

LABORATORIES

R&D INFRASTRUCTURES MARINE TECHNOLOGY

Technology for a better society

Ocean Basin Laboratory

The Ocean Basin Laboratory is used for basic as well as applied research on marine structures and operations. A total environmental simulation including wind, waves and current offers a unique possibility for testing of models in realistic conditions. With a depth of 10 metres and a water surface of 50x80m the Ocean Basin Laboratory is an excellent tool for investigation of existing or future challenges within marine technology.



Ship Model Tank

The main activity of the towing tanks is related to investigation of hydrodynamic performance of ships. This includes resistance, propulsion, seakeeping in head and following seas, and directional stability tests with free running models. The tanks are equipped with two carriages: One for towing up to 10 m/s for traditional calm water tests and a second carriage for seakeeping tests and other tests performed with fixed or free-running models.



Cavitation Tunnel

The cavitation tunnel is used to investigate the hydrodynamic performance of different type of ship hulls, propulsors and other hydrodynamic objects. Propeller induced pressure fluctuations and noise as well as cavitation are investigated by means of measurements and high speed video observation. Propeller shaft and single propeller blade forces and moments can be measured using advanced in-house developed miniaturized instrumentation, in addition to standard thrust and torque measurements.



Marine Structures Laboratory

The main activity in the laboratory is the testing of structures, structural components and materials. Typical problems involve fatigue testing, ultimate strength and collapse testing. Experimental work is often combined with analytical or numerical analysis. Small scale testing can be performed to obtain material data and material coefficients to be used in numerical analysis and full scale testing. Dynamic full scale testing is performed for qualification of flexible risers, power cables, umbilicals, hoses and mooring lines. A wide range of structural analysis programs are available for linear and non-linear static and dynamic analyses. These include special programs for fatigue and fracture mechanics analysis, and the collapse behaviour of intact and damaged structures.



Energy-/Machinery Laboratory

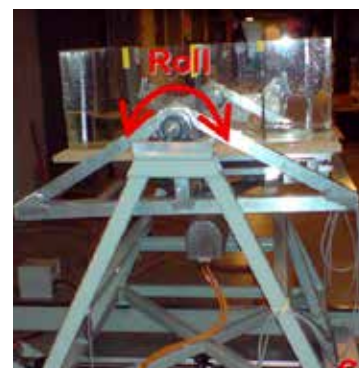
The laboratory is amongst the best equipped independent engine laboratories in Scandinavia. Well developed installations with highly specialized experimental equipment, instrumentation and data-acquisition systems, and an experienced staff are crucial assets in provision of professional customized support and accredited services to our clients. We have in-house workshop capabilities for making customized engine components or modifying existing components and systems in order to improve performance.



Sloshing Laboratory

For investigating liquid loads in tanks with custom geometries, we have developed a sloshing laboratory with two motion platforms and a drop rig for deterministic water impacts. The motion platforms are custom made for exciting scaled vessel motions.

- The 6 DOF vessel motion simulator
- The 2 DOF vessel motion simulator
- The drop rig



Marine Cybernetics Laboratory

The Marine Cybernetics Laboratory is a wave basin, especially suited for tests of marine control systems, due to the relatively small size and advanced instrumentation package. It is also suitable for more specialized hydrodynamic tests (for example forced motion tests), mainly due to the advanced towing carriage, which has capability for precise movement of models in 6 degrees of freedom. Flow measurements can be performed using Particle Image Velocimetry (PIV) technique.



