

**REDESIGNING LAYOUT AT PT. INKOASKU TO INCREASE
PRODUCTIVITY BY USING SYSTEMATIC LAYOUT PLANNING (SLP)
METHOD AND DISCRETE EVENT SIMULATION MODEL**

By

Vincentia Kitriastika

1-1208-061

A Thesis submitted In Partial Fulfillment of the Requirements for
BACHELOR OF SCIENCE

DEPARTMENT OF INDUSTRIAL ENGINEERING

FACULTY OF ENGINEERING

SWISS GERMAN UNIVERSITY

SWISS GERMAN UNIVERSITY
EduTown BSDCity
Tangerang 15339
INDONESIA

Telp. +62 21 3045 0045

Fax. +62 21 3045 0001

E-mail: info@sgu.ac.id

www.sgu.ac.id

2012

Revision after the Thesis Defense on 25th July 2012

STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

Vincentia Kitriastika

Date

Approved by:

Dr. Ir. Prianggada Indra Tanaya. MME.

Date

Dr. Ir. Yuki Indrayadi. MME.

Date

Chairman of the Examination Steering Committee

Date

Vincentia Kitriastika

ABSTRACT

**REDESIGNING LAYOUT AT PT. INKOASKU TO INCREASE
PRODUCTIVITY BY USING SYSTEMATIC LAYOUT PLANNING (SLP)
METHOD AND DISCRETE EVENT SIMULATION MODEL**

By

Vincentia Kitriastika

SWISS GERMAN UNIVERISTY

Bumi Serpong Damai

Dr. Ir. Prianggada Indra Tanaya, MME., Advisor

Dr. Ir. Yuki Indrayadi, MME., Co-Advisor

The primary objective of this thesis is to increasing the productivity of passenger cars wheel producing company, PT. INKOASKU by redesigning the layout of the factory.

The main problem encountered is that the goods are not produced in single location, causing a considerable hindrance in terms of time and distance, and hence efficiency.

Redesigning process will be using SLP method and flow analysis while supported by analysis of Assembly line balancing to optimize the layout. Regarding the evaluation process, ARENA software will be used to simulate and identify the bottleneck in the production process, and comparing the layout alternatives to decide the best layout. The best chosen layout according to the simulation and SLP method that supported with flow analysis and assembly line balancing will be used as the master draft layout that will be proposed to PT. INKOASKU and will be shown in 2D and 3D dimensional layout.

Keywords : Systematic Layout Planning (SLP), assembly line balancing, flow analysis, simulation, productivity

DEDICATION

I dedicate this thesis to my beloved family, and friends for their unconditional love, support, constant helping hands, and companions.



ACKNOWLEDGMENTS

First and foremost, I would like to express endless gratitude to God, for his blessings and guidance throughout the creation and completion of this thesis.

I especially want to thank my advisor Dr. Ir. Prianggada Indra Tanaya. MME. and Dr. Ir. Yuki Indrayadi. MME., for the guidance during my thesis work at Swiss German University. Their willingness to constantly help, guide, and motivate contribute tremendously to the completion of this thesis.

Mr. Erwyn Fabryando, and Ms. Irma Triasantina Maharani deserve special thanks as my advisors in PT. INKOASKU and support my thesis work with providing data and knowledge in the industry. And also for all the staffs who always help me during the completion of my thesis.

To all my friends in Industrial Engineering '08 and STUDENTO's family for the friendship, support, and help in the past four years.

Last but not least, my deepest gratitude goes to my family for their love and support throughout the process of writing this thesis. This thesis is impossible to be complete without them.

TABLE OF CONTENTS

STATEMENT BY THE AUTHOR.....	2
ABSTRACT.....	3
DEDICATION.....	4
ACKNOWLEDGMENTS.....	5
TABLE OF CONTENTS.....	6
CHAPTER 1 – INTRODUCTION.....	12
1.1 Background.....	12
1.2 Problem Identification.....	12
1.3 Research Purpose.....	13
1.4 Methodology.....	14
1.5 Scope.....	16
1.6 Thesis Limitation.....	16
1.7 Thesis Organization.....	17
CHAPTER 2 – LITERATURE REVIEW.....	18
2.1 Introduction.....	18
2.2 Factory Layout.....	18
2.3 Systematic Layout Planning.....	18
2.3.1 Systematic Layout Planning (SLP) and Arena Implementation in Agilent Technologies, Inc. (Ailing, 2009).....	19
2.3.2 Systematic Layout Planning (SLP) at Iron Manufacturing (Wiyaratn and Watanapa, 2010).....	20
2.3.3 Systematic Layout Planning (SLP) Implementation in PT. Sanken Argadwija (Baskoro, 2010).....	20
2.3.4 Implementation of Systematic Layout Planning (SLP) for Library Layout in Catholic University of Atmajaya.....	21
2.4 Lean Methodology.....	21
2.4.1 Lean Thinking Implementation in Pathology (Neil Westwood Clinical Process Consultant).....	22
2.5 Genetic Algorithm.....	23
2.5.1 Genetic Algorithm Implementation in Irregular Construction Sites (Elbeltagi and Hegazy, 2003).....	24
2.6 Concluding Remarks.....	24
CHAPTER 3 – METHODOLOGY.....	25
3.1 Introduction.....	25
3.2 Overview of PT. INKOASKU.....	25
3.2.1 Company Profile.....	25
3.3 Background Theory.....	26
3.3.1 Factory Layout.....	26
3.3.2 Systematic Layout Planning.....	31
3.3.3 ABC Analysis.....	37
3.3.4 Simulation.....	38
3.3.5 Knowledge.....	44
3.4 Problem Identification.....	51
3.4 Thesis Methodology.....	52
3.4.1 Preliminary Study.....	54

3.4.2 Data Collection	54
3.4.3 Analysis Data	61
3.4.4 Summary	63
3.5 Software Tools	64
CHAPTER 4 – RESULT & DISCUSSION.....	65
4.1 Introduction.....	65
4.2 Analysis Product	65
4.2.1 Product Demand in 2011	65
4.2.2 Cumulative and Percentage Demand	67
4.2.3 ABC Analysis	69
4.3 Analysis Layout	72
4.3.1 Area Relationship Chart.....	72
4.3.2 Area Relationship Worksheet	74
4.3.3 Dimensionless Block Diagram	83
4.3.4 Area Relationship Diagram.....	88
4.3.5 Production Line Area Planning.....	101
4.3.6 Current Workshop Area and Facility Dimension	121
4.3.7 Space Requirement Planning	135
4.3.8 Area Allocation.....	136
4.3.9 Drafting the Layout.....	136
4.4 Simulation	140
4.4.1 Introduction.....	140
4.4.2 Conceptual Model.....	140
4.4.3 Parameter Measures	142
4.4.4 Assumptions.....	142
4.4.5 Model Translation.....	143
4.4.6 Model Verification.....	151
4.4.7 Model Validation	151
4.4.8 Simulation Run Length	154
4.4.9 Proposed Simulation	154
4.4.10 Analysis Calculation	155
4.5 Concluding Remark	156
CHAPTER 5 – CONCLUSION AND RECOMMENDATION	162
5.1 Conclusion	162
5.2 Further Developments.....	163
GLOSSARY	164
REFERENCES	165
APPENDIXES	166
CURRICULUM VITAE.....	207