

COMPREHENSIVE SUPPORT IN COMPLEX PROJECTS

SCIENTIFIC & ENGINEERING SUPPORT OF ADVANCED SURFACE SHIP STUDIES

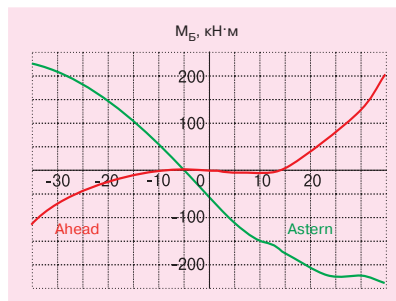
A series of numerical, theoretical and model experimental studies has been completed in support of advanced surface ship projects. The studies were aimed at selection of optimal characteristics for the ship under study including the following:

- ✓ Comparative analysis of developed options for the ship propulsion plant and generating recommendations for selection of the most optimal solution. The basic criterion involved the ship ability to perform her assigned tasks together with the minimum costs of propulsion plant life cycle (development, operation and recycling) and support in project implementation by the domestic industry within specified time schedules;
- ✓ Investigation of the ship seakeeping characteristics and design of propellers (towing and self-propelled tests of hull model and measurement of velocity field in the propeller disc);
- ✓ Series of hydrodynamic and cavitation tests of the propeller model;



Vessel model ready for tests to define rudder head forces and moment

- ✓ Calculations of the ship seakeeping characteristics;
- ✓ Experimental determination of the ship maneuverability in still water and in a seaway. In particular, defining the hydrodynamic and aerodynamic characteristics of the ship, mathematical model plotting for the ship motion under wind and waves conditions. The limiting weather conditions have been identified when the ship still maintains maneuverability at transit and can lie to with specified kinematics parameters. Rudder head forces and moment have been identified experimentally; recommendations for selection of steering gear have been formulated.



Relationship between rudder moment and rudder angle

AEROHYDRODYNAMICS

TESTS OF RESERVE PROPULSION SYSTEM FOR PROMISING DIESEL SUBMARINES

Reserve propulsion system for promising diesel submarines have been accomplished in the Krylov Institute model tank. Reserve propulsion system is a new advanced structure incorporating submersible motor, where propeller (PR) equipped with a shell with distributed permanent magnets serves as a rotor and a stator is a propeller nozzle with distributed power supply windings, plus power supply racks switching currents and keeping nominal modes of motor rotation.

The complex diagnostics included the following measurements:

- ▶ Propeller RPM;
- ▶ Propulsor-generated thrust;
- ▶ Forward speed (ahead and astern);
- ▶ Vibration levels in area of thrust bearing and at the casing of propulsor nozzle;
- ▶ Water temperature in the area of thrust bearing and in clearance between submersible motor rotor and stator;
- ▶ Average values of time-dependent and instant motor phase current and line voltage values and power supply network values.



Reserve propulsor system

Recommendations were given regarding application of these reserve propulsors systems for newly designed diesel submarines.

Reserve propulsor system in the model tank

