UNIVERSITI TEKNOLOGI MARA

MALAY FISHING BOAT IMPROVEMENT: HULL DESIGN AND STABILITY ANALYSIS

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ABSTRACT

The purse seiner Malay fishing boat is a vessel that plays a vital role in the coastal fishing communities of Southeast Asia. The project's primary objective is to create a suitable hull design for new Malay fishing boats, and concurrently, to analyze the hull stability. The problem with the current purse seiner boat is because of outdated material and the Deck house placement problem. The scope of work for this project will cover 3D hull design work, lines plan creation, hydrostatic data, and general arrangement. Then, for the stability work it will cover for both lightship and full load conditions in work area of initial stability, GZ curve (large angle stability) and Trim Analysis. This project contribute to the long-term sustainability and success of the fishing industry while ensuring the boats can withstand the challenges of the marine environment. The methodology is by creating the new hull design and analyze the hull hydrostatic data. For stability assessment finding the total weight, Longitudinal Center of Gravity (LCG), and Vertical Center of Gravity (VCG) by doing the weight estimation works. Initial stability analysis will help in finding the Metacentric height (GM) value. Then, GZ Curve graph to find the maximum angle of heel for both lightship and full load conditions. Trim calculation to find the trim of the ship in lightship and full load condition whether it will trim by the bow or trim by the stern of the ship. The result achieved within this project is suitable 3D hull design with 25.5m length, 5.8m Breadth and 4m depth and hydrostatic data at design waterline and at various draft. The detailed lines plan of the hull with waterlines, stations, buttocks lines and baseline. The general arrangement that is suitable for the ship with all detailed list of items weight on the ship and optimal ship Longitudinal Center of Gravity (LCG) which is 13.789m (Lightship), 12.502m (Full Load) and Vertical Center of Gravity (VCG) which is 2.48m (Lightship), 2.323m (Full Load). Then for initial stability analysis, the metacentric height obtained in positive value and located above the center of gravity of the ship for both lightship and full load conditions with the value 1.242m and 1.323m. GZ Curve shows that both load cases exceed the IMO standards with Max GZ value of 0.545m at 51.8 degree (Lightship) and 0.641m at 54.5 degree (Full Load); it can be concluded that it meets the predetermined conditions. For trim analysis the result is that both conditions will trim down at the bow with the trim value of 170.105cm (Lightship) and 92.268cm (Full Load).

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