

Alkali Free Set Accelerating Admixtures for Sprayed Concrete

Dr. Qi Xu

UGC International Development Center , Zurich, Switzerland

Abstract: Set accelerators are the most crucial admixtures in sprayed concrete. They shorten the setting, provide high early and long-term strength. The performances of set accelerators have been investigated with sprayed mortar and sprayed concrete. The chemical interactions between set accelerators and cements at early stage (up to 24 hours) have been studied by DCA, ICP-OES, ESEM-EDS and XRD, focusing on the properties of the liquid and solid phases of the samples. The results show that the alkali free accelerator reacts immediately with cement to form ettringite, which leads to the quick set of sprayed concrete. The alkali free accelerator affects the hydration process of cement, as well as the crystal structure, the morphology and the amount of hydration products in the microstructure.