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Eco Friendly Building Materials Used for High strength and high performance Concrete

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Abstract: Bottom ash and lateritic sand is an alternative for river sand. Due to fast growing construction industry, the demand for sand has increased tremendously, causing deficiency of suitable river sand in most part of the world. Due to the depletion of good quality river sand for the use of construction, the use of lateritic sand has been increased. Another reason for use of Bottom ash is its availability and waste product and low cost. Since this sand can be produced from power plants (NLC), it can be readily available at the nearby place, reducing the cost of transportation from far-off river sand bed. Hence the practice of replacing river sand with hydro sluiced bottom ash and lateritic is taking a tremendous growth. It is also inferred from the literature that replacement of normal sand with hydro sluiced bottom ash and lateritic sand produces no appreciable increase in compressive strength due to the variation in the pore size of concrete at micro level. This paper presents the optimization of partially replacement of hydro sluiced bottom ash and lateritic sand by natural sand with nano silica in high performance concrete. The ordinary Portland cement is partially replaced with nano-silica by 0.35 %, 0.5 %, 0.75 % and natural sand is partially replaced with hydro sluiced bottom ash and lateritic sand. Samples of concrete (eg.cubes) are made in M25 grade. The studies reveal that the increase in percentage of partial replacement of nano silica increased the compressive, tensile and flexural strength of concrete. It was found that 0.55 water/cement ratio produced higher compressive strengths, tensile strength and better workability for partially replaced with nano-silica by 0.50 % mix, proportion. These results compare favourably with those of conventional concrete. By practice it shows that conventional mix has more strength than bottom ash sand and lateritic sand mix so we will be adding various % of nanosilica to the bottom ash mix and compare the values of compressive strength, corrosion resistance, tensile strength and economy in practice of conventional mix. Since we are replacing nanosilica with cement the strength increases and the porosity decreases as the nano materials fill the fine pores between the aggregates and the cement. The practicality for its usage in the marine environment, Nuclear power plants, Chemical Industry, etc are studied.

Key words: compressive strength, flexural strength, Hydro sluiced bottom ash, nano silica, tensile strength, lateritic sand.