HORMIPORTS

R+d+i

Description

In recent years concrete technology has evolved intensively, towards materials whose properties are far from traditional concrete, achieving products that offer a global improvement in terms of performance not only related to resistance, but ductility, durability or aesthetics.
Fiber reinforced concrete (FRC) has been used for some years in specific applications and is regulated by standards included in Spanish Concrete Intructions (EHE).
FRCs are defined as those concretes that include in their composition short fibers, discrete and randomly distributed in its mass.
The approach of the project is based on the analysis of mixtures of concrete with metallic and polymeric fibers proper for port infrastructures. Metallic fibers can provide structural improvements and polymeric fibers spalling resistance. In specific application, metallic and polymeric fibers can replace steel reinforcements completely.

For the development of the project, the recommendations of Committee ACI 544 have been followed. For this purpose, several cases for port applications have been studied, modeling the the performance with large pilot specimens and comparing the results to tests in real conditions.

Objectives and improvements

Main objective of the project is the development of the design and experimental validation of singular concrete caissons for maritime works, such as anti-reflective chamber caissons (CMW's NOWAVES patent) or caissons to support railway infrastructure in ports.

An improved anti-reflective caisson has been developed, especially in the ability to inhibit crakcs and improve the impact resistance or dynamic load, in addition to improving the spalling.

Results

A complete model of anti-reflective caisson has been developed based on FRC. It meets all the technical and functional requirements expected during its service life. The model has been validated by means of several tests that have been carried out on large scale pilot specimens out in collaboration with Universidad Politécnica de Valencia. A summary of the results that have been achieved are the following:

- Anti-reflective caisson design criteria have been defined, so that it can withstand the stresses during the construction phase and its service life in different environmental situations, considering hydrodynamic criteria, especially anti-reflective capacity, dimensions criteria and construction feasibility criteria.
- It has been designed a dosage of FRC for marine environment, which meets the functional requirements of the product as well as those needed for existing systems for caissons manufacturing.
- Representative structural elements have been manufactured and tested in different conditions to verify the previously calculated performance.

ROVER MARITIME

Proyecto R+D certified according to standard UNE166001:

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
Una manera de hacer Europa

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GENERALITAT VALENCIANA

IVACE

CERTIFICA I+D

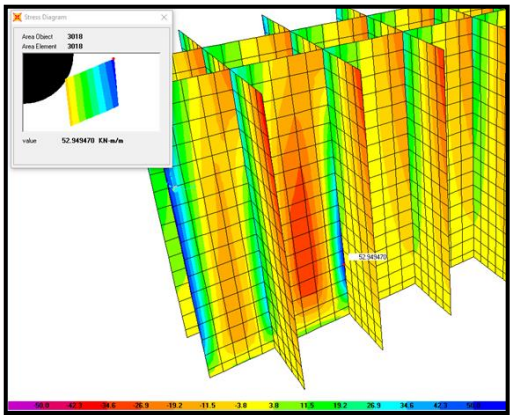

Image 1: Calculation model

Image 2: Pilot manufacturing

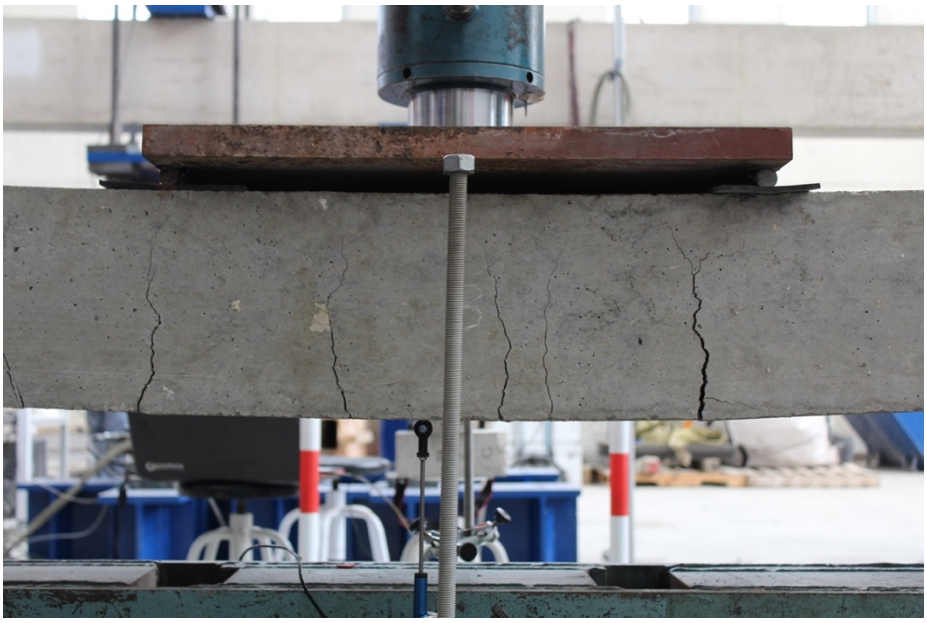

Image 3: Mechanical resistance test

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