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A Study on the Stabilization of the Swell Behavior of Basic Oxygen Furnace Slag by Using Geopolymer Technology

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Abstract : Basic Oxygen Furnace (BOF) Slag is a by-product of iron making. It has great engineering properties, such as, high hardness and density, high compressive strength, low abrasion ratio, and can replace natural aggregate for building materials. However, the main problem for BOF slag is expansion, due to it contains free lime or free magnesium. The purpose of this study was to stabilize the BOF slag by using geopolymeric technology, hoping can prevent BOF slag expansion. Geopolymer processes contain a large amount of free silicon. These free silicon can react with free-lime or free magnesium oxide in BOF slag, and thus to form stable compound, therefore inhibit the expansion of the BOF slag. In this study for the successful preparation of geopolymer mortar with BOF slag, and their main properties are analyzed with regard to their use as building materials. Autoclave is used to study the volume stability of these geopolymer mortar. Finally, the compressive strength of geopolymer mortar with BOF slag can be reached 33MPa in 28 days. After autoclave testing, the volume expansion does not exceed 0.2%. Even after the autoclave test, the compressive strength can increase to 35MPa. According to the research results can be proved that using geopolymer technology for stabilizing BOF slag is very effective.

Keywords : BOF slag, autoclave test, geopolymer, swell behavior
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