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JUDUL: IMPLEMENTING KOBETSU KAIZEN STEPS IN A MANUFACTURING COMPANYSESI PENGAJIAN : 2004 / 2005Saya : MURUGAN A/L NAGARETINAM

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**NATIONAL TECHNICAL UNIVERSITY COLLEGE OF  
MALAYSIA**

**IMPLEMENTING KOBETSU KAIZEN  
STEPS IN A MANUFACTURING COMPANY  
GOODWAY RUBBER INDUSTRIES (M) SDN BHD**

Thesis submitted in accordance with the requirements of the National  
Technical University College of Malaysia for the Degree Bachelor of  
Manufacturing Engineering (Process)

By


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Faculty of Manufacturing Engineering

November 2005

## DECLARATION

I hereby, declare this thesis entitled “ Implementing Kobetsu Kaizen In A Manufacturing Company- Goodway Rubber Industries Sdn. Bhd” is the results of my own research except as cited in the reference.

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## ABSTRACT

With the Japanese re-export of several prominent management concepts such as total quality control (TQC), just-in-time production (JIT) and lean production, one common factor cited for operational excellence has received considerable attention during the last decade. The concept of KAIZEN has been introduced to the management arena, at times as the “missing link” in explanations for the widely noted operational excellence of Japanese firms. The first well-known and most frequently cited proponent of *kaizen* was Imai, who wrote *KAIZEN – The Key to Japan's Competitive Success* (1986). He outlined the concept, its core values and principles, its relation to other concepts and the practices used in the improvement process. Kaizen is a Japanese philosophy that means continual incremental improvement. “Kai” translates as Change and “Zen” translates as good or for the better. Implementation of the Kaizen system needs the involvement of all level of employees in a company. Manufacturing industries is the best place to implement the Kaizen project and evaluating its efficiency. This paper illustrates about Kaizen project at GOODWAY Rubber Industries (M) Sdn. Bhd. Goodway Rubber Industries is a well known re-tread tyre maker for automotives. The implementation is done at factory 4. The improvement project undertaken is based on line 2. Various losses and process downtime are affecting the specified process line. Kobetsu Kaizen 10 steps are used as guidelines to tackle the surfacing problems. The proposed Kaizen project would be able to increase the productivity, reducing abnormal time and eliminating the Six big losses recorded. The implementation of Kobetsu Kaizen steps in the production line number two have significantly increase the Overall Equipment Effectiveness (OEE) from 81.42% to 87.8% thus allowing an improvement of 6.38%. The contribution of Kaizen to the Overall Equipment Losses also records a decrease from 18.58% to 12.2%. The main concern of the project is to focus on performance losses which consists minor stoppages and speed loss. The elimination of losses results in higher productivity output and more decent work condition.

**Keywords:-** Kaizen, Productivity and Process improvement, Overall Equipment Effectiveness

## ABSTRAK

Peralihan konsep – konsep pengurusan seperti Total Quality Control (TQC), Just – In- Time (JIT) dan Lean Manufacturing adalah sumbangan daripada empayar perindustrian Jepun. Konsep – konsep pengurusan yang berteraskan penambahbaikan atau perubahan kepada sistem pengurusan konvensional kepada yang lebih cekap dan menguntungkan. Ia juga memberikan impak positif kepada sesuatu organisasi itu. Antara konsep yang terkemuka adalah Kaizen. Kaizen secara amnya telah diperkenalkan kepada firma- firma Jepun dan dikenali sebagai punca utama kegemilangan sektor perindustrian Jepun. Tokoh Kaizen pertama adalah Imai yang turut menerbitkan sebuah buku yang bertajuk KAIZEN- The Key To Japan's Competitive Success (1986). Beliau menggariskan nilai- nilai utama dan prinsip Kaizen, hubungannya dengan konsep- konsep lain dan cara yang digunakan dalam melaksanakannya. Kaizen adalah falsafah Jepun yang membawa maksud perubahan berterusan, “Kai” merujuk kepada perubahan dan “Zen” merujuk kepada yang lebih baik. Pengaplikasian Kaizen memerlukan penglibatan semua lapisan pekerja didalam sesebuah organisasi. Tempat terbaik untuk mengaplikasikan konsep Kaizen ini adalah di sektor pembuatan dimana kecekapannya dapat diuji secara menyeluruh dan berkesan.

