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CAESES[®] and NavCad[®] Coupled Solution Highlighted at COMPIT 2016

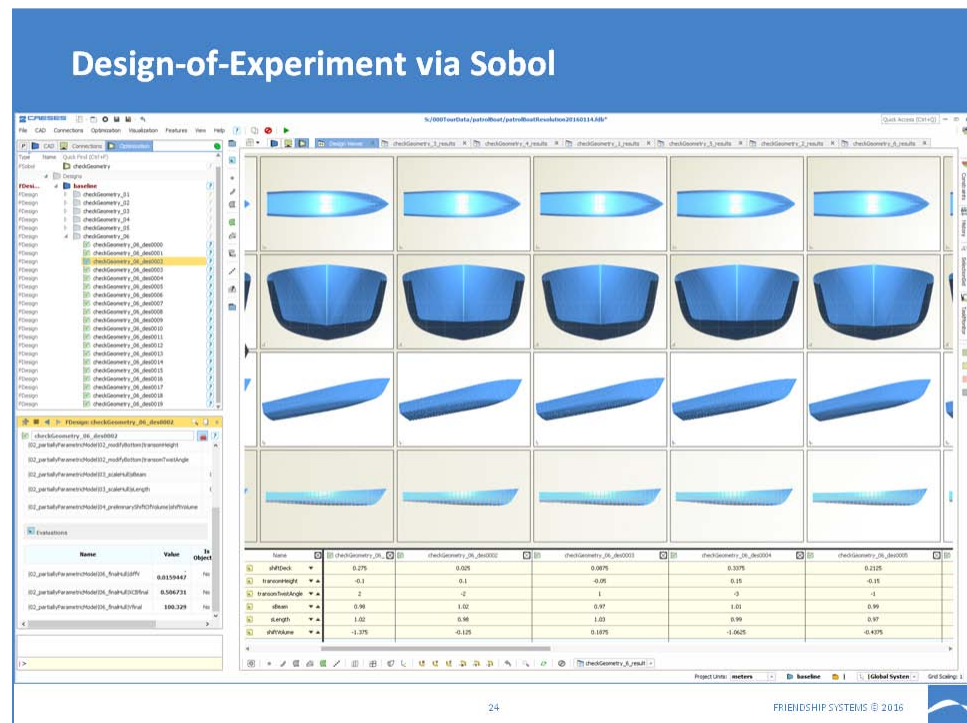
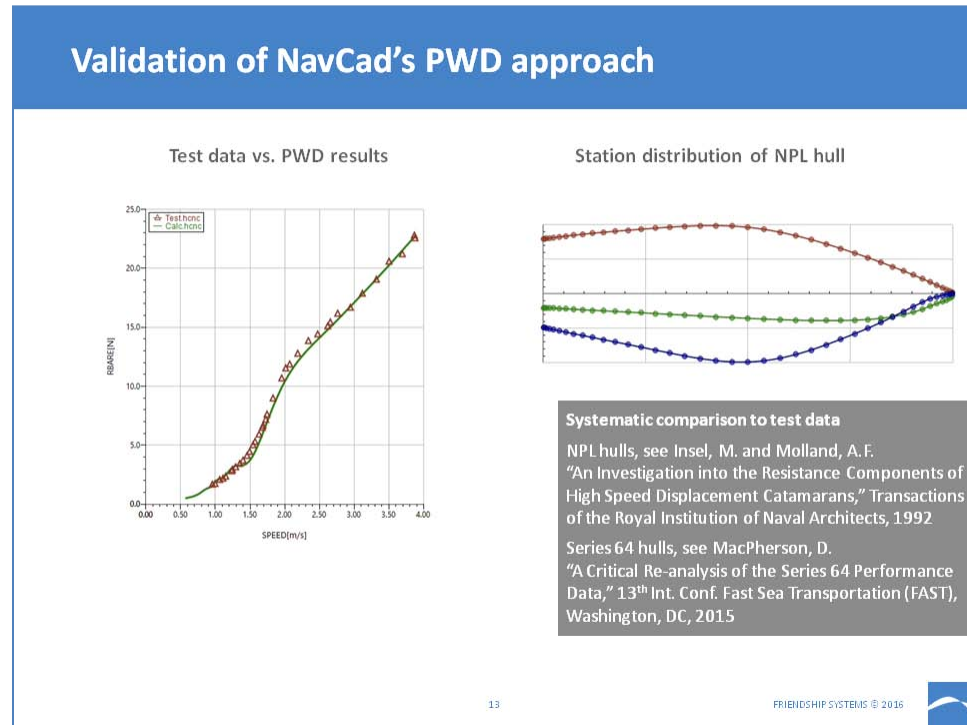
Much of the commentary regarding hull form optimization found in industry journals and proceedings focuses on process and methodology rather than outcome. The recent paper presented by HydroComp, Inc. (Durham NH USA) and FRIENDSHIP SYSTEMS (Potsdam Germany) at the 15th *Conference on Computer Applications and Information Technology in the Maritime Industries* (COMPIT) demonstrated the real savings in acquisition and life-cycle cost which can come from a systems-based optimizing solution that is within reach of even small design offices.

