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Study on Energy Transfer in Collapsible Soil During Laboratory Proctor Compaction Test

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Abstract : Collapsible soils such as loess are a common geotechnical challenge due to their potential to undergo sudden and severe settlement under certain loading conditions. The need for filling engineering to increase developing land has grown significantly in recent years, which has created several difficulties in managing soil strength and stability during compaction. Numerous engineering problems, such as roadbed subsidence and pavement cracking, have been brought about by insufficient fill strength. Therefore, strict control of compaction parameters is essential to reduce these distresses. Accurately measuring the degree of compaction, which is often represented by compactness is an important component of compaction control. For credible predictions of how collapsible soils will behave under complicated loading situations, the accuracy of laboratory studies is essential. Therefore, this study aims to investigate the energy transfer in collapsible soils during laboratory Proctor compaction tests to provide insights into how energy transfer can be optimized to achieve more accurate and reliable results in compaction testing. The compaction characteristics in terms of energy of loess soil have been studied at moisture content corresponding to dry of optimum, at the optimum and wet side of optimum and at different compaction energy levels. The hammer impact force (E0) and soil bottom force (E) were measured using an impact load cell mounted at the bottom of the compaction mould. The variation in energy consumption ratio (E/ E0) was observed and compared with the compaction curve of the soil. The results indicate that the plot of energy consumption ratio versus moisture content can serve as a reliable indicator of the compaction characteristics of the soil in terms of energy.

Keywords : soil compaction, proctor compaction test, collapsible soil, energy transfer
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