Ain Shams University

Faculty of Engineering

Irrigation & Hydraulics Department

EFFECT OF SKEWNESS ON SCOUR AROUND ARTIFICIAL SPUR DIKES

A Thesis Submitted in Partial Fulfillment of the Master Degree

Civil Engineering – Irrigation and Hydraulics (2005)

By

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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 of Science.

The work in this thesis was carried out in the Irrigation and Hydraulics Department, Faculty of Engineering, Ain Shams University from January 2002 to July 2005.

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

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Acknowledgment

I would like to express my deepest gratitude to Prof. Dr. ING. Sameh D. Armanious, Professor of Irrigation & Drainage, Irrigation & Hydraulics Dept., Faculty of Engineering, Ain Shams University for his continuous guidance, expert advice and valuable suggestions that greatly enriched this work. I am deeply grateful to the kindness of Dr. Yehia K. Abdel-Monim, Associate Professor, Ain Shams University, for his continuous generous and sincere contributions to this work. I am much obliged to Dr. Yasser M. Sadek, Assistant Professor, Ain Shams University, for his keen support, sincere help and valuable efforts throughout this study.

It is also a pleasure to express my sincere thanks to the staff of the Hydraulics laboratory, Ain Shams University, for their kind help and cooperation.

Last but not least, I would like to thank my whole family for their patience and their sincere help in finishing this work.

Approval Sheet

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2005

صفحة الموافقة على الرسالة

تأثير درجة الميل على النحر حول الرءوس الصناعية

رسالة مقدمة من

المهندس/ سليمان رجب محمد

بكالوريوس الهندسة المدنية (1998)

للحصول على

درجة الماجستير

فى الهندسة المدنية – رى وهيدروليكا (2005)

وقد تمت مناقشة الرسالة والموافقة عليها

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ABSTRACT

Local scour around spur dike results in scour hole around the spur. This causes the depth of footing to decrease leading to structure failure in the end. This laboratory experimental study examines the effects of time and flow parameters on the scour hole dimensions. The dimensions under study are the maximum scour depth, the length of the scour hole, and the scoured volume. The study concentrates on the effect of the angle of skewness on the scour parameters. It was found that the relative maximum depth of scour increase with the increase of the angle of skewness till it reaches 90^{o} then decreases with its increase. The relative length of scour and the relative volume of scour were found to be increased with the increase of the angle of skewness.

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List of Symbols

Symbol	Description	Dimension
AS	Angle of Skewness	----------------
C_i	Coefficient	----------------
D	Maximum Depth of Scour	L
D_{50}	Mean Sediment Diameter	L
F	Froude Number	----------------
g	Gravitational Acceleration	LT^{-2}
Q	Discharge	L^3T^{-1}
R_n	Reynold's Number	----------------
t	Time	T
t_o	Characteristic Time	T
U	Average Velocity of Flow	LT^{-1}
V	Volume of Scour	L^3
y	Flow Depth	L
γ_s	Sediment Submerged Weight	$ML^{-2}T^{-2}$
ν	Fluid Kinematic Viscosity	ML^{-2}
ρ	Fluid Mass Density.	ML^{-3}
ρ_s	Sediment Mass Density.	ML^{-3}

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