

Study of the initiation and propagation of a crack in a heterogeneous media using model of cohesive forces

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Abstract : The behavior of crack defects in a heterogeneous media like the weld is a very interesting subject. The mechanical properties change through the different areas of the welded joint (Base Metal, Heat Affected Zone and Fusion Zone). The crack is solicited in mode III (anti-plane shear loading). A cohesive forces model is applied to study the initiation and propagation of a crack located in the middle of the weld using a semi-analytical method, where the equilibrium equations are solved and the solution is converted to a singular integral equation by using the standard Fourier's transformers. The equation is solved numerically. The limit load of the fracture is represented as a function of different parameters (opening of the crack, the width of the weld,...). The results obtained shows the variation of the crack opening in accordance with the width of the weld taking into account the critical crack opening.

Keywords : MDR, Crack, welding, cohesive forces model