HIGHER TECHNICAL INSTITUTE
MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

OPTIMIZATION OF PARAMETERS AFFECTING LATHE CUTTING PROCESS A CASE OF DESIGN OF EXPERIMENTS (DOE)

by

PYROS ANDREAS (M/723)

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OPTIMIZATION OF PARAMETERS AFFECTING LATHE CUTTING PROCESS : A CASE OF DOE

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Project Number: M/723

Dedicated to my parents and family

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Project Report

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TABLE OF CONTENTS

TABLE OF FIGURES

SUMMARY

This project deals with the optimization of the important parameter in a metal cutting process employing lathe single point cutting tool. The purpose is to change and combine the most important factors such as the cutting speed, the feed rate, depth of cut lubrication etc. and carry out an investigation into the best combination of these factors in order to find the optimum settings that give the best surface finish.

First of all a study was made about single point cutting tools theory, the different cutting tool materials and cutting fluids, the tool wear and tool life and about the surface texture.

A number of experiments was performed at machine shop of the HTI and the shafts used for the experiments and for surface finish measurements (made of Gray cast iron), were offered by a specific industry which uses the particular material in production.

The Taguchi method in Design of Experiments (DOE) was studied extensively and using this method the optimum solution was achieved. The optimum solution was later confirmed by executing another two experiments and conclusions for the whole project were made.