

# **DEICING SALT SCALING RESISTANCE OF HIGH-VOLUME FLY ASH CONCRETE USING VARIOUS SOURCES OF FLY ASH**

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## **ABSTRACT**

The primary objective of this investigation was to evaluate salt scaling resistance of concrete incorporating large amounts of Class C and Class F fly ash obtained from several sources. Two series of laboratory investigations (Series 1 and Series 2) and one field investigation (Series 3) were carried out. The Series 1 investigation involved mixtures having fly ash from one source and varied the fly ash to cementitious materials ratio from 0 to 74%. The Series 2 investigation used mixtures having Class C fly ash from three additional sources and developed mixtures with fly ash to cementitious materials ratios of 0%, 40%, 50%, and 60%. The Series 3 investigation consisted of four separate studies (Study 3A, 3B, 3C, and 3D) which involved mixtures incorporating Class C and Class F fly ashes. All concrete mixtures were proportioned to meet strength requirements for individual applications. Test data showed that high-strength concrete with excellent salt scaling resistance can be manufactured with up to a 45% fly ash to cementitious materials ratio. Series 1 test results also indicate that it is possible to produce structural grade concrete with Class C fly ash (up to a fly ash to cementitious materials ratio of about 56%) having adequate resistance against salt scaling. The Series 2 mixtures with a fly ash to cementitious materials ratio of up to approximately 50% exhibited salt scaling resistance which was either comparable to or superior to the reference without fly ash. The laboratory evaluation of the Series 3 mixtures showed that as fly ash content in the mixture increased (fly ash to cementitious materials ratio increased), salt scaling resistance decreased. However, some mixtures with up to 50% fly ash exhibited adequate salt scaling resistance.