CLICK*design*

Delivering fingertip knowledge to enable service life performance specification of wood

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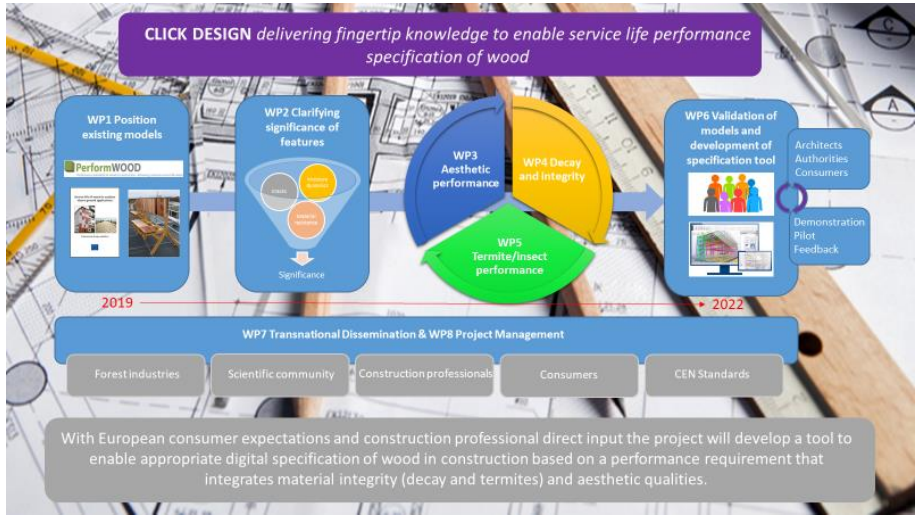
Why?

- Struggle to answer questions about durability and performance of wood products
- Disadvantage for timber compared to steel, aluminium, plastic and concrete
- Building Information Modelling (BIM) and life cycle analysis (LCA) include service life data

What and who?

- A software tool for architects and specifiers to enable performance specification for wood
- From the complex, fragmented and general to the easy-to-use, consolidated and specific in an accessible digital tool
- March 2019 to February 2022



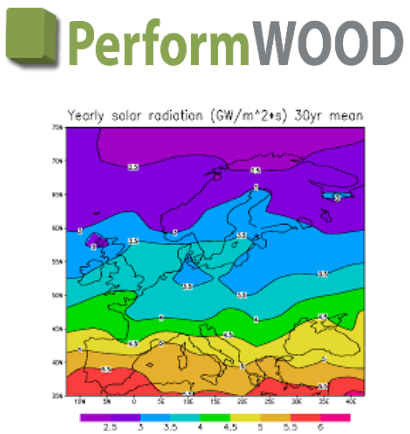
bre
GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN
LUND UNIVERSITY
VTT
INNORENEW COE
FCBA INSTITUT TECHNOLOGIQUE
NIBIO NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH
IRBI Institut de Recherche sur la Biologie de l'Insecte

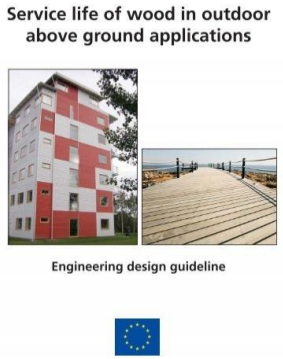
Hygiène Office
Escola de Enxeñaría Forestal Campus de Pontevedra Universidade de Vigo
FPInnovations

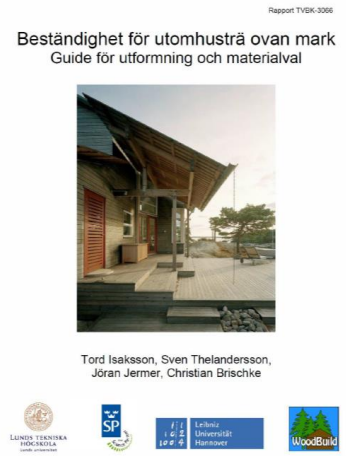
CORDES HOLZBAU
MIEBACH INGENIEURBÜRO
HOLZBAU DEUTSCHLAND BUND DEUTSCHER ZIMMERMEISTER
WPA Wood Protection Association
CMD Cluster da Madeira e o Deseño de Galicia
FINSA soluciones en madera
GEORGE BARNSDALE Est. 1884
ARCHITYPE
kebony
VÄYLÄ
JARTEK
SWEDISH WOOD
Limträteknik AB
Wolman by BASF - We create chemistry
stordenso
tmf SWEDISH FEDERATION OF WOOD AND FURNITURE INDUSTRY
accoya
Puutuoteteollisuus
JELOVICA
TreFokus

