

DESIGN OF THE ELECTRICAL SERVICES OF A FACTORY

Project Report submitted by
ANTONIADES CONSTANTINOS

In part satisfaction of the award of
Diploma of Technical Engineer in
Electrical Engineering of Higher Technical
Institute, Cyprus.

Project supervisor : S. Anastasiou
Head of the electrical department
in H.T.I.

External Assesor : CHR. IOSIFIDES
Electrical Engineer

Type of project : Individual

June 1989



A B S T R A C T

This project as its title states is a design of the Electrical services of a factory. More specifically the basic aims are to design the complete electrical installation of a c a n factory and to study the following:

- a) The illumination engineering work involved.
- b) The fire alarm system.
- c) To provide all necessary diagrams schedule of materials and costing.

The lighting load was determined in accordance with the study of the illumination engineering work and also the power load was determined in accordance to the details given

In carrying out the design the I.E.E. (15th edition) and E.A.C. requirements were taken into account.

<u>CHAPTER 1 : LIGHTING</u>	<u>PAGE</u>
1.1 Introduction	1
1.2 Units and Definitions	1
1.3 Factors governing the lighting design	3
1.4 Choice of light source	3
1.5 Lumen method of design	3
1.6 Illumination calculations	5
1.7 Electrical installation design of lighting fittings	
I. General	7
II. Load analysis	8
 <u>CHAPTER 2: POWER</u>	
2.1 Introduction	10
2.2 Selection of all elements of the motor circuits	10
2.3 Calculation of the full load current of a motor	12
2.4 Calculations for motor final subcircuits	12
2.5 Socket outlets	16
 <u>CHAPTER 3 : RATING OF DISTRIBUTION BOARDS</u> <u>INTERCONNECTING CABLE SIZE</u> <u>RATING OF CIRCUIT BREAKERS</u>	
3.1 Load per distribution board	19
3.2 Selection of distribution boards	20
3.3 Interconnection cable calculations	21
 <u>CHAPTER 4 : FIRE ALARM SYSTEM</u>	
4.1 General	25
4.2 Equipment description	26
4.3 Wiring	27
4.4 Choice of detectors- conclusion	28
 <u>CHAPTER 5: EARTHING</u>	
5.1 Introduction	29
5.2 Methods of earthing	29
5.3 Direct of solid method of earthing	29
 <u>CHAPTER 6: COSTING</u>	30
 CONCLUSIONS	33
REFERENCES	34

A P P E N D I C E S :

Page

1. Working plane illumination	35
2. Utilization factors	36
3. Lighting Design lumens	37
4. Technical Data for the installation of induction motors	38
5. Ionization Smoke Detector	39
6. Scattered-Light Smoke Detector	40
7. Alarm Buttons	41
8. Response Indicators	42
9. Connecting leads for Fire Alarm System	43
10. Factory plan for lighting	44
11. Factory plan for power	45
12. Factory plan for Fire alarm system	46
13. Single line diagram	47