

EGU2020-12832

<https://doi.org/10.5194/egusphere-egu2020-12832>

EGU General Assembly 2020

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Evaluation of dynamic properties and seismic performance of reinforced ground using renewable materials

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The awareness of earthquakes increased due to the occurrence of two large scale earthquakes in Gyeongju (M 5.8) and Pohang (M 5.4) earthquakes in Korea. The development of structural design standards is required to reduce structural damage caused by earthquakes. Current seismic analysis for the structural design requires maximum ground acceleration due to earthquakes, which will be influenced by the dynamic properties of the ground. In this study, the dynamic properties of the ground were improved by mixing cement and biopolymer solutions with soils, which will affect the dynamic properties of soils. Thus, the resonant column tests were performed to estimate the improved dynamic properties of soils, and equivalent linear response analysis was conducted to explore the maximum ground acceleration on the ground. Based on the new maximum ground acceleration on the improved soils, the safety of geo-structure was estimated. The results show that the improved soil using cement and biopolymers results in the increased safety factor of the geo-structure.

Acknowledgement

This work is supported by the Korea Agency for Infrastructure Technology Advancement(KAIA) grant funded by the Ministry of Land, Infrastructure and Transport (Grant 20CTAP-C152100-02). Also, This research was supported by a grant(2018-MOIS31-009) from Fundamental Technology Development Program for Extreme Disaster Response funded by Korean Ministry of Interior and Safety(MOIS).