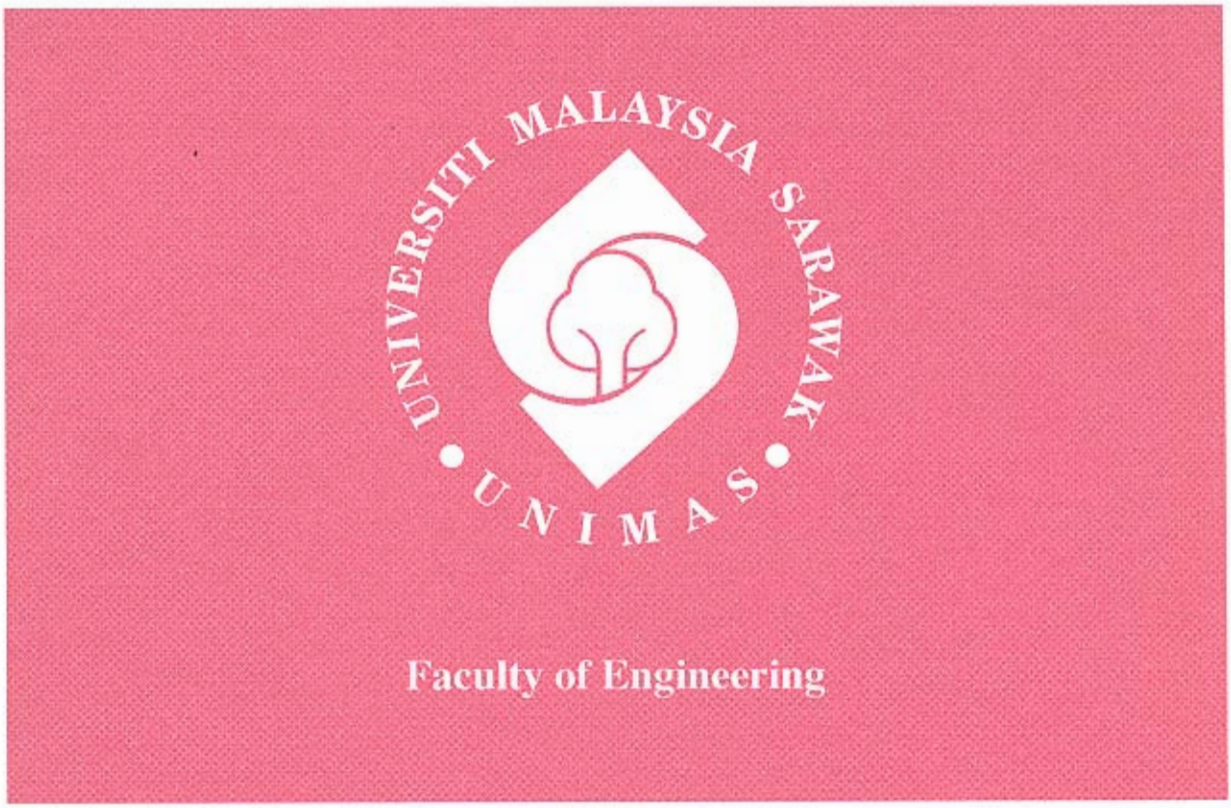

STUDY ON HUMAN WORKING BEHAVIOUR IN AUTOMATED AND MANUAL MANUFACTURING SYSTEM

Sharina Binti Segri

Bachelor of Engineering with Honours
(Mechanical and Manufacturing Engineering)
2013

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STUDY ON HUMAN WORKING BEHAVIOURS IN AUTOMATED AND MANUAL MANUFACTURING SYSTEM

SHARINA BINTI SEGRI

Thesis is submitted to

Faculty of Engineering, Universiti Malaysia Sarawak

In Partial Fulfillment of the Requirements

For the Degree of Bachelor of Engineering

With Honours (Mechanical and Manufacturing Engineering) 2013

To my beloved family, lecturers and friends…

ACKNOWLEDGEMENT

I would like to extend my sincerest gratitude towards my project supervisors, Dr. Syed Tarmizi Syed Shazali for his guidance and encouragement in accomplishing this dissertation. I would also like to thank my family and friends who have ceaselessly supported me throughout this report. My deep appreciation goes to the companies that involve by giving their cooperation as a case study in this report.

