

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

**ELECTRICAL SERVICES OF A
MULTISTOREY BUILDING**

E.1367

BY: THEODOROY ANDREAS

JUNE 2004

ELECTRICAL SERVICES OF A MULTISTOREY BUILDING

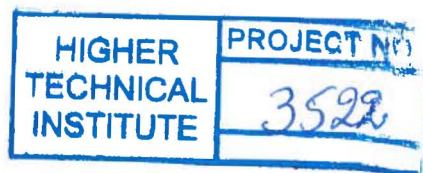
**PROJECT REPORT SUBMITTED BY:
ANDREAS THEODOROY**

In part satisfaction of the award of diploma of Technical Engineer in
Electrical Engineering of the Higher Technical Institute

PROJECT SUPERVISOR: MR A. GEORGIU

Lecturer in Electrical Engineering Department of H.T.I

JUNE 2004



ELECTRICAL SERVICES OF A MULTISTOREY BUILDING.

SUMMARY:

The electrical services of the multistorey building was designed considering the IEE wiring Regulations of the 16th edition. We design the electrical services of the building with the 16th edition in order to verify that our installations are safe to persons property and livestock.

The electrical services designs consists of the socket outlets circuits, lighting circuits, fixed appliances, storage heaters , air conditions , tv installation , telephone installation and lightning protection system.

The multistorey building consists five floors including the ground floor. Ground floor consists the meter room , the entrance room ,parking and eleven storehouses where each flat has his own storehouse.

First ,second and third floors consists of three flats in each floor where all flats has the same load. The fourth floor has only two flats but the load is the same. Each flat has his own meter in the meter room .

Finally in the electrical services of our multistorey building we do inspection and testing in order to be safe to persons property and livestock.

ACKNOWLEDGMENTS

I would like to express my thankfulness and appreciation to my project supervisor Mr A.Georgiou for his valuable help and guidance given to me throughout the project period. Also I want to thank my supervisor of electrical installations on the second module of the training for his help by giving me helpful informations for the electrical services of my multistorey building.

CONTENTS

ACKNOWLEDGEMENTS

SUMMARY

	PAGES
CONTENTS	1-6
<u>CHAPTER 1 :SOCKET OUTLETS</u>	7
1.1. General information	7
1.2. Socket outlets calculations	7
1.2.1. calculation for ring circuit 1 for ground floor	7-10
1.2.2. calculation for ring circuit 1 for first floor (flat 101)	11-14
1.2.3. calculation for ring circuit 1 for first floor (flat 102)	14-17
1.3. Tabulated results for socket outlets	18
<u>CHAPTER 2 :LIGHTING CIRCUITS</u>	19
2.1. General informations	19
2.2. Lighting circuits calculations	19
2.2.1. calculation for lighting circuit 1 for first floor (flat 101)	19-22
2.2.2. calculation for lighting circuit 1 for fourth floor (flat 402)	23-25
2.3. Tabulated results for lighting circuits	26-27

<u>CHAPTER 3 :FIXED APPLIANCES</u>	28
3.1. General informations	28
3.2. Cooker unit calculations	28-30
3.2.1. Tabulated results for cooker unit	31
3.3. Water heater calculations	31-33
3.3.1. Tabulated results for water heater	34
3.4. Washine machine calculations	34-36
3.4.1. Tabulated results for washine machine	37
3.5. Dishes machine calculations	37-39
3.5.1. Tabulated results for dishes machine	40
3.6. Lift calculations	40-43
3.7. Water pump calculations	43-46

<u>CHAPTER 4 :AIR CONDITIONS</u>	47
4.1. General informations	47
4.2. Air conditions calculations	47
4.2.1. calculation for air condition 1 for first floor (flat 101)	47-49
4.2.2. calculation for air condition 5 for first floor (flat 101)	50-52
4.2.3. calculation for air condition 3 for third floor (flat 301)	52-54
4.3. Tabulated results for lighting circuits	55-56

<u>CHAPTER 5:STORAGE HEATERS</u>	57
5.1. General informations	57
5.2. Storage heaters calculations	57
5.2.1. calculation for storage heaters of 2.55KW for first floor (flat 101)	57-59
5.2.2. calculation for storage heaters of 3.4KW for first floor (flat 101)	60-62
5.2.3. calculation for storage heaters of 1.7KW for first floor (flat 101)	62-64
5.3. Balancing of storage heaters	64-65
5.3.1 Table for balancing	65
5.4. Main supply cable calculations	65-67
5.5 Tabulated results for storage heaters	68
5.6. Single line diagram	69

CHAPTER 6 :ILLUMINATION

6.1. General informations	70
6.2. Illumination calculations	71
6.2.1. calculation for living room for first floor (flat 101)	71-72
6.2.2. calculation for kitchen for first floor (flat 101)	72-73
6.2.3. calculation for bedroom for first floor (flat 101)	74-75
6.3. Tabulated results for illumination calculation	76-81

CHAPTER 7 :TELEPHONE INSTALLATION

7.1. General informations	82
7.2. Table 1 for telephone installation	83
7.2.1. Conduit schematics	84
7.2.2. Wiring schematics	85
7.3. Table 2 telephone installation	86

<u>CHAPTER 8 :MAIN SUPPLY CALCULATIONS</u>	87
8.1. General informations	87
8.2. Main supply calculations	87
8.2.1. calculation for first floor (flat 101)	87-89
8.2.2. calculation for second floor (flat 202)	89-90
8.2.3. calculation for third floor (flat 303)	91-92
8.2.4. calculation for fourth floor (flat 402)	93-94
8.2.5. calculation for roof	94-95
8.2.6. calculation for ground	96-97
8.3 Single line diagrams	98-101

CHAPTER 9 :LIGHTNING PROTECTION DESIGN **102**

9.1. General informations	102
9.2. Effects of lightning strike	103
9.2.1. Electrical effects	103
9.2.2. side-flashing	103
9.2.3. Thermal effects	103
9.2.4 Mechanical effects	104
9.3. Need for protection	104
9.4 Lightning design calculations	104-105

CHAPTER 10 :TV-ANTENNA WIRING DESIGN **106**

10.1. General informations	106
----------------------------	-----

<u>CHAPTER 11 :EARTHING</u>	107
11.1. General informations	107
11.2. Earthing type	107
11.3. Main equipotential bonding conductors	108
11.4 Supplementary bonding conductors	108-109

<u>CHAPTER 12 :FAULT LEVEL CALCULATIONS</u>	110
12.1. General informations	110
12.2. Calculation for first floor (flat 101)	110-111
12.3. Calculation for first floor (flat 102)	111
12.4. Calculation for first floor (flat 103)	112
12.5. Calculation for second floor (flat 201)	113
12.6. Calculation for second floor (flat 202)	114
12.7. Calculation for second floor (flat 203)	115
12.8. Calculation for third floor (flat 301)	116
12.9. Calculation for third floor (flat 302)	117
12.10. Calculation for third floor (flat 303)	118
12.11. Calculation for fourth floor (flat 401)	119
12.12. Calculation for fourth floor (flat 402)	120
12.13. Calculation for roof	121

<u>CHAPTER 13:INSPECTION AND TESTING</u>	122
13.1. General informations	122
13.2 Tests	122
13.2.1. Visual inspection	122
13.2.2. Continuity of ring final circuit conductor	123
13.2.3. Continuity of protective conductors	123
13.2.4 Insulation resistance	123-124
13.2.5 Polarity test	124

<u>CHAPTER 14: COSTING</u>	125
-----------------------------------	------------

14.1. General informations	125-127
14.2 Tabulated results for costing	128-130