Buku tesis ini menerangkan tentang projek Kobetsu Kaizen di Goodway Rubber Industries (M) Sdn. Bhd di kilang 4 di bahagian line 2. Goodway Rubber Industries (M) Sdn. Bhd adalah pengeluar produk tayar celup berkualiti dan terkemuka di dunia. Terdapat beberapa jenis pembaziran masa dan operasi berlaku di kawasan kajian. Pembaziran ini dikenali dan cara- cara pembaikan dijalankan selaras dengan konsep Kobetsu Kaizen sebagai panduan. Penggunaan konsep ini telah membawa perubahan dari segi peningkatan kecekapan mesin daripada 81.42% kepada 87.8%. Manakala, pembaziran masa dan operasi pada mesin dan cara bekerja telah dikurangkan daripada 18.58% kepada 12.2%.

## **DEDICATION**

*For My Beloved parents and wonderful family members.*

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**LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED  
NOMENCLATURE**

10m	-	10 meter
3m	-	3 meter
A	-	Availability Loss
JUSE	-	Japanese Union for Scientist and Engineers
KK	-	Kobetsu Kaizen
OEE	-	Overall Equipment Effectiveness
OEL	-	Overall Equipment Losses
P	-	Performance Loss
PTL	-	Precured Tyre Length
QCC	-	Quality Control Circle
SMED	-	Single Minute Exchange of Dies Program
SOP	-	Standard Operating Procedures
SPG	-	Superior Global Competitor
TPS	-	Toyota Production System
TQM	-	Total Quality Management
Y	-	Yield Loss

## CHAPTER 1

### INTRODUCTION

KAIZEN, pronounced by Ky Zen, is a Japanese philosophy that means continuous, incremental improvement. 'Kai' translates as Change and 'Zen' translates as good or for the better. When applied to the work place, it means continual improvement that involves managers and works alike (Vincent S.Palmer, 2001). The development of kaizen also known as continuous improvement is vital for a developing company to keep on moving with current market flow.

Kokuo (1996) describes Kaizen as a Japanese word meaning gradually and orderly, continuous improvement. The KAIZEN business strategy involves everyone in an organization working together to make improvements without large capital investments. As per explained, Kaizen contributes much to improvement of an organization or any working atmosphere. Kaizen can be applied to any area in need of improvement (Joseph C. Chen *et al.*,1997). In fact, the overall concept of continuous improvement appears to be relevant to every area of industrial and logistics activity, from the production of basic materials such as steel, aluminium and timber to manufacturing industries as diverse as automotive, furniture, canning, food and drink (Leigh Pomlet 1994). Kaizen strives toward perfection by eliminating waste. It eliminates waste to be any activity that is not value adding (Kevin O'Brien,2003).

## **1.1 OBJECTIVES OF STUDY**

Kobetsu Kaizen improvement method proves to be the backbone of every success companies. The objectives of the project are:-

1. To implement Kobetsu Kaizen improvement steps in Goodway Rubber (M) Sdn. Bhd.
2. To analyze and define the contribution of the case study done at Goodway Rubber.

