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Contact: Dr. Mar¨ªa Clavero
mclavero@ugr.es
34-958-241-000-31154
Universidad de Granada

Spanish engineers design a new model of slope marine dock

It prevents docks from breaking in the face of heavy swell

This release is available in Spanish.

Marine docks construction has traditionally encountered problems derived from swell-produced breking, especially in the event of great storms. The economic spending to repair the damage is very high and it affects ports, promenades or beaches. The most recent case in Spain was the storm of March 2008, which caused considerable material damage in the coasts of the Bay of Biscay.

A new design will permit to build slope marine docks with less risk of damage, in order to reduce the costs of construction, maintenance and upkeep of such maritime structures.

"We have designated this new structure 'S", says María Clavero Gilabert, a member of the Group of Dynamics of Environmental Flows in the Andalusian Centre for Environmetal Studies (CEAMA-University of Granada, Spain), supervised by Dr. Miguel Losada Rodríguez.

This study "is focused on the optimization of the typology of slope marine docks in order to lessen their main damage, the extraction of pieces from the external layer (loss...
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According to the researcher, this study "is focused on the optimization of the typology of slope marine docks in order to lessen their main damage, the extraction of pieces from the external layer (loss of the blocks which Project the dock against swell).

At present, these structures have been designed in such a way that there may be serious damage in case swell grows stronger than that predicted in the design. Thanks to the results of this work, it is possible to design slope docks which remain absolutely steady up to the design swell and, in case of stronger swell, it i sable to adapt and therefore they do not suffer this problem". It is possible for docks to reduce swell energy without breaking, with the consequent benefit for the areas to be protected.

Swell Canal

The research work to improve maritime structures has been developed from the tests carried out in the Swell Canal of the CEAMA. It was necessary to "construct slope docks to scale with homogeneous pieces of concrete cubes and carry out tests with incident swells and growing waves, so that the dock became distorted until a balance or stable profile for such wave height was reached", says María Clavero.

The Swell-Current Canal of the CEAMA, which allows to carry out experiments on a large scale, is one of the most important in Spain; it is 23 metres long, cashiers are one meter high and it is 0.65 metres wide. This "laboratory" has been used quite often and allows to carry out the tests of the research groups specialized in Mechanics of Structures and Hydraulic Engineering. Such tests have been applied to research and technological development agreements with the port authorities of Gijón, the Bay of Cadiz, Almería-Motril, the State Coastal Office of the Spanish Ministry of the Environment, companies such as Consultoría Ibérica de Estudios e Ingeniería S.A, Dragados S.A. or EGMASA, etc.

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The study by Clavero Gilabert has been funded by the Spanish Ministry of Education and Science and has been carried out in the last five years. Different papers in International conferences have been fruit of this research; one might mention the 29th and 30th International Conference on Coastal Engineering held in Lisbon -2004- and San Diego -2006-, respectively).