LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL

TESTING and METROLOGY

UEHM

Maritime Hydraulics Experimental Laboratory

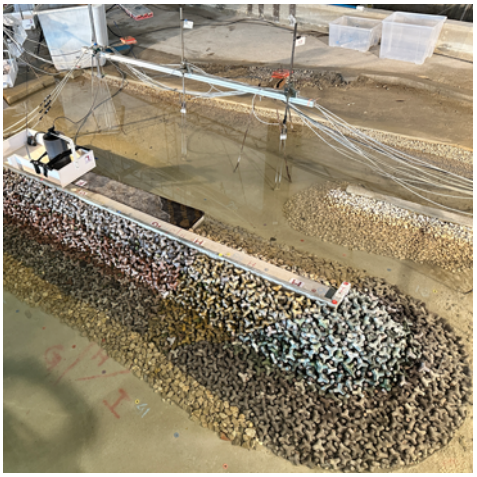
HYDRAULICS AND ENVIRONMENT DEPARTMENT

Av. do Brasil 101 • 1700-066 Lisboa • PORTUGAL
tel. (+351) 21 844 30 00 lnec@lnec.pt

www.lnec.pt

Scope

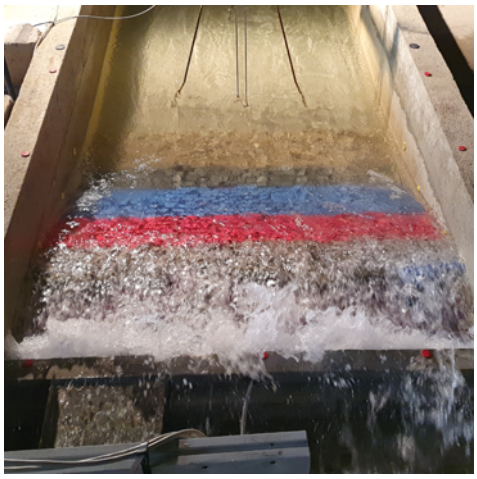
The Maritime Hydraulics Experimental Unit (UEHM) is integrated in the Ports and Maritime Structures Unit, of the Hydraulics and Environment Department of LNEC and it operates in the Maritime Hydraulics testing hall, with an area of 6500Ç m^2, where two-dimensional and three-dimensional scale model tests are conducted using wave flumes and wave tanks, respectively.



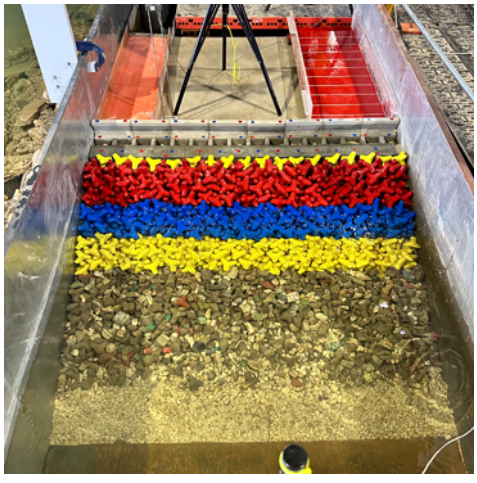
Its scope of action is focused in areas of great economic and social importance, such as the support for port design and management. This covers areas of study such as maritime wave action, wave-structure interaction, navigation and moored ship behavior, risk in maritime infrastructures and port management. The UEHM list of clients includes national and international port entities, designers and consultants.

Field of expertise

UEHM conducts experimental activities in the fields of port engineering and maritime infrastructures, namely it supports the design, safety and operation of maritime works (e.g. breakwaters, coastal defense structures, submarine outfalls, artificial reefs, wave energy devices) in the maritime, port and coastal areas.



At UEHM, tests are conducted on physical scale models of agitation, currents and resonance for port and coastal zones, stability and overtopping of maritime works and evaluation of wave pressure on structures. Tests are also carried out to study the morphodynamics of coastal areas.



In addition to the above-mentioned tests, usually carried out within the scope of commissioned studies, the UEHM conducts important research tests for studies of:

- Wave propagation under extreme conditions, including climate change scenarios
- Wave-structure interaction
- Alternative coastal protection solutions (nature-based solutions)
- Aquaculture nets and cage solutions
- Evaluation of the performance of wave energy devices
- Ship behaviour in harbour approaches and when moored
- Calibration of numerical models

UEHM is also in charge of several programs for the systematic observation of maritime works (OSOM[+]).

Highlights

Throughout its seven decades of existence, LNEC/NPE has carried out studies in almost all Portuguese ports (Mainland and Autonomous Regions), in other national relevant structures (for example, at the protection of the Forte do Bugio) and also international structures, as the maritime protection of the Macau International Airport landfill (PRC), the Porto Amboim breakwater (Angola) and the requalification studies of Porto Inglês (Cabo Verde). Recently, important studies are the physical scale model of the extension of the breakwater of the port Lajes das Flores (Flores Island, Azores), the new protection works of the port of São Roque do Pico (Pico Island, Azores) and the expansion of the multipurpose quay, at the port of Praia da Vitória (Terceira Island, Azores). In these studies, the use of novel procedures to better monitor the damage evolution on the structures has been of particular interest, namely procedures for three-dimensional surveys of the armor layer envelope, using photogrammetric techniques.

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