

Caltite Self-Compacting Concrete

Rehabilitating and waterproofing the structure

The basement of a building at an education facility was deteriorated by soil water which caused severe water leakage from the basement floor and walls. To rehabilitate the basement, a special “waterproof” concrete mix was required.

Caltite concrete is a waterproofed concrete which reduces capillary water absorption as well as reduces permeability to water under pressure. Such properties allow waterproof concrete to be used in water-resisting construction below ground in place of water-proofing membranes.

The particular mix design has not been used before in Saudi Arabia.



Project Requirements:

1. Target strength: 40 MPa @ 28 days
2. High waterproofing properties: water absorption, according to BS 1881:122, less than 1%
3. W/cm ratio: 0.35-0.40
4. Wall jacketing thickness: around 15 cm

Challenges:

1. Concrete floors and walls should be impervious to stop any ground water ingress.
2. Very thin reinforced sections with limited pouring points.
3. Very difficult to vibrate and compact the placed concrete, especially in the walls.
4. Many openings, connections and pipes in the existing walls.

5. Difficult to reach by a mobile pump inside the existing basements.



Solutions:

1. Caltite (waterproofing admixture) was used in the mix design to meet the strict waterproofing requirements.
2. Self-compacting concrete (SCC) with a 700 mm flow was the solution for pouring the very thin wall section without vibrators.
3. The self-compacting concrete also acted as a self-leveling concrete for the basement floors to ensure easier and faster placing.
4. Extension pipeline systems were used to deliver concrete from the mobile pumps to the basement.



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