

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

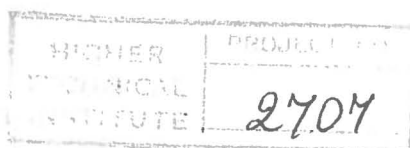
IMPROVEMENT OF THE SHEAR STRENGTH OF STEELS

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Design by

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IMPROVEMENT OF THE SHEAR STRENGTH
OF STEELS

by
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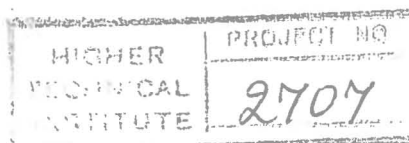
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ABSTRACT

In this project the shear strength of metals and the techniques of metal powder synthesis were studied with particular reference on spray drying, ways of strengthening of metals and tensile testing.

At a second stage the design and construction of aluminium press and die were carried out, for the production of metallic specimens by compacting of metal powders. Cast iron tensile specimens were also constructed for comparison.

Unfortunately, during our research we found out that the tubular furnace, which was an essential apparatus for the construction of the specimens, was impossible to be found in Cyprus. However, we managed to construct our own tubular furnace the design of which consist of a heating element wrapped around a pyrex tube.

Due to the practical problems mentioned above the project was confined to the theoretical part, as the samples was impossible to be ready in time. Experimental samples will, hopefully, be presented in my interview.

INTRODUCTION

Metals are probably the most commonly used materials nowadays, with an enormous variety of applications and properties. Because of their great practical value, they lie at the cross-roads of many scientific and technological disciplines. Chemists are interested in the oxidation and reduction of metals, the catalytic properties of metals and the laws by which metals combine together to form alloys. Chemical engineers apply their general principles of chemical processing to the production of pure metals from ores. Solid-state physicists are fascinated by the electronic and atomic structures of metals and by the ways in which these structures determine the characteristic properties of metals and alloys. Mechanical engineers are interested in the plastic working of metals, structural engineers in the mechanical performance of metals in practical use, and electrical engineers in all the special electrical and magnetic properties obtainable from metallic materials.

The use of metals started from the very ancient years, and it is not a coincidence that man's standard of life was raised with the discovery of new metals. With stronger metals man could construct better tools, built houses to live in, kill animals for his food and clothes more easily, and generally improve his life. Except from finding new metals, man managed to develop procedures for improving the properties of them as also and ways of mixing them. This raised his standard of life even more.

A procedure that has recently been developed is powder metallurgy. Powder metallurgy offers a versatile and efficient method of producing metal parts and components, as it is applicable for simple as well as complex shapes, and full range of chemical, physical and mechanical properties are achievable. Powder metallurgy also offers many advantages and that is the reason it has increased considerably the last years.