

DESAIN KONSTRUKSI KAPAL PATROLI TNI AL MENGGUNAKAN MATERIAL FIBERGLASS UNTUK KEAMANAN LAUT KABUPATEN BENGKALIS

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ABSTRACT

Patrol vessels are vital assets for the Indonesian Navy (TNI AL) in maintaining maritime security, including in the waters of Bengkalis Regency. One such vessel, the PAT MEDAN, has experienced performance degradation due to structural damage and extended operational age. This study aims to redesign the PAT MEDAN's construction using fiberglass material, which is known for being lightweight, strong, and corrosion-resistant. The design process refers to the standards set by Biro Klasifikasi Indonesia (BKI), specifically Volume V for fiberglass ships. The methodology includes surveying the existing vessel's condition, redesigning the structure with appropriate structural calculations, creating 3D models using Rhinoceros software, and conducting structural strength analysis using the Finite Element Method (FEM). The results show that the new construction design significantly improves structural strength, optimizes material usage, and complies with BKI standards. A comparison between the old and new constructions reveals improvements in deformation, stress distribution, and safety factor, making the new design a viable model for future patrol vessel refurbishment to enhance maritime security in Bengkalis.

Keywords: *patrol vessel, fiberglass, ship construction, FEM, maritime security.*