

## Numerical and Comparative Analysis between Two Composite Plates Notched in Different Shapes and Repaired by Composite

**Authors :** Amari Khaoula, Berrahou Mohamed

**Abstract :** The topic of our article revolves around a numerical and comparative analysis between two notched Boron/epoxy plates that are U-shaped and the other V-shaped, cracked, and repaired by a rectangular patch of the same composite material; the finite element method was used for the analytical study and comparison of the results obtained for determining the optimal shape of notch which will give a longer life to the repair. In this context, we studied the variation of the stress intensity factor, the evolution of the damaged area, and the calculation of the ratio of the damaged area according to the crack length and the concentration of the Von Mises stresses as a function of the lengths of the paths. According to the results obtained, we conclude that the notch plate U is the optimal one than notch plate V because it has lower values either for the stress intensity factor (SIF), damaged area ratio ( $D_r$ ), or the Von Mises stresses.

**Keywords :** the notch U, the notch V, the finite element method FEM, comparison, rectangular patch, composite, stress intensity factor, damaged area ratio, Von Mises stresses

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