Comparative Analysis of Active Bonded Piezoelectric Repair Systems for Damaged Structures under Mechanical and Thermo-Mechanical Loads

By Abdulla, M [illegible], Meftah) ; Aabid, A (Aabid, Abdul) ; Abdullah, NA (Abdullah, Nur Azam) ; Baig, M (Baig, Muneer)

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

Source ACTUATORS
Volume: 13 Issue: 10
DOI: 10.3390/act13100390

Article Number 390

Published OCT 2024

Indexed 2024-10-31

Document Type Article

Abstract Active repair systems employing piezoelectric (PZT) patches have emerged as promising solutions for mitigating crack propagation and enhancing structural integrity in various engineering applications. However, the existing literature predominantly focuses on the application of PZT patches for repairing structures under mechanical loading. In this study, a finite element analysis (FEA) is employed to investigate the repair of a centre-cracked

MENU

aluminium plate under both mechanical and thermo-mechanical loading conditions. This study explores the influence of key parameters, including temperature, PZT patch thickness, type of PZT material, adhesive material, and adhesive thickness, on the structural integrity and crack propagation behaviour. The results reveal significant differences in stress distribution and crack propagation tendencies under varying loading conditions and parameter settings. These findings emphasize the necessity of considering thermo-mechanical loading conditions and parameter variations when designing effective active repair systems. In conclusion, this study provides valuable insights into optimizing PZT patch-based repair strategies for improved structural integrity and crack mitigation in aerospace and other engineering applications under diverse loading scenarios.

Keywords

Author Keywords: PZT; actuators; stress intensity factor; crack repair; plate

Keywords Plus: ELEMENTS; CRACK

Addresses

[1] Ir Find more records containing the WOS category of Engineering, Mechanical rosp Engn, Kulliyyah Engn, POB 10, Kuala Lumpur 50728, Malaysia

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

Categories/ Classification

Research Areas: Engineering; Instruments & Instrumentation

Web of Science Categories

Engineering, Mechanical; Instruments & Instrumentation

Language

English

Accession Number

WOS:001340820100001

eISSN

2076-0825

IDS Number

K0I9V

– See fewer data fields

Citation Network

In Web of Science Core Collection

0 Citations

40
Cited References

How does this document's citation performance compare to peers?

← Open comparison metrics panel

Data is from InCites Benchmar
Analytics

Use in Web of Science

0
Last 180 Days

0
Since 2013

This record is from:

Web of Science Core Collection

- Science Citation Index Expanded (SCI-EXPANDED)

Find more records containing the WOS category of Engineering, Mechanical

Suggest a correction

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

Clarivate™
Accelerating innovation