

Potential of industrial By-Products based geopolymer for rigid concrete pavement application

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ABSTRACT

Rigid pavements are less expensive than flexible pavements and have a 20-year service life, making them more suitable for areas with weak subgrade soil and poor drainage. However, the use of rigid pavements comes at the expense of the environment. The production of cement has caused serious environmental problems, the most serious of which is the emission of carbon dioxide gas (CO₂) into the atmosphere, causing natural greenhouse effect and global warming. Sustainable materials aid in the reduction of CO₂ emissions as well as the use of natural raw materials in cement production. In the past few decades, significant progress has been made to develop alternative sustainable building materials (such as geopolymer cement/concrete) in order to control CO₂ emissions. Numerous studies have found that geopolymer is comparable to ordinary Portland cement (OPC) in terms of strength and chemical resistance. However, only a few studies have been done on the usage of geopolymer as a rigid pavement. From the review that has been done, it can be concluded that, in addition to high strength, the requirements for rigid pavement concrete material should include fast setting time, good workability and high durability. The review emphasized that geopolymers have been proven to have excellent strength, durability and processability which fulfil the requirement for rigid pavement application. Finally, this review also introduces future research opportunities regarding the potential of geopolymers as an alternative to OPC for rigid pavements.

KEYWORDS

Rigid concrete pavement; Geopolymer; Industrial by-product

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