

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **Redesign and Development of Automatically Adjustable Rostrum**

SESI PENGAJIAN: **2012/2013 Semester2**

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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 & Automation) (Hons.). The member of the supervisory is as follow:

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(Project Supervisor)

ABSTRAK

Rostrum adalah bahagian yang sangat penting dalam mana-mana majlis terutama majlis rasmi. Fungsinya untuk memegang atau meletakkan dokumen-dokumen dan nota penceramah. Yang boleh menarik perhatian orang ramai majlis pembesar suara. Ia juga digunakan untuk menggalakkan tahap keyakinan untuk penceramah kali pertama. Kebanyakan panggung dalam pasaran semasa adalah item antarabangsa untuk upacara namun ia mempunyai ketinggian yang tetap. Warga antarabangsa mempunyai purata ketinggian berubah-ubah, yang bermakna mimbar tidak boleh mempunyai ketinggian yang tetap. Projek ini memberi tumpuan kepada peningkatan dan pembangunan mimbar semasa yang menghasilkan sistem panggung untuk pelarasan ketinggian automatik. Masalah semasa ialah ketinggian mimbar itu boleh laras dalam satu arah sahaja. Objektif utama projek ini adalah untuk mereka bentuk dan membangunkan secara automatik ketinggian mimbar laras yang sesuai dengan ketinggian yang berbeza speaker. Sistem ini dikawal oleh pengukur sensor jarak yang digunakan untuk mengesan kehadiran penceramah. Ketinggian mimbar diselaraskan secara automatik ke ketinggian penceramah menggunakan maklumat yang dikumpul oleh sensor ini. Sensor akan bertenaga ganti untuk menjalankan motor, maka mimbar akan berhenti gerakannya pada ketinggian mudah untuk pembesar suara. Mimbar yang diperbuat daripada papan lapis dan mimbar ini boleh digunakan dalam semua keadaan dan fungsi kerana ia adalah unik dan masih mencapai fungsi asas panggung. Ini reka bentuk mimbar boleh meningkatkan faktor ergonomik itu. Hasil dijangka adalah reka bentuk semula dan pembangunan panggung secara automatik laras yang memenuhi objektif.

ABSTRACT

Rostrum is a very essential item used for any ceremony especially a formal ceremony. It functions to hold or place the documents and notes of the speaker. It can attract attention of the crowd to the speaker. It can also be used as an encouragement to the first time speaker. Most rostrums in the current market has fixed height. The international speakers have different heights, meaning that a rostrum should not have a fixed height for ergonomic purposes. This project focuses on the improvement and development of an automated height adjustment rostrum. The project is a continuation improvement of previous design. The current problem when the height of the rostrum is only adjustable in one direction. The main objective of this project is to re-design and re-develop an automatically height adjustable rostrum that suit different height of the speaker. The system is controlled using a distance measuring sensor to detect the presence of a speaker. The height of the rostrum is adjusted automatically to the height of the speaker using information gathered by the sensor. The sensors are activated after sensing the obstacles and will then energized the motor in order to reach the appropriate level and convenient to the height of the speaker. The body of the rostrum is made of Plywood and this rostrum can be used in all situation and functions as it is unique and still accomplish the basic function of the rostrum. This design of this rostrum can be further improve the ergonomics factor.

DEDICATION

- My parents: Thank you for your support with my studies. I am honoured to have you as my parents. Thank you for always giving me a chance to prove and improve myself during my studies. Thank you for your kindness and always understanding me. Please do not ever change. I love you.
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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

FYP 1	-	Final Year Project 1
FYP 2	-	Final Year Project 2
cm	-	centimetre
DC	-	direct current
Amp	-	Ampere
LED	-	light emitting diode
PSD	-	positive sensitive detector
IREL	-	infrared emitting diode
CW	-	clockwise
CCW	-	counter clockwise
PWM	-	pulse width modulus
s	-	second
V	-	voltage
PCB	-	printed circuit board
ADC	-	analog digital converter
Kg	-	kilogram
cm/s	-	centimetre per second

CHAPTER 1

INTRODUCTION

This chapter describes the background of rostrum, problem statements, objectives, scopes of the project, and outline of the report.

