

Polystyrene Paste as a Substitute for a Portland Cement: A Solution to the Nigerian Dilemma

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Abstract : The reduction of limestone to cement in Nigeria is expensive and requires huge amounts of energy. This significantly affects the cost of cement. Concrete is heavy: a cubic foot of it weighs about 150 lbs. and a cubic yard is about 4000 lbs. Thus a ready-mix truck with 9 cubic yards is carrying 36,000 lbs excluding the weight of the truck itself, thereby accumulating cost for also manufacturers. Therein lies the need to find a substitute for cement by using the polystyrene paste that benefits both the manufactures and the consumers. Polystyrene Paste Constructional Cement (PPCC), a patented material obtained by dissolving Waste EPS in volatile organic solvent, has recently been identified as a suitable binder/cement for construction and building material production. This paper illustrates the procedures of a test experiment undertaken to determine the splitting tensile strength of PPCC mortar compared to that of OPC (Ordinary Portland Cement). Expanded polystyrene was dissolved in gasoline to form a paste referred to as Polystyrene Paste Constructional Cement (PPCC). Mortars of mix ratios 1:4, 1:5, 1:6, 1:7 (PPCC: fine aggregate) batched by volume were used to produce 50mm x 100mm cylindrical PPCC mortar splitting tensile strength specimens. The control experiment was done by creating another series of cylindrical OPC mortar splitting tensile strength specimens following the same mix ratio used earlier. The PPCC cylindrical splitting tensile strength specimens were left to air-set, and the ones made with Ordinary Portland Cement (OPC) were demolded after 24 hours and cured in water. The cylindrical PPCC splitting tensile strength specimens were tested at 28 days and compared with those of the Ordinary Portland cement splitting tensile strength specimens. The result shows that hence for this two mixes, PPCC exhibits a better binding property than the OPC. With this my new invention I recommend the use of PPCC as a substitute for a Portland cement.

Keywords : polystyrene paste, Portland cement, construction, mortar

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