

MARIN provides assistance from concept to operation

MARIN assists its clients from concept to operation. By combining its hydrodynamic knowledge and operational experience it can provide clients with advice at all the stages of their projects. Willemijn Pauw, w.pauw@marin.nl

In the early stage of a design not all parameters are fixed, therefore it is still possible to make significant changes and improvements. An integrated approach with knowledge from different fields of expertise is valuable and MARIN's hydrodynamic and operational experts

are ready to contribute to your concept design.

MARIN has a full range of tools available. For many decades we have developed, improved and worked with model tests, computer simulations, full-scale measurements and

(full-mission) bridge simulators. This strong combination helps improve concept designs.

For example, the operational feedback from an exercise at the bridge simulator can be fed into the numerical simulations and the design (see article Hiloal page 13).



Concept model design: maximum flexibility coupled with minimised costs

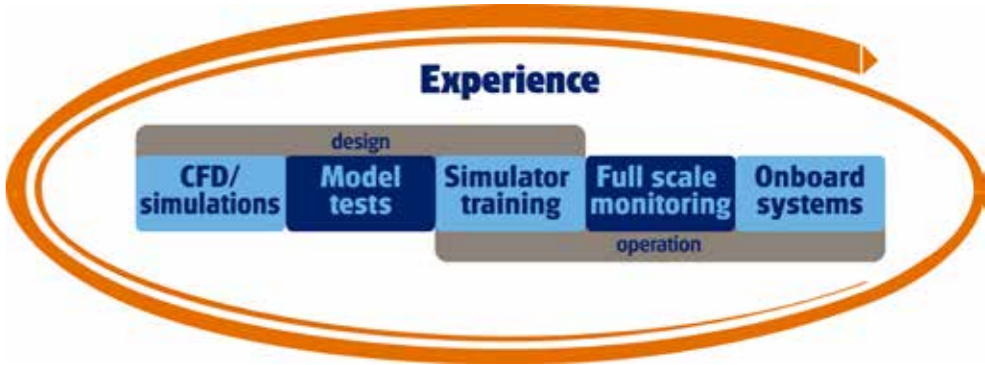
In another example, results from (concept) model testing can be used to obtain a more accurate numerical assessment of the operability in the conceptual design phase of the project. Model tests performed in the concept phase may be focused on one specific design subject or used to give a quick first impression of the overall performance of the concept.

Model tests performed in the concept stage require a different approach to those performed in the final design stage. Where verification tests for a final design require the simulation to be as realistic as possible for the most accurate prediction, the concept stage needs maximum flexibility, coupled with minimised costs. The concept model test approach proves itself particularly valuable when it flags up design changes that need to be made to mitigate possible issues during an existing test campaign. To take full advantage of this approach, close cooperation between MARIN and the client is crucial.

To achieve maximum flexibility and minimised costs at the concept stage, MARIN reduces any unnecessary model complexity, procedures and instrumentation. In this approach a distinction has to be made between tolerance and accuracy. For example, in the early stage of the design the exact weight distribution is not known yet. It may be less relevant to adjust the weight distribution to the specified values exactly. Instead, the weight distribution can be approximated to the specified values with a higher tolerance. On the other hand, the actual weight distribution is measured and documented accurately, so it is reliable and can be used in a numerical assessment. During the model tests MARIN's standard quality procedures are followed so there is no doubt that the obtained results are accurate and reliable.

There are several ways to reduce the complexity of the model test campaign. These can include:

- Simplifying the mooring system by using just three mooring lines, consisting of a spring and steel wire, or a standard chain type.
- Building the model with a larger tolerance than normal, so that it can be built from readily available materials.



- If less relevant, no appendages will be placed on the model.
- Saving basin time by not calibrating the waves, but still measuring them during the model tests. Alternatively, waves from MARIN's database may be selected.
- Using standard instrumentation and simplifying the model test setup.
- Delivering only the measured data (ASCII data) of the signals and a global data report with limited discussion or conclusions on the results.

Green water assessment for SBM concept

A typical example of the concept model test approach is the test series performed for SBM. A green water assessment was made in the Offshore Basin by using a tanker from MARIN's stock with a large number of wave probes at the bow. Adjustments to the test conditions were realised directly responding to the test results.

SBM stated: "The tests, which focused on enlarging SBM's in-depth knowledge on green water phenomena, were very illustrative of the behaviour of an FPSO in relatively severe seas. The electronic delivery of measured data from these conceptual tests perfectly suited our needs for this internal R&D project."



Test series performed for SBM