

# How good is our understanding of reality ?

## The added value of full-scale measurements

If innovation is the engine that drives ship designs, tools and procedures to higher standards beyond far horizons, then full-scale measurements take the role of the navigation instruments to avoid problems en route and to ensure progress in the right direction.

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The dramatic, 350 TEU, container loss incident by the Dutch islands in early 2019 illustrates the knife edge where modern technology operates between efficiency and safety. Unfortunate surprises occur despite standards, tools and procedures. Continuous data collection and evaluation is needed to check if our understanding and representation of ships and offshore structures is in line with their true behaviour at sea.

Many full-scale measurements have been conducted over the history of CRS. Speed trials, noise and vibration measurements, resistance, wave conditions and structural loads are just a few. The most recent MARIN data collection campaign for CRS was the

CRISM project in cooperation with two leading container ship operators. This aims to collect a long-term reference data set for environmental conditions, structural integrity, powering efficiency and inertial loads in general.

The data is used to validate recently developed CRS tools and to determine the relevance of new phenomena that have surfaced with the increased sizes of modern box ships. Typical examples are large motions and the effect of hull flexural dynamics on structure and cargo stowage.

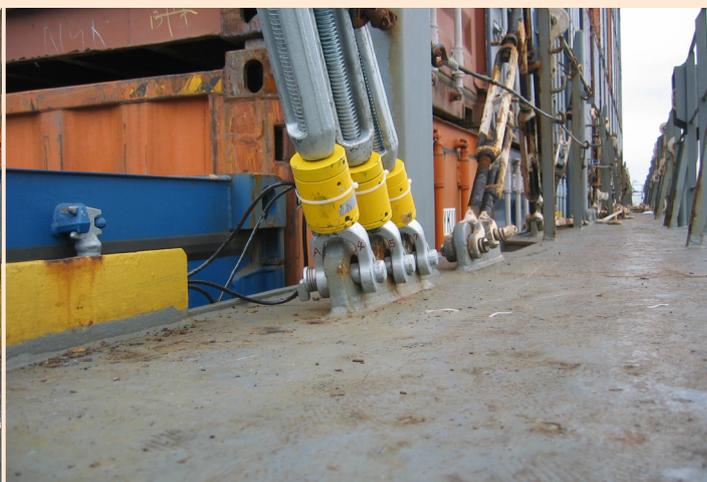
A particular challenge for safety, weather and seakeeping related phenomena, is that measurements need to run for a very long

time to capture the rare conditions where incidents and damages are likely to occur. Customised indicators are needed to index the terabytes of years of high-resolution data for specific phenomena. Indicators for new phenomena derived from Joint Industry Projects such as Lashing@Sea, TULCS and SPA, can be stored in databases alongside plain sensor data to allow quick and intuitive interpretation of otherwise overwhelming data.

MARIN and CRS use this essential information to verify present design and operational practice, identify needs for adjustments with respect to safety and efficiency, and ultimately to provide a sound basis for ongoing innovations. ▢



Specially designed MARIN measurement container (right bottom) on the NYK Argos



Instrumented lashing rods on the NYK Argos