

Accepted Manuscript

Effect of residual stress on the matrix fatigue cracking of rapidly cured epoxy/
anhydride composites

Mathew W Joosten, Steven Agius, Tim Hilditch, Chun Wang

PII: S1359-835X(17)30265-8

DOI: <http://dx.doi.org/10.1016/j.compositesa.2017.07.007>

Reference: JCOMA 4727

To appear in: *Composites: Part A*

Received Date: 23 March 2017

Revised Date: 9 June 2017

Accepted Date: 7 July 2017



Please cite this article as: Joosten, M.W., Agius, S., Hilditch, T., Wang, C., Effect of residual stress on the matrix fatigue cracking of rapidly cured epoxy/anhydride composites, *Composites: Part A* (2017), doi: <http://dx.doi.org/10.1016/j.compositesa.2017.07.007>

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.

Effect of residual stress on the matrix fatigue cracking of rapidly cured epoxy/anhydride composites

Mathew W Joosten^a, Steven Agius^b, Tim Hilditch^a and Chun Wang^c

^a School of Engineering, Faculty of Science Engineering and Built Environment, Deakin University, 75 Pigdons Road Waurn Ponds, VIC 3217, Australia

^b Australian Future Fibres Research and Innovation Centre (AFFRIC), Deakin University, 75 Pigdons Road Waurn Ponds, VIC 3216

^c School of Mechanical and Manufacturing Engineering, The University of New South Wales, Sydney, NSW 2052, Australia

Corresponding Author

Dr Mathew W Joosten

Email: mathew.joosten@deakin.edu.au

Address: Building KE, 75 Pigdons Rd, Waurn Ponds VIC 3216

Abstract:

There is an increasing demand for rapid cure resin systems for high-volume production of composite structures, especially for the automotive sector. While shortening production time, rapid cure cycles often lead to high residual thermal stresses in the structure. This study investigates the impact of residual stress on the onset of fatigue induced matrix micro-cracking in carbon-epoxy composites made of rapid curing resin. The effect of residual stress on the onset of fatigue induced matrix cracking was predicted using a simplified analytical model with the assumption of plane stress. A good agreement is observed between the analytical prediction and experimental results, however, further validation is required to assess the model's potential in accelerating the design and certification of composite structures to meet fatigue endurance requirements.

(Keywords: Fatigue initiation, B. Fatigue, C. Analytical modelling, D. Mechanical testing)

Download English Version:

<https://daneshyari.com/en/article/5439431>

Download Persian Version:

<https://daneshyari.com/article/5439431>

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