ABSTRAK

Manusia merupakan peranan yang penting dalam semua bidang kerja termasuk sektor pembuatan. Projek ini membincangkan tingkah laku manusia yang bekerja di dalam sistem pembuatan automatik dan manual dan membandingkan kesan sistem pembuatan yang berbeza terhadap pekerja. Tingkah laku manusia di tempat kerja kadang-kadang boleh membawa kepada kesilapan manusia yang menyebabkan berlakunya pengeluaran yang kurang memuaskan dan berlakunya kecederaan di tempat kerja. Kawasan kajian ini meliputi tenaga kerja di bahagian pengeluaran dan beberapa pekerja telah dipilih untuk menjadi sampel kajian ini. Keputusan diperoleh melalui kaedah soal selidik, temubual dan pemerhatian di mana tiga syarikat telah dipilih untuk kajian ini. Haisil kajian menunjukkan para pekerja mempunyai corak kelakuan yang sama walaupun mampunyai sistem pembuatan yang berlainan. Interaksi antara rakan sekerja perlu diperbaiki dan interaksi manusia dan-mesin adalah baik. kebanyakkan pekerja yang ditemui menyatakan bahawa mesin di tempat kerja adalah selamat dari segi langkah-langkah keselamatan. Pengendalian dan penyenggaraan jentera perlu diteliti untuk mengekalkan kualiti pengeluaran. Ia juga menunjukkan bahawa hubungan antara manusia dan mesin juga boleh dikaitkan kerana interaksi manusia-mesin memberi kesan ke atas produktiviti keseluruhan sesebuah syarikat.

ABSTRACT

Human possesses an important role in any workplace including the manufacturing sector. This project discusses the human working behaviour in automated and manual manufacturing system such as human-human interaction, human-machine interaction and to compare the effect with different manufacturing system towards the employee. Human working behaviour can sometimes lead to human error which explains the reasons for the occurrence of deviation in production. The area of interest for this study is the work force at the shop floor area, where a sample of respondent is chosen for this purpose. Results are obtained through the methods of questionnaires, interviews and observation where three companies are selected for this study. It is observed that the most human operator behave in a similar pattern in different type of manufacturing system. The interaction between colleague need to be improved and human-machine interaction is adequate as the workers mostly found that the machine is safe in term of safety measures in the shop floor. The handling and maintenance of the machinery need to be good in order to maintain the quality of the productions. It is also observed that the relationship between human and machine can also be related since the human-machine interaction gives impact on the overall productivity of the company.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This study discusses the human working behaviours in automated manufacturing system semi-automated and manual manufacturing system. Human behaviours plays major role in the operation of machinery and manufacturing planning. Nowadays there many factories are choosing to use modern technology that acquires more automated system to handle the operation, but it seems like some of the small factories that still use the manual system to handle their operation. In manufacturing system, the main objective is to achieve a better service and production. Manufacturing is an important commercial activity, carried out by companies that sell products to customers. The type of manufacturing performed by a company depends on the kinds of products it makes. Manufacturing industry consists of enterprises and organizations that produce and/or supply goods and/or services. Industry can be classified as primary, secondary and tertiary. The details of manufacturing system will discuss in Chapter 2. The manual manufacturing system is productions that consists of a sequence of workstations where assembly task are performed by human. At each station, a worker performs apportionment of the total work on the unit. Automated manufacturing system consists

of multiple workstations that are automated and linked together by work handling system that transfer part from one station to the next station. This study focuses on human interaction with different types of manufacturing system and how it affects their work.

1.2 Overview of The Study

Malaysia's manufacturing industry has been charting remarkable growth since the early 1980s when the country witnessed a transition from being a predominantly agricultural economy to one that was industrial-based. Today, the manufacturing industry continues to develop rapidly and has since become an important catalyst to the country's economic growth.