## **1.2 SCOPE OF STUDY**

The project evolves in manufacturing company which practices kaizen improvement method in its production arena. The main concern of the study is to highlight the importance and impact of the kaizen continuous improvement project approach in manufacturing companies. The scope is narrowed to Goodway Rubber (M) Sdn Bhd in its production line. Factory 4 buffing section especially at line 2. What would be the manufacturing sector's alternative way of increasing productivity or reducing waste rather than conventional method? This question is highlighted in the further discussion and literature surveys which have been done. Apart from that, the case study was conducted through references made from Kobetsu Kaizen 10 steps, journals, books and websites which contain information about kaizen. The thesis paper also includes comparisons which are obtained by using the Kobetsu Kaizen method. A clear understanding of kaizen and its application in industry is the main concern of why the study is performed.

## **1.3 LIMITATIONS OF STUDY**

The study is limited to Kobetsu Kaizen and doesn't include any other improvement methods available around. The scope is narrowed to the Kaizen

application at Goodway Rubber and all relative information about it.

#### 1.4 BACKGROUND OF COMPANY

Goodway Integrated was incorporated in Malaysia under the Companies Act, 1965 on 19th June 2003 as a private limited company under the name of Prosperous Image Sdn Bhd. Subsequently, on 9th September 2003; it was converted to a public limited company and assumed its present name on 15th October 2003 (Company profile, 2004).

The Group is principally involved in the development, manufacturing and distribution of technical compounds, tyre compounds and other rubber related products. The Group also provides retreading services (Company profile, 2004). Since being founded in 1990, Goodway Rubber Industries Sdn Bhd has made deep in roads into the highly established rubber industry (Company profile, 2004).

Despite being the youngest player, Goodway has successfully harnessed its roaring energy to state-of-the-art German technological expertise in rubber compounding. The result is a consistent delivery of an impressive range of innovative and high quality products (Company profile, 2004). This delivery of excellence each and every time has earned Goodway the proud title, "*The largest retread rubber manufacturer in Asia.*" (Source: - Company profile, 2004).

Goodway now supplies an impressive range of retread materials and high quality technical rubber compounds to leading retread manufacturers, commercial vehicle proprietors, new tyre manufacturers along with Fortune 500 companies dealing in hoses and other rubber related products. Goodway's loyal customer base today spans over 50 countries including the Asia Pacific, Middle East, Oceania and the Americas (Company profile, 2004).

Goodway delivers a series of superior precured treads for the cold retreading process (vulcanization of retread tyres in a chamber or autoclave at temperatures ranging from 95°C to 120°C). Each precured tread has its unique tread pattern and utilizes a series of specially engineered compounds suited to various applications and targeted road conditions (Company profile,2004).

### 1.5 PROBLEM STATEMENT

Problem identification is vital in every project to be done. As per stated in the objective section of this paper, Kobetsu Kaizen Improvement Project is used as guideline to improve OEE and eliminating the OEL are discussed further in the next pages to come. The current working set-up contains losses from various factors. Losses are identified and rectified. The company found it to be a decline in production rate in the factory 4 buffing section. The output rate per day doesn't reach the target. There are two types of product in the section, 10m PTL and 3m PTL. Here are some of the descriptions of the problem. Refer to Table 1.0 below. There are two lines in producing the finished part in the buffing section. It involves manpower and conveyer to transport the PTL.

Description	3 meter PTL	10 meter PTL
Output Target	80 pieces/ Hour	30 pieces/ Hour
Current Output	59.72 pieces/ Hour	2.03 rolls/ Hour
Differences Between Target and Current Output	20 pieces	28 rolls
Decrease In Output Rate	25.35%	93.23%
Total Loss of Time	50.65 seconds	

Table 1.0:- Description of Output losses in the project line

Hence, it is obvious that there is a major loss in the line. The major losses in the line are identified and Kobetsu Kaizen 10 steps are followed gradually. Figure 1.0 at the next page shows the normal and abnormal time for each of the 11 processes involved in the project line. Take note that the abnormal time is higher than the normal time.

