

A Study on the Reinforced Earth Walls Using Sandwich Backfills under Seismic Loads

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Abstract : Reinforced earth walls offer excellent solution to many problems associated with earth retaining structures especially under seismic conditions. Use of cohesive soils as backfill material reduces the cost of reinforced soil walls if proper drainage measures are taken. This paper presents a numerical study on the application of a new technique called sandwich technique in reinforced earth walls. In this technique, a thin layer of granular soil is placed above and below the reinforcement layer to initiate interface friction and the remaining portion of the backfill is filled up using the existing insitu cohesive soil. A 6 m high reinforced earth wall has been analysed as a two-dimensional plane strain finite element model. Three types of reinforcing elements such as geotextile, geogrid and metallic strips were used. The horizontal wall displacements and the tensile loads in the reinforcement were used as the criteria to evaluate the results at the end of construction and dynamic excitation phases. Also to verify the effectiveness of sandwich layer on the performance of the wall, the thickness of sand fill surrounding the reinforcement was varied. At the end of construction stage it is found that the wall with sandwich type backfill yielded lower displacements when compared to the wall with cohesive soil as backfill. Also with sandwich backfill, the reinforcement loads reduced substantially when compared to the wall with cohesive soil as backfill. Further, it is found that sandwich technique as backfill and geogrid as reinforcement is a good combination to reduce the deformations of geosynthetic reinforced walls during seismic loading.

Keywords : geogrid, geotextile, reinforced earth, sandwich technique

Conference Title : ICCSCE 2016 : International Conference on Civil, Structural and Construction Engineering

Conference Location : Singapore, Singapore

Conference Dates : July 04-05, 2016