

Experimental Studies on Fly Ash-Waste Sludge Mix Reinforced with Geofibres

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Abstract : The aim of the present study is to carry out investigations on Class F fly ash obtained from NTPC thermal power plant, Dadri, U.P. (India) and electroplating waste sludge from Aligarh, U.P. (India) along with geofibre for its subsequent utilization in various geotechnical and highway engineering applications. The experimental studies such as California bearing ratio (CBR) tests were carried out to evaluate the strength of plain fly ash as well as fly ash-waste sludge mix reinforced with geofibre, as the CBR value is the vital parameters used in the design of flexible and rigid pavements. Results of the study show that the strength of the mix is highly dependent on the curing period and the sludge and geofibre content. The CBR values were determined for mix containing fly ash (83.5-93.5%), waste sludge (5-15%) and 1-2% geofibre. However, out of the various combinations of mixes the CBR value of the mix 88.5%FA+10%S+1.5%GF at 28 days of curing was found to be 53.52% when compared with the strength of plain fly ash. It has been observed that the fibre inclusion increases the strength of the plain fly ash and fly ash-waste sludge specimens by changing their brittle to ductile behavior. The TCLP leaching test was also conducted to determine the heavy metal concentration in the optimized mix. The results of TCLP test show that the heavy metal concentration in the mix 88.5%FA+10%S+1.5%G at 28 days of curing reduced substantially from 24 to 98% when compared with the concentration of heavy metals in the waste sludge collected from source. It has also been observed that the pH of the leachate of this mix is between 9-11, which ensures the proper stabilization of the heavy metals present in the mix. Hence, this study will certainly help in mass scale utilization of two industrial wastes viz., electroplating waste and fly ash, which are causing pollution to the environment to a great extent.

Keywords : Dadri fly ash, geofibre, electroplating waste sludge, CBR, TCLP

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