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Optimization of composite patch repair for center -cracked rectangular plate using design of experiments method

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MATERIALS TODAY-PROCEEDINGS

Volume: 27 Pages: 1713-1719 Part: 2

DOI: 10.1016/j.matpr.2020.03.639

Published: 2020

Document Type: Proceedings Paper

Conference

Conference: 1st International Conference on Advanced Lightweight Materials and Structures (ICALMS)

Location: Hyderabad, INDIA

Date: MAR 06-07, 2020

Sponsor(s): CMR Grp Inst, Management

Abstract

The repair of aircraft structures using composite material patches are well known in aerospace industries. In the present work composite patch bonded with a superglue over a cracked rectangular plate under uni- form uniaxial tensile stress is considered. A three-dimensional finite element method was used to define the stress intensity factor for a repaired plate at mode -I crack propagation. Later, the design of experi- ments method was used to investigate the parametric effect on repair structure in order to achieve the optimum solution. The size and mechanical properties of the adhesive bond and composite patch that affect the repair quality are considered as the parameters for reduction in stress intensity factor. The out- come of this work will serve as a guideline for designer to improve the repair quality and durability. (C) 2019 Elsevier Ltd. All rights reserved. Selection and peer -review under responsibility of the scientific committee of the First International con- ference on Advanced Lightweight Materials and Structures.

Keywords

Author Keywords: [Passive repair](#); [Crack](#); [Composite patch](#); [Finite element method](#); [Optimization](#); [Design of experiments](#)

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