



A unique multiphase test facility is being established by the Sloshing of Liquefied Natural Gas (SLING) research project to examine sloshing impacts in LNG tanks. Hannes Bogaert, h.bogaert@marin.nl

New multiphase test facility under construction

Through the STW 'Perspective Programme', a major public-private cooperation named SLING has been created. The SLING consortium comprises the technology foundation STW, four top Dutch universities, representatives from the LNG, shipping and ship-building industry, engineering companies and MARIN. SLING aims to plug the gaps in the industry's knowledge about new technology for LNG tanks with crucial cost saving potential.

The key to designing cost-effective LNG tanks is a shift to a first-principle approach to assess the dominant design loads, i.e. sloshing impacts. The current design method relies on sloshing model tests and requires

a calibration based on operational feedback, which however does not yet exist for new applications. This prevents new tank designs which maximise use of the ship's capacity by optimising tank geometry, and minimising Boil-Off-Gas by optimising the strength of the tank.

SLING brings together an unparalleled, multidisciplinary team to draw-up a first-principle approach to assess sloshing by disentangling the complex sloshing physics through advanced experiments and numerical simulations.

Multiphase test facility – a world

first The research requires a multiphase facility, which consists of a controlled envi-

ronment with multiple test setups installed inside, i.e. a flume tank with a wave maker installed on one end of the flume and an instrumented, transverse wall at the other end and a large flat impactor and a small disk impactor. The controlled environment consists of a 15 m long x 2.5 m diameter autoclave with observation windows; a gas and liquid supply system; and a heating/cooling system for the autoclave and test setups, facilitating testing in the vicinity of the water-vapour boundary for a large range of temperatures (5°C to 200°C) and pressures (5 mbar to 10 bar).

The test facility will be located at MARIN and due to open late 2017. ▢