

JMU and NYK Formulating Method for Evaluating Ship Performance in Actual Seas

JMU and Nippon Yusen Kaisha ("NYK"; head office: Tokyo; president: Takaya Soga) are mutually formulating a method for estimating a ship's performance in actual seas before construction is completed and recently completed verification of a vessel's propulsive performance in wind and wave conditions in actual seas.*

The two companies aim to know a vessel's performance in actual seas before the conclusion of a shipbuilding contract and aid in the reduction of GHG emissions by procuring highly fuel-efficient vessels.

Background and Issues

In conventional shipbuilding contracts, the guaranteed speed is set and agreed based on the relationship between the ship's speed and horsepower in calm waters (i.e., ship performance in calm seas*), and the shipyard and shipping company mutually confirm the guaranteed speed during sea trials in the final phase of construction. However, since actual voyages are strongly affected by waves and winds, the guaranteed performance in calm seas deviates significantly from the performance in actual seas.

JMU and NYK introduced a clause guaranteeing ship performance in actual seas in a shipbuilding contract in September 2020 and have been working to verify performance in actual seas.

Overview of Verification

1. JMU and NYK selected two new VLCCs designed and built at JMU as target vessels and collected data on vessel speed, main engine horsepower, wind direction, wind speed, etc., for one year from the delivery of the vessels in 2022.

2. In actual seas, the two companies mutually verified the degree of achievement against the guaranteed speed/power curve** formulated in 2020. The evaluation determined the difference between the guaranteed speed/power curve and the vessel's data for each wind direction (headwind, crosswind, and tailwind) and calculated the average value.

3. JMU and NYK confirmed that the guaranteed speed/power curve for the ship performance in actual seas was highly accurate. Both companies agreed to establish an analysis and evaluation method to evaluate ship performance in actual seas technically and objectively for specific routes.

4. One of the two new VLCCs was built using JMU technology to improve the shape of the vessel's hull for better performance in actual seas, and the two companies confirmed a significant difference in this ship's performance in actual seas, as expected.



The Two Target VLCCs

Future

JMU and NYK will utilize a new method of developing new hull forms to further improve performance in actual seas. The two companies will also evaluate the performance of other vessel types in actual seas.

JMU will continue to develop the vessels with an emphasis on ship performance in actual seas and introduce new technologies to promote the building of highly fuel-efficient vessels.

* Ship performance in calm seas and actual seas

Ship performance in calm seas: Propulsive performance when moving straight ahead in calm weather conditions. Each shipyard has long-standing knowledge of this performance and can estimate it with a high degree of accuracy at the time of contract conclusion. Ship performance in calm seas is greatly affected by the hull's shape below the water.

Ship performance in actual seas: Performance in weather and sea conditions similar to those prevalent in the oceans. When drawing up contracts, shipyards often have difficulty making precise estimates because the navigation route and weather and sea conditions are unknown. The hull shape above the water significantly affects actual sea performance.

** Guaranteed speed/power curve

A graphical curve representing the relationship between a vessel's speed and horsepower.