In manufacturing industries, there a lot of people involve and human behaviours contributes to its production quality. Human conditions, such as fatigue, complacency, and stress along with many others, are called human factors. Human factors directly cause or contribute too many incidents. It is universally agreed that 80 percent of maintenance errors involve human factors. If they are not detected, they can cause events, worker injuries, wasted time, and even accidents. (Riley et al., 2008).

1.3 Problem Statement

In order to keep up with customer demand, the workers at manufacturing company have to work harder. Meanwhile, they have to think of their needs and well being. Their life may be affected due to the hectic and hazardous environment or the pressure from the work that they do to maintain an excellent job. It is important to achieve a good quality of work. Human behaviours related a lot towards their performance in work. In this project, the human behavior in manual and automated manufacturing system will be analyzed to compare the effect with different manufacturing system towards the employee. The author focuses on human performance at shop floor. This includes human interaction with machines, human interaction between themselves, safety and working shift.

1.4 Objective of Study

The main objective of this report is to study the human working behaviours in automated and manual manufacturing system. Therefore, the following are the objective of this study:

a) To identify the human working behaviours in different manufacturing systems in the work place;

b) To clarify the different human behaviour between different manufacturing systems and;

c) To analyze and reconfigure workstations environment that are able to produce high quality end products.

1.5 Scope of Study

The scope of this topic will include:

a) Recognizing human working behaviours in workplace with two different manufacturing systems

b) The study on the impact of human working behaviours based on the different manufacturing systems

c) The analysis and evaluation based on the effects of human working behaviours in performance of work

1.6 Methodology

Methodology is a step that carried out to achieve the objective and scope of the study.

i. Stage 1: Literature review

The literature review provides the information and researches that have been done previously about the study. It includes the human behavior, manufacturing system and how human behaviours affects the works in manufacturing industry

ii. Stage 2: Data collection method

The data collections are from the internet, books, questionnaires and interviews. Questionnaires and interviews are carried out at selected manufacturing companies.

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iii. Stage 3: Result Analysis

Result analysis discusses the findings from the data collected.

iv. Stage 4: Discussion

The discussion concludes the project report. This includes the achievement of the objectives that were stated before.

v. Stage 5: Summary

The outcome of the report must meet the objectives of the final year project.

1.7 Expected Outcome

By the end of this research, the author expects to determine the human working behaviours in manual and automated manufacturing systems and how it affects their works.

1.8 Summary

Manufacturing industries have significant effects on human working behaviours. Understanding the manufacturing system and the working environment can improve the human working behaviours to a suitably related behaviours and production quality in the industries. The overview of human behaviours and manufacturing system is discussed in the next chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter starts by introducing the concept of a manufacturing system and its classification. It explains several of human working behaviours that exist in manufacturing industry. Anli (2008), stated that modern manufacturing enterprises are becoming more global than ever that encompassed owned or contract manufacturing and transportation facilities, suppliers, distributors, and customer service centers scattered over the globe. The expectation of this research is to investigate human behaviours between automated and manual manufacturing system. The research is conducted with particular attention to manual and automated assembly flow lines.

2.2 Manufacturing Systems

The word Manufacturing was derived from the Latin words *manus* (meaning 'hand') and *facere* (meaning 'to make'). In late Latin, these were combined to form the

word *manufactus* meaning 'made by hand' or 'hand-made'. Indeed, the word factory was derived from the now obsolete word *manufactor*.

Manufacturing is defined in Collins English Dictionary (2000), as " to process or make a product from raw material, especially as a large-scale operation using machinery; once processed, it should have worth in the market or value". Therefore, in Scallan (2003), manufacturing is 'adding value' to the material. It is supposed to be cost-effective and to generate income through sales for the manufacturing organization.

From Chryssolouris (1992), state that manufacturing system can be defined as the arrangement and operation of machines, tools, material, people and information to produce a value-added physical, informational or service product whose success and cost is characterized by measurable parameters.

By Palm and William (1999), a system is a combination of elements intended to act together to accomplish an objective. The systems approach to problem solving views a system as a set of interconnected elements and tries to understand the system performance.

In general terms, based on the above definition, a manufacturing system can be defined as a system in which raw materials are processed from one form into another form, known as a product, gaining a higher or added value in the process and thus creating wealth in the form of a profit.