My Web of Science

Profile

My researcher profile EDIT

My records

Publications ADD

Peer reviews ADD

Editor records ADD

Editorial board memberships ADD

Pending records

Optimization of Structural Damage Repair with Single and Double-Sided Composite Patches through the Finite Element Analysis and Taguchi Method

By: Aabid, A (Aabid, Abdul) ; Ibrahim, YE (Ibrahim, Yasser E.) ; Hrairi, M (Hrairi, Meftah) ; Ali, JSM (Ali, Jaffar Syed Mohamed)

View Web of Science ResearcherID and ORCID (provided by Clarivate)

MATERIALS

Volume: 16 **Issue:** 4

Article Number: 1581

DOI: 10.3390/ma16041581

Published: FEB 2023

Indexed: 2023-03-13

Document Type: Article

Abstract:

Over the last four decades, numerous studies have been conducted on the use of bonded composite repairs for aircraft structures. These studies have explored the repair of damaged plates through experimental, numerical, and analytical methods and have found that bonded composite repairs are effective in controlling crack damage propagation in thin plates. The use of double-sided composite repairs has been found to improve repair performance within certain limits. This study focuses on these limits and optimizes double-sided composite repairs by varying adhesive bond and composite patch parameters. The optimization process begins with a finite element analysis to determine the stress intensity factor (SIF) for various variables and levels, followed by the application of the Taguchi

method to find the optimal combination of parameters for maximizing the normalized SIF. In conclusion, we successfully determined the stress intensity factor (SIF) for various variations and normalized it for optimization. An optimization study was then performed using the Taguchi design and the results were analyzed. Our findings demonstrate the repair performance of bonded composite patches using a cost-effective and energy-efficient approach.

Keywords

Author Keywords: composite patch; cracked plate; stress intensity factor; finite element method; Taguchi method

Keywords Plus: STRESS INTENSITY FACTOR; FATIGUE-CRACK GROWTH; ADHESIVE DAMAGE; PLATES; PREDICTION; SHAPES

Addresses:

[1] Prince Sultan Univ, Coll Engn, Dept Engn Management, POB 66833, Riyadh 11586, Saudi Arabia

[2] Int Islamic Univ Malaysia, Fac Engn, Dept Mech & Aerosp Engn, POB 10, Kuala Lumpur 50728, Malaysia

Categories/ Classification

Research Areas: Chemistry; Materials Science; Metallurgy & Metallurgical Engineering; Physics

Citation Topics : 7 Engineering & Materials Science › 7.63 Mechanics › 7.63.367 Delamination

Web of Science Categories: Chemistry, Physical; Materials Science, Multidisciplinary; Metallurgy & Metallurgical Engineering; Physics, Applied; Physics, Condensed Matter

Document Information

Language: English

Accession Number: WOS:000941568800001

PubMed ID: 36837212

eISSN: 1996-1944

Other Information

IDS Number: 9L5DH

— See fewer data fields

Citation Network

In Web of Science Core Collection

0
Citations

30
Cited References

Use in Web of Science

Web of Science Usage Count

5	5
Last 180 Days	Since 2013

This record is from:

Web of Science Core Collection

- Science Citation Index Expanded (SCI-EXPANDED)

Suggest a correction

If you would like to improve the quality of the data in this record, please Suggest a correction