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(57) Abstract :
This invention evaluates the effects of nano-silica (NS) on the physical-chemical compressive, tensile, and flexural strengths of cement pastes containing recycled aggregate slag-based concrete made with M-sand rather than river sand. Various mixtures containing recycled aggregate and 1.5 percent by weight of cement and slag were created. In order to increase early age strength, Nano-silica was added as a filler ingredient to Portland slag cement, which has high pozzalanic properties. The early hydration of C3S is typically facilitated by NS due to its highly reactive surface. NS thickened cement paste and increased cement's hydration. Two different mixes of M30 and M35 grade concrete were used to examine the effect of nano-silica on recycled aggregate slag-based concrete. Recycled aggregates are substituted for natural aggregates at various rates of 30, 45, and 60%. Nano-silica enhances the mechanical and durability properties of concrete made with recycled aggregate and slag, allowing it to be used for slabs and roads. Using M sand and nano silica reduced the permeability of RAC, which is typically greater than that of regular concrete, by about 6%. Concrete made with recycled aggregate exhibits very little chloride attack at 28 and 90 days, respectively. Although using Nano-silica reduces the absorption, RAC has a higher water absorption rate than conventional concrete.

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