Lateral Deformation Characteristics of Coir Geomat Reinforced Vertical Embankments

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For the design of internally stabilised reinforced earth walls, lateral deformation is not considered as a design criterion and therefore, the designer would not know the performance of the wall with regard to its aesthetic appearance during its service life. Therefore, it is imperative that the designer limits the lateral deformation of reinforced earth walls under service loads. In addition to durability considerations, suitability of application of coir geomats as the reinforcing material in a vertical embankment requires an investigation of its lateral deformation characteristics as well. In this study, the lateral deformation characteristics of a model vertical embankment reinforced with coir geomats are compared with the lateral deformation characteristics of the same model embankment reinforced with non-woven type polymer geotextiles. For this purpose, a vertical embankment of height 500 mm and length 700 mm was formed by using either coir geomats or geotextiles of length 605 mm at a vertical spacing of 100 mm as reinforcement in a soil having shear strength parameters of $c'=5$ kPa and $\phi'=31°$ compacted to 95% of standard Proctor density. The embankment was initially loaded at its natural moisture content up to a maximum surcharge pressure of 115 kPa through a rigid steel plate and was unloaded. It was then reloaded up to a maximum surcharge pressure of 244 kPa and was unloaded. The embankment was then soaked over a period of 48 hours ensuring no erosion of the soil took place during the process and again the embankment was loaded up to a maximum surcharge pressure of 244 kPa. During the above loading and unloading processes the lateral deformation along the central vertical axis was measured at the mid-height of each soil layer. The results show that the lateral deformation exhibited by the coir geomat reinforced embankment is comparatively less than that exhibited by the geotextile reinforced embankment corresponding to the same fraction of the design surcharge pressure applied, under the natural and soaked moisture conditions.

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