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USE OF PLASTIC BOTTLES GRANULES FOR SOIL STABILIZATION AND DESIGN OF FLEXIBLE PAVEMENT

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ABSTRACT:- Availability of sound road aggregates is rare and costly nowadays due to rapid growth in the pavement construction activity to meet the increasing demand due to infrastructure development. Construction of pavement requires large quantity of earth material. India is experiencing tremendous growth in infrastructure including road network and highways. Roads are to be designed with good reliability to fulfill the long term performance during the design period. Long term performance of flexible pavement depends on the soundness of the underlying subgrade soil. Unstable, poor or weak soil can create significant problems for the pavement. Problematic and weak soil has low California bearing ratio (CBR) which require more thickness of pavement section. Considering increasing cost of the aggregates, use of weak soil by giving additional strength by way of stabilization method is a need of time. Present research study focus on the evaluation of benefits of stabilization of subgrade soil. Silty soil having CBR of 5.75 and plastic bottle granules were selected for the laboratory investigation. Experimental program consisting of Atterberg limit, compaction, California bearing ratio tests were carried out. These tests were performed on unstabilized as well as stabilized subgrade soil at different percentages of stabilizers by dry weight of soil. Percentage of plastic bottle granules was varied from 0.4%, 0.8 %, 1.2% and 1.6 % by dry weight of soil mass. Results obtained from laboratory study showed that 1.2 % of plastic bottle granules were optimum for the improvement of strength characteristics of subgrade soil stabilization. This optimum percentage of stabilizer is further taken for the proposed design of 1 kilometer long and 7 meter wide pavement section resting on stabilized subgrade soil as per IRC: 37 (2012).

Keywords—Plastic Bottles, Flexible Pavement, California Bearing Ratio.

