ELIMINATING WASTE: ENHANCEMENT OF PRODUCTIVITY OF MANUFACTURING COMPANY

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This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Manufacturing Process) with Honours

By

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Author's Name : Mohd Fahmi Bin Ahamd

Date : 20 April 2010

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This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Process) with Honours. The members of the supervisory committee are as follow:

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ABSTRACT

This research addresses the application of the lean manufacturing to the continuous production or processes sector focusing on the automotive manufacturing company. The goal of this research is to investigate how the lean manufacturing can be enhanced the productivity. Throne the evaluation of the problems that have in the automotive manufacturing company and purpose the improvement. a part of that the main focusing is at the Assembly Engine (AE) production line. This research is attempt to identify bottle neck process at the automotive manufacturing industries where are the lean technique are directly applicable. Therefore, the objectives of this research are to implement the concept of lean manufacturing in the automotive manufacturing company, to analyze and identify the wastages, and lastly, to improve the productivity by reducing the wastages.

ABSTRAK

Tajuk projek ini ialah "Menghapuskan Pembaziran: Peningkatan Produktiviti Dalam Perusahaan Pembuatan." Kajian ini bertujuan untuk membahaskan penerapan nilai lean manufacturing untuk diterapkan ke dalam sistem pengeluaran atau sektor pengeluaran dengan memfokuskan pada perusahaan pembuatan kenderaan. Objektif daripada kajian ini adalah untuk menyiasat bagaimana lean manufacturing dapat meningkatkan produktiviti berdasarkan penilaian daripada masalah yang ada di perusahaan pembuatan kenderaan dan bertujuan membaiki proses pengeluaran yang ada di dalam bidang pemasangan injin kenderaan. Selain daripada itu kajian ini bertujuan untuk mengetahui tentang proses kritikal yang terlibat di dalam industri pembuat kenderaan. Oleh kerana itu, tujuan dari penelitian ini adalah untuk menerapkan konsep lean manufacturing di perusahaan pembuatan, untuk menganalisis dan mengenalpasti pembaziran, dan teknik, untuk meningkatkan produktiviti dengan mengurangkan pembaziran

DEDICATION

For my beloved parents and sister, for love, help, and support

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LIST OF ABBREVIATIONS

BMFP	–	Bachelor of Manufacturing Process
PSM	–	Projek Sarjana Muda
TPS	–	Toyota Production System
WIP	–	Work In Progress
VSM	–	Value stream Mapping
etc	–	etcetera
JIT	–	Just In Time
USA	–	United State of America
UK	–	United Kingdom
US	–	United State
UTeM	–	Universiti Teknikal Malaysia Melaka
FOL	–	Front of Line
EOL	–	End of Line
SMED	–	Single Minute Exchange of Die
TQM	–	Total Quality Management
TPM	–	Total Productive Maintenance
3PL	–	Third Party Logistic
JITD	–	Just In Time Distribution
JITP	–	Just In Time Purchasing
EDI	–	Electronic Data Interchange
AE	–	Assembly Engine
LET	–	Light Electronic Transducer
VOC	–	Value Outcome Cost
4M	–	Man, Machine, Material, Method
SH	–	Sub-Head
SA	–	Sub-Assembly
PDI	–	Process Department Inspection

CHAPTER 1
INTRODUCTION

1.1 Introduction

Lean manufacturing is a manufacturing strategy that seeks to produce a high level of throughput with a minimum of inventory. Instead of pushing product to the market, it is there pull through a system that are set up too quickly respond to customer demand.

Originally a Japanese methodology known as the Toyota Production System designed by some Japanese leaders such as Sakichi Toyoda, Eiji Toyoda, Taiichi Ohno and Shingeo Shingo, lean manufacturing centers on placing small stockpiles of inventory in strategic locations around the assembly line, instead of in centralized warehouses and minimize the consumptions of resource that added no value to a product. Lean manufacturing has been the symbol of efficiency and optimal performance since the 1980's, mainly due to its association with the automotive industry and Toyota. It has been shown to outperform the traditional production model of large batches on several occasions (Boyer et. al, 1997, Nakamura et. al, 1998). Toyota Production System (TPS) are often used interchangeably, and the philosophy they describe is the same: elimination of waste, maximization of efficiency, and continuous improvement. Converting into a lean strategy involves both operational changes and, also organizational changes. The Toyota Production System (TPS) was based on the desire to produce in a continuous flow, and the recognition that only a small fraction of the total time and effort to process a product added value to the end customer. This was clearly different on what was practiced by Western world. Lean production has now expanded and lean thinking has been applied to all aspects of the supply chain. There are many well documented examples of the

application of ‘lean thinking’ to business processes including project management (Womack & Jones, 1990). Lean can be applied to all aspects of the supply chain for maximum benefits within the organization are to be sustainable realized. The two biggest problems with the application of lean to business processes are the perceived lack of tangible benefits and the view that many business processes are already efficient. There are many tangible benefits associated with lean business processes. A lean business process will be faster, such as the speed of response to a request for the business process, and as most business processes are linked to organizational supply chains, then this can deliver significant financial benefits to a company (Melton, 2004). The perception that a business process is already efficient is all too often an illusion. Functionally, many business processes may appear very efficient, however the application of Lean Thinking forces us to review the whole supply chain in which the business process sits, and this frequently reveals bottlenecks and pockets of inefficiency (Womack et. al, 1990).

