

Comparison of Modulus from Repeated Plate Load Test and Resonant Column Test for Compaction Control of Trackbed Foundation

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Abstract : Primary function of the trackbed in a conventional railway track system is to decrease the stresses in the subgrade to be in an acceptable level. A properly designed trackbed layer performs this task adequately. Many design procedures have used assumed and/or are based on critical stiffness values of the layers obtained mostly in the field to calculate an appropriate thickness of the sublayers of the trackbed foundation. However, those stiffness values do not consider strain levels clearly and precisely in the layers. This study proposes a method of computation of stiffness that can handle with strain level in the layers of the trackbed foundation in order to provide properly selected design values of the stiffness of the layers. The shear modulus values are dependent on shear strain level so that the strain levels generated in the subgrade in the trackbed under wheel loading and below plate of Repeated Plate Bearing Test (RPBT) are investigated by finite element analysis program ABAQUS and PLAXIS programs. The strain levels generated in the subgrade from RPBT are compared to those values from RC (Resonant Column) test after some consideration of strain levels and stress consideration. For comparison of shear modulus G obtained from RC test and stiffness moduli E_{v2} obtained from RPBT in the field, many numbers of mid-size RC tests in laboratory and RPBT in field were performed extensively. It was found in this study that there is a big difference in stiffness modulus when the converted E_{v2} values were compared to those values of RC test. It is verified in this study that it is necessary to use precise and increased loading steps to construct nonlinear curves from RPBT in order to get correct E_{v2} values in proper strain levels.

Keywords : modulus, plate load test, resonant column test, trackbed foundation

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