

Fracture resistance enhancement of layered structures by multiple cracks - DTU Orbit (08/11/2017)

Fracture resistance enhancement of layered structures by multiple cracks

A theoretical model is developed to test if the fracture resistance of a layered structure can be increased by introducing weak layers changing the cracking mechanism. An analytical model, based on the J integral, predicts a linear dependency between the number of cracks and the steady state fracture resistance. A finite element cohesive zone model, containing two cracking planes for simplicity, is used to check the theoretical model and its predictions. It is shown that for a wide range of cohesive law parameters, the numerical predictions agree well quantitatively with the theoretical model. Thus, it is possible to enhance considerably the fracture resistance of a structure by adding weak layers.

General information

State: Published

Organisations: Department of Wind Energy, Composites and Materials Mechanics

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Number of pages: 17

Pages: 92-108

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: Engineering Fracture Mechanics

Volume: 151

ISSN (Print): 0013-7944

Ratings:

BFI (2017): BFI-level 2

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 2

Scopus rating (2016): CiteScore 2.39 SJR 1.247 SNIP 1.676

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 2

Scopus rating (2015): SJR 1.362 SNIP 1.945 CiteScore 2.44

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 2

Scopus rating (2014): SJR 1.619 SNIP 2.214 CiteScore 2.28

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 2

Scopus rating (2013): SJR 1.483 SNIP 2.047 CiteScore 2.25

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 2

Scopus rating (2012): SJR 1.367 SNIP 2.112 CiteScore 1.82

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 2

Scopus rating (2011): SJR 1.793 SNIP 2.237 CiteScore 1.92

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 2

Scopus rating (2010): SJR 1.482 SNIP 1.946

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 2

Scopus rating (2009): SJR 1.734 SNIP 1.899

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 1

Scopus rating (2008): SJR 1.602 SNIP 2.235

Web of Science (2008): Indexed yes

Scopus rating (2007): SJR 1.358 SNIP 2.075

Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.682 SNIP 2.225
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.244 SNIP 2.206
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.653 SNIP 2.28
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.555 SNIP 2.09
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.319 SNIP 1.569
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.927 SNIP 1.164
Scopus rating (2000): SJR 0.809 SNIP 1.104
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.732 SNIP 0.929

Original language: English

Cohesive law, Delamination, Fracture resistance, J integral, Multiple cracks

DOIs:

[10.1016/j.engfracmech.2015.10.036](https://doi.org/10.1016/j.engfracmech.2015.10.036)

Source: FindIt

Source-ID: 276878464

Publication: Research - peer-review › Journal article – Annual report year: 2016