MODEL TESTS ON WAVE TRANSMISSIN COEFFICENT FOR RUBBLE MOUND STRUCTURES WITH SUPERSTRUCTURES

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INTRODUCTION

The coastal structures, such as breakwaters, are constructed to provide the calm basin for ships and to protect the harbor facilities. The adequate design and the evaluation of design parameters are indispensable. The determination of crest height of coastal structures is one of the most important design process among all procedures. The allowable wave overtopping, the relative crest height (R_c/H_s) and the wave transmission could be applied to design the crest height of structures.

The previous studies on the wave transmission coefficients were mainly conducted about the low crested structures. The previous design method could not cover the conventional breakwaters with superstructures. In this study, the wave transmission coefficient for rubble mound structures with superstructures would be investigated with hydraulic model tests.

MODEL TESTS

The experiments were conducted in 2-D wave flume in Korea Institute of Civil Engineering and Building Technology (KICT). The wave flume is 50 m long and 1.2 m wide. The irregular waves with Bretschneider-Mitsuyasu spectrum was applied to the tests. The schematic sketch of test model and dimensions could be found in Figure 1. The main armor units covered on rubble mound structures were tetrapods. The width of superstructure (B), the number of row of tetrapods in front of the superstructure (W) and the freeboards (R_c) were changed and these effects were analyzed qualitatively.

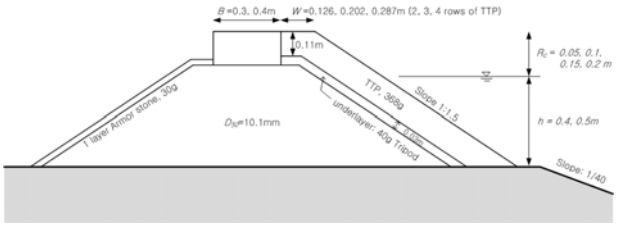

Figure 1 - Schematic sketch of rubble mound structures

TEST RESULTS

The transmitted waves through the rubble mound and overtopped waves were measured. The transmission coefficients were calculated as the ratio between the incident waves and transmitted waves. The results were compared with the previous results (Seelig, 1980; van der Meer, 1990; Melito and Melby, 2002).

Figure 2 is the results of wave transmission coefficients for rubble mound structures and the results were compared with other results. The previous studies were mainly focused on the low crested structures, and the superstructures were not installed. It could be known that the trend and pattern of wave transmission coefficient for R_c/H_s is similar with other results. And the superstructures have the important role to reduce the wave transmission coefficients.

The effect of wave periods on wave transmission would be analyzed with wave steepness. And the effect of number of rows of tetrapods would also analyzed with linear function. The analysis method is similar with Melito and Melby (2002).

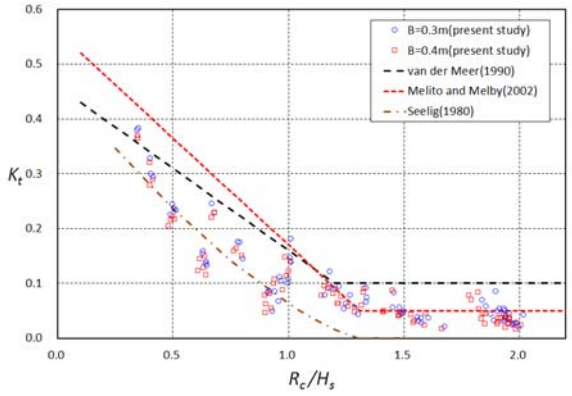

Figure 2 - Test results for transmission coefficient and comparison with previous results : the effect of width of superstructure (B)

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