Case Story – Highlights

The Danish Port of Hvide Sande increases capacity with port traffic management system

How a cloud-based vessel traffic management system can help increase port capacity

Ability to call larger vessels with fewer delays

Potential for optimising the port's maintenance dredging programme

Improved safety conditions for ship and harbour workers with more accurate predictions of vessel motions

Challenge

The Port of Hvide Sande on the West coast of Denmark is a pillar of the local community, maintaining its position as a fishing port while broadening its economic footprint and evolving into a diversified multi-use port business, including offshore wind services. As coastal trade has increased, so has the size of the fleet of vessels. This is why the port has embarked on a transition to accommodate larger vessels from 90m in length up to 160m with a digital port management system.

This step-change increase in vessel sizes does not come without challenges, chief among which at Port of Hvide Sande is wave-induced vessel motion at the entrance to the port.

Historically, the port adopted a static 1m under keel clearance (UKC) as a safety margin to account for wave-induced vessel motion in vessels up to 90m. In order to accommodate up to 160m LOA vessels, this safety margin had to be revised to account for the increased motion of the longer vessels. For example, 0.5 degrees of pitch for a 90m LOA vessel result in 0.8m of vertical motion, compared with 1.4m for an LOA of 160m.

Solution

The harbour master and his team looked for ways to optimise port capacity within the boundaries of these weather conditions without compromising on safety. The Port of Hvide Sande consequently extended its relationship with DHI to adopt the digital and physics-based port management system NCOS ONLINE to support the safe transit of larger and deeper drafted vessels in consideration of the local metocean conditions.

The Port of Hvide Sande has become the first North Sea port to leverage dynamic data on ship specifications and weather to optimise its operations for the benefit of its stakeholders, customers, and the local and regional economy.

NCOS ONLINE leverages DHI's Metocean Data for local wave conditions, FORCE Technology's 3D Vessel Response Engine SimFlex4 and measured data to provide vessel response calculations with the same accuracy as a full-mission bridge simulator for a fraction of the cost. This method provides a highly accurate vessel-specific estimation of the combined effects of the wave-induced roll, pitch and heave motions, wind-induced heel and squat with regard to UKC.

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