THÜNEN
OUR RESEARCH RESONATES

IRGWP Webinar 05 November 2026

DURAWORLD - A global comparison of field test methods to determine the above-ground durability of wood

Christian Brischke, Gry Alfredsen, Djeison C Batista, Kévin Candelier, Jérémie Damay, Johanna Elam, Lesley P Francis, Miha Humar, Ulrich Hundhausen, Hiroshi Matsunaga, Rebecka Ringman, Rod Stirling, Mats Westin, Xinfeng Xie

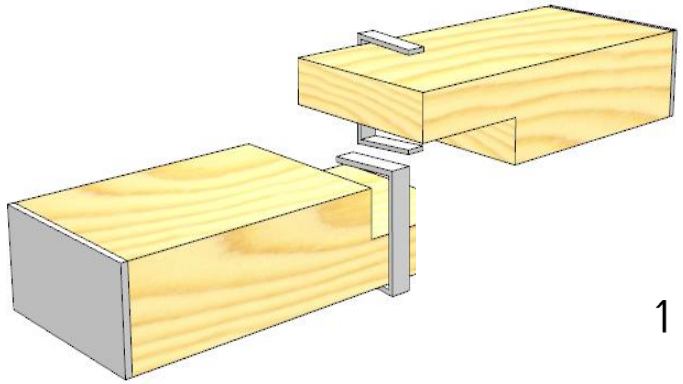


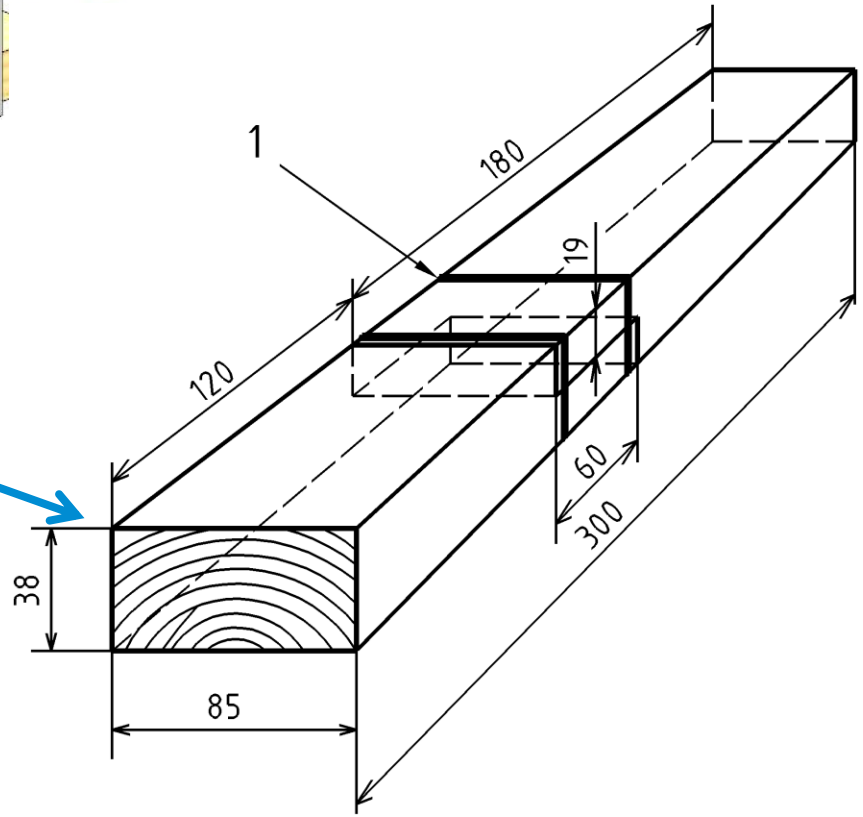
Photo: Thünen / Christian Brischke

Background & motivation

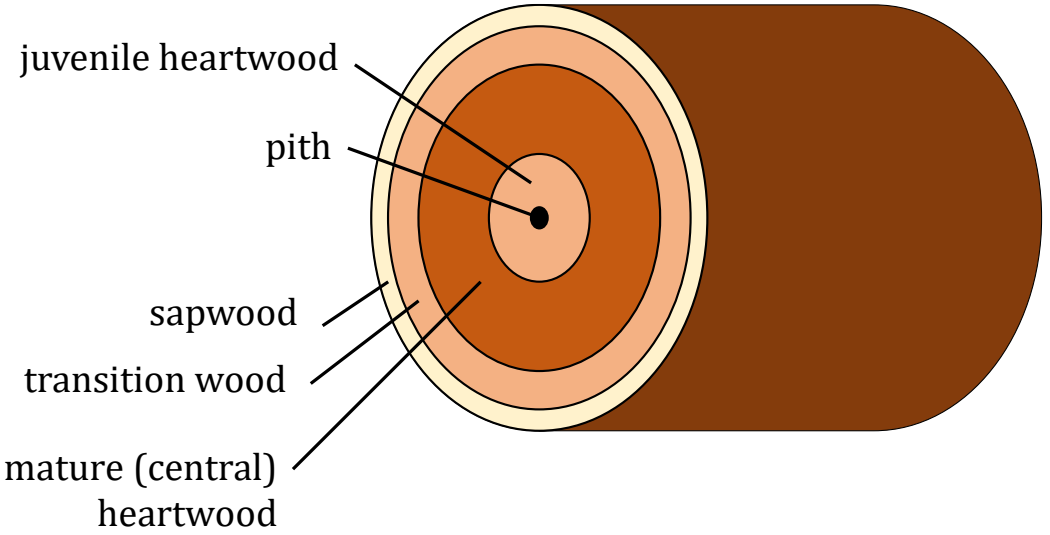
- Need to conduct field tests in AND above ground!
- Several (> 70) above-ground methods available, but only very few are standardized
- Mostly designed for efficacy testing
- Issues with Lap-joint and L-joint tests

Lap-joint Issues I





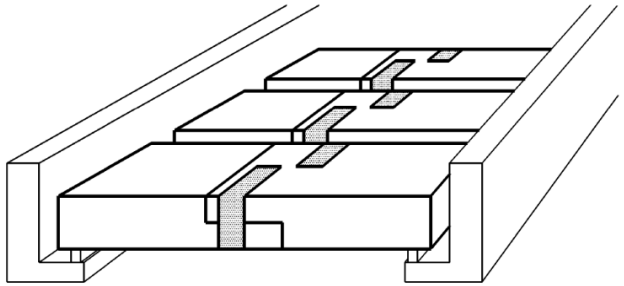
Max. angle = 10°

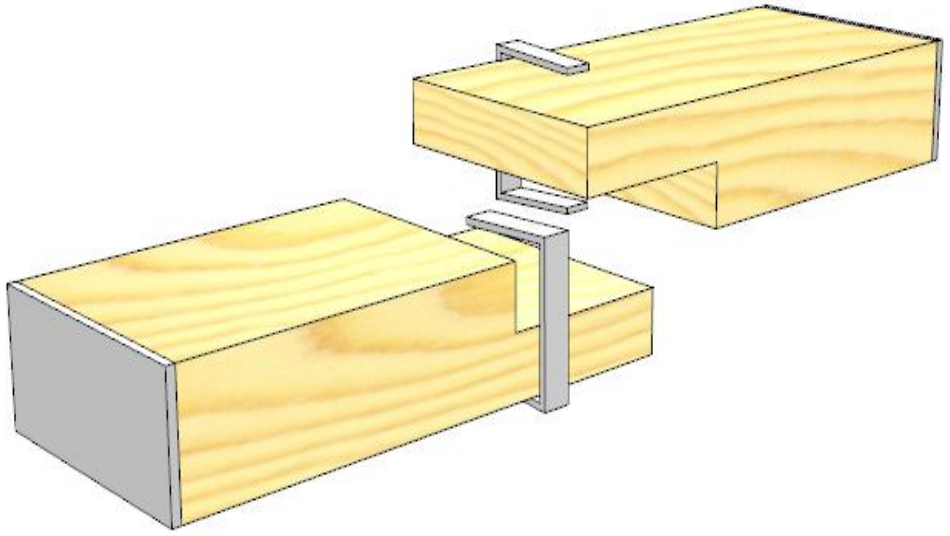


Roundwood requirements:

