

## Accepted Manuscript

Correlation of drilling damage with mechanical strength: a geometrical approach

Jorge Miguel Silva, Filipe Ferreira, Stella M. Abreu, João E. Matos, Luís Miguel P. Durão

PII: S0263-8223(17)31404-6  
DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.08.080>  
Reference: COST 8838

To appear in: *Composite Structures*

Received Date: 2 May 2017  
Revised Date: 16 August 2017  
Accepted Date: 17 August 2017



Please cite this article as: Miguel Silva, J., Ferreira, F., Abreu, S.M., Matos, J.E., Durão, L.M.P., Correlation of drilling damage with mechanical strength: a geometrical approach, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.08.080>

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 DRILLING DAMAGE WITH MECHANICAL STRENGTH: A GEOMETRICAL APPROACH

Jorge Miguel Silva<sup>\*</sup>, Filipe Ferreira<sup>\*</sup>, Stella M. Abreu<sup>†</sup>, João E. Matos<sup>†</sup>, Luís Miguel P. Durão<sup>\*</sup>

<sup>\*</sup> ISEP/CIDEM, Instituto Superior de Engenharia do Porto  
Centro de Investigação e Desenvolvimento em Engenharia Mecânica  
e-mail: lmd@isep.ipp.pt

<sup>†</sup> Laboratório Engenharia Matemática (LEMA) Instituto Superior de Engenharia do Porto  
e-mail: sau@isep.ipp.pt, jem@isep.ipp.pt

**Key words:** Composite Materials, Machining, Delamination, Enhanced Radiography, Damage Assessment, Mechanical Testing.

**Summary.** Nowadays composites are one of the most interesting groups of materials with applications in several technologically advanced fields like aeronautics, automotive or medicine among others. The great demand for this material comes from its low weight and high specific strength resulting in a good option for several demanding uses. One of the main advantages is related to the ability to produce parts in a near-net shape. However, assembly requirements normally include secondary operations like drilling. The resulting damage can affect the mechanical properties of the material questioning product reliability. In this work the authors present a comparative study of different combinations of tools, cutting speeds and feed rates associated with a method of image analysis that includes fractal dimension, a geometrical feature of the damaged region. This mathematical feature accounts for the irregularity of the damage boundary that can act as a stress concentration factor, thus causing mechanical strength reduction. Results include the presentation of a damage

Download English Version:

<https://daneshyari.com/en/article/4917799>

Download Persian Version:

<https://daneshyari.com/article/4917799>

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