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CIVIL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

THE RELATIONSHIP BETWEEN THE  
MOISTURE CONTENT, THE DENSITY  
AND THE STRENGTH OF SOILS

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**THE RELATIONSHIP BETWEEN THE  
MOISTURE CONTENT, THE DENSITY  
AND THE STRENGTH OF SOILS**

(Experimental)

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and

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WITH LOVE TO OUR FAMILIES AND FRIENDS

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## SUMMARY

This project was undertaken, in order to determine the relationship between the moisture content, the dry density and the strength of soils.

To achieve that the California Bearing Ratio (CBR) test and the Proctor test were carried out.

For the experimental study a cohesionless soil was used.

The project is divided into five chapters:

The first chapter gives an account on the soil stabilization and mentions the properties of soil.

The second deals with mechanical stabilization and densification.

The third chapter refers to CBR test, more specified. And also talks about measurement of soils.

The fourth chapter is an experimental study in order to examine the influence of dry density and moisture content of a soil on its strength.

Finally, the conclusions are that the water content is increased, the CBR is decreased and when the dry density is increased the CBR is increased, too.

## INTRODUCTION

In previous ages, no design procedure was considered important because the traffic of those times was not much and therefore the pavements constructed were considered to give satisfactory results.

The use of asphalt pavement structures for streets, highways, airports and other purposes, has increased quite rapidly during the past three decades and especially after the Second World War.

It was very important for engineers to develop methods for properly designing of the above structures.

The objective of those pavement design procedures was to provide structures that will be suitable in a specific environment and be able to sustain the anticipated traffic loading. For this reason, it is of great importance to achieve good compaction. The densities achieved by compaction are invariably expressed as dry densities. The moisture content at which maximum dry density is obtained for a given amount of compaction is known as the optimum moisture content.

Two methods were used in the project to determine the soil strength in relationship with the moisture content and dry density of soils. These methods are: the Proctor test ("Heavy" compaction test) and the CBR test (California Bearing Ratio).