DBH > 50 cm
Sapwood width >> 70 mm

Lap-joint Issues II







Lap-joint Issues II

CCA 2kg



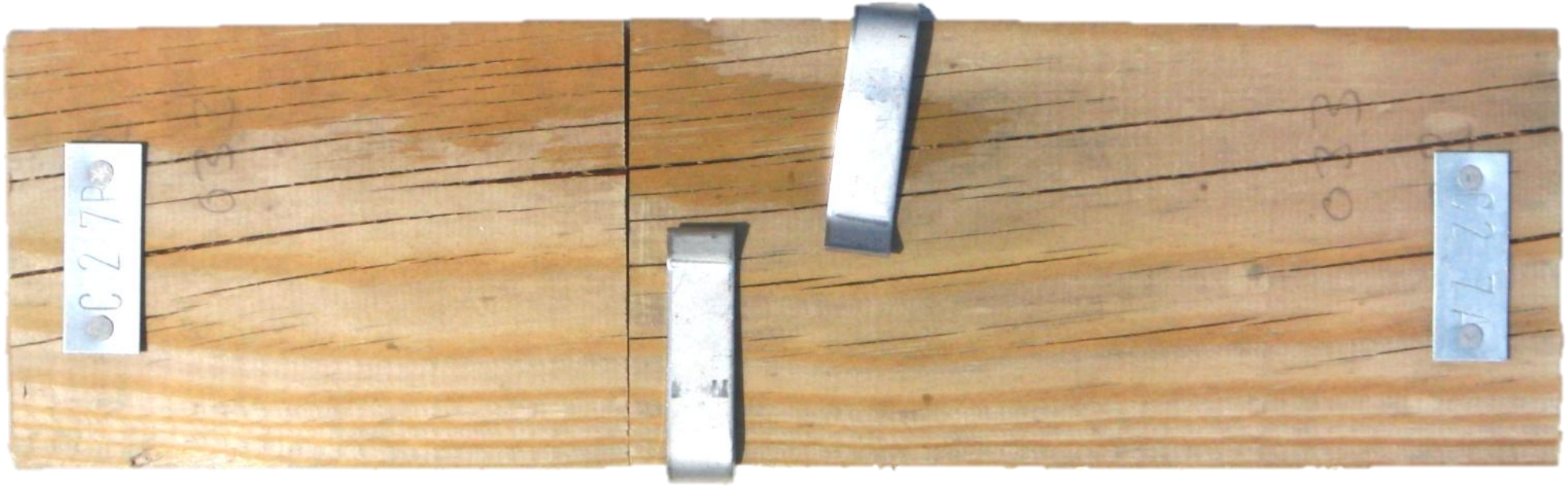
Beech



English oak

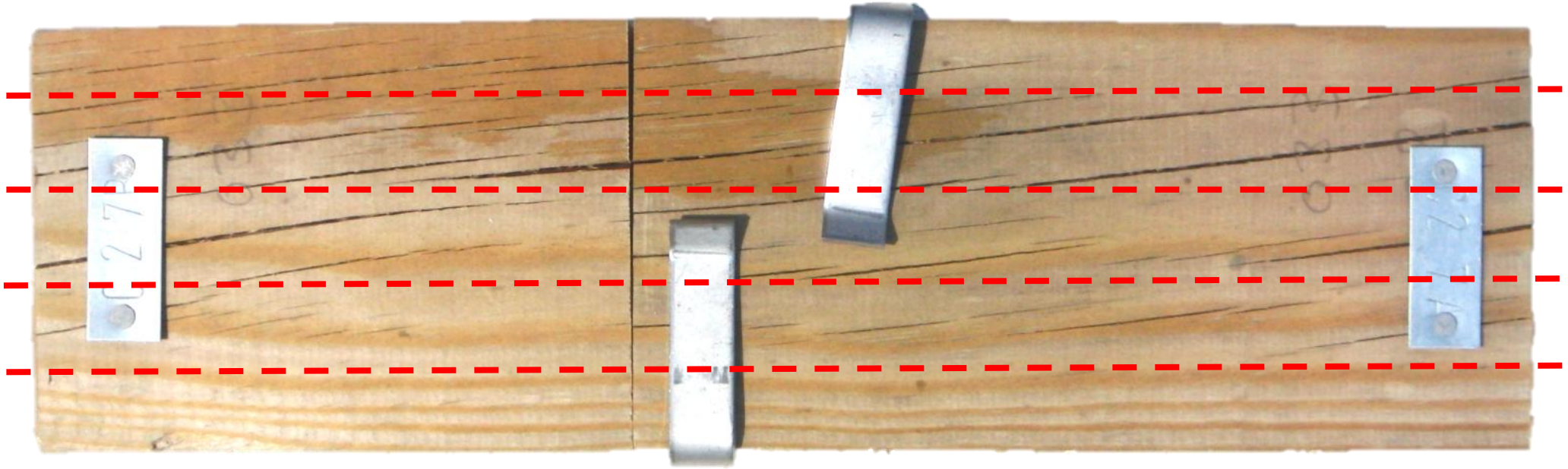


Lap-joint Issues II



Christian Brischke
DURAWORLD

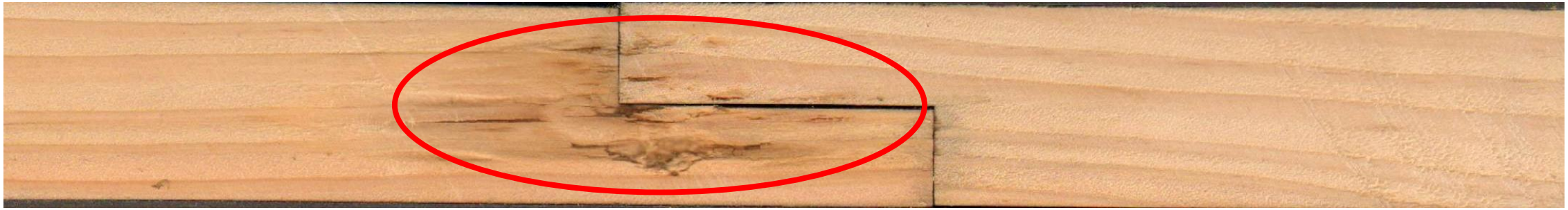
Lap-joint Issues II



Christian Brischke
DURAWORLD

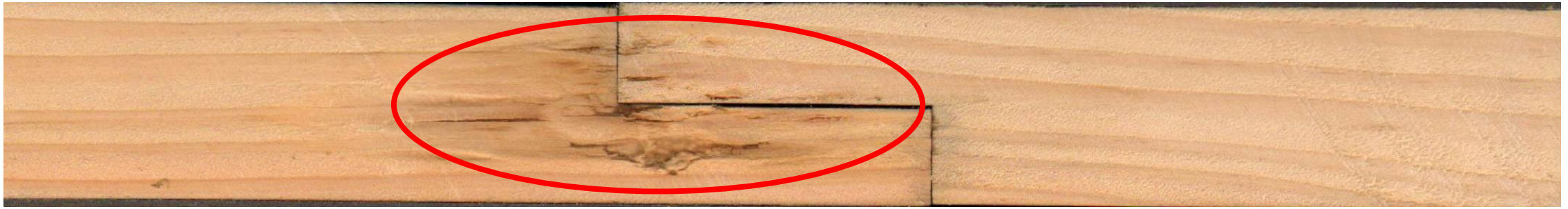
Lap-joint Issues II

Test sample A



Lap-joint Issues II

Test sample A



Test sample B



L-joint Issues





The ‚perfect method‘

- Applicable for all kinds of wood-based materials
- Can be used for durability & efficacy testing
- Simple, clear and inexpensive
- Fast (enough) – not only in the tropics
- Reproducible
- …

