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HYDRAULIC PERFORMANCE OF COASTAL AND HARBOUR STRUCTURES.

by

U. G. Thushari Thilakarathne

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Research supervised

by

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ABSTRACT

The main focus of the research study is the development of an analytical model for the prediction of reflection and transmission coefficients of porous vertical structures of both the open and close (absorber) types. Having developed governing equations for the different flow regions, appropriate boundary conditions and other justified simplifications have to be adopted in order to develop a solution.

The input data for the model are the incident wave characteristics and the properties of the porous media. The wave climate is identified by its height, the wave period and still water depth. The porous structure it self is characterized by its length, overall porosity and the flow coefficients in the Forchcheimer equation ($I = au + bu^2$). The model was verified with results obtained from hydraulic model investigations conducted previously.

This study incorporates a literature review and presents the results of hydraulic performances especially on wave reflection and transmission characteristics of a wide range of structures varying from vertical, homogeneous sloping, multi layered sloping and berm configurations.

Hydraulic model test can provide reliable method to quantify many of the wave structure response functions for sea walls and breakwaters. But fewer experiments have been carried out of these structures in Sri Lanka especially on berm structures. Therefore a detailed hydraulic model investigation (1:20) relating to the hydraulic performances of berm breakwater with berm width of 6m was done as a part of this study. It was tested in Lanka Hydraulic Institute (LHI), Katubedda, Moratuwa. The results are compared with a model investigation done on a berm structure with the berm width of 12m at a scale of 1:20 (also tested in Lanka Hydraulic Institute in 1999).

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My heartfelt gratitude goes to my parents, my husband and my husband's parents for the encouragement given and standing by me throughout.

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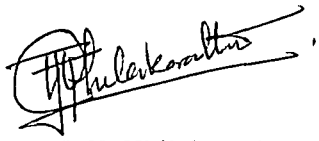
DECLARATION

This thesis is a report of research carried out in the Department of Civil Engineering, University of Moratuwa, between Febuary 2002 and December 2003. Expect where references are made to other work, the contents of this thesis are original and have been carried out by the undersigned. The work has not been submitted in part or whole to any other university. This thesis contains 150 pages.



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