Valorizing low-quality wood species into innovative multilayer engineered wood products

Summary

TalTech Laboratory of Wood Technology is offering a PhD position to a well-qualified individual to work on a research project to design innovative multilayer engineered wood products from low-quality wood species. The PhD student will be employed part-time as an early-stage researcher.

Research field:	Chemical, materials and energy technology
Supervisors:	Prof. Dr. Jaan Kers Dr. Anti Rohumaa
Availability:	This position is available.
Offered by:	School of Engineering Department of Materials and Environmental Technology
Application deadline:	Applications are accepted between September 01, 2021 00:00 and September 30, 2021 23:59 (Europe/Zurich)

Description

This PhD project investigates the use of low-quality hardwood species, suitable modifications and composite structure in the development of environmentally friendly innovative-engineered wood products. The project will also emphasize the role of different wood material processing stages and adhesive-wood interaction with veneer-based composites' properties.

Moreover, for some innovative and value-added applications such as fire safety or further increasing strength of composites, the virgin properties of wood will not suffice. In these cases, modification of veneer could be an excellent opportunity to tailor veneers to optimize quality and to develop new and innovative veneer-based composites. Examples include thermal treatment or acetylation, which could reduce the equilibrium moisture content, improve dimensional stability and durability of wood, or impregnating some layers of veneers to improve fire resistance. All these modifications affect adhesive interaction with modified wood and the quality of the final product.

Research objectives:

- to study the influence of the wood processing parameters and modification methods on veneer surface properties of different hardwood species
- to study how wood processing parameters and modifications affect the bonding quality
- to develop innovative multilayer-engineered wood composites with enhanced strength, durability and fire safety

Tasks of the PhD student:

- review existing knowledge in the field of veneer-based engineered wood products.
- prepare a research plan and execute it
- develop the processing parameters and modifications for hardwood species
- design innovative veneer-based engineered wood products with enhanced quality

Applicants should fulfil the following requirements:

- Master´s degree in the field of wood technology, wood science, wood chemistry, materials technology, or civil engineering
- excellent communication skills (written and verbal) in English

- deep knowledge in the field of wood properties, adhesive bonding of wood based materials and research and development methods for engineered wood products

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