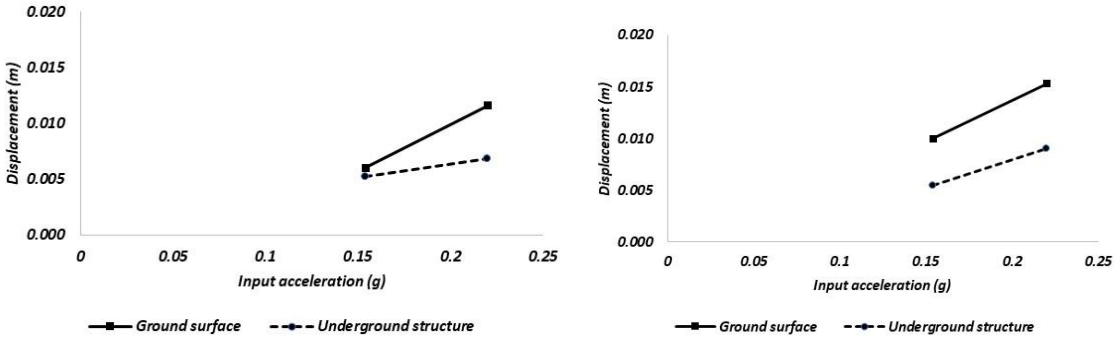

(a) Depth of underground structure = 3m (b) Depth of underground structure = 6m

Fig. 9. Obtained displacement at ground surface and underground structure (half embedded structure case)

The dynamic centrifuge tests were performed in dry dense sand condition. Therefore, the amplification of seismic loading and ground movement is very small. The numerical analysis model also shows significantly small movement. In these cases, the structure and soil behave with in-phase. Therefore, the further study for evaluating underground structure in soft ground condition which could occur large ground displacement such as liquefiable ground, should be conducted.

5. CONCLUSIONS

A series of dynamic numerical analysis conducted to evaluate seismic behaviors of deep underground building structures. Following detailed conclusions are drawn.

1) Seismic responses of deep underground building structure were calculated by PLAXIS2D, which is two-dimensional numerical simulation tools. The numerical model system was simulated based on centrifuge tests from Kim et al (2016). In addition, the analysis results were compared with centrifuge test data for verifying analysis model.

2) HSSMALL was adopted for soil constitutive model, and interface elements was adopted between plate and soil elements to simulate dynamic interaction effect. Moreover, parametric studies for fixed condition and embedded depth were conducted.

3) The dynamic centrifuge tests were performed in dry dense sand condition. Therefore, the amplification of seismic loading and ground movement is very small. The numerical analysis model also shows significantly small movement. In these cases, the structure and soil behave with in-phase.

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