ASSESSMENT OF WORKING POSTURE AT DIFFERENT WORKSTATION DESIGN FOR SOCKET ADAPTER ASSEMBLY USING RULA METHOD

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Assessment of Working Posture at Different Workstation Design in Socket Adapter Assembly Using RULA Method

Report submitted in accordance with the requirements of the Universiti Teknikal Malaysia Melaka for the Bachelor Degree in Manufacturing Engineering (Manufacturing Management) with Honours

By

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Faculty of Manufacturing Engineering

April 2008

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JUDUL: ASSESSMENT OF WORKING POSTURE AT DIFFERENT WORKSTATION DESIGN IN SOCKET ADAPTER ASSEMBLY USING RULA METHOD

SESI PENGAJIAN: 2007/2008

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Author's Name	:	Mohd Azmil Bin Ariffin
Date	:	……

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APPROVAL

This PSM submitted to the senate of Universiti Teknikal Malaysia Melaka (UTeM) and has been as partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Management) with Honours. The member of the supervisory committee is:

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MR. ISA HALIM

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ABSTRACT

The workstation design is a important thing that must be studied **as** it influences the productivity of industry**.** To obtain safe workstation design study on working posture should be taken into account so that the users will be more safe and productive. This study was carried out to assess working posture of workers while they performing assembly of socket adapter of different workstation design i.e. table height, working position and using jig or not. Rapid Upper Limbs Assessment (RULA) was used as a tool to determine the impact of different workstation design on workers posture. Based on obtained results, the author revealed that workstation design 103 cm (standing with jig) is the safest to the worker. From the conducted study, the author concluded that safe working is directly determined by the design of workstation.

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ABSTRAK

Rekabentuk tempat kerja adalah perkara yang amat penting untuk dikaji kerana ia akan mempengaruhi produktiviti sesuatu industri.Untuk mendapatkan rekabentuk tempat kerja yang selamat, posisi kerja mesti dikaji dan dititikberatkan untuk menjamin keselamatan dan produktiviti pengguna.Kajian ini dilaksanakan untuk menilai posisi kerja semasa pekerja melakukan proses memasang soket penyesuai pada rekabentuk kerja yang berlainan berdasarkan ketinggian meja, posisi kerja dan menggunakan *jig* atau tidak. *Rapid Upper Limbs Assessment (RULA)* telah digunakan sebagai alat untuk menilai kesan posisi kerja terhadap anggota badan pekerja.Berdasarkan keputusan kajian, penulis mendapati rekabentuk kerja pada ketinggian 103 cm (berdiri dengan menggunakan *jig*) adalah yang paling selamat kepada pekerja.Hasil dari kajian penulis membuat kesimpulan bahawa rekabentuk tempat kerja adalah penentu untuk mendapatkan posisi kerja yang selamat.

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DEDICATION

For my beloved parents:

Ariffin Bin Ahmad

Ramlah Bt Ibrahim

And for my adored brothers and sisters:

Mohd Adilah Bin Ariffin

Mohd Arif Bin Ariffin

NurAzlina Bt Ariffin

Mohd Aslam Bt Ariffin

Nuramirah Bt Ariffin

Nuratifah Bt Ariffin

Nurakmar Bt Ariffin

Nurazimah Bt Ariffin

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Mohd Azmil Bin Ariffin.

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

IE	-	Industry Engineering
CTD	-	Cumulative trauma disorders
MSD	-	Musculoskeletal disorder
RULA	-	Rapid Upper Limb Assessment Analysis
REBA	-	Rapid Entire Body Assessment
IEA	-	International Ergonomic Associations
OSHA	-	Occupational Safe and Health Act
CATIA	-	Computer Aided Three dimensional Interactive Application
CAD	-	Computer-aided design
CAM	-	Computer-aided manufacturing
CAE	-	Computer-aided engineering

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CHAPTER 1
INTRODUCTION

This chapter provides information of background of study, problem statement and objectives of study. Besides that, it also contains the scope and limitation, potential benefits and project outline.