WP1 Position and existing models

- Surveyed and critically reviewed existing models to identify strengths and weaknesses
- Comparative evaluation of models based on: hygrothermal properties, biophysical decay, material resistance, and engineering design.
- Comparison of availability of input data, consistency of variables, transferability of output data to superior modelling levels and their accuracy, reliability and reproducibility is being made and information lacking identified







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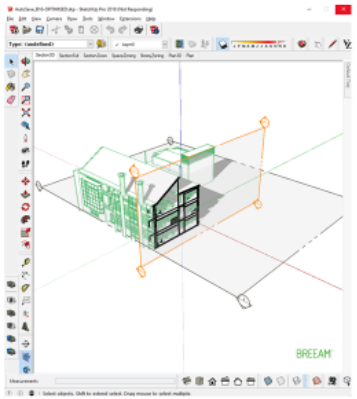
WP2 Clarifying significance of ‘missing’ features

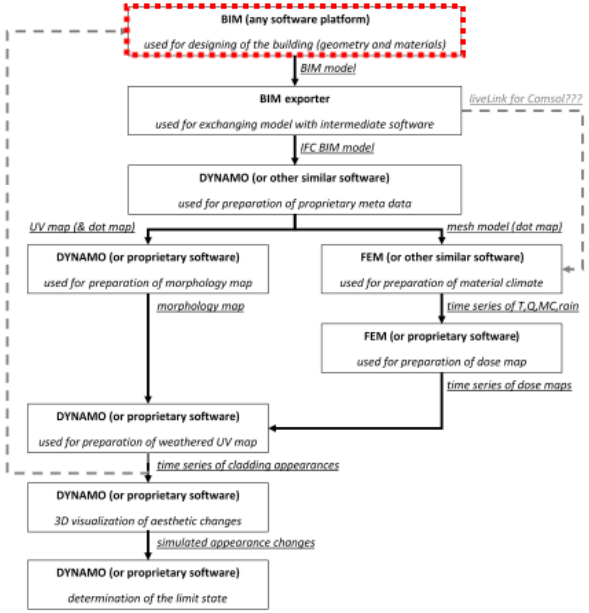
- Investigate features missing from existing models that potentially have a significant impact on performance
- Approaches to fill the gaps using laboratory and field trials: cracks, weathered material, material resistance and adaptability to in-ground situation
- Product performance is being assessed against real performance and failure data in existing databases.

WP3 Aesthetic performance of building

- Quantify appearance changes of wood surfaces and the definition of aesthetic limit states
- Integration into BIM
- Develop a novel methodology for combining multi-sensor data (including colour, texture, gloss, roughness) into a single model indicator expressing customer perception ‘satisfaction with appearance’

