AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
IRRIGATION AND HYDRAULICS DEPARTMENT

WAVE ENERGY DISSIPATION BY USING FLOATING BREAKWATER

BY
Ghada Mahmoud Sami Ali Ezeizah
B.Sc. Civil Engnieer 1991 - Ain Shams University

A Thesis
Submitted in Partial Fulfilment
for the Requirements of the Degree of
MASTER OF SCIENCE
IN CIVIL ENGINEERING

Supervised by

Prof. Dr. Abd El. Fattah El-Fiky
Prof. of Hydraulics, Harbor Engineering
and Inland Navigation
Ain Shams University

Prof. Dr. Abd El. Mohsen El-Mongy
Prof. of Harbor Engineering
and Inland Navigation
Ain Shams University

Dr. Ali Mohamed Talaat
Assoc. Prof.
Irrigation and Hydraulics Dept.
Ain Shams University

Dr. Mahmoud Sami Abd El-Salam
Assis. Prof.
Irrigation and Hydraulics Dept.
Ain Shams University

Cairo, Egypt
1994

EXAMINERS COMMITTEE

Signature

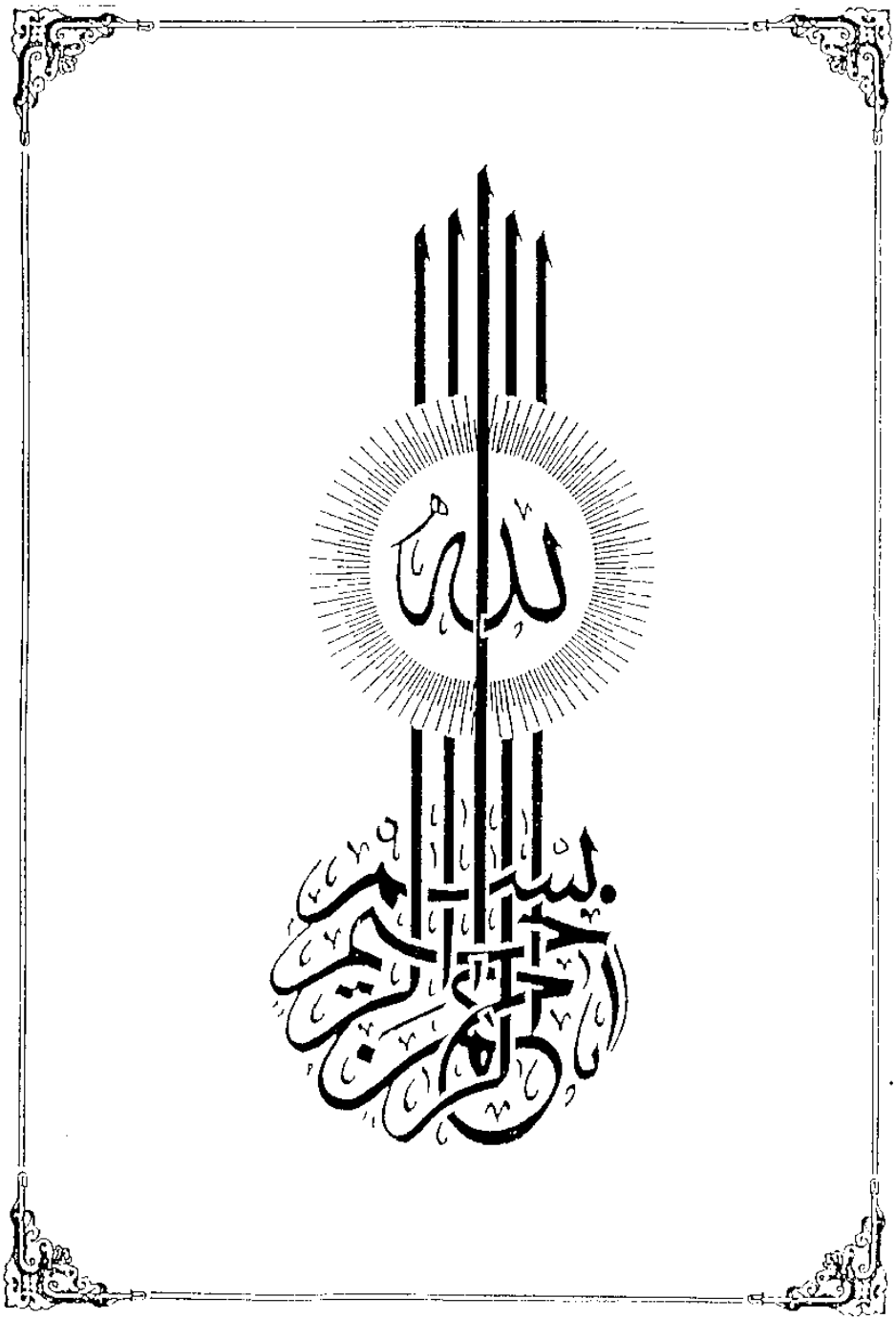
1. Prof. Dr. Soud Mostafa Al- khafif
Part-time professor
Water Research Center
Ministry of Puplic Works & Water Resources

