CNIM asks MARIN to verify the performance of a new SWATH design

With a growing demand for wind farm support vessels, Constructions Industrielles de la Méditerranée (CNIM) has developed a SWATH design with the aim of providing excellent walk-to-work transfer capability, in calm water and in a developed seaway. CNIM asked MARIN to assist the company in demonstrating its performance whilst in operation at sea.

The vessel is designed for the North Sea, English Channel and Irish Sea, in wave heights up to 3 m. The aft gangway has a large rotation radius, allowing the vessel to choose its position towards the turbine and heading relative to the environment.

SWATH The SWATH concept, or “Small Waterplane Area Twin Hull”, is known to show reduced motions in developed seaways when compared to a monohull. This is explained by the fact that most of its displaced volume lays deep underwater, far away from the large, wave-induced forces found at the free surface.

In a first phase, several candidate hull forms were compared to each other by means of linear seakeeping calculations. These showed that by carefully tuning the vessel displacement, as well as the strut shape, resonant response in roll and pitch could be prevented in the range of wave conditions expected in the areas of operation.

From the hull form selected at the end of the calculation phase a 5 m scale model was manufactured for testing. The objective of the model tests was to verify the findings from the calculations and to validate the design for operational conditions. Most of the tests were conducted in head waves, with significant wave heights up to 4 m. The measurements showed that as soon as the vessel presents sufficient draught and air gap, as well as reasonable damping in the vertical plane, the vessel motions remain limited, especially at the aft when considering head waves, even in the highest wave conditions.

DP ability In addition to ship motions, the dynamic positioning ability was determined numerically for several propulsor configurations. The effect of waves, wind and current from various directions was considered. Results showed that the best strategy is to keep the bow into the current as it can quickly become the most dominant factor.

In the future attention will focus on the propulsive performance and behaviour at forward speed, in calm water, in waves and during manoeuvres.