

Performance of lightweight foamed concrete with replacement of concrete sludge aggregate as coarse aggregate

Abstract

The use of waste materials in construction industry is very essential in order to reduce the depletion of natural sources. Thus, this study is focused to determine the performance of lightweight foamed concrete made with concrete sludge aggregate (CSA) and to determine the optimum proportion of CSA that can give optimum compressive strength. Strength is one of the most important properties of concrete since the first consideration in structural design is that the structural elements must be capable of carrying necessary loads. CSA has been used as partial substitution to normal coarse aggregate to manufacture structural lightweight foamed concrete. Two different sets of CSA proportions have been prepared with foamed injected through mixing processes. 25% and 50% of CSA for production of lightweight concrete were designed according to proper mix design. It is found that maximum percentage of CSA that contributes to the highest compressive strength of 25 MPa is 50% of CSA replacement. Its density is 1837 kg/m³ with water adsorption of 16.35%. The usage of concrete sludge aggregate as construction material can be further promoted in order to solve major environmental issues.

Keywords

Aggregate; Concrete sludge aggregate; Foamed concrete; Performance