

UNIVERSITI TEKNOLOGI MARA

**LEAN PRODUCTION
AS EFFICIENCY IMPROVEMENT TOOL
IN BOATBUILDING PROCESS**

RASYIDAH BINTI OTHMAN

Thesis submitted in fulfilment of the requirements

for the degree of

Master of Science

Faculty of Mechanical Engineering


September 2009

CANDIDATE'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

In the event that my thesis be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and agree be subjected to the disciplinary rules and regulations of Universiti Teknologi MARA.

Name of Candidate : RASYIDAH BINTI OTHMAN
Candidate's ID No. : 2005101602
Programme : M Sc in Mechanical Engineering
Faculty : Mechanical Engineering
Thesis Title : Lean Production as Efficiency Improvement
Tool in Boatbuilding Process

Signature of Candidate : 
Date : 09 / 09 / 09

ABSTRACT

The improvement in boatbuilding or shipbuilding process has become a focus and has received huge attention from the Malaysian boat builders and shipbuilders. Furthermore, shipbuilders around the world are moving and looking forward to optimizing their resources in order to become a world-class shipbuilder so as to compete with Asian shipbuilders particularly from South Korea, China and Japan. For any shipyards that have lack of resources, knowledge in preparing effective planning strategies and having ineffective methods of production, the possible outcome is to invite displeasure amongst clients for not being able to deliver the quality product on time. In this research, the application of lean principles and tools in identifying the production planning problems at Kay Marine Sdn. Bhd. (KMSB) has been explored, right from the problems identification to improvement strategy of the boatbuilding process. Lean tools used in this research are: Cause and Effect Diagram, Five Whys, Work Study Method, Group Technology and Assembly Line Balancing with Takt Time. Comparison between proposed methods against the current method was done to identify the improvements in terms of throughput, work- in-progress (WIP) inventory occupancy, labour productivity, efficiency, labour cost and penalty. Most of these metrics can be improved by at least 40%. With all of these improvements, it can be deduced that KMSB can be more competitive in boatbuilding production; while at the same time enjoys the workers' improved competency and confidence.

ACKNOWLEDGEMENTS

In the name of Allah, most gracious and merciful, Alhamdulillah with Allah permission, this research has completed. Praised to Prophet Muhammad (s.a.w.) his companions and to those on the path as what he preached upon, may Allah keep His blessing and tenders.

It is a great pleasure to acknowledge the people who had contributed and assisted in conducting this research and preparing this thesis. A warm gratitude and appreciation goes to Kay Marine Sdn. Bhd. (KMSB) Managing Director, Mr. Kamarudin Mansor, for his support and willingness for allowing this research to be conducted at his premise. Highest appreciation goes to all the employees of Kay Marine Sdn. Bhd. who were involved directly or indirectly in this study. Thank you for their assistance and time.

To Universiti of Kuala Lumpur (UniKL), thank you very much for the Short Term Research Grant (STRG) that was awarded for funding this research project. To supervisors of this research, Mr. Shaharudin B. Ahmad (UiTM) and Assoc. Prof. Dr. Iberahin B. Jusoh (UTM), thank you so much for the encouragement, guidance, valuable comments, criticism and suggestions in completion of this research. Special gratitude goes to. Liker J. K., Coordinator of National Ship Research Program (NSRP), United States of America and. Cheah A., Speaker from Federation of Manufacturing Malaysia (FMM), thank you for your technical advice and support in conducting this research. Lastly, a warmest gratitude goes to my husband Muliadi, my children Nurleena Khadijah & Ibrahim Al-Muaeqli, family, friends and all the people who unnamed here. Thank you so much for your love, support, motivation, understanding and helpfulness.

TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF APPENDICES	xii
CHAPTER 1: INTRODUCTION	
1.01 Background	1
1.02 Lean Production	2
1.03 Overview of Malaysian and World Shipbuilding Industry	3
1.04 Lean Production and Shipbuilding	8
1.05 Problem Statement	8
1.06 Research Objectives	10
1.07 Scope of the Study	10
1.08 Significance of the Study	11
CHAPTER 2: COMPANY'S BACKGROUND	
2.01 Shipyard Description and Location	12
2.02 Shipyard's Outreach	13
2.03 Project Background	14
2.04 Shipyard Area and Facilities	14
2.05 Production Planning and Scheduling	17
2.06 Boat Descriptions	18