

COMPUTER ANALYSIS OF
PUMPING SYSTEMS

PROJECT REPORT SUBMITTED

BY : GEORGE GEORGHIOU

In part satisfaction of the award of
Diploma of Technician Engineer in
Mechanical Engineering of the
Higher Technical Institute

C Y P R U S

PROJECT SUPERVISOR : Mr. P. DEMETRIOU
Lecturer in
Mechanical Engineering H.T.I.

Type of Project : Individual

Project No. : M/505

J u n e 1990



ABSTRACT

This project deals with the development of theory for pumps and piping systems. Also, it involves a spreadsheet program written in Supercalc 5, suitable for the selection of the most efficient pump and piping system, for submersible and centrifugal pump installations.

It is arranged in eleven small chapters, as follows:

In Chapter 1, the general classes of pumping machinery are present as well as a small description of positive-displacement pumps.

In Chapters 2 to 6, the theory of centrifugal and submersible pumps is developed giving details about their construction, operation and methods of installations. Also, in these chapters miscellaneous centrifugal and deep well pumps are described very briefly.

In Chapters 7 to 10, the required theory and formulae on which the program is based, are given. Especially chapter 10, gives a very good idea of the structure of the program that was followed.

In Chapter 11, the reader will be given the basic knowledge required to operate the program which is stored on the diskette accompanying this project.

In my opinion if anybody who will come across this project and has not enough time to spend on it, he/she must go straight away to chapter 11 and read the instructions for using the program.

CONTENTS

	PAGE
ACKNOWLEDGEMENTS	i
CONTENTS	ii
ABSTRACT	iii
INTRODUCTION	1
CHAPTER 1: CLASSIFICATION OF PUMPS	3
CHAPTER 2: ROTODYNAMIC PUMPS	10
CHAPTER 3: CENTRIFUGAL PUMPS	13
CHAPTER 4: MISCELLANEOUS PUMPS	21
CHAPTER 5: DEEP-WELL PUMPS	24
CHAPTER 6: SUBMERSIBLE PUMPS	30
CHAPTER 7: THEORY AND PERFORMANCE OF CENTRIFUGAL PUMPS	35
CHAPTER 8: PUMP AND PIPING SYSTEMS	47
CHAPTER 9: TROUBLES IN CENTRIFUGAL PUMPS	61
CHAPTER 10: PRACTICAL METHODS FOR MATCHING PUMP AND PIPING SYSTEMS	66
CHAPTER 11: THE COMPUTER PROGRAM	76

