



UiTM SWIMMING POOL WATER HEATING SYSTEM

KAMSANI BIN KAMAL

(2000337832)

A project submitted in partial fulfilment of the requirement for the award of
B. Eng. (Hons) Mechanical Engineering.

**Faculty of Mechanical Engineering
Universiti Teknologi MARA (UiTM)**

OCTOBER 2003

ACKNOWLEDGEMENT

“In the name of Allah that the most Beneficiate, the Most Merciful”

First of all, all praise and thanks goes to Allah s.w.t who was gave the strength and blessings for author to make it possible to complete the final year project title **UiTM Swimming Pool Water Heating System**.

Secondly, the author would like to express gratitude and sincere thanks to Prof. Madya Mohd Yusoff bin Mohd as advisor for this project and his continued assistance and guidance through out the work. He gave a lot of advices and guidance throughout three semesters on how to do this project from the beginning until the end. The author truly owed him a lot.

Next, the author also would like to convey appreciation to Mr. Bukhari bin Manshoor as team project member, UiTM Swimming Pool, Selangor Aquatic Centre Shah Alam, Pusat Akuatik Majlis Sukan Negara Bukit Jalil and to all who are involved in helping to finish the project.

The author would like in this opportunity to extend never-ending gratitude towards beloved wife and daughters for their courage, support, patient and time given to finished this project. With their prayer gave more spirit and energy to finish this project.

Finally, Thank you once again to each and everyone and to them who are not mention above, if not much, have a little part of this final report. May Allah forgive us and bless us all, Amen!

Regards,

-Kamsani Bin Kamal-

ABSTRACT

The total primary energy demand in Malaysia projected to increase at an annual growth rate of 7% by the year 2020. This growth rate means Malaysian energy industries will be on average 5.4 times larger than that in 1995. The electricity generation, transmission and distribution sector will be six times larger than it will today. Thus, it is necessary to tap alternative renewable energy sources to fulfil the energy demand in the future. To overcome the energy demand in Malaysia, the alternative energy that can be chosen is solar energy. In this project, that is to study and propose the system that can control water temperature for UiTM swimming pool, the authors chose to use a solar water heating system. Beside the using of the solar energy as an alternative energy in water heating system, the author also want to realise this system in UiTM as one of the teaching materials or aids especially for subjects that involve directly in the area of fluid and heat transfer.

TABLE OF CONTENTS

	CONTENTS	PAGE
	PAGE TITLE	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iii
	TABLE OF CONTENTS	iv
	LIST OF TABLES	vii
	LIST OF FIGURES	viii
CHAPTER 1	INTRODUCTION	
	1.1 Introduction	1
	1.2 Objective	2
	1.3 Scope and Methodology	3
	1.4 UiTM Swimming Pool	5
CHAPTER 2	SWIMMING POOL	
	2.1 Introduction	6
	2.2 Pool Operation	7
	2.3 Filtration	8
	2.3.1 Perpetual Media	9
	2.3.2 Temporary Media	10
	2.4 Recirculation Pump	12
	2.5 Swimming Pool Chemistry	13
	2.5.1 pH of Water	13
	2.5.2 Alkalinity	14
CHAPTER 3	THERMAL COMFORT	
	3.1 Introduction	15
	3.2 Human Comfort	20
	3.3 Body Temperature Regulation	24
CHAPTER 4	SOLAR ENERGY	
	4.1 Introduction	25
	4.2 Solar Radiation	26

CHAPTER I

INTRODUCTION

1.1 Introduction

Swimming pool is a place that people can make assorted activities. They can do activities such as swimming, diving and so on. Beside that, swimming pool also becomes a place that people can bring their family as part of their social life with family. Therefore, they like the swimming pool that can give comfortable and 'relaxing atmosphere' to them. They are usually looking for cleanliness of the water, the suitable temperature of water, cleanliness of surrounding and the location of the swimming pool itself.

The water temperature is important for people doing activity in the swimming pool. If the water of the swimming pool is too cool or too hot, they will not go down into the pool and doing their activities. With the suitable water temperature condition may will spend more time in the water and reduced energy consuming due to heat transfer from the body to the water. Since the swimming pool at the UiTM is used for training, swimming competition and recreation, it needs the water temperature of swimming pool at the suitable level. At the moment, the UiTM swimming pool does not have any device or mechanism to control the water temperature.