



TECHNICAL UNIVERSITY *of* MALAYSIA MALACCA

**Productivity Improvement using Line
Balancing Technique: A Case Study at an
electronic Company**

Thesis submitted in accordance with the requirements of the Technical
University of Malaysia Malacca for the Bachelor Degree of Manufacturing
Engineering in Manufacturing Process

By

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ABSTRACT

The problem of balancing assembly line is a classical industrial engineering problem. Even though much of the work area goes back to mid 50s and early 60s, the basic structure of the problem is relevant to the design production system today. The thesis is cover all the topic of assembly line balancing; methodology and theory and the company approaches to implement this technique. The case study focused on Flextronics Malacca and parallel line in production lot and the model sequenced that both line more than one model. This is know and compare the two model to proven that the line more than one or parallel could be balanced or not. The scope of project characterized by following up the Flextronics approaches and their schedule planning to implement this technique which starting from October 2006 untill January 2007. For chapter 4 the result is used to compare before and after improvement to prove the effectiveness of the parallel line. After that chapter discussion is about the effectiveness of improvement by using this technique shall discuss by comparing the result. Finally the finding that will get from the study case to compare the Flextronics approaches and theory assembly line balancing before whether its relevant and practical or not to solve industrial production problem.

DEDICATION

For My parent and Supervisor Lecturer

ACKNOWLEDGEMENTS

I would like to thank for god as give me a chance and opportunity during complete this project as well as this project has been successfully completed without any problem. Not forget also to say thanks to my parent as give me encourage especially when I struggle to complete this study and report for my project in final year. Their encouragement as a spiritual to me along the duration of this thesis done. For my supervisor lecturer that handle me during this project I appreciated and dedicated for Miss Zuhriah Bte Ebrahim as give me the guideline, supporting and giving some recommendation to overcome problem faced during the project. I would like also thank to my classmate that give me encouragement and supporting me doing complete this project.

TABLE OF CONTENTS

Abstract	i
Dedication	ii
Acknowledgement	iii
Table of Content	iv
List of Figures	xi
List of Tables	xiv
Sign and symbol	xvi
List of Appendices	xviii
1. INTRODUCTION	1
1.1 The project	1
1.1.1 The products	3
1.1.2 Management and Organization Chart	4
1.2 Objectives Project	6
1.3 Scope of Project	6
1.4 Background Problems	7

2. LITERATURE REVIEW	8
2.1 The concept of Line Balancing	8
2.2 Assembly Line Balancing	10
2.3 The type of problem in Line Balancing	13
2.3.1 Assembly line Balancing Problem	13
2.3.2 Stochastic Single Assembly Line Balancing Problem	16
2.3.3 Parallel Assembly Line Balancing Problem	18
2.3.4 Mixed Model Assembly Line Balancing Problem	19
2.4 Line Balancing Analysis	20
2.4.1 Heuristic line Balancing	20
2.5 Demand Flow Technology	22
2.5.1 Background of DFT	22
2.5.2 What is Demand Flow Technology?	22
2.5.3 Product Synchronization in Parallel Lines A1B and A5	24
2.6 Demand Flow Technology resources	27
2.6.1 The perspective Line Balancing	27
2.6.2 Resource Calculation	28
2.7 Flextronics Approach	31
2.7.1 Management Approach	31

3. METHODOLOGY	36
3.1 Introduction	36
3.2 Selecting production line	38
3.3 Preparing implementation schedule	41
3.4 Implementing the Flextronics Line Balancing Approach	43
3.5 Collecting Data	44
3.6 Analyzing Data	46
3.7 Discussing the Result	46
3.8 Findings	47

4. RESULT	48
4.1 Introduction	48
4.2 Results After Implementation (By Phase)	49
4.2.1 Phase 1	49
4.2.2 Phase 2	51
4.2.3 Phase 3 & 4	53
4.2.4 Phase 5	55
4.3 Product Output (represents in SGR)	57
4.3.1 Phase 1	57
4.3.2 Phase 2	59
4.3.3 Phase 3&4	61
4.3.4 Phase 5	63
4.7 The cycle time (s) and Takt Time (s)	65
4.4.1 Phase 1	66
4.4.2 Phase 2	68
4.4.3 Phase 3&4	70
4.4.4 Phase 5	72
4.7 Quality Yield	74
4.5.1 Goldfinger	75
4.5.2 Sigmund	76