1.1 Background of study

Nowadays, workstation design is the important things that must be studied seriously because the condition of the workstation design will effect to all system in industry. Basically a workstation is meaning the place that a worker occupies when performing a task or job. Usually the worker will stay in long term at a workstation where work is done. Some examples of workstation design are work standing or work sitting for machine operation, assembly or inspection. A good designed of workstation is very important because it will be prevent diseases that related to poor working posture and automatically will ensure that work is productive.

Every design of workstation should be consider with the worker condition and the task so the work will be perform in comfortable, productive and efficiently. To find the good workstation design, ergonomics guideline is the exactly method that must to use. Ergonomic research become the integral part in design the workstations. The implementation of the proper workstation design will help the worker to maintain a correct and comfortable body posture. This is very important because awkward body

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posture or repetitive work will cause a lot of problem such as back injury, static muscle effort, cumulative trauma disorders (CTD) and so on. This study will investigate the productivity, quality and human factor on workstation design based on anthropometry and productivity of the subject by using socket adaptors as sample with several of workstation design. This continuation study will be done at Industry Engineering (IE) laboratory at Fasa B.

1.2 Problem Statement

The main factor in workstation design is to reduce the harmful posture and can make the worker done their job with comfortable in long term suitable with their capability. Many painful afflictions of musculoskeletal system are associated with the working posture.

(a) Static posture in poorly designed workstation was attributed to neck and upper extremity loadings (Sillanpaa et al., 2003).

(b) Poor work design, a product which was difficult to assemble, and organizational lack of were the reasons for such performance and quality problems. Ergonomics problems lead to the worsening of worker performance, which ultimately leads to quality deficiencies (Majorkumar Govindaraju et al, 2001).

(c) Inadequate posture from an improperly designed workstation causes static muscle effort, eventually resulting in acute localized muscle fatigue and consequently in decreased performance and productivity and in enhanced possibility of operator related health hazards (Corlett *et al*, 1982).

This study will investigate the productivity, quality and human factor on workstation design based on anthropometry and productivity of the subject by using socket adaptors as a sample.

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1.3 Project Objectives

The objectives of this project are as follow:

(a) To assess working posture of workers while they performing socket adaptor assembly at different table height, 91 cm and 103 cm.

(b) To analysis the working posture of workers while performing socket adapter assembly at the different working position, standing and sitting position.

(c) To evaluate working posture of worker while they performing socket adapter assembly with or without assistance device like the jig.

1.4 Scope and Limitation of Study

The scope of this study is focus on assessment of workstation design for safe working posture of workers while they performing socket adaptors assembly. The result of this study can help us to find the good manner how manage the work at workstation design through the RULA analysis. In this study, only the certain parameters that are focus like table height, working position (standing and sitting) and assistance devices (jig). In addition, various variables also will be used such as table height to find the optimum design of workstation.

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1.5 Potential Benefits of Study

The potential benefits can be obtained from this study:

(a) It can help to assess a good workstation design for safe working posture suitable to human limitation and capability.

(b) Good workstation design that means the worker can give the optimum performance and automatically will be impact the productivity.

(c) Can be good references for students or academic studies related to the ergonomics application in industry.

(d) The result of this study also can be a guideline to evaluate a new workstation design to make work more productive and effective.

1.6 Report Outline

This study generally has six chapters:

Chapter 1 Introduction

Chapter 1 is about introduction in general of problem statement, objectives, scope and limitation of study, potential benefits and also project online and project structure.

Chapter 2 Literature Review

This chapter 2 is about the literature review. The detail about the project will discuss more clearly in this chapter related to the journal. All the definition and the scope of study will be explain in detail such as ergonomic, working posture and human factor.

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Chapter 3 Methodology

Chapter 3 will cover about the methodology. All the method, descriptive, theoretical, analytical techniques and relevant experiment that use to find the data fill will be discussed in this chapter.

Chapter 4 Case Study

This chapter is review about the case study and this study will cover about the human factor and working posture at several of workstation design.

Chapter 5 Result and Discussion

Chapter 5 is about the result and discussion of this study. This chapter provides a general discussion on the results of the study and implications of the findings base of the research project.

Chapter 6 Conclusion and Recommendation

This chapter is the last chapter and contains the summary and conclusion of the entire work, including methods, results, major conclusions and recommendations from the work. In this chapter all the all recommendation and suggestion for improvement will be highlight.

