Recent Experiences with Lime – Fly Ash Stabilization of Pavement Subgrade Soils, Base, and Recycled Asphalt

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KEYWORDS: fly ash, lime, soil stabilization, pavement, subgrade

ABSTRACT

Pavement Engineers have long recognized long term benefits of increasing the strength and durability of pavement subgrade soil by mixing in a cementitious binder during reconstruction or new construction. Federal and state highway engineers want to design a "perpetual pavement" which demand perpetual foundations. Millions of dollars per mile can be saved by soil subgrade stabilization in comparison to cutting out and replacing the unstable subgrade soil. Local government codes recognize a stabilized subgrade can now be given credit towards the thickness design of the overall pavement. Lime alone has traditionally been used in clay-bearing, highly cohesive soils whereas portland cement has been used to bind non-cohesive, granular or poorly cohesive soils . Likewise Portland cement is mainly used to stabilize an aggregate subbase or base course. Class C fly ash has been successfully used for soil subgrade stabilization. Recently little has been reported on lime activation of class F in the pozzolanic reaction fashion for either soil, dense aggregate base, or asphalt recycling. For a low cohesive, silty soil or for reclaiming full depth asphalt pavement our research and some recent practice has shown the use of lime and class F fly ash can be economically engineered and competitive with portland cement. For example in a 12 inch thick subgrade, a mix of 3-4% quicklime and 6- 8% fly ash can achieve adequate strengths and cost about 15-20 cents per sq. ft. as compared to 6% Portland cement that would cost about 30 cents per sq. ft.