

***STRENGTH ANALYSIS OF HIGH-DENSITY POLYETHYLENE
PLASTIC WELDED JOINTS
(Case Study of the Polbeng I Research Vessel)***

Name student : Muhamad Yudi
Nim : 1304211057
Supervisor : Dr. Jamal,ST.,MT

ABSTRACT

Plastic welding, especially High Density Polyethylene (HDPE), has become one of the main technologies in thermoplastic-based ship construction. This study was conducted as part of the development and testing of joint structures on the research vessel "Polbeng I" built using HDPE material. The use of HDPE as the main material requires precise welding techniques so that the joint strength can withstand dynamic loads and corrosive marine environments. This study focuses on comparing the strength of welding joints with the V bevel and X bevel methods on HDPE plates used in ship structures. Validation of the inspection results before testing is a visual test. Testing using tensile and comparison tests. The tensile strength obtained for the V and X seams is 4.08 MPa for no connection and for the V seam is 2.99 MPa and for the X seam 3.09 MPa. The bending test results for each V and X seam are for the V bevel 62.50 MPa and for the X 153.07 MPa. Furthermore, validation of the test results uses the Det Norske Veritas (DNV) and Biro Klasifikasi Indonesia (BKI) standards. The X-joint has met DNV standards and BKI requirements, with a value of 75.74%. Meanwhile, the V-joint has not met the requirements, with a value of 73.28%. Test results indicate that the X-joint can be used in the construction of ships made from HDPE plastic.

Keywords: Plastic welding, HDPE, research vessel, V-bevel, X-bevel, ASTM D638, DNV, Polbeng