UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Work Related Musculoskeletal Disorder Assessment of Jointing Cable Operation

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

By

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I hereby declare that this report entitled "**Work Related Musculoskeletal Disorder Assessment of Jointing Cable Operation**" is the result of my own research except as cited in the references.

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Date **:**

APPROVAL

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

……..…....…

Supervisor

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ABSTRAK

Sistem otot adalah sistem organ yang memberikan kemampuan seseorang untuk menggerakkan otot dan sistem rangka. Dalam sistem tubuh, penyakit dan gangguan boleh menjejaskan fungsi dan keberkesanan sistem. Pekerjaan yang berkaitan dengan gangguan muskuloskeletal berlaku ketika terdapat ketidaksesuaian antara keperluan fizikal pekerjaan dan kemampuan fizikal dari tubuh manusia. Penyelidikan ini bertujuan untuk mengenalpasti sikap canggung di mana terjadi ketika penyambungan kabel. Kaedah ini akan diamati ketika kabel sambungan dijalankan dan juga beberapa kajian mengenai peringkat yang dirasakan oleh pekerja untuk mengenal pasti bagaimana kerja berat dan berat terasa, menggabungkan semua sensasi dan perasaan stres fizikal, usaha, dan kelelahan. Semua data yang diambil akan dilakukan analisa oleh Rapid Upper Limb Assessment, RULA. RULA adalah alat skrining yang menilai beban BIOMEKANIK dan kedudukan pada tubuh dengan perhatian khusus pada batang, leher, dan ahli-ahli badan atas. Suatu penilaian Rula memerlukan sedikit masa untuk menyelesaikan dan skor menghasilkan sebuah senarai aksi, yang menunjukkan tahap campur tangan yang diperlukan untuk mengurangkan risiko kecederaan akibat beban fizikal pada operator atau pekerja. Akhirnya hasilnya akan dibincangkan untuk mencapai matlamat dan juga mencadangkan pembaikan ergonomik dalam kerja penyambungan kabel.

ABSTRACT

Musculoskeletal system is the organ system that gives people the ability to move muscles and skeleton system. In this body system, diseases and disorders that can affect the function and effectiveness of the system. Work related musculoskeletal disorders occur when there is a mismatch between the physical requirements of the job and the physical capacity of the human body. This study purpose to identify the awkward posture where occur during cable jointing. The method will be observed during cable jointing also some survey and rating of perceived by worker to identify how heavy and strenuous the working feels, combining all sensations and feelings of physical stress, effort, and fatigue. All data taken will be analysis by The Rapid Upper Limb Assessment, RULA. RULA is a screening tool that assesses biomechanical and postural loading on the body with particular attention to the neck, trunk, and upper limbs. A RULA assessment requires little time to complete and the scoring generates an action list, which indicates the level of intervention required to reduce the risks of injury due to physical loading on the operator or worker. Finally the result will be discussed to achieve the objective and also propose an ergonomics improvement for the cable jointing task.

DEDICATION

For my beloved parents:

ALLAHYARHAM Omar Bin Abu Hassan & Mrs Zaliha Binti Nikmat

For my supportive siblings

Zool Fadli Bin Omar & Wife

Sirajul Fahmi Bin Omar & Family

Nurul Izza Binti Omar & Husband

For my lecturers, especially for my Supervisor of Project Final Year

And my treasured friends

BMFU

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CHAPTER 1
INTRODUCTION

This chapter explains the background of this research, objectives, scope, problem statements as well as the limitations in completing this research. The basic fundamental of ergonomics as a whole, as well as potential risk level of musculoskeletal disorders will be discussed in the background of study. Current issues in joining cable will be highlighted to support the background. The results are making based on the current joining cable review. This research is mainly about work related musculoskeletal disorders assessment of jointing cable operation.

