

HYDRAULIC DESIGN OF COASTAL STRUCTURES: INVENTING THE WORLD ON A SMALL SCALE

Willems Marc

Flanders Hydraulics Research (Waterbouwkundig Laboratorium), Authorities of Flanders,
Mobility and Public Works Department, Berchemlei 115, 2140 Antwerpen-Borgerhout, Belgium
E-mail: Marc.Willems@mow.vlaanderen.be

The hydraulic design of coastal structures is a complex task. Physical models are employed as design tools in almost all major coastal engineering projects. Design physical models have the goal of attempting to predict prototype behaviour by reproducing as good as possible all the features and forces of an actual prototype situation (e.g. breakwater stability, wave penetration in harbours).

Physical models can also be used to study a physical process in detail in order to develop new understanding about the physics (e.g. flow or wave forces on piles).

Besides, physical models are applied to verify or extend numerical models. These validation models may not resemble anything in the real world because often they are idealized and simplified to minimize scale effects and to provide a test case that more closely fits the assumptions of numerical models (e.g. rectangular harbour with perfectly reflecting vertical side walls).

In the oral presentation the different goals and types of physical models will be presented. Advantages, disadvantages and complementary design tools (field measurements and numerical models) will be discussed briefly. A number of photos of physical models and videos of model tests will illustrate the possibilities of physical modelling.

References

Hughes S. 1993. Physical models and laboratory techniques in coastal engineering. Advanced series on ocean engineering 7. 568p.