

MARA UNIVERSITY OF TECHNOLOGY (UITM) FACULTY OF MECHANICAL ENGINEERING SHAH ALAM, SELANGOR.

FINAL PROJECT REPORT

TITLE >

CONDITION BASED MAINTENANCE (CBM) STUDY: TO CALCULATE DATA AND FIND T-S AND P-H DIAGRAM FOR AIR-CONDITIONING SYSTEM BASED ON ACTUAL DATA FROM OBSERVATION AT PTAR 1

BY

SHAIFUL AMROL MOHD. ARIFIN GAFAR MOHD. DUHA MOHD ASRUL ISHAK

APRIL 2000

CONTENTS	5
----------	---

PREFACE		I
ACKNOWLED	GEMENT	П
CHAPTER 1		
1.0 Introduction	and Literature Review	1-4
1.1 Final	Project Objectives	
1.2 Defin	ition of Air Conditioning	
1.3 Air C	onditioning System	
CHAPTER 2		
2.0 Air Conditio	oning System at PTAR 1	5-30
2.1 Centr	al Air Conditioning System (PTAR 1)	
2.1.1	Principle Work of Central Air Conditioning System	
2.1.2	Principle Work of Refrigeration in Central Air	
	Conditioning System	
2.2 The N	lain Components in PTAR 1	
2.3 Cond	ition Based Maintenance (CBM)	
2.3.1	What is Condition Based Maintenance?	

PAGE

- 2.3.2 Objectives of CBM
- 2.3.3 Procedure When Using CBM
- 2.3.4 Benefits of CBM

CHAPTER 3

3.0 T-s and p-h diagram for Main Circuit at PTAR 1

- 3.1 Modeling Vapor Refrigeration Systems: Actual Vapor-
 - Compression Cycle
- 3.2 The purpose of The Chart

3.3 The Main Circuit at PTAR 1 and Calculation

- Of Data Collection
- 3.4 Comparison of COP_{actual} and COP_{carnot}

CHAPTER 4

4.0 Analysis From Data

- 4.1 Discussion
- 4.2 Problems and Recommendations
- 4.3 Conclusion

REFERENCES

APPENDIX

61-65

ACKNOWLEDGEMENT

We are grateful to our final project advisor, Pn. Che Faridah for guiding us in completing this project. We are also thank you to En. Anuar Hashim, the technician, for his overall supervision in our project at PTAR 1.

It was a marvelous job for them in giving advice and helping us in the information about the refrigeration system, doing the analysis of data and our main objective of this project; to calculate T-s and p-h diagram for air conditioning PTAR 1 according to the actual data. They have also given full co operation, fine criticism and full support that helped us in opening our minds and giving strength for doing this course study.

We are also grateful to maintenance staffs for their help and full cooperation in this final project. They have also give advice and spend their times in teaching us about the operation and maintenance in PTAR 1. Here are the staffs that involve in this particular final project:

- 1. Engineer En. Saaid Hassan
- 2. Technician En. Anuar Hashim
- 3. Technician En. Rafini

1.2 Definition of Air Conditioning

Air conditioning is defined as 'the process of treating air' so as to control simultaneously its temperature, humidity and cleanliness to meet the requirements of the conditioned. As indicted in the definition, the important actions involved in the operation of an air conditioning system are:

1. Temperature control

Room temperature is controlled to the predesigned dry bulb temperature by cooling or heating room air.

2. Humidity control

Room air is controlled to the predesigned relative humidity or dehumidifying room air.

- Air filtering, cleaning and purification
 Removing dust and dirt from the air cleans room.
- 4. Air movement and circulation

Air that is controlled in temperature and humidity and cleaned is distributed throughout a room. As a result, room air can be maintained evenly in temperature and humidity conditions.

2