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Comparative Study on Durability, Mechanical Strength and Ecology of Ferrocement Made from Geopolymer and Conventional Portland Cement Mortar

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Abstract: Ferrocement is a composite material composed of a mortar reinforced with steel fabric/mesh, used to form thin sections.Geopolymer is an innovative construction material prepared by utilizing the industrial waste materials like Fly ash, GGBS, Red mud, Rice husk ash etc... In the present study OPC with partial replacement of Fly Ash (25%, 50%) and geopolymer mortar were taken with the geopolymer mortar ratio of 1:2. And the liquid/binder ratio was 0.45. Itwasobserved thatferrocementmade by geopolymer mortar shown superiorpropertiesinterms of strength,durability,fatigue,hightemperatureresistance,corrosion,etc.Corrosion was not observed even after 60 days of Alternate Wetting and Drying (AWD) cycles of Accelerated Corrosion Test.The test results show that flexural strength of geopolymer mortar increases with increase in volume fraction percentage and specific surface of steel mesh as compare to ferrocement mortar.The micro-structural changes were determined by FESEM. Thesenewcomposites (Geopolymer mortar) canbeusedformakingprecastelementssuchas castingofwatertanks,innovativearchitectural aestheticconstructions, fasterlowcostdurablehouses,corrosion resistant pipesforsewagelines,tunnelliningsinmetrorail,roadsandirrigationtechniques. Thepresent development ofnewferrocementcanbecomeanaptsubstituteforconventional ferrocement, butwithverylow carbonfootprint.

Keywords: Ferrocement, Geopolymer, wire mesh, Accelerated corrosion test, Durability, FESEM, EE, ECO2E.

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