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MALAYSIA**

**Quality Management System (QMS)
Implementation in Manufacturing
Industries**

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

By

Wan Haslinda Wan Hussin

Faculty of Manufacturing Engineering

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Alamat Tetap:
Lot 137, Lorong Madrasah
Kg Sg Tapah Tambahan
30020 Ipoh, Perak

Cop Rasmi:
NOR AKRAMIN BIN MOHAMAD
Pensyarah
Fakulti Kejuruteraan Pembuatan
Kolej Universiti Teknikal Kebangsaan Malaysia
Karung Berkunci 1200
Ayer Keroh, 75450 Melaka

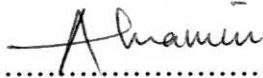
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.....

Main supervisor

Faculty of Manufacturing Engineering

NOR AKRAMIN BIN MOHAMAD

Pensyarah

Fakulti Kejuruteraan Pembuatan

Kolej Universiti Teknikal Kebangsaan Malaysia

Karung Berkunci 1200

Ayer Keroh, 75450 Melaka

DECLARATION

I hereby, declare this thesis entitled “Quality Management System (QMS) Implementation in Manufacturing Industries” is the results of my own research except as cited in the reference.

Signature :
Author's Name : WAN HASLINDA BINTI WAN HUSSIN
Date : 29th NOVEMBER 2005

ABSTRACT

The road to a quality organization is paved with the commitment of management. The quality management practices will enable a company to achieve its goals. The main thrust of a Quality Management System (QMS) is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. Quality Management means what the organization does to ensure that its products conform to the customer's requirements. Hence, the establishment of this research is an attempt to observe the implementation of Quality Management System (QMS) tools and techniques in the manufacturing industry. The tools and techniques observed are; Statistical Process control (SPC), Acceptance Sampling, Reliability, Design of Experiment (DOE), Failure Mode and Effect Analysis (FMEA), and Quality Function Deployment (QFD). Furthermore, this study significantly important to studied the effectiveness of Quality Management Systems tools and techniques that have been implemented in the industry. This research methodology focuses on examining the literature review. The literature reviews were obtained by reviewing the relevant topics from Internet, textbooks, journals, documents and other resources. According to the field research approaches, the survey data for this study has been conducted by questionnaires distribution. The data has been gathered within three states which are Perak, Selangor, and Wilayah Persekutuan Kuala Lumpur. This study concludes that, all of the companies have implemented the Quality Management System (QMS) awareness. However not all of the listed tools and techniques were use by the companied. The companies have rated the Statistical Process Control (SPC) which used by most companies as an excellent technique. Furthermore, this study probably requires to carry out in the extended of one techniques which focused in only five companies. This will result more information in this techniques which differentiation can be made among these five companies.

ABSTRAK

Perjalanan bagi sesuatu organisasi berkualiti adalah bergantung kepada komitmen pengurusan organisasi itu sendiri. Pengurusan berkualiti membolehkan syarikat mencapai sasaran yang diinginkan. Sistem pengurusan berkualiti adalah bagi mengenal pasti proses yang mana akan memberi impak pada kualiti produk dan proses. Ini baik berbanding mengesan kepincangan pada produk atau servis yang telah siap. Pengurusan berkualiti bermaksud usaha yang dilakukan bagi memastikan produk yang dihasilkan memenuhi kehendak pengguna. Oleh yang demikian, penyelidikan ini bertujuan memantau pelaksanaan teknik dan kaedah sistem pengurusan berkualiti di industri pembuatan. Ia juga bertujuan bagi melihat sejauh mana keberkesanan sistem ini. Bagi memperolehi maklumat yang berkaitan, kajian ilmiah yang memfokus kepada kaedah dan teknik sistem pengurusan berkualiti dijalankan. Kajian yang dijalankan adalah berkenaan kaedah dan teknik “Statistical Process control” (SPC), “Acceptance Sampling”, “Reliability”, “Design of Experiment” (DOE), “Failure Mode and Effect Analysis” (FMEA), and “Quality Function Deployment” (QFD). Maklumat bagi kajian ilmiah ini diperolehi dari rujukan menerusi internet, buku, jurnal, dokumen dan sebagainya. Bagi memperolehi maklumat yang berkaitan, borang soal selidik berkaitan pengaplikasian teknik dan kaedah sistem pengurusan berkualiti diedarkan kepada industri pempuatan. Borang soal selidik ini diedarkan pada tiga negeri iaitu Perak, Selangor, dan Wilayah Persekutuan Kuala Lumpur. Berdasarkan kepada soal selidik, kesemua industri yang memberikan maklumbalas telah mengaplikasikan sistem pengurusan berkualiti di syarikat masing-masing. Walaubagimanapun, tidak semua teknik dan kaedah yang disenaraikan digunakan dalam sesebuah syarikat. “Statistical Process Control” (SPC) telah diaplikasikan oleh hampir kesemua syarikat yang memberikan maklum balas. Pengaplikasian SPC dalam syarikat telah dikategorikan sebagai teknik yang sangat baik. Walaubagaimanapun, adalah disyorkan agar pada masa hadapan penyelidikan dilakukan berdasarkan pada satu teknik sahaja yang memfokuskan kepada lima syarikat. Ini bagi memperolehi lebih informasi berkaitan teknik yang digunakan dan perbandingan pengaplikasian boleh dilakukan berdasarkan kelima-lima syarikat ini.

