



Politecnico
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Experimental Testing and Data Analysis of Elastomeric Specimens for the Characterization of Semi-Rigid Floating Platform Connections

Master thesis proposal at the Marine Offshore Renewable Energy Lab Department of Mechanical and Aerospace Engineering Politecnico di Torino

Recommended profile:

Mechanical Engineering, Material Engineering, Civil Engineering

Topics involved:

Very Large Floating Structures, Floating Island, Connections systems, Compression tests, Material characterisation

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An internship in SEAform can also be associated with the thesis.

Proposal description

The rising sea levels, the strong urban pressure on coastal communities and the problem of land shortage are placing great emphasis on floating solutions as a sustainable alternative to current land reclamation practices based on the dredging technique. The main factors that have hindered the development of Very Large Floating Structures (VLFS) are the high costs and technological development limitations, primarily attributed to the high loads and corrosive marine environment. In order to decrease the loads acting on the floating structures and reduce production costs, various solutions of modular platforms have been proposed in the literature, along with various proposals for connection systems aimed at mitigating the loads caused by the hydroelastic response of the system.

The aim of this thesis is to experimentally investigate the mechanical behaviour of elastomeric materials by means of compression tests, in order to characterize the stiffness and damping properties of the material and component. The results of the experimental campaign will be used to enhance the modelling of semi-rigid connections systems in floating platform modules, contributing to the development of a VLFS' semi-rigid connections innovative technology.

This work, in collaboration with SEAform, will consist of the following steps:

- A comprehensive literature review on elastomeric material testing methods, both in academic and engineering standards.
- A detailed examination of current models and frameworks used to characterize stiffness and damping in elastomeric specimens.

- The execution of a set of compression tests following the identified procedures.
- Data analysis and characterization of the material's mechanical properties.
- Implementation of the findings in a numerical model of semi-rigid connections used in floating platforms.

This thesis will contribute to the ongoing research at SEAform (<https://seaform.it/>), aiming to optimize the design and performance of floating platforms for marine and offshore applications. An internship in SEAform can also be associated with the thesis.