

An investigation into the resistance components of converting a traditional monohull fishing vessel into catamaran form

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Abstrak

Resistance or drag is one of the most important factors in ship design, in particular in connection with the development of more efficient and environmentally friendly vessels. The shape of the hull under water will affect the fluid flow characteristics around the ship, hence causing the resistance to increase or decrease. If the resistance increases, the size of main engine and subsequently, the fuel consumption increases accordingly and this is not often anticipated by ship designers and operators. The use of a catamaran for passenger carriers is well known and its application for fishing vessels has received serious attention in the last few years, due to its advantages to produce wider deck area and smaller size of engine at the same displacement as the monohulls. The conversion of monohull fishing vessels in Cilacap the waters into a catamaran hull is an interesting topic in association with the development of better fishing vessels in this region. The resistance investigation of the conversion vessel was carried out by Computational Fluid Dynamics (CFD) approach and this is combined with classical slender body theory. In terms of mathematical calculation, the results between CFD and the combination of empirical formulas and slender body theory shows such a good agreement and the difference between the two is less than 5%. In terms of naval architecture, the results showed that the modification of a monohull vessel into a catamaran can increase the payload capacity up to two times. Conversely, this causes the resistance to increase about almost four times and this is certainly unpopular for the fishermen.