

Utilization of Pozzolonic Material for the Enhancement of the Concrete Strength: A Comprehensive Review Paper

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Abstract : Concrete is the material of choice where strength, performance, durability, impermeability, fire resistance, and abrasion resistance are required. The hunger for the higher strength leads to other materials to achieve the desired results and thus, emerged the contribution of cementitious material for the strength of concrete. In present day constructions, concrete is chosen as one of the best choices by civil engineers in construction materials. The concept of sustainability is touching new heights and many pozzolonic materials are tried and tested as partial replacement for the cement. In this paper, comprehensive review of available literatures are studied to evaluate the performance of pozzolonic materials such as ceramic waste powder, copper slag, silica fume on the strength of concrete by the partial replacement of ordinary materials such as cement, fine aggregate and coarse aggregate at different percentage of composition. From the study, we conclude that ceramic wastes are suitable to be used in the construction industry, and more significantly on the making of concrete. Ceramic wastes are found to be suitable for usage as substitution for fine and coarse aggregates and partial substitution in cement production. They were found to be performing better than normal concrete, in properties such as density, durability, permeability, and compressive strength. Copper slag is the waste material of matte smelting and refining of copper such that each ton of copper generates approximately 2.5 tons of copper slag. Copper slag is one of the materials that is considered as a waste which could have a promising future in construction industry as partial or full substitute of aggregates. Silica fume, also known as micro silica or condensed silica fume, is a relatively new material compared to fly ash, It is another material that is used as an artificial pozzolonic admixture. High strength concrete made with silica fume provides high abrasion/corrosion resistance.

Keywords : concrete, pozzolonic materials, ceramic waste powder, copper slag

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