

USE OF SUPERPLASTERIZER IN TIF FOR HVFA CONCRETE FOR INDUSTRIAL PARK ROADS WITH MINIMUM LIFE-CYCLE COSTS

By Tarun R. Naik, John H. Tews, Bruce W. Ramme, and Shiw S. Singh

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ABSTRACT

This research was primarily carried out to demonstrate the application of HVFA concrete systems to minimize overall costs of road pavements. The research was completed in two phases. Phase I work was primarily devoted toward development of superplasticized concrete mixtures through laboratory investigation. Phase II work was directed toward demonstration of HVFA concrete application in paving roads. For Phase I work, six different concrete mixtures were proportioned using a Class C fly ash as cement replacement in the range of 18-74% of total cementitious materials. Each concrete mixture was evaluated with respect to compressive strength, tensile strength, flexural strength, modulus of elasticity, shrinkage, abrasion resistance, chloride ion permeability, salt scaling resistance, and freezing and thawing durability. The results indicated that concrete mixtures incorporating fly ash up to 56% are appropriate for paving and structural applications. On the basis of the results of this and other investigations, a 40% percent fly ash mixture was selected for Phase II investigation to demonstrate technical and economic feasibility of using HVFA concrete in construction of pavements. Test data collected to-date have shown excellent results for pavements made with 40% fly ash concrete.