

MODIFICATION OF THE STEP HULL DESIGN OF THE POSAL (PAT MEDAN) BENGKALIS VESSEL AND ITS EFFECT ON THE SHIP'S HYDRODYNAMIC CHARACTERISTICS

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ABSTRACT

The POSAL (PAT MEDAN) Bengkalis patrol boat requires good flow characteristics to support high-speed operation. One geometric modification that can be applied is a step hull, which can alter the flow pattern beneath the hull and reduce drag force. This study aims to analyze the effect of step hull height variations on drag force, lift force, pressure distribution, and flow patterns using the Computational Fluid Dynamics (CFD) method. The analyzed models consist of a conventional hull and step hull variations of 25%, 50%, 75%, and 100% of Hstep. The simulation results show that the conventional hull produces a drag force of 16,134.76 N and a lift force of 11,560.39 N. The 25%, 50%, 75%, and 100% variations produce drag force values of 5,090.803 N, 4,986.245 N, 4,920.820 N, and 4,860.675 N, respectively. The 100% variation produces the lowest drag force, with a reduction of 69.88% compared with the conventional hull. The corresponding lift force values are 18,384.25 N, 18,157.89 N, 17,951.20 N, and 17,852.52 N. Based on drag force, lift force, and flow patterns, the 100% Hstep variation is considered the best configuration.

Keywords: step hull, drag force, lift force, flow pattern, CFD.