

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

DESIGN OF ELECTRICAL SERVICES

OF A BUILDING

E / 1095

BY: ROUSSOS THEODOROS

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HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

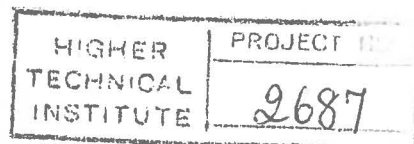
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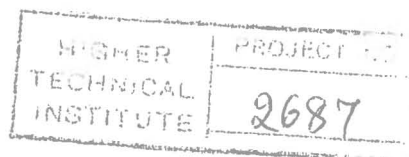
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## SUMMARY

### DESIGN OF ELECTRICAL SERVICES OF A BUILDING

(By: ROUSSOS THEODOROS)

Before a building is constructed, a variety of designs must be applied in such a way so that it governs any rules of being functional safe, and accessible for maintenance. One of the most important services in a building is the ELECTRICAL SERVICES.

The project work includes drawings a typical calculations of the design carried out. Relevant tables, manufacturers catalogues and information for each system are shown at the end as appendices.

The telephone installation is carried out according to the building plans provided and it is conformed with the CYTA relevant regulations.

The power design is applied based on the Three-Phase 415V RMS 50Hz, T.T. earthing system. This chapter composed of the installation of various loads such as Lighting, Socket Outlet, Water Pump, Lift Motor and air conditioning installation, balancing of the Three-Phase loads, application of Diversity, calculation of the supply cable and Fault Level calculations. All this are designed in accordance of I.E.E Wiring Regulations 16<sup>th</sup> Edition and Electricity Authority of Cyprus General Conditions of supply.

The illumination design is composed of the sufficient illumination level of each interior satisfying its needs and a calculation of the exact position of luminaries in a room in accordance of C.I.B.S. code for interior lighting.

The central antenna system is carried out having in mind the maximum signal required at the nearest TV point and the minimum signal required at the farthest TV point for good reception to all TV points.

Finally, the costing of such services is applied including material , labor costing and profit.

## INTRODUCTION

The reader will forward realize that this project deals with the design of the Electrical Services of Building. It is divided into 6 chapters, in which, each one deals with a different subject. In each chapter the relevant regulations relating to our needs are highlighted and then an example of the calculations is made. Then, all the results are tabled. After that, four Appendices are provided so that to help the reader to find the information needed. In the chapters, the reader is kindly asked to look for information at the back in the Appendices with the phrase(see Appendix ... page ...). Finally the actual architectural drawings are shown designed on an A1 size of paper.

Chapter 1 deals with the telephone installation. The position of the telephone points are shown providing needs for direct exchange lines communicating directly outside the building within secrecy.

Chapter 2 deals with the power design. All the materials that will be used are approved by British Standards or other approved standards. For each one of the circuits calculated (such as lighting, Socket outlet, water pump, lift motor, air conditioning installation), all the appropriated materials are stated. Moreover, the wiring is calculated including the needed test such as: Selection of the circuit breaker, selection of phase conductor, selection of circuit protective conductor, test for thermal constraints, test for energy let through and selection of conduit sizing.

Chapter 3 is also a part of the power design and deals with the balancing of phases, since the supply is three(3) phase 415V RMS, and also with the diversity applied on the load, the calculation of the cables interconnecting the distribution boards (D.B)plus the main supply cable and finally the calculations made to protect the installation if a fault occur.

Chapter 4 deals with the installation design. The illumination design is made in order to calculate the adequate number of luminaries in an interior (offices, parking places etc.) providing a sufficient amount of light for the purpose the interior is needed. For this reason, the exact position of luminaries in the room is calculated.

Chapter 5 deals with the Earth Equipodential Bonding and also with the appropriated tests applied to the installation in order to check its safety and functionality.

Chapter 6 deals with the costing of the installation. Two tables of costing are applied, one concerning the illumination and the powers fields and the other concerning the telephone field. The whole costing is applied

with the analytical method which includes the material costing and the quantities needed, the labor costing and the profit.