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A Comprehensive Study of Wave Angels and their Influence on Sail Boats

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ABSTRACT

Sailboats have been utilized for centuries, yet the research regarding the impact of sails on these vessels has been relatively limited. Previous studies have primarily focused on the size of the sail and its influence on the speed of the sailboat. However, a new research endeavor aims to delve deeper into the subject by analyzing the forces acting upon the sail, considering various sail and ring configurations, and examining their effects on the overall performance of the sailboat. The study took place in the coastal region of Banyuwangi, taking into account the local wind conditions. The sailboat used in the experiment had specific dimensions, measuring 5 meters in length, 2 meters in width, and 1 meter in height, with a water-laden depth of 0.5 meters. Through extensive investigations, it was determined that the optimal wind direction for maximum efficiency was found to be 180 degrees, or directly behind the sailboat. Moreover, the study identified that the sailboat could tolerate a maximum heeling degree of 25 degrees towards the port side or starboard side before experiencing adverse effects. The findings of this research project demonstrated a significant correlation between the force exerted on the sail, variations in the sail and ring configurations, and their impact on the sailboat's performance.

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