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<https://doi.org/10.15017/1809232>

出版情報 : Proceedings of International Exchange and Innovation Conference on Engineering & Sciences (IEICES). 2, pp.1-, 2016-10-14. 九州大学大学院総合理工学府

バージョン :

権利関係 :

Investigate the Mechanical and Durability Properties of Cement Mortars being Exposed to Ammonium Nitrate Solutions

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Abstract: *The main purpose of this research is to investigate the effect of aggressive ammonium nitrate on mechanical and durability properties of cement mortar. The mortar specimens were immersed in ammonium nitrate solutions with 5%, 20% and 50% concentrations. After 28 days of curing, the specimens were immersed in ammonium nitrate solutions until 10, 20, 40 and 60 days before testing. The results showed that at 5% and 20% concentrations, the compressive strength loss of cement mortar after 60 days of exposure was 23% and 43%, respectively. For 50% concentration, the loss in compressive strength reached 55% at 60 days of exposure. At 20% and 50% concentrations, the porosity of cement mortar increased by 3.9% and 10.9% after 60 days of exposure, respectively. The loss in the bulk density at 5% and 20% concentrations of ammonium nitrate solution after 60 days of exposure was about 3% and 6%, respectively.*

Keywords: Cement mortar; aggressive ammonium nitrate; compressive strength; porosity; bulk density.