

**Di Pisa, C.; Aliabadi, M. H.**

**Boundary element analysis of stiffened panels with repair patches.** (English) Zbl 1403.74161  
*Eng. Anal. Bound. Elem.* 56, 162-175 (2015).

Summary: In this paper a boundary element method for analysis of fractured stiffened panels repaired with riveted or adhesively bonded patches is presented. In order to achieve such a formulation, several boundary element formulations involving the membrane and bending of displacement, and, stress resultants are coupled together to analyse the model. The multi-region formulation is used to simulate the stiffeners, which are modelled as an assembly. They are then connected to the sheets to form the stiffened panels by means of a rivet formulation. The dual boundary element method is used to simulate the presence of cracks, and the patches, treated as independent plates, are joined to the panel either with rivets or adhesive. A boundary element formulation for adhesive bonding is implemented to model the adhesively bonded patches. The Crack Opening Displacements (COD) method and the J-integral are implemented to evaluate the required fracture parameters. Examples presented include a wing box with a three spar section, with fully stiffened skin, and, the skin is considered to have a crack and a repair patch is used on top of the crack to stop its growth.

**MSC:**

- 74S15 Boundary element methods applied to problems in solid mechanics
- 65N38 Boundary element methods for boundary value problems involving PDEs
- 74R10 Brittle fracture

Cited in 2 Documents

**Keywords:**

repair patches; boundary elements; Reissner plate; assembled plate structures; rivets; adhesive bonding; dual boundary element method

**Full Text:** [DOI](#)

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