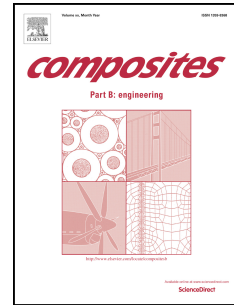


Accepted Manuscript

Semi-continuous strategy for the modelling of damage mechanisms in unidirectional composites under low velocity impacts

Bassam Mahmoud, Marcos Colungo Torrecilla, Pablo Navarro, Steven Marguet, Issam Tawk, Jean-Francois Ferrero



PII: S1359-8368(17)30135-X

DOI: [10.1016/j.compositesb.2017.07.014](https://doi.org/10.1016/j.compositesb.2017.07.014)

Reference: JCOMB 5149

To appear in: *Composites Part B*

Received Date: 13 January 2017

Revised Date: 4 July 2017

Accepted Date: 13 July 2017

Please cite this article as: Mahmoud B, Colungo Torrecilla M, Navarro P, Marguet S, Tawk I, Ferrero J-F, Semi-continuous strategy for the modelling of damage mechanisms in unidirectional composites under low velocity impacts, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.07.014.

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.

Semi-Continuous strategy for the modelling of damage mechanisms in unidirectional composites under low velocity impacts

Mahmoud Bassam^{a,b}, Colungo Torrecilla Marcos^a, Navarro Pablo^a, Marguet Steven^a, Tawk Issam^b, Ferrero Jean-Francois^a

^aUniversité de Toulouse, Institut Clément Ader, UMR CNRS 5312, INSA/UPS/ISAE/Mines Albi, 3 rue Caroline Aigle, 31400 Toulouse, France

^bUniversity of Balamand, Deir El-Balamand, El-Koura, Lebanon

Abstract

This article deals with the development of a finite element model for the prediction of low velocity impact damage within unidirectional composite laminates. This model is based on analysis of the impact damage observed experimentally. The modelling scale is that of the bundle of fibers of the unidirectional ply. These bundles are represented with 1D rod elements. The matrix is modeled with 2D damageable shell elements. The laminate is built using cohesive elements. The strategy is validated by a comparison with low velocity drop weight impact tests. Several experimental parameters are varied : the materials (T700/M21 and HTA7/913), the thickness (1.44mm and 2.4mm), the stacking sequence and the impact velocity ($2m.s^{-1}$ and $3m.s^{-1}$). The calculated load-displacement curves and the damage extent correlate well with experimental results.

Keywords:

A. Carbon fibre, B. Impact behaviour, C. Finite element analysis (FEA), C. Damage mechanics

Download English Version:

<https://daneshyari.com/en/article/5021115>

Download Persian Version:

<https://daneshyari.com/article/5021115>

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