

NEWSLETTER #5

JUNE 2020

CONTENT

- P. 2 GREETINGS FROM THE COORDINATOR
- P. 3/4 FOREST RELATED PROJECTS FINANCED BY EU WITHIN H2020
- P. 5 FOREST EUROPE
- P. 6-18 FORESTVALUE JC 2017 — NEWS FROM CO-FUNDED PROJECTS
- P. 19 SAVE-THE-DATES



GREETINGS FROM MIKA

What a spring... we have had due to the coronavirus outbreak... In ForestValue we were lucky to be able to arrange our Project Steering Committee meeting in Brussels on 3-4 March 2020 just before the strict travel regulations took place everywhere, and everyone who was supposed to actually attended the meeting, too. Especially lucky we were in that sense that it was much easier to discuss and decide on important issues face-to-face than arranging it all virtually, although the present times have shown that this seems to be working quite well virtually, too.

One of the topics on the meeting agenda was a possible additional “voluntary” 2nd joint call, voluntary referring to the fact that the call is not written in the ForestValue work programme and the call would be a self-sustained call i.e. the funding to the call would come from the participating funders only without any co-funding from the European Commission. After it turned out that the Horizon Europe partnership proposal on forestry was not selected (see our previous newsletter) and there is no guarantee until when there will be next EU-wide funding possibilities for the forest-based sector and under which topics, the funders in ForestValue started discussing that a new joint call could potentially be an important opportunity both for the development of the sector and to continue the successful long-lasting research collaboration among the funding partners.

The discussions in the meeting showed that there is a lot of interest among the funders in a new joint call and thus, one of the major decisions taken at the meeting was that ForestValue would start planning a new transnational call for proposals for research, development and innovation in the forest-based sector. The funders have now started with the call implementation and, assuming all progresses as planned, the intention is to have the call launched in January 2021. This is really good news for the sector and let's just hope that we'll manage to make this happen during these complicated times.

The 17 projects selected for funding in the ForestValue Joint Call 2017 have now completed their first-year activities and in this newsletter you have a chance to learn more about the outcomes so far. At the moment it looks like that the projects have not had too severe consequences of Covid-19, however, only the coming autumn will show how the situation will develop. Hopefully there will be no major wave of new infections which would bring a second wave of lockdowns.

On behalf of the ForestValue consortium, summer greetings and wish you well.

Best regards

Mika



FOREST RELATED PROJECTS FINANCED BY EU WITHIN H2020 SOCIETAL CHALLENGE 2

(FOOD SECURITY, SUSTAINABLE AGRICULTURE AND FORESTRY, MARINE, MARITIME AND INLAND WATER RESEARCH AND THE BIOECONOMY)

Under H2020 Societal Challenge 2, during the period 2014-2020, the European Commission (DG Research & Innovation and DG Agriculture and Rural Development) has funded more than **34 projects** related to research and technological development in European forests. All these projects are monitored by REA – Research Executive Agency, which is the EU body implementing this part of H2020 research program.

These forest related projects are an important part of the funding effort of the EU targeting European forests, representing about 10% of the total number of projects financed by EU under H2020 Societal Challenge 2 (Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy).

Most of these projects are directly targeting the forest in different ways: collaboration between national research funding agencies, **ecosystem services, integrated land management, IT tools for forests, building with wood, forest technologies**, etc. (e.g. ForestValue, SINCERE, LANDSUPPORT, GenRes Bridge, EURAKNOS, ROSEWOOD4.0, i2connect, BASAJAUN, BuildinWood, Forwarder2020, OnTrack, WOODnat, InnoForEST).

Some projects are targeting forests and climate change issues, bringing a significant added value at EU level on data harmonisation, forest management models, genetic resources, forest products and agri-environmental public goods (e.g. DIABOLO, ALTERFOR, GenTree, HOMED, B4EST, INCREDible, CONSOLE).

More information on all H2020 project can be found online on H2020 Dashboard, Projects and Results. <https://cordis.europa.eu/projects/en> (Selection listed below)



George PREDOIU, EUROPEAN COMMISSION
Research Executive Agency; Unit B2 - Sustainable Resources for Food Security and Growth

FOREST RELATED PROJECTS FINANCED BY EU WITHIN H2020 SOCIETAL CHALLENGE 2

(FOOD SECURITY, SUSTAINABLE AGRICULTURE AND FORESTRY, MARINE, MARITIME AND IN-LAND WATER RESEARCH AND THE BIOECONOMY)

[SINCERE](#) Spurring INnovati-
ons for forest eCosystem sER-
vices in Europe (SINCERE)

[LANDSUPPORT](#) Development
of Integrated Web-Based Land
Decision Support System
Aiming Towards the
Implementation of Policies for
Agriculture & Environment

[GenRes Bridge](#) Joining forces
for genetic resources and
biodiversity management

[EURAKNOS](#) Connecting
Thematic Networks as Know-
ledge Reservoirs: towards a
European Agricultural Know-
ledge Innovation Open Source
System

[ROSEWOOD4.0](#) EU network
of regions on sustainable wood
mobilisation ready for
digitalisation

[i2connect](#) Connecting advisers
to boost interactive innovation
in agriculture & forestry

[ALTERFOR](#) Alternative models
& robust decision-making for
future forest management

[INCREDible](#) Innovation Net-
works of Cork, Resins & Edib-
les in the Mediterranean basin

