An Introduction to the
# Hydromechanics Laboratory
United States. Naval Academy
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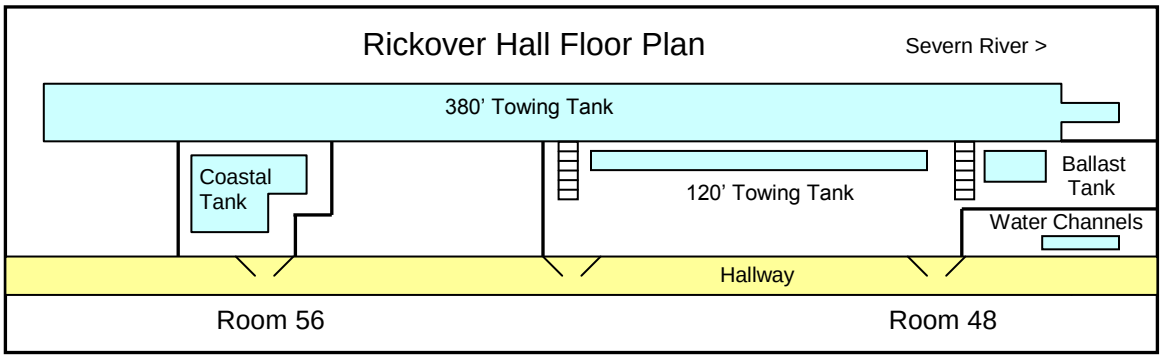
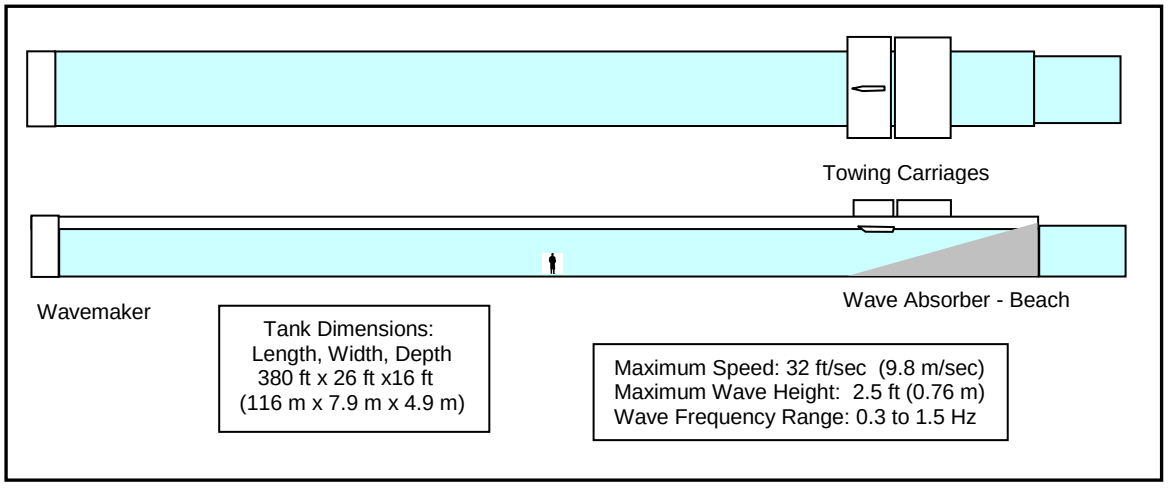


