

**THEORETICAL PREDICTION OF ELASTIC PROPERTIES OF
CEMENTITIOUS COMPOSITES MADE WITH AND WITHOUT MINERAL
ADMIXTURES**

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ABSTRACT

This research work was carried out to establish an appropriate theoretical model to describe elastic properties of cementitious composites. The elastic properties include modulus of elasticity, modulus of rigidity, bulk modulus and Poisson's ratio. A literature search was carried out to gain information about existing analytical models in order to predict elastic behavior of composites. Analysis of the literature information collected revealed that mechanical behavior of concrete can be modeled by using available models for composites.

In this work, plain concrete was considered as a particulate composite in which matrix (hardened paste) is made up of cement, sand, and ash, and reinforcement is represented by coarse aggregates particles. In order to evaluate 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.