

**MARIN's Seakeeping and Manoeuvring Basin offers its best capabilities to serve safety at sea**

# SMB plays vital role in bulk carrier safety probe

**Guilhem Gaillarde discusses the role played by MARIN's Seakeeping and Manoeuvring Basin (SMB) to further define structural and safety standards for large bulk carriers.**

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Green seas on the foredeck of the Capesize bulk carrier.

Following the inquiry into the loss of MV Derbyshire and after studying results of model tests performed at MARIN and at SSRC in Glasgow, the UK High Court ruled that further model testing, using short crested seas and a number of hull models, is required to provide comprehensive seakeeping and wave load data to validate bulk carrier safety standards.

## **Additional tests**

As a result, the UK Department of Environment, Transport and the Regions (DETR) has asked MARIN to undertake additional tests for several types of modern bulk carriers. The International Association of Classification Societies (IACS) was invited to take an active part in the study and to produce (in conjunction with DETR) specifications for the model test study. The tests were carried out under the direct supervision of DETR and Lloyd's Register of Shipping. Their representatives have witnessed the tests and are to review the results. The purpose of the study is to provide definitive data of wave loads in the forward half-length of the weather decks of large, low freeboard vessels in severe and extreme wave conditions. Results are to

be placed in the public domain and be used, in conjunction with appropriate analyses to define the statistical return periods, to define structural and safety standards for these vessels. Model tests on two Capesize bulk carriers have already been undertaken in September and October 2000, while a Panamax size bulk carrier will be tested early next year.

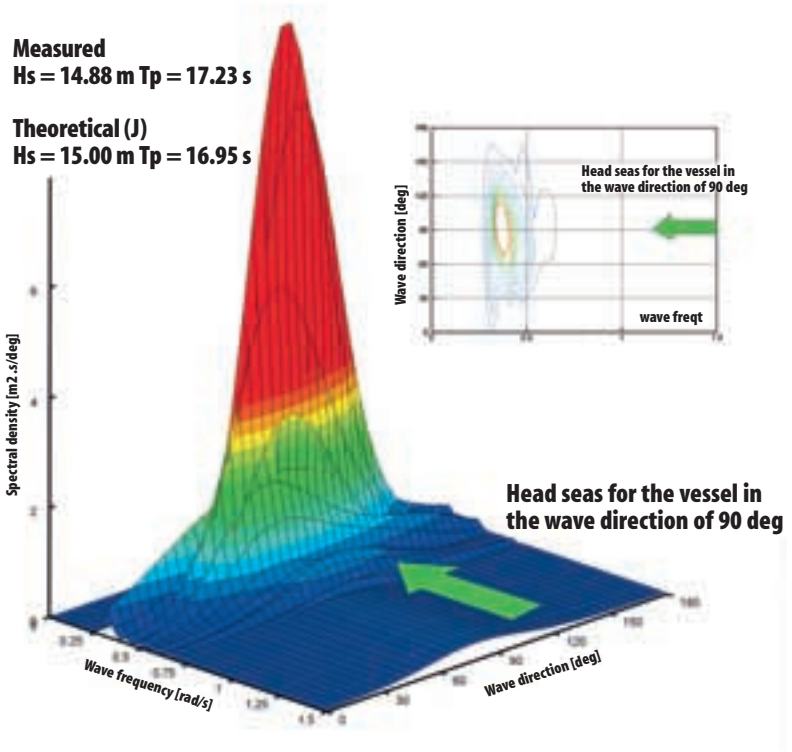
## **Short-crested seas**

The capabilities of the wave makers were fully used to generate short-crested seas with a maximum spreading angle, 90 deg on port-side and 70 deg on starboard. The spreading function used in the present tests were a standard ISSC spreading function and the wave characteristics were extracted from the envelope of the 20-year storm return period in North Atlantic.

A number of JONSWAP spectra were also performed in order to model more accurately sea states typical of extreme typhoon conditions. [MARIN](#)

**Measured**  
 $H_s = 14.88 \text{ m}$   $T_p = 17.23 \text{ s}$

**Theoretical (J)**  
 $H_s = 15.00 \text{ m}$   $T_p = 16.95 \text{ s}$



Directional spectrum realised in the basin,  
with a ISSC standard spreading function.

## Measurements and instrumentation

A new measurement system QUASAR was used during this study, allowing high frequency measurement on a high number of channels. Six-component frames were located below three hatch covers and two elements of the foredeck equipment, and 12 smaller pressure panels were located on the cover itself to investigate the spatial variation of the loading. A total of more than 50 channels were measured at 1 kHz (sample frequency). For an accurate evaluation of the sustained speed for such low powered vessels as well as the ability to maintain heading in these conditions, longitudinal and transverse drift forces were measured using a soft spring arrangement.

The vessel was tested at different headings, in soft spring arrangement at zero speed and self propelled. The test series are essential for a better understanding of the performance of these vessels in such storm conditions. [MARIN](#)

Details of the foredeck equipment on  
the Capesize bulk carrier.



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