



"Wood will meet the demand for eco-friendly and cost-efficient construction material." Erik Larnøy, Norwegian Forest and Landscape Institute, coordinates the network Wood Science and Engineering. Photo: Mats Hannerz

Wood – the eco-friendly Nordic material

A post office in wood without preservatives, but protected with the new invention PLEOT. Photo: Andreas Treu.

Wood is an environmental-friendly, durable and adaptable material for house building and many other purposes. Wood constructions have a long history in northern Europe, although, recently, timber has had to compete with steel and concrete. However, it is still a viable alternative, and new inventions have increased the potential uses of wood in construction.

"There is an increasing demand for eco-friendly and cost-efficient products in construction, and wood will meet this demand", says Erik Larnøy, coordinator of the SNS-supported network Wood Science and Engineering.

He is convinced that there will be a prosperous future for wood in construction. Wood has been the dominant cladding material for small houses for centuries. In the Nordic countries, there is now a trend for also using wood in larger constructions.

Wood is often highlighted in new public constructions such as opera houses, airports and bridges. In addition, projects are underway in all countries to boost the use of wood in apartment blocks, where wood has a lower market share today.

The increased research focus on the protection of wood against fire will contribute positively to this development.

Challenges

But the increased use of wood also poses challenges. In nature, wood functions as a tree stem that is water-saturated. When used as engineering and building material, its water content is generally much lower. Drying processes can result in unwanted twisting and cracks, and dry wood is sensitive to moisture-induced stresses and deformation.

At a critical moisture level there is a risk that untreated wood can be attacked by microorganisms – but the use of conventional wood preservatives is becoming more and more restricted.

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“Modern research in chemical engineering, biotechnology and material science give us a totally new basis for studying and understanding the complicated interaction between water and the substance of wood, and to develop new bio-based modifications”, he says. Many new inventions to modify or protect wood have been born in the Nordic countries, such as PLEOT (see below).

The network assembles wood scientists from the Nordic and Baltic countries to meet, cooperate and share resources. It was officially launched in 2004, but cooperation has a longer history. Its predecessor “Nordiska samarbetsgruppen för virkeslära” (Nordic cooperation group for wood science) was established in the early 1970s, and Nordic research and practice have had a strong influence on the standards for timber classification across Europe. The network also initiated the scientific

journal *Wood Material Science and Engineering*, which was first issued in 2006.

Erik Larnøy points out a number of reasons for combining efforts across the northern European countries. “First, each of our research groups is rather small, and we benefit a lot from sharing resources and competences. Second, a large share of the research funding comes via decisions made at the EU level, and we need to build stronger clusters to compete for this. Third, there are new product standards for wood and wood-based products in the offing, with decisions taken at the European level. There is an urgent need to make the Nordic voice heard in the decision process.”

The network covers expertise in a wide range of wood science and technology fields, such as: availability of wood resources; wood–water relations; wood durability; wood modification; wood mechanics;

wood composites; engineered wood products; and eco-efficient wood-based products and wood engineering.

The activities of the network vary from year to year, but usually involve arranging workshops and conferences, exchanging Masters and PhD students and joint applications to research programmes.

The network has members from Denmark, Finland, Norway, Sweden, Estonia, Latvia and Lithuania. In 2012, new members from Northern Germany (Hannover) and the UK (Napier) will also participate. The next annual conference is planned to take place in Lithuania in September 2012.

More information about the network can be found on the SNS webpage, where proceedings from the latest conference can also be downloaded.

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Electropulse can replace chemical preservation

The electropulse protection of wood (PLEOT) is a Norwegian invention tested by researchers at the Norwegian Forest and Landscape Institute. The technology can replace the use of chemicals for preservation and increases the durability of wood.

From around 1900, creosote and arsenic were used for wood protection, and until 2002 wood protective agents based on arsenic, copper and chrome were used across Europe. Today, all heavy metals except copper are banned from wood preservatives. However, copper is not as effectively fixed if chrome is not present. Thus, the amount of copper has to be increased, resulting in new environmental risks.

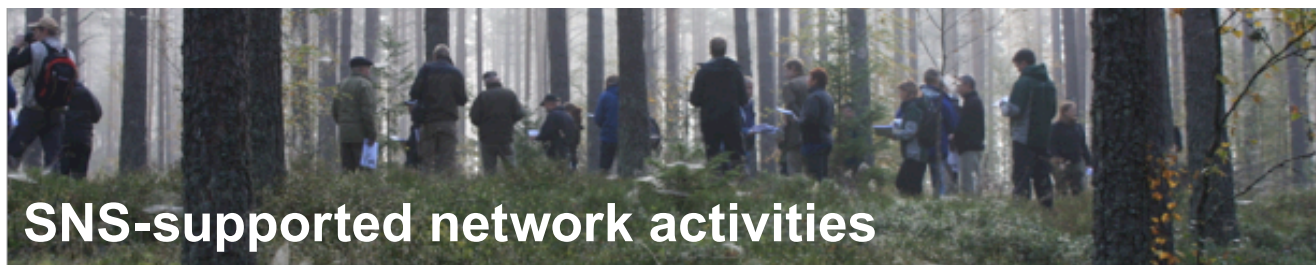
PLEOT induces a low current electrical field, preventing

microorganisms from attacking the wood when it is at a critical moisture level. The equipment is permanently installed within the wooden construction, but consumes a minimal amount of power. The energy needed can be provided by, for instance, a solar panel. The Norwegian Forest and Landscape Institute has tested the use of PLEOT to control fungal attacks on pine, spruce and beech wood in the laboratory, with successful results. In 2011, the equipment was installed in a post office building in West Telemark, Norway.

