

DESIGN OF A SWIMMING POOL

by

Theodoros Theodosiou

Project Report

Submitted to

the Department of Civil Engineering

of the Higher Technical Institute

Nicosia Cyprus

in partial fulfilment of the requirements

for the diploma of

TECHNICIAN ENGINEER

in

CIVIL ENGINEERING

June 1991



SUMMARY

The design of the swimming pool is based on the proper design and analysis of the retaining walls to be used for the construction, to resist a combination of EARTH and HYDROSTATIC loads.

The design is based on the limit state philosophy according with the methods employed by the BS: 8110, while using the earlier code of practice for liquid-retaining structures the BS 5337 : 1976. (See Appendice "B")

For the Analysis and Design the following steps are required for the solution:-

STAGE 1 : STABILITY ANALYSIS

STAGE 2 : BEARING PRESSURE ANALYSIS

STAGE 3 : MEMBER DESIGN AND DETAIL

Sliding was not taken into account because the floor of the pool provides adequate resistance to sliding.

The following MATERIAL SPECIFICATIONS are used:

Concrete strength, $f_{cu} = 30 \text{ N/mm}^2$

Steel Tensile stress, $f_y = 460 \text{ N/mm}^2$

Weight of concrete = 24 KN/m^3

Soil Density, $\gamma = 20 \text{ KN/m}^3$

Angle of shearing resistance, $\phi = 30^\circ$

Soil Bearing Capacity = 200 KN/m^2

Water density, $\gamma_w = 9.81 \text{ KN/m}^3$

CONTENTS

| | |
|------------------------|-----|
| Contents | I |
| Acknowledgements | II |
| Summary | III |
| Introduction | IV |

| | |
|-------------------------------|--|
| 1.0 Designing and planning | |
| 1.1 Outlining the scheme | |
| 1.2 Programming | |
| 1.3 Budgeting | |
| 1.4 The site survey | |
| 1.5 Problem places | |
| 2.0 Substructures | |
| 2.1 Location and distribution | |
| 2.2 Digging and foundation | |
| 2.3 Water and drainage | |
| 2.4 Materials and Methods | |
| 3.0 Section X - X, Pool empty | |
| 3.1 Section X - X, Pool full | |
| 3.2 Section Y - Y, Pool empty | |
| 3.3 Section Y - Y, Pool full | |
| 4.0 References | |