

Investigation into the modulus of elasticity of concrete

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Abstract

The modulus of elasticity of concrete is an important parameter used in reinforced concrete design and analysis. Its value is not as well defined as that of steel or aluminum in spite of the fact that so many researches have been done in this field. In this research, investigation of all possible variables which can affect the value of modulus of elasticity of concrete were studied and the following three sample forms of equations similar to ACI were statistically derived which predict the modulus of elasticity of concrete more accurately to the experimental one:

$$E_c = 194.3 w^{1.2} (f'_c)^{0.46} \quad (1)$$

$$E_c = 244.2 w^{1.18} (f'_c)^{0.44} \quad (2)$$

$$E_c = 45317.0 (f'_c)^{0.52} \quad (3)$$

where

E_c = modulus of elasticity, psi

w = dry-unit weight of concrete, pcf

f'_c = 8-day compressive strength, psi