DURAWORLD objectives

- Comparison of methods for above-ground durability testing
  - sandwich, bundle, and lap-joint method
- Comparison of assessment criteria according to different standards
  - e.g. CEN, ASTM, AWPA
- Establish assessment criteria that can be used for durability classification and decay modelling
- Input to standardization

Partners



Hamburg



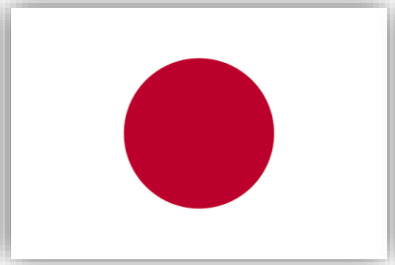
Austevoll



Hilo



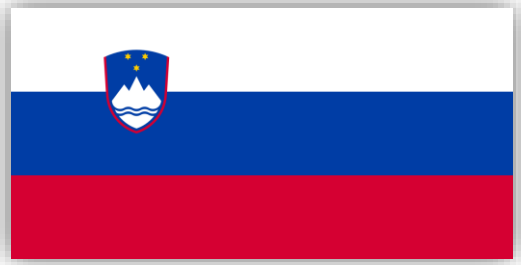
Cap Estérias



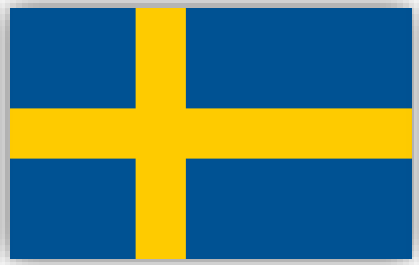
Tsukuba



Jerônimo Monteiro



Ljubljana



Borås



Kourou



Brisbane

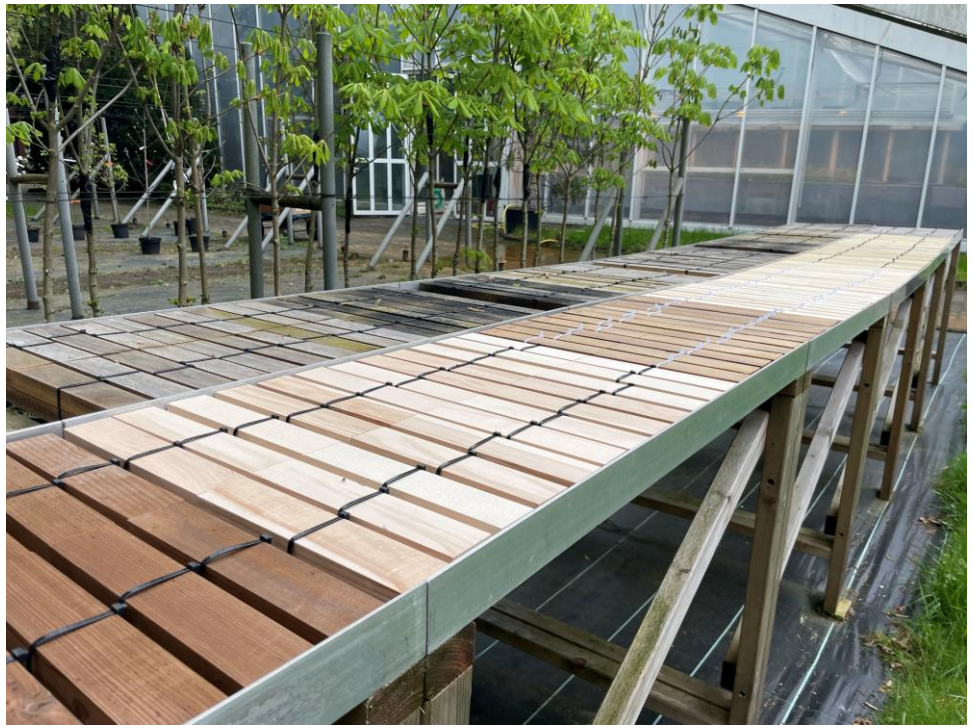


Vancouver



Hamburg, Germany







Austevoll, Norway



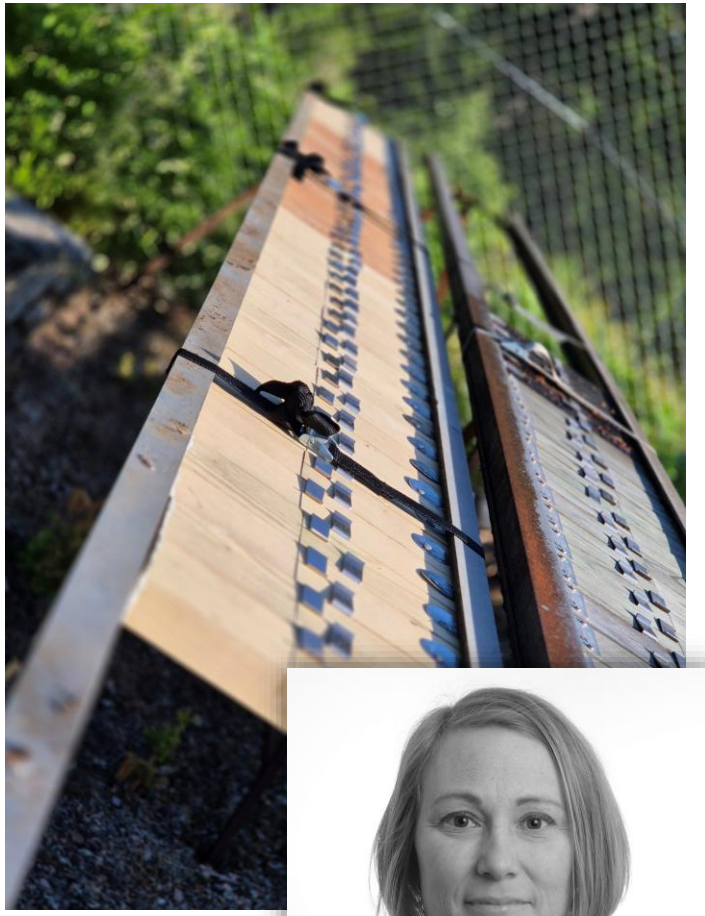






