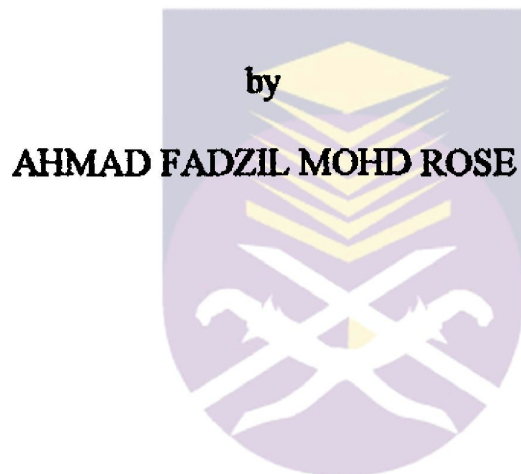


LEACHATE PERMEABILITY OF COMPACTED SOIL BARRIER



**A Report Submitted to the School of Civil Engineering
in Partial Fulfillment of the Requirement for the award
of a degree in Bachelor of Engineering (Honours) (Civil)**

May 1997

ACKNOWLEDGEMENT

Praises to Allah Almighty for giving the author the desired strength to complete this project. First the author would like to record his deep appreciation and heart felt thanks to Prof.Ir.Haron Ismail and Pn.Badariah for their help, enthusiasm and encouragement that leads to completion of this project . Their invaluable assistance and constructive criticism offered have resulted in the successful completion of this project successfully.

The author also extends his gratitude and thanks to all the staff of Civil Engineering Laboratory for providing the necessary and invaluable assistance during the course of the experimental works.

Finally , my sincere thanks to my beloved mother and father for their love and support ,to my colleagues and for their tireless effort in helping me completing this project.

AHMAD FADZIL BIN MOHD ROSE

MAY 1997

TABLE OF CONTENT

TITLE	PAGE
ACKNOWLEDGEMENT	i
TABLE OF CONTENT	ii
LIST OF NOTATIONS	iv
LIST OF TABLES	v
LIST OF FIGURES	vi
ABSTRACT	xi
CHAPTER ONE : INTRODUCTION	
1.1 Problem statement.....	1
1.2 Objective Of Study.....	8
1.3 Scope Of Study.....	9
CHAPTER TWO : LITERATURE REVIEW	
2.1 Formation And Composition Of Leachate.....	11
2.2 Leachate Generation.....	13
2.3 Estimation Of Leachate Volume.....	14
2.4 Contaminants On Leachate Permeability.....	15
2.5 Chemical Contaminants Permeability.....	19
2.6 Water Permeability.....	21
CHAPTER THREE : EXPERIMENTAL PROGRAM	
3.1 Soil Description.....	24
3.2 Test Equipment And Procedure.....	25
3.2.1 Compaction Procedure For Both Test.....	26
3.2.2 Water/Chemical Permeameter.....	27

ABSTRACT

Landfill represents the permanent or semi permanent burial of solid, liquid and or semisolid. The migration of both original waste components or decomposed by product such as leachate or gaseous emission must be contained within the landfill or manageable abstracted and destabilised. The primary parameter that influences the contaminant of waste is the permeability of the 'engineered soil barrier(soil)'.

This study , therefore investigate the parameter that effect leachate permeability of engineered soil barrier. The compacted soil barrier examines in this laboratory investigation are : silt of high plasticity (MH) and clay of low plasticity (CL).The soils were compacted at different energy level , and different moisture content. A falling head permeameter were used to measure both water and leachate permeability of the soil.

The following conclusions can be made leachate permeability, k_c for compacted cohesive soil :

- noticed from the experimental studies , the maximum permeability occurs of the optimum water content, and
- permeability is largely depends on the concentration of leaching solution.

1.0 INTRODUCTION

A typical secure landfill configuration with compact soil barrier (liner) can be seen in Figure 1.1. The function of the impermeable base and sides is to prevent the escape of leachate or liquids wastes. For 'engineered' soil barriers the fundamentals' question that need be addressed is : What soil type should be used? What is the material physical properties that controlled its effectiveness?

1.1 Problem Statement.

The containment of the various types of leachate in landfill situations is certainly an important problem that needs to be addressed today. The function of the engineered soil barrier is to minimise potential migration of waste material. One of the most important factor that decide on the suitability of the landfills is permeability .

Though considerable work have been done to study water and air permeability of compacted soil liner in the sanitary landfills, but very few studies have been done on the leachate permeability of compacted soil. Soil textures and permeability are the major factors affecting the movement of waste constituents through soils [Brady , 1977].