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

Message From the Management

2012 has been a year of change. The year began with an annual meeting, where the new centre management was presented and where the new partner Holmen was welcomed. Many other changes have ensued, and the greatest change takes place now at the turn of the year, when EcoBuild Phase 2 ends and an, in principle, unlimited “Phase 3” begins. Many things will remain the same, though. EcoBuild continues to strive towards a vision which is very similar to the one we have had before our eyes in Phase 2: “EcoBuild is an internationally leading and progressive meeting point for cooperation between industry, institutes and universities for the development of ‘green’ chemical technology for eco-efficient and durable wood- and biobased products.” This remains a very topical and dynamic field of research.

A plan for a common centre, hosted by SP and Swerea IVF, has been elaborated during the year, and it is launched at the onset of 2013. This development is very exciting, and further changes will take place during the coming year. Among other things, a couple of new areas will be introduced in EcoBuild due to the complementary competences at Swerea IVF. Our provisions are distinctly different, now continuing without the direct financial basic support from Vinnova, the Knowledge foundation and the Swedish Foundation for Strategic Research. We now turn also to other financiers of various kinds who take an interest in developments as the ones offered through the centre. We can also count on a direct support from both host institutes as part of our backbone. Membership fees from all partners will help us to maintain the common centre activities. Read more about this below under EcoBuild 2013.

The Sixth European Conference on Wood Modification (ECWM6), held in Slovenia in September this year, was a very gratifying event to attend as a manager for EcoBuild. The centre was marketed well, and many fine contributions were made by centre participants. In addition, Dennis Jones of SP Trä and EcoBuild was active in the scientific committee and had a chief responsibility for the conference publications. Read more about the conference below.

With this I want to express my gratitude to all participants in EcoBuild for excellent efforts during EcoBuild Phase 2, and at the same time I open the door to EcoBuild 2013!

A big THANK YOU!

Emma Östmark

Centre Management

A few words from the editor

This issue of the newsletter is special in several ways. According to the plans, 2-3 issues have been produced each year 2007-2011, but no previous issues were made during 2012. We have certainly had much to write about, but on the final lap of the fantastic six-year period with support from the three big research financers the work load has forced us to rethink our priorities. The newsletters can of course never mirror everything that happens within a large program like EcoBuild, but in this issue you will see at least a few glimpses of some highlights. The other aspect that makes this issue so special is that it marks the start for the second life of EcoBuild, an exciting new phase that we look forward to with eagerness and confidence. This is also the last issue that will be freely distributed to non-members as well as members.

EcoBuild 2013

A new phase ensues, and EcoBuild will hereafter be hosted by two institutes: SP and Swerea IVF. A close collaboration and a growing number of common projects have paved the way for a common centre from 2013. The centre management will now consist of Emma Östmark, SP, centre manager, and Jonas Aspling, Swerea IVF, deputy centre manager. They will form a management team together with research coordinators Mats Westin, SP, and Martin Stråät, Swerea IVF, and the university coordinator Magnus Wälinder, KTH/SP. A new feature this year is a modest membership fee that active partners contribute with to support common centre activities.

The focus areas remain mostly unchanged: 1) biobased binders & coatings, 2) biocomposites, 3) biotextile fibres & technical textiles, 4) modified wood & fibres and 5) durability & eco-efficiency. Binders and coatings have so much in common that they now are drawn together in one area, and the other change is thus that the growing area of textile fibres forms a new focus area. A more comprehensive presentation of EcoBuild 2013 is promised in the next newsletter issue.

EcoBuild on a wave of success (new meets old)

The proud vessel that was built by boatbuilders Tunarps Båtbyggeri for EcoBuild was delivered in the end of May. It has now been tested as a tenderboat to a classic, slender sail yacht, incidentally celebrating its 100th anniversary this year, which made the boats a handsome pair. The dinghy is built with the strip-plank technique
The February 2013 annual meeting

Next annual meeting will have a special significance, now that EcoBuild continues on its trajectory, but under new conditions. As usual, it will be an opportunity to get an overview of the broad field of activities of the centre. Everybody participating during phase 2 are welcome to attend, as well as new partners for 2013.