In addition to eliminating waste, lean manufacturing seeks to provide optimum quality by building in a method whereby each part is examined immediately after manufacture, and if there is a defect, the production line stops so that the problem can be detected at the earliest possible time. The lean manufacturing method has much in common with the Total Quality Management (TQM) strategy. Both strategies empower workers on the assembly line, in the belief that those closest to production have the greatest knowledge of how the production system should work. In a lean manufacturing system, suppliers deliver small lots on a daily basis, and machines are not necessarily run at full capacity. One of the primary focuses of lean manufacturing is to eliminate waste; that is, anything that does not add value to the final product gets eliminated. In this respect, large inventories are seen as a type of waste that carries with it a high cost. A second major focus is to empower workers, and make production decisions at the lowest level possible.

Basically, supply chain management factors heavily into lean manufacturing, and a tight partnership with suppliers is necessary; this facilitates the rapid flow of product and parts to the shop floor. Lean manufacturing strategies can produce excellent results. The

advantages of lean manufacturing include lower lead times, reduced set-up times, lower equipment expense, and of course, increased profits. It gives the manufacturer a competitive edge by reducing costs and increasing quality, and by allowing the manufacturer to be more responsive to customer demands.

1.2 Problem Statement

A progress of Assembly Engine (AE) department at HMSB Automotive Manufacturer is categorized as bottleneck in the production line of automotive manufacturer by the management. Those of the problems are:

a) Engine Assembly Department is no meet required output per shift which has been set by the department engineer. Thus, AE department from the other shifts are often required to work overtime.

b) An abnormal of cycle time during shift B (night), which caused the machine to be idled in addition and affected the other next processes.

c) The number of rejected item at AE department significantly high, and fail of firing tested (must be rework).

d) The consumption of AE department is very high compare with the number of output that is produced.

1.3 Objectives

The mainly purposes of this project research are:

- To investigate of non value added activities at engine assembly department at company HMSB.
- To analyze how the tools of lean manufacturing can give an impact to the car manufacturing environment.
- To purposes the lean manufacturing tools at engine assembly department at the car manufacturing industry with continues improvement activities.
- To minimized the consumption and increased the productivity of the company up to 85%.

1.4 Importance of the Study

The important of this study is to determine an effective lean manufacturing concept for different tool and technique. It will then decide where most effective of the lean tool and technique can be used. This will be followed by review of the process industry and study the finding regarding application of lean concept and implement it to continuous manufacturing industry particularly.

1.5 Scope of the Study

In order to understand the effect of lean tool in the process sector involved is used to illustrate the procedure of implementing lean tools at a process facility. That refers to a number of different lean techniques, including Takt Time, Kaizen, Line Balancing, and 5S and a few tool that are follow with the suitable of the process achievement. While the obvious result is to improve the performance, the ultimate objective can be achieved. The basics of lean manufacturing employ continuous improvement processes to focus on the elimination of waste or non value added steps within an organization. The challenge to organizations utilizing lean manufacturing is to create a culture that will create and sustain long-term commitment from top management through the entire workforce. Lean manufacturing techniques are based on the application of five principles to guide management actions toward success.

This research project is conducted in Universiti Teknikal Malaysia Melaka (UTeM) and all the data from HMSB Company.

CHAPTER 2
LITERATURE REVIEW

2.1 The History of Lean

After World War II Japanese, manufacturers were faces with the dilemma of vast shortages of shortages material, financial, and human resources. The problem that Japanese manufacturer were face with differences from those of their Western counterparts. These conditions resulted in the birth of the "lean" manufacturing concept. The Toyota Motor Company, led by its president Toyoda recognized that American automakers of an era were out - producing their Japanese counterparts, in the middle of 1940's American companies were outperforming their Japanese counterparts by a factor of ten. In order to make a move toward improvement early Japanese leader such as Toyoda Kiichiro, Shigeo Shingo, and Taiichi Ohno devised a new disciplined, process-oriented system, which is know today as the "Toyota Production System," or "Lean Manufacturing". Taiichi Ohno, who was given the task of developing a system that would enhance productivity at Toyota in generally, considered being the primary force behind this system. Taiichi Ohno drew upon some ideas from the West and particularly from Henry Ford's book "Today and Tomorrow". Ford's moving assembly line of continuously flowing material formed basis for the "Toyota Production System". After some experimentation, the "Toyota Production" System was developed and refined between 1945 and 1970, and still growing today all over the world. The basic underlying idea of this system is to minimized the consumption of resources that add no value to the product (eliminate waste). In order to compete in today fiercely competitive market, many manufacturing company have come to realize that the traditional mass production concept has to be adapted to the new idea of lean manufacturing.