

## Accepted Manuscript

Damage-induced Acoustic Emission Source Identification in an Advanced Sandwich Composite Structure

Shirsendu Sikdar, Wiesław Ostachowicz, Joy Pal

PII: S0263-8223(18)30209-5  
DOI: <https://doi.org/10.1016/j.compstruct.2018.04.051>  
Reference: COST 9605

To appear in: *Composite Structures*

Received Date: 14 January 2018

Revised Date: 15 March 2018

Accepted Date: 11 April 2018



Please cite this article as: Sikdar, S., Ostachowicz, W., Pal, J., Damage-induced Acoustic Emission Source Identification in an Advanced Sandwich Composite Structure, *Composite Structures* (2018), doi: <https://doi.org/10.1016/j.compstruct.2018.04.051>

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.

# Damage-induced Acoustic Emission Source Identification in an Advanced Sandwich Composite Structure

Shirsendu Sikdar<sup>1\*</sup>, Wiesław Ostachowicz<sup>2</sup>, and Joy Pal<sup>3</sup>

Email: [ssikdar@imp.gda.pl](mailto:ssikdar@imp.gda.pl)<sup>1</sup>, [wieslaw@imp.gda.pl](mailto:wieslaw@imp.gda.pl)<sup>2</sup>, [jpal.cob@gmail.com](mailto:jpal.cob@gmail.com)<sup>3</sup>

<sup>1,2</sup>Institute of Fluid-Flow Machinery, Polish Academy of Sciences, 14, Fiszerza Street, Gdansk 80-231, Poland.

<sup>3</sup>Department of Civil Engineering, Bennett University, Greater Noida–201310, UP, India.

## Abstract

This paper proposes an acoustic emission (AE) based real-time health monitoring framework to efficiently identify the probable damage initiation/propagation locations in advanced sandwich composite structures. Towards this, numerical simulations and laboratory experiments on damage-induced AE-wave propagation in an aramid honeycomb composite structure have been carried out using a randomly selected sensory network. The simulation results are successfully validated with laboratory experiments. Eventually, the damage-source/AE-source regions are efficiently identified by applying an evolutionary algorithm- *Particle-Swarm-Optimization* based monitoring framework, which uses the registered AE-signals from the sensory network. A thorough assessment of different AE-source locations was carried out to evaluate the performance and the robustness of the proposed online monitoring strategy. The results clearly represent the efficiency of the framework for localizing the AE-source locations in such advanced and complex structures. Moreover, the proposed framework is reliable, independent of sensor positions, and not dependent upon the operator's expertise.

**Keywords:** acoustic emission; aramid honeycomb composite sandwich panel; piezoelectric transducer disc sensors; damage localization; particle swarm optimization; structural health monitoring.

Download English Version:

<https://daneshyari.com/en/article/8959980>

Download Persian Version:

<https://daneshyari.com/article/8959980>

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