

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

Message from the Manager

The Centre Management and Board recently made a survey of the strengths, weaknesses, opportunities and threats of EcoBuild (a so-called SWOT analysis). An apparent strength is the successful recruitment of interdisciplinary competences to SP, for example in the fields of green chemical engineering, material science, and life cycle analysis. A total of 14 people (7 with a doctor's degree, 5 PhD students, and 2 MSc) have been enrolled since the spring of 2007. Another strong side is the engaged industry partners, who collaborate with researchers in both the institute and the university spheres.

Some of the most salient opportunities are that the development of "green" and eco-efficient materials and products is very topical at this point in time and that Swedish industry, institutes and universities must cooperate in order to be able to compete internationally in this field.

A SWOT analysis must be continually used and updated, in the day-to-day work but also in the strategic work with the long-term development of the Centre. We would like to hear also the views and ideas of centre participants concerning strengths, opportunities, weaknesses and threats for EcoBuild. You are welcome to give us further input! Please call or write to me, Mats or Finn, both now during the fall and later.

The Centre Management and Board have dedicated the 23–24 November to concentrated work on these issues and on the strategies for "Phase 3", i.e. the time after 2012, when the Centre is expected to survive "on its own". In the near future we also plan to perform another survey of customer satisfaction among the industrial partners of the Centre.

Magnus Wälinder

Centre Management



Magnus Wälinder
Centre Manager



Mats Westin
Deputy Centre Manager

Cellulose nanofibres in composites



Prof. Douglas Gardner from University of Maine visited EcoBuild in mid-October on his way to the Nordic-Baltic workshop in Estonia. While in Stockholm, he gave a very interesting lecture on nano-cellulose-containing thermoplastic composites. His presentation described several new materials with exciting properties and explained how cellulose in the nano-scale can give totally different effects than a more conventional fibre reinforcement.

7th International Wood Coatings Congress

The latest coatings conference in this series was arranged by the Paint Research Association PRA in Amsterdam 12-13 October 2010, on the theme Reducing the Environmental Footprint. A few SP scientists were among the 175 participants to report back to EcoBuild.

The conference covers coatings for both interior and exterior use. Environmental effects appeared as a keyword for many of the contributions, and control of VOC emissions continues to be a topical issue. Durability and test methods were also discussed by a large number of papers. Several new product developments were presented, and a trend can be seen towards more incorporation of nanomaterials and an interest to tailor coatings for modified wood and composites.

Nordic Baltic Network in Tallinn

The sixth conference of the Nordic-Baltic Network in Wood Material Science and Engineering (WSE) was held October 21-22 in Tallinn, Estonia. The event is particularly aimed towards PhD students, and this time over 70 people from ten countries had gathered. The programme contained 23 oral and 10 poster presentations. Introductory keynote lectures were given by Prof. Douglas Gardner from the University of Maine, USA on "Towards structural wood plastic composites: Technical innovations" and by our recurrent guest professor Roger Rowell, University of Wisconsin: "Heat treatments of wood to improve decay resistance". Student talks included studies on quality, moisture, strength, adhesion and treatability of pine wood, wood for flooring, modified wood and steam explosion for fiber production. The presentations will be available on the WSE website (www.wse.no). The next conference will be held next year in Norway.

Advances in wood modification

There is progress in the research in project 11, involving Kebony's wood modification with furfuryl alcohol and related chemistry.

Natural product thermosets are being synthesized for use in wood plastics composites to replace traditional thermosets such as polyethylene. The byproducts and waste from Kebony's wood modification process which are currently burned are being studied for use in Medium Density Fiber (MDF) board products.

Concurrent work includes the development of new wood protection products, originating from natural resources, to complement the current furfuryl alcohol products. New chemistries are being investigated including glycerol based polyesters and thiol-ene based materials.

Some of this research was presented at the 5th European Conference on Wood Modification (ECWM5) in Riga in September 2010 and will be presented at the "European symposium of photopolymer science" in Mulhouse, France, in November. This work involves the modification of wood with vinyl functional PEG oligomers and curing with electron beam radiation, and a paper has been submitted to the ACS Journal of Materials and Interfaces.

From ECWMS

The Fifth European Conference on Wood Modification was held in Riga, Latvia September 20-21, 2010. It was a somewhat smaller conference than the Fourth Conference held in Stockholm last year. This was partly due to the global economic downturn and partly due to the short time between conferences so that there were fewer new results to report. The meeting became a success, though, with many high quality presentations and posters. The conference programme consisted of eight sessions over the two days. The six sessions of full 20 minutes presentations covered, respectively, economics and products, chemical modification, thermal modification, resins and waxes and general environmental issues, panels and wood plastic composites, and weathering, surface properties and marine borers. Two of the sessions were devoted to posters, continuing on the established routine with 5 minutes presentations for brief overviews of each poster. The posters were displayed for the full length of both days. 14 corporate sponsors supported the conference.

It was obvious from the conference that chemical modification of wood has reached a higher level of maturity as compared to past conferences. There were fewer talks on new chemistries and more on properties, longer term performance and applications. A greater emphasis on environmental issues could be discerned, e.g. in papers on carbon footprint assessment for acetylated wood, on recycling chemically modified wood and on analysis and toxic hazards of leachates from chemically modified wood.

