

The large-scale CIEM wave flume of the Maritime Engineering Laboratory (LIM) at the Catalonia University of Technology (UPC) is an exceptional research infrastructure (both in the EU and world-wide) for controlled hydraulic experiments in coastal, harbour and oceanographic engineering, as well as in other fields such as aquaculture and wave-energy installations.



From the year 1993 that the flume was created many national and international projects have been carried out in this facility. Since 1997 The CIEM flume has been recognized as a "Large Scale Facility" by the DG Research of the European Commission (EU). Since 2006 The CIEM flume has been recognized as a "Singular Installation for Science and Technology" by the Spanish Ministry of Science and Education.

LOCATION



CIEM - LIM/UPC

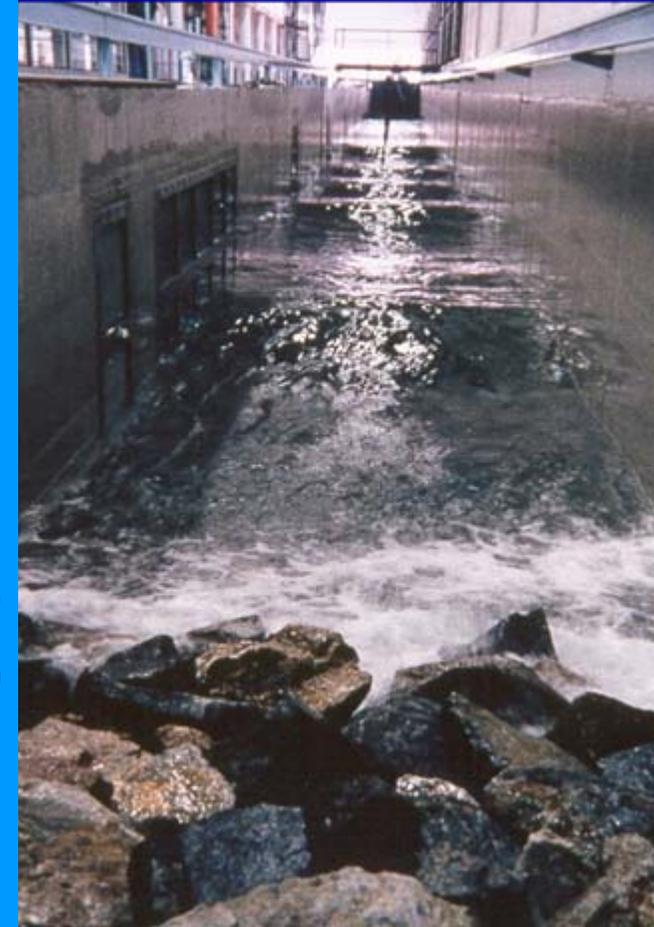
Canal d'Investigació i Experimentació Marítima
Laboratori d'Enginyeria Marítima (LIM/UPC)

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DIMENSIONS

With 100 m length, 3 m width and up to 7 m depth inside the current generation system wells, the **CIEM** flume is an excellent tool for scaled tests and analyses close to reality (Nature). The usual working scales are between 1:2 and 1:20, but it is possible to work also at other scales. The larger scale ratios allow a reduction of scale effects inherent to all scaled experiments.



Windows and an optical test section along the flume (based on the clear water provided by its filtering/pumping system) offers a unique capability for non-intrusive optical observations for a wide range of experimental arrangements close to real scale.

WAVE – CURRENTS GENERATION

The combined and controlled waves and current generation is accomplished by a wedge type wave generator, particularly suitable for generating waves in intermediate water conditions, and a bidirectional pumping system with a capacity of 2000l / s. The system is hydraulically actuated and PC-controlled. It is capable of reproducing waves with heights up to 1.6 m.



The control software allows the generation of regular and irregular waves (parametric or user-defined spectra, as well as actually measured time series). Additionally a PC-based active absorption system, allows running tests for wave series as long as required without the effect of spurious model-induced reflections. This is an essential feature for testing highly-reflective structures (such as surface-piercing structures) or for the analysis of equilibrium shapes in beach profiles (particularly for accretive sequences).

MAIN USES

The generated waves can be used to study the influence of sea and swell over beach profiles and coastal defense structures. The tests allow the assessment of projects or the quest and improvement of innovative solutions for a given problem. The current generation allows the study of the interaction with the wave and sediment, as well as experimenting with submersible vehicles, energy devices, etc..



Some usual applications are :

- Structural stability and functional-hydrodynamic analyses (run-up, run-down, overtopping, reflection and transmission).
- Beach profile morphodynamics.
- Wave beach structure interactions (scouring, fluxes through and above the structure, modified profile morphodynamics).
- Floating structures such as fish cages, floating breakwaters, buoys, energy extracting devices ...

