UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MECHANISM DEVELOPMENT OF FLEXIBLE WORKTABLE

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

by

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I hereby, declared this report entitled “Mechanism Development of Flexible Worktable.” is the results of my own research except as cited in the reference.

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Date : 01 NOVEMBER 2010

APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Robotics and Automation) with Honours. The member of the supervisory committee is as follow:

……

Supervisor

ABSTRAK

Projek development flexible worktable yang akan digunakan di dalam pelbagai bidang termasuk industri. meja kerja yang fleksibel mempunyai x, y, dan z paksi memerlukan bentuk yang sistematik, sangat menitik berat seperti kos bahan, proses pemilihan bahan, pemilihan proses, alat alat yang di gunakan untuk membangunkan projek ini dan fungsi bentuk dengan pergerakan paksi x, y dan z tanpa halangan pergerakannya. Semua idea dan perkiraan asal di tulis dengan membuat lakaran, seterusnya dipindahkan ke lukisan yang lebih terperinci. Kesemua bahagian lukisan dimasukkan pada proses pergerakan mengunakan solidwork. Walau bagaimana pun, untuk mengunakan meja kerja ini mestilah melibatkan kerja kerja yang ringan sahaja kerana meja kerja ini terdapat specifikasi yang telah di kaji dalam projek ini.

ABSTRACT

The project development of flexible table which is can be used in various field includes industrial field. This flexible table are built in 3 axis. Axis X, Y and Z needs systematic design to make sure it is stable and suitable to the situation of uses. During the process in making the flexible table it is important to choose the quality and suitable materials, and tools to make sure the movement of every axis doesn't have any distraction. The flow of making also important to support the stability of the product. All the original idea are sketch and then transform to the details drawing. Then the details drawing are bring to the movement and motion process using SolidWork software. Although the chooses of the material for this flexible table is very specific, it only can be uses for minor work only. It is depends on specification that had been examine.

DEDICATION

Allhamdullillah thank God, finally I can complete these reports on time. Thank you also to my beloved parents who gave me full support as I able to complete my PSM report.

To my beloved Lecturer Mr. Khairol Anuar Bin Rakiman thank you for your assists and your understanding. Your guidance and advice is very helpful for me in completing the PSM report.

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Thank you.

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Be Upon His Messenger Prophet Muhammad S.A.W and His Companions

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MOHD MUAMMAR GADDAFI BIN AB AZIZ

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LIST OF ABBREVIATIONS, SYMBOLS, SPECIALIZED NOMENCLATURE

CAD	-	Computer Aided Design
3D	-	3 Dimension
2D	-	2 Dimension
VDC	-	Virtual Design and Construction
PLC	-	Programmable Logic Controller
FANUC	-	Factory Automatic Numerical Control
AC	-	Alternating Current
DC	-	Direct Current
PSM	-	Projek Sarjana Muda
UTeM	-	Universiti Teknikal Malaysia Melaka

CHAPTER 1
INTRODUCTION

1.1 Project Background

Development of flexible worktable is to increase knowledge in the fields of engineering and manufacturing technology of today. Additionally, many voiced the demand that attempted to comfort and convenience to consumers in various fields. To know that the problem now, which is flexible worktable existing system, is very weak in terms of movement, control, design is about function and in terms of cost is too high. Various kinds of ideas that comes to mind to provide convenience to the users to control and provide enjoyment to all levels of society to have it. With the idea of systematic design, could be adopted in all the jobs that require advanced worktable at home or in the industry. Worktable flexible is very important, for example, be used by project managers, engineers, architects, mechanics, artists, designers and others who need to make more than one task at a time. Use flexible work table is normally applied in the aircraft repair industry as a tool for increasing and decreasing the Z axis, left and right on the X axis, and forward and backward on the Y axis is the motion and correcting the position of engine and chassis during the installation of ship engines fly. With the findings and how to work this situation, flexible worktable is created with a size suitable for use in various types of professionals do the job.

As a proven flexible tool worktable is easy with the situation where the quality and space-saving and eco-environment, the electrical system is chosen as a function of the power to move it without using a system of pneumatic and hydraulic systems. X, Y and Z axis movement is a testament to save space in a variety of work situations that are very narrow and does not complicate the situation. To implement the best product, material selection and motor selection is taken seriously in the development of flexible worktable. This project is also a lot of research, expertise and selection process to be controlled for realizing the excellence of products useful in the future.

1.2 Problem Statement

Individuals who often have trouble working with a narrow space, should have a desk and an adjusting movement of the worktable height, usually people who use large work space, must be taken to several places, a flexible workbench is a tool for them to do the job of the day , such as mechanics, engineers, architects, artists, designers and other professionals. Typically, they use a table that does not require a connection from a source of electricity, with a desk job that requires a flexible electrical connection or battery power to activate. As a result, flexible working desk requires high maintenance costs compared to the normal worktable, In addition, by using a flexible workbench users would be easy to put in the correct position, only for the first time. Done in the right place, it will move the worktable. For use in open space, users need to make a connection to the battery, users also have difficulty feeling of when using in the room or in the workplace.

1.3 Objective

The major objectives of this project are:

a) To study the appropriate load design and size of flexible worktable.
b) To study proper materials to suit of materials for the development of a with flexible worktable.
c) To develop a good flexible worktable with part of mechanism.

1.4 Scope of Project

For the scope of this project, many things need to be explored, such as design loads that are suitable to the working environment and to ensure that the project is leading to the right direction to achieve goals such as finding the appropriate size. This project is aimed to design a systematic and flexible simulation worktable movement such as y axis, and z without the interference of movement, with the help of solidwork software. Before using the software, a sketch of this process is needed. To enroll this project, learning the process of selection of materials is important to produce high quality and non-perishable products. Therefore, to develop flexible worktable, it is also necessary to test each axis and to take data for every test. With the data, we can make right improvement to the products.

1.5 Project Planning

The project planning is needed to identify and plan to achieve the objective with the punctual time planning. The good planning can make the project is in actual track. For a good time management planning, a Gantt chart is a suitable method in applying a guide for the project proceeds.

A Gantt chart is a type of bar chart that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements comprise the work breakdown structure of the project.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter is about material selection, process selection, design and specifications used in building a flexible workbench. Materials play an important role to make the product strong, durable, and relevant or appropriate in the use of industry and daily life. This can lead to comfort in the work to be done. To develop quality products, the uses of appropriate equipment are also discussed in this chapter.

2.2 Material selection

Materials selection activities can be improved by tools that are used in a design brief meeting between product designers and clients. These tools, in broad outlines, can help clients to express what kind of user-interaction they want to create with the product and its materials. Furthermore, the tools support product designers to translate these desired user interactions in a material profile. This profile is then used in the information searches about candidate materials.

2.2.1 Intuitive Methods in Material Selection

Selection of materials in the industry environment was made after detailed analysis and in accordance with a systematic procedure. Some general rules are listed in Figure 2.1