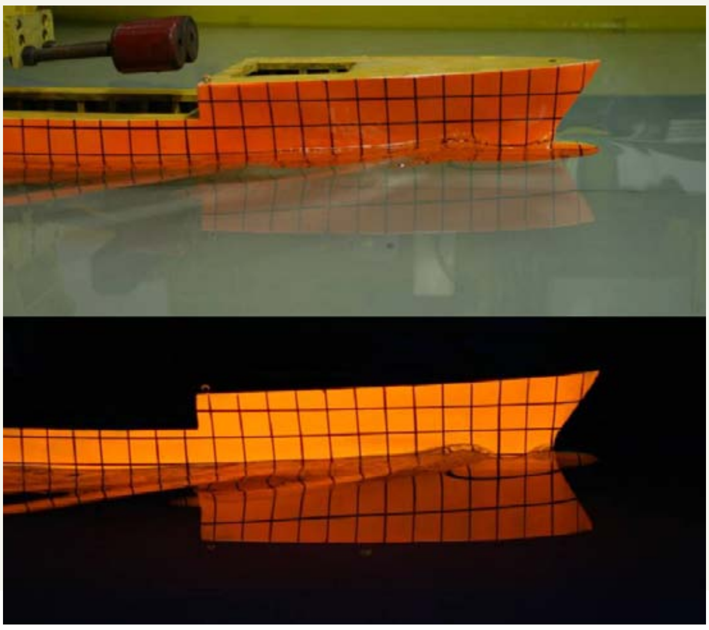
This is the sixth newsletter of the *Knowledge Centre Manoeuvring in Shallow and Confined Water*, which aims to consolidate, extend and disseminate knowledge on the behaviour of ships in shallow and confined water. This newsletter contains a final update on the *2nd International Conference on Ship Manoeuvring in Shallow and Confined Water: Ship-to-Ship Interaction*, an item on a new technique to measure the dynamic waterline in a towing tank and an item on a PhD research project that has started to study ship hydrodynamics in or near a lock in six degrees of freedom.

43 papers will be presented at the *2nd International Conference on Ship Manoeuvring in Shallow and Confined Water: Ship-to-Ship Interaction*, which will be held in Trondheim, Norway from May 18 to 20, 2011. As can be seen from the provisional scientific programme posted on the website, ship-to ship interaction will be discussed in all its aspects: lightering, replenishment, operational aspects and findings from experimental and numerical studies. Interaction with floating bodies and the effect of passing vessels on moored vessels will also be discussed. Sessions will also be devoted to shallow and confined water effects, squat, overtaking and meeting in channels and canals and ship-tugboat interaction.

If you are interested to attend the conference, please visit our website to register. The conference is organized in co-operation with the Royal Institution of Naval Architects, the Norwegian University of Science and Technology and MARINTEK.

Researchers of the Knowledge Centre recently presented a new technique to measure the dynamic waterline at the Second International Conference on Advanced Model Measurement Technology for EU Maritime Industry (AMT' 11) which was held at Newcastle University, UK.

One of the methods to investigate squat, freeboard and bow wave dynamics with passing ships and in waves is the use of images of the ship's side to determine the instantaneous waterline. It has long been very challenging to accurately measure this on a ship model in a towing tank.



Reflections and glare from lighting sources often result in poor image quality, which in turn increases the (manual) effort needed to determine the instantaneous waterline on the image.

To remedy this, a new technique has been developed whereby a semi-transparent fluorescent coating is put on ship models. A projected Cartesian mesh is painted on the model and is used to correlate the warped image with a projected side view of the ship's hull. In this way, the image analysis stays two-dimensional and no stereovision systems have to be used.

The test setup consists of four black light tubes in two waterproof housings and a digital camera controlled via a laptop computer. The UV light emitted by the black lights is reflected by the fluorescent coating as visible light which is captured with a digital camera. An automated processing algorithm is in development at the Image Processing and Interpretation Division of Ghent University. Using this novel measuring technique, the dynamic waterline is evaluated not only much more accurately but also significantly faster.

A new PhD research project has started at the Knowledge Centre with the objective of formulating a mathematical model that is able to correctly evaluate the forces (surge, sway, heave) and moments (roll, pitch, yaw) acting on a vessel while approaching, entering or leaving a navigation lock in real-time.

Ship sizes have increased over the years to satisfy the demand of goods all over the world. As a result, navigation lock sizes decrease in relation to common ship dimensions. Although it is possible to increase the size of navigation locks or even to build new locks, it is not a common practice because of the impact on society and environment and ultimately because of the costs involved. From an environmental point of view, the highest possible ratio between ship and navigation lock volume is desirable because the area is smaller, less energy and water are required to operate the lock and less salt water intrudes. However, allowing larger ships into navigation locks means that the clearance decreases drastically and, for safe operation, it is imperative to know the behaviour of the ship while entering, being in and leaving the navigation lock.

Lock effects can be mathematically formulated and implemented in a ship manoeuvring simulator to determine the main dimensions that may be allowed in the lock as a function of ship type, speed, tugboat usage, external forces, etc. Manoeuvring simulations are also used for navigational training purposes. This PhD research project therefore aims to model lock effects much more accurately by considering all six degrees of freedom. Read more

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