

Laporan Projek Tahun Akhir
Kursus Dip. Lanjutan Kejuruteraan Jentera
Kajian Kejuruteraan , ITM, Shah Alam.

'Mendapatkan profil suhu serta
kelembapan di PTAR, ITM, Shah Alam'

By :

Azhar Bin Shukor

Mei 1987

Preface

The purpose of this project is to get the temperature and the humidity profile for the main library of ITM Shah Alam. The main aim of this project is to minimize the electrical consumption of the air-conditioning plant and also to determine the electrical consumption. In this report, discussion was made on how to minimize the energy consumed by the air-cond plant, what should be done and etc.

The author would like to offer his sincere thanks to all 'Penyelia kumpulan A', Mr. Mohd. Nor Berhan, Mr. Mohd. Salleh, Mr Azhar and all the librarians which gives moral support, advices, full cooperations and their willingness to share those knowledge for making this project completed.

And the same thing goes to Mr. TC Chin from AMD Penang, Mr. Abdul Latif Ismail from University Hospital, K. Lumpur; for providing all the required equipments. For Ir RR Oehlers , President of ASHRAE M'sian Chapter; Mr. Chua, from Ranhill Bersekutu and Ir K.S. Chua, from Climax System; for their support by providing all those reading materials and their practical knowledge.

Azhar
ADME

CONTENTS :

Preface		
Nomenclature		
Chapter 1: Introduction to an air-conditioning system.		
1.1	What is air-conditioning and it's purpose	1
1.2	Classification of air-cond system	1
1.3	Psychrometry	2
1.3.1	Dry air	2
1.3.2	Saturated air	2
1.3.3	Dry-bulb temperature	2
1.3.4	Wet-bulb temperature	2
1.3.5	Relative humidity	3
1.3.6	Specific humidity or humidity ratio	3
1.3.7	Degree of saturation	4
Chapter 2: Air-conditioning cooling load calculation or estimation.		
2.1	Defination	5
2.1.1	Space heat gain	5
2.1.2	Space cooling load	6
2.1.3	Space heat extraction rate	6
2.1.4	Cooling coil load	7
2.1.5	Calculating space cooling load	7
2.2.1	General procedure	8
2.2.2	Calculating space cooling load heat gain by conduction through exterior roofs and walls	9
2.2.3	Calculating space cooling load from sources within the conditioned space	10
2.2.4	Calculating space cooling load from ventilation and infiltration air	12
2.3	Example on heat load calculation	12
2.3.1	Conduction	13
2.3.2	Roofs	14
2.3.3	Walls	14
2.3.4	Flat roofs	14

2.3.5	Conduction through glass	16
2.3.6	Interior partition	17
2.3.7	Solar	17
2.3.8	Lightings	18
2.3.9	People (Occupants)	18

Chapter 3: Profile plotting technique and how to
obtain data.

3.1	Flow rate	21
3.2	Temperature	22
3.3	Relative humidity	23

Chapter 4: Discussion, Limitation, Calculation
and Comment or Proposal.

4.1	Discussion	24
4.2	Limitations	26
4.3	Conclusion	26
4.4	Comment or Proposal	27

Appendix 1 : System block diagram and psychrometric
chart of the system.

Appendix 2 : Data for cooling load calculations and
TRANE cooling and heating load estima-
tion sheet.

Appendix 3 : Temperature and relative humidity pro-
file drawings.

1.1 What is air-cond. and it's purpose.

The science and practice of creating a controlled climate in indoor spaces is called air-conditioning.

The main objective is to provide comfort for the occupants inside the conditioned space. In order to achieve this, one should control those variables listed below:

- i) temperature of the surrounding air;
- ii) humidity of the air;
- iii) purity of the air; and
- iv) motion of the air.

1.2 Classification of air-cond system.

Air-cond system can be classified in two ways, according to:

- i) the purpose
 - a) Comfort air-cond system
 - normally used for controlling the atmospheric conditions for human health and comfort.
 - b) Industrial air-cond system
 - to control atmospheric conditions mainly for proper conduct, research and manufacturing processes.
- ii) season of the year
 - a) Winter air-conditioning,
 - b) Summer air-conditioning, and
 - c) Year round air-conditioning.
- iii) the equipment arrangement
 - a) Unitary system, and
 - b) Central system.