“If the technology functions according to expectations and lab tests, wood protected by electropulsing could become an alternative to impregnated wood”, says Erik Larnøy. The technology could, typically, be used to protect wooden terraces, construction materials, cladding, playgrounds, telephone poles and quay structures. In addition, the technology can be used to protect wooden windows and doors, and can also stop fungal attacks on old buildings, thus protecting cultural heritage.



Small wooden houses used for testing PLEOT under natural climate conditions. Photo: Andreas Treu



SNS and EFINORD decided jointly to support nine network activities in 2012. These are as follows:

SSFE – Scandinavian Society of Forest Economics

SSFE assembles expertise in forest economics and, since 1958, has organised a scientific conference every two years.

Activities 2012: The biennial meeting will take place in May 2012, in Finland, organised by research staff from the University of Helsinki, Metla, Metsäteho and SYKE. Some 45–50 presentations will be offered in parallel sessions. Proceedings will be published in the series Scandinavian Forest Economics.

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Development and maintenance of NOLTFOX – the Northern European Database of Long-Term Forest Experiments

The NOLTFOX project started in 1999 with the development of a database containing standardised and easily accessible information and documentation on existing long-term forest field experiments.

Activities 2012: The database will continue to develop, with updated data and links to literature. A seminar and a PhD summer course are planned.

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WSE – Northern European Network for Wood Science and Engineering

The network is described in another article in this issue.

Activities 2012: A two-day workshop will be held in Lithuania, organised by Kaunas University.

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Phytophthora-diseases of deciduous forest trees in Nordic and North-European regions

This new network was initiated as a response to the increasing damage caused by *Phytophthora* on deciduous trees in northern Europe.

Activities 2012: A workshop will be organized.

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NorForm – Northern Forest Water Mercury Network

The network was described in News and Views No. 6, 2011.

Activities 2012: Two international workshops will be held to discuss current research into the effect of forestry activities on mercury.

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Natural Disturbance Dynamics Analysis for Forest Ecosystem Management

The network has facilitated the exchange of knowledge and experience relating to natural disturbance dynamics for the past 10 years, and brings together researchers from the Nordic and Baltic countries at annual meetings. In 2012, activities will be arranged in conjunction with the PRIFOR network (see below).

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PRIFOR – Nordic working group on the history of primeval boreal forests

The network was formed in 2007 as a response to the shared frustration over lack of funding and the need for stronger connections between researchers working on primeval forests. In 2012, activities will be arranged in conjunction with the Natural disturbance dynamics network.

Joint activities 2012 for PRIFOR and Natural Disturbance: A workshop will be held in Latvia with the theme “The mosaic forest landscape” Another workshop will be arranged in Estonia, and in July, an excursion to Poland is planned, focussing on natural disturbances in protected areas.

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Social indicators in forestry – further development in the north European context

This new network aims to gather together researchers and scientists to discuss the challenge of using social indicators and to monitor changes to social issues, particularly recreation and tourism, associated with forestry and forest use.

Activities 2012: A project plan will be developed for the standardisation and harmonisation of social indicators for monitoring and management of sustainable forestry and forest use, and for sustainable nature-based recreation and tourism. Two meetings will be arranged

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Nordic-Baltic Forest research Communicators

This network brings together communicators from the Nordic and Baltic countries, and was established in 1999. It aims to increase the efficiency of the communication of forest research results.

Activities 2012: An annual Nordic/Baltic workshop will be held to plan common activities. The network will contribute to NBForest and produce policy papers.

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The editorial board and invited guests at the meeting in Copenhagen, September 2011. Katrine Hahn-Kristensen (SNS), Halvor Solheim, Jimmy Johansson (editor Wood Material Science and Engineering), Bruce Talbot, Dick Sandberg (WMSE), Victoria Babbit (Taylor & Francis), Remigijus Ozolincius (editor Baltic Forestry), Anne Sverdrup-Thygeson, Hans-Peter Ravn, Jari Kouki. Front row, from left: Lars Högbom, Ronald McRoberts, Liisa Saarenmaa (SNS), Elina Vapaavuori, Gun Lidestav Photo: Mats Hannerz.

Good advice for scientific journal

Teach authors how to produce better manuscripts and devise better instructions for the reviewing process. These were two of the recommendations from the editorial board of Scandinavian Journal of Forest Research when they met to suggest how to improve the journal's quality.

Scandinavian Journal of Forest Research is one of the leading scientific journals focusing specifically on forest issues in the boreal and temperate regions. The journal is ranked 21st out of 54 indexed journals in the Web of Science Forestry category. In September, the editorial board of the journal met in Copenhagen to discuss its continuing development.

The number of submitted manuscripts has increased two- to

three-fold over the last ten years. The submission rate continues to rise, indicating that the journal is a popular target for forest researchers. The editorial board discussed the implications of the higher number of articles that have to be handled. Good referee reports to be used as a decision support tool for the editor are particularly important. The board decided to develop new, and better, instructions both for authors and for referees in order to improve quality in both categories. Currently, new author instructions as well as a rephrased Aims and Scope, have been published on the journal's website.

The role of the journal in the international arena was also discussed. The journal name has been under discussion for at least ten years, since many readers may interpret the word "Scandinavian" to indicate

a regional profile for the contents. Despite this, statistics show that the journal is read and downloaded worldwide. In 2010, over 26,000 full-text articles were downloaded, with the top country for downloading being the USA. Discussions about the name will probably continue at future board meetings, but many members stress that "Scandinavian" forest research has a good international reputation, thus making it a quality brand in itself.

The journal webpage has undergone development during the past year, since the publisher Taylor & Francis introduced their Tandfonline service. The journal page is also available as an application for smart phones.

Read more on the journal webpage www.tandfonline.com/sfor

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More info about SNS:

www.nordicforestresearch.org

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