HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

AGGREGATES IN HIGHWAY CONSTRUCTION

Michalis Triftarides

C/1065

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AGGREGATES IN HIGHWAY CONSTRUCTION

by

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Project report

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Aknowledgments

We would like to express our thanks to our families and our Tutors who supported us all these years during our attendance to the Institute.

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HIGHER TECHNICAL INSTITUTE

NICOSIA - CYPRUS

CIVIL ENGINEERING DEPARTMENT

Academic Year 2008/2009

Diploma Project Number: C/ 1065

Title: Aggregates in Highway Construction.

Objectives:

1. To give an account on the origin and types of rocks and discuss the relation of aggregate properties with their geological history.
2. To write an account on the various sources of aggregates and the methods by which these are obtained.
3. To give a short discussion on the required properties of aggregates used in highway construction and give a critical analysis of the various methods used to assess these properties.
4. To carry out a survey and report the specification requirements of aggregates used in highway construction in Cyprus and abroad.

Terms and Conditions:

1. Standards and Specifications for aggregates include the Cyprus, British and American ones.

Students: Triftarides Michael

Supervisor: Mr I. Economides.

SUMMARY

AGGREGATES IN HIGHWAY CONSTRUCTION, Michalis Triftarides

The scope of this project is to give a general information about aggregates which are used in highway road construction, giving emphasis to their characteristics and properties and also pointing their engineering significance.

The first section of the project is the Introduction. It describes the desirable characteristics of ideal aggregates for the construction of flexible pavement.
The second section describes the geological and petrological characteristics of aggregates.
The third section describes the main operations in the production process, quarrying operations, crushing operations and screening operations.
The fourth section considers the tests and procedures used to describe or evaluate the physical mechanical and· chemical properties for aggregates.
The fifth section describes the desirable properties of aggregates used in unbound pavements. Also macadam bases and specifications are given.
The sixth section describes the desirable properties and influences of aggregates used in Bituminous bound construction materials. Also the types of bituminous surfacing are pointed out.

1.0. INTRODUCTION

Aggregates constitute the basic material of highway pavement construction. They support the main stresses occurring within the pavement and in addition the aggregates in the direct weathering effects of natural elements.

Flexible pavements are normally made of several distinct layers superimposed on the subgrade. The lowest of these layers is the subbase above which are laid the roodbase and the surface course. The surface course it self consists of a basecource and wearing course.

The roadbase is normally the thickest and the most important element of the flexible pavement, where the stress-carrying capacity is a factor of primary importance. Roodbase materials range from unbound soils and aggregates to chemically stabilized soil, to cement bitumen-bound materials.

The surface cource is the uppermost layer of a flexible pavement. The highway materials used in surface cource can vary from loose mixtures of soil and gravel to the very highest quality bituminous mixtures.

The aggregate is the most importance element of a flexible pavement. One definition of an aggregate is that it is a material such as broken stone slag, gravel or sand which when held together by a binding agent forms a substantial part of such materials as concrete asphalt and coated macadams.

Aggregate particles posses a series of physical and chemical properties which together with grading determine the suitability of the aggregate for an engineering application.

The ideal aggregates for flexible pavement should have the following characteristics:

- Strength and toughness
- Ability to crush into chunky particles free from flakes, slivers and pieces that are unduly, thin and elongated
- Low porosity
- Hydrophobic characteristics
- A particle size and gradation appropriate to the type of construction