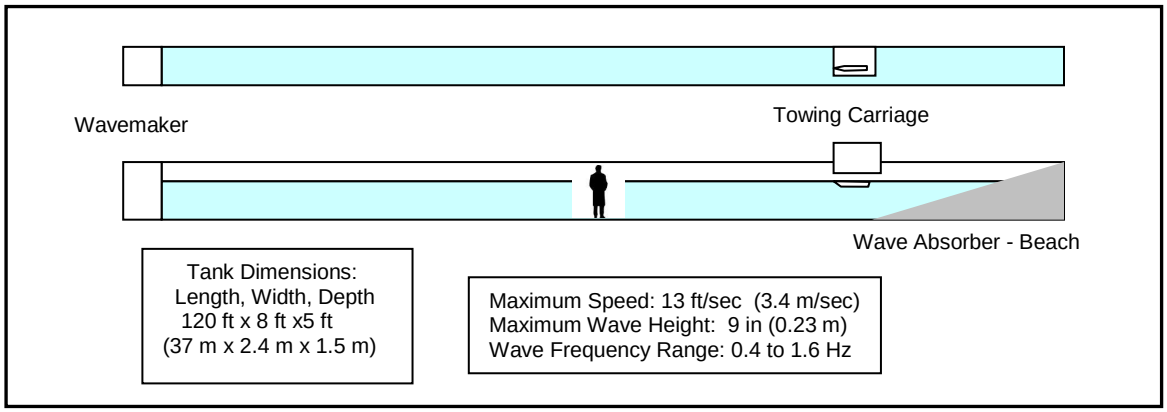

The Naval Academy Hydromechanics Laboratory (NAHL) began operations in Rickover Hall in September 1976. The primary purpose of the facilities is to further the education of midshipman. All midshipmen receive instruction in the Laboratory during the course of their studies. Those who major in Ocean Engineering or Naval Architecture participate in more advanced laboratory work and often undertake independent research projects using these facilities. The Laboratory has a dedicated staff of technicians and engineers to assist students and keep the facility running with state-of-the-art equipment and techniques. During the academic breaks, faculty and staff use the laboratory to conduct research projects sponsored by the Navy and other organizations.

## 380-Foot Towing Tank



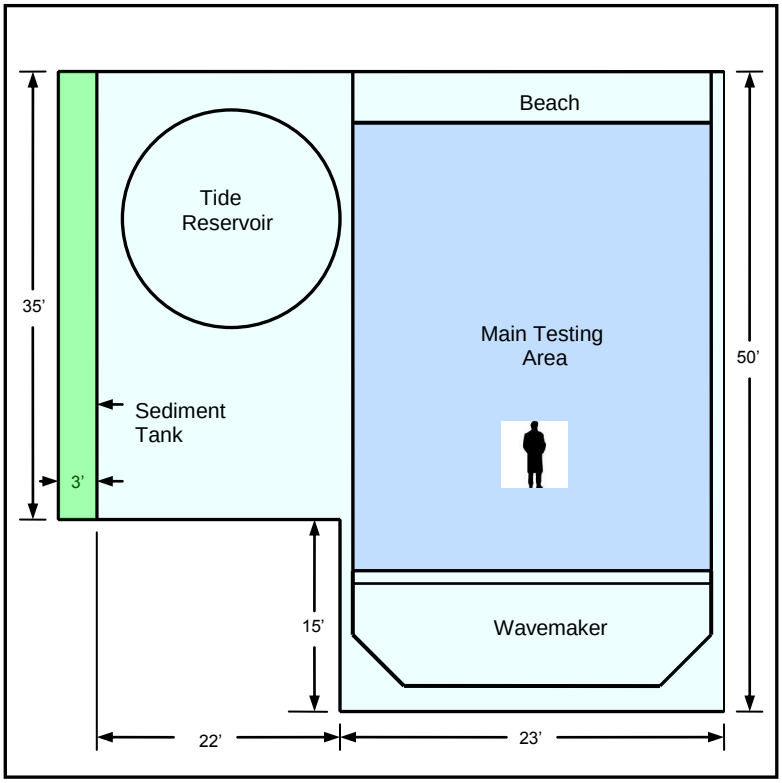

The 380-foot towing tank is a world class facility that is large enough to test ship models up to 25 feet in length and weighing several thousand pounds. A large tank is required to overcome scaling problems when testing models fitted with propellers, rudders and other scaled appendages. The long tank length allows testing at high speeds. The tank is outfitted with two towing carriages, a dual flap wavemaker and specialized equipment for measuring resistance, seakeeping and maneuvering characteristics of all types of marine vehicles and ocean platforms.

