

NEARSHORE MORPHODYNAMIC OF DRAINED BEACHES

Leonardo Damiani¹, Antonio F. Petrillo¹, Alessandra Saponieri²

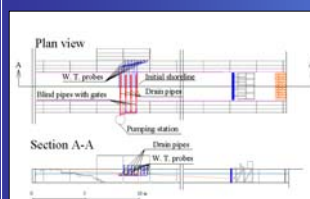
(1) Full Professor, Technical University of Bari, Italy - l.damiani@poliba.it;

(2) PhD student, University of Calabria, Cosenza, Italy - asaponieri@dds.unical.it

SUMMARY AND AIMS

The poster deals with a morphological study on a beach equipped by a Beach Dewatering System (BDS). BDS is able to modify beach hydrodynamics by lowering the water table and thus increasing beach infiltration capability; the modified hydrodynamic condition influences cross shore sediment transport and should stabilize the beach. The experimental results shown in this paper were obtained in a physical 2D model performed at Laboratory of Coastal Engineering in Bari, Italy.

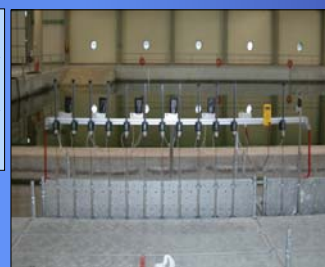
EXPERIMENTAL SET UP - 2D MODEL - COASTAL ENGINEERING LABORATORY (LIC) – TECHNICAL UNIVERSITY OF BARI



Physical model (1:10)



The drain system consists in 4 holed pipes at different distance from the shoreline. Each drain can work independently from the others.



The mean water level was measured by means of a battery of piezometers, connected with gauges close to drain pipes and located along the emerged beach profile.

TEST	Hs [m]	Tp [s]	H/L	H/wT
1	0.05	1.51	0.0140	1.299
2	0.10	1.90	0.0160	1.861
3	0.15	1.90	0.0267	3.101
4	0.20	1.90	0.0356	4.134
5	0.25	1.90	0.0445	5.168

Test program



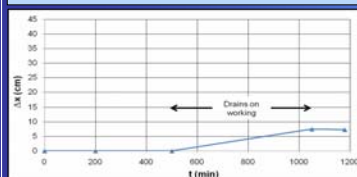
The wave height was measured by wave gauges, installed along the channel



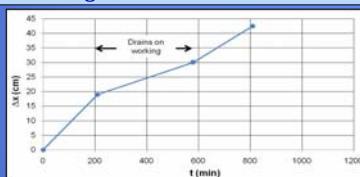
After each cycle of wave attacks submerged and emerged longitudinal beach profiles, have been measured by a profiler

MORPHODYNAMIC EFFECTS – TEST RESULTS

Shoreline retreating



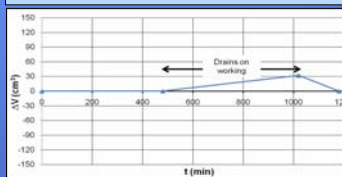
Nourishing wave attack



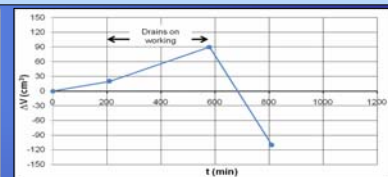
Erosive wave attack

No drain effects has been observed during nourishing wave attacks for which shoreline seems to be quite stable. During high energy wave attacks the shoreline retreating is more remarkable than the previous one; a lower shoreline back drawing velocity is remarked, as the slide reduction of the line slope shows. However the drainage effects on the shoreline position is not particularly evident.

Sediment volume



Nourishing wave attack



Erosive wave attack

Graphs show the positive effect of the drainage system, producing a noticeable build up of sediments on the emerged beach; when the drains are switched off, all sand is removed and wave attack resume its natural trend.

SOME CONCLUSIONS

Morphological investigation shows the effectiveness of drains in the sand volume growing onshore and small effects on the shoreline position; hydrodynamic results, not discussed in this paper, confirm the good BDS response. All obtained results confirm that the model characteristics, first of all the sand permeability, assure drain effectiveness, even if these results could be affected by scale effects, which create some doubts on quantitative analysis. For this reason new tests were performed at FZK Large Channel (Hannover, Germany)