ROLLER COMPACTED CONCRETE USING LOCAL MATERIALS OF JORDAN

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ABSTRACT

Roller Compacted Concrete Using Local Materials of Jordan

Roller Compacted Concrete (RCC) is a concrete with no-slump consistency which is transported, placed and compacted with the same equipment that is used for earth and rock fill dams. RCC is a relatively new method of construction and has recently appeared as an economically attractive material for gravity dam construction.

The main objective of this work is to evaluate RCC using local materials of Jordan. The work has been made into two phases: Phase 1 was a mix proportion program in which the physical properties of a number of RCC mixes were examined. Phase 2 was a test section constructed to evaluate the mixes designed in the laboratory and the method of construction followed in RCC. The methods of mixing, transporting, placing and compacting RCC were evaluated and discussed. Field control tests during the construction of the test section were conducted. These include field density of the compacted layer and temperature rise in the RCC.

Drilled core samples were extracted from the hardened RCC to study their properties. Field permeability tests were done to measure the coefficient of permeability of RCC in the test section.

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The results of testing the core samples at 93 days age were as follows:

- **Average Compressive Strength**: 6.03 MPa
- **Average Splitting Tensile Strength**: 612 KPa
- **Average Modulus of Elasticity**: 420 MPa
- **Average Density of Cores**: 2219 kg/m³

An average coefficient of permeability $2.531 \times 10^{-3}$ cm/sec. was found. This value represented permeability through the mass of RCC plus seepage through the joints between the layers. As listed above, a low strength of cores was obtained.

Increasing the cement content of the mix and increasing the fineness of pozzolan are recommended. Mortar application of 15 mm thick is recommended prior to placing a new layer.