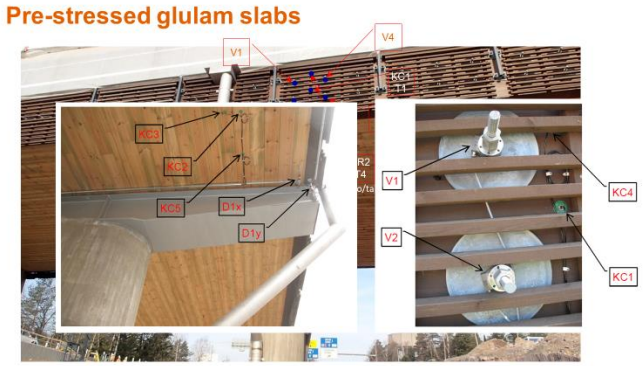
BIM implementation

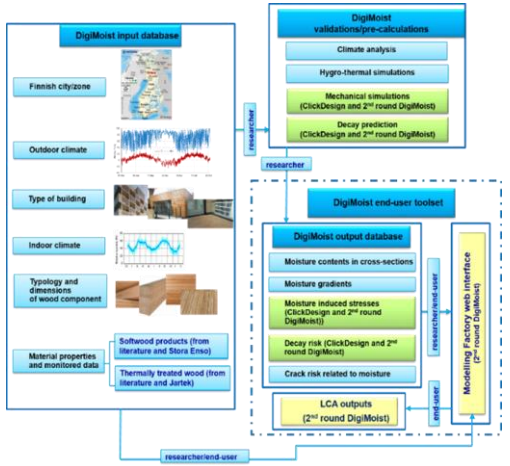


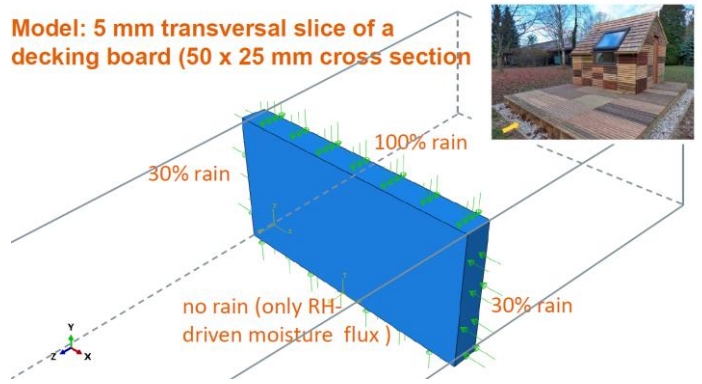


WP4 Impact of decay on integrity

- Understand the effect of fungal decay on strength and stiffness of timber structure
- Experimental studies on the spatial distribution of decay in timber under laboratory conditions
- Finite element analyses to predict distribution of moisture, temperature and relative humidity inside wood as well as moisture gradients across sections including under sub-freezing temperatures and eventual presence of free water in wood, wind velocity, solar radiation and shading







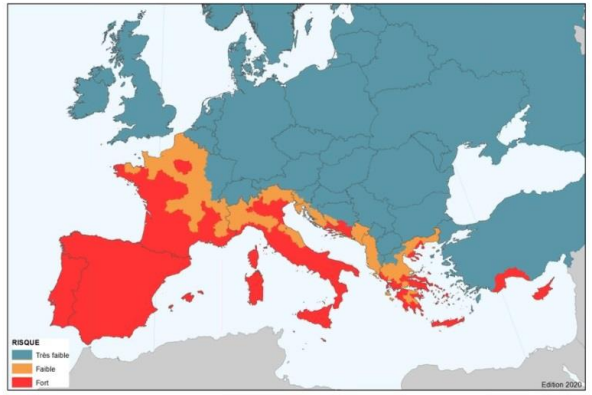
WP5 A measure of termite and insect performance

- Study the adaptability of existing models to create a measure of insect/termite performance to contribute to the model
- Identify parameters influencing the insect risk, such as climate, moisture, accessibility for termites, study of the performance of selected model construction materials against subterranean termites
- Conduct reality checks of the performance measures

