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Wind assisted ship propulsion feasibility study.

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The harvesting of wind energy and its transformation into a thrust force for ship propulsion is gaining in popularity due to the expected benefit in emission reduction. To exploit the benefit a proper integration between the conventional diesel engine-screw propeller propulsion plant and the wind-assisted plant is mandatory. A mathematical model describing the behaviour of the rotor in terms of propulsive thrust and power is proposed. The rotor model has been integrated into an existing diesel propulsion model in order to evaluate the ship's net fuel consumption. The methodology allows for the evaluation of the engine-propeller working points and finally the total ship propulsive power considering the influence of the rotor, for a given wind condition. A 3000 tons Ro-Ro/Pax ferry has been selected as a case study. Results are presented about the parametric analysis of rotor dimensions and wind conditions. For a fixed wind condition the effect of the rotor at different ship speeds is presented.

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