Borås, Sweden

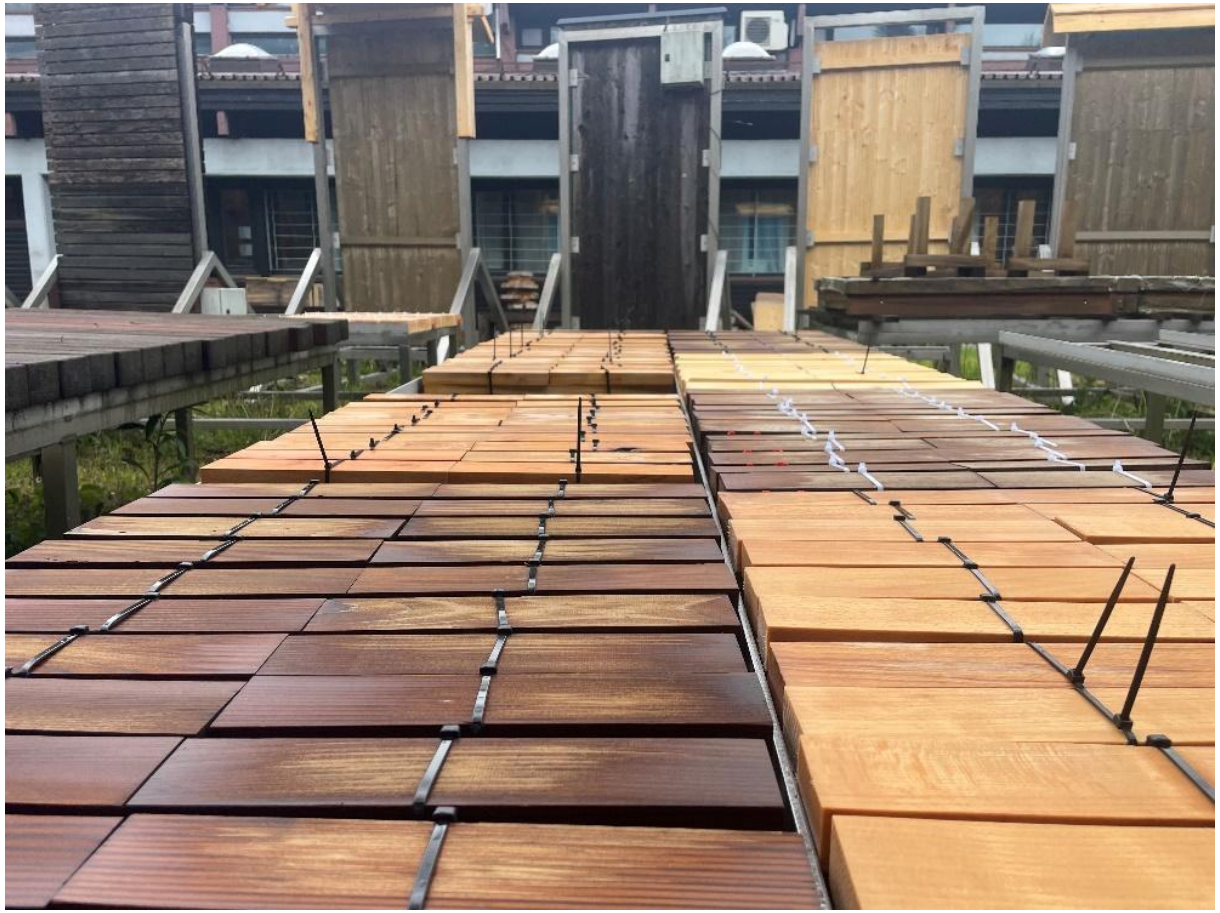








Ljubljana, Slovenia







Hilo, Hawaii, USA







Kourou, French Guyana



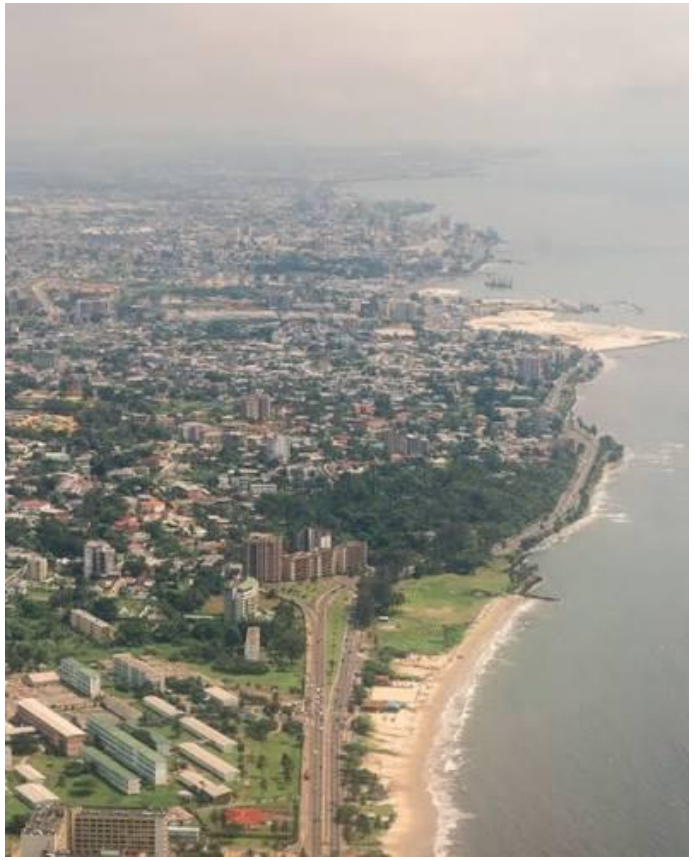






Cap Estérias, Gaboon







Jerônimo Monteiro, Brazil





Brisbane, Australia







Vancouver, Canada





Tsukuba, Japan

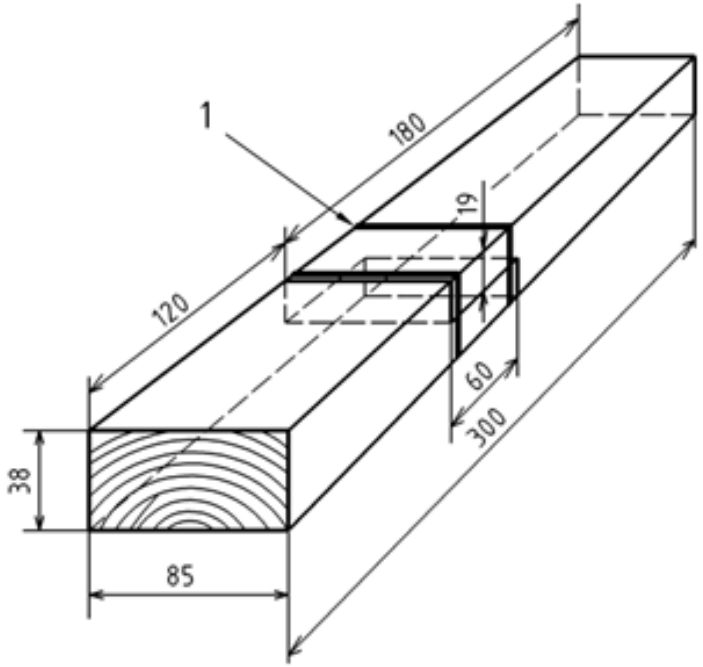


