

SITE AND MATERIALS INVESTIGATION FOR A DAM

Project Report Submitted by

SAVVAS GEORGHIADES

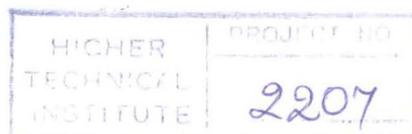
In part satisfaction of the conditions
for the award of Diploma of Technician
Engineer in CIVIL ENGINEERING of the
Higher Technical Institute, Cyprus

Project Supervisor: Mr. M. Poullaides
Senior Lecturer in Civil
Engineering, H.T.I

External Assessor: G. Loucaides

Type of project: Individual

June 1994



SUMMARY

The object of this report which was carried out with the assistance of the Water Development Department was to describe the different stages of site investigation for dams and also fill material investigation.

Chapter 1 is dealing generally with site investigation.

Chapter 2 describes the prefeasibility stage which includes the desk study and the site visit.

Chapters 3 describes the feasibility stage and the investigations that are carried out at this stage. Also brings as an example the feasibility stage of Ayios Theodoros dam.

Chapter 4 is dealing with sampling.

Chapter 5 the different methods of laboratory testing of soils are given.

Chapter 6 describes the different insitu tests that are related with dam construction.

Chapter 7 is dealing with grouting.

CONTENTS

	PAGE
AKNOWLEDGMENTS	
SUMMARY	
INTRODUCTION	
CHAPTER 1 : SITE INVESTIGATION	
1.1. GENERAL	1
1.2. OBJECTIVES	2
1.3. INFORMATION REQUIRED FROM A SITE INVESTIGATION	3
CHAPTER 2 : PREFEASIBILITY STAGE	
2.1. DESK STUDY	4
2.1.1. Aerial photographs	4
2.1.2. Topographical maps	5
2.1.3. Geological maps	5
2.2. SITE VISIT	6
CHAPTER 3 : FEASIBILITY STAGE	
3.1. SURFACE INVESTIGATIONS	8
3.1.1. Surface geological mapping	8
3.1.2. Topographical maps	9
3.2. SUBSURFACE INVESTIGATIONS	9

	PAGE
3.2.1. GENERAL	9
3.2.2. PURPOSE	13
3.2.3. Geological lithology	13
3.2.4. Geological structure and weathering zone	13
3.2.5. Depth of grouting curtain	14
3.3. FEASIBILITY STAGE OF AYIOS THEODHOROS DAM	15
3.4. RESERVOIR AREA	16
3.5. MONI DAM	17
CHAPTER 4 : SAMPLING	
4.1. GENERAL	18
4.2. CORE HANDLING	19
4.3. BOREHOLE LOGS	20
CHAPTER 5 : LABORATORY TESTS ON SAMPLES	
5.1. GENERAL PRINCIPLES	23
5.2. ATTERBERG LIMIT TESTS	23
5.3. PARTICLE SIZE DISTRIBUTION	23
5.4. PERMEABILITY TESTS	24
5.5. COMPACTION TESTS	24
5.6. CHEMICAL TESTS	25
5.7. CONSOLIDATION TEST	25

	PAGE
CHAPTER 6 : INSITU TESTS	
6.1. STANDARD PENETRATION TEST	27
6.2. WATER PRESSURE TESTS	28
6.2.1. Lugeon test	28
CHAPTER 7 : GROUTING	32
CHAPTER 8 : GEOPHYSICAL SURVEYS	
8.1. GENERAL	35
8.2. LAND GEOPHYSICS	35
8.2.1. Resistivity	35
8.2.2. Gravimetric	36
8.2.3. Magnetic	36
8.2.4. Seismic	36
8.3. GEOPHYSICAL BOREHOLE LOGGING	36
8.4. GEOPHYSICS AT AYIOS THEODHOROS DAM	38
CHAPTER 9 : FILL MATERIAL INVESTIGATION	
9.1. PURPOSE	40
9.2. FIELD WORK	40
9.3. DAM FILL MATERIALS	41
9.3.1. Rockfill material	41
9.3.2. Clay core material	45
9.3.3. Filter material	47
9.3.4. Membranes	48
9.3.5. Concrete	49

CHAPTER 10 : DAM TYPES

10.1. Rockfill dam	50
10.2. Rockfill dam with clay core	52
10.3. Concrete faced rockfill dam	52
10.4. Asphaltic concrete faced rockfill dam	53
10.5. Rockfill dam with upstream geomembrane	53

CHAPTER 11 : DESIGN STAGE

11.1. General	54
11.2. Spillway	54
11.3. Diversion tunnel	55

CONCLUSIONS

BIBLIOGRAPHY - REFERENCES