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COMPUTATIONAL MECHANICS OF WOOD, WOOD-BASED PRODUCTS AND TIMBER STRUCTURES

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J. FÜSSL[*], J. EBERHARDSTEINER[*], M. LUKACEVIC[*], AND M. KALISKE[†]

[*] Institute for Mechanics of Materials and Structures, TU Wien
Karlsplatz 13, 1040 Vienna, Austria
Josef.Fuessl@tuwien.ac.at, Josef.Eberhardsteiner@tuwien.ac.at, Markus.Lukacevic@tuwien.ac.at

[†] Institute for Structural Analysis, TU Dresden
Georg-Schumann-Str. 7, 01187 Dresden, Germany
Michael.Kaliske@tu-dresden.de

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ABSTRACT

Wood is an excellent building material due to its outstanding weight-performance characteristics, its sustainable availability and its appearance generally perceived as very pleasant. Nevertheless, it is not used as extensively and efficiently as these properties would suggest. The inherent heterogeneous material structure and the great diversity of species make wood a challenging material as regards computational mechanical and engineering design models. Thus, the potential of wood, wood-based products, and timber building components is not fully exploited yet. Limits in existing design methods hamper a reliable and economically competitive design of timber structures. The use of modern computational methods is expected to complement experimental investigations and to enhance the predictive capability of design methods for wood and wood-based products as well as for timber engineering. Challenges are for example the appropriate description of complex brittle and ductile failure modes (triggered by the anisotropic material behaviour), the resulting load transfer mechanisms (specifically in the case of reinforcements), and a realistic determination of compliances of connections between timber components. For all this, the time-, moisture- and temperature-dependency of wood may be taken into account. To address these challenges, detailed knowledge of the mechanical behaviour of wood on different length scales, from the 'cell wall material' over 'wood-based products' up to 'timber structures', must be gained, brought together in modern mechanical modelling strategies, and finally transferred to engineering practice.

This minisymposium is considered to be a forum for scientists and engineers working in the field of computational wood mechanics and wood technology. The submitted contributions should refer to recent developments and advances on analytical and numerical aspects of the mechanical and physical behaviour of wood and timber structures. Contributions dealing with developments in the fields of wood processing, innovative wood composites, and new experimental investigations are also welcome.