

INVESTIGATION ON EFFECTIVENESS OF DIFFERENT BINDER IN GEOCOMPOSITE

By

SAYANI BINTI KHORIM

Report is submitted as
The requirement for the degree of
Bachelor Engineering (Hons) (Civil)

**UNIVERSITI TEKNOLOGI MARA
NOVEMBER 2006**

ACKNOWLEDGEMENT

I would like to express my appreciation to individual that has been helping me in preparing my research proposal especially to Ms. Chow Shiao Huey as supervisor and mentor in guiding me through the research.

My father, mother who had been by side all this time and the source of my will

Lastly, I would like to thanks to all member parties that has been helping me to complete this research

Thank you.

TABLE OF CONTENTS

CHAPTER	PAGE
ACKNOWLEDGEMENT	ii
TABLE OF CONTENT	iii
LIST OF FIGURES	vi
LIST OF TABLES	viii
LIST OF APPENDICES	ix
ABSTRACT	x
1.0 INTRODUCTION	1
1.1 Research Background	1
1.2 Objective of Research	2
1.3 Scope of Work	3
1.4 Significance of Research	3
2.0 LITERATURE REVIEW	4
2.1 Introduction	4
2.2 Existing Geocomposite Applications in Civil Engineering	4
2.3 Reported Studies on Shredded Tire Geocomposite	7
2.3.1 Summary of Reported Laboratory / Material	
Test on Scrap Tire Geocomposite	9
2.3.2 Summary of Reported Model Test on Scrap Tire	
Geocomposite	10
2.3.3 Summary of Reported Field Test on Scrap Tire	
Geocomposite	11
2.3.4 Application in Civil Engineering	12

2.3.5 Summary	19
2.4 Binder in Scrap Tire Geocomposite	20
2.4.1 Overview of Binder Application	20
2.4.2 Binder Application in Scrap Tire Geocomposite	23
2.5 Critical Summary	27
3.0 METHODOLOGY	28
3.1 Introduction	28
3.2 Materials Used	29
3.2.1 Shredded Scrap Tire	29
3.2.2 Ordinary Portland Cements (OPC)	29
3.2.3 Rice Husk Ash (RHA)	30
3.3 Mix Design and Sample Preparation	31
3.3.1 Control on Casting of Test Specimens	32
3.3.2 Control on Water - Cement Ratio	33
3.4 Permeability Laboratory Testing	34
3.4.1 Particle Size Distribution Test	34
3.4.2 Density Bottle Method (BS 1377:1975, Test 6(B))	36
3.4.3 Laboratory California Bearing Ratio Test	38
4.0 RESULT AND ANALYSIS	41
4.1 Introduction	41
4.2 Preliminary laboratory Test Results and Interpretation	41
4.2.1 Sieve Analysis	41
4.2.2 Specific Gravity	42
4.2.3 Bulk Density	43

ABSTRACT

This study investigates the California Bearing Ratio (CBR) characteristic of shredded tire geocomposite and the effectiveness of different types of binders (Ordinary Portland Cement, OPC and Rice Hush Ash, RHA) in shredded tire geocomposite. This project began with intensive literature review followed by mix design. Three preliminary tests namely particle size distribution test, specific gravity test and bulk densities test were then conducted to characterize the shredded tire. The main scope of this study is laboratory CBR test. A total of five CBR test series were conducted to investigate the effect of curing day, repeatability of test specimen, effect of soaking and non soaking, effect of cement content and effect of RHA content. To ensure the consistency of the test results, standardization and control was enforced on casting process and water-cement ratio. The CBR test results revealed that higher curing day and cement content increase the CBR of shredded tire geocomposite. On the contrary, a higher RHA content will reduce the CBR of the geocomposite. Higher CBR is also observed for non-soaking curing condition. In conclusion, this study has identified Ordinary Portland Cement (OPC) as a suitable binder to form shredded tire geocomposite.