2. Prof. Dr. Mohamed Ibrahim Balah
Prof. of Harbor Engineering and Inland Navigation
Faculty of Engineering
Suez Canal University

3. Prof. Dr. Abd El-Fattah El-Fiky
Prof. of Hydraulics,
Harbor Engineering and Inland Navigation
Hydraulics Department, Faculty of Engineering
Ain Shams University

4. Prof. Dr. Abd El-Mohsen El-Mongy
Prof. of Harbor Engineering and Inland Navigation
Hydraulics Department, Faculty of Engineering
Ain Shams University

Date: 18/5/1994



STATEMENT

This disseration is submitted to Ain Shams University for the degree of master of Science in Civil Engineering.

The work included in this thesis was carried out in the department of Irrigation and Hydraulics, Ain Shams University from December 1991 to May 1994.

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

Date: 15/5/1994

Signature: Ghada

Name:

Ghada Mahmoud Sami Ali Ezeizah

VITA

Name	:	**Ghada Mahmoud Sami Ali Ezeizah**
Date of Birth	:	January 24th, 1970
Place of Birth	:	Cairo
Scientific Degree	:	B. Sc. in Civil Engineering
		Irrigation and Hydraulics
Graduated from	:	Ain Shams University,
		Faculty of Engineering
Date of Graduation:		June 1991
Current Job	:	Demonstrator at Ain Shams University
		Irrigation & Hydraulics Department

Name: Ghada Mahmoud Sami Ali Ezeizah

Date: 15/5/19

Signature: Ghada

Dedication

To my parents: my beloved mother and my dearest father, without whose love, encouragement and prayers I could not have continued with this study.

To my husband, Eng. Ahmed Soltan, without his help, advice, and encouragement this work would not have been possible.

ACKNOWLEDGEMENT

I wish to express my deep gratitude to ***Prof. Dr. Abd El-Fattah El-Fiky,*** *Professor of Hydraulics, Harbor Engineering, and Inland Navigation for his kind supervision and useful suggestions since the start of the work.*

I am deeply indepted to ***Prof. Dr. Abd El-Mohsen El-Mongy,*** *professor of Harbor Engineering and Inland Navigation, for his constant supervision, planning, generous support and constructive criticism throughout this work.*

Special thanks and gratitude to ***Dr. Ali Mohamed Talaat,*** *Associate professor, Irrigation and Hydraulics Department for his invaluable support, help and encouragement.*

Grateful thanks to ***Dr. Mahmoud Sami Abd El-Salam,*** *Assistant professor, Irrigation and Hydraulics Department for his concern, high efforts, and constructive directions.*

I wish also to extend my thanks to all technical staff of Irrigation and Hydraulics laboratory, Faculty of Engineering, Ain Shams University, for their help and cooperation during the experimental investigation.

I am also deeply grateful to ***my father Eng. Mahmoud Sami Ezeizah,*** *for his help and encouragement since the start of the work.*

CHAPTER III

EXPERIMENTAL WORK

Summary

WAVE ENERGY DISSIPATION BY USING FLOATING BREAKWATER

The study presents a two dimensional hydraulic model investigation for the box type floating breakwater behavior. The thesis is devoted to the following main objectives:

- Study the effect of the floating breakwater characteristics on the amount of dissipated, transmitted, and reflected energy from the breakwater.

- Comparison between the efficiency of four different breakwaters in cross sectional shape (Rectangular, Trapezoidal, Inverted Trapezoidal, and Thin Inverted Trapezoidal) in order to show the effect of the different parameters of shape on the breakwater behavior.

- Comparison between two immersing systems (Immersion by Tension, and Immersion by Weights) on the breakwater efficiency.

The thesis consists of five chapters and is arranged as follows:

Chapter 1: Introduction

This chapter contains a general introduction to the research, and describes scope and objectives of the study.

Chapter 2: Literature Review

This chapter discusses the concept and historical background of the different types of breakwaters. The characteristics, advantages, and disadvantages of each type are also discussed. A detailed investigation of floating breakwater is presented.

Chapter 3: Modeling and Experimental work

This chapter discusses the experimental phase of this study. It presents a summarized discussion of the modeling approach and the experimental procedure. It also includes a description of the experiment apparatus components and its calibration process.

Chapter 4: Results and Analysis

This chapter presents a parametric analysis of the experimental results. It also contains linearly regressed empirical equations, curves relating the different variables and technical comments on these curves.

Chapter 5: Comments, Conclusions, and Results

This chapter presents a classification of the possible errors and their sources. It also presents the conclusions revealed by the study containing the effect of relative draft, shape parameters, and method of immersion on the amount of dissipated, transmitted, and reflected energy of waves. Recommendations for future researches are also introduced.

Appendices

Consist of references and tables of measuring and calculated quantities.

TABLES OF CONTENTS

Page

CHAPTER IV

RESULTS AND ANALYSIS

LIST OF TABLES

LIST OF FIGURES