Anobids

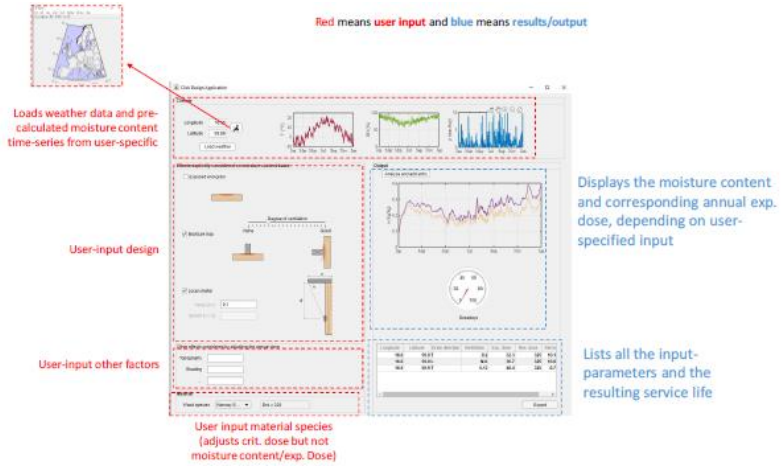
Hylotrupes bajulus

termites

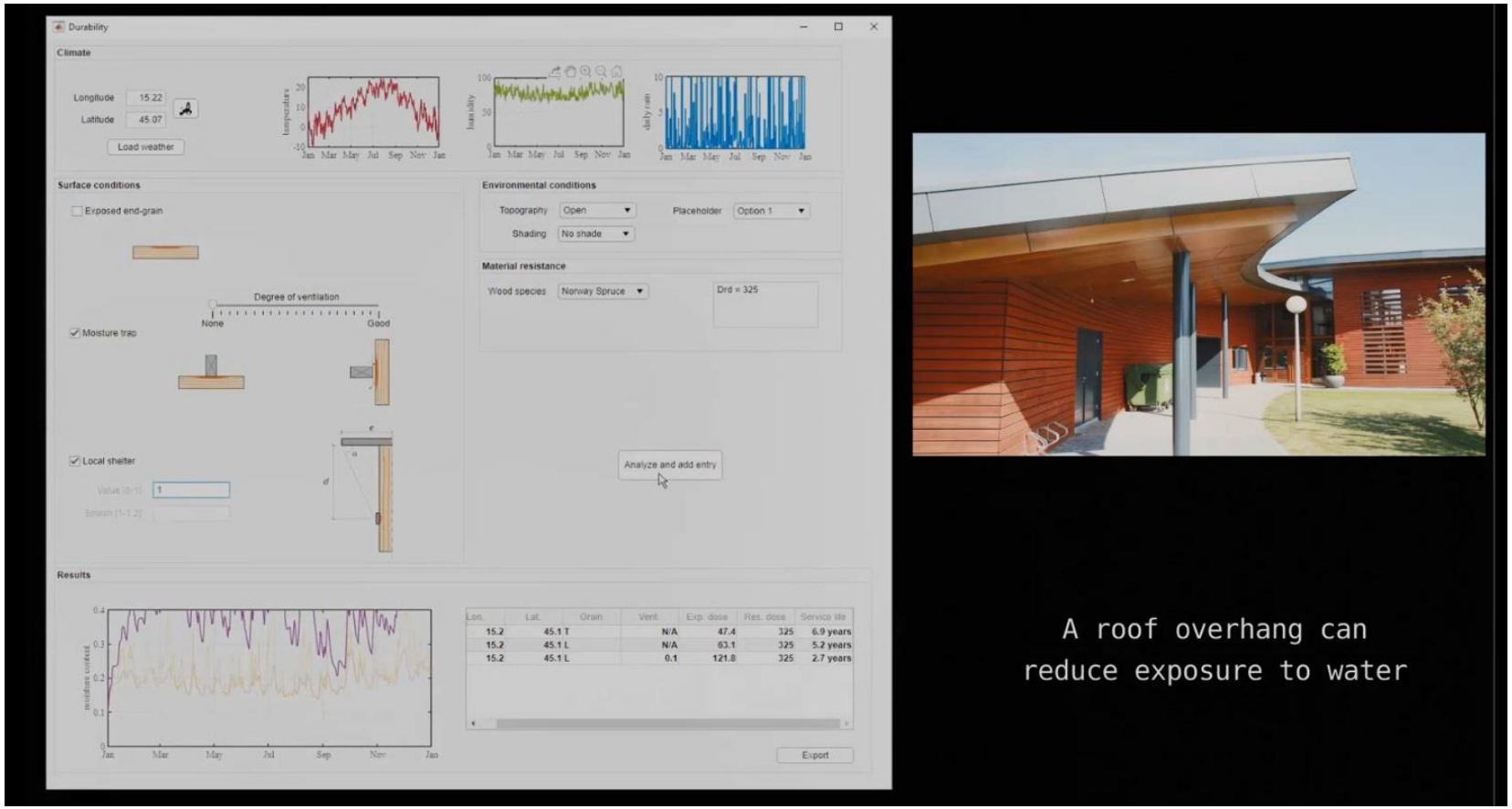


WP6 Validation of models & development of specification tool

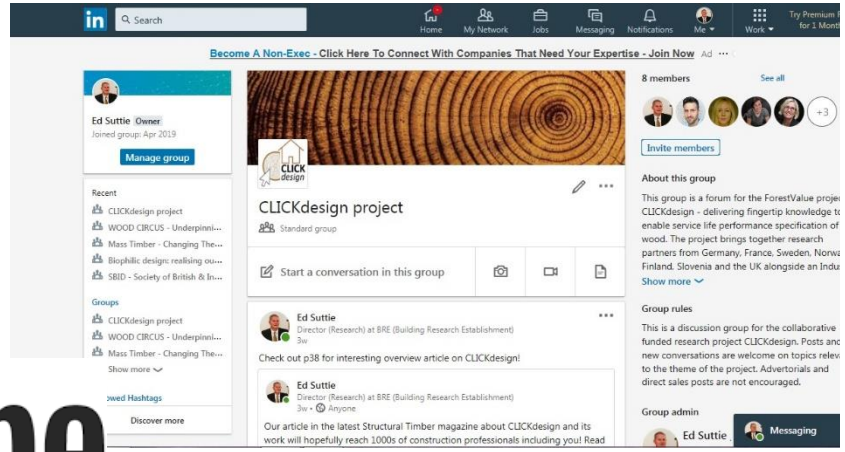
- Develop numerical models on the basis of the results of the previous WPs
- A set of models will be validated against real-case studies from across Europe
- Validation of the most promising set of performance models under different scenarios to predict the performance of timber structures and products
- Development of the CLICK DESIGN tool



