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Long term investigation on sulphate resistance of concrete containing laterite aggregate

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Abstract

Utilization of laterite rock at 20% as partial aggregate replacement in concrete production is seen as one of the alternative to reduce the high dependency of concrete industry on granite aggregate supply and preserve this natural resource for future generation. This paper reports the durability performance of concrete containing laterite aggregate upon sulphate attack. A reference mix, plain concrete consisting 100% granite aggregate and another one mix containing 20% laterite aggregate as partial coarse aggregate replacement were used. All specimens were prepared in cubes of (100×100×100mm) and subjected to water curing for 28 days. After that, the specimens were immersed in Magnesium Sulphate solution for a period of 50 weeks. The durability of the concrete mixes was determined through measurement of mass change and residual compressive strength. The compressive strength test was conducted following the procedures in BSEN 12390 – 3. Upon exposure in sulphate environment, reaction between sulphate ions and portlandite which formed gypsum contributes to concrete expansion and disintegration causing strength reduction in both specimens. Owing to the small difference in total mass loss and residual compressive strength between the two mixes, it is concluded that the sulphate resistance of laterite concrete is comparable to plain concrete.

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