

**Title: Concrete Maturity Field Studies for Highway Applications**

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**Abstract:** The Arrhenius maturity function was used to estimate strength evolution in three highway structures: a bridge pier, a bridge deck, and pavement. The research documents field instrumentation and strength estimation. Each structure was constructed with a mixture containing 35% ground granulated blast-furnace slag as a mass replacement of total cementitious materials and approximately a 0.40 water-cementitious materials ratio. The temperature profiles for each application were recorded and discussed. The logarithmic strength-maturity relationship was compared with the hyperbolic strength-maturity relationship for each application. Cylindrical concrete specimens, cast on site during construction, were exposed to a variety of curing conditions. Minor differences in material proportions were also investigated. The quality of cure of the companion specimens significantly affected the strength-maturity relationship. Small deviations in mixture proportions did not appear to affect significantly the strength-maturity relationship for the mixtures studied.