[BASAJAUN](#) - Building A
SustainAble Joint between
rurAl & UrbaN Areas Through
Circular & Innovative Wood
Construction Value Chains

[Build-in-Wood](#) Sustainable
wood value chains for
construction of low-carbon
multi-storey buildings from
renewable resources

[Forwarder2020](#) Smart
Forwarder for sustainable &
efficient forest operation and
management

[OnTrack](#) Innovative solutions
for increasing efficiency and
reducing environmental
impacts of future wood supply

[WOODnat](#) Second generation
of planted hardwood forests
in the EU

[InnoForEST](#) Smart information,
governance & business
innovations for sustainable
supply & payment mechanisms
for forest ecosystem services

[PASTFORWARD](#) Development
trajectories of temperate forest
plant communities under global
change: combining hindsight
and forecasting

[DIABOLO](#) Distributed,
integrated & harmonised forest
information for bioeconomy
outlooks

[GenTree](#) Optimising the
management & sustainable use
of forest genetic resources in
Europe

[HOMED](#) HOListic
Management of Emerging
forest pests & Diseases

[B4EST](#) Adaptive BREEDING
for productive, sustainable &
resilient FORESTs under
climate change

[CONSOLE](#): CONTRact
SOLutions for Effective &
lasting delivery of agri-
environmental-climate public
goods by EU agriculture
and forestry

[SuFoRun](#) Models & decision
Support tools for integrated
FOrest policy development
under global change and
associated Risk & Uncertainty

[EFFORTE](#) Efficient forestry by
precision planning & manage-
ment for sustainable environ-
ment & cost-competitive bio-
based industry



FOREST EUROPE

FOREST EUROPE is the brand name of the Ministerial Conference on the Protection of Forests in Europe. It is the pan-European voluntary high-level political process for intergovernmental dialogue and cooperation on forest policies in Europe. 46 European countries and the European Union are the signatories to FOREST EUROPE.

Since 1990, the collaboration of the ministers responsible for forests in Europe has been setting agenda for policy making at national and European levels by providing a main policy framework for sustainable forest management and balancing its economic, environmental and social pillars. FOREST EUROPE has led to achievements such as the internationally agreed guidelines, criteria and indicators for sustainable forest management.

The Ministerial Conferences are the highest decision making body of the FOREST EUROPE process where ministers responsible for forests take decisions on issues of the highest political relevance regarding forests and forestry. The Ministerial Conferences have been convened with an interval of 3 to 5 years. **The 8th Ministerial Conference will take place in Bratislava, Slovakia, in spring 2020.** The conference should focus on the multifunctional role of the forests and sustainable forest management in Europe as well as on future cooperation of countries on a pan-European forest risk knowledge mechanism in order to coordinate better the adaptation of forests against climate change. From 2021 on, Germany will take over the chairmanship of FOREST EUROPE, currently Slovakia is in charge. Although the Ministerial Conferences represent the most important events of FOREST EUROPE, they are not the only ones taking place:

The FOREST EUROPE Expert Level Meeting (ELM) is the decision-making body between ministerial conferences. The Expert Level Meetings are attended by representatives of the FOREST EUROPE signatories as well as by observers from non-European countries, international organisations including stakeholders (environmental and social NGOs, forest and land owners' federations, forest industry and the scientific community).

Roundtable Meetings are platforms for strategic discussions and exchange of information and views on emerging issues. These meetings aim at exchange of information and opinions, to provide essential guidance for the implementation of FOREST EUROPE decisions as well as on strategic developments of FOREST EUROPE.

Last but not least, working groups, seminars and workshops represent ad hoc work focused on specific subjects of scientific, technical or political nature. Depending on the subject, these meetings are attended by FOREST EUROPE representatives as well as by nominated experts from specific areas. The results of these meetings are presented for consideration to the subsequent Expert Level Meeting.

For more information, please visit **www.foresteurope.org** or contact the Liaison Unit in Bratislava at:

[liaison.unit.bratislava \(at\) foresteurope.org](mailto:liaison.unit.bratislava@foresteurope.org)





MANAGEMENT FOR MULTIFUNCTIONALITY IN EUROPEAN FORESTS IN THE ERA OF BIOECONOMY

(www.jyu.fi/BERG/berg-projects-1/forest-values;)

The MultiForest consortium organized in early May a two-day optimization workshop with partners from Austria (IIASA), Finland (JYU), Germany (TUM), Norway (NIBIO), and Sweden (SLU). The Covid-19 lockdown in Europe forced the members to become creative, as the originally planned face-to-face meeting in Munich had to be turned into an online workshop. For most partners, this was the first time they participated in such an event.

In the first part of the workshop, an introductory lecture on **multi-objective optimization** was given by **Prof. Michael Emmerich** from Leiden University. This introduction gave the MultiForest consortium a solid background for the afterwards introduced multi-objective optimization framework. The company partner **FinnOpt** (www.finnopt.com) developed this framework that forms the basis for the national-level optimizations of forest management practices for different policy scenarios. For this, the partners translate the aims and targets of their national policy documents for forestry, biodiversity and bioeconomy into verbal optimization problems. Afterwards, these are formulated as mathematical optimization problems within the software developed by FinnOpt.

The partnership with the private company FinnOpt is a relatively rare collaboration in research projects, involving ecology and policy analyses. While the academic partners benefit from FinnOpt by having state-of-the-art optimization procedures, it delivers the opportunity for FinnOpt to develop a flexible product to be commercialized later on. Moreover, the expertise and knowledge of FinnOpt helps to translate the national policies into optimization problems in a harmonized way, which in turn will provide comparable results among the countries.