The annual meeting will be held at KTH (Stockholm) on the 7th of February, approximately between 10 and 16. A separate invitation with more details will very soon be sent out.

A strong footprint in Ljubljana

Now recognized as the world's foremost conference on wood modification, the Sixth European Conference on Wood Modification was held in Ljubljana, Slovenia in September 2012. This year's conference saw 150 persons from industry and academia attending, listening to a range of presentations over the 2-day duration. EcoBuild, who had a special session in the Fourth conference held in Sweden in 2009, had a very strong presence, reflecting the importance in modified wood in various EcoBuild projects and activities. Dennis Jones of SP Trä / EcoBuild was part of the organizing and scientific committees and was also being responsible for the scientific editing of all papers submitted.

The conference had sessions dealing with economics, products and the environment, chemical modification, performance, thermal modification, surface modification and weathering, and methodology, as well as two additional poster sessions. EcoBuild was linked to no fewer than 16 papers at the conference, with EcoBuild members from Sweden and Norway presenting ongoing work, whilst professors Roger Rowell and Phil Evans also presented papers on the use of acetylated wood for musical instruments and the performance of coated modified wooden claddings, respectively.

The success of this conference was demonstrated by its links to two COST (Collaboration in Science and Technology) Actions dealing with wood science and technology. The 7th European Conference for Wood Modification (ECWM7) will be held in Lisbon on 10-12 April, 2014.

Course to the future

During two intensive weeks in April, a PhD course in Wood chemistry, biocomposites and building materials was given by Prof. Em. Roger Rowell at SP Trä for 25 students.

The course was arranged for the second time, in a collaboration between KTH Building materials and EcoBuild. The course curriculum included wood structure and chemistry, but also discussions on degradation mechanisms, the protection of wood, and various ways of utilising wood for different construction purposes.

Not only the basics of wood anatomy and chemistry were treated, but also production, manufacture and applications of different kinds of treated or modified wood and wood-plastic composites.

"Inspiring! A real kick-start of my doctoral studies!" says Rebecka Ringman, who just began as a PhD student at SP Trä.

"Roger was very pedagogic. He showed that a broad knowledge in wood science often is necessary for the ability to draw the right conclusions in specialised areas"", says Gustav Sandin of SP Trä.

Professor Rowell has also spent a two month period during the autumn in one of the available rooms in the EcoBuild corridor at SP in Stockholm where he made greatly appreciated efforts to support PhD students with discussions and reviewing manuscripts for publications and thesis reports.

8th meeting of the Northern European Network for Wood Science and Engineering (WSE)

In September 2012, researchers and students within the field of wood science and engineering gathered for two days at the 8th annual meeting of WSE held in Kaunas, Lithuania. This year's conference consisted of 32 oral scientific presentations and 10 poster presentations. Prof. Em. Roger Rowell and Prof. Callum Hill also gave inspiring keynote lectures. The meeting is an excellent forum for experienced and early-stage researchers from the Nordic, Baltic and North Atlantic regions to meet and discuss their research and also to start up cooperative and international research projects. The network has recently expanded somewhat from its origin as a purely Nordic-Baltic affair. In 2013, the meeting will be held in Hannover, Germany on September 11-12 (see link below under Conferences).

Probing deeper into fungal mysteries

Annica Pilgård has received a four year grant of nearly 6 MSEK from the Swedish research council Formas. The study, performed mainly at the Technical University of Munich, includes a state of the art approach to elucidate decay mechanisms of brown-rot fungi...
New academic degrees

**Sara Olsson**, SP, won her title of Licentiate of Technology on the 27th of April 2012 by presenting her thesis “Enhancing UV-protection of Clear Coated Wood by utilizing Reactive UV-absorber and Epoxy Functionalized Soybean Oil”.


**Martin Kihlman, Karlstad University**, also became Licentiate of Technology when he presented his thesis “Dissolution of cellulose and SP. She works with dissolution and regeneration of cellulose in the projects CelluNova and ForTex.

**Magdalena Sterley**, SP, defended on the 1st of June 2012 her thesis “Characterisation of green-glued wood adhesive bonds” at the Linné University in Växjö.


