

<b>Name of organization</b> Lir-National Ocean Test Facility		<b>Year of information updating</b> 2018
<b>Year established</b> 1977		<b>Year of joining the ITTC</b> 2018
<b>Address</b> Lir National Ocean Test Facility Beaufort Building Ringaskiddy County Cork Ireland P43 C573		<b>Status in the ITTC</b> Member
<b>Contact details</b> (phone, fax, e-mail) Phone: 00353 (0)21 4864300 email: <a href="mailto:lir-notf@ucc.ie">lir-notf@ucc.ie</a> / <a href="mailto:ianpower@ucc.ie">ianpower@ucc.ie</a>		<b>Website</b> <a href="http://www.lir-notf.com">www.lir-notf.com</a>
<b>Type of facility</b> Lir National Ocean Test Facility is a custom designed test facility for laboratory testing of small to medium scale laboratory testing of ocean and maritime systems. Wave tank, towing tank and electrical testing.	<b>Year constructed/upgraded</b> 2016	
<b>Name of facility</b> Lir-National Ocean Test Facility	<b>Location</b> (if different from the above address)	
<b>Main characteristics</b> (dimensions of tank/basin/test section; for simulators: full mission, part task or desk top)		
<p><b>Open Ocean Emulator</b> (25m x 18m x 1m deep): used for testing a variety of marine structures (wave energy convertors, floating wind platforms, coastal structures, oil and gas platforms). It has a central section with a depth of 2.5m to assist in the testing of mooring lines.</p> <p><b>Deep Ocean Basin</b> (35m x 12m x 3m deep): It has a moveable floor plate to allow the water depth to be adjusted, making it suitable for circa. 1/15th scale operational conditions and 1/50th scale survival waves. Equipped with 16 hinged force feedback paddles capable of a peak wave 1.1m in height.</p> <p><b>Wave and current flume</b> (28m x 3m x 1m deep): A multi-purpose facility with the capability of running separate and combined unidirectional wave and current tests. It has 8 hinged force feedback paddles and three thrusters for generating current speeds of greater than 1 m/s and it is fitted with a towing carriage that can operate at speeds up to 1.5 m/s.</p> <p><b>Microgrid</b>: A dual-bus three phase 400V system consisting of generation, storage and load elements. It can operate in parallel with the local grid or as an islanded system (33 kVA diesel generator, Ocean Energy Converter Emulator, 5 kWh lithium ion battery storage).</p> <p><b>Wave watch Flume</b> (15 m x 0.75 m x 0.75 m deep): A glass sided flume equipped with 2 hinged force feedback paddles capable of a peak wave generation condition of <math>H_s = 0.16</math> m, <math>T_p = 1.4</math> s and <math>H_{max} = 0.32</math> m, making it suitable for circa. 1/50 scale, unidirectional wave conditions. It is fitted at the other end with a variable depth floor to provide easy adjustment of the bathymetry for stability testing of coastal structures. Also used to provide students with an introduction to tank testing, wave observation as well as initial device concept development.</p> <p><b>Medium Speed Rotary Emulator</b> Rated values 22 kW, 1,500 rpm, max speed 3,000 rpm This scaled rotational test rig is used for generator type selection, control strategy design and optimisation. The flexible design facilitates islanded, direct and indirect connection to the grid from different types of generators. Hardware in the Loop (HIL) functionality is achieved with a Speedgoat system. Flexible system control options are available, from simple fixed speed or torque modes to more complex hardware in the loop modelling modes.</p> <p><b>High Speed Rotary Emulator</b> Rated values 11 kW, 9,000 rpm Consists of a permanent magnet machine with resolver feedback directly coupled to an induction machine with encoder feedback. Various electrical control options are available with the Vacon and Parker drive panels, both with full regenerative capability and Ethernet connectivity, as well as the HBM torque sensor. A Sorrensen 10 kW dc power supply allows flexibility of power flows.</p> <p><b>Linear Test Rig</b> Rated values, 20 kW, 15 kN, 0.9 m/s, 1.8 m/s<sup>2</sup>, stroke length 0.9 m</p>		

This ¼ scale linear electromechanical test rig has been built to emulate the linear motion induced by the waves. The system is controlled using an industrial standard PLC and HMI, to ensure safety of equipment and personnel.

**Rotary PTO test rig**

Rated values 15 kW, 1,000 rpm

Consists of a standard 6 pole, 15 kW machine operated from a universal variable speed ac Emerson UniDrive. The rotary PTO test rig, together with components of the microgrid, provides generator testing options to developers for their initial scaled test device, at various speeds and load profiles.

**Photos of ocean basins**



**Detailed characteristics** (carriages, wave/current/wind generators, instrumentations, etc.)

**Open Ocean Emulator** (25m x 18m x 1m deep): Equipped with wave generating paddles on two sides, able to generate secondary waves.

**Deep Ocean Basin** (35m x 12m x 3m deep): It has a moveable floor plate to allow the water depth to be adjusted, making it suitable for circa. 1/15th scale operational conditions and 1/50th scale survival waves.

**Wave and current flume** (28m x 3m x 1m deep): It has 8 hinged force feedback paddles and three thrusters for generating current speeds of greater than 1 m/s and it is fitted with a towing carriage that can operate at speeds up to 1.5 m/s.

**Applications** (Tests performed)

Reputed for our contributions to wave, tidal and offshore wind energy development. We are also known for our work with floating structures, offshore structures, coastal engineering including breakwaters and harbours, hydrodynamics, scour, vessels and offshore logistics.

**Published description** (Publications on this facility)

Lir NOTF consists of state of the art wave tanks and electrical rigs that allow for scaled testing in a controlled environment.

The state of the art facilities comprise a 2,600 m<sup>2</sup> tank hall which houses 4 different wave tanks. These include a new deep ocean wave basin (circa 1:15 scale testing) and capable of producing waves of up to 1.2 metres high, an ocean wave basin (circa 1:50 scale testing), a wave and current flume with coastal/tidal testing capabilities (circa 1:50 scale testing) and a wave demonstration flume.