

MODELLING ELASTIC PROPERTIES OF CEMENTITIOUS COMPOSITES CONTAINING INDUSTRIAL BY-PRODUCTS

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ABSTRACT

This work was undertaken to determine an appropriate theoretical model to describe elastic properties of concrete composites. The elastic properties include modulus of elasticity, modulus of rigidity, bulk modulus and Poisson's ratio, etc. Literature search was conducted to collect information about existing analytical models in order to predict elastic behavior of composites. Based upon information gathered it was concluded that mechanical behavior of concrete can be modelled by using available models for composites.

Plain concrete was considered as a particulate composite in which matrix (hardened paste) is made up of cement, sand, and ash, and reinforcing fillers are represented by aggregates.

In order to judge validity of theoretical models, elastic properties of concrete specimens were also determined experimentally for fly ash concrete proportioned to have 28-day compressive strength of 6000 psi (41 MPa) using ASTM Class F fly ash from two different sources. Fly ash content was varied between 40 to 60 percent.

The result of this investigation has established an excellent model for representing elastic properties of fly ash concretes.