



“Gheorghe Asachi” Technical University of Iasi, Romania



EXPERIMENTAL STUDY ON PLASTIC WASTE APPLICATION FOR SOIL STABILIZATION

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Abstract

The rapid population growth in the world causes an increase in the amount of consumption and correspondingly brings up environmental problems to the agenda. Plastics, which are the most used and known as waste today, come to the forefront of the factors that trigger environmental problems. Although the control of plastic wastes cannot be ensured, they accumulate in nature. The reuse of these wastes is very important in terms of both economic and environmental concerns. Therefore, the recovery and reuse of waste are accepted as the best action in terms of practice. In the case that the engineering properties of the soils are insufficient, these properties can be increased by reinforcing the soils. In this study, the strength and deformation behaviors of the soil that were suitable for the subgrade layer were investigated by including different amounts of plastic waste in the soil to provide the reuse of plastic waste, which has become an environmental problem. In this context, engineering experiments were carried out by adding Low-density polyethylene (LPDE) plastic strips with dimensions of 15x15 and 15x30 mm, ratios of 0%, 0.3%, 0.5%, and 0.7%, respectively, into the soil. As a result of the tests carried out, it can be concluded that the effect of plastic reinforcement on the soil mass depends on the plastic content and the type of soil used for the study. The CBR value took its maximum value in the sample with plastic content of 0.7%, but the maximum dry density value was obtained when the plastic content was 0.5%. Therefore, in this study, it is recommended to use 0.5% of the plastic content, which is considered an additive, rather than 0.7%, in order not to lose the maximum dry density. Considering the climatic conditions, the wet CBR test with a curing time of 7 days was performed and the results of the wet CBR test were lower than the results of the dry CBR test. However, it was within the required value range for the design.

Keywords: environmental-friendly soil stabilizer, environmental pollution, plastic wastes, soil stabilization

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