

# Accepted Manuscript

Correlation of acoustic emission with finite element predicted damages in open-hole tensile laminated composites

Reza Mohammadi, Mehdi Ahmadi Najfabadi, Milad Saeedifar, Jalal Yousefi, Giangiaco Minak



PII: S1359-8368(16)31106-4

DOI: [10.1016/j.compositesb.2016.09.101](https://doi.org/10.1016/j.compositesb.2016.09.101)

Reference: JCOMB 4593

To appear in: *Composites Part B*

Received Date: 22 June 2016

Revised Date: 13 September 2016

Accepted Date: 29 September 2016

Please cite this article as: Mohammadi R, Najfabadi MA, Saeedifar M, Yousefi J, Minak G, Correlation of acoustic emission with finite element predicted damages in open-hole tensile laminated composites, *Composites Part B* (2016), doi: 10.1016/j.compositesb.2016.09.101.

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.

# Correlation of acoustic emission with finite element predicted damages in open-hole tensile laminated composites

Reza Mohammadi<sup>1</sup>, Mehdi Ahmadi Najfabadi<sup>1\*</sup>, Milad Saeedifar<sup>1</sup>, Jalal Yousefi<sup>1, 2</sup>,

Giorgio Minak<sup>2</sup>

1. Non-destructive Testing Lab, Department of Mechanical Engineering, Amirkabir University of Technology, 424 Hafez Ave, 15914, Tehran, Iran
2. DIN Department, Alma Mater Studiorum - Università di Bologna via Fontanelle 40, 47121 Forlì, Italia

## Abstract

This paper focuses on quantification of damage mechanisms in Standard Open-Hole Tensile (OHT) laminated composites using Acoustic Emission (AE) and Finite Element Method (FEM). To this aim, OHT tests were carried out in unidirectional glass/epoxy composite materials. AE accompanied with a wavelet and fuzzy C-means clustering methods were used to distinguish damage mechanisms of the specimen. These damages were consisted of three main mechanisms, including matrix cracking, fiber/matrix debonding and fiber breakage. FE analysis was utilized to validate the AE results. Scanning Electron Microscope (SEM) images were also used to investigate damage mechanisms in the specimen. The comparison of the applied methods shows that the difference in results of FE analysis and wavelet transform methods are less than 15 percent but there is a more difference (around 42 percent) between results of fuzzy C-means and FEM.

**Keywords:** Damage mechanisms; Acoustic emission; Finite element method; Polymer composites.

---

\* Corresponding author; Tel: (+98 21) 6454 3431; Fax: +98 21 8871 2838; Email address: ahmadin@aut.ac.ir

Download English Version:

<https://daneshyari.com/en/article/5021708>

Download Persian Version:

<https://daneshyari.com/article/5021708>

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