DEDICATION

To my siblings;

Wan Hasliza binti Wan Hussin

Wan Haziq bin Wan Hussin

Wan Hasliyana binti Wan Hussin

For your love, encouragement, and support on this project was absolutely invaluable.

To my special person;

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For your patience whose always tested during writing this project. Your love, support and understanding are vital part of this research.

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For your love and demonstration the values of education since I'm still a little kid.

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Wan Haslinda binti Wan Hussin
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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
QMS	-	Quality Management System
SPC	-	Statistical Process Control
DOE	-	Design of Experiment
FMEA	-	Failure Mode and Effect Analysis
QFD	-	Quality Function Deployment
MNC	-	Multinational Corporation
SMI	-	Small and Medium Industry



CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The road to a quality organization is paved with the commitment of management. If the management is not totally behind this effort, the road will be filled with potholes, and the effort will drag to halt. A keen sense of involvement is a prerequisite for this journey because, like any journey of import, the company will sometimes find itself in uncharted territory. Company policies must be carefully formulated according to principle of a quality program.

The quality management practices will enable a company to achieve its goals. These practice start at the top, where top management creates the road map, they continue with middle and line management, who help the employees follow the map. With an ever –watchful eye on the satisfaction of the customer, the entire workforce embarks on an intensive study of product design and process design.

The International Organization for Standardization's ISO 9000 series describes standards for a QMS addressing the processes surrounding the design, development and delivery of a general product or service. Organizations can participate in a continuing certification process to demonstrate their compliance with the standard. A QMS can be defined as:

“A set of co-ordinate activities to direct and control an organization in order to continually improve the effectiveness and efficiency of its performance.”



These activities interact and are affected by being in the system, so the isolation and study of each one in detail will not necessarily lead to an understanding of the system as a whole. The main thrust of a QMS is in defining the processes, which will result in the production of quality products and services, rather than in detecting defective products or services after they have been produced. Quality Management means what the organization does to ensure that its products conform to the customer's requirements.

1.2 RESEARCH OBJECTIVES

The study is aimed to achieve the following objectives:

- a) The project was to find out the implementation of Quality Management System tools and techniques in the manufacturing industries.
- b) This project also studied the effectiveness of Quality Management Systems implementation in the industries.

1.3 RESEARCH SCOPES

The scopes are focusing on certain quantitative QMS tools and techniques that been used by manufacturing industries. Types of tools discussed are:

- a) Statistical Process Control (SPC)
- b) Acceptance Sampling
- c) Reliability
- d) Experimental Design
- e) Failure Mode and Effect Analysis (FMEA)
- f) Quality Function Deployment (QFD)



1.4 PROBLEM STATEMENTS

The problem statement is to study the Quality Management System (QMS) tools and techniques that been used by manufacturing industries. In order to achieve quality management, certain tools and techniques have been used. In this study, tools and techniques that been used were defined. Certain management didn't use the tools and techniques even though there are many types of it. These tools and techniques will give helps management to achieve targets, improve customer satisfaction, increase productivity and etc. However, there are companies which are using the tools but still didn't achieve any improvements.

The aim of this study is to observe the implementation of quality management system in the manufacturing industry and its performance in the industry. However, the study will be based on the tools and techniques which might be used by management to ensure that its products conform to the customer's requirements. The tools and techniques discussed are the Statistical Process Control (SPC), Acceptance Sampling, Reliability, Experimental Design, Failure Mode and Effect Analysis (FMEA) and Quality Function Deployment (QFD).

1.5 LIMITATION OF STUDY

This are several problems will be faced during conducted the project research. The problems that needed to be considered are:

1.5.1. Time Constraint

In preparing and conducting the report, the researcher needed long duration to collect the data and make analysis about the research. So, in order to produce a better research, it needs to have a longer time than currently.



1.5.2. Lack of Experience and Knowledge

The researcher still lack of knowledge and experience in doing research comprehensively but researcher try to work hard and committed to complete the research properly.

1.5.3. Lack of Cooperation from Respondents

Not all the respondents are willing to answer the questionnaires. Lack of cooperation from the respondents are also happen because maybe they are busy in performing jobs and sometimes refuse to answer some of questions. In addition, some respondents also not return back the questionnaire given to them. This had caused delay in getting the data needed.

1.5.4. Accessibility of Data

The researcher needs to ask the permission from the management before take out any information regarding to the operation of the company. Generally, there are some data that are important to the organization, which is secret and confidential. The organization cannot distribute to the data to outside parties. This is to avoid any misuse of information of the company. Therefore, it is difficult to obtain some of the information related to the study, which considered as confidential.

1.5.5. Concentration and Commitment

This project paper is one of the subjects that should be taken during final semester in order to accomplish the program. Thus, a full concentration and commitment on this research is not possible.