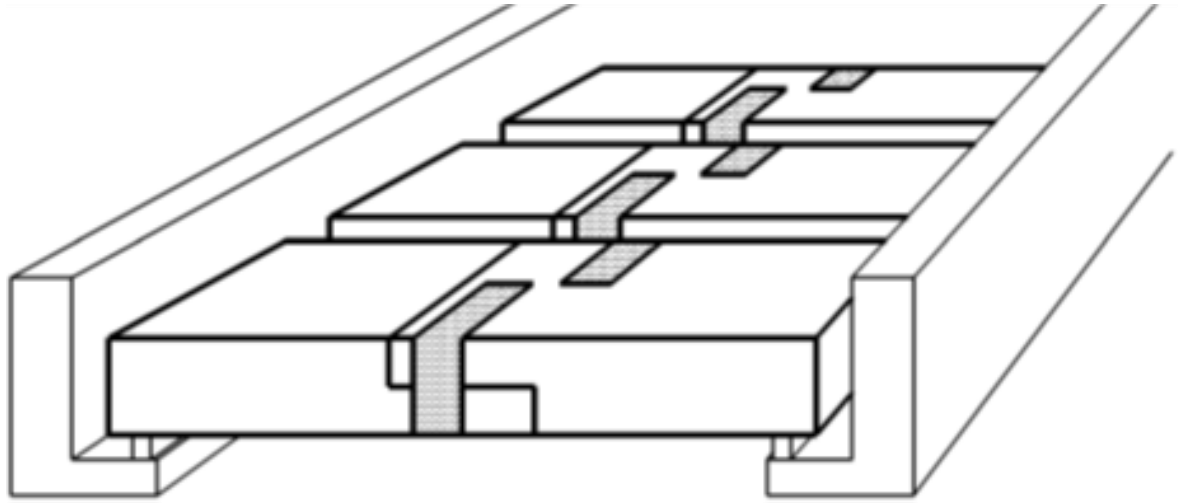


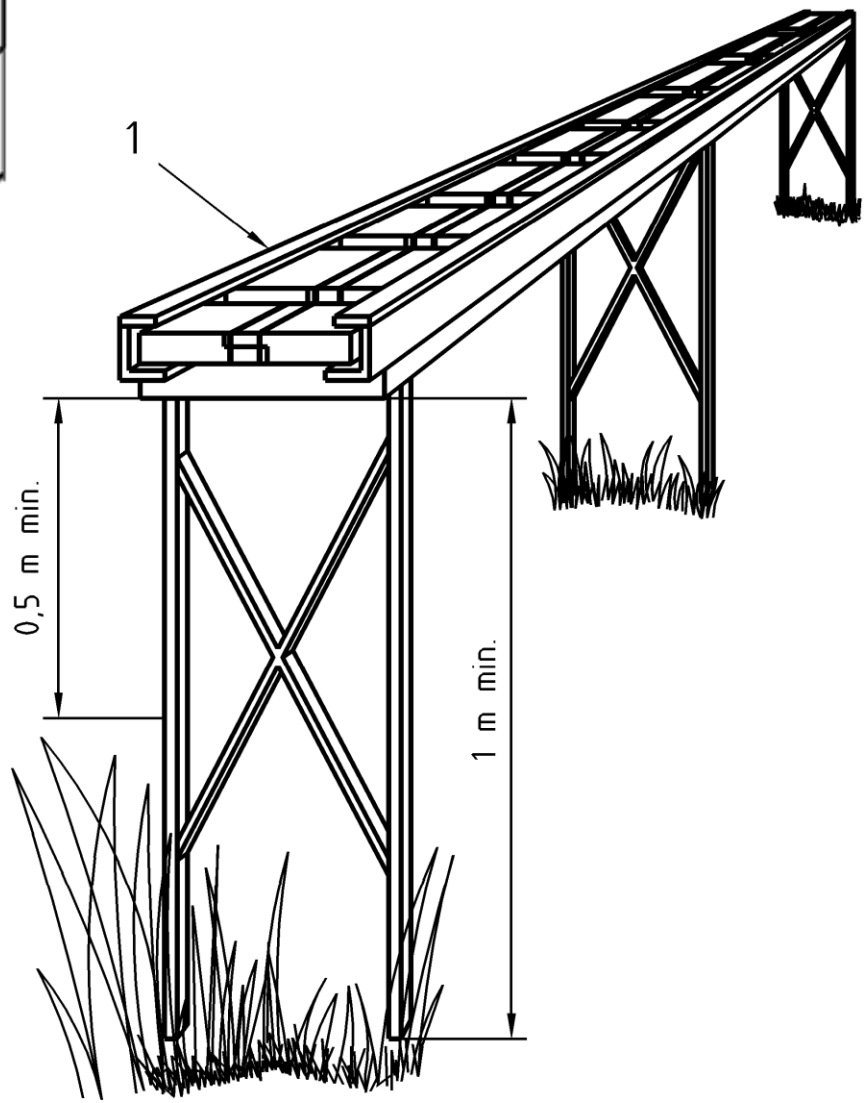


Lap-joint method

- EN 12037 (2023)
- ASTM standard

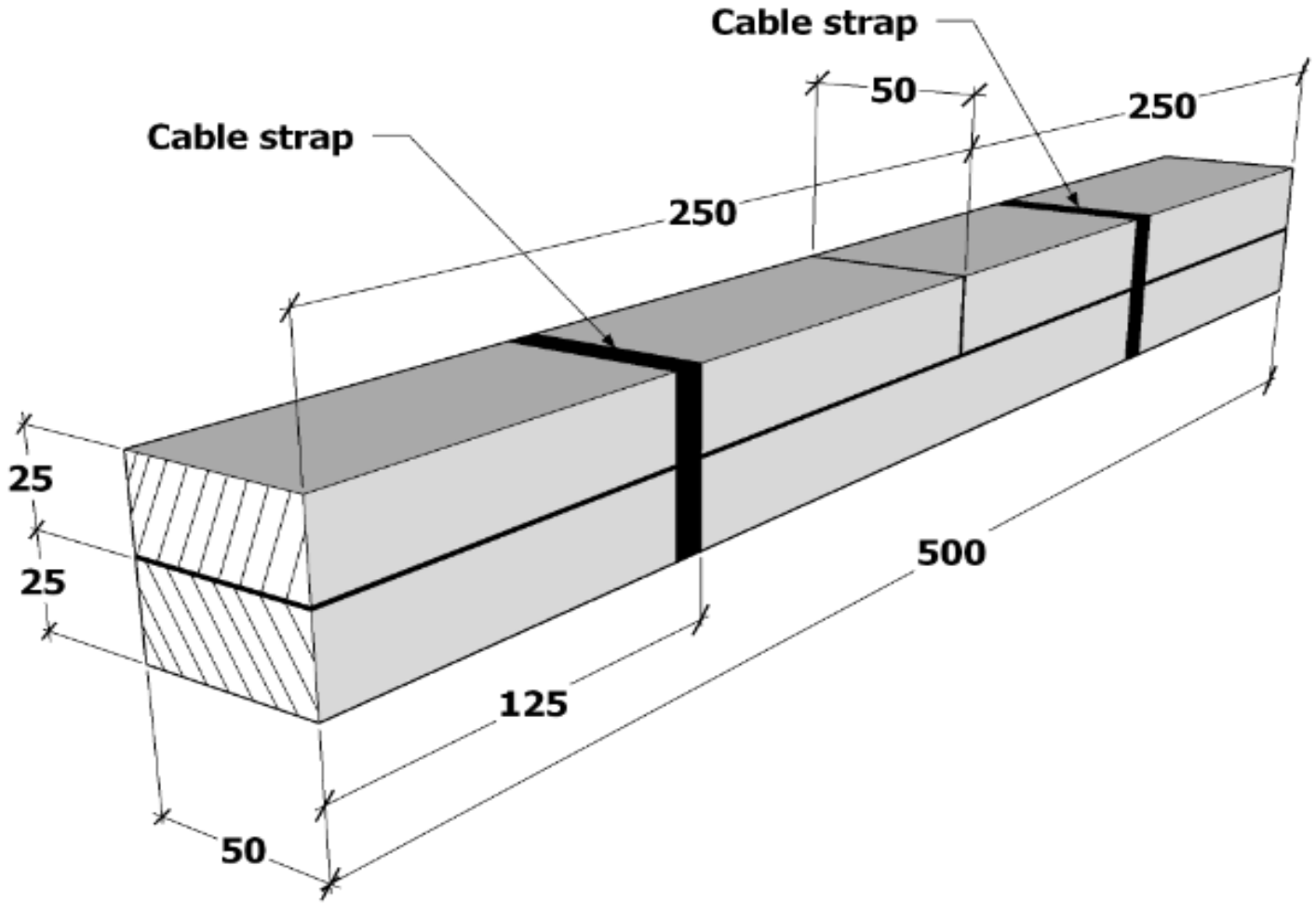






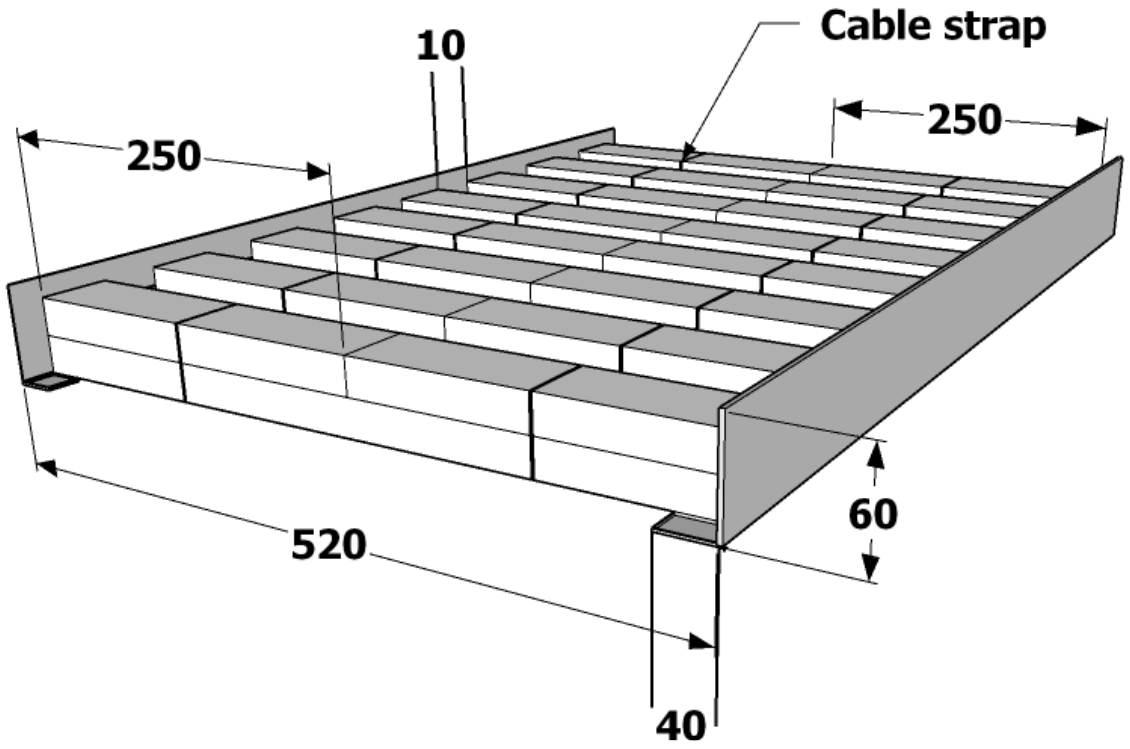
Bundle method

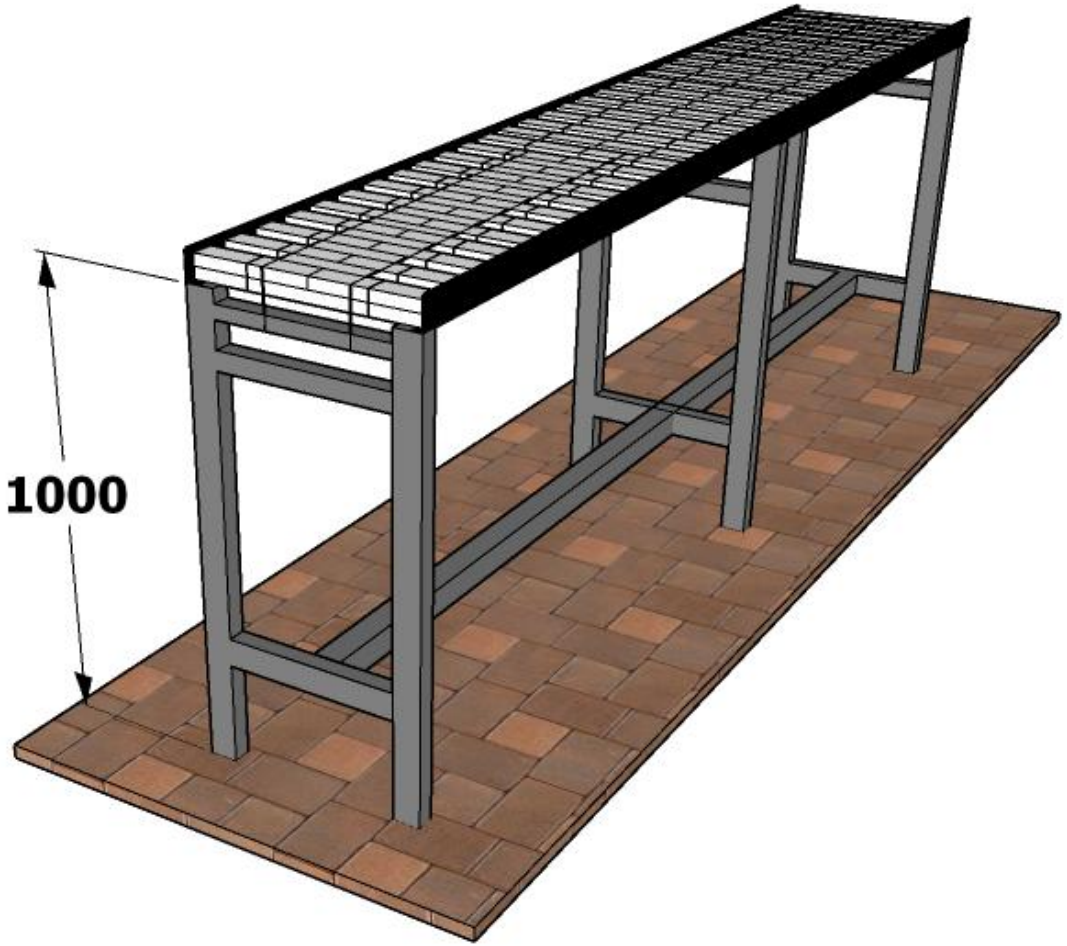
- Draft standard



Bundle method

- Draft standard



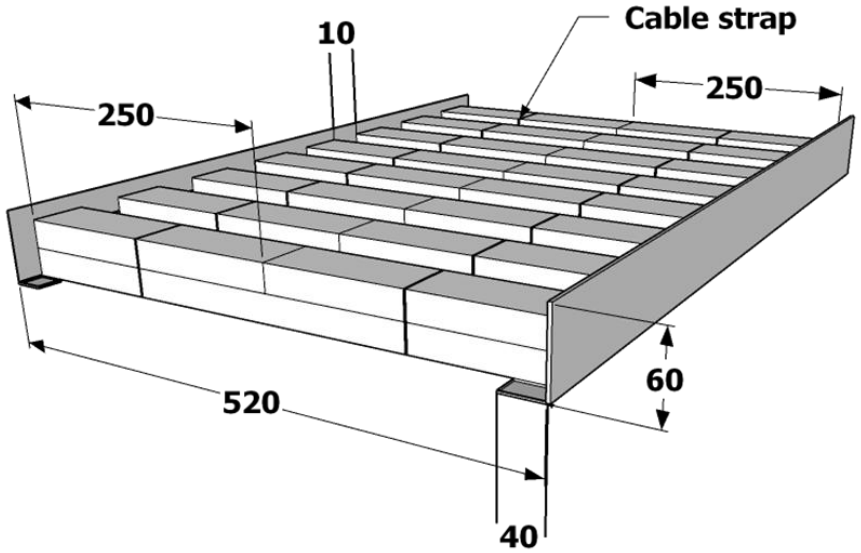


