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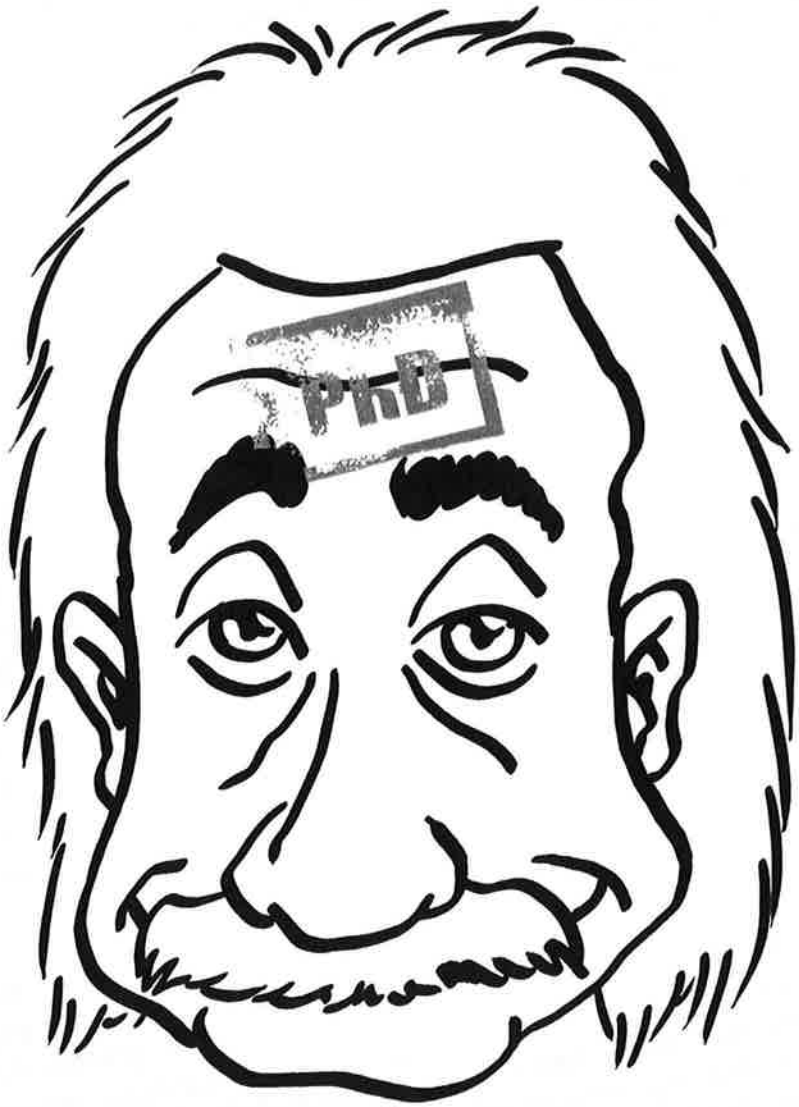

"The true sign of intelligence is not knowledge, but imagination"

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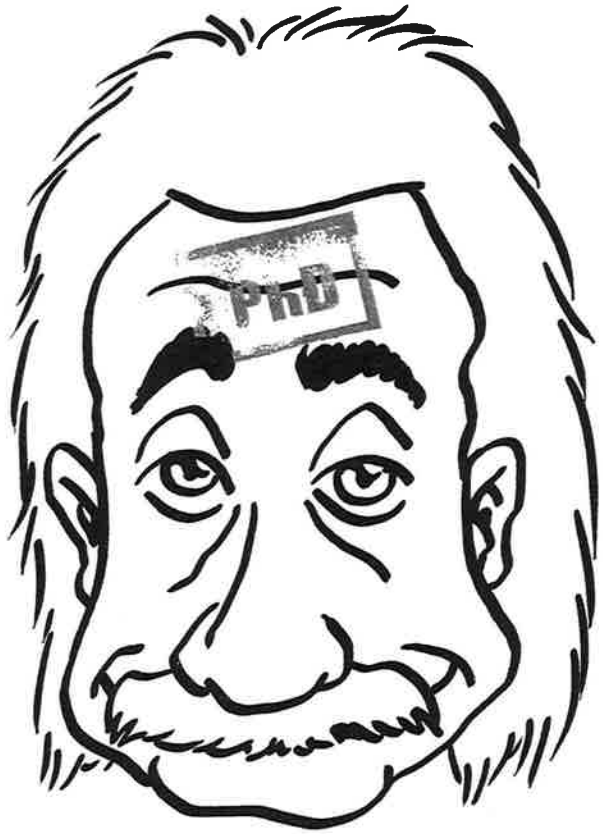

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Breaking Wave Impacts on Coastal Structures with Cantilever Surfaces

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Supervisor(s): Peter Troch, Philippe Van Bogaert

I. Introduction

Vertical breakwaters and sea walls are frequently used structures to protect ports from sea actions. Therefore, controlling overtopping of the waves at the top of the vertical breakwaters is a critical issue for the ship safety. This is why engineers tend to provide the vertical breakwaters with a return crown wall or even a completely horizontal cantilever slab. However, wave impacts on the horizontal part give rise to a significant uplifting force. These forces cannot be substituted by a static equivalent. Thereby, a detailed description of the space and time distribution of the wave impacts becomes imperative (Kisacik et al., 2010).

The main objective of the present research is to bring a new design tool to assess violent water wave impacts on a vertical wall. In this particular research, small scale model tests were carried out to fulfill the goals.

II. Methodology

Physical model tests are carried out in the wave flume (30 m x 1 m x 1.2 m) of Ghent University, on a scale of 1/20 (fig. 1). The physical model is instrumented with 10 pressure sensors to register wave impact pressures and related forces both on the vertical and horizontal parts. Nine wave gauges have been installed for active wave absorption, wave reflection and breaking wave height near the structure, respectively.

In the model tests, the wave period, wave height and water depth are considered as variable input parameters.

Figure 1. Small-scale model set up.

III. Conclusion

The scaled model has been tested under the test scheme. A parametric analysis of measured forces and pressures both on the vertical and horizontal part of the scaled model is conducted.

IV. Acknowledgements

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References

[1] Kisacik, D.; Van Bogaert, P.; Troch, P. (2010) "*Experimental results of breaking wave impact on a vertical wall with an overhanging horizontal cantilever slab*" 32nd Int. Conf. on Coastal Eng., Shanghai

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