Demonstration durability tool



Transnational dissemination



YouTube

CLICK design

ForestValue

Delivering fingertip knowledge to enable service life performance specification of wood

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The CLICKdesign project is developing a performance based specification protocol to enable a software tool for architects, specifiers and the public to embed service life performance specification for wood. This will help increase market confidence with users for selecting wood as a reliable product and enhance an optimised performance of timber in the built environment.

Project CLICKdesign goes beyond the current position by including:

- Robust forecasting of aesthetic changes on surfaces developing the kinetic and/or intensity of variation in such changes due to location, microclimate, architectural design and materials used for construction.
- Studying spatial distribution of fungal decay and its interaction with moisture transport and resulting gradients in buildings.
- Development of a termite/insect performance measure for the first time in Europe.
- Robust integrated performance classification based on the whole set of external parameters – the foundation established for decay, material and integrity aspects, aesthetic limits and performance and termite/insect performance aspects.
- Providing a CLICKdesign tool that utilises European standards, the latest research findings and wood databases and puts it at the fingertips of specifiers and users.
- Features wholly not integrated into specification now such as the significant variations due to climate change and exposure dose for wood products and also the distribution and locations of wood destroying organisms, which may for example expand termite risk zones in Europe.
- Inspiring new wood and wood-based products using the tool, supported by training outreach, and creating business opportunities for industries to innovate.

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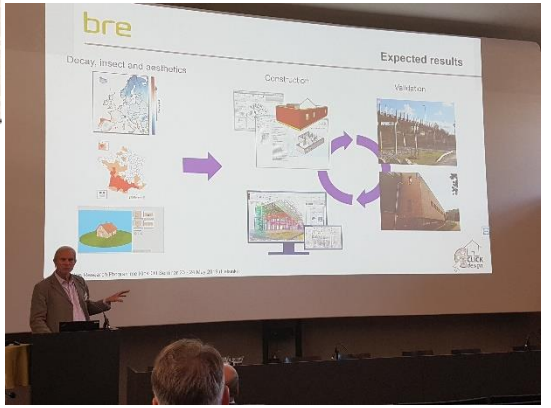

COVID-19 impacts

- Collaboration and creative problem solving
- Team availability altered
- Postponed researcher exchanges
- We find solutions and work around the problem
- March 2019 to February 2022 – possible to extend to April 2020

19 tonnes CO_2

250kg CO2 per return EU flight 15 team members, two PM meetings and three conference or other events in 2020

Coming up soon

- **Piloting the tool** with professional bodies and improving it 2021 workshops
- Increasing influence on **standardisation** work and CEN committees especially CEN/TC38 WG28 *Performance Classification* of wood
- More support for **young researchers -** in the first year CLICKdesign has already supported 14 students in their Bachelors, Masters and Doctoral studies, providing opportunity for young researchers

Thank you

BRE Ed Suttie, Tom Jennings UGOE Christian Brischke, Philip van Bester InnoRenew Jakub Sandak, Anna Sandak VTT Stefania Fortino, Petr Hradil FCBA Magdalena Kutnik, Mathilde Montibus Lund University Eva Frühwald-Hansson, Jonas Niklewski NIBIO Gry Alfredsen, Lone Ross Gobakken University of Vigo David Lorenzo IRBI Christophe Lucas Hygiene Office Eric Vieillemard

Project CLICKdesign is supported under the umbrella of ERA-NET Cofund ForestValue by MIZS (Slovenia), YM (Finland), The Forestry Commissioners (UK), RCN (Norway), ADEME and ANR (France), FORMAS, SWEA and Vinnova (Sweden), BMEL and FNR (Germany). ForestValue has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773324.