

FATIGUE PROPERTY OF CONCRETE WITH AND WITHOUT MINERAL ADMIXTURES

By Tarun Naik and Shiw Singh

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ABSTRACT

This research was conducted: (1) to present the state-of-the-art information on fatigue behavior of plain concrete with or without mineral admixtures; and, (2) to evaluate the fatigue characteristics of Class C fly ash concrete under flexural stress.

A number of studies have shown that concrete fatigue strength is significantly influenced by a large number of variables including stress range, rate of loading, load history, stress reversal, rest period, stress gradient, material properties, etc. Effects of these parameters on fatigue characteristics of concrete are addressed in this paper. In general, endurance or fatigue flexural limit of plain concrete was found to vary between approximately 50 and 70% of its static flexural strength. But it can be lower than 50% when concrete is tested in water.

Experimental investigations conducted in this work revealed that fly ash concrete mixture having 15% cement replacement showed superior performance relative to high-volume fly ash mixture with 50% cement replacement with respect to compressive strength and flexural fatigue strength. However, fly ash concrete mixtures showed essentially the same results when the flexural fatigue strength was expressed as percentage of the flexural static strength.