

Characterization of Cement Mortar Based on Fine Quartz

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Abstract : The introduction of siliceous mineral additions in cement production allows, in addition to the ecological and economic gain, improvement of concrete performance. This improvement is mainly due to the fixing of Portlandite, released during the hydration of cement, by fine siliceous, forming denser calcium silicate hydrates and therefore a more compact cementitious matrix. This research is part of the valuation of the Dune Sand (DS) in the cement industry in Algeria. The high silica content of DS motivated us to study its effect, at ground state, on the properties of mortars in fresh and hardened state. For this purpose, cement pastes and mortars based on ground dune sand (fine quartz) has been analyzed with a replacement to cement of 15%, 20% and 25%. This substitution has reduced the amount of heat of hydration and avoids any risk of initial cracking. In addition, the grinding of the dune sand provides amorphous thin populations adsorbed at the surface of the crystal particles of quartz. Which gives to ground quartz pozzolanic character. This character results an improvement of mechanical strength of mortar (66 MPa in the presence of 25% of ground quartz).

Keywords : mineralogical structure, pozzolanic reactivity, Quartz, mechanical strength

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