Bundle method









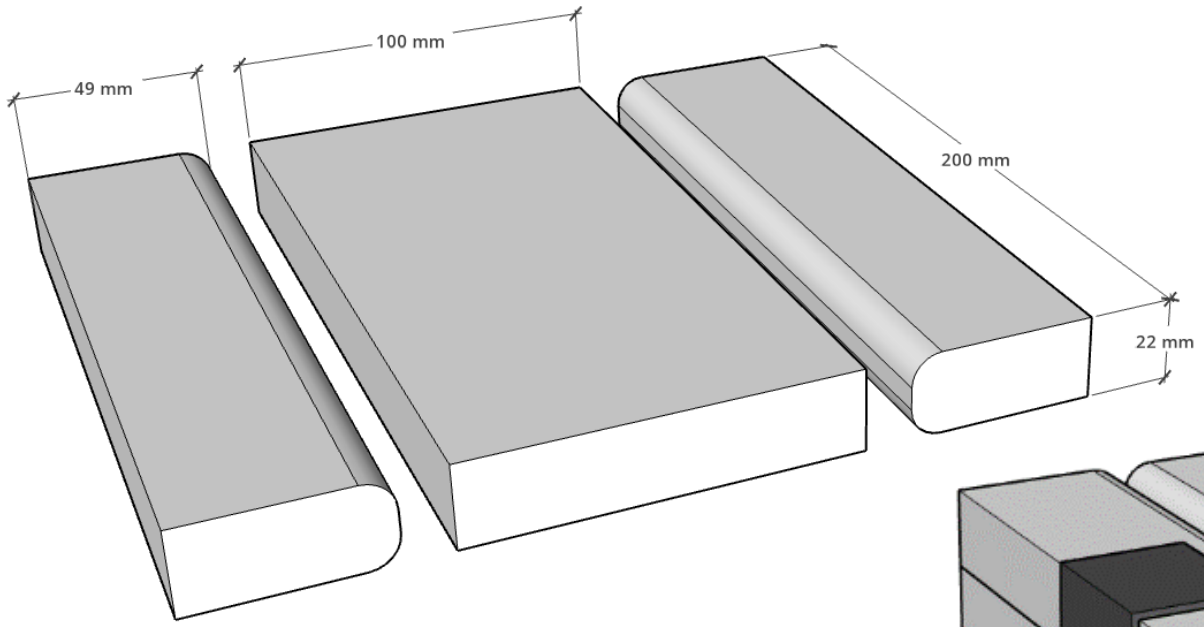
Bundle method

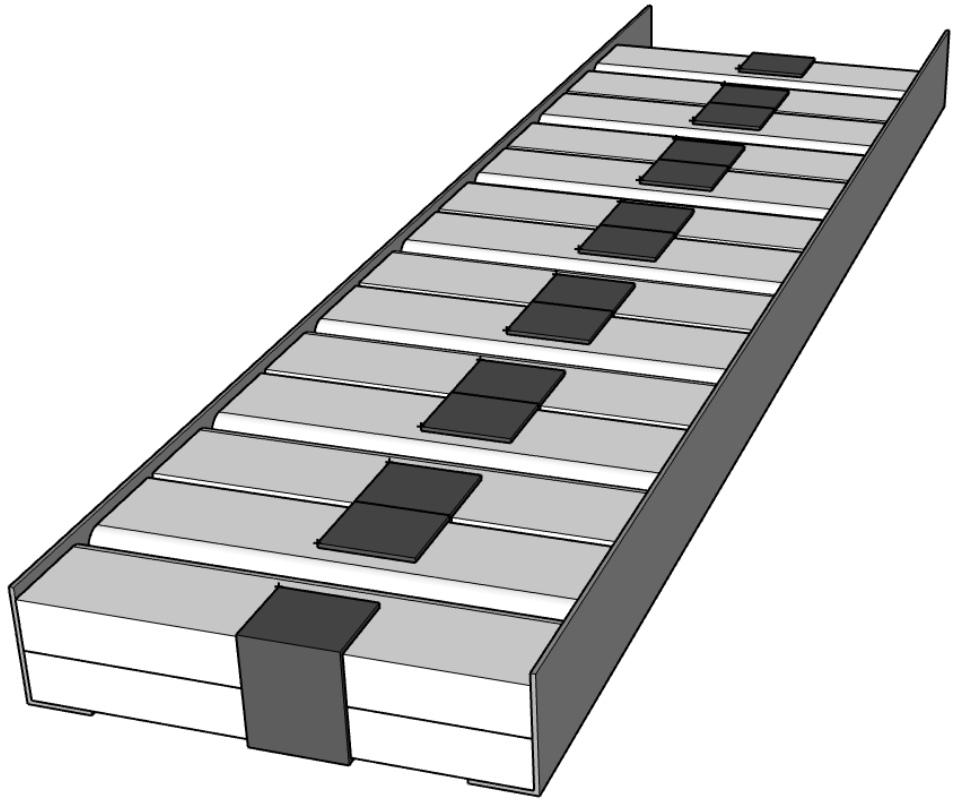


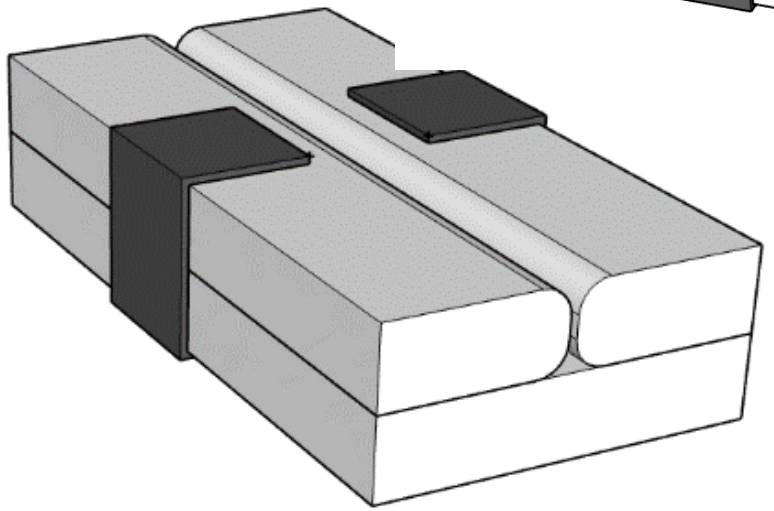


Sandwich method

- Draft standard

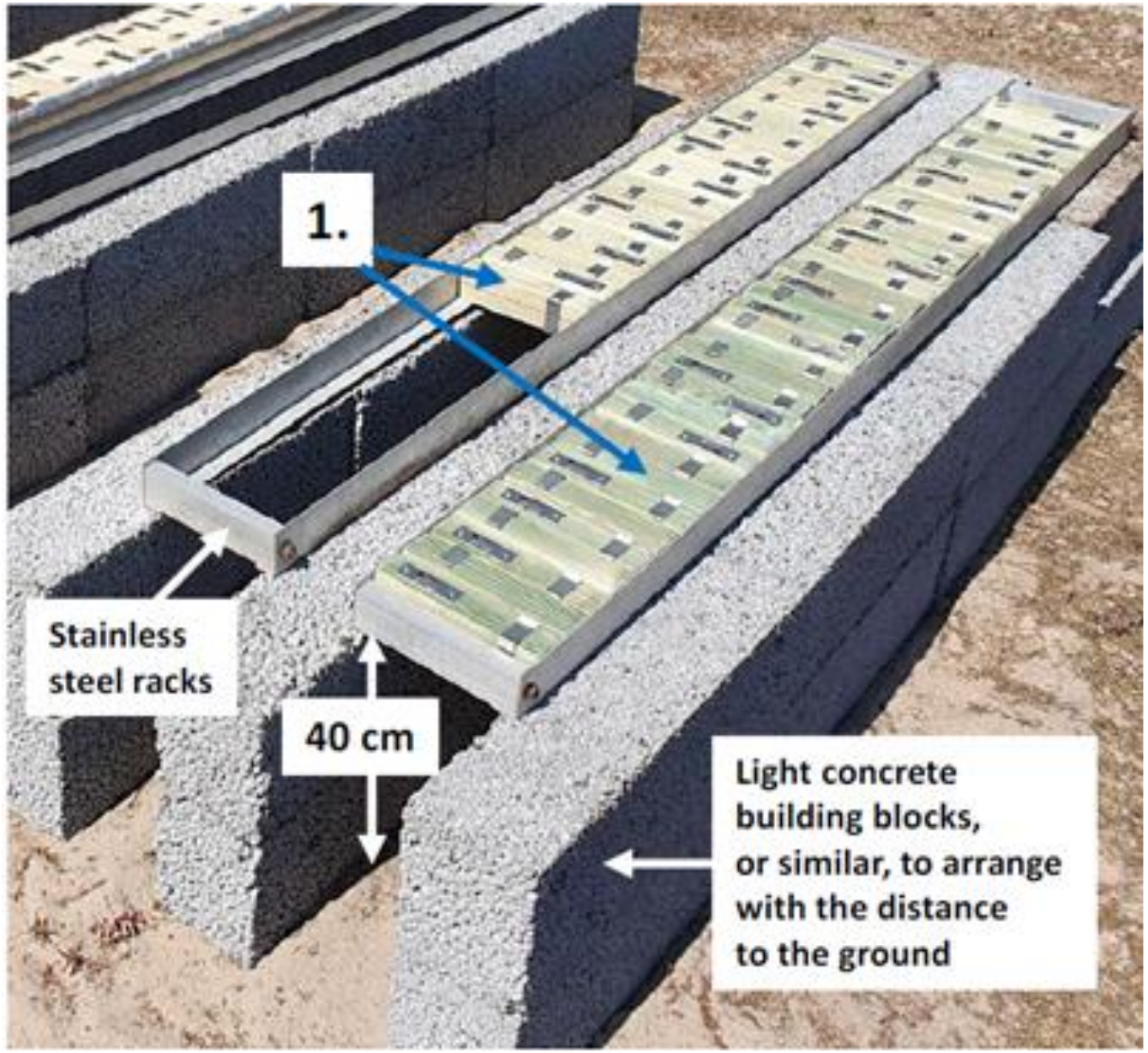






Sandwich method

- Draft standard



Test materials

(1) Scots pine (*Pinus sylvestris*) sapwood (sw)

