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Study on Seismic Performance of Reinforced Soil Walls in Order to Offer Modified Pseudo Static Method

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Abstract : This study, tries to suggest a design method based on displacement using finite difference numerical modeling in reinforcing soil retaining wall with steel strip. In this case, dynamic loading characteristics such as duration, frequency, peak ground acceleration, geometrical characteristics of reinforced soil structure and type of the site are considered to correct the pseudo static method and finally introduce the pseudo static coefficient as a function of seismic performance level and peak ground acceleration. For this purpose, the influence of dynamic loading characteristics, reinforcement length, height of reinforced system and type of the site are investigated on seismic behavior of reinforcing soil retaining wall with steel strip. Numerical results illustrate that the seismic response of this type of wall is highly dependent to cumulative absolute velocity, maximum acceleration, and height and reinforcement length so that the reinforcement length can be introduced as the main factor in shape of failure. Considering the loading parameters, mechanically stabilized earth wall parameters and type of the site showed that the used method in this study leads to most efficient designs in comparison with other methods which are generally suggested in cods that are usually based on limit-equilibrium concept. The outputs show the over-estimation of equilibrium design methods in comparison with proposed displacement based methods here.

Keywords : pseudo static coefficient, seismic performance design, numerical modeling, steel strip reinforcement, retaining walls, cumulative absolute velocity, failure shape
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