An ambitious social and cultural programme helped to make the conference a truly memorable event. An organ concert at the Riga Cathedral on the first night was followed by a reception at the Museum of the History of Riga and Navigation. A jazz group entertained us during the reception, and the first technical session opened with a French horn quartet favoring us with two classical pieces. The second night, a fine dinner was held in the beautiful Small Guild Hall.

The 6th European Conference on Wood Modification will be held in Ljubljana, Slovenia, September 17-18, 2012.



Silentwood – a new EU-project

One of the most important measures in an evaluation of a centre as EcoBuild is the extent of spin-off effects in the form of new projects, activities and contracts that are generated. It is particularly valuable if such effects also produce results that directly nourish the centre in return.

The EU project Silentwood started in the beginning of the summer. The SME-targeted* project aims at developing new door constructions using novel material combinations, leading to competitive doors with high sound reduction indices. The goal is to reach a high proportion of renewable material sources. This primarily means using wood and materials with a wood origin, but also other plant fibres can be used. SP has an important role in the consortium, and we see opportunities for getting inspiration from the development of composites in EcoBuild as well as for contributing in the other direction. Contact person: Finn Englund.

* SME = small and medium-sized enterprises

Upcoming conferences

- 22-24 March 2011: 3rd Nordic Wood Biorefinery Conference (NWBC), Stockholm, Sweden. <http://www.innventia.com/nwbc2011>
- 28-30 March 2011: European Coatings Congress, Nürnberg, Germany. <http://www.european-coatings-show.com/en/congress/>
- 12-15 April 2011: DBMC XII - 12th International Conference on Durability of Building Materials and Components, Porto, Portugal. www.fe.up.pt/12dbmc
- 16-18 May 2011: Wood & Biofiber Plastic Composites, Madison, WI, USA. <http://www.forestprod.org/woodandbiofibercomposites/index.html>
- 16-17 June 2011: International Conference on structural health assessment of timber structures, Lisbon, Portugal. <http://shatis11.lnec.pt>
- 29-31 August 2011: BIOPOL 2011, the 3rd International Conference on Biodegradable and/or Biobased Polymers, Strasbourg, France. Home page not yet available, but see <http://biopol.free.fr/index.php/after-bio-pol-the-blog-biopol-the-conference/>
- 31 August – 2 September 2011: Novel Materials from Wood or Cellulose, Stockholm, Sweden. www.innventia.com/iaws2011

Focus area 1 Biobased binders

In five issues of this newsletter, from 2008-1 to 2009-2, we have presented all active researchers with portraits and a few keywords selected by the respective person. We know that this has been appreciated, and it is time to repeat and update. Many co-workers are no longer in the consortium, but above all, many have joined. This time we start over with Focus Area 1.

Projects P1 Protein binders
P2 Emulsion polymerization
P3 Extractive derivatives

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



Per Brynildsen
Kebony
Wood modification,
market, technical
development



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



Magnus Eriksson
Polymers, adhesives
surface treatment,
biochemistry



Mark Lawther
Prof., Biovelop
Polysaccharides (non-starch)
proteins, enzymes, lignin-cellu-
lose cross-links, fibre modifi-
cations, 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



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



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



Emma Nordell
Project manager, Lant-
männen R&D. MSc and
ex-trainee.
Research in agriculture
and energy, innovation
management



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



Farideh Khabbaz
Casco Adhesives
Research, biobased
wood adhesives



Mats Larsson
R&D Director, Lantmännen.
Ph D in Biotechnology.
Research in food,
agriculture and energy

Nya publikationer

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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 27 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. 140 MSEK during the period 2007-2012, spin-off effects included. VINNOVA, the Knowledge Foundation and the Swedish Foundation for Strategic Research contributes with 40 MSEK. The industry co-finances with 65 MSEK, half of which is as cash contributions and the rest as their own work efforts.

At the moment ca. 120 persons are connected to the activities of EcoBuild. Around 80 researchers are directly involved in the projects. 71 of these are senior researchers, out of which 46 have a PhD degree. Ca. 40 pursue their research mainly at institutes or universities and ca. 40 at the partner industries. The cooperation is reinforced by several cases of double affiliation. 8 PhD students work directly as EcoBuild students, and another 2 external students work within connected projects.

Industrial partners

Akzo Nobel Industrial Coatings AB, Akzo Nobel Industrial Finishes AB, Arch Timber Protection, BioVelop A/S, Byggelit AB, Capeco AB, Casco Adhesives AB, Dellencat, Dr. Wolman GmbH - BASF Group, Eastman Chemical Company, Heatwood AB, Hennes & Mauritz AB, IKEA of Sweden AB, Jeld-Wen Sverige AB, Kebony ASA, KIRAM AB, Norner Innovation AS, Ofk Plast / Polyplank AB, Osmose Denmark A/S, Perstorp AB, SSAB Tunnpålat AB, Svenska Lantmännen, Svenskt Konstsilke AB, Södra Skogsägarna, TanumsFönster AB, Vestre AB, Viance.

Centre Board

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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
Pernilla Walkenström, Swerea IVF
Per Brynildsen, Research Director Kebony

Main financiers 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

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