(2) Scots pine heartwood (hw)

(3) Norway spruce (*Picea abies*)

(4) European larch (*Larix decidua*) hw

(5) European beech (*Fagus sylvatica*) sw

(6) Black locust (*Robinia pseudoacacia*) hw

(7) Gympie messmate (*Eucalyptus cloeziana*) hw

Specimens

Total = **7** wood species **x 11** test sites **x 3** test methods **x 10** replicates

= **2,310** specimens = **6,160** wood elements

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= **2,310** specimens = **6,160** wood elements

Produced by:

THÜNEN

University *of Ljubljana*

NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

National Centre for Timber Durability and Design Life

Queensland Government

Forest & Wood Products Australia

The University Of Queensland AUSTRALIA

University of the Sunshine Coast

Specimens

Total = **7** wood species **x 11** test sites **x 3** test methods **x 10** replicates

= **2,310** specimens = **6,160** wood elements





Decay assessment - EN 12037:2023 (Lap-joint method)

Rating	Description	Definition
0	Sound	No evidence of decay.
1	Slight attack	Visible signs of decay, but no significant softening or weakening of the wood.
2	Moderate attack	Areas of decay (softened, weakened wood); typically, not more than 3 cm^2 and to a depth of 2 mm to 3 mm.
3	Severe attack	Marked softening and weakening of the wood typical of fungal decay; distinctly more than 3 cm^2 affected and to a depth of 3 mm or 5 mm or 5 mm to 10 mm over a few cm^2.
4	Failure	Very severe and extensive rot, member(s) often capable of being easily broken.

Decay assessment - EN 252:2015 (graveyard method)

Rating	Description	Definition
0	Sound	No evidence of decay. Any change of colour without softening has to be rated as 0.
1	Slight attack	Visible signs of decay, but of very limited intensity or distribution: changes which only reveal themselves externally by very superficial degradation, softening of the wood being the most common symptom, to an apparent depth in the order of one millimetre.
2	Moderate attack	Clear changes to a moderate extent according to the apparent symptoms: changes which reveal themselves by softening of the wood to a depth of approximately 1 to 3 millimetres over more than 1 cm^2 per segment
3	Severe attack	Severe changes: marked decay in the wood to a depth of more than 3 millimetres over a wide surface (more than 20 cm^2) or by softening deeper than 10 mm over more than 1 cm^2 per stake.
4	Failure	Impact failure of the segment or more than 50 % of the cross-sectional area show clear signs of decay.

Decay assessment - AWPA E16:2022 and E7:2021

Rating	Description	Definition
10	Sound	No sign or evidence of decay, wood softening or discoloration caused by microorganism attack.
9.5	Trace-suspect	Some areas of discoloration and/or softening associated with superficial microorganism attack.
9	Slight attack	Decay and wood softening is present. Up to 3 % of any cross-sectional area is affected.
8	Moderate attack	Similar to '9', but more extensive attack with 3-10 % of any cross-sectional area affected.
7	Moderate/severe attack	Sample has been between 10-30 % of any cross-sectional area decayed.
6	Severe attack	Sample has been between 30-50 % of any cross-sectional area decayed.
4	Very severe attack	Sample has been between 50-75 % of any cross-sectional area decayed.
0	Failure	Sample has functionally failed. It can either be broken by hand due to decay, or the evaluation probe can penetrate through the sample.

Next steps

- Nov/Dec 2026: Shipping specimens
- April 2027: Start of exposure
- 2027 -2032: Regular assessments

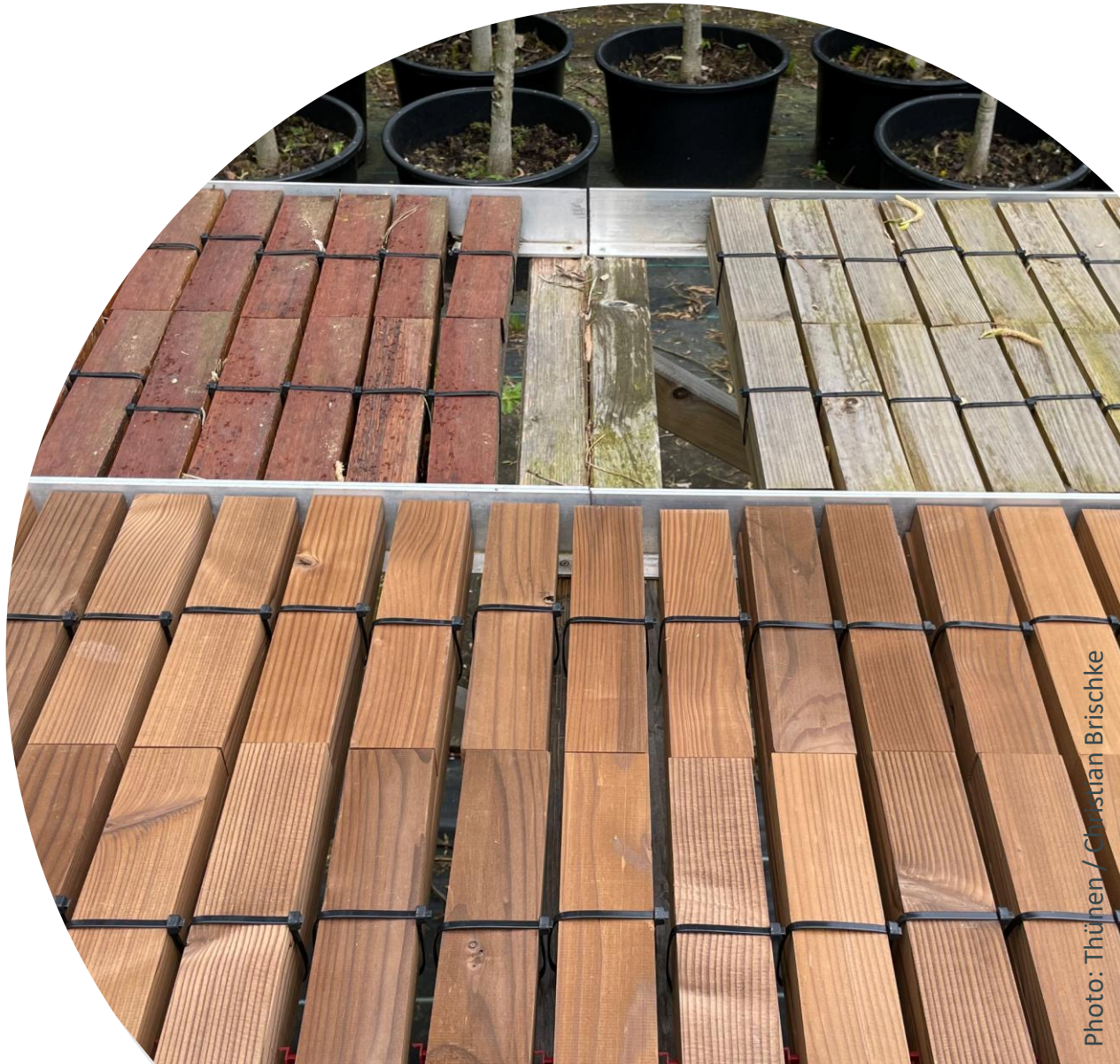
→ Presentation and publication of results

→ Input to standardization

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OUR RESEARCH RESONATES

Thanks for listening!

… and to all the hardworking carpenters who make this happen!


Photo: Thünen / Christian Brischke

Christian Brischke

Thünen Institute of Wood Research

christian.brischke@thuenen.de