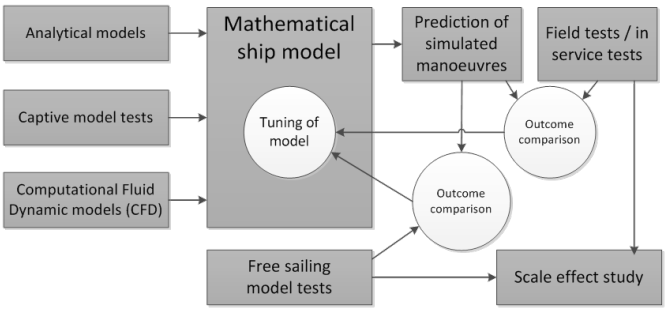
No 2 - 2013

This is the second newsletter of the Knowledge-building Project for the Industry "Sea Trials and Model Tests for Validation of Shiphandling Simulation Models" supported by Research Council of Norway. This project aims to improve present validation methodology for shiphandling simulation models. It includes captive and free-sailing model tests as well as sea trials with selected case vessels. The second newsletter gives a brief introduction to the project, describes activities taking place in the period August – December 2013 and a brief description of planned work for 2014.

Brief project description

The project started in April 2013 and will end in December 2016. Total budget is approximately 18 mill NOK (equivalent to 3 mill Euro). Project content is illustrated by the block diagram below.



The project partners have agreed on a set of case vessels including research vessels from two of the participating universities), ferry, offshore vessel, container ship and shuttle tankers. In addition to standard IMO manoeuvring trials the research partners will investigate ship specific low speed test manoeuvres with masters on case vessels and pilots.

As part of the project the research partners will arrange a number of workshops on topics such as documentation of low speed manoeuvring performance, uncertainties in manoeuvring models and validation of simulation models. External specialists will be invited to some of these workshops. The project includes a PhD scholarship at NTNU and a PostDoc position.

Completed activities August – December 2013

The first sea trials with case vessels took place in August. The first set of tests was made with the NTNU research vessel "Gunnerus". In addition to standard IMO manoeuvring tests a series of low speed manoeuvres were made. All tests were made in calm, deep water conditions in the Trondheimsfjord. In addition to on-board instrumentation MARINTEK set up and tested a dedicated instrumentation system for logging control signals to propellers and rudders and motion parameters for the vessel (accelerations, speeds and positions). A sketch of the dedicated instrumentation system is shown on figure 1.

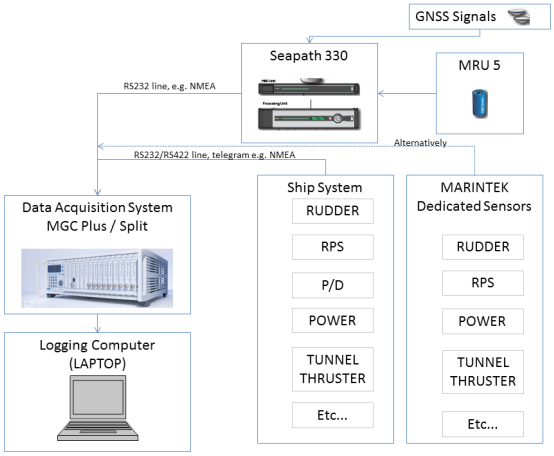


Figure 1. Instrumentation system used for sea trials.

For these tests a combined wave, wind and current buoy was installed in the predefined test area prior to start of the manoeuvring tests, see figure 2. One additional objective of this first test series was to compare the dedicated instrumentation system to the sensors and recording system of the vessel itself. Figure 3 shows some of the tests done.

To investigate the repeatability of test manoeuvres some turning circles and 20/20 zig-zags were repeated several times. A model without appendices was later on tested in MARINTEK's towing tank using their hexapod system to generate input to establish hydrodynamic coefficients for this vessel.

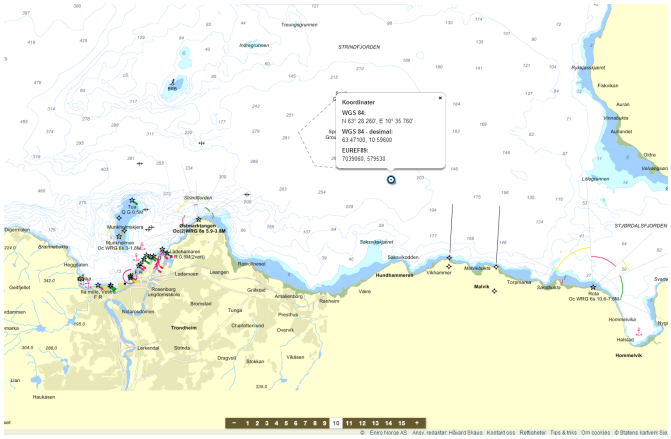


Figure 2. Test area in the Trondheimsfjord.

Figure 3. Bird's eye view of some manoeuvring tests for "Gunnerus".

In late August MARINTEK's scientists stayed on the LNG ferry "Landegode" for a week to prepare for and to execute manoeuvring tests. Installation and testing of project specific instrumentation was done while the ferry was in service. The manoeuvring tests were done during its off-service period between 10 am and 3 pm. Figure 4 shows the ferry performing a few standard tests. As this ferry had high-efficiency rudders (Rolls-Royce Promas) and three thrusters a number of ship specific tests were done on request from the master. One specific and surprising finding was the influence of the bow thruster in the speed range of 6 – 12 knots. In November a captive model test (using MARINTEK's Hexapod) was performed.

The project partners have reviewed publications on validation of shiphandling simulation models and found that there is a lack of reliable data for validation studies. A validation workshop took place at Flanders Hydraulic Research early October. It has been decided to continue work on verification, validation and accreditation of simulation models in the first part of 2014.

The 2nd Steering Committee meeting took place in

Figure 4. Thruster tests for LNG ferry "Landegode".

Trondheim late November. It was decided to include a new Norwegian partner (Marine Cybernetics) and to look for a third Norwegian shipping company contributing with an additional case vessel (preferably a large oil/bulk carrier). The international partners were finalizing their plans for selecting case vessels and time schedule for sea trials.

Planned activities for January – June 2014

The first free-sailing model test in the project will take place early March in MARINTEK's Ocean basin. The "Gunnerus" model will be used. The test plan will include standard IMO manoeuvres and specific low speed tests. Some additional captive model tests will be done for the LNG ferry "Landegode" mid May. Immediately after there will be captive model tests with Island Offshore's new offshore vessel "Island Condor" (a UT 776CD design).

Project partners will have separate meetings with shipping companies operating the project's case vessels. It is planned to arrange two workshops, one to finalize the state-of-the art study of validation methods and one on performing manoeuvring sea trials. The 3rd Steering Committee meeting will be held late May 2014.

Disclaimer

Although this newsletter is written with care, neither MARINTEK nor other project partners are responsible for errors in the content.

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