



**DESIGN AND PERFORMANCE OF PASSIVE SOLAR
COMPOUND PARABOLIC CONCENTRATING COLLECTORS**

AZIZUL BIN TAAT

98493663

AIZUDDIN BIN TAAT

99083045

SHAHRUL ANNUAR BIN HARUN

99083628

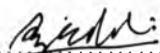
**FACULTY OF MECHANICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM)
SHAH ALAM**

JUNE 2003

“We declare that this thesis is the result of my own work except the ideas and summaries which we have clarified their sources. The thesis has not been accepted for any degree and is not currently submitted in candidature of any degree”

Signed : 
Date : 14 Jun 2003

Azizul Bin Taat
UiTM No : 98493663

Signed : 
Date : 14 Jun 2003

Aizuddin Bin Taat
UiTM No : 99083045

Signed : 
Date : 14 June 2003

Shahrul Annuar Bin Harun
UiTM No : 99083628

ABSTRACT

In our daily life, we need energy for living. We use energy for everything from cooking, to moving the vehicles until generating power plant. But it is getting less day by day. The energy source that we using like firewood, charcoal, petroleum, all are unrenowable, it will not last long instead we need to find it more as the use of it is increase. But it is also not clean and exhaustible that can contribute pollution to the world.

This project studies the performance of passive compound parabolic concentrating (CPC) solar collector under Malaysian climatic conditions. It involves the design of two types of CPC collectors, the hexagonal and the octagonal shapes. The performances of these two collectors are then compared with two other established shapes, the sphere and the square. The collector can collect both solar and daylight energy. This report measures the illumination concentration ratio (CR) produced by the collectors. It was found that the CPC collector produces the highest CR.

TABLE OF CONTENTS

	CONTENTS	PAGE
	PAGE TITLE	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURE	vii
CHAPTER 1	INTRODUCTION	1
	1.1 What Is Solar	1
	1.2 Solar Collectors	2
	1.3 Sky Simulator	6
	1.4 Model Year Climate (MYC) Data	7
CHAPTER 2	OBJECTIVE	8
	2.1 Design	8
	2.2 Experimental Design	8
	2.3 Test	9
CHAPTER 3	METHODOLOGY	10
	3.1 Design	10
	3.2 Fabrication	15
	3.3 Experiment	18
	3.4 Instrument For Measurement	23
CHAPTER 4	RESULTS AND CALCULATIONS	28
	4.1 Experiment 1	30
	4.2 Experiment 2	37
	4.3 Experiment 3	44
CHAPTER 5	ANALYSES	58
CHAPTER 6	ESTIMATION OF OUTPUT ILLUMINATION FOR SOLAR COLLECTORS	62

CHAPTER 7	CONCLUSIONS AND RECOMMENDATIONS	84
	REFERENCE	86
	APPENDIXES	