

**ANALISIS GERAKAN SWAY KAPAL AKIBAT PERUBAHAN
DESAIN SKEG PADA TONGKANG
(STUDI KASUS: *BARGE STAR RAYA*)**

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ABSTRACT

The operation of the BARGE STAR RAYA barge in the narrow waters of the Barito River is susceptible to excessive lateral (sway) motion, which potentially reduces course stability and increases the risk of collision. This study aims to analyze the effect of modified skeg shapes and angles on minimizing sway motion using numerical simulation via Hydrodynamic Response Analysis in ANSYS AQWA based on the JONSWAP wave spectrum ($H_s = 0.516$ m; $T_p = 3.367$ s) across seven model variations (No Skeg, Conventional Skeg/Case 1, and angles of 40°, 10c, 20°, -10° circ, and -20°) under wave directions of 0°, 45°, 90°, 135°, and 180°. The simulation results indicate that waves originating from 90° (beam sea) represent the worst-case scenario. The addition of skegs is proven effective in damping lateral displacement compared to the No Skeg condition (9.74834 m), with the Case 4 configuration (Skeg Angle 20°) emerging as the most optimal variation, yielding the smallest maximum displacement of 7.78873 m. This corresponds to a 20.10% reduction in sway motion compared to the No Skeg condition and a 7.25% higher efficiency compared to the Conventional Skeg (8.39761 m).

Keywords: *Barge, Sway Motion, Skeg, Hydrodynamic Response, ANSYS AQWA.*