1.1 Background of study

Ergonomics deals with the interaction of equipments and work situations with the human being. The basic human sciences involved are anatomy, physiology and psychology. These sciences are applied by the ergonomist towards two main objectives the most productive use of human capabilities, and the maintenance of human health and well-being. In a phrase, the job must 'fit the person' in all respects, and the work situation should not compromise human capabilities and limitations. Findings of scientific research have identified physical, psychosocial/organizational and individual occupational risk factor for the development of work related musculoskeletal disorders. There has also been parallel interest from ergonomics practitioners, occupational health physicians, employers, employee representatives and regulating authorities in measuring exposure to known risk factors as the basis for programmers of risk prevention and reduction. It is now accepted that these programmers should be founded upon ergonomics principles and should incorporate the holistic assessment of all elements of the work system so that optimal solutions can be achieved.

Musculoskeletal system is the organ system that gives people the ability to move muscles and skeleton system. Musculoskeletal system has the form, support, stability, and body movement. This system explains how the bones connect to other bones and muscle fiber network, such as tendons and ligaments bond. Muscles and bones remain in place also plays a role in bone movement. To enable the movement, the different bones connected by joints. Avoid the end of the bone cartilage from rubbing directly on one another. Muscle contact (close) to transfer the bones attached to the joints. However, that diseases and disorders can affect the functionality and effectiveness of the human body system. The disease can be difficult to diagnose because the close relationship musculoskeletal system to other internal systems. Musculoskeletal systems refer to systems that have muscles attached to an internal skeletal system and are required for people to move to a more favorable position.

Cable jointers mostly work standing on floor made of cement or limited space in underground or of similar limited room. People continuously stand and awkward while working are more likely to suffer from pain and aching in the hands and low back than others. In a study of cable jointing working postures, the operation of jointing cable are done with awkward and standing. This work requires that jointer have to work for prolonged periods with their spine flexed forward and/or with their arms flexed at or above shoulder level. These working postures are strenuous for the back and shoulders. In addition to these factors the jointers have to assume many other awkward working position and they have fairly high work demands. All these factors may contribute to the development of musculoskeletal symptoms.

Subitec Sdn Bhd is one of Tenaga Nasional Berhad`s contractor that gave the joining cable services. Subitec Sdn Bhd has great services and experiences on joining cable also supply jointing tool kit.

This research is about a study done at a Subitec Sdn Bhd to assess potential risk level of musculoskeletal disorders and to identify awkward postures present in a joining cable task. From the result, this study is expected to explain and provide understanding of the level of potential risk of musculoskeletal disorders.

1.2 Problem statement

Jointing cable operations are part of the work involving the upper limbs. Musculoskeletal extremity disorders are often caused by awkward postures, excessive force and repetition because of the limited work area, standing for prolonged period and heavy equipments. In this study, potential risk level of musculoskeletal disorders will be assess in joining cable task also to identify awkward postures present during joining cable. This study is expected to explain and provide understanding of the level of potential risk of musculoskeletal disorders and identify awkward postures.

1.3 Objectives

(a) To identify the locations of body part discomfort during cable jointing task.
(b) To assess the amount of exertion encountered during the task of cable jointing.
(c) To analyze working postures assumed by workers during cable jointing task.

1.4 Scope

This study focused on the potential risk level of musculoskeletal disorders in a jointing cable task. This research done at the last phase which the identify awkward postures present during jointing cable and measurement taken on exposure assessment techniques have been gathered for inclusion in this review. The potential risk is the main concern and the supportive outcome of this study will explain and provide understanding of the level of potential risk of musculoskeletal disorders. However, on the other hand, this research will not cover the preventive of potential risk of musculoskeletal.

1.5 Potential benefits

Ergonomics may seem like a subjective solution to increasing effectively in the workplace. While it is certainly easier to measure the effects of ergonomics in some work environments than others, paying attention to ergonomics in any workplace can save money by reducing injuries and time lost.

Every year, hundreds of thousands of work days are lost due to work-related injuries. The cost of these days missed easily totals in the billions. These injuries were certainly not limited to those caused by heavy lifting; they also included seemingly less-serious injuries such as carpal tunnel syndrome. Thus the company that prevents these sorts of injuries stands to gain, through decreased pay-out for workers' compensation and fewer days lost.