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1.7 Structure of Report

In Figure 1.1 shows the content of each chapter.

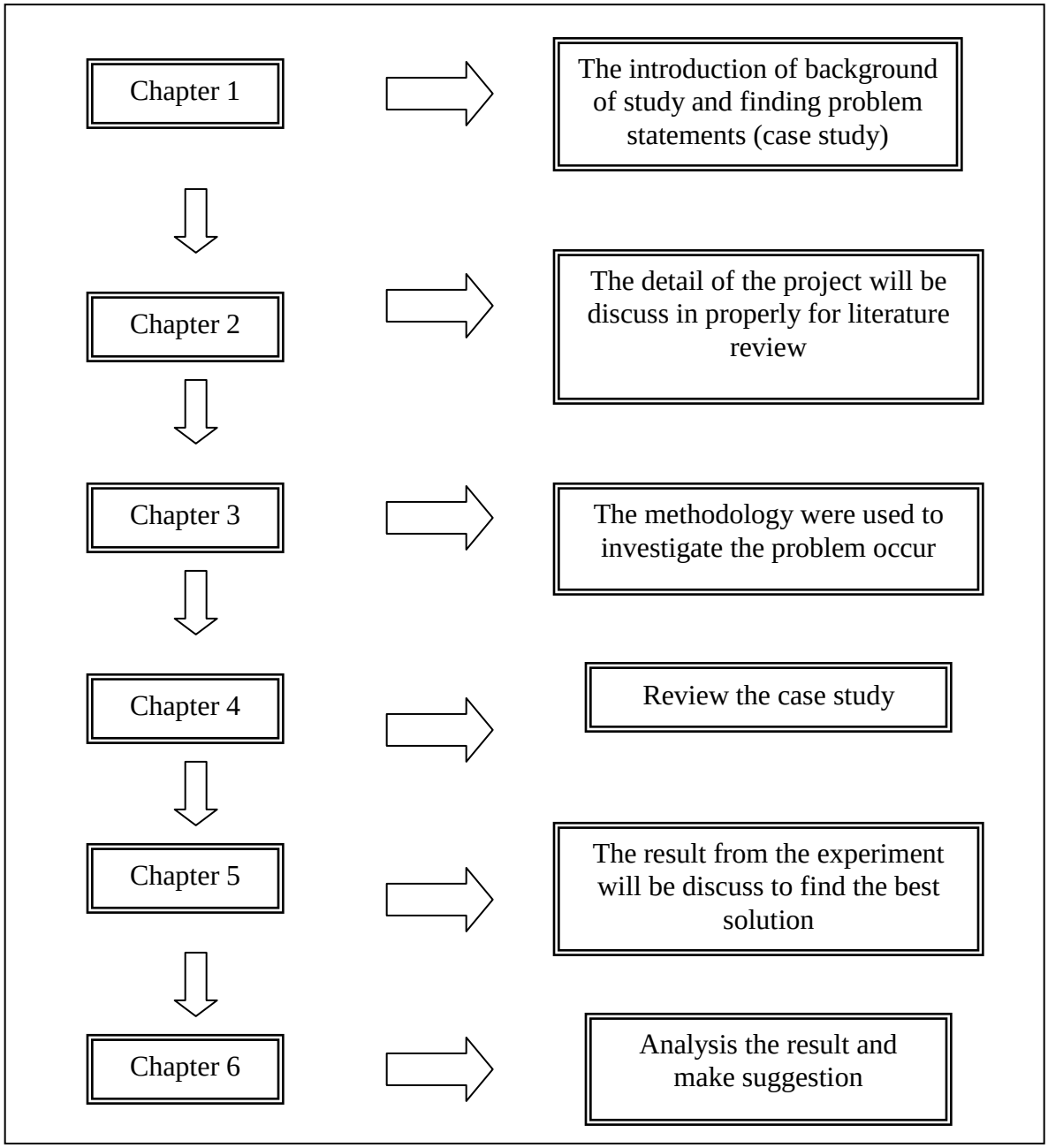

Figure 1.1: Structure of report

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