

Title: Current status, forecasting and impact of the overtopping in the main infrastructure of the Catalan coast due to a change of mean sea level.

Author: José Vicente Saura Ferreres

Supervisors: Francesc Xavier Gironella i Cobos y Agustín Sánchez Arcilla

Keywords: Catalan coast, ports, overtopping, climate change, mean sea level.

ABSTRACT

Harbours are centers which promote great economic activity and create thousands of jobs thanks to their activities, linked to the trade, the industry and the leisure time. They are infrastructures which develop logistic and harbour operations related to the maritime transport and its interconnection with other means of transport. Therefore, they are of great importance in the economic, local and autonomic, sector.

The Catalan coast stands out due to the large number of harbours which receive, directly, the wave forces coming from the off-shore. In each and every case, the jetties aim is to prevent an excessive overtopping which would cause their ineffectiveness or breakdowns in their infrastructures.

In the harbours design process, one of the most important parameters to avoid the overtopping is the crown height of the levees, which may be reduced due to the climatic change. The forecast for 2050 is the increase of the sea level of about +0.20 meters, while in 2010 it is foreseen to increase +0.50 m, even though the most pessimistic forecasts foresee an increase of +1.00 meter in a hundred years [1]. After the previous forecasts, it is for sure that the overtopping will suffer great modifications regarding the current values.

The evidence of the climatic change is the reason which makes people become conscious of the need of undertaking actions to adapt the infrastructures to its effect in advance. Thereafter, it is of great relevance to analyze all the infrastructures which were calculated for a specific sea level and dynamic conditions which will be modified in the horizon of their useful life.

Consequently, this Thesis is developed with the idea of doing a sensibility analysis of the harbours infrastructure in most of the Catalan ports, susceptible to the increase in the average sea level. Although the analysis of the adaption strategies in the harbours sector would also require a detailed study for each and every harbour because of their local parameters, the labor of this Thesis is to draw up an alarm map which allows to highlight those ports in which urgent works will be necessary.