# Applied Wood Materials
# Wood Technology / Surface Technology

EMPA
Materials Science & Technology

## Activities

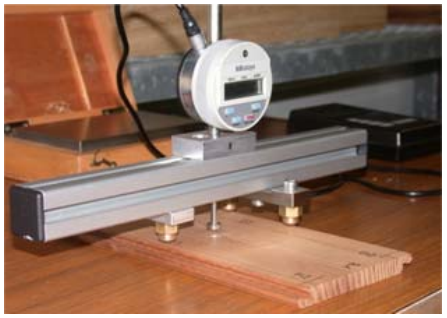
The use of wood and wood products as building material strongly depends on their material, processing and use properties. The group «Wood Technology/Surface Technology» is involved in the analysis and the improvement of these properties in the fields of wood physics and mechanical technology as well as regarding weathering protection and adhesive bonding. A special focus is put on the wood surfaces, where the primary interaction with other materials and the environment takes place.

The activities range from «forest oriented» wood research (forestry – wood chain, interface forest – wood processing) to the use characteristics of assembled wooden components and thus cover the wide area from raw-material to end-use applications.

## Focus topics

### Wood properties

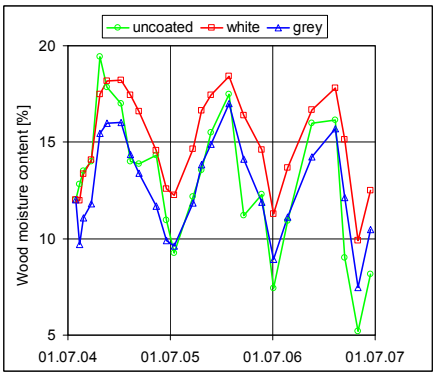
- Physical and mechanical properties of wood and wood products (wood quality, grading)
- Properties and potential use of less-exploited (native) wood species or grades (e.g. Sweet chestnut)
- Modified wood (e.g. Thermowood, Bioincising)
- Improvement of wooden components and products (e.g. windows, façade cladding, flooring elements)



*Measurement of deformations on a pre-fabricated flooring element*

### Weathering protection

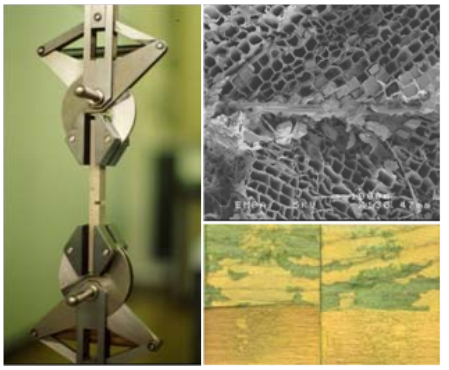
- Protective surface treatments of wood and wood products (effectiveness, durability, environmental impact)
- Nanotechnology for surface protection / Functionalised wood surfaces (e.g. hydrophobisation)
- Moisture-related processes in (weather exposed) wooden components




*Effect of surface coating on the wood moisture content during exposure*

### Adhesive bonding

- Moisture and temperature resistance (reliability)
- Application of coupling agents for the adhesive bonding of wood
- Effect of wood extractives on bond quality
- Rehabilitation of adhesive joints
- Quality control



*Tensile shear test (left) and assessment of bond line (right)*

## Competences / Methods

- Mechanical and moisture-related material tests
- Microscopy of biological materials (light microscopy, SEM, TEM, UV-microscopy, partly with elemental analysis)
- Surface characterization:
  - Visual assessments, microscopy, colour, gloss, hardness
  - Wetting behavior (contact angle, surface energy)
- Coatings:
  - Film structure, film thickness, adhesion
  - Natural und artificial weathering tests (EN 927)
- Adhesive bonding: bond line strength, delamination
- R&D projects, damage analysis, expert's reports, consulting

*Natural und artificial weathering according to EN 927*

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