

EVALUATION OF BARGE VOID TANK STRUCTURAL STRENGTH AGAINST EXTERNAL CONDITONS

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ABSTRACT

This study aims to evaluate the structural strength of the Bahari 2218 barge's void tank under grounding conditions and to assess the effectiveness of adding H-Beam and bottom girder reinforcements. The analysis was conducted using Finite Element Analysis (FEA) via ANSYS Static Structural software, with 3D geometric modeling performed in Rhinoceros. Simulation results under a load of 36.68 kN/m² showed a maximum deformation of 3.088 mm and a maximum Von Mises equivalent stress of 243.29 MPa. This working stress level falls below the yield strength of ASTM A36 steel (250 MPa) and complies with the regulations of the Indonesian Classification Bureau (BKI). The H-Beam and bottom girder reinforcements proved effective in enhancing structural stiffness, reducing stress concentration in the midship area, and ensuring the void tank's reliability in withstanding external forces resulting from grounding.

Keywords: Barge, midship, void tank, Finite Element Analysis (FEA), H-beam, bottom girder, stress, deformation.