## 120-Foot Towing Tank



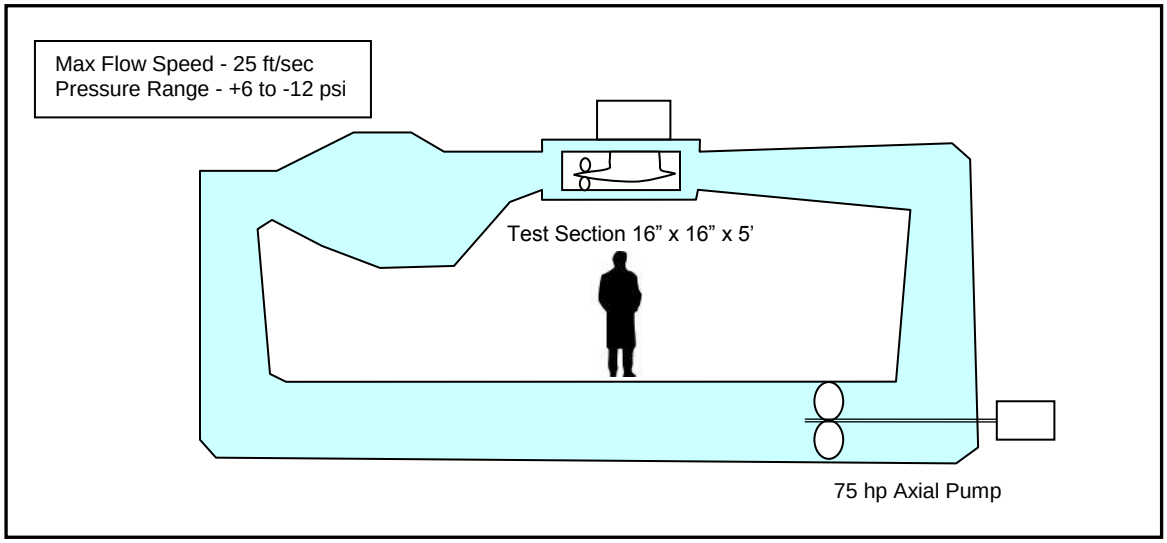

The 120-foot towing tank is the workhorse of the laboratory and is in use almost every day when classes are in session. Models in this tank are typically three to six feet in length and weigh ten to fifty pounds. Small scale model testing is extremely useful for demonstrating concepts and homing in on solutions to hydrodynamic problems. Students are able to build and test their own models in this tank with little outside assistance. This tank also has a dual flap wavemaker and is used extensively for wave measurements, resistance and seakeeping experiments.

## Coastal Engineering Tank



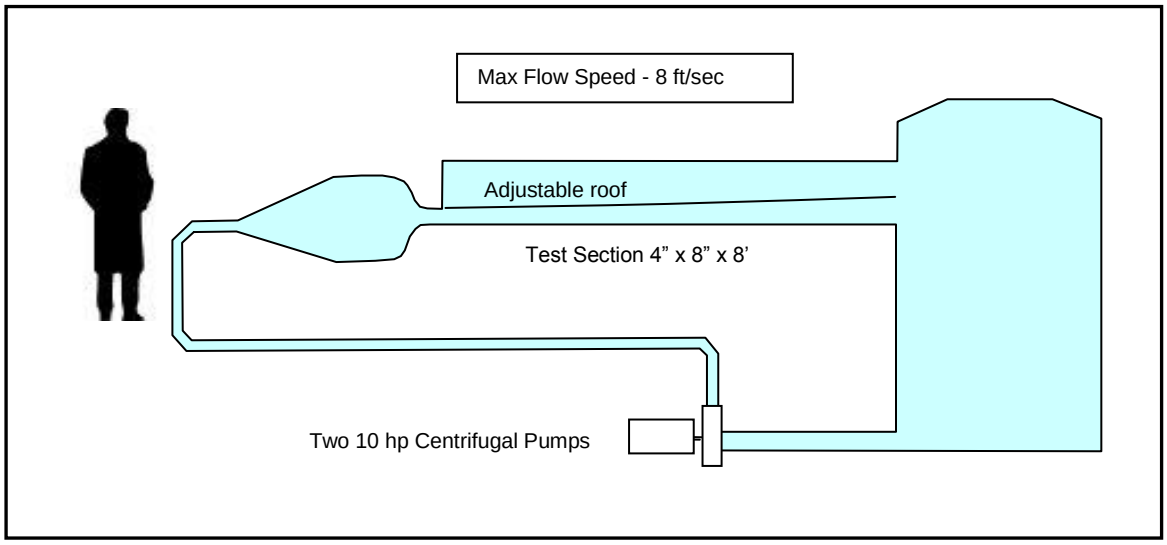

Ocean Engineering students use this facility to study the effect of waves on beaches and ocean structures. Breakwaters, jetties, groins and harbors can be designed and their effectiveness evaluated. A moveable bridge straddles the tank and can be used as an observation platform and as a place for mounting instrumentation. The main testing area has a piston wavemaker and the sediment tank has a vertical wedge wavemaker. Tidal flow can be simulated using a computer controlled pump system. The lab is equipped to measure wave heights, particle velocity, currents, beach profile and sediment composition.

## Variable Pressure Water Channel




The variable pressure water channel is used for visualization of cavitation, measurement of forces and pressures on submerged bodies and propeller thrust/torque measurements. The test section has a free surface and pressure can be varied inside of the chamber to allow proper scaling of cavitation on propellers, hydrofoils and other test subjects. Laser Doppler velocimetry (LDV) is used to make detailed flow measurements around test subjects.

## Low Turbulence Water Tunnel




This water tunnel was designed specifically for flow uniformity and low freestream turbulence intensity. It is primarily used for research on turbulent boundary layers. Both laser Doppler velocimetry (LDV) and particle image velocimetry (PIV) are used to make detailed measurements of the boundary layer structure. The test section has an adjustable roof to allow adjustment of the freestream pressure gradient. Constant water temperature is maintained by a dedicated cooling system.