In the next step, the framework will be used to optimize simulated forest management to find management practices fulfilling best the objectives of each national forest policy. Based on the optimization outcomes the long-term effects of sectoral policies on the multifunctionality of forest landscapes will be studied. Additionally, we will investigate if policies are designed coherently or if they would cause a dramatic reduction of important forest ecosystem services or biodiversity (ESB) in the long-term. Later, the framework will also be used within stakeholder workshops to illustrate to different forest sector representatives how management decisions affect the provision of future forest ESB.

Even without the spring flair in Munich, the MultiForest consortium was very happy with the workshop outcome, and there was still some time left for social interaction in an online “Biergarten” atmosphere.



hardwood_joint

INNOVATIVE JOINTS IN HARDWOODS

The overall project objective is to foster high-performance hardwood structures in the European building sector by developing economic, reliable and innovative joint technologies for hardwood members and the design thereof.

For this purpose, **hardwood_joint** aims at understanding load transfer mechanisms and failure modes of hardwood joints in order to allow for final joint optimisation. Therefore, models for laterally loaded single-fastener joints based on nonlinear beam-on-foundation approaches were developed, that include the rope effect. These models were verified using experimental results, which measured the tensile forces in the fastener that develop during loading due to the rope effect. Furthermore, first test series investigating minimum distances and spacing of joints with laterally loaded screws were carried out. The analysis of the load-displacement curves of these parametric series help to derive more fundamental rules for distances and spacing. Moreover, a feasibility study concerning staples and nails in non-predrilled hardwoods was carried out.

Apart from joints with laterally loaded fasteners, also joints with axially loaded fasteners are treated in **hardwood_joint**. Large experimental campaigns on joints with groups of axially loaded screws were carried out that allow for definition of minimum distances and spacing that prevent brittle failure modes. Different test configurations were used, for instance also joints with screws in the end grain were investigated. In such joints, duration-of-load effects are known to be important and comprehensive testing series are planned. All addressed topics up to now allow for a deeper understanding of existing joints. Moreover, investigations to optimise joints were carried out; i.e. methods were developed that can potentially increase both stiffness and capacity of joints. A promising way is to increase friction between shear planes through rough surfaces.

A parametric study looked into the effectiveness of shallow or deep grooves on hardwood surfaces.

Numerical studies investigated the effect of moisture variations on these grooved surfaces were carried out. Finally, as any final implementation of design models in standards and engineering handbooks require input values, a literature study was carried out to see if all necessary values are available. Missing values, e.g the embedment strength of birch, were subsequently determined.

https://forestvalue.org/wp-content/uploads/2019/06/51_hardwood_joint_compressed.pdf

© hardwood_joint

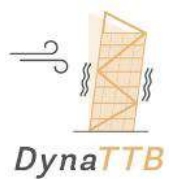


© hardwood_joint



© hardwood_joint





DYNAMIC RESPONSE OF TALL TIMBER BUILDINGS UNDER SERVICE LOAD

Within the DynaTTB project work is on-going on Finite Element modelling and full-scale measurements of tall timber buildings. In total seven tall timber buildings in five different countries in Europe are planned to be used for full-scale measurement of dynamic properties, see Figure 1.

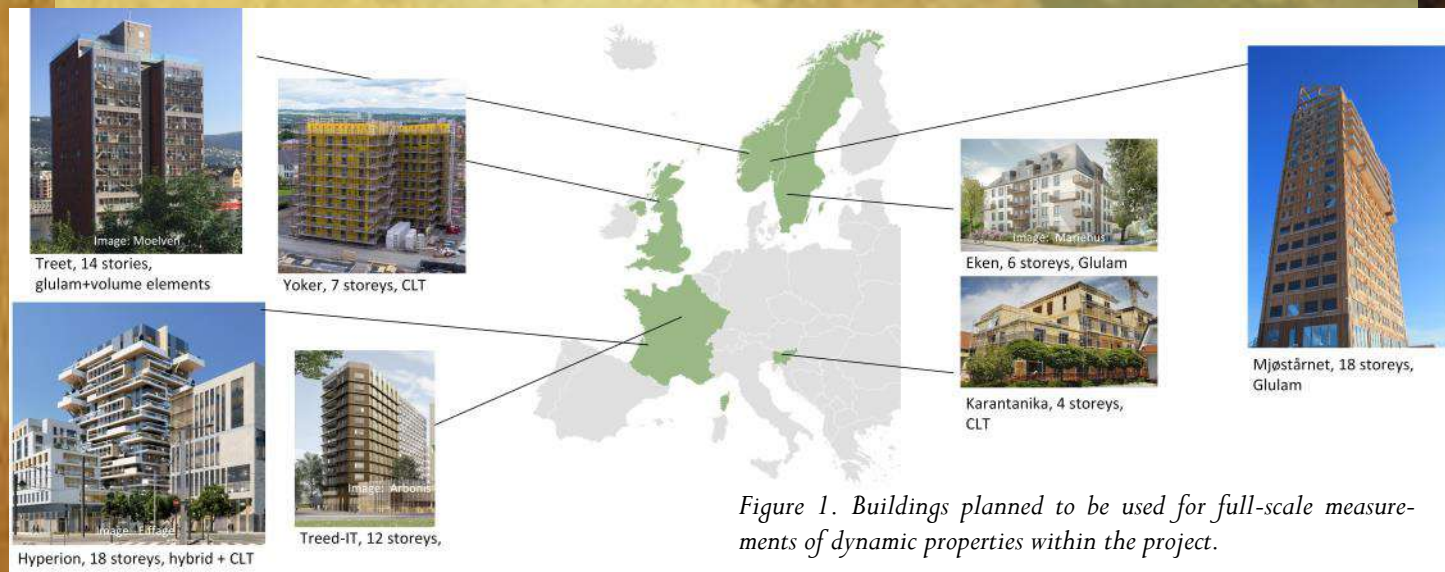


Figure 1. Buildings planned to be used for full-scale measurements of dynamic properties within the project.

