H.T.I.

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A PERFORMANCE MEASUREMENT SYSTEM AND STATISTICAL ANALYSIS OF THE HIGHER TECHNICAL INSTITUTE

M/941

GEORGIOU NICOLAS

JUNE 2002

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DEVELOPMENT OF A PERFORMANCE MEASUREMENT SYSTEM AND STATISTICAL ANALYSIS OF THE HIGHER TECHNICAL INSTITUTE

M/941

BY: GEORGIOU NICOLAS

JUNE 2002

HIGHER TECHNICAL INSTITUTE
PROJECT NO. 3363

DEVELOPMENT OF A PERFORMANCE MEASUREMENT SYSTEM AND STATISTICAL ANALYSIS OF THE HIGHER TECHNICAL INSTITUTE

BY: GEORGIOU NICOLAS

SUPERVISORS: MESSARITIS VASOS
ANGELI I. IOANNIS

Project report submitted to the
Department of Mechanical Engineering
of the
Higher Technical Institute

In partial fulfillment of the requirements for the diploma of
TECHNICIAN ENGINEER
In
MECHANICAL ENGINEERING

M/941

JUNE 2002

HIGHER TECHNICAL INSTITUTE
PROJECT NO. 3363

ABSTRACT

The object of this project is the development of a performance measurement system and statistical analysis of the Higher Technical Institute (HTI).

Even though the ISO and the methods of SPC are widely used in most every manufacturing industry and generally in all activities that have to do with the production of a product, in the educational systems are hardly used. But, in the case of the HTI the implementation of these are necessary.

Some of the basic SPC tools and techniques were used like brainstorming, cause and effect diagram, control charts, Pareto analysis team problem solving techniques, in order to identify and present the vital few performance indicators.

The most performance indicators were measured for the last 3 years because to have an improvement and to analyze them must have at least 3 years. For the other performance indicators were measured from the beginning of HTI.

For the presentation of the performance indicators the computer programs Microsoft Excel and SPC ANSTANT for Windows were used. For the cause and effect diagram Microsoft Visio was used.

Suggestions for improvement of the Educational System have been quoted, hopping the recommended solutions to be implemented so that the institute gains its value again.

DEDICATION

To my parents for their support

and guidance all these years.

To my niece Irene who provided a source

for relaxation through difficult times.

CONTENTS

	Page
ABSTRACT	I
DEDICATION	II
CONTENTS	III
LIST OF FIGURES	VI
LIST OF TABLES	VII
LIST OF APPENDICES	VIII
ACKNOWLEDGMENTS	IX
CHAPTER 1 – INTRODUCTION TO THE PROJECT	
1.1 SCOPE OF THE PROJECT	1
1.2 METHOD	1
1.3 PRESENTATION OF THE CHAPTERS	1
CHAPTER 2 – INTODUCTION TO QUALITY, SPC AND PERFORMANCE MEASUREMENTS	3
2.1 INTRODUCTION TO QUALITY	3
2.1.1 DEFINITIONS OF QUALITY	3
2.2 INTRODUCTION TO SPC	4
2.2.1 DEFINITIONS OF SPC	4
2.2.2 THE NEED FOR SPC	5
2.2.3 APPLICATIONS OF CONTROL CHARTS	5
2.2.4 TYPES OF CONTROL CHARTS	6
2.2.5 BASIC TOOLS OF QUALITY	8
2.3 INTRODUCTION TO PERFORMANCE MEASUREMENT	11
2.3.1 PERFORMANCE INDICATORS	11

