

ANALISIS PERBANDINGAN HAMBATAN KAPAL TRIMARAN TERHADAP *CONVENTIONAL SIDE HULL* DENGAN SWATH *SIDE HULL*

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ABSTRAK

Indonesia mengalami perkembangan jumlah armada kapal hingga Agustus 2022 terdapat 4.906 kapal penumpang, 50.419 kapal ikan dan 44.645 kapal barang dibandingkan pada tahun 2017 jumlah armada hanya 27.567 kapal, tahun 2018 jumlah armada 29.928 dan meningkat menjadi 32.587. Dengan ini, para *naval engineer* melakukan inovasi salah satunya *multi-hull* seperti SWATH dan Trimaran. Penelitian ini bertujuan salah satu inovasi untuk mengetahui perbandingan hambatan trimaran *conventional* dengan kapal trimaran SWATH. Model kapal yaitu kapal dari penelitian dari jurnal validasi yang nanti akan divariasikan menjadi SWATH. Analisis hambatan dan perhitungan model ini menggunakan metode *Computational Fluid Dynamic* (CFD) dengan bantuan bantuan *software* ANSYS. Analisis perbandingan hambatan ini dilakukan terhadap hambatan total, hambatan gesek, hambatan viskositas, hambatan gelombang dan hambatan residu dengan kecepatan pada *fr* 0.1, 0.3, 0.5, 0.7 dan 0.9. Dari hasil yang didapatkan pada CFD, bahwa koefisien hambatan total (C_T) dengan rata – rata selisih trimaran *conventional side hull* dengan SWATH *side hull* sebesar 11%, C_F mendapat selisih nilai dengan rata – rata sebesar 8,4%, C_W mendapat selisih nilai dengan rata – rata sebesar 2,3%, C_V mendapat selisih nilai dengan rata – rata sebesar 1,3%. Hasil dari *contour* gelombang yang di dapat dari CFD menunjukkan bahwa trimaran SWATH memiliki bentuk *contour* gelombang lebih teratur dibandingkan trimaran *conventional side hull*, hal ini disebabkan dengan WSA (*Wetted Surface Area*) yang lebih kecil. Interferensi yang dihasilkan menunjukkan perbandingan sebesar 0,07% yang dimana nilai terendah -0,0088.

Kata Kunci: *Multi-hull*, hambatan, *CFD*.

ANALYSIS COMPARISON OF RESISTANCE TRIMARAN SHIP TO CONVENTIONAL SIDE HULL SHIP WITH SWATH SIDE HULL SHIP

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ABSTRACT

Indonesia experienced the development of the number of ship fleets until August 2022 there were 4,906 passenger ships, 50,419 fishing boats and 44,645 freighters compared to 2017 the number of fleets was only 27,567 ships, in 2018 the number of fleets was 29,928 and increased to 32,587. With this, naval engineers made innovations, one of which was multi-hulls such as SWATH and Trimaran. This research aims one of the innovations to determine the comparison of conventional trimaran resistance with SWATH trimaran ships. The ship model is a ship from research from a validation journal which will later be varied into SWATH. Analysis of resistance and calculation of this model using the Computational Fluid Dynamic (CFD) method with the help of ANSYS software. This resistance comparison analysis is carried out on total resistance, friction resistance, viscosity resistance, wave resistance and residual resistance with speeds at fr 0.1, 0.3, 0.5, 0.7 and 0.9. From the results obtained in CFD, that the total drag coefficient (CT) with an average difference between trimaran conventional side hull and SWATH side hull is 11%, CF gets a difference in value with an average of 8.4%, CW gets a difference in value with an average of 2.3%, CV gets a difference in value with an average of 1.3%. The results of the wave contour obtained from CFD show that the SWATH trimaran has a more regular wave contour shape than the conventional side hull trimaran, this is due to the smaller WSA (Wetted Surface Area). The resulting interference shows a ratio of 0.07%, where the lowest value is -0.0088.

Keyword: *Multihull, resistance, and CFD.*