

UNIVERSITI TEKNOLOGI MARA

**EFFECTS OF FLOW AND
SEDIMENT DISCHARGE ON LOCAL
SCOUR AROUND CYLINDRICAL
PIER AT CHANNEL BEND**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Civil Engineering

January 2016

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 14th December 2015 to conduct the final examination of Mohd Fais bin Mohd Noor on his Master of Civil Engineering thesis entitled “Effects of Flow and Sediment Discharge on Local Scour around Cylindrical Pier at Channel Bend” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

Local scour around bridge piers has been explored extensively in the laboratory. There are many parameters that affect the magnitude of local scour depth at piers such as velocity of the approach flow, depth of flow, width of pier, size and gradation of bed material and others. Therefore, this study aims to establish the relationship between the effects of flow and sediment discharge on local scour around cylindrical pier at channel bend. Large physical scale of channel bend was constructed with total area of 6 m width x 7 m length with a 2.25 m radius of curvature (R), 0.9 m channel width (W), radius over width (R/W) ration of 2.5 and 180 degree of bend angle together with relocatable radial measuring equipment to measure local scour depth. The model was filled with 200 mm thick layer of sand with $D_{50} = 0.84$ mm. A total of 12 sets of experiments using different flow and sediment matrix and flow without sediment released were carried out. Four scour estimation equations has been selected for evaluation. They are Shen *et al.* (1969), Coleman (1971), Hancu (1971) and Ab. Ghani and Nalluri (b) (1996). From analysis Hancu (1971) yields the best results with 98 percent accuracy followed by the new modified Ab. Ghani and Nalluri (b) equation with 77 percent accuracy. Hancu had used y/b and Fr as the predictors for rate of local scour while Ab. Ghani and Nalluri (b) had use y/b , b/d and $\left(\frac{q}{by\sqrt{gy}}\right)$ as their predictors for rate of local scour.

TABLE OF CONTENT

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
LIST OF PLATES	xiv
LIST OF EQUATIONS	xv
LIST OF SYMBOLS	xvi
LIST OF ABBREVIATIONS	xvii
CHAPTER ONE: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objectives of the Research	3
1.4 Scope of Works and Limitation	3
1.5 Significance of Study	4
CHAPTER TWO: LITERATURE REVIEW	
2.1 Introduction	5
2.2 Concept of River Morphology	5
2.2.1 The Formations of the River Bend	6
2.2.2 Meandering Channel	7
2.2.3 The Evolution of Bend Geometry-Established Facts	9
2.3 Classification of Streams	10
2.3.1 Topography Resulting from Stream Deposition	12
2.4 Sediment Transport around Channel Bend	13
2.4.1 Types of Erosion	14