This story is about a waterjet-driven patrol boat tender that was nearing completion of its design, and the speed predictions were coming up a bit short. The supplier of the main engines felt that the installed power should have been adequate (based on similar installations), and contracted HydroComp for an independent technical review of the hull-waterjet-engine system with the intent of determining how much power would be needed to drive the hull at the contract speed. A resistance prediction and propulsion analysis confirmed that the boat would not make the necessary speed with the given hull, engine, and waterjet. However, as the engine builder suspected, the problem was not insufficient engine power. The problem was that neither the hull nor the waterjet were optimized for the target speed and loading condition.

An optimization process is described in the paper using FRIENDSHIP SYSTEMS CAESES as the hull form modeler and optimizing platform, with HydroComp NavCad Premium responsible for resistance prediction, engine power definition and fuel consumption, waterjet model propulsion analysis, and operating modes analysis for the boat's representative duty profile. The paper also highlights NavCad's prediction of total resistance using a novel linear wave-theory code that has been validated for high-speed transom-stern craft, as well as the efficient hull form manipulation within CAESES. The two tools are used as a coupled integrated solution to optimize the hull form for minimum resistance and to select the waterjet and engine models that offer the highest efficiency and minimum installed power and life-cycle fuel consumption. It could be shown that cost savings readily amounted to around 40,000 € at the investment phase and more than 80,000 € of savings per year in fuel costs. Assuming a life-time of the vessel of 25 years, this amounts to more than 2,000,000 € of cost reduction for the operator. Very importantly, too, the final design actually meets the target speed of 26 kn while the parent design before optimization fell short with just about 23 kn top speed.

HydroComp and FRIENDSHIP SYSTEMS have demonstrated successful software integration on numerous occasions. The first project used CAESES to generate and modify the geometry of an AUV, while NavCad was used to analyze the resistance and propulsion. The hull form was successfully optimized to minimize the required propulsion power for a given submerged volume. Other projects include a planing hull optimization study.

SLIDE IMAGES



About HydroComp

Since 1984, HydroComp has been a leader in providing hydrodynamic software and services for resistance and propulsion prediction, propeller sizing and design, and

forensic performance analysis. Through its unique array of software packages and services, HydroComp is able to serve naval architectural design firms, shipyards, yacht owners, ship operators, propeller designers, universities and militaries around the globe. www.hydrocompinc.com

About FRIENDSHIP SYSTEMS

CAESES is a powerful 3D parametric modeler that includes an integration and optimization platform that can utilize third-party calculations. The CAESES software is created by FRIENDSHIP SYSTEMS, a German software company which was founded in 2001 as a spin-off from the Technische Universität Berlin (Technical University Berlin, TUB) and its division Naval Architecture and Ocean Engineering at the Institute of Land and Sea Transport Systems (ILS). www.caeses.com.

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