

## Description

In port areas it is necessary to guarantee in the internal basin such conditions of seawater agitation that allow port operations and docking and mooring of vessels. The multi-reflection and resonance within the port basin can multiply the energy of the incident waves in several times, preventing the accomplishment of the required operating conditions. The problem then arises and the wave energy corresponding to the mentioned phenomena has to be absorbed or attenuated in order the energy is not amplified inside the port and the required operational levels can be fulfilled. This problem of commercial ports of commercial ports can also be extended to small and recreational ports, as well as navigation channels that can suffer from problems similar to those described, adding the effect that reflection can cause to navigation conditions.

## Objectives and improvements

The main objective of the MUCAR project is to study and design a new system to reduce the reflection of waves in the classic caisson docks, as well as to evaluate the influence on the stability and overflows of the structures, and to develop the necessary structural modifications in the current caisson machine of Cyes Maritime Works, to be able to put them into practice. This is the development of an innovative technique in the field of anti-reflective caissons that represents an important advance in the construction process of this type of port structure in terms of greater effectiveness.

## Results

A new technology was developed for the design of caissons, to provide them anti-reflective properties and adapt them to the maritime construction means available at Cyes Maritime Works. The technology was validated at small scale (1:35) tests that were carried out by Universidad

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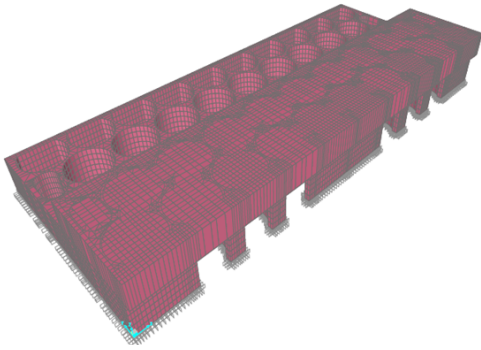


Figure 1: 3D multicircuit caisson model

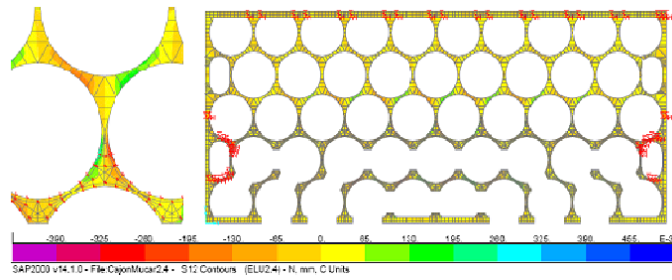


Figure 2: Model of load resistant system in multicircuit caisson



Figure 3: Small scale test

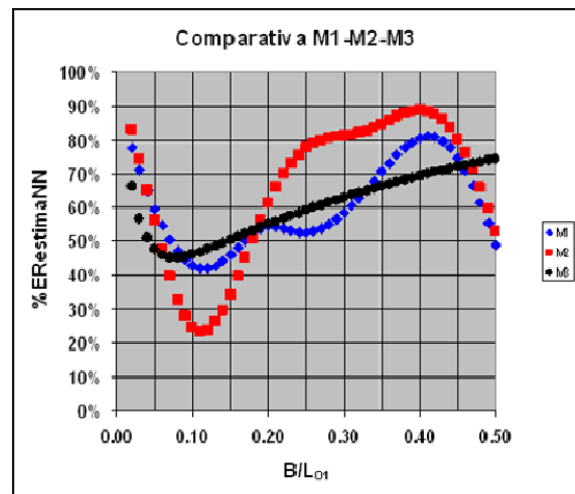


Figure 4: Test results