UNIVERSITI TEKNOLOGI MARA

STRUCTURE DESIGN AND ANALYSIS OF RE ENGINEERING THE TRADITIONAL MALAY BOAT CONSTRUCTION WITH NEW MATERIALS FOR TOURISM

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Dissertation submitted in partial fulfilment of the requirements for the degree of **Diploma in Mechanical Engineering**

College of Engineering

February 2025

ABSTRACT

The project aims to introduce modern materials to the redesign of the traditional Malay boat while retaining its cultural identity toward a more effective use in tourism. Built with cengal wood, the craft suffers from degeneration of its construction material, low durability, and lack of skilled carpenters. All these factors severely undercut their viability under modern circumstances. No falling construction standards further undermine the safety and reliability of these boats. The present study provides a solution-replacing cengal wood with glass-fiber-reinforced polymer, a material commonly used in other advanced industries, which has an ultimate factor of safety in the range of two to three given its high strength, durability, and a good degree of structural stability. The project entails the boat frame structure's design following GRP Construction Standards and structural analysis for performance evaluation. Calculations on buoyancy, weight of the hull, load distribution, bending moment, shear force, and factors of safety will be made to ascertain the modern safety and performance levels of the vessel. The GRP shows a significant improvement in the strength of the boat, stability, and efficiency as a material. While this research attests to the possibility of a material transition, future opportunities should be taken to further perfect this approach in the selection of materials, computational analysis, and structural optimization. Research down the line may look into the material integration of aluminum alloys, fiber-reinforced plastics, advanced structural analysis methods for optimal load transfer and safety and involve local artisans to develop the traditional aesthetics of the vessel with performance requirements.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Ts. Dr. Nik Mohd Khairuddin Nik Ismail

Finally, this dissertation is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah's.

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