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EXPERIMENTAL MODEL FOR TESTING THE HYDRODYNAMIC RESISTANCE OF AN ENVIRONMENTAL UNDERWATER VEHICLE

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Abstract

The Remotely Operated Vehicles-Unmanned Autonomous Underwater Vehicles (ROV-UAUV) are playing an important role in the exploration and surveillance of the underwater environment, where communications are difficult and restrictive. This kind of subsea vehicles have no crew on board, can be autonomous or remotely controlled and are designed to provide an efficient underwater supervision having complex tasks related to the environmental monitoring, emergency response, geological research, preventing or combating the consequences of natural disasters etc.
This study presents the hydrodynamic experimental model tests performed in the Towing Tank of the Faculty of Naval Architecture, from "Dunarea de Jos" University of Galati, in order to determine the hull resistance of an underwater vehicle, used for operations survey, both in maritime and inland navigation, at a maximum working depth of 50 meters. In principle, the ROV-UAUV 1:2 scale model is attached to the carriage by means of a hydrodynamic profile support. By applying the superposition assumption, the hull resistance of the underwater vehicle is determined based on the difference registered between the resistance of the entire system composed of the ROV-UAUV and the support and the resistance of the hydrodynamic profile. In order to evaluate the influence exerted by the free-surface on the hull resistance, two immersion cases are analyzed. The experimental model tests results validates the following main conclusions: the hull resistance increases with speed at all immersions and the negative effect of the free surface on the hull resistance decreases when the immersion of the system increases.

Key words: full-scale extrapolation, model resistance test, remote operated vehicle

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