Microstructural Studies of GGBS Aggregate on Geopolymer Concrete

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ABSTRACT

Concrete has grown more popular as a result of its versatility and inexpensive cost. Quarries provide the majority of the coarse aggregate needed in the building. The need for alternative materials has risen as a result of the rising use of natural resources. The goal of this study is to identify an environmentally benign and cost-effective material to replace coarse aggregate. The usage of an environmentally friendly material like GGBS Clinker helps to reduce the environmental burden on society. This study examines the advantages and disadvantages of using GGBS clinker in concrete. The use of GGBS clinker as a replacement for conventional aggregate helps to keep traditional construction materials from becoming depleted. Based on the results, it is concluded that GGBS Aggregate can be used by 100% replacement in Conventional concrete. It is observed that 7.23%, 3.5% and 3.67% decrease in Compressive, Flexural and Split tensile strength of GGBS Aggregate when compared to conventional concrete. Furthermore, between 7 and 28 days, it displayed a 60% decrease in porosity, with a well-compacted and thick ITZ at 28 days. Flexural strength showed a strong association with compressive strength, which similar to natural aggregate concrete. Overall, geopolymer aggregate concrete studied in this study has the potential to use as lightweight coarse aggregate in concrete.

Keywords: *Coarse aggregate, Durability, GGBS clinker, Microstructure, SEM analysis.*