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MODELLING OF INTERFACE BEHAVIOUR IN COMPOSITES

JANA WILMERS[*], SWANTJE BARGMANN[*], ALI JAVILI[†] AND ANDREW T. MCBRIDE[‡]

[*] Chair of Solid Mechanics, University of Wuppertal
Gaußstr. 20, 42119 Wuppertal, Germany
www.mechanics.uni-wuppertal.de

[†] Department of Mechanical Engineering, Bilkent University
06800 Bilkent, Ankara, Turkey
http://me.bilkent.edu.tr/

[‡]Infrastructure and Environment, School of Engineering, The University of Glasgow
Glasgow G12 8QQ, United Kingdom
http://www.gla.ac.uk/schools/engineering/

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ABSTRACT

Composite materials are widely used as load carrying components in the aerospace, aviation, automotive and wind power industries. Compared to traditional metallic materials, composite materials are particularly attractive due to their high specific strength and stiffness, as well as their superior fatigue resistance properties. The presence of interfaces between the different constituents in a composite material can play a significant role in the overall response of the material.

Interfaces exhibit properties different from those of both bulk constituents and therefore may directly influence the thermomechanical behaviour of the composite, or introduce the possibility for functionalisation of the material as well as more complex failure mechanisms such as interface debonding. Furthermore, interfaces are responsible for the occurrence of size-effects and, thus, reliable modelling of interface is of great importance especially for nano-materials. Several computational models have been proposed and developed to account for the different characteristics of the mechanical behaviour of various composite systems, such as fibre-reinforced, laminates and particle-reinforced composites, for varying loading conditions.

Contributions to this minisymposium which deal with modelling the mechanical material behaviour of physical interfaces between different constituents in a composite material are encouraged. Works attributed to the development of material models for interfaces are particularly welcome, in addition works on the validation of models by experimental testing, and applications of existing models to the simulation of experimentally observable effects are also invited. Any material system can be addressed, including multi-phase metals, MMC/CMC/PMC, laminates and biological or bio-inspired materials.