During December 2019 and January 2020 full-scale measurements were performed on the first two buildings, CSTB performed measurements on the building Treed-It in Paris and University of Exeter performed measurements on the building Yoker in Glasgow. The building Treed-It in Paris is 11 stories high and was measured before completion, Figure 2. The building will be measured one more time after the inside plasterboards and final flooring is mounted. These two measurements will show the effect of non-structural elements on the dynamical properties of the building.

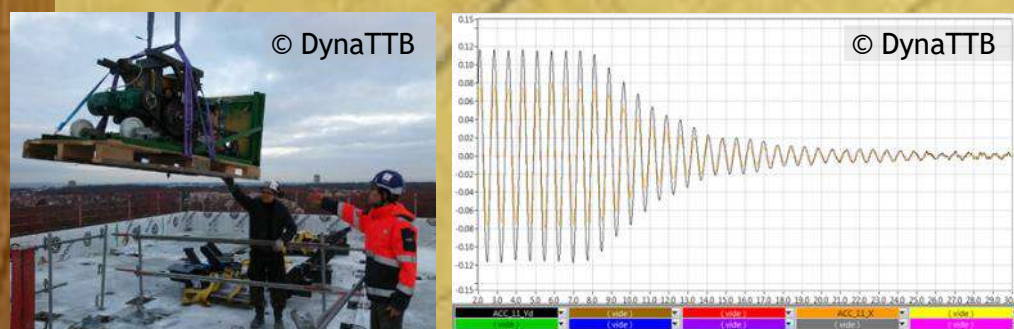


Figure 2. a) Lifting the shaker into place at the top floor of the building in December 2019. b) Data from one of the accelerometers of the tests showing decay when the shaker is stopped.

These measurements have yielded data regarding resonance frequencies and damping. Some of the buildings have also been equipped with measuring devices for ambient vibration tests. In parallel to these measurements, FE-models for estimating dynamic response are being created. These models, based on best engineering estimation, will in the first step be used for planning the measurement campaigns for these buildings. In the next step these models will be improved for prediction of the real response of the buildings. This will include refining the models with stiffness and damping of elements, connections and assemblies.

<https://www.dynattb.com/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773324

<https://forestvalue.org/>
@ForestValue2017



**ALMOST CANCELLED BY CORONA:
MULTIFOREVER SUCCEEDED IN
ESTABLISHING THE FIRST
CROSS-EUROPEAN MULTI-
SITE TRIAL WITH DOUG-
LAS FIR SOMATIC SEEDLINGS!**



Conifers have large economic, ecological and societal values worldwide. However, seeds produced from natural or assisted breeding in these woody species are visibly running short due to increased environmental threats. Climate change is already challenging the traditional seed-based plantation forestry requiring improved varieties to produce a diverse range of wood products. Complementary strategies are therefore essential to enable the propagation of trees in a more efficient and reliable way.

Fortunately, plants can generally be propagated without the need for sexual reproduction, e.g. through cuttings as one of the most popular horticultural practices. However, these vegetative propagation methods are either expensive or ineffective in conifers. MULTIFOREVER¹ contributes to the implementation of somatic embryogenesis, a promising micropropagation technology to multiply conifer seeds and more specifically the tiny embryo within (the future seedling). This method could be effective for industrial scale-up, in a way that from a single seed, it is no longer a single tree that is obtained, but potentially a very large number of trees forming a clone of the initial seed. It allows both multi-site performance trial (a breeding tool called “clonal test”) and consistent deployment of improved varieties.

First-generation field trials with somatic seedlings were established by partners up to 20 years back in spruce, pine and larch². MULTIFOREVER is the joint effort to set up international trials aimed at demonstrating not only the performance of advanced somatic seedlings but also the benefits of associated new management strategies for plantation forestry.

Spring 2020 was the critical time for planting the first multi-site trial of Douglas-fir somatic seedlings in Europe (ca. 3ha overall). Douglas-fir produces quality & aesthetic timber, highly appreciated in construction. A dozen 2-3-year-old clones produced by Humboldt-Universität zu Berlin (HUB) in collaboration with Staatsbetrieb Sachsenforst (SBS, HUB's subcontractor) were planted at 3 sites in Germany (HUB/SBS), France (FCBA) & Sweden (UPSC/SLU & Linnaeus University) in reference to French, German & Finnish seedling standards that were further exchanged among partners.

Implementation of clonal mixtures was attempted at some planting sites. The results shall prefigure what multi-varietal forestry, the deployment of tested, high-performance varieties, could look like. This strategy can both contribute to optimized wood production & reduced risks to environmental impacts through e.g. more dynamic diversity management at the stand & landscape levels.