1.1 Project Motivation

Rostrum is a platform or a reading desk with a slanted top that used for public orators, a stage for public speaking, usually placed on a stand or affixed to some other forms of support on which documents or books are placed as support for reading aloud or lecture. Rostrum is also called as lectern that been used by speakers, lecturers or leaders to convey messages, to give lecture and speech, to speak formally to a crowd.

Nowadays, the rostrum is use for formal ceremonies such as meetings, award ceremonies, political events and others. Rostrum is always must in any speaking venue and it is also an effective way to give out information. Rostrum tends to attract attention from the audiences or crowd. People would listen to the speaker once the speaker is on the podium. It is a best way to attract attention of peoples.

1.2 Project Background

There are many flaws of the rostrum in the market today can be considered when doing research. The major problems that happened in the current rostrum design are heavy and hard to transport, majority rostrum has a fixed height, manually adjustable height of microphone, no pointer on rostrum for presentation, majority rostrum does not have screen display for text/speech, microphone doesn't follow personal movement, there is no wheels on the lower part of rostrum for easy transportation, and the list goes on.

The first problem is the rostrum is heavy and hard to transport due to the rostrum having no wheels. Ordinary rostrums generally made from wood or wood products as a solid piece of furniture capable of standing without any additional support. But the problem is that the rostrum becomes too heavy. So by being heavy and not having any wheels, it creates a problem for moving the rostrum. More manpower will be needed to transport the rostrum./

Mostly rostrum in the market doesn't have screen display that makes it easier for the speaker to speak without having to see his or her notes. Normally, speakers use cue cards to deliver speeches in a more organize manner. Sometimes the speakers can get lost in the cue card searching for his or her notes. This could create panic and increase stage fright in the speaker. This would ruin the speech. Rostrum with screen display could solve the problem.

Currently in the market, majority rostrum does not have a pointer for presentation purposes. The problem creates when an extra person is needed to navigate the slides. This is an example of important feature as it can be used for multiple presentations even for paper presentation.

Normally, the current rostrum is manually adjusted and for the master of ceremony his or her need to manually adjust the rostrum after each speaker. There is another problem when the speaker moves from side to side but the microphones stays constant. No feedback happens causes the microphone to be constant. This cause the

voice projection of the speaker to be disturbed which limits the movement of the speaker.

The final problem mentioned in this part is concerning the height factor of speakers. Currently in the market, the rostrums are designed fixed for one height and this creates a problem for speakers who are either too short or too high for the rostrum.

1.3 Problem Statement

Current design of the rostrum in the market shows that most rostrums have fixed height based on normal height of human. The height of the rostrum cannot be adjusted and majority of the rostrum in the market is fixed by the manufacturer. If it can be adjustable, it will still need manual adjustment or trained personal. This could affect the comfort of the speakers as he or she has to manually adjust the height of the rostrum is not familiar with it. This has to be repeated for each different speakers. The current designs in the market, either the fixed sized rostrum or the adjustable rostrum have not completely solved the problem of variable height of speakers. Then in order to completely solve the problem, it should have an automated adjustable rostrum.

1.4 Objectives

The objectives of this project are :

- a) To redesign and reconstruct electrical circuit of existing automated adjustable rostrum.
- b) To analyze and validate the performance of the system consisting of both the electronic device and the mechanical parts of the automated adjustable rostrum.

1.5 Scopes

The scopes of this project are :

- a) The rostrum is to be controlled via sensor.
- b) The proposed design is only suitable for average sized human from around the world. Not suitable for abnormality in height.
- c) The analysis of the mechanical structure and electrical circuitry in terms of their accuracy and time consistency.
- d) These problems are not considered in this project :
 - The rostrum is heavy and hard to transport due to having no wheels
 - The rostrum has no pointer for presentation
 - There is no screen display on the rostrum
 - The rostrum has no automatic adjustable microphone

1.6 Outline of Report

This is organized as follows :

- a) Chapter 2 : Literature Review and Background Knowledge
 - Understanding the design of various type of rostrum in the currently market. This includes the adjustable and non adjustable rostrum, the system and mechanisms.
 - compare design and identify the weakness and strength of current design in the market.

