COMPARISON DESIGN STUDY OF CATAMARAN AND MOHONULL SHIP AS A RESEARCH VESSEL IN BENGKALIS RIAU SEA

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Abstract
A research vessel is a ship with special purposes for an oceanographic surveys, research and exploration in a specific ocean. An oceanographic research needs a vessel characteristics due to this requirement priority: good seakeeping, good stability, wide laboratory and work deck area, economic operation and ability to set the research equipment.

Catamaran is a multi-hull vessel that knowns as a type of vessel besides of the monohull vessel. Each of this type of vessel has different characteristics of the resistance, stability and seakeeping. According to its characteristics, with the same displacement, a monohull and a catamaran design as a research vessel were compared.

The resistance component of catamaran is important for determining the principal dimensions in catamaran. The designed catamaran has configuration with demihull separation ratio S/L = 0.4 so that the wave resistance interference factor (τ) can be ignored. Catamaran resistance obtained 17.5% smaller than monohull.

Catamaran has better stability than monohull by the higher GZ and smaller rolling period. Catamaran can obtain three times wider deck area than monohull that gives advantages in arrangement lay out with more spaces and
ability to set the equipment and outfitting better than monohull.

Encounter frequency ($\omega_e$) determined by the wave frequency ($\omega_w$) in Karimunjawa sea. The analysis for displacement, velocity, acceleration and response of heaving, rolling and pitching motion are done in wave heading $\mu = 0^\circ$, $\mu = 45^\circ$, $\mu = 90^\circ$ and $\mu = 180^\circ$ with variation of vessel’s speed $V = 0$ knot and $V = 20$ knots. Generally, the catamaran displacement, velocity, acceleration and response of heaving, rolling and pitching motion were smaller than monohull in variation of wave heading and speed above.

Keywords: comparison, research vessel, catamaran, monohull, Bengkalis Riau