Performance

The characteristics of concrete are dependent on the ingredients used to create it. It is widely recognised that the performance and strength of concrete is defined by the quantity and type of cement, as well as the type of aggregate used.

Hydramax 1006 changes this. With a typical "standard" concrete, you would expect to see somewhere between 60% and 70% of the cement particles hydrated after a 28-day period. Even after many years, this percentage may only rise to between 70% and 80%. With the inclusion of Hydramax 1006 within the mix design this percentage can rise up to 85%(1) in a much shorter time frame.

The typical consequences of this ultra-efficient hydration of cement particles using Hydramax 1006 are:

- Early strength - Mould striking times reduced between 4 and 7 hours
  - 7-day strength in 3 days(1)
  - 28-day strength in 7 days(1)

- Ultimate strength - potentially 30% higher(1)
- Flexural strength - potentially 100% higher(2)
- Tensile strength - potentially 100% higher(2)

Technology

Hydramax 1006 can hydrate up to 85%(1) of cement within a 28-day period. The increased hydration performance is achieved by using a combination of highly efficient compounds which dramatically improve the efficiency of the Portland cement hydration.

Hydramax 1006 changes the hydration of the mix significantly, reducing the pores and capillary tracts and thus making the matrix denser. The increased hydration utilises more cement particles, producing a denser calcium silicate hydrate mass and reducing the amount of "free" calcium hydroxide. Calcium hydroxide is still produced, (as it is inherently part of the hydration process) but it is more evenly spread amongst the mass of the concrete, in smaller amounts, which are mechanically bound by a significantly denser matrix.

The inclusion of Hydramax 1006 within the mix design results in faster hydration reactions, potentially using up to 100% of the mix water, using more cement particles, reaching strengths faster, reducing capillary tracts and creating a denser concrete.

(1) Based on a Hydramax 1006 dosage rate of 2.5% of OPC by weight, added to a comparable mix containing no admixtures.

(2) For a 30 MPa concrete: Estimate for tensile/flexural strengths: 30 x 0.15 = 4.5 MPa. With Hydramax 1006 added to the same 30 MPa design, compressive strength increases by 25% (30 x 1.25 = 37.5 MPa) The corresponding tensile/flexural strength increases by 50% (4.5 + 2.25 = 6.75 MPa). The compressive strength to tensile/flexural strength ratio is 18% for the mix containing Hydramax 1006, compared to 15% for the mix not containing Hydramax 1006. (6.75 MPa/37.5 MPa = 18% v's 4.5 MPa/30 MPa = 15%).

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