FLEXIBLE PAVEMENT DESIGN BY CBR METHOD

**Abstract**

This report summarizes work performed under Texas Department of Transportation (TxDOT) Project 4563, Prediction Model for Concrete Behavior. The main product developed under this project is a software program, named Concrete Works, which gives laboratory technicians, engineers, and contractors a tool that
combines concrete design, analysis, and performance prediction to improve and optimize the performance of concrete structures.

A unique feature of the testing performed is the use of rigid cracking frames. This test was developed in Germany, and measures the cracking sensitivity of a restrained dog-bone-shaped concrete specimen from the time of concrete placement. Temperature-controlled formwork is used to cure the specimen to match field conditions of mass concrete members. These frames are designed to allow fresh concrete to be cast into their
formwork, which enables the study of very early-age behavior of concrete mixtures.

More than 70 tests have been completed to date and these results were used to characterize the very early-age creep behavior and risk of cracking of various concretes. Mixture-specific heat of hydration values are used to accurately model the effect
of various cementitious materials material on the in-place concrete temperature distribution. The model has been calibrated with over 33,000 hours of temperature data collected from field sites. The software provides detailed results to check compliance with specification to control thermal cracking, alkali silica reaction,
delayed ettringite formation, and service-life expectancy. This report concludes with a section aimed at implementing ConcreteWorks, with emphasis on how best
to use, specify, and check compliance with mass concrete design guidelines.