

TABLE OF CONTENTS

Table of Contents.....	i
201. Concrete works.....	1
201.1 General	1
201.1.1 Life Span of Concrete Structure	1
201.1.2 Codes and Standards	1
201.2 Soil Parameters.....	1
201.3 Materials.....	1
201.3.1 Grades of Concrete	1
201.3.2 Reinforcement	2
201.3.3 Minimum Cover of Reinforcement	2
201.3.4 Classes of Exposure and Crack Width.....	2
201.3.5 Admixtures	2
202. Cyclopean Concrete	3
203. Shop Drawings, As-Built Drawings	3

201. CONCRETE WORKS

201.1 GENERAL

201.1.1 Life Span of Concrete Structure

New works are to be designed for a life of 60 years.

201.1.2 Codes and Standards

Complementary or new design shall as far as possible be carried out in compliance with relevant International Standards such as:

- BS Standards.
- ACI and Uniform Building code.
- BAEL 1992
- AFPS 90

Or equivalent standards

201.2 SOIL PARAMETERS

The Contractor shall carry out soil investigations to satisfy himself with the prevailing soil conditions for all sites.

201.3 MATERIALS

201.3.1 Grades of Concrete

The minimum grades of concrete for the various structures are given as follows:

Grade	Component
C30	Reinforced concrete for Structures (350 Kg cement/cu.m)
C20	Mass concrete and Blinding concrete (250 Kg cement/cu.m)

Reinforced and mass concrete must be vibrated.

Admixtures and mix design of the different Grades of concrete shall be submitted for approval prior to commencing the work.

DEIR DALLOUM ROAD REHABILITATION

201.3.2 *Reinforcement*

All reinforcing steels shall be Type 2 High Yield Bars and comply with the requirement of BS 8110 and shall have a specified characteristic strength of 420 N/mm².

Dowel bars and stirrups shall be Mild Steel grade 25, $f_y = 250 \text{ N/mm}^2$.

Lap lengths shall be 50 diameters. Mechanical bending for $\phi \geq 12 \text{ mm}$ is required.

201.3.3 *Minimum Cover of Reinforcement*

The concrete cover for all steel bars including stirrups shall not be less than 40 mm in structures where concrete surfaces are in contact with water.

Where concrete surfaces are in contact with soil, the cover of reinforcement shall not be less than 35 mm.

The cover of reinforcement in external surfaces of structures, and all elements of buildings shall not be less than 30 mm.

Formwork for all concrete surfaces in contact with water and/or soil and internal surface (walls and ceilings) of technical rooms shall be of form panels (marine plywood or metallic formwork) in order to obtain a regular and smooth finish.

201.3.4 *Classes of Exposure and Crack Width*

External and internal walls, columns and beams are to be considered as subject to severe exposure as defined in Sub-Clause 3.3.4 of BS 8110.

The faces of structures in contact with ground shall also be considered as subject to severe exposure.

Concrete surfaces in contact with water are designed for a maximum crack width of 0.2 mm.

201.3.5 *Admixtures*

Admixtures (retarders, mass waterproofing, silica fume, ...) are to be added to concrete in contact with liquid. Technical sheets and the mix design of concrete shall be submitted for approval.

202. CYCLOPEAN CONCRETE

Cyclopean concrete shall consist of Class C concrete, as specified, containing large embedded stones. The embedded rubble stones shall be of approved quality, sound and durable, and free from segregations, seams, cracks and other structural defects or imperfections tending to destroy its resistance to the weather. It shall be free from rounded, worn, or weathered surfaces. All weathered stone shall be rejected. The stone shall be kept free from dirt, oil, or any other injurious material which may prevent proper adhesion. The largest dimension of any rubble stone shall not exceed 20 centimeters. The distance between two adjacent rubble stones or between a rubble stone and the form shall not be less than 5 centimeters.

The stone shall be carefully placed-not dropped or cast-so as to avoid injury to the forms or to the partially set adjacent masonry. All stones shall be washed and saturated with water before placing. The total volume of the stone shall not be greater than one third of the total volume of the portion of the work in which it is placed.

203. SHOP DRAWINGS, AS-BUILT DRAWINGS

Shop Drawings and all necessary material technical specification shall be submitted to the Engineer for approval at least 21 days before starting of the work.

As-built drawings shall be prepared and submitted successively during the execution of works and shall be also submitted completely to the Engineer for approval one month maximum after the completion of the work.

It is the duty of the Contractor to undertake all the Engineer's recommendations, modifications and corrections at his own expense until complete satisfaction of the Engineer.