Planting of Douglas-fir somatic seedlings on the French site near Peyrat-le-Château. With kind assistance of ONF-PNRGF. April 20-23, 2020 - Land owner: R. Atelin



© Marin Chaumet





AESTHETICS IN ARCHITECTURE HOW WOOD AND BEAUTY IS PART OF CLICKDESIGN

ForestValue project CLICKdesign is developing a performance-based specification approach for wood. The unique single software tool includes diverse models & performance databases associated with decay & integrity, insect risk & aesthetic function.

Aesthetics is a branch of philosophy concerning studies on the nature and expression of beauty or taste and for a building is one of the principal aspects of architecture. The appeal of a building is complex – it covers combined effects of the shape, size, texture, colour, balance, unity, movement, emphasis, contrast, symmetry, proportion, space, alignment, pattern, decoration, culture & context. Buildings that are designed in order to satisfy requirements regarding safety, serviceability, durability should also consider aesthetics for the entire service life. Led by Jakub & Anna Sandak (InnoRenew, Slovenia) CLICKdesign is advancing our understanding of the diverse processes that affect the aesthetical performance of building elements service life including:

Weathering is predominantly related to the superficial deterioration with its intensity depending on micro-climatic conditions. Wood that is exposed to exterior weather conditions starts to change its appearance after only a few hours. **Decay** is a biotic degradation process affecting both, material functionality and aesthetics.

It is relatively simple to define the critical limits when wood is losing its technical characteristics (e.g. mechanical strength decreases due to de-



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© CLICKdesign

decay). It is extremely difficult to define critical limits related to aesthetics. In real cases, the aesthetic limits states are reached before functional loss and long before passing the safety limit. CLICKdesign will provide a software tool for architects and specifiers to embed wood product service life into their decision making, that will include important aesthetic qualities as part of the model.

In the next six months the public facing tool facilitating the selection of the right wood product in the right end use will go live. The professional software tool will be issued closer to project conclusion after having been tested using performance data sets from around Europe and real-case studies (timber buildings and structures) working with architects to help refine the tool.

We are proud of our progress and especially that the project CLICKdesign has already supported 14 students in their Bachelors, Masters & Doctoral studies, providing opportunity for future young researchers. We are excited that the CLICKdesign tool will support the use of wood to lock up carbon for longer in our buildings as a primary way of tackling the climate emergency we face together.

<https://www.bregroup.com/services/research/clickdesign/>





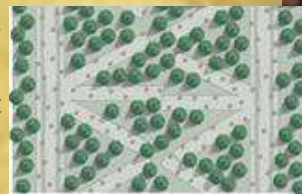
SMALL DIAMETER WOOD UTILIZATION WITH INNOVATIVE STAND MANAGEMENT FOR MULTIFUNCTIONAL FORESTS AND A GROWING SUSTAINABLE BIO-ECONOMY



The SMALLWOOD project are doing R&D work in Sweden, Finland, Slovenia and Spain on new technologies that increase efficiency of sustainable management and utilization of different types of small diameter wood. This source is a largely underutilized resource in Europe, with a strong potential in contributing to building up a sustainable forest based bio-economy. At present, such biomass is used for heat and power generation, or not used at all, but in the near future, it can also be processed into e.g. biochemical and biofuels.

Picture 1. The upgraded Bracke C16 head mounted on the harvester base machine. The machine and equipment was transported between the research areas in Sweden, Finland, Slovenia and Spain. In addition, the operator was the same in all countries.

So far, we have done experimental field studies in Sweden, Finland and Slovenia on a Multi-tree harvesting technique (Picture 1) combined with a novel working method (boom-corridor thinning) (Picture 2), to develop a more efficient thinning system. The trials were done in a variety of stands, from small diameter coppice to almost ordinary first thinning stands.



Picture 2. Schematic outline of a boom-corridor thinning pattern. Between strip-roads the thinning is done in the area of narrow corridors.

Preliminary results from field trials in Sweden come from pine dominated plots with spruce, birch and other broadleaves (Figure 3). The stands were dense and had in average 3500 stems/ha (variation 2100 – 6600 stems/ha), with an average dominating tree height of 10.2 m. Such stands have a lot of biomass. The standing volume was estimated to 186 m³ biomass/ha (93 ton dry biomass/ha). The harvest was on average 89 m³ biomass/ha (44.5 ton dry biomass/ha). This means that the harvest was about 48% of the standing volume. This would be high in an ordinary first thinning where only logs with at least 5-6 cm top end diameter are utilized, but in biomass thinning all tree sizes are commercial, thus giving a higher potential of removal. The productivity of the harvest was 11.6 m³ solid biomass/effective work hour (G0 hour), meaning about 5.8ton dry biomass/G0 hour.

The experience is that the harvest productivity can be high with this kind of equipment and work method. This is possible because of a combination of the multi tree handling, the fact that no delimbing is done and an efficient novel work method. Detailed results from all field trials and comparison between field trials from different countries and different forest stands conditions will be published within the next years. In addition, environmental impacts of new technologies will be analyzed, and new business models proposed. As part of field trials practical demonstration events were organized in Sweden, Finland and Slovenia. Different stakeholders, mainly forest professionals, were invited. Reports from DEMO events and more information about the project are available at:

<http://www.smallwood.eu/>



NOVEL BUSINESS MODELS AND MECHANISMS FOR THE SUSTAINABLE SUPPLY OF AND PAYMENT FOR FOREST ECOSYSTEM SERVICES



Novel business models and mechanisms are needed for the sustainable supply of and the payment for forest ecosystem services (FES). The NOBEL project analyses in five case study regions in Sweden, France, Spain, Portugal and Austria how such business models can be set up in pilot demonstrations with stakeholders to match different expectations on forest management and payment options.

