

Accepted Manuscript

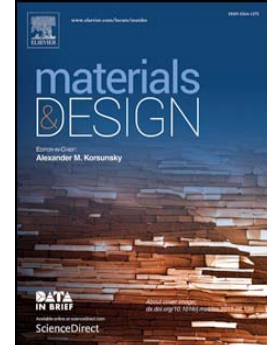
A method to control delaminations in composites for adjusted energy dissipation characteristics

M. Kultz, A. Hornig, M. Gude, H. Jäger

PII: S0264-1275(17)30239-3
DOI: doi:[10.1016/j.matdes.2017.03.003](https://doi.org/10.1016/j.matdes.2017.03.003)
Reference: JMADE 2837

To appear in:

Received date: 12 December 2016
Revised date: 28 February 2017
Accepted date: 1 March 2017



Please cite this article as: M. Kultz, A. Hornig, M. Gude, H. Jäger, A method to control delaminations in composites for adjusted energy dissipation characteristics, (2017), doi:[10.1016/j.matdes.2017.03.003](https://doi.org/10.1016/j.matdes.2017.03.003)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A method to control delaminations in composites for adjusted energy dissipation characteristics

M. Kultz, A. Hornig*, M. Gude, H. Jäger

Technische Universität Dresden, Institute of Lightweight Engineering and Polymer Technology (ILK), 01307 Dresden, Holbeinstr. 3, Germany

Abstract

Concepts to adjust the delamination behaviour of textile reinforced composites are investigated. The composite interfaces are modified by adjusting the interlaminar contact area using perforated PTFE-foils. According mode I and mode II energy release rates are determined and a progressive correlation between the interlaminar contact area and energy release rates is identified. The results are exploited within three point bending experiments to adapt the structural delamination and subsequent energy dissipation behaviour with the proposed interface modification concept. Two structural designs concepts are evaluated numerically: adjusting structural energy dissipation capacity and adjusting the peak levels as well as the characteristic trends of the structural reactive forces. It is demonstrated, that the mechanical response of composite structures can be tailored by controlling their delamination behaviour.

Keywords: A. delamination, B. energy dissipation, C. textile reinforcement, D. composite, E. energy release rate,

1. Introduction

Textile reinforced composites (TRC) are commonly applied in various branches of mechanical engineering like automotive or aerospace due to their high inplane mechanical properties [1, 2, 9]. However, handling failure due

*Corresponding author. Tel.: +49-351-463-38007; Fax: +49-351-463-38143

Email address: Andreas.Hornig@tu-dresden.de (A. Hornig)

URL: www.tu-dresden.de/mw/ilk (A. Hornig)

Download English Version:

<https://daneshyari.com/en/article/5024078>

Download Persian Version:

<https://daneshyari.com/article/5024078>

[Daneshyari.com](https://daneshyari.com)