Circulating Water Tunnel

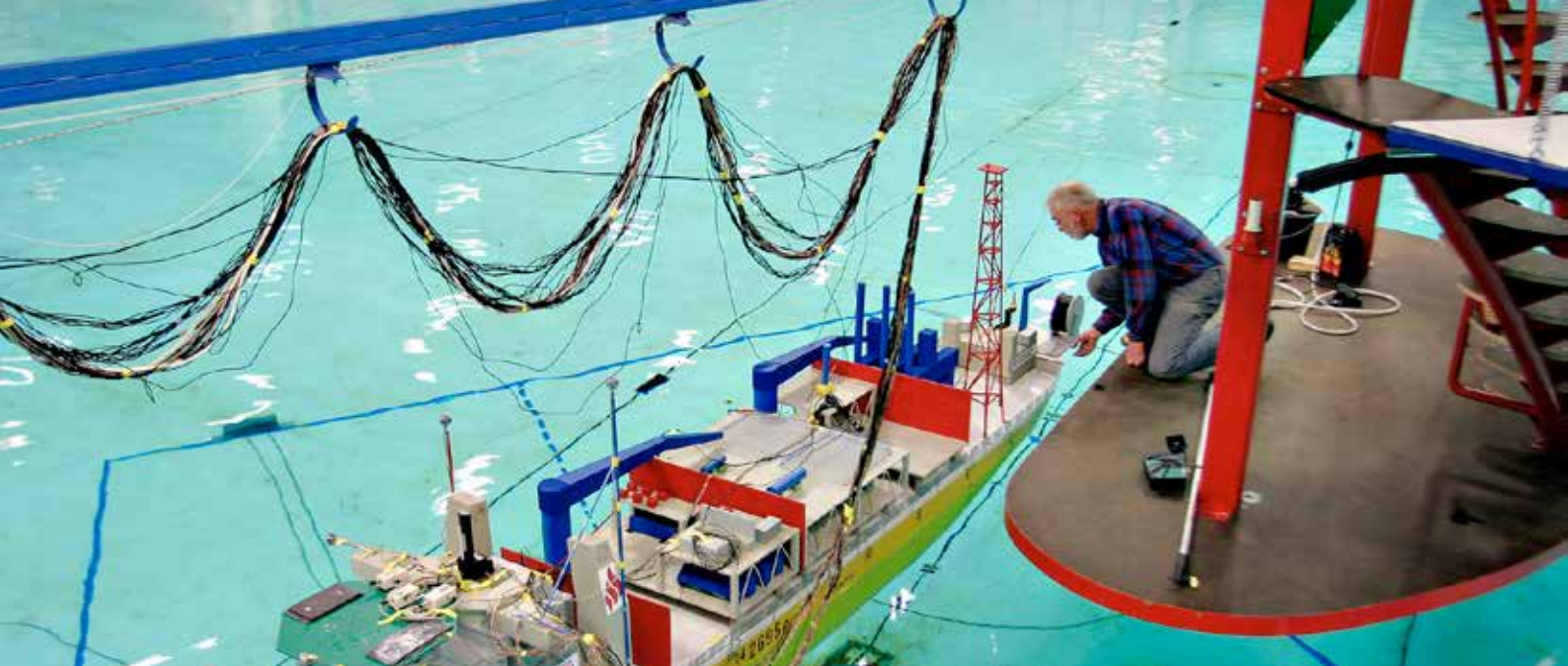
The Circulating Water Tunnel (CWT) is a test facility dedicated to optical measurement techniques and flow visualization. The tank's measurement section is completely transparent and can be operated either with a free surface or the lid closed.

Laser-based techniques like PIV (Particle Image Velocimetry) and LDV (Laser Doppler Velocimetry) allow non-intrusive measurements of instantaneous 3D flow fields at high temporal and spatial resolutions. The laboratory is hence especially well-suited for research projects that integrate experimental and computational results.



All laboratories

For more information and full description of all our laboratories, please visit our website.
www.sintef.no/ocean-laboratories



Technology development through testing and verification

SINTEF Ocean's laboratory facilities are internationally renowned. Demanding industrial partners and customers from all over the world develop their technology in close cooperation with SINTEF Ocean, partly based on testing and verification in our top class laboratories.

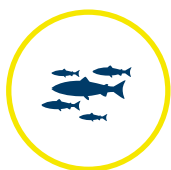
We have 80 years of experience in the development of cost-effective, high performance ships, where model testing in our laboratories constitutes an important element. We have the testing facilities, expertise and analytical tools for developing operationally efficient and safe ship concepts.

Emission to air is the one of the main challenges for the shipping industry, and through our laboratory facilities, we provide technology development for improving energy consumption and reduced emissions. SINTEF has participated actively in the development of different concepts of ocean energy technology. Extensive research and testing of offshore wind turbines as well as tidal and wave technology is carried out in our laboratories.

For decades we have tested, studied and validated different types of marine operations. We have been working with all types of marine operations involving offshore vessels, fixed and floating structures, worldwide. In the development of the Norwegian Continental Shelf, challenging and harsh conditions have placed tough requirements on various concepts; floating production units, gravity based offshore structures and complete subsea and subsea-to-shore solutions.

A key factor has been the ability to test and verify future solutions in modern laboratories. SINTEF runs some of the world's leading laboratory facilities in the field of marine technology development. We have combined laboratory experience with the development of associated numerical tools and software, of which many are in daily use around the world at the operators' and supply industries' workbenches.

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