

Squat measurements on vessels transiting the Lower and Outer Weser

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Abstract

OMC International (OMC) was commissioned by Wasser- Und Schifffahrtsamt Bremerhaven (WSA) to develop and produce a dynamic tidal transit-schedule program for the Lower and Outer Weser region. This program, called Dynamic Underkeel Clearance (DUKC[®]) assesses the under-keel clearance and passage safety of deep draft vessels travelling along the Lower and Outer Weser.

This paper details squat measurements and subsequent model validation undertaken as part of the implementation process for the DUKC[®] System. This involved full-scale dynamic sinkage and trim measurements conducted on Panamax and Post-Panamax container vessels and bulk vessels. Initial measurements were undertaken by the University of Applied Sciences Oldenburg (FHO). Later measurements were conducted by OMC, FHO and WSA. High precision DGPS equipment was used to record both horizontal and vertical motions onboard the vessels. For some of the measurements an escort (survey) craft was available to reduce the need for accurate water plane modelling. The recorded dynamic sinkage and trim were then compared against modelled values from the DUKC[®] System.

Particularly for the Post-Panamax container vessels, the under water hull shape, considering the vessel's load state and trim, was found to be a key parameter in determining dynamic sinkage and the magnitude and direction of dynamic trim. The paper also briefly discusses the effect of changing salinity, and therefore water density, on the vessel trim and sinkage.

Finally the impact of the squat measurements on the dynamic tidal transit-schedule program and operational safety are discussed..