

METHODOLOGY FOR THE CONTROL OF BEACH NOURISHMENT IN THE GULF OF CADIZ (SW SPAIN)

A.Herrera¹, G. Gomez-Pina², L.Fages² & J.J. Muñoz-Pérez¹

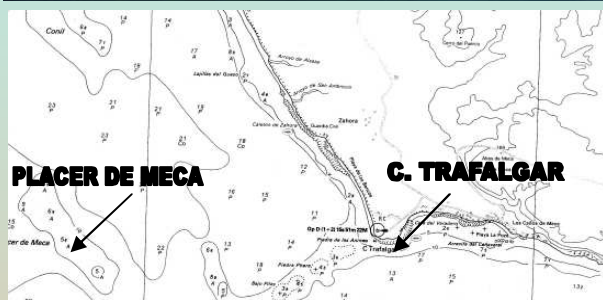
¹Applied Physics Dpt, University of Cadiz, CASEM, 11510 Puerto Real, Spain.

juanjose.munoz@uca.es

²Coastal Dpt, Ministry of Environment, Marianista Cubillo, 7 11071 Cadiz, Spain

ggomez@mma.es

INTRODUCTION



Victoria is a 3 Km long beach located in the Gulf of Cadiz, facing the Atlantic Ocean, on the SW coast of Spain, near the Strait of Gibraltar. A renourishment project of 2.10⁶m³ took place in spring 1991. A monitoring based on topo-bathymetric levellings was performed till nowadays. An average erosion rate of about 50.000 m³ per year was found and a new 280.000 m³ nourishment was poured on summer 2004.

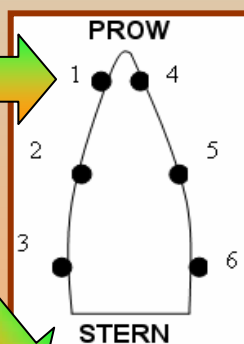
Placer de Meca, an underwater sand deposit in the surroundings of the Cape of Trafalgar and at a distance of 25 nautical miles, was chosen as the borrow site. The trailing suction dredger, the Atlantida I, has a hopper capacity of 1.597 m³. The dredged sediments, (mostly silicyclastic origin) consisted primarily of fine sands (D₅₀=0,34 mm).

CONTROL METHODOLOGY

Although a portable meter system for dry weight control in dredging hoppers was already developed (muñoz-Pérez et al., 2003), up to the present, human supervision is still required until some type of protection measures can be put into affect for the maintenance of the device against involuntary manoeuvres caused by unauthorised personnel.



figure 1: technician over the sand accumulated in the hopper.



So, distance between deck and sand surface are measured at the end of each loading phase by the representatives of contractor and government respectively in order to calculate the sand volume by using vessel ullage chart.



Figure 2: Atlantida I. The dredge used during the beach nourishment

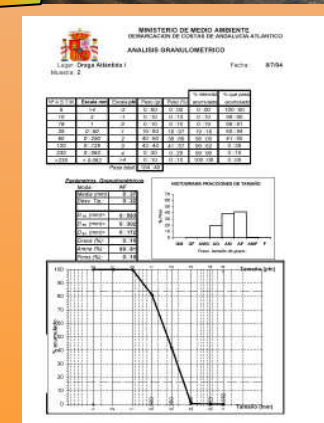


Figure 3 Safety measures at the beach consisted on fences, informative signs and private guards.

There was also an archaeologist on board and another one prospecting at the beach. The borrow site, "Placer de Meca" is close to the place where the famous naval battle of Trafalgar took place, and that is the reason why an archaeologist control was necessary.



As the controlling technician was a sea science bachelor, she was charged as well with the environmental tasks, e.g. to identify, weigh and number the fishes trapped into the hopper.



Granulometries were performed to guarantee a minimum D₅₀ and be able to apply the graphics of James (Shore Protection Manual, 1984).

The position of the ship was determined by DGPS and recorded to be sure that the limits of the extraction zone were never crossed while dredging.

REFERENCES:

Muñoz-Pérez, J.J.; Gutierrez-Mas, J.M.; Moreno, J.; Español, L.; Moreno, L. and A. Bernabeu (2003). "Portable meter system for dry weight control in dredging hoppers". JWPC&OE 129(2): 79-85
 Muñoz-Pérez, J.J.; Lopez de San Roman, B.; Gutierrez-Mas, J.M.; Moreno, L. and G. Cuenca (2001). "Cost of beach maintenance in the Gula of Cadiz (SW Spain)". Coastal Engineering 42: 143-153.