

Ocean Wave
Tidal Flow
Marine Current



Location:
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Renewable Energy Testing Capabilities at Ohmsett

The U.S. Department of Interior's Bureau of Safety and Environmental Enforcement (BSEE) is collaborating with research institutions and industry on testing wave and current energy systems. Ohmsett—The National Oil Spill Response Research & Renewable Energy Test Facility is one of the largest outdoor saltwater tanks in North America and is designed to evaluate the performance of full-scale and meso-scale equipment under realistic but safe environmental conditions. The facility, managed by BSEE and operated under contract by MAR, Incorporated, is located at the Naval Weapons Station Earle Waterfront in Leonardo, New Jersey (about one hour drive south of New York City).

At the heart of Ohmsett is a large outdoor, above ground concrete test tank that is 203 meters long, 20 meters wide 3.5 meters deep and holds 10 million liters of crystal clear salt water. The facility is equipped with a wave generator capable of producing sinusoidal, harbor chop waves and wave spectra.

The Ohmsett tank is equipped with three movable bridges with tow speeds of up to 6 knots, programmable to 1/100th knot increments to simulate ocean current flow. The robust tow bridges are able to accommodate the torque and forces of the largest current turbines and wave energy converter (WEC) equipment. The Control Tower is fully computerized and data from various sensors and video cameras are collected for synthesis and analysis.

Tank water is clarified through a diatomaceous earth filter system capable of processing the entire tank in 24-hours. The filter system keeps the water clear to permit the use of a sophisticated underwater photography and video imaging system during testing. An electrolytic chlorinator is used to control biological activity.

Support facilities at Ohmsett include a machine shop that provides a complete range of materials, fabrication and welding services to support testing. We have the ability to lift various devices with the availability of a 75-ton crane and an onsite deck crane that can lift up to 1500 lbs with a 42 foot reach. A vast amount of indoor and outdoor work space can be found here to prepare and modify test equipment. There is an on-site chemistry laboratory and a complete meteorological station for continuous weather measurements. The Ohmsett training facility and classroom can accommodate over 25 personnel and includes state-of-the-art multimedia and audio-visual equipment.

Why Ohmsett

Ohmsett provides a facility for testing, research and development of large to full-scale equipment processes for ocean wave and current technologies. Ohmsett has 20 years experience working with government agencies, academia, and private companies on research projects that include testing concepts for new products not yet in production and innovative studies for technologies to include wave modeling, remote microwave wind vector sensing, and mast wake characteristics with waves and calm surface. The experienced staff members are available to help with acceptance testing of equipment and assist in existing product evaluation and improvement recommendations. For more information contact Matthew Quinney at 732-866-7055 or email Matthew.Quinney@bsee.gov.

Facility Specifications

The wave generator system can produce FM Slides, JONSWAP and Pierson-Moskowitz spectra with controlling parameters being wind velocity and scale. Customers may specify their own wave characteristics if they are not adequately represented by these standard types. The data collection system is capable of recording up to 32 channels.

A new wave-damping beach system is planned to attenuate the reflected waves so that they will not interfere with newly generated waves. Along with the recent wave flap improvements, the more effective beach system will allow Ohmsett to generate realistic waves that can be used by researchers testing the performance of hydrodynamic energy converting devices.

Wave Tank:

- 203 meters (667 feet) long
- 20 meters (65 feet) wide
- 3.5 meters (11 feet) deep; 2.4 meters (8 feet) nominal operating water depth
- 10 million liters of water maintained at open ocean salinity (35 ppt)
- Tow bridge capable of speeds up to 3.1 meters/sec (6 knots)
- Computerized drive system
- Equipment tow bridges

Wave Characteristics:

- Regular waves as high as one meter (3 feet)
- Simulated harbor chop waves (randomized waves)
- FM Slides with selectable: slew rates, start and stop
- Pierson-Moskowitz &
- JONSWAP spectra parameterized by wind speed & scale
- Wave spectra
- A movable, wave-damping artificial beach

Facility:

- Controlled reproducible conditions
- Test protocol development
- Underwater video/viewing capabilities
- Data collection and video system
- Fully equipped machine shop
- On-site chemistry laboratory
- Meteorological station
- 15,000 lb forklift