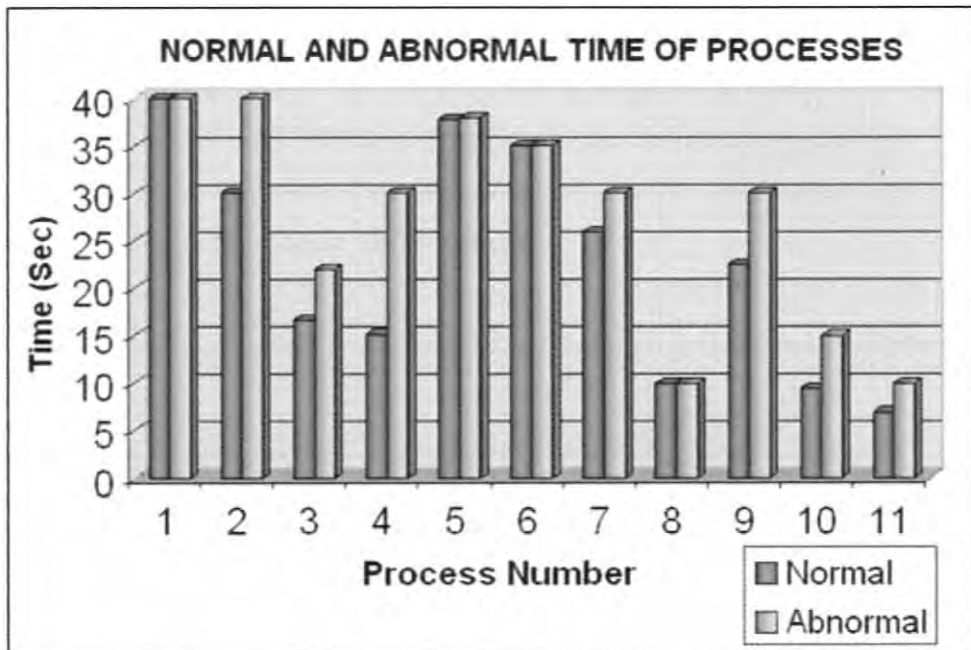


Figure 1.0:- Normal and Abnormal time differentiation  
 Source:- Goodway Rubber Industries (M) Sdn Bhd

## 1.6 PLANNING OF PROJECT

The duration of the project is four months. It took four months to fully adapt the Kobetsu Kaizen 10 steps as it requires much longer time for analysis and implementation time. The effectiveness of the countermeasures done was analyzed for a period of one month so that a more reliable and trustable data are gathered. Refer to Appendix C for the scheduling of the project.

## 1.7 ORGANIZATION OF THE REPORT

The report is logically organized into five (5) chapters and appendices:

*Chapter one* is the introduction and is composed of objectives, scope of study, limitations, background of company and problem statement.

*Chapter two* comprises literature review of all terminologies of KOBETSU KAIZEN, definition of Kaizen, History of Kaizen, Benefits of Kaizen, Overview of Kaizen philosophy, Principles of Kaizen, Ten steps of Kobetsu Kaizen and Overall Equipment Losses (OEL) and Six Big Losses Identifications.

*Chapter three* describes in detail the methodology followed in this research study.

*Chapter four* investigates the adoption and implementation of Kobetsu Kaizen improvement method in the production line number 2 of factory 4 Goodway Rubber Industries (M) Sdn. Bhd. The results of each step of Kobetsu Kaizen implementations are explained in detail in the sequence. Based on the data obtained from each step, a graphical tool in the form of a *cause and effect diagram* was used in studying and improving the processes to determine the root cause. Finally, a series comparison is done to prove the project has fulfilled the objective and target set by the group.

*Chapter five* is more concerned on discussion and conclusion. The overall improvements that have been done at the project line are evaluated and graphical comparison is done for every aspect such as OEE, OEL, Minor Stoppages and Speed loss. Comparison between before and after implementation is done and discussed. The Chapter is more emphasis on overall view as each of the comparisons has been explained in Chapter 4 briefly. Conclusion and recommendation for future studies are explained in brief.