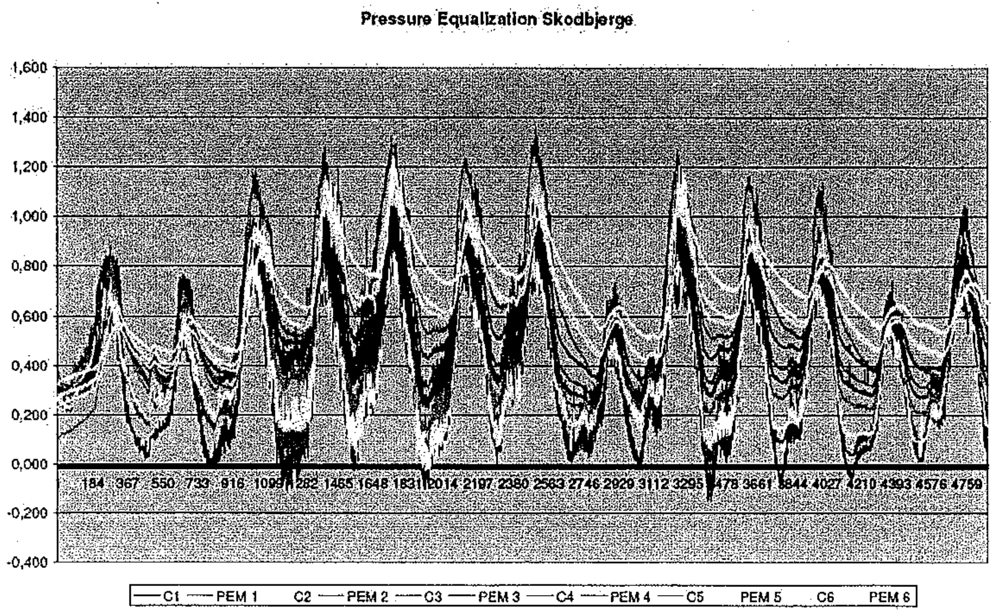

fig. 5

Based on the physical effects of the PEM tubes on the beach described above a separate test was made with water level sensors (Diver), to determine the effect of PEM on the water table in the beach. The test was carried out in the northern part of the Skodbjerge test area in control area 1.

Figure 6.20: Time variation in the whole row of tubes and outside the tubes

Appendix 3 presents the gross-behaviour of the beach, i.e. the dampening of the tidal wave as function of the distance from the coastline as sketched in figure 6.11c.
There was a change in the mean Water Sea Level of 35 cm from the first week to the second, due to changes in the weather conditions. That means that the groundwater flow in the second week incorporated an additional 35 cm thick layer of the beach in its flow domain.
The analysis of the dampening shows that the dampening characteristics of the beach was the same before and after the implementation of the PEM-tubes, which demonstrates that the PEM-system has no significant drainage effect. The inclusion of the 35 cm layer of beach has not changed the characteristics as well, which demonstrates how uniform the composition of the beach actually is.

6.8: The near tube morphology.

It has been claimed by SIC, that due to drainage, accumulation will start to take place. An example provided by SIC is shown in figure 6.21, where a small salient is observed in the neighbourhood of some tubes. However it is just downdrift of other coastal structures (groins), so the morphological behaviour here is a little bit difficult to interpret.

We have observed no individual salients in front of each row in the present test. The coast line passes the individual rows without any local changes in width, and it has

The PEM modules create a groin that catches long shore sand transport.

Figure 6.21: Observed accumulation of sand in front of a row of tubes at Skagen.

been like that from the very beginning of the tests. It has puzzled us a lot, since this should be expected, - at least in the initial state.
SIC has suggested two explanations:

- There is an interaction between the initial salients which merge to one bigger coherent structure
- The increased flow velocity in the beach will remove the finer fractions and form "washed sand". This washing will spread to all sand in the beach because of the down drift of the sand, so the tubes all the times has access to new sand.

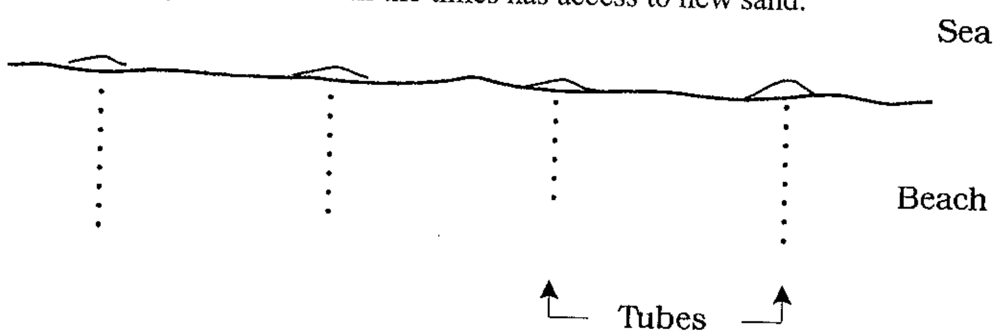

Figure 6.22: No individual salient are observed in front of the tubes just after installation.

If this is true it is still difficult to follow why it is so from the very beginning. The merging of the salient cannot occur before the individual salient has reached a certain size, maybe like the one shown in figure 6.21. And with regards to the washed sand, it certainly must take a long period of time (Years!) before all the fines have been washed away.
Also in Appendix 1, figure 2, an example is shown in which pumping provokes the drainage. In this case a very clear development of a local salient is seen, which demonstrates that such one actually should emerge if draining really took place.