### PRODUCTIVITY IMPROVEMENTS IN A CYPRUS INDUSTRY

GEORGE MAVROYIANNIS

H.T.I. DIPLOMA

M/1003

JUNE 2005

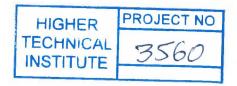
# PRODUCTIVITY IMPROVEMENTS IN A CYPRUS INDUSTRY

## BY GEORGE MAVROYIANNIS

DIPLOMA PROJECT

M/1003

**JUNE 2005** 



#### PRODUCTIVITY IMPROVEMENTS IN A CYPRUS INDUSTRY

By

George Mavroyiannis

Project report submitted to the

Department of Mechanical Engineering

of the Higher Technical Institute

Nicosia Cyprus

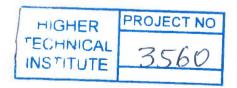
in partial fulfillment of the requirements for the diploma of

#### **TECHNICIAN ENGINEER**

In

MECHANICAL ENGINEERING

June 2005



#### PRODUCTIVITY IMPROVEMENTS IN A CYPRUS INDUSTRY

By: George Mavroyiannis

#### SUMMARY

This project has taken place in an area of production requiring improvements in a manufacturing firm in Cyprus. The production line of a specific product, has been investigated in detail as a try to improve the productivity of the industry.

The whole project has been divided in nine chapters:

At chapter one, a description of the operations layout strategy is represented, as a method to study in detail the production process to find the points where this needs improvements.

Chapter two refers at method study, and basically at time study to set the time standards for the production process.

At chapter three, a detailed description of the process involved is represented, after an extensive study.

Chapter four, deals with the study of the present production process using productoriented layout and time study, which are described at chapters one and two respectively.

Chapter five, estimates the sectors that the whole process needs improvements, and proposes an ideal solution to eliminate the factors which keep the productivity level low.

At chapter six, the same procedure, as at chapter four, is followed, which is, productoriented layout and time study, to study the proposed production process. A detailed examination of the improvements is represented.

Chapter seven, refers to the plant layout, and by using process-oriented layout and group technology, a more efficient plant layout is represented.

Chapter eight, deals with the method study. Other problems and further improvements are described.

Chapter nine, refers to the summary of recommended solutions, further work, and to the plant of suggestions implementations.

I.	
li control de la	
I .	
h	
1	
1	
I .	
li de la constantina	
1	
1	
1	
ł	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
1	
-	
1	
1	
ŀ	
1	
1	
ľ	
I	
1	
1	
I	To my sister,
1	io illy sister,
(	
1	
	Fleni
	Eleni.

#### **ACKNOWLEDGEMENTS**

Several people should be mentioned for their contribution and substantial assistance during the preparation and completion of the current project. I am grateful to the followings:

My supervisor Dr. Andreas Stassis for his guidance and for his help, which was given at any time he was asked for.

Dr. Vasilios Mesaritis for teaching me production management during the semester. I must also thank Heracles Mechailides Ltd., and especially Mr. Panayiotis Mechailides production manager of the industry, for their cooperation.

I am also grateful to Christos Filitas for his help with the photographs, to Eleni Mavroyianni, who was very helpful in solving my computer problems for me (she is my "computer tutor" and my sister). Without their help, nothing would be possible.

#### **CONTENTS**

		Page
SUMMARY	Υ	1
ACKNOWI	LEDGMENTS	IV
CHAPTER	ONE - INTRODUCTION TO THE RELATED THEOR	Y OF
PRODUCI	<u> </u>	1
1.1	Why study production operation management?	2
1.2	The production challenge	
1.2		
1.3	Productivity measurement	3
1.4	Productivity actions of the production/operations managers	4
1.5	Objectives of layout	5
1.6	Types of layout	6
1.7	Repetitive and product-oriented layout	7
CHAPTER	TWO – WORK STUDY	11
21	Aspects of work study	12

2.2	Work study	14
CHAPT PROCE	ER THREE – DETAILED DESCRIPTION OF THE PRODUCTION SS	17
3.1	Shear cutting machine	18
3.2	CNC machine	19
3.3	Press brake machine	21
3.4	Welding station	21
3.5	Assembly station 1	24
3.6	Disjoin station	25
3.7	Painting room	25
3.8	Assembly station 2	27
CHAPT	ER FOUR – STUDY OF THE PRODUCTION PROCESS	29
4.1	Product-oriented layout	30
4.2	Time study	36
<u>CHAPT</u>	ER FIVE – DESCRIPTION OF THE PROPOSED SOLUTION	39
5.1	Workstations which need to get some improvement	40
5.2	Description of the proposed changes	40
5.3	Effect of these changes at each workstation	43

CHAPTER SIX – STUDY OF THE PROPOSED PRODUCTION PROCESS			
6.1	Product-oriented layout	46	
6.2	Time study	50	
6.3	Productivity improvement	52	
CHAP	TER SEVEN – GROUP TECHNOLOGY AND PROCESS ORIENTED		
LAYU	<u>UT</u>	54	
7.1	Plant layout	56	
7.2	Transportation diagram	56	
7.3	Process-oriented layout	60	
CHAP.	TER EIGHT – METHOD STUDY	65	
8.1	Process chart	66	
8.2	Process chart symbols	66	
8.3	Method study	68	
8.4	Description of the problems faced at each workstation and improvements	71	
8.5	Classification of problems and difficulties	72	
<u>CHAP</u>	TER NINE – CONCLUSIONS	78	
BIBLIOGRAPHY81			