

ABSTRACT

Fast track concrete has proven to be successful in obtaining high early strengths. This benefit does not come without cost. Type III cement and insulation blankets to accelerate the cure add to its expense when compared to conventional paving. This research was intended to determine the increase in time required to obtain opening strength when a fast track mix utilized conventional Type I cement and also used a conventional cure. Standard concrete mixes also were tested to determine the acceleration of strength gain when cured with insulation blankets. The goal was to determine mixes and procedures which would result in a range of opening times. This would allow the most economical design for a particular project and tailor it to that projects time restraint.

Three mixes were tested: Class F, Class C, and Class B. Each mix was tested with one section being cured with insulation blankets and another section without. All used Type I cement.

Iowa Department of Transportation specifications required 500 psi of flexural strength before a pavement can be opened to traffic. The Class F mix with Type I cement and using insulation blankets reached that strength in approximately 36 hours, the Class C mix using the blankets in approximately 48 hours, and the Class F mix without covers in about 60 hours. (Note: Class F concrete pavement is opened at 400 psi minimum and Class F bonded overlay pavement at 350 psi.)

The results showed a significant improvement in early strength gain by the use of insulation blankets. The Type I cement could be used in mixes intended for early opening with sacrifices in time when compared to fast track but are still much sooner than conventional pavement. It appears a range of design alternatives is possible using Type I cement both with and without insulating blankets.