CHAPTER 3 – DESCRIPTION OF THE HTI AND IMPLEMENTATION OF ISO 9001 12

3.1 HTI 12

3.2 MECHANICAL ENGINEERING DEPARTMENT 13

3.3 RELATION OF HTI AND ISO 9001 13

3.4 INTRODUCTION TO THE ISO 9000 14

3.5 BENEFITS AND LIMITATIONS OF THE ISO 9000 15

3.6 REQUIREMENTS OF ISO 9001:RELATED WITH THIS PROJECT 16

CHAPTER 4 – METHODOLOGY ADOPTED 22

4.1 FAMILIARIZE WITH SPC 22

4.2 SUGGESTIONS FOR PERFORMANCE INDICATORS 22

4.3 ANSTANT FOR WINDOWS SPC SOFTWARE 23

4.4 CAUSE AND EFFECT DIAGRAM 24

4.5 IDENTIFICATION OF THE PERFORMANCE INDICATORS 26

CHAPTER 5 – PILOT IMPLEMENTATION AND MEASUREMENTS 27

5.1 INTRODUCTION OF DATA 27

5.2 DISCUSSION ON THE TABLES AND FIGURES OF MICROSOFT EXCEL 28

5.2.1 DAYS LOST 28

5.2.2 LEVEL OF ABSENCES 29

5.2.3 TOTAL HOURS LOST 30

5.2.4 STUDENT'S GRADES 37

5.2.5 STUDENT'S FAILURES 38

5.3 DISCUSSION OF THE CHARTS OF ANSTANT FOR WINDOWS 46

5.3.1 FIRST YEAR STUDENTS 46

5.3.2 SECOND YEAR STUDENTS 50

5.3.3 THIRD YEAR STUDENTS 54

5.3.4 REGISTERED/GRADUATED STUDENTS 58

5.4 FINAL CONCLYSION ON PARETO CHARTS 61

5.5 SUGGESTIONS FOR IMPROVEMENT 61

CHAPTER 6 – OVERALL CONCLUSIONS AND BENEFITS 63
6.1 CONCLUSIONS 63
6.2 BENEFITS TO THE AUTHOR 64

REFERENCES 115

LIST OF FIGURES

		Page
FIGURE 2.1	SEVEN BASIC TOOLS	10
FIGURE 4.1	CAUSE AND EFFECT DIAGRAM	25
FIGURE 5.1	AVERAGE % DAYS LOST FOR FIRST YEAR STUDENTS	32
FIGURE 5.2	AVERAGE % ABSENCES FOR FIRST YEAR STUDENTS	32
FIGURE 5.3	AVERAGE % DAYS LOST FOR SECOND YEAR STUDENTS	34
FIGURE 5.4	AVERAGE % ABSENCES FOR SECOND YEAR STUDENTS	34
FIGURE 5.5	AVERAGE % DAYS LOST FOR THIRD YEAR STUDENTS	36
FIGURE 5.6	AVERAGE % ABSENCES FOR THIRD YEAR STUDENTS	36
FIGURE 5.7	% AVERAGE MARKS FOR FIRST YEAR STUDENTS	40
FIGURE 5.8	% FAILURES FOR FIRST YEAR STUDENTS	40
FIGURE 5.9	% AVERAGE MARKS FOR FIRST YEAR STUDENTS	42
FIGURE 5.10	% FAILURES FOR SECOND YEAR STUDENTS	43
FIGURE 5.11	% AVERAGE MARKS FOR FIRST YEAR STUDENTS	45

LIST OF TABLES

		Page
TABLE 3.1	BENEFITS AND LIMITATIONS OF ISO 9000	1 5
TABLE 5.1	PERFORMANCE INDICATORS FOR FIRST YEAR STUDENTS	31
TABLE 5.2	PERFORMANCE INDICATORS FOR SECOND YEAR STUDENTS	33
TABLE 5.3	PERFORMANCE INDICATORS FOR THIRD YEAR STUDENTS	35
TABLE 5.4	PERFORMANCE INDICATORS FOR FIRST YEAR STUDENTS	39
TABLE 5.5	PERFORMANCE INDICATORS FOR SECOND YEAR STUDENTS	41
TABLE 5.6	PERFORMANCE INDICATORS FOR THIRD YEAR STUDENTS	44
TABLE 5.7	SUMMATION OF PARETO CHARTS	62

LIST OF APPENDICES

		Page
APPENDIX I	FIRST YEAR STUDENT'S GRADES	66
APPENDIX II	FIRST YEAR STUDENT'S FAILURES	76
APPENDIX III	SECOND YEAR STUDENT'S GRADES	83
APPENDIX IV	SECOND YEAR STUDENT'S FAILURES	91
APPENDIX V	THIRD YEAR STUDENT'S GRADES	98
APPENDIX VI	THIRD YEAR STUDENT'S FAILURES	108

ACKNOWLEDGEMENTS

I would like to thank my project supervisor and lecturer Dr. Messaritis Vassos, Lecturer in the Mechanical Engineering Department, for his help, for the completion of this project as well as for his guidance in my studies.

Also, I would like to express my sincere appreciation and to thank my project supervisor Dr. Ioannis I. Angeli, of the HTI for his help, guidance, advising and support during the development of this project.