

Influence of microstructure on fibre delamination test

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Abstract. The experimental determination of interface properties of fibrous composite materials by fibre push- or pull-out tests is a challenging task. It requires adequate preparation of specimens on very small length scales (typically 50 μm and smaller) and with additional constraints, e. g. on the orientation of the fibres relative to the cutting plane.

Thus, in practice the number of experiments is limited. Consequently, the efficiency and the robustness of the experiment highly contribute to the success of the investigations of material properties.

Based on a finite element modeling, we investigate different experimental settings for glass fibre reinforced polypropylene with respect to their robustness (in terms of measuring possibilities and uncertainties) and their versatility for the identification of interface properties. The uncertainty of the material properties is accounted for by consideration of statistically distributed material properties. The presented methodology can be transferred to other materials, e. g. fibre reinforced metal ceramic composites.

References

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