HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

A STUDY OF VIBRATION ABSORPTION USING VISCOELASTIC MATERIALS

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2000

A STUDY OF VIBRATION ABSORPTION USING VISCOELASTIC MATERIALS

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Project Report

Submitted to

the Department of Mechanical Engineering

of the Higher Technical Institute

Nicosia Cyprus

In partial fulfilment of the of the requirements

for the diploma of

TECHNICIAN ENGINEER

in

MECHANICAL ENGINEERING

June 2000

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AKNOWLEDGEMENTS

I would like to express my word note of thanks to my project supervisor Dr. Stassis Andreas for his support, guidance and help throughout the whole project procedure.

THANK YOU!

SUMMARY

The purpose of this project is to study and investigate in what rate vibrations are absorbed by a viscoelastic material.

At first, some theory was needed to be studied about vibrations, viscoelasticity and damping, to be able to understand what to do.

After the gain of study, I had to construct some testpieces to be tested in different conditions. All the results taken out of the tests had to be presented in tables and graphs.

At last some suggestions where made on how viscoelastic materials can be used for vibration absorption, and also the conclusions about the results.

INTRODUCTION

Vibration absorption is very important for cars, machines, boats, tools and every kind of equipment. The latest years a new way was found for vibration absorption, by using viscoelastic materials.

Viscoelastic materials have the ability to absorb the energy of the vibrations. Mechanical engineers are trying to construct vehicles, airplanes and other machines by connecting their parts with viscoelastic materials.

This project is an experimental project where some testpieces are tested. Through these results taken out from the tests we will be able to calculate the energy absorbed, the damping ratio, the change of the damping ratio between different mixtures of hardener and resin, which is the viscoelastic material in this case. To be able to do these tests, first of all a study about vibrations and viscoelasticity must be done.

In the construction of the first testpieces, different analogy of hardener and resin is added on each testpiece. By testing these testpieces we will be able to find out which analogy has the greatest damping ratio. The other testpieces are two squares, the one is solid and the other has its sides glued. By testing these two testpieces we can compare the results and find out which one has the greater damping ratio and can absorb more energy from the vibrations. Also some modifications on the testpiece with the glued sides will change the damping ratio and the energy absorption.

The tests will take place in the H.T.I Metrology laboratory using the Vibration Analyzer. So I have to get familiar with the Analyzer

and its options related with these tests. Some photos of the Analyzer during the tests will be shown, and also some information about the Analyzer from the Analyzer instruction notes.