

## About COST Action FP1407: ModWoodLife

The forest-based sector can become a leader in achieving the European Commission's ambitious target of reducing CO<sub>2</sub> emissions with innovative production technologies, reduced energy consumption, increased wood products recycling, and reuse. Apart from these environmental benefits, the use of forest products in long life products, such as built environment applications, allows for the possibility of extended storage of atmospheric carbon dioxide.

### Working Groups

#### Working Group 1: Product Category Rules

**Objectives:** To develop product category rules for modified wood based on the scientific and industrial state-of-the-art of commercialized and developing modified wood products and technologies. Evaluation of current PCRs and adoption where appropriate.

#### Activities:

- Thermodynamics and chemical reactions associated with wood modification processing
- Process parameters leading to thermal degradation and chemical, structural, mechanical, and physical properties changes
- Innovative wood modification processing for specific applications in construction and interior design.
- Performance of modified wood: machining of the wood surface (with reference to FP0802; see also partial results of E35); the impact of the combined actions of heat, moisture, and mechanical pressure (results of FP0904), surfaces (FP1006) and wider issues (FP1303).

**Leader:** Dick Sandberg (Sweden)

**Deputy leader:** Robert Nemeth (Hungary)

#### Working Group 2: Life Cycle Assessments

**Objectives:** To perform objective environmental impact assessments of commercial modification processes and incorporate environmental impact assessments into wood modification processing and product development, including recycling and upgrading at the end of service life.

#### Activities:

- Crucial environmental aspects associated with innovative wood modification processing technologies and resulting products
- Reference service life of the product, maintenance requirements and performance in service (in cooperation with FP1303).
- Optimization of the developed processes from the sustainability point of view.
- Scenarios for up-cycling after product service life based on the cradle to cradle concept.

**Leader:** Christelle Ganne-Chedeville (Switzerland)

**Deputy leader:** Lauri Linkosalmi (Finland)

Working Groups 3 and 4 will be discussed in greater detail in the next newsletter.

#### ModWoodLife Facts

**Type:** COST Action FP1407: ModWoodLife

**Duration:** 4 years (2015-2019)

**Visit us on** <http://costfp1407.iam.upr.si>

#### Participants

4 working groups

96 research partners

33 countries

#### MC Chair

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#### What is Life Cycle Assessment?

Life Cycle Assessment (LCA) - The common LCA methodology is defined in ISO 14040 (1997) and ISO 14044 (2006). Since the 1980s, when LCA analysis was first developed, numerous methodologies to classify, characterize, and normalize environmental effects have been developed. The most common are focused on the following indicators: acidification, eutrophication, thinning the ozone layer, various types of ecotoxicity, air contaminants, resource usage and greenhouse gas emissions. Furthermore, these processes continue to be improved to provide greater consistency and enhanced communication. LCA is performed for various stages of a product's life span. The LCA methodology involves four steps (ISO 14040, 2006). First, the goal and scope definition step spells out the purpose of the study and its breadth and depth. The second step, Life Cycle Inventory (LCI), quantifies the environmental inputs and outputs associated with a product over its entire life cycle or during the time frame, which is being considered. Inventory flows include inputs of water, energy, and raw materials, and releases to air, land, and water. Third, impact assessment (LCIA), characterizes these inventory flows in relation to a set of environmental impacts as identified in LCI. Finally, the interpretation step combines environmental impact in accordance with the goals of the study.

## Short Term Scientific Mission (STSM)

### Manja Kitek Kuzman:

Assit. Prof.dr. Manja Kitek Kuzman, University of Ljubljana, Department of Wood Science and Technology spent a short-term scientific mission » Modified wood - types and application in wooden construction (architecture) and their service life « at the host institution, Luleå University of technology, Wood Science and Engineering, Sweden.

The most important aspects of choosing wood as a building material were defined between northern and southern Europe and traces the changes in architecture through various traditions. The representative constructions were visited in Skeleftea and Waxo. For every construction key figures were gathered.

During the STSM a list of selected wood modification processes and resultant products used in wooden construction was prepared. Modified wood products were categorized by producer, country, method, products, ecolabels and certificates: chain of custody/eco labels and EPDs, quality certification and other /awards. The collection of data will be important background information for e.g. further LCA analysis of processes and products. Wood is an option, a piece in the puzzle towards developing sustainable community building.

The subject of this research is directly applicable to the research interests of the COST Action FP1407. The proposed STSM will enable a foundation for international partnership of the universities involved in the proposed STSM in future joint proposals for European grants.



Älvsbacka Strand Cycle and Pedestrian Bridge in Skellefteå



Manja Kuzman and Dick Sandberg at Luleå University of technology, Wood Science and Engineering



Multi-residence buildings, Ekorren District in Skellefteå



DeFelsko PosiTest Pull-off Adhesion Tester for determining of the adherence of lacquer coatings



Research team (from left to right: prof. Bekhta P., Dr. Lis B., Dr. Krystofiak T., prof. Proszyk S., Ing. Wilczyńska G.)



Meeting with supervisor - Results analysis and discussion - Official farewell (from left to right: prof. Hruzik G., prof. Bekhta P., prof. Proszyk S.)

