

عنوان مقاله:

Determination of the Effect of the Ratio of the Alkali-silicate Solution to Slag on the Compressive Strength of the Alkali-Activated Slag Concrete

محل انتشار:

دومین کنفرانس بین المللی یافته های نوین پژوهشی در مهندسی عمران، معماری و مدیریت شهری (سال: 1395)

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خلاصه مقاله:

Portland cement is the most widely used material in the construction industry and its production requires the use of significant amounts of energy and also causes the release of large quantities of CO₂ gas into the atmosphere. These amounts, which contain between 5% -8% of CO₂ in the atmosphere are caused by the production of Portland cement. Environmental problems resulting from the production of Portland cement have enticed researchers to focus on the possibility of substituting this type of cement by new materials. Ground blast furnace slag is one of these materials which, by using alkali-activation, can be employed for making concrete. Expanding of consumption of these materials made it necessary to investigate its physical, chemical and mechanical effective parameters. In addition to variables such as the ratio of water to binder materials (cement) and grade of binder material, the ratio of the alkali-silicate solution (ASS) to slag weight is one of the parameters that affects the properties of concrete. In this research, different mass ratios of the ASS to slag was studied while the concentration of the sodium hydroxide solution and other properties of alkali-silicate solution was kept constant. The involved sodium hydroxide concentration was 18.75 molar, the ratio of the sodium silicate to sodium hydroxide was 3, the amount of slag in the mix design was 400 kg per cubic meter, the water to binder ratio was 0.35 and considered amounts for alkali-silicate solution to slag respectively were 0.25, 0.3, 0.35, 0.4, 0.45, 0.5, 0.55, 0.6,. Compressive strength as the main characteristic of concrete was tested and it was observed that, by increasing the ratio to 0.45, the compressive strength of concrete increased but, while it continued to increase, the resistivity of the concrete decreased.

کلمات کلیدی:

alkali-activated concrete, slag, alkali-silicate solution, compressive strength

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