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التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Experimental Study of Wave Overtopping on Seawalls

A Thesis submitted in partial fulfillment of the requirements of the degree of Master of Science in Civil Engineering
Irrigation & Hydraulics [2020]

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Statement

This thesis is submitted to the Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University in the partial fulfillment of the requirements for the Degree of Master in Civil Engineering.

The work in this thesis was carried out in the hydraulic laboratory of Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University from September 2016 to September 2019.

No part of this thesis has been submitted for a degree or a qualification at any other university or institution.

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Abstract

Wave overtopping is a key process in coastal environment. The assessment of the wave overtopping rates is an important aspect in the design of different coastal structures, such as seawalls. It was found that increasing the roughness of the seawall slope has significant impact on reducing the wave overtopping rates due to its energy dissipation effect. This study presents the study of modeling wave overtopping using experimentally to investigate the effect of energy dissipators on reducing wave overtopping discharge for sloped seawall 2H:1V with an inherent or artificially added degree of roughness. Experimental tests were conducted in the wave flume at the Hydraulic laboratory of Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University. Different models were tested under various wave and water depth conditions to examine the efficiency of the two types of energy dissipation measures (submerged breakwater &two-layers of riprap); increasing the roughness of the seawall slope and construct a submerged breakwater in front of the wall. Only non-breaking waves are investigated. The tested models include a smooth seawall, a smooth seawall with submerged breakwater in front of it at variable distance and a rough seawall with two-layers of riprap and varying the stones height. The impact of the proposed energy dissipation measures was quantified by comparing the obtained results to known wave overtopping estimation formulae in literature where no such measures were adopted and accordingly the reduction factors for these measures were deduced.

Keywords: seawalls, wave overtopping, wave energy dissipation, experimental modelling.

Table of Contents

Researcher data ..... **IV**

Statement ..... **V**

Acknowledgement ..... **VI**

Abstract ..... **VII**

List of Tables ..... **XI**

List of Figures ..... **XII**

List of symbols ..... **XVIII**

CHAPTER -1: Introduction **1**

1.1 Problem definition 1

1.2 Study objective 4

1.3 Research Methodology 5

1.4 Thesis outline 6

CHAPTER-2: Literature Review **7**

2.1 Background 7

2.2 Literature Study on Physical Modelling 9

2.3 Influence of Relevant Parameters 10

2.3.1 Wave height H_{m0} 10

2.3.2 Wave period T_m 11

2.3.3 Wave steepness $s_{m-1,0}$ 11

2.3.4 Breaker Parameter $\xi_{m-1,0}$ 12

2.3.5 Slope α 15

2.3.6 Crest freeboard 15

2.3.7 Permeability, porosity and roughness 16
2.3.8 Bullnose or wave return wall 17
2.4 Wave Overtopping on Sloped Seawall 18
2.4.1 Wave overtopping discharge 18
2.4.2 Overtopping Prediction Overview 22
2.5 Previous research 32
2.6 Gaps in the Literature Review 47
CHAPTER-3: Experimental setup 48
3.1 Model setup 48
3.2 Wave flume 50
3.2.1 Wave Generation Equipment 50
3.3 Measurement Devices 52
3.3.1 Wave gauge 52
3.3.2 Printing graphs 54
3.3.3 Overtopping measurement 55
3.4 Test Setup 55
CHAPTER-4: Data analysis and discussion 61
4.1 Smooth seawall 61
4.1.1 Effect of wave period 62
4.1.2 Effect of Relative wave height 63
4.1.3 Comparison with pervious prediction formula 66
4.2 Smooth seawall with submerged breakwater. 71
4.2.1 Effect of submerged breakwater 71

4.2.2 Comparison with smooth seawall 74

4.2.3 Calculation of Reduction Influence Factor $\boldsymbol{\gamma BR}$ 79

4.3 Rough seawall 85

4.3.1 Effect of slope roughness 85

4.3.2 Calculation of Roughness Influence Factor $\boldsymbol{\gamma f}$ 90

CHAPTER-5: Conclusion and Recommendations 97

5.1 Conclusions 98

5.2 Recommendations 101

References 102

Tables of Experimental Rustles 106

List of Tables

Table 2-1 Critical overtopping discharges and volumes (Allsop et al, 2005) [8] 21

Table 2-2 Values of the coefficients a and b in Equation 2.3 for straight smooth slopes 24

Table 2-3 Adjustment factor for wave conditions of low steepness 25

Table 2-4 Adjustment factor for wave conditions of low steepness 27

Table 2-5 Values for roughness reduction factor, γf, Besley (1999) and TAW (2002a) 28

Table 2-6 Values for roughness reduction factor, γf, for permeable structures (Pearson et al, 2004) 29

Table 2-7 Coefficients *A* and *B* and R^2 using new relationship derived in this study. [16] 40

Table 3-1 Hydraulic boundary conditions of the test setups 56

List of Figures

Figure 1-1 Rate of increase of global Mean Sea Level (Source: NASA) [2]. 3

Figure 1-2 Wave flooding due the sea level rise at Alexandria coastline, 2010 [3]. 4

Figure 2-1: Overtopping discharge damage on vertical wall. [5] 8

Figure 2-2: Overtopping discharge damage on sloped seawall. [6] 8

Figure 2-3: Type of breaking on a slope. [5] 13

Figure 2-4: Spilling waves on a beach; $\xi m-1,0< 0.2$. [5] 14

Figure 2-5: Plunging waves; $\xi m-1,0< 2.0$. [5] 14

Figure 2-6: Free board on slope seawall. [5] 16

Figure 2-7: Free board on slope seawall Effective fairly significant bullnose at Cascais, Portugal. Waves are breaking on the foreshore and give impulsive wave conditions. [5] 18

Figure 2-8 Example of wave overtopping measurements, showing the random behavior. [5] 20

Figure 2-9 Comparison between EurOtop 2007 and EurOtop 2016 general prediction formulae (Illustration from: EurOtop Manual (2016). [5] 31

Figure 2-10 Typical beach profile in Belgium (left) causing danger during storms (right). [14] 34

Figure 2-11 smooth dike with vertical wall (left) smooth dike with parapet (right). [14] 34

Figure 2-12 All data plotted in the dimensionless semi logarithmic diagram, where □v and □par are included on the abscissa. [14] 34

Figure 2-13 Flow chart describe use of □v and □par depends on the (dimensionless) height of the vertical wall or parapet hwall/RC. [14] 35