Accepted Manuscript

Modeling, Simulation, and Experiments of High Velocity Impact on Laminated Composites

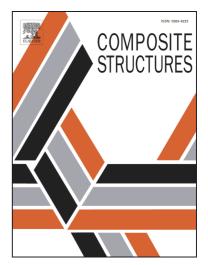
M. Schwab, M. Todt, J. Tauchner, D. Schlie, H.E. Pettermann

 PII:
 S0263-8223(18)32783-1

 DOI:
 https://doi.org/10.1016/j.compstruct.2018.08.047

 Reference:
 COST 10097

To appear in: *Composite Structures*



Please cite this article as: Schwab, M., Todt, M., Tauchner, J., Schlie, D., Pettermann, H.E., Modeling, Simulation, and Experiments of High Velocity Impact on Laminated Composites, *Composite Structures* (2018), doi: https://doi.org/10.1016/j.compstruct.2018.08.047

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.

ACCEPTED MANUSCRIPT

Modeling, Simulation, and Experiments of High Velocity Impact on Laminated Composites

M. Schwab^a, M. Todt^a, J. Tauchner^b, D. Schlie^c, H. E. Pettermann^{a,*}

^aInstitute of Lightweight Design and Structural Biomechanics, Vienna University of Technology, Getreidemarkt 9, A-1060 Vienna, Austria ^bFACC AG, Fischerstr. 9, A-4910 Ried im Innkreis, Austria ^cInstitut für Bauweisen und Strukturtechnologie, Deutsches Zentrum für Luft- und

Raumfahrt e.V. (DLR), Pfaffenwaldring 38-40, 70569 Stuttgart, Germany

Abstract

High velocity impact on laminated composite panels is investigated by modeling, simulation, and experiments. Impact velocities of 100, 200, and 300m/s are considered and normal as well as oblique impacts are studied. FEM simulations are conducted to design three different laminate configurations to achieve the cases of a reflecting, almost stucking, and fully perforating impactor, respectively. Within a domain where material nonlinarities are expected the shell-based ply-scale approach is used. Every ply is modeled by a layer of shell elements which are connected via cohesive zone elements. Both element types are assigned nonlinear constitutive laws to capture their mechanical behavior appropriately. Outside this domain, a single layer of composite shell elements is used. Corresponding laminated plates are produced and tested using a gas gun setup, where energy absorption and damage patterns are assessed.

The comparison of simulations and experiments shows excellent agree-

^{*}Corresponding author: pettermann@ilsb.tuwien.ac.at

Download English Version:

https://daneshyari.com/en/article/10150710

Download Persian Version:

https://daneshyari.com/article/10150710

Daneshyari.com