Synergy between theory and practice for Ultra Large Containerships sailing to the port of Antwerp

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ABSTRACT

In 2003 an accessibility study based on real-time simulations for the S-class containerships of Maersk Sealand was performed at Flanders Hydraulics Research in cooperation with all involved parties (public and port authorities, pilots, tug and shipping company). The regulation for the upstream and downstream navigation on the Western Scheldt did not accept the arrival of a ship with length over all greater than 340 m. Since 2003 the ship dimensions of all shipping companies have been growing not only in length but also in width and the maximum draft exceeds the maximum allowable value for ships sailing in one tide to the port.

An overview is given of two main research studies for the evaluation of the accessibility of ULCS with a maximum capacity of 14,000 TEU to the Western Scheldt on the one side and the accessibility of the Berendrecht lock, the Deurganck dock and Delwaide dock on the other.

The first topic is based on an extensive research which includes the implementation of towing tank results from the Towing Tank for Manoeuvres in Shallow Water (cooperation FHR – Ghent University) into a fully integrated simulation model for the evaluation of meetings of ULCS on the Western Scheldt. A decade of model tests has been used to build mathematical prediction models for ship behaviour, bank effects, ship-ship interaction and squat evaluation. Real-time simulations at two coupled ship manoeuvring simulators revealed the possibilities and restrictions.

The second topic concerns research studies which show that the efforts and knowledge of all parties must be joined to open this infrastructure, originally designed for ships with more modest dimensions, for ULCS with a maximum capacity of 14,000 TEU.

The arrival of the ULCS MSC Beatrice in April 2009 is preceded by real-time simulation studies and training to develop new strategies to handle these ships in a confined environment. Although the Berendrecht lock (500 m length to 68 m width) is still the largest lock in the world, an unconditional accessibility is hard to define.

The paper gives an overview of the possibilities of research and training for accessibility issues for Ultra Large Containerships using data results of real-time simulation runs.

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