The Austrian case study region is located in the region of the Ausseerland. Manifold opportunities for the provision of forest ecosystem services exist in such a mountainous region with beautiful lakes and landscape. The high touristic attractiveness of the narrow valleys causes pressures on the environment, but is also the main income for local people and supports rural development. The environmental and socio-economic conditions are also challenging for the management of these mountain forests. In a first workshop the current, past and potential future activities in the provision of forest ecosystem services was discussed jointly with the Austrian Federal Forests (ÖBf AG).



© Wolfgang Simlinger

The participating forest managers, hunters & service providers provided insight into their experiences gathered over the years, mainly in recreational services, but also non-timber forest products. Some of the innovative ideas had a lot of potential, but the successful implementation was hampered by the high investment in terms of time & staff resources. Economic incentives were often marginal compared to the input in resources. However, the provision of these services were often seen as a good opportunity to showcase the activities of the Austrian Federal Forests and contributed to the overall good image of the institution.

Selected FES that are also related to the business strategy of the ÖBf AG performed very well: providing huts and houses for rent in touristic activities, supporting the creative industry for photo and film shootings in providing access to the landscape scenery or conducting fishery and hunting management. As FES with a future potential can be considered trail parks, tree planting activities for and with partners, contracting for nature conservation activities and event management. Other less important FES already in place are educational guided tours, thematic trails for bee-keeping, climbing, mushroom breeding, brushwood sale for floristics or planting of personalized seedlings.

There is a need to consolidate the existing experiences and findings and focus on a bundle of measures in the Austrian case study. This will allow to identify new potential business models and mechanism in the fields of tourism and recreation, health care or biodiversity.

Further project activities can be followed on our homepage <https://nobel.boku.ac.at/>

Coordinating Institution: University of Natural Resources and Life Sciences Vienna



STRONG CELLULOSE COMPOSITES

Project

The «Strong Cellulose Composite» project targets enhancement, functionalization as well as upscaling and implementation of a novel cellulose material. The “green” sustainable high performance product is fabricated in a process comprising delignification and densification of wood while retaining the beneficial fibre directionality.

Partners

By bringing together complementary expertise from academia and industry in fundamental and applied research fields, the project aims at exploring a multitude of application potentials and creating an added value for forestry and the wood value chain on a short-term basis.

Partners from academia

ETH Zürich, Switzerland
Aalto University, Finland
Stockholm University, Sweden
BOKU, Austria

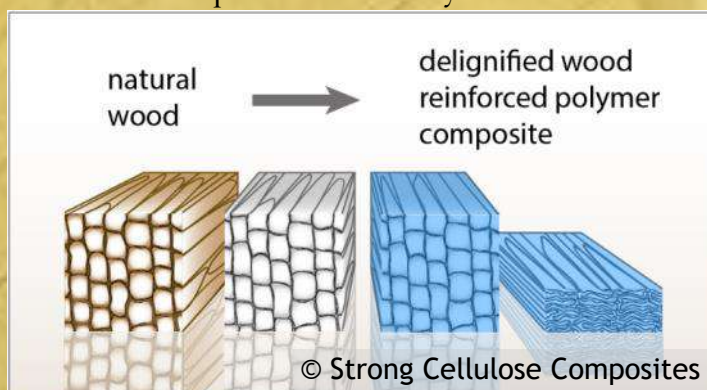
Partners from industry

BASF, Switzerland
Stora Enso, Finland
IB STEINER, Austria
Röthlisberger, Switzerland

News

We have recently published our first publication of the project with the title “**Delignified Wood-Polymer Interpenetrating Composites Exceeding the Rule of Mixtures**” in *ACS Applied Materials & Interfaces*.

In this work we report the manufacturing of a high-performance load-bearing wood-based material. The material is obtained by structure-retaining delignification of wood followed by an infiltration of epoxy and a subsequent densification. This process results in a natural fiber composite with a cellulose fiber volume content of up to 80 %. The high volume content of the reinforcing cellulose component combined with its unidirectional orientation and the interpenetrating character of the composite results in very high tensile stiffness. The material is a promising alternative to less sustainable composites such as glass fiber composites in the transportation industry.



M. Frey, L. Schneider, K. Masania, T. Keplinger, and I. Burgert. *ACS Applied Materials & Interfaces* 2019, 11 (38), 35305-35311

Visit our project website!
www.cellulosecomposites.com

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INNOCROSSLAM RESEARCH PRACTICE FOR PRACTICE

Timber construction has greatly evolved in recent years. New products such as CLT (Cross Laminated Timber) have completely changed the construction market and consequently new opportunities for the timber industry emerged. But for such novel material as CLT, there are always uncertainties about the accuracy of the applied assumptions and models. The InnoCrossLam project will contribute to the mechanical resistance and stability of CLT structures by developing design guidelines and therefore provide practical tools for structural designers and architects.

Within the first year, the project has compiled the current experience of practitioners, asking them how they deal in their daily work with the subtleties of CLT design. Questions such as "*How do you currently use CLT? What problems do you face and how do you solve them?*" have been set to several practitioners, mostly from Europe.