### Pavlo Bekhta:

Prof. Pavlo Bekhta of the Ukrainian National Forestry University, Department of Wood-Based Composites, Cellulose and Paper, completed a short-term scientific mission at Poznan University of Life Sciences, Department of Wood Based Materials, Division of Gluing and Finishing of Wood.

The preliminary findings of this STSM showed that using of thermally densified veneer in coating process makes it possible not only to improve the aesthetic properties of the surface (smoothness and gloss) and adhesive strength between coating and substrate, but also to reduce the coat consumption. In addition, a significant reduction of varnish consumption reduces the emission of harmful substances into the environment and further facilitates the recycling of such coated products. Consequently, the use of thermally densified veneer in coating processes in addition to economic advantages will also have environmental benefits.

### Jussi Ruponen:

Jussi Ruponen, M.Sc. (Tech.), a Doctoral student, at Aalto University School of Chemical Technology Department of Forest Products Technology in Aalto, Finland, completed a short-term scientific mission at Mendel University in Brno, Brno, Czech Republic.

The STSM enabled learning to use a new thermal modification process control system, deepened the understanding of the relationship of wood shape stability and temperature gradient, and finally allowed to complete an LCA with some actual, self-collected data.



The process scheme



a set before modification



a set after modification



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## COST Action LCA meeting in Zürich

On December 3, 2015 FP1407 Working Group 2, Life Cycle Assessment, met in Zürich, Switzerland. The topic of the meeting was "LCA of wood modification processes: where are the weaknesses in inventories?", and was organized by Christelle Ganne-Chedeville from Bern University of Applied Sciences. During the meeting there were many interesting talks ranging from in-situ energy monitoring at a pilot scale wood processing facility, raw material data representativeness, to economic allocation and EPDs for wood products.

In addition to the Working Group 2 meeting, many participants stayed in Zürich on December 4th to attend the LCA Forum "DF 60 — Environmental Use of Wood Resources Discussion forum on Life Cycle Assessment". This event had participants from all over Europe who came to gain new perspectives on the ecological uses of wood resources and their relevance from the viewpoint of scientists, policy makers, and practitioners. The first part of the program was opened by Frank Werner regarding life cycle inventories of wood in the ecoinvent database. Later in the morning LCA applications in regard to wood construction and energy were explored. In the afternoon, presentation on LCA of wood products and wood energy systems were given. The day ended with a panel discussion between scientists and industry members, discussing how future research with LCA can contribute to an environmentally optimal use of wood resources.



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### Upcoming event

We kindly invite you to participate in the **COST Action FP1407 2<sup>nd</sup> Conference: Innovative production technologies and increased wood products recycling and reuse** in Brno, Czech Republic.

The conference will focus on presenting state-of-the-art production technologies in wood modification, development of recycling of modified wood, related barriers, and challenges. Special emphasis will be given to the cascading use of wood and related environmental impacts. The topics covered at the conference are not limited only to mentioned ones, a variety and diversity of contributions are welcome.

When: **29-30<sup>th</sup> of September, 2016**

Where: **Brno, Czech Republic**

### CALL FOR ABSTRACTS

An extended abstract (1-2 pages) relevant to the topics of the conference should be submitted by email to the local organizer, Václav Sebera [seberav@gmail.com](mailto:seberav@gmail.com) no later than 10<sup>th</sup> of July, 2016.

# Future Events

## 1. STSM

Short Term Scientific Missions are available from COST Action FP1407. The Action has several places remaining for STSMs that can be completed before April 30, 2016. Please consider applying an STSM today.

Projects should cover any of the activities covered by the Action, which include:

- modification of wood or other biobased products;
- Environmental aspects of wood or biobased materials processes, products, or services;
- related activities (i.e., modelling, user studies, characterisation, LCA, EPDs, etc.)

Applications should be submitted at least two weeks before the expected travel dates through the online system found at: <http://www.cost.eu/stsm>. The information required by the COST system includes: dates of the STSM, length of stay, title of planned scientific activity, short description of the work-plan, short CV and a budget request (to cover travel and living expenses during the STSM, at a maximum of 2500 EUR).

## 2. Workshop

Technical Workshop: Application of NIR spectroscopy in wood science and technology.

The workshop will take place on April 19–21 2016 at Trees and Timber Institute (IVALSA), Via Biasi 75, 38010 San Michele all' Adige.

Participants are invited to present their case studies or NIR-related research activities. Please submit an abstract (maximum of 2 pages) of the contribution by March 20, 2016.

Contact Anna & Jakub Sandak, phone: +39 0461 660232, e-mail: [sandak@ivalsa.cnr.it](mailto:sandak@ivalsa.cnr.it), website: [www.bio4everproject.com](http://www.bio4everproject.com). Additional information available: <http://costfp1407.iam.upr.si/en/events/sisnir--cost-fp1303--fp1407-joint-meeting>

## 3. Training school

A training school on Life Cycle Assessment is being organized at Luke, Jokiniemenkuja 1, Vantaa on April 26–28, 2016.

See web page for details: <http://costfp1407.iam.upr.si/en/events/fp1407-training-school-finland>

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