on modified wood and new protection systems.

The major goal of the present subproject is to gain knowledge about the degradative mechanisms utilized by decay fungi when exposed to modified wood. Molecular methods can give some of the answers, and one first step to tackle some of the unsolved questions is taken in this study. A specific and Quantitative Real-Time Polymerase Chain Reaction (QRT-PCR) assay was now established for identifying and quantifying early stages of fungal colonisation in modified wood and for profiling growth dynamics of the white-rot fungus *Trametes versicolor* through different stages of decay.

QRT-PCR was used to study the colonisation of three different wood modification systems (acetylation, furfurylation, thermal modification), two reference treatments (Cu-HDO, CCA) and untreated controls of Scots pine sapwood. The incubation time was 2, 4, 6, 8 and 10 weeks. While the fungal colonisation in untreated control samples showed a continuous increase during the experimental period, the amount of fungal DNA in modified wood had an initial peak after two weeks. In the following weeks the DNA amount declined to roughly half of the peak amount. The furfurylated samples had a lower fungal colonisation than all the other treatments except for Cu-HDO. In the reference samples of traditional wood preservation systems (Cu-HDO, CCA) the fungal colonisation trend was quite similar to that observed in modified wood, except that the amount of fungal DNA declined more drastically in these copper-based treatments than in modified wood.

These results will be presented at the IRG 29 Annual Conference in Istanbul, Turkey, on 25-29 May 2008.



Every QRT-PCR analysis involves up to 96 samples.

The second annual General Meeting

The General Meeting on 31 January summarized the first year of EcoBuild and described the plans for continued work during 2008. The event was well-attended. A little more than 40 participants, of which almost half represented the industrial partners, listened to accounts of the current development in the different technical areas and sub-projects. A large part of the overview was given by the centre management, Magnus Wålinder and Mats Westin, but a number of other area coordinators and sub-project leaders also appeared.

The formal meeting part was dealt with in a short time, and among other things the enrolment of some new industrial partners was reported. They are now 35 in total.

Special attention was given to the internal web forum, which was presented by Rune Ziethén. The web forum is indispensable for the sharing of information within the centre and for keeping all produced documents in order. The presentation was partly in the form of guidance to the users, and it was underlined that this forum has not reached any final form, but it will be subject to continuous changes. Further education and training in the utilization of the web forum will be offered whenever needed, chiefly to sub-project leaders.

Area 1: Biobased binders

The wide group of researchers active in EcoBuild will consecutively be briefly presented in this and forthcoming issues of the newsletter. For each person, a few key words are used to give a small glimpse of their respective profiles. We begin this time with area 1: Biobased binders.

Sub-projects:

Dp1 Novel agro-protein based board resins

Dp2 Bio-polyester

Dp3 Lignin/cellulose esters

Area coordinator:
Prof. Mark Lawther, Biovelop

Polysacharides (non-starch), proteins, enzymes, lignin-cellulose cross-links, fibre modifications, bio-based binders

Mats Johansson
Professor, KTH
Coatings, polymer synthesis, networks, renewable materials

Eva Malmström
Professor, KTH
Macromolecular architecture, dendritic polymers, controlled polymerizations

Sara Khosravi
Industrial PhD student,
Casco Adhesives

Adhesives, particle board and MDF, analysis

Peter Herder
R&D manager, Casco Adhesives
Project portfolio management, adhesives development for wood industry, patents

Emma Östmark
Ph D, SP Trätek

Polymer synthesis, macro-molecular architecture, grafting, renewable materials

(Emma is also freshly recruited from KTH Fibre and Polymer technology, where she just before Christmas successfully defended her doctoral thesis, entitled "Tuning Properties of Surfaces and Nanoscopic Objects Using Dendronization and Controlled Polymerizations".)

Ulf Odda
Casco Adhesives
R&D and Market manager, board adhesives

Petra Nordqvist
Industrial Ph D,
Casco Adhesives and KTH
Biobased wood adhesives, proteins

Farideh Khabbaz
Casco Adhesives
Research, biobased wood adhesives

Per Persson
Ph D, Perstorp Speciality Chemicals AB
R&D: engineer, coatings binders, organic synthesis

Stefan Lundmark
Innovation manager, Perstorp Specialty chemicals AB, R&D
Associate professor LTH, Polymer technology

Finn Englund
Ph D., SP Trätek
Organic synthesis, coatings, wood material science, environmental issues

Upcoming conferences

- 31 March – 2 April: 42nd International Wood Composites Symposium & Technical Workshop
  Seattle, WA, USA www.woodsymposium.wsu.edu
- 12 – 13 May: 10th International Conference on Progress in Biofibre Plastic Composites, Toronto, Ontario, Canada www.biocomposites-toronto.com
- 11-13 June: Nordic Polymer Days 2008, Stockholm www.polymer.kth.se/npd08
- 24-26 September: International Panel Products Symposium 2008, Esbo, Finland
- 14 – 15 October: PRA's 6th International Woodcoatings Congress "PRESERVE, PROTECT, PROLONG", Amsterdam, the Netherlands www.pra-world.com
- 14 – 16 October: Wood Plastic Composites 2008, Vienna, Austria www.amiplastics.com/ami/AMIConference.asp?EventID=135

Licentiate seminar: Lars Elof Bryne

At 10.15 on Friday the 16 May, Lars Elof Bryne at KTH Byggvetenskap will present his licentiate thesis. The title is "Aspects on wettability and surface composition of modified wood.", and his research deals with material surfaces, chiefly of modified wood. With sophisticated methods he has studied how ageing, also in protected indoor environments, affects wettability and glueability. The moderator is Charles R. Frihart, Forest Products Lab., Madison, WI. All interested are welcome to the seminar room at KTH Byggvetenskap, Brinellvägen 34.

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.

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
Lars Philipsson, Private
Per Brynildsen, Research Director Kebony

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, Rögle Tröskeln AB, Scandinavian FineWood AB, SF Marina Wallhamn AB, Slottsbro AB, SSAB Tunnplåt 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.

Main financers of the Centre

VINNOVA

IN PARTNERSHIP WITH THE Knowledge Foundation

Swedish Foundation for Strategic Research

Newsletter from EcoBuild
Editor: Finn Englund
Phone: +46 (0)10-615 50 00 • E-mail: finn.englund@sp.se

Sender: SP Trätek
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

SP INFO 2008:15