- b) Chapter 3 : Design Methodology
 - Understand and analyse the electrical part and electronic circuit for the system
 - All data are collected and development process of the design is started followed by the assembly.
 - Understand the process and flow chart of the processes that are needed to be followed in the project.

- c) Chapter 4 : Results and Discussion
 - The rostrum is tested under different set of height.
 - The result of the test is presented.

- d) Chapter 5 : Conclusions and Future Recommendations
 - Project conclusion and the recommendation for future works are presented.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapters, discusses the literature review of this project. This includes the explanation about the definition of rostrum, types of rostrums currently in the market, function and design of rostrum, and limitation of rostrums.

2.2 Definition of Rostrum

Rostrum, in other words called lectern, is an important element of formal meeting, public speeches, talks, and ceremonies (The Flower Expert,2008). It is also known as a few names such as podium,lectern or special religious rostrum such as minbar, bimah and bema (Merriam-Webster, 2008). According to the Merriam Webster online dictionary, rostrum is an ancient Roman platform for public orators, a stage for public speaking, or a raised platform on a stage. It is also defined as a platform for speakers in the Roman Forum decorated with the beaks of captured ships.

Rostrum has mainly been used to in still confidence in the young children. This is by making them speak at the rostrum which gives them the confidence

they needs as the rostrum is a good support for new speakers. New speakers usually would have stage fright and would stumble while giving their speech. This can be overcome by using the rostrum to his or her advantage (Joanne Mikola,2008).

2.3 Functions of Rostrum

The function of rostrum is a reading desk with a stand to give a support to place books or document. It is also a platform on which people stand to deliver speeches. This can allow the speakers to give talk, speech, lecture or scripture reading. Nowadays, leader of nations, ministers, political icons, celebrities and even regular speakers uses rostrums for formal ceremonies. In simple way, even though rostrum is continuously overlooked as something less significant, it is truly what the world need in the arena of public speaking.

2.4 Types of Rostrum

There are 2 major types of rostrum in the market. The first one is fixed height rostrum and the second one is adjustable rostrum.

2.4.1 Fixed Rostrum

Nowadays, the fixed rostrum is one of type of rostrums that normally found in the current market. It is made with one fixed size. Normally this fixed rostrum made with wood and some are also made from metal and see through acrylic. The price range of this rostrum is from RM1000 to as high RM 13000 for custom made rostrum (Drumshields, 2008).

2.4.1.1 Wood Based

This rostrum commonly found in the current market. It has been build using all type of wood for example pine, oak, mahogany and maple. Currently in the market, this type of rostrum is much cheaper compared to the other type of rostrums. This type of rostrums comes in many sizes and design as can be observed in public halls. Figure 2.1 shows the Wood Based Rostrums.



Figure 2.1 : Wood Based Rostrums

ewlBiz, 2008 (right)

RJ Fine WoodWorking,2008 (left)

2.4.1.2 Metal Based

This is also another type of fixed rostrum and this rostrum is made by using light metal for example aluminium, alloys and other light metals. Nowadays, this type of rostrums has been enlarged and the usage of this rostrum is starting to increase. The number of metal based rostrum is rising. Some of the design has a surface that looks exactly like a wooden based lectern. Figure 2.2 shows the Metal Based Rostrums.



Figure 2.2 : Metal Based Rostrum

(ewlBiz,2008)

2.4.1.3 Acrylic Based

This acrylic type is one of the newest types of material used to build rostrums. This type of rostrum is light weight and looks nice as it is see through. This type of rostrum comes in all design and shape that we can observe it from the picture. One the designs which are not stated above are the v shaped stand for the podium. Figure 2.3 shows the Acrylic Based Rostrum.



Figure 2.3 : Acrylic Based Rostrum

(Drumshields, 2008)