

## Accepted Manuscript

Analytical modeling of low velocity large mass impact on composite plate including damage evolution

Harpreet Singh, Puneet Mahajan

PII: S0263-8223(16)30249-5

DOI: <http://dx.doi.org/10.1016/j.compstruct.2016.04.009>

Reference: COST 7373

To appear in: *Composite Structures*



Please cite this article as: Singh, H., Mahajan, P., Analytical modeling of low velocity large mass impact on composite plate including damage evolution, *Composite Structures* (2016), doi: <http://dx.doi.org/10.1016/j.compstruct.2016.04.009>

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.

# Analytical modeling of low velocity large mass impact on composite plate including damage evolution

Harpreet Singh, Puneet Mahajan\*

*Indian Institute of Technology Delhi, New Delhi, India*

April 6, 2016

## Abstract

An improved analytical model to predict the response of composite laminate under low velocity large mass impact is proposed. A spring-mass system is used to represent the contact, bending, shear and membrane stiffnesses of the laminate system. The stiffness of the springs is evaluated by dividing the laminate into a central damaged region with degraded stiffness surrounded by an undamaged region. The stiffness of the springs changes as the damage region grows with time. The predictions of the force between impactor and laminated and size of the damaged region from the model are compared with the finite element (FE) simulation results and available experimental results in the literature for CFRP laminates. The comparison demonstrates a good prediction capability of the proposed formulation. The damage radius predicted by the analytical model is also checked and found good match with FE simulation results.

**Keywords**– low velocity impact, analytical model, progressive damage analysis, large mass impact behavior

---

\*Corresponding author- Indian Institute of Technology Delhi, Department of Applied Mechanics, New Delhi, Delhi 110016, India.

Phone: +91 11 26591229, mail: composites.impact@gmail.com

Download English Version:

<https://daneshyari.com/en/article/6705580>

Download Persian Version:

<https://daneshyari.com/article/6705580>

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