



Photo by Joe DelNero, NREL 70310

NREL Wave Tank Facts

Description

The wave tank, located at the National Renewable Energy Laboratory's (NREL's) Flatirons Campus in Arvada, Colorado, provides a versatile testing environment for marine energy research. It features an OMEY Labs wave tank equipped with a flap-type wave generator. The design is nominally pitched in the range of 1/50 to 1/100 scale of waves in North Atlantic seas, with a working width of 2.5 meters (m) and a nominal working depth of 1.3 m. The total length of the tank is 16 m, and it holds approximately 13,000 gallons of fresh water.

The wavemaker is able to produce a wide range of wave conditions with high-quality orbital particle motion. It can produce regular and irregular waves with a wave height of up to 0.2 m and a range of periods from 0.5 to 5 seconds.

Capabilities

- OMEY Labs 16-m-long indoor wave flume capable of producing 2D waves.
 - Peak-to-peak wave heights of up to 0.2 m.
 - Wave period bandwidth of 0.5–5 s.
 - Glass flume wall for external underwater observation and imaging.
- Three Ocean Sensor Systems, Inc. wireless sonic wave sensors.

- Wireless connectivity: XBee/XBee-Pro Modules, ZigBee Personal Area Network (PAN).
- Automatic anti-aliasing filter.
- Sample rates: 1, 2, 4, 8, 16, and 32 hertz.
- Four-camera Qualisys motion capture system for precise motion tracking.
 - Point-trajectory tracking and rigid body motion and multibody motion with 6 degrees of freedom.
 - Capture frequencies of up to 183 hertz.
- Modular Ocean Data Acquisition (MODAQ) system.
 - Flexible multimeasurement platform.
 - Custom data acquisition systems built for each project.
 - MODAQ Field, Cloud, and Web components acquire, analyze, monitor, and control data.
- 15-ton-capacity crane.
- Mooring systems.
 - Magnets with 600 pounds of hold force.
 - Custom-built Unistrut or aluminum 80/20 structures.

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