This up-to date input from practice is crucial for the project, since it will bring together research from InnoCrossLam and innovative ideas from designers of CLT buildings. Two different tools have been used to gather as many relevant responses as possible. The first one was an online survey, which was distributed through different social networks being accessible to a world-wide community. Currently, more than 100 answers of designers have already been gathered. The second tool is as important, since it involves personal interviews with some of the survey respondents.

One of the pleasant experiences of personal interviews was with a group of engineers from the associated partner of InnoCrossLam merz kley partner GmbH. The Austrian company, which has received several awards for its work in timber construction, has agreed to share its many years of experience in building with CLT and to incorporate this knowledge into current research. In a joint meeting, expertise was exchanged and possible simplified rules for the preliminary design in demanding design situations - such as deep beams or point-supported floors - were discussed. The extremely fruitful day was rounded off by an educational tour of the new company headquarters - built from cross laminated timber.

<http://innocrosslam.zag.si/>



© InnoCrossLam





WHY ARE WE STUDYING THE DEMOLITION OF BUILDINGS?

Authors: Bahareh Nasiri, Michael Risse, Raphaela Ivanica, Mark Hughes

Currently, the use of recovered wood and wood products from demolition as a secondary resource is neglected in most European countries. Instead, most recovered wood is used for energy generation and thus lost for a further use in material applications despite the fact that it has a high intrinsic resource value. This situation will be further aggravated in the future by the decreasing availability of softwoods, the main resource for wood buildings, caused by climate change.

It is thus necessary to increase the resource efficiency of wood use in the built environment as also suggested by several EU initiatives and national regulations. One strategy is to recover useable wood and wood-products from demolished buildings and reuse the material in a cascade before using it for energy generation. At the time of demolition, many of the wood products used in buildings potentially can have many years of useful service life ahead of them. In particular, the main structure of a building, if it has been adequately protected from physical and biological degradation, may provide large quantities of valuable material for recovery. Current demolition practices, however, prioritize the speed and cost of demolition over the recovery of wood suitable for re-use or re-processing in solid form. Consequently, much of the materials' utility is lost through breakage and contamination with non-wood materials, or ignored through lack of proper segregation on-site. One of the key reasons why wood is not recovered is that there is no market for the material and indeed current regulations often effectively preclude the reuse of wood in material form because of the potential for contamination with preservatives. Consequently, wood from demolition is usually chipped and burned for energy production.



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So why are we studying the demolition process? If we want to increase the resource efficiency of wood use through cascading, we are facing a “chicken and egg” situation. Without a market for cascaded solid wood products, there is little incentive for demolition contractors to recover wood intact and segregate it properly, and without classification of good condition solid wood from demolition, there is no material to create that market! To try to overcome this impasse, we are studying the demolition process from offer to delivery and engaging with demolition professionals and experts to understand both the demolition process itself and the motivations of demolition contractors. We hope that by understanding the demolition process we will be able to identify ways of recovering a higher proportion of material from the demolition process suitable for cascading and consequently enable the development of a market for recovered solid wood. Furthermore, this understanding will enable us to modify the construction of our future wood buildings in a way to increase the recovery of high-quality recovered wood. www.infuturewood.info/

SURVEY ABOUT SMALL-SCALE FOREST OWNERS' ATTITUDES TO FOREST MANAGEMENT - PRELIMINARY RESULTS

Small-scale forest owners manage about 60 % of European forests. Jointly, they encompass 99 % of all forest owners in Europe. Their forests provide a large share of wood based raw materials for traditional forest products and the raw materials for wider applications of a growing bioeconomy.

The role of small forest owners is hampered by three challenges:

- 1) The structure of small-scale forest owners is changing, because of urbanization, and also their perception on wood productions and ecosystem services is changing.
- 2) The timber demand worldwide is increasing which is amplified by the increasing substitution of fossil raw materials.
- 3) The ongoing climate change requires a management to adapt forests to future climate conditions and to reduce the risk of climate related calamities.

In the past six months, the team of ValoFor put huge effort in the finalization of a common survey and choice experiment. Its delivery to small-scale forest owners in five partner countries was hampered due to the COVID-19 outbreak measures, causing slight delays in the finalisation and analysis of the survey. In the survey forest owners were asked for their attitude towards different management scenarios: "Business as usual", "Close to nature", "No management" and "Increasing profitability".

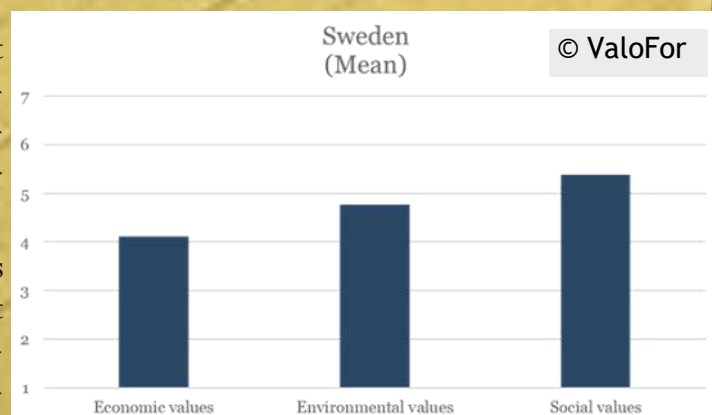
The results of the survey and choice experiment will help to detect tipping points in management behaviour of small-scale forest owners in relation to owner and forest characteristics (income, forest size, site productivity) and ownership motives.