. DISCUSSION	77
.1 Introduction	77
.2 Productivity	78
5.2.1 Phase 1	78
5.2.1.2 Comments	78
5.2.2 Phase 2	79
5.2.2.1 Comments	79
5.2.3 Phase 3 & Phase 4	80
5.2.3.1 Comments	80
5.2.4 Phase 5	81
5.2.4.1 Comments	81
3 Cycle Time and Standard Time	82
4 Quality Yield	83
5 Problem Occured	84
5.5.1 Phase 1:	84
5.5.1.1 Potential Problem	84
5.5.2 Phase 2:	85
5.5.2.1 Potential Problem	85
5.5.3 Phase 3 & 4:	86
5.5.3.1 Potential Problem	87
5.5.4 Phase 5:	88
5.5.4.1 Potential Problem	88

6. SUGGESTION AND RECOMMENDATION FOR FURTHER IMPROVEMENT	91
6.0 Introduction	91
6.1 A Framework for Implementing Line Balancing Technique	92
6.2 Identify the number of workstation	94
6.3 Obtaining single-skilled operator set and multiple-skilled operator set	95
6.4 Workmotion study to identify the actual work load for each One operator in workstation	97
6.5 Obtaining the number of multiple-skilled operator needed for each operation	98
6.6 Identifying all feasible allocations for needed multiple-skilled operator.	99
6.7 Revised and rearranged segments by creating sequence of work template	100
6.8 Confirmation of skill efficiency by analyzing three indices	105

7. CONCLUSION AND SUMMARY	104
7.1 Summarized Case Study	104
REFERENCES	105
APPENDIXES	107

LIST OF FIGURES

1.1	Flextronics Malacca	1
1.2	Flextronics Line per Shift	2
1.3	Several end product of the company based on the name of PCBA given	3
1.4	Flextronics Organizational Chart	5
2.1	An example of Precedence Diagram	11
2.2	The product sequencing model	14
2.3	Surface Mounted Technology (SMT) Flowchart process	24
2.4	Backend Flowchart process	26
2.5	The Line Balancing Technique by DFT concept	30
2.6	The History of F.M.S	31
3.1	Flowchart Methodology	37
3.2	The Flextronics approaches line balancing implementation	44
4.1(a)	Result Before Improvement SGR/Output of Goldfinger vs Targeted	57
4.1(b)	Result After Improvement SGR/Output of Goldfinger vs Targeted	58
4.2(a)	Result Before Improvement SGR/Output of Sigmund vs Targeted	58
4.2(b)	Result After Improvement SGR/Output of Sigmund vs Targeted	59
4.3(a)	Result Before Improvement SGR/Output of Sigmund vs Targeted	59
4.3(b)	Result After Improvement SGR/Output of Sigmund vs Targeted	59

4.4(a) Result Before Improvement SGR/Output of Goldfinger vs Targeted	60
4.4(b) Result After Improvement SGR/Output of Goldfinger vs Targeted	60
4.5(a) Result Before Improvement SGR/Output of Sigmund vs Targeted	61
4.5(b) Result After Improvement SGR/Output of Sigmund vs Targeted	61
4.6(a) Result Before Improvement SGR/Output of GoldFinger VS Targeted	62
4.6(b) Result After Improvement SGR/Output of GoldFinger VS Targeted	62
4.7(a) Result Before Improvement SGR/Output of Goldfinger vs Targeted	63
4.7(b) Result After Improvement SGR/Output of Goldfinger vs Targeted	63
4.8(a) Result Before Improvement SGR/Output of Sigmund VS Targeted	64
4.8(b) Result After Improvement SGR/Output of Sigmund VS Targeted	64
4.9(a) Result Before Improvement Operator Cycle Time Goldfinger	66
4.9(b) Result After Improvement Operator Cycle Time Goldfinger	66
4.10(a) Result Before Improvement Operator Cycle Time Sigmund	67
4.10(b) Result After Improvement Operator Cycle Time Sigmund	67
4.11(a) Result Before Improvement Operator Cycle Time Sigmund	68

