EXPERIMENTAL ANALYSIS OF THE WATER TABLE OF A BEACH EQUIPPED WITH A DRAINAGE SYSTEM

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The results of the experiments carried out on a two-dimensional physical model (in a Froude scale 1:10) of a beach equipped with a drainage system are shown in this paper. The study has been carried out to investigate thoroughly some aspects emerged from previous tests. The problem concerns the system efficiency when there are wave runs having different characteristics and beach profile changes. The experimental facilities, fully described in a previous paper (Chiaia et al., 2004) , are made up of four drains arranged in parallel with the shoreline and at different intervals from it. The W.T. monitoring system, which was originally made up of 8 piezometers put upstream and downstream from each drain, has been considerably improved by inserting 8 more pressure probes and an electronic system of level reading. The new experimental configuration has allowed to get some useful information on the hydraulics of the draining pipes. The experiments have been carried out by using 5 different wave runs (see table 1), characterized by JONSWAP energy spectra, representative of summer (nourishment) and winter (erosive) sea states (Darlymple, 1992). T

The figures 1 and 2 report some features of the W.T. measured during the tests with and without the drainage system.

The depression ratio, previously introduced (Chiaia et al., 2004), is a good factor in evaluating the drainage system.

It has been proved that the most significant W.T. depressions occur with low energy wave runs, while, when the wave runs are erosive, the system doesn't always succeed in dewatering the beach above sea-level.

The value of the depression ratio is not sufficient to determine the system efficiency, which depends on the drained flow rate, too.

The results of the tests confirm the chance to set up several parallel drains which work at the same time thus guaranteeing a considerable improvement in the efficiency.

Table 1. Wave run characteristics

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

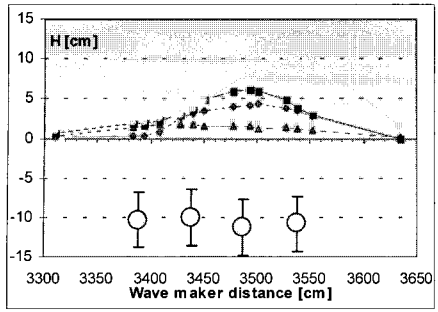

Fig. 1 The W.T. without drainage

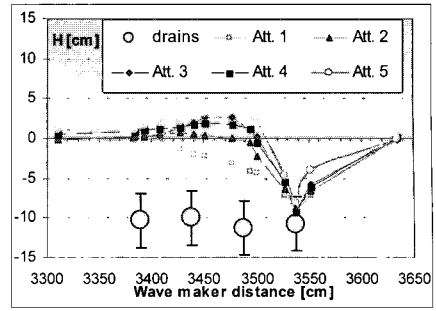

Fig. 2 The W.T. with drainage

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