

Hull monitoring system helps optimise total lifecycle maintenance

One of the core services of MARIN is to carry out measurement campaigns on board ships and to analyse the collected data. Currently, MARIN is involved in a project which aims to optimise service life maintenance, based on data from a hull structure monitoring system. [Ingo Drummen, i.drummen@marin.nl](mailto:Ingo.Drummen@marin.nl)

The Valid 2 project focuses on the building blocks of such a monitoring system and the analysis of its collected data. The final task in the project will provide an example of how the data collected within the Valid projects can be used to improve the design and planning of maintenance needs. For this, reliability-based approaches will be used. Bureau Veritas, American Bureau of Shipping, BAE Systems, Damen, Defence R&D Canada, DGA hydrodynamics, DST Group, Lloyd's Register, Ingalls Shipbuilding, MARIN, Office of Naval Research, TU Delft and United States Coast Guard are participating in the project.

Of course an important objective is the development and installation of a prototype hull structure monitoring system. The system should be able to quantify fatigue life and extreme loads of the USCG WMSL Class hull structure.

In September 2015 the new system was successfully installed on USCG WMSL STRATTON. The location of the sensors was optimised using state-of-the-art-numerical tools, in combination with methods developed within the predecessor project, the Valid JIP.

To assist in the analysis of the collected on board data, laboratory tests will be carried out to evaluate fatigue measurement and analysis approaches for early crack detection. As part of these tests the effect of regular

versus irregular loading and mean stress will be investigated.

Having knowledge of the encountered wave conditions is very important for determining the service life maintenance. For this a wave radar gives detailed information.

A wave radar is, however, also an important cost driver in a monitoring system. Therefore, a new 'Ship As a Wave Buoy' (SAWB) method was developed. The method uses

the extensive database that was built up during the Valid JIP. Based on the measured roll and pitch motions, the most probable significant wave height is selected from the database. The first comparison of measured and calculated wave heights has shown that the new method is promising. ▢



Picture of USCG WMSL STRATTON