4.11(b)Result After Improvement Operator Cycle Time Sigmund	68
4.12(a)Result Before Improvement Operator Cycle Time Goldfinger	69
4.12(b) Result After Improvement Operator Cycle Time Goldfinger	69
4.13(a) Result Before Improvement Operator Cycle Time Sigmund	70
4.13(b) Result After Improvement Operator Cycle Time Sigmund	70
4.14(a) Result Before Improvement Operator Cycle Time Goldfinger	71
4.14(b) Result After Improvement Operator Cycle Time Goldfinger	71
4.15(a) Result Before Improvement Operator Cycle Time Goldfinger	72
4.15(b) Result After Improvement Operator Cycle Time Goldfinger	72
4.16(a) Result Before Improvement Operator Cycle Time Sigmund	73
4.16(b) Result After Improvement Operator Cycle Time Sigmund	73
4.17(a)(b) The defect of model goldfinger and Sigmund	74
4.18 Defect type of Labelling	74
4.19 The comparison percentage yield before and after implementation	75
4.20 The comparison percentage yield before and after implementation	76
5.1(a)(b) Remove PRE IR station before and after improvement	84
5.2(a)(b) Removing Kapton Tape with combination of location gold after skipped	85
5.3(a)(b) Changing from stamping to dotting after improvement	86
5.4(a)(b) Minimizing or reducing become one scanner after improvement	87
6.1 Illustrates the frame work for operator allocation line problem	90
6.2 Three indices analysis for operator allocation 1.	103
6.3 Three indices analysis for operator allocation 2.	103

LIST OF TABLES

2.5	Comparison between DFT and Lean	23
2.7	The action FMS Tracking Scheduled from June 2006	34
3.2a	Explanation of line for SMT and Backend process (A1B)	38
3.2b	Explanation of line for SMT and Backend process (A5)	39
3.3	The Detail Flextronics Line Balancing Implementation	40
4.1	Before and After Improvement at PRE/ IR station	49
4.2	Before and After Improvement at PRE/ IR station	50
4.3	Result Before and After Improvement at Deburring Station (Backend)	51
4.4	Result Before and After Improvement at Deburring Station (Backend)	52
4.5	Result Before and After Improvement at FI station and remove kapton tape	53
4.6	Result Before and After Improvement at FI station and remove kapton tape	54
4.7	Result Before and After Implementation at FI (Scanning) process	55
4.8	Result Before and After Improvement at FI Station (Backend)	56
5.1	Result productivity before and after for phase 1	78
5.2	Result productivity before and after for phase 2	79
5.3	Result productivity before and after for phase 3 & 4	80
5.4	Result productivity before and after for phase 5	81
6.1	Flexibility Training Woksheet For Operator	93
6.2	Training Matrix for cross training each product/line	94
6.3	Sequence of work template for sampling at P/IR Workstation	98

6.4	Sequence of work template for sampling work at FI station(stamping)	99
6.5	Sequence of work template for sampling work at FI station(scanning)	100
6.6	Operator allocation worksheet for each different case	103
6.7	Shows worksheet to measure performance of Operator	103
7.1	The differentiate productivity before and after implementation for all phases	104

LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

NVA	-	Non value added
FMS	-	Flextronics Manufacturing System
SFM	-	Synchronize Flow Manufacturing
DFT	-	Demand Flow Technology
SMT	-	Surface Mounted Technology
WIP	-	Work in process
TDE	-	Test Development Engineering
WIP	-	Work in process
I.E	-	Industrial Engineering
WD	-	Workdays per month
Dc	-	Daily rate
Fr	-	Hourly Flowrate
n	-	Number of stations
c	-	Station cycle time
$\sum t$	-	Total work content time of unit
ALBP	-	Assembly Line Balancing Problem
K	-	No of station
t(Sk)	-	Cumulated task time
s	-	Station Load

t_{\max}	-	Targets task time
PCB	-	Printed Circuit Board
H	-	Effective work hours
S	-	Workshift per day
P/IR	-	Pre Inspection Resources
ICT	-	Integrated Circuit Testing
FI	-	Final Inspection
PV	-	Target Monthly Volume

LIST OF APPENDIXES

Appendixes A

- Gantt Chart PSM

Appendixes B

- Collected data (Cycle Time) Before
- Collected data (Cycle Time) After
- Status Quality Yield (Before)
- Status Quality Yield (After)

Appendixes C

- Flextronics Scheduled Approved
- Standard Data Form collected In Flextronics

CHAPTER 1

INTRODUCTION

1.1 The Project

The project is about study on productivity improvement through the application of line balancing concept at Flextronics Sdn. Bhd in Malacca. The company that done the research is sub-con in industrial electronic company which has headquarters at Flextronics, Senai in Johor Bharu. Flextronics Malacca is the fifth plant to be built in Malaysia branches includes Senai, Tampoi, Shah Alam and Pulau Pinang. The Malacca Plant was bought over by Flextronics from Dovatron (M) Sdn. Bhd on the late of 1993, but only started its operation on January of 1994. However, they take almost 3 years to develop before granted with ISO 9002 on 1997.



