

Accepted Manuscript

Dynamic mechanical analysis and thermoelasticity for investigating composite structural elements made with additive manufacturing

Ferdinando Cannella, Alberto Garinei, Roberto Marsili, Emanuela Speranzini

PII: S0263-8223(17)33463-3
DOI: <https://doi.org/10.1016/j.compstruct.2017.11.029>
Reference: COST 9095

To appear in: *Composite Structures*

Received Date: 23 October 2017
Revised Date: 11 November 2017
Accepted Date: 13 November 2017



Please cite this article as: Cannella, F., Garinei, A., Marsili, R., Speranzini, E., Dynamic mechanical analysis and thermoelasticity for investigating composite structural elements made with additive manufacturing, *Composite Structures* (2017), doi: <https://doi.org/10.1016/j.compstruct.2017.11.029>

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.

Dynamic mechanical analysis and thermoelasticity for investigating composite structural elements made with additive manufacturing

Ferdinando Cannella¹, Alberto Garinei², Roberto Marsili³, Emanuela Speranzini^{3*}

¹ Italian Institute of Technology, Genoa, 16163, Italy

Email: misure@unipg.it

² DIS, University Guglielmo Marconi, Rome, 00193, Italy

Email: agarinei@gmail.com

³ DI, Department of Engineering, University of Perugia, Italy

Email: roberto.marsili@unipg.it; emanuela.speranzini@unipg.it.

Abstract

Additive manufacturing (AM) has been widely used in recent years to build components and composite structural elements, since it allows complex shapes to be produced in one process step, quickly and with reduced weight. AM technology meets needs in many fields of production, including mechanics, industrial production, civil production, aeronautics, and medical implants. Nevertheless, during AM processes the material properties are affected by several setup parameters and the final mechanical characteristics are not completely defined yet. In this work, a measurement system is presented for defining the material mechanical characteristics of the printed components and composite structural elements. The parameters obtained are used for constructing a reliable finite element model to envisage the performance of the new structural elements before printing. The Dynamic Mechanical Analysis (DMA) for measuring the material mechanical properties and Thermoelasticity Strain Analysis (TSA) for validating the numerical model were used.

Keywords: Dynamic mechanical analysis; additive manufacturing; thermoelastic stress analysis; FEM analysis; thermographic camera.

(*) Corresponding author: Department of Engineering, University of Perugia, via G. Duranti, 93 - 06125 Perugia – Italy; email: emanuela.speranzini@unipg.it; direct phone: +39 0755853909; fax: +39 0755853606.

Download English Version:

<https://daneshyari.com/en/article/6704683>

Download Persian Version:

<https://daneshyari.com/article/6704683>

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