

Close-coupled towing in model scale



Close-coupled towing in real life. Photo courtesy of Arctia Oy/ Tommy Berg.

A wide range of model tests was performed at various stages of the project to ensure that the design meets all the stringent requirements.

The new Baltic Sea icebreaker design has been verified in a wide variety of model tests. One of these tests was completed in January 2022 in the ice model test basin at Aker Arctic in Helsinki. The aim was to investigate how well the vessel can manoeuvre while towing a large commercial vessel, one of its important tasks in the future.

Close-coupled towing is a common way to escort commercial vessels in the Baltic Sea during winter and all assistance icebreakers in this area are equipped with a towing notch in the stern. (See article on page 14.)

For the test, the icebreaker model was equipped with a scaled-down towing notch with rubber fenders, a wire rope, and load sensors. An existing model of a commercial vessel was attached to the notch as in a real-life setting.

"Manoeuvrability was demonstrated by zig-zagging along the length of the basin," Tuomas Romu explains. "Icebreaking professionals with real-world towing experience observed the tests and shared their valuable insight as the tests progressed."

Propulsion alternatives tested

During the icebreaker concept comparison phase, three different propulsion alternatives were evaluated by towing the same cargo vessel with the same towing notch in the same ice conditions. Test runs were done in both unbroken level ice as well as in thick brash ice.

"As expected, the assistance tests demonstrated how the icebreaker's propulsion configuration has a large impact on the manoeuvrability when towing another vessel," Romu adds. "In addition, some interesting observations were made about the effect of the icebreaker's hull form on the dynamics of the coupled two-vessel system and the discussions with the experts after the tests provided some new ideas."

After selecting a triple-azimuth propulsion configuration for the new Baltic Sea assistance icebreaker, the assistance tests were successfully repeated for the final Aker ARC 130 S design.

"The assistance test set-up is a valuable addition to our portfolio and can be considered in other escort icebreaker projects," Romu says. ■