Improvement in California Bearing Ratio of Various Soils in Botswana by Fly Ash

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ABSTRACT

Botswana is a country of about 581,730 km^2 in area. Three quarters of which is covered by sands of the Kalahari Desert on the western side of the country. Rapid development has taken place in road construction in Botswana during the past decade. A major problem in providing an adequate road system in this region has been the scarcity of good road construction material compounded by adverse climatic and geological factors.

In the present investigation effort has been made to improve the road construction material by adding fly ash alone. Soils of various grading, varying from Kalahari sand to clay of high plasticity were collected from different parts of the country. These soils were mixed with different proportions of fly ash. California bearing ratios (C.B.R.) of 4 days soaked samples of all the soil-fly ash admixtures were determined. The effect of curing period on C.B.R. was determined by curing the samples for different curing periods before testing for C.B.R.. It was found that C.B.R of all the soils increase with the increase in fly ash proportion as well as with the curing period. The gain in C.B.R. was found to be maximum in sandy soils and minimum in clayey soils with silty soils falling in between. The trend showed the gain even beyond 21 days suggesting that hardening process is expected to continue even beyond 21 days..

The use of fly ash in road construction would provide an economic solution to improve the material for road construction as well as reduce the amount of dumping of fly ash as a waste, which is about 350 tons per day in Botswana.