Figure 1.1: Flextronics Malacca

The work force of this company keeps increasing at an increasing rate and reaches 3600 peoples today. Besides that it has 30 SMT lines which could accommodate the more quantity people that need to get job.



Figure 1.2: Flextronics line per shift

Assembly lines can be classified into two general groups (with single and multimixed products) and U-Type assembly lines (with single and multimixed products), serial and parallel lines. There are all these types above mentioned assembly line at Flextronics. This project will use Line A1B and A5 as a case study. These two lines are recognized as parallel lines in Flextronics. The lines A1B and A5 which are two models only goldfinger and Sigmund those go through to the both line making assembly process from SMT (Surface Mounted Technology) process until Backend process. The research studied that we done focused on the parallel lines at line A1B and A5 for single model, Sigmund and goldfinger which running for both lines. This project involves parallel line will focus on the single line balancing problem which have parallel workstations. This project will base on Flextronics approaches implementing line balancing technique from the planning schedule that determined by the management headquarters.

The approach is based on the FMS team strategy to develop problem solving method based on DFT (Demand Flow Technology) concept. The objective of their approach is to improve the productivity of the company that such give the profit. This could be achieved by develop stochastic cost integrated into a balancing line to enable an approximately minimum cost balanced to be obtained. The purpose of this project to studied the flextronic's propose an efficient optimal processing based on eliminating Non Value Added by balancing the process.

1.1.1 The Products

With the experience more than 25 years made this factory become flexible and strongest management to handle all the project that given by customer successfully and fulfill customer satisfaction. In 2002 the management factory is changed again into two sections because of model infocus give many problems. This model is transferred to the new branch factory at Senai, Johor Bahru. Therefore, Malacca Branch only produced model HP and Carrier Access Instead of focusing on manufacturing end products this plant is more on the creation of the main boards of the end products. The main customers of Flextronics Malacca are Hewlett Packard, Carrier Access, In Focus and Baxter. Here in Malacca, the main products manufactured include printers, digital cameras, Liquid Crystal Display Screen, Touch Screen and Video Projectors. Figure 1.3 below shows several end products of the company based on the name given by the customer for the PCBA board produced.

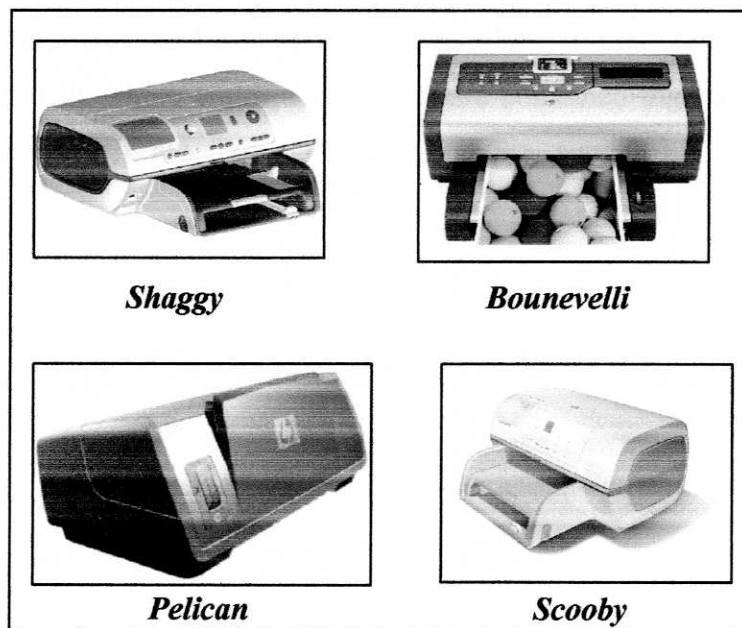


Figure 1.3: Several end product of the company based on the name of PCBA given.