

Thermo-mechanical modeling of the temperature dependent forming behavior of thermoplastic prepregs

Jean-Paul Ziegs¹, Daniel Weck², Maik Gude³, and Markus Kästner¹

¹Institute of Solid Mechanics

²TU Dresden

³TU Dresden Institute of Lightweight Engineering and Polymer Technology

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Abstract

Numerical optimization of the manufacturing process of hybrid lightweight structures consisting of fiber-reinforced plastics (FRP) is of high importance. It can reduce the time to market and can also avoid the production of costly prototypes. To model the considered thermoforming process, the temperature dependent deformation mechanisms have to be characterized and modeled within a finite element framework. An industry-oriented approach based on the parameterization of a material model implemented in LS-DYNA is introduced. The accordingly parameterized material model for the FRP is eventually applied in the simulation of thermoforming processes to show the influence of process and material parameters on the forming behavior of the thermoplastic prepreg.

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