The survey was a great opportunity to contact more than 8,000 forest owners in partner countries across Europe and promote the ForestValue research programme and the ValoFor project.

The preliminary analysis of the survey responses from Finland and Sweden indicate high interest of small-scale forest owners in social values, followed by economic values in Finland and environmental values in Sweden (Figure 1).

Fig. 1: The importance of economic, environmental, and social values to small-scale forest owners in Sweden.

Moreover, the ValoFor project team collected the data of nationally implemented European subsidy systems for a common analysis.





ADVANCED VIRTUAL APTITUDE AND TRAINING APPLICATION IN REAL TIME

The AVATAR project aims to develop a digital coaching, assistance and feedback system for forest machine operators to improve productivity while reducing mental workload. The project contributes to efficiency improvements of Cut-To-Length operations for enhanced timber utilization at higher value added resource recovery. Alongside occupational health and safety, AVATAR supports the implementation of a sustainable and competitive bio-economy in Europe.

The AVATAR team held its third Consortium Meeting from March 5th - March 6th, 2020 in Ås, Norway - kindly hosted by the Norwegian Institute of Bioeconomy Research (NIBIO). The goal of the meeting was to move AVATAR project activities forward as well as enable interaction and networking between the partners, to review project activities so far, to agree on next activities and to plan for AVATAR communication as well.

It has been shown that project activities are in good progress in each partnering organization. Interviews with forest operator trainers to qualitatively describe work patterns and practices of forest machine operators have been conducted in Germany, Sweden and Norway. The subsequent development of algorithms to automatically detect work elements of harvesters and forwarders has been started. The project partners have also worked on methods for forest, machine and terrain data assessment. These aspects focus on designing a sensor-fusion hardware and software for forest data collection and visualization as well as environment and machine localization and mapping. A harvester

task analysis was conducted to define and shed further light on the complexity of work tasks of forest machine operators. The task analysis serves as a basis for the operator training design and the generation of research hypotheses for the empirical testing of the developed feedback concepts.

Because of the Corona pandemic outdoor field tests with forest machinery of contractors almost stalled. However, creative project partners found interesting ways to test monitoring equipment using an alternative carriage (Figure 1).

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Figure 1: AVATAR equipment mounted on a stroller (Image: NIBIO)

www.avatar.uni-goettingen.de/



FROM FUNDAMENTALS TO VALORIZATION ENZYMATIC OXIDATION OF CELLULOSIC FIBRES AND UNDERLYING MECHANISMS

FunEnzFibres (2019-2022) aims at unravelling the potential of enzymatic oxidation of cellulosic fibres for material solutions. In particular, the potential of enzymatic oxidation in sustainable fibrillation and dissolution processes is being studied.

During the 1st year, project meetings have been arranged in Finland and Norway, bringing together academic partners and the industrial advisory board. A research visit from VTT to NMBU was done in June 2019, for bridging the expertise of LPMO enzymology at NMBU to enzymatic fibre processing at VTT. A number of enzyme variants for biocatalytic fibre oxidation is now available from NMBU, VTT and industry, and these are being evaluated in fibre modifications.

A fascinating novel analytical tool for assessing all fibre layers stepwise, from surface to the core has been developed at BOKU for detection of oxidised groups. The project has been presented in national and international scientific conferences (e.g. 41st Symposium on Biotechnology for Fuels and Chemicals, 2019, USA; Cordon Conference Carbohydrate-Active Enzymes for Glycan Conversions, 2019, USA).

Website: www.nmbu.no/en/projects/node/38547

Research Gate page: <https://www.researchgate.net/project/From-fundamentals-to-valorization-Enzymatic-oxidation-of-cellulosic-fibres-and-underlyig-mechanisms-FunEnzFibres>



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Picture 1: group photo from FunEnzFibres project meeting in Norway



FOREST SECTOR: SAVE-THE-DATES

24 June 2020 14:00 – 24 June 2020 15:30

INTEGRATE WEBINAR: Promoting the integration of nature conservation into sustainable forest management at the policy, practice and research level

<https://integratenetwork.org/webinar.html#three>



21 – 23 September 2020, Krakow, Poland

TEUFOR2020: Modern Technologies and Engineering in Sustainable Forest Utilization <https://teufor2020.urk.edu.pl/english.html>

06 - 09 October 2020, Bolzano, Italy

IUFRO SYMPOSIUM: Socio-economic and socio-ecological value added of non-wood forest products, forestry & timber processing industry



THE BIOECONOMY celebrates NATURE

9–11 September 2020
in Ruka, Finland

bp WORLD
bioeconomy
FORUM

F O R E S T V A L U E PLANNING A NEW JOINT CALL FOR RDI PROPOSALS

ForestValue has decided to start planning a new transnational call for proposals for research, development and innovation in the forest-based sector. This 2nd joint call would be a self-sustained call i.e. the funding to the call would come from the participating funders only without any co-funding from the European Commission.

All call details are still open, however, assuming all progresses as planned, the intention is to have the call launched in January 2021.

More information will be provided as it becomes available.

WWW.FORESTVALUE.ORG

WWW.LINKEDIN.COM/

[GROUPS/12110816/](https://www.linkedin.com/groups/12110816/)



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<https://forestvalue.org/>
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