**Petra Nordqvist**, KTH, defended on the 1st of June 2012 her thesis “Exploring the Wood Adhesive Performance of Wheat Gluten” at KTH in Stockholm. She now bears the title PhD and she is here seen crowned by a wreath of wheat ears.


**Kristoffer Segerholm**, SP/KTH, defended on the 7th of December 2012 his thesis “Characteristics of Wood Plastic Composites Based on Modified Wood: Moisture properties, biological performance and micromorphology”.


for various wood modifications. The main objective is to obtain information about the protection mode of modified wood and to reveal the biochemical mechanisms utilized by decay fungi when attacking wood, especially modified wood with its altered material properties. The results may help to increase the use of wood with an enhanced service life to ensure maximal storage of carbon in the built environment.

- We have chosen laboratory testing, before field testing, for this study to avoid complicating factors such as growth of other species, varying weather conditions, etc, says Annica. We will thus gain information solely about colonization and gene expression of the chosen brown rot fungi *Postia placenta* under these artificial conditions. However, we strongly believe that this information will be valuable in the research of decay of modified wood in the field.

**ForTex – a very tangible spin-off**

SP Trä leads since September 2012 a new large project, ForTex, within VINNOVAs programme “Utmaningsdriven innovation”, with the goal to produce textile fibres from Swedish forest biomass in an eco-efficient way.

The project is an applied extension of the CelluNova project, which has run within the EcoBuild frame since 2010. ForTex will also run within EcoBuild. Its background is the difficult market situation for the Swedish pulp & paper industry regarding bulk products like newsprint. The global consumption of newsprint is decreasing rapidly and furthermore such products are made much more cheaply from e.g. fast-growing Eucalyptus than from our slow-growing forests. A business development towards new market segments is therefore urgent for the cellulose industry. In contrast to the traditional pulp & paper industry, the textile industry shows a strongly increasing demand for cellulose based alternatives to cotton fibres, since the cotton production is not expected to increase (“peak cotton” seems to have been reached) and furthermore the sustainability in the cultivation of cotton is questioned.

The basic idea behind ForTex is to utilise the capacity and equipment in present pulp mills and to integrate this with fibre spinning plants. During its two years the project will explore and chart all necessary preconditions for a demonstration plant at a Swedish pulp mill.

The industry consortium involves Södra Cell and KIRAM AB, representing the early parts of the value chain from pulp to textiles, and H&M and IKEA, who represent the later parts, including the consumers.

Researchers from SP, Swerea IVF, and Innventia are in charge of the work packages of the project. The budget amounts to 20 MSEK, with Vinnova bearing half of the costs.

**Newly employed**

**Petra Nordqvist** (see picture under Degrees) has during the autumn worked mainly at SP and to a smaller extent at Casco, in a direct continuation of EcoBuild project P1 where she was engaged during her student period.

**Ralph Nussbaum** was for many years a coworker at Trätte, the predecessor of SP Trä. During a 10 year long exile with IKEA of Sweden he then worked with quality and environment issues, linked to coatings, adhesives, the use of chemicals etc. Ralph returned to SP Trä in September and he has now the project leader responsibility for the new and important ForTex project.

**Rebecka Ringman** was employed in April as a PhD student and now works together with Annica Pilgård both at SP in Borås and at the Technical University of Munich. Rebecka has a licentiate degree in microbiology and is now using molecular methods to study how brown rot degrades wood.

**Alberta Mok** was employed during the autumn as an industrial PhD student, installed at both Chalmers and SP. She works with dissolution and regeneration of cellulose in the projects CelluNova and ForTex.
Upcoming conferences

- 6-7 May 2013: Advancements in fiber-polymer composites: wood fiber, natural fibers and nanocellulose, Milwaukee, WI, USA. http://www.woodema.org
- 29-31 May 2013: Innovation as the source of value in the forestry, wood processing and furniture manufacturing, Gdansk, Poland. See http://www.woodema.org
- 9-11 June 2013: 67th FPS International Convention and 56th SWST International Convention, Austin, TX, USA. http://www.forestprod.org/ic/program.php
- 23-24 September 2013: 6th International Symposium on Wood Fibre Polymer Composites, Biarritz, France. Abstracts to woodpolymer@fcba.fr

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


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Main financiers of the Centre:

VINNOVA

Knowledge Foundation