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THE CONSTRUCTION OF A STRENGTH CURVE
FOR A LIMESTONE AGGREGATE

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**THE CONSTRUCTION OF A STRENGTH CURVE FOR A
LIMESTONE AGGREGATE**

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PROJECT REPORT

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SUMMARY

The aim of this diploma project was to create a strength curve for a limestone aggregate. This is separated in two main parts: the theoretical and experimental. The former specifies the characteristics and behaviour of concrete and its components, while the latter one covers all the experimental work: preparation, performance and comments.

C H A P T E R 1

1. INTRODUCTION

1.1 The history and importance of concrete

As long as people set up buildings, they search for materials, which facilitate the act of building. Although the first human homes-namely caves- were made of stone, it took thousands of years until the brick, the artificial stone, was invented.

Anyway, the pioneering invention was concrete. Any shape of stone could be made with this material, and therefore, buildings could be set up within a much shorter period of time. Furthermore, concrete had a better quality than everything which had been known up till then. The German term for concrete – Beton – is a French which can be translated with mineral pitch.

The exact date at which concrete was made for the first time is unknown. But the most important invention concerning concrete construction was made in 1849.

Concrete, has some characteristics and properties, as all the other materials which change by differentiating its Mix Design. These properties are the following: compressive strength, density, impermeability, durability, resistance to abrasion, resistance to impact, tensile strength, resistance to sulphates, shrinkage and creep.

Most of concrete properties are related to its compressive strength. We are not saying that, these properties are a single and unique function of compressive strength but, in a very general way, concrete of higher strength has more desirable properties.

In the world market, concrete is the building material, most widely used.

1. It is one of the cheapest materials. Much cheaper than wood, steel and stone.
2. Easily constructed, transported and placed. It has also the unique property of taking the shape and form of the formwork to be used.
3. It lasts through the centuries, According to the Brooklyn Public Library, concrete was made before 500 BC and can last up to 50000 years. Its not surprising the fact that, so many structures from the Ancient Egypt or Ancient Greece still remain in good condition.
4. It can be designed to satisfy different conditions, have different characteristics and properties, so we can create concrete to comply with the desires of a specific job.

1.2 Types of concrete

There are many different kinds of concrete. Reinforced concrete is strengthened by steel. This is done by casting concrete around steel rods or bars and most large structures such as bridges need this extra strong concrete. Prestressed concrete is made by casting concrete around steel cables stretched by hydraulic jacks. After the concrete hardens the jacks are released and the cables compress the concrete. Concrete when compressed is the strongest. This type of concrete is used for floors and roofs as well as other things. Precast concrete is cast and hardened before being used for construction. Precasting makes it possible to produce a mass number of concrete building materials. Nearly all of prestressed concrete is precast as are concrete blocks. Concrete blocks are made in various weights and sizes and they are used to make about two-thirds of masonry walls in the U.S.

Engineers have designed kinds of concrete for certain uses. Air-entrained concrete is good in harsh weather and is used for roads and airport runways. High-early-strength concrete is used in hurried jobs and cold weather because it hardens quicker than ordinary concrete. Lightweight concrete weighs less than any other concrete because it is made from pumice: a naturally light mineral.



Photo 1: Modern concrete structures



Photo 2: Modern concrete structures

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