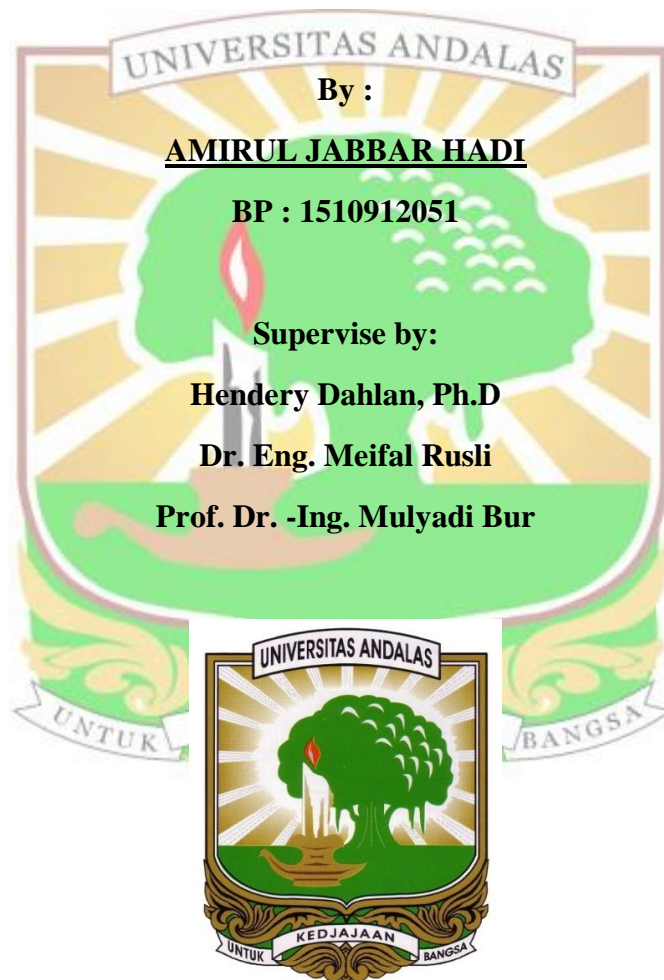


FINAL PROJECT

ANALYSIS OF STIFFENER INSTALLATION EFFECT TO STRESS INTENSITY FACTOR AND STRESS CONCENTRATION ON THE CRACK TIP

Submitted to the Mechanical Engineering Department of Andalas University in
Partial Fulfillment of the Requirement for the Degree of Sarjana Teknik (ST)



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ABSTRACT

Cracks propagation in a structure is caused by continuous loads to the structure so that the stress at the tip of the initial crack is getting bigger. Many region of the structure potentially have initial crack, including in the edge of plate hole. Previous research has obtained the effect of stiffener on crack propagation on the edge of the plate. Holes as the most common stress concentration failure in metallic structure most often to appear the initial crack on micro-scale. For this reason, it is also necessary to find out the effect of stiffener on crack propagation on the edge of a plate hole.

Computer simulation is used in this study to obtain stresses that occur on the crack tip at the edge of the plate hole during the load is given, which stiffeners have been attached to the plate with the variation of stiffeners distance to crack tip. Variations of crack length are 7,5 mm; 10 mm; and 12,5 mm. The distance variation for each models are 2,5 mm; 5 mm; 7,5 mm; 10 mm; and 12,5 mm. The contact of stiffeners to the plate also has variation, namely bonded contact, full weldment, and segment weldments.

The 10 N load is applied to the plate and simulation is run to obtain the result of stress intensity factor and stress concentration. The most significant of contact type on reducing K_I is bonded contact, where for model 7,5 mm length of crack the value of K_I can decrease from $96,126 \text{ MPa}\sqrt{\text{mm}}$ to $60,099 \text{ MPa}\sqrt{\text{mm}}$. For the effect of stiffeners installation in reducing stress concentration, is kind of inconsistent. Especially for model 12,5 mm length of crack and distance of stiffeners 10 mm and 12,5 mm.

Keywords: Stress intensity factor, stress concentration, crack.