

Accepted Manuscript

Optical excitation thermography for twill/plain weaves and stitched fabric dry carbon fibre preform inspection

Hai Zhang, François Robitaille, Christian U. Grosse, Clemente Ibarra-Castanedo, Jaime Ocana Martins, Stefano Sfarra, Xavier P.V. Maldague

PII: S1359-835X(18)30006-X

DOI: <https://doi.org/10.1016/j.compositesa.2018.01.006>

Reference: JCOMA 4887

To appear in: *Composites: Part A*

Received Date: 7 October 2017

Accepted Date: 6 January 2018

Please cite this article as: Zhang, H., Robitaille, F., Grosse, C.U., Ibarra-Castanedo, C., Martins, J.O., Sfarra, S., Maldague, X.P.V., Optical excitation thermography for twill/plain weaves and stitched fabric dry carbon fibre preform inspection, *Composites: Part A* (2018), doi: <https://doi.org/10.1016/j.compositesa.2018.01.006>

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.



Optical excitation thermography for twill/plain weaves and stitched fabric dry carbon fibre preform inspection

Hai Zhang^{a,*}, François Robitaille^{b,*}, Christian U. Grosse^c, Clemente Ibarra-Castaneda^a, Jaime Ocana Martins^{b,d}, Stefano Sfarra^{e,f}, Xavier P.V. Maldague^a

^a*Department of Electrical and Computer Engineering, Computer Vision and Systems Laboratory (CVSL), Laval University, 1065 av. de la Médecine, Quebec, G1V 0A6, Canada*

^b*Department of Mechanical Engineering, University of Ottawa, Colonel By Hall, 161 Louis Pasteur, Ottawa, K1N 6N5, Canada*

^c*Chair of Non-destructive Testing, Technical University of Munich, Baumbachstr. 7, 81245 Munich, Germany.*

^d*Department of Mechanical Engineering, Federal University of Santa Catarina, Campus Universitário, Trindade, Florianópolis - SC, 88040-900, Brazil*

^e*Department of Industrial and Information Engineering and Economics, Las.E.R. Laboratory, University of L'Aquila, Piazzale E. Pontieri no. 1, 67100 L'Aquila, Italy*

^f*Tomsk Polytechnic University, Lenin Av., 30, Tomsk 634050, Russia*

Abstract

Carbon fibres have become the natural choice as reinforcements for polymer composite materials (PMCs). The non-destructive inspection of dry carbon fibre preforms has the potential to increase the reproducibility and reduce the cost of PMC manufacturing, by identifying defects in dry multilayer preforms prior to resin injection. However, use of optical excitation thermography for inspecting dry carbon fibre preforms that constitute the structural reinforcement precursor in the manufacturing of PMCs is poorly documented in the open literature. In this work, optical excitation thermography was used for inspecting six dry multilayer carbon fibre preforms featuring different textile structures, thicknesses and defects, for the first time. Advanced image processing techniques were used in processing the thermographic data for comparative purposes. In particular, partial least square thermography, as a recently proposed technique, was studied in detail. Finally, the performance of different thermog-

*Corresponding author.

Email addresses: hai.zhang.1@ulaval.ca (Hai Zhang),
Francois.Robitaille@uottawa.ca (François Robitaille)

Download English Version:

<https://daneshyari.com/en/article/7889733>

Download Persian Version:

<https://daneshyari.com/article/7889733>

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