Perhaps the greatest benefit of ergonomics in the work place is that the work station can be customized to the worker, thereby making the office better able to accommodate a wide variety of workers. These studies to sure the jointer will be explained and provide understanding of the level of potential risk of musculoskeletal disorders.

1.6 Review of Methodology

Firstly, this study with conformation of the title of the project and identifies a suitable company to as a reference in research of study. This study is conducted at a joining service which is Subitec Sdn Bhd. To guide of this study, the main objective and scope of the project is defined which is then followed by writing the literature review. The source of literature review is mostly from the journals, articles, and report. There are also the sources from the books that are related to this study. In addition, case studies that are related to this study will be included in the literature review. When the problem, is being clarified based on an observation, the work method study will be carry out and all of this will be cover in PSM II. The process of joining cable will be study and all data and information about the process will be recorded. Then, the awkward postures present during joining cable will be identified.

Finally the result will be presented with the explanation and provide understanding of the level of potential risk of musculoskeletal disorders.

1.7 Structure of Report

Generally, this report is divided into two parts which are Projek Sarjana Muda, PSM I and PSM II. In total, this report contains of five main chapters. These chapters are separated into two parts which the first part contains three chapters; introduction, literature review and methodology. Whereas, the second part of contains two more chapters, results and discussion. Finally, conclusion of this study will be discussed in PSM II.

In the first chapter, introduction, briefly explain the background of the study which is about important the ergonomic in work. It is also contains the problem statement, objectives, scope, review of methodology and also structure of report. All theories were obtained and referred from the articles, journals, and some books related to the study are explain in detail in Chapter 2, Literature Review.

In chapter 3, Methodology, all methods that have been use are explained specifically in term to achieve the objectives and obtain the result of the study. On the other hand, in Chapter 4, for the results and discussion, this report are focus primarily on the data that been collected and identify the influence factor that achieve the result.
In the last chapter, conclusions which conclude this study and also included some suggestion in order to improve this study for future. Finally, all the chapters are compiled separately in sequences in order to give clear view to the readers.

CHAPTER 2

LITERATURE REVIEW

This chapter contains the literature review of the study which relates to the scope of the study. It covers the definition of work method, work measurement and specially focusing on ergonomic and work related musculoskeletal disorders assessment element. Sources of information were obtained from articles, journals, and some books related to the study. Each source was selected based on the similarity with the scope of the study. At the end of this chapter, the elements will be narrowed down to the assessment method used for the study.

2.1 Introduction

Ergonomics can be defined simply as the study of work. More specifically, ergonomics is the science of designing the job to fit the worker, rather than physically forcing the worker's body to fit the job. Adapting tasks, work stations, tools, and equipment to fit the worker can help reduce physical stress on a worker's body and eliminate many potentially serious, disabling work related musculoskeletal disorders (MSDs). Not everyone really understands what ergonomics is, what it does, or how it affects people. It is aimed at anyone who has a duty to maintain and improve health and safety and who wants to gain insight into ergonomics and to make sure that tasks, equipment, information and environment suit each worker.

Ergonomics can also reduce the potential for ill health at work, such as aches and pains of the wrists, shoulders and back. Those used most often should be placed where they are easy to reach without the need for stooping, stretching or hunching. Failure to observe ergonomic principles may have serious repercussions, not only for individuals, but whole organizations. Many well-known accidents might have been prevented if ergonomics had been considered in designing the jobs people did and the systems within which they worked.

(a) To assess the fit between a person and their work, ergonomists have to consider many aspects. These include:

i. The job being done and the demands on the worker
ii. The equipment used (its size, shape, and how appropriate it is for the task)
iii. The information used (how it is presented, accessed, and changed)
iv. The physical environment (temperature, humidity, lighting, noise, vibration)
v. The social environment (such as teamwork and supportive management)