

# **ANALYSIS OF LOW ALLOY STEEL OF MULTIPLE REPAIRS WELDING EFFECT ON MECHANICAL PROPERTIES AND MICRO STRUCTURE**

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## **ABSTRACT**

The possibility of error in the welding process can't be avoided and could be fatal to the structure. Of these situations can occur due to human error and wrong procedure. Treatment necessary to repair it, if the errors in the welding process is then repeated to perform multiple weld repair at the joint. As a result of multiple repairs carried out will greatly affect the mechanical properties and microstructure.

In this research using A 572 Gr. 50 with dimension 280 x 280 x 21 mm. Welding job done SMAW method on the position 1G (flat) with using electrode AWS E-7018 with preheat 150<sup>0</sup>C and back weld on the root.

In the tensile tests, tensile strength values non repair welding results slightly higher than the tensile strength of welded with repair 1x to 3x, respectively for 554.80 (MPa) > 546.14 (MPa), 549.56 (MPa) and 547.36 (MPa). Whereas all fracture in the impact test are 100% ductile except in 3X repairs weld specimens that are brittle fracture. Through the observation of metallography structure of the macro, wide of area HAZ procentage from specimen 1X, 2X and 3X compare non repair, such as 0.05%, 15% and 61%. It's related to the micro-structures observation, taken grain size procentage of HAZ from specimen 1X, 2X and 3X compare non repair, such as 0.05%, 7% and 16.5%. All of this indicates that increasing amount of repair welding processes that have done, it will be decreasing mechanical properties and micro-structures values.

**Key Word:** Multiple repairs, mechanical properties, metallography, HAZ, grain size