

عنوان مقاله:

Chemical Activation and Set Acceleration of Lime-Pozzolan Cement

محل انتشار:

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نویسندگان:

Ali Allahverdi - College of Chemical Engineering Iran University of Science and Technology Narmak ۱۶۸۴۶, Tehran, Iran

Jaleh Ghorbani - College of Chemical Engineering Iran University of Science and Technology Narmak ۱۶۸۴۶, Tehran, Iran

خلاصه مقاله:

Lime-Pozzolan cements were some of the earliest building materials. The invention of lime and lime-pozzolan cements back to the Neolithic period (7000 BC). They were widely used in the masonry construction of aqueducts, arch bridges, retaining walls and buildings during Roman times. Lime-pozzolan cements have a number of advantages including low cost and more importantly long-term engineering properties such as very low heat evolution, decreased permeability and increased chemical resistance. However these cements have important disadvantages including long setting time along with low early strengths. In order to shorten the setting time and to fasten the strength development lime pozzolan cements, different methods including calcinations, acid treatment, prolonged grinding, elevated temperature of curing and addition of chemical activators have been tried to improve the pozzolanic reactivity of natural pozzolan. This paper deals with the effect of some chemical activators and set accelerators on set and strength behaviors of a lime-pozzolan cement containing 70% natural pozzolan and 30% hydrated lime (by mass). Results obtained show that addition of alkaline compounds and Portland cement clinker can improve the set and strength behaviors of lime-pozzolan cements. Sodium sulfate is the most effective chemical activator for lime-pozzolan cements compared to  $\text{Na}_2\text{CO}_3$ ,  $\text{NaOH}$ ,  $\text{CaCl}_2$ , and ordinary Portland cement clinker. The most effective set accelerator for lime-pozzolan cements however is sodium hydroxide compared to  $\text{Na}_2\text{SO}_4$ ,  $\text{Na}_2\text{CO}_3$ ,  $\text{NaCl}$ ,  $\text{CaCl}_2$  and ordinary Portland cement clinker. Addition of 6%  $\text{Na}_2\text{SO}_4$  could noticeably increase 50-day compressive strength and presence of 4%  $\text{NaOH}$  as a set accelerator could effectively decrease both initial and final setting times.

کلمات کلیدی:

Pozzolan, chemical activation, set acceleration, compressive strength, setting time

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