

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

"EXTERNAL TELEPHONE PLANT
OF A NEW AREA"

GEORGIA MAFKIDOU

381

JUNE 2001

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

**"EXTERNAL TELEPHONE PLANT
OF A NEW AREA"**

E. 1289

GEORGIA MARKIDOU

3E1

JUNE 2002

HIGHER TECHNICAL INSTITUTE	PROJECT NO. <i>3336</i>
----------------------------------	----------------------------

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to my project external supervisor Mr. Costas Miltiadous for his guidance and valuable advises during the whole process of this project. I would like also to give thanks to, Mrs. Evanthia Kokkinou, Mr. Prokopis Hatziprokopiou, Mr. Marios Kallenos, Mr. Stelios Stylianou and Mr. Costas Philippou for their valuable assistance and a very special thanks to Mr. Andonis Frantzias for the time he spent to help me.
Also I would like to thank the entire Network Access department for their support

From the Higher Technical Institute I would like to give my sincere thanks to my supervisors Mr. J. Demetriou and Mr. G. Kourtelis.

I would like to take this opportunity and give a very special thanks to my parents for their support and encouragement during my studies.



SUMMARY

The general idea of this project is to give a full description of the design of the telephony cabling of a new area. The first 3 chapters deal with all the parameters and objects (cables, cabinets, joint pits, manholes etc) used in the construction of the network. Chapters 4-5-6-7 deal with the actual design, cost analysis and work orders. The last chapter explains the Cable Pressure Control System used in order to avoid and prevent faults in the main cables.

The whole design was done following the certain rules and guidelines used by Cyta for the construction of its network.

CONTENTS

	Page
Introduction	1
Chapter 1	Network 3
1.1	Primary Network 3
1.2	Categories of network 3
1.2.1	City Network 3
1.2.2	Village Network 3
1.2.3	Avoiding signal loss 4
1.3	Secondary distribution network 5
1.3.1	Average requirements of telephone lines 5
1.4	The cabinet, joint pits and manhole system 6
1.4.1	The cabinet 6
1.4.1.2	The cabinet security system 9
1.4.2	Joint pits 11
1.4.3	Manholes 12
1.5	Cable joints and cables in detail 13
1.5.1	Cable joints 13
1.5.2	Cables 14
1.6	General description of all types of copper network 16
Chapter 2	Cable's pressure control system 17
2.1	General description of the system 17
2.1.1	Import and production system of dry air 17
2.1.2	Network of pressure control 17
2.2	Installation of cables pressure control system 18
2.2.1	System of import and production of dry air 18
Chapter 3	Transmission line characteristics 21
3.1	Attenuation 21
3.2	Line Loading 22
3.3	Loop Resistance 23
3.4	Crosstalk and Interference 23
Chapter 4	Design of the network, estimating of cost and labor instructions 25
4.1	Wayleaves 25
4.2.	Design 25
4.3	Costing and estimating 26
4.3.1	Analytically the estimation of the project 26
4.3.2	Publishing the estimation 28
Chapter 5	Design of a new area of 800 plots 29
5.1	Topographic Drawing 29
5.2	Schematic Drawing 30
5.3	Primary Network Design 32

Chapter 6	Estimation of the cost of the project	33
6.1	Installation of primary network	33
6.2	Creation of the new geographical area,997	33
6.3	Creation of the secondary distribution network,997	33
6.4	Creation of the new geographical area,998	34
6.5	Creation of the secondary distribution network,998	34
Chapter 7	Work orders	35
7.1	Generally	35
7.2	Work order for the gangs	35
7.3	Subdivision 1	36
7.4	Subdivision 2	36
7.5	Subdivision 3	36
Chapter 8	Cables Pressure Control System work order	37
8.1	The name of the 2000-pair cable	37
8.1	The transducers name	37
8.3	Work order of pressure control system	37
Appendices		
Appendix 1	Estimating Formulas	
Appendix 2	Materials - Costing	

INTRODUCTION

The main purpose of this project was to design in detail the external telephone line plant of a new area.

The project presents the survey carried out, the drawings and the estimation of the cost of the whole project. It was designed following certain rules of CYTA which were established during the registration of the Access Network Section of the organization with ISO 2001/2000.

Due to a new regulation established on 10/3/2000 all the new telephone installations are to be connected to the network via underground cables. This was done in order to offer:

- Better quality of signal
- Reduction of failures
- Better looking environment
- Easier future expansion and new services provision (e.g. cable TV, optical fiber to the building etc)
- Reduction of time required for the installation of new lines.

According to various statistics the average requirement of telephone lines per household is 2. This number differs between areas (e.g. Villages, towns, hospital area, shopping moles etc.)

Two important parameters that should be taken into consideration are the correct position of the cabinet and the number of the telephone lines per geographical area to be served.

A more detailed description about these parameters and their importance is explained in later chapters of this report.

According to these specifications and other details that are to mention later in following chapters, the topographic and the schematic drawings were designed.

At the topographic drawings the exact the position of the cabinets, manholes, joint pits and the pipes are shown.

On the schematic drawings all the cabinets, cables, joints and distribution points are shown.

In order to avoid any damages to the plants of other organizations (e.g. EAC, Waterworks, etc) during the excavations, the drawings are sent to them in order to examine if there are any possible problems with their plants. If there are no such problems the project is carried out.

At the end the cost of the project was calculated. For the estimation of the cost a lot of different functions and assumptions were taken into consideration and these are explained in the relevant chapter.

CYTA tries to discover and study more improved methods of telecommunication in order to offer clients a better quality of service and more flexible routes of communication. CYTA has already connected the Exchanges with one another with fiber optic cables and at the moment carries out a pilot project for connecting the cabinets to the exchange via fiber optic cables.