CHAPTER 2

LITERATURE REVIEW

2.1 QUALITY MANAGEMENT SYSTEM

2.1.1 Definition of Quality

The word "quality" shows a concern for customer satisfaction. Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs. Some goals of quality programs include:

- a) Fitness for use. (Is the product or service capable of being used?)
- b) Fitness for purpose. (Does the product or service meet its intended purpose?)
- c) Customer satisfaction. (Does the product or service meet the customer's expectations?)
- d) Conformance to the requirements. (Does the product or service conform to the requirements?)



2.1.2 Definition of Management

Management characterizes the process of leading and directing all or part of an organization, often a business, through the deployment and manipulation of resources (human, financial, material, intellectual or intangible). Management also has a responsibility to innovate and improve the functioning of the organization. There are 5 management functions and they are planning, organizing, leading, coordinating and controlling.

In manufacturing, management is an area of business that is concerned with the production of goods and services, and involves the responsibility of ensuring that business operations are efficient and effective. It is the management of resources and the distribution of goods and services to customers. It also refers to the production of goods and services, the set of value-added activities that transform inputs into many outputs.

2.1.3 Definition of System

A system is a group of interrelated component working together towards a common goal by accepting input which went through a certain process to produced output. Basically containing a group of related element such as;

- a) Input - Involves capturing and assembling elements that enter a system to be processed. Example; raw material, data, human effort.
- b) Process - A process that convert input into output. Example; manufacturing process, mathematical calculation
- c) Output - Involves transferring element that been produced to destination. Example; finished products



2.1.4 Definition of Quality Management System

A Quality System (QMS) is a system that outlines the policies and procedures necessary to improve and control the various processes that will ultimately lead to improved business performance. One of their purposes is quality control in manufacturing.

Traditional quality systems in manufacturing focus primarily on technical issues such as equipment reliability, inspection, defects measurement and process control. (Evans J.R and Lindsay W.M., 2005)

2.2 QUALITY MANAGEMENT SYSTEM (QMS) IMPLEMENTATION IN MANUFACTURING INDUSTRIES

Burgess (1999) state, any good quality management system should have as its foundation comprehensive reviews of new products and processes. Design reviews must begin early, when the design is still flexible, and extend to qualification of the initial product produced and the process producing it. A quality system that permits either skipping review steps or making them superficial can lead to serious quality problems.

Bhuiyan and Alam (2005) explain, understanding the quality system, the implementation requirements and the benefit was crucial to make the system effective at the grass-roots level. From the start, many employees misunderstood the perception of the quality effort. A number of key people considered the effort to be useless, believing that the status quo was good enough as the quality of their products was considered best on the market. Furthermore, the Quality system implementation assembly supervisor believed that tracking defects at the inspection stage meant that the company had good internal quality. As a result, not everyone seriously committed to making the changes needed to successfully implement a quality system.



Van Der Wiele and Brown (2002) said that the quality management philosophy has gone through a process of change itself. It started in the 1980s in the Western world as a motivational drive to change work environments in order to become more customer oriented and develop a competitive advantage. It has stimulated the development and use of many tools and techniques which can be used to improve processes and to prevent problems. Now, quality management is being linked to and intergrated with company management systems, e.g. the ISO 9000 series and the management systems, related to the quality awards models. Organization with high level of quality maturity have been able to integrate the quality management systems into their normal day-to-day fabric of managing the business and by doing so, the glamour and enthusiasm around the philosophy has gone, although many of the core principles have been installed. Quality is now seen strongly as means to an end rather than end in itself.

Lee S.F. *et al.* (1999) state, being the major part of management responsibility within the quality management system, management should establish and maintain a proper documented quality system as the means of ensuring product conformance to the specified requirements. Besides, management should also be concerned with the initiation, development, implementation, and maintenance of the quality system.



2.3 IMPLEMENTATION OF QMS TOOLS AND TECHNIQUES IN MANUFACTURING INDUSTRIES

Tools and techniques are practical methods, skills, means or mechanisms that can be applied to particular tasks. Among other things they are used to facilitate positive change and improvements, (McQuater *et al.*, 1995).

The management focus and commitment phase required the use of data analysis tools (e.g. cause and effect analysis, flow charts and Pareto analysis) to identify problem areas, quantify their effects and prioritize the need for solution. During the intensive improvement phase the introduction of more complex tools (e.g. statistical process control (SPC) and failure mode and effects analysis (FMEA) helped to facilitate company-wide improvement but was dependent on the understanding and deployment of the other more basic tools introduced earlier.

The quality management tools and techniques were applied in the organization at different times during the period from 1987 to the end of 1994 (see Figure 2.1). In the early stages, the tools and techniques were applied in a haphazard manner, without serious thought to the implications on the long-term development of the improvement strategy and process. The choice of tools and techniques was also affected by the resources available within the company to facilitate their successful introduction. By the end of 1994 a wide range of tools and techniques was being applied in different parts of the organization for different reasons but the major utilization was by the quality improvement facilitators and by quality improvement teams, (Bunney and Dale, 1997).

The most successful application of tools and techniques was during the quality improvement team meetings. While focusing on a particular problem, the application of Pareto charts, control charts and flowcharting became a positive help rather than just another new tool or technique, as previously perceived.