

## An experimental investigation of sloshing impact physics in membrane LNG tanks on floating structures

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## **Propositions**

Accompanying the thesis

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membrane LNG tanks on floating structures

H. Bogaert

1. The list of Elementary Loading Processes (ELPs) is complete for sloshing impacts in membrane LNG tanks.
2. The pressure impulse, i.e. the integral of the pressure with respect to time over the impact, is not a conclusive parameter to evaluate the efficacy of the load to deform the membrane cargo containment systems.
3. Sloshing model tests with flat tank walls do not preserve the geometric similarity for membrane LNG tanks as they do not take into account the bulges of the membrane. The resulting bias of the impact loads at scale 1:40 can, however, not be overcome by preserving the geometric similarity.
4. The way forward to increase the validity of the methodology to assess sloshing in membrane LNG tanks, is to improve the experimental basis of sloshing model tests in combination with a physical based scaling approach.
5. A thorough understanding of how the identified phenomena bias the sloshing model tests and how they bias the scaling of the impact pressures, is a requirement to reach the goal stated in proposition #4. Addressing only parts of the research areas that are linked to the five sources of biases, is not sufficient to improve the validity of the assessment methodology.
6. Improving technical and social practices require long-term experiments and re-evaluation, which is only possible through perseverance and continuous support of stakeholders. Our welfare system would benefit from a long-term experiment with an unconditional basic income.
7. Governments should be responsible for creating a tax structure which stimulates businesses to invest in employees, research and product development, instead of tax heavens which drain resources from society.
8. Popularity of television baking and cooking competitions directs the ideas for future use of the new multiphase test facility under development within the SLING research program.
9. King William I of the Netherlands imposed Dutch as the official language in Belgium (1815-1830). Today Belgium takes a more subtle approach with the Dutch. TV-shows and songs from Belgium company Studio 100 are gradually affecting Dutch vocabulary and pronunciation of several generations.

These propositions are regarded as opposable and defensible, and have been approved as such by Prof.dr.ir. R.H.M. Huijsmans.