

## A Study on the Methods for Detection of Underground Cavity

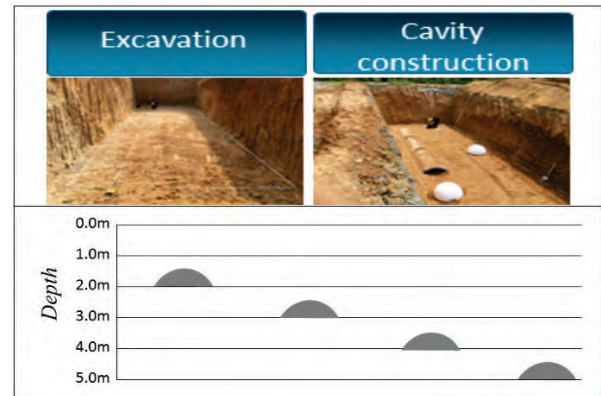
Yushik Han<sup>1</sup>, Heejeung Sohn<sup>1</sup>, Ki-cheong You<sup>1</sup>

(1) Geotechnical Engineering Research  
Institute of Korean Geotechnical Society,  
Seoul, Korea

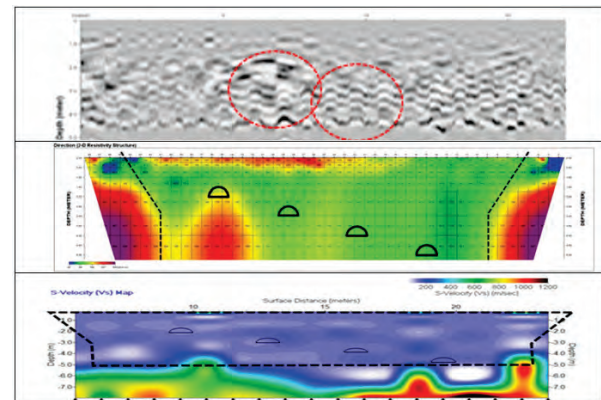
keywords: Ground Penetrating Radar,