

ABSTRACT

This project consisted of slipforming a 4-inch thick econcrete subbase on a 6-mile section of US 63. The project location extends south from one mile south of Denver, Iowa to Black Hawk County Road C-66 and consisted of the reconstruction and new construction of a divided four-lane facility. The econcrete was placed 27.3 feet wide in a single pass.

Fly ash was used in this field study to replace 0, 30, 45 and 60 percent of the portland cement in three portland cement econcrete base paving mixes. The three mixes contained 300, 350 and 400 pounds of cementitious material per cubic yard. Two Class "C" ashes from Iowa approved sources were used. The ash was substituted on the basis of one pound of ash for each pound of cement removed.

The work was done October 6 through October 29, 1987 and May 25 through June 9, 1988. The twelve subbase mixes were placed in sections 2500 to 3000 feet in length on both the north and southbound roadways.

Compressive strengths of all mixes were determined at 3 and 28 days of age. Flexural strengths of all mixes were determined at 7 and 14 days. In all cases strengths were adequate.

The freeze/thaw durability of the econcrete mixes used was reduced by increased fly ash levels but remained above acceptable limits.

The test results demonstrate the feasibility of producing econocrete with satisfactory properties even using fly ash at substitution rates up to 45 percent.

CONCLUSIONS

The results of this study indicate that a reduction in cementitious material and an increase in the percentage of fly ash are viable options. More fly ash and lower cementitious content did not reduce the workability or placeability.

During the nine years prior to 1984, compressive strength of the subbase was adequate with a 300 pound cement factor mix. A 28-day strength of 300 psi flexural or 2500 psi compressive strength is about the target strength for econcrete. Test mixes with 245

pounds cement/105 pounds fly ash and 220 pounds cement/180 pounds fly ash provided 3-day compressive strengths equivalent with the 300 pound cement mix. With proper precautions, the higher ultimate strength should not create problems.

RECOMMENDATIONS

Based on the test results the following recommendations are made:

1. Revise specification article 2114.026, "Slip-Formed Portland Cement Concrete Base" item 2 as follows:

The cementitious material content of the base shall be one of the following:

	Portland Cement (pounds per cubic yard)	Class C Fly Ash (pounds per cubic yard)
Mix a	350	0
Mix b	245	105
Mix c	220	180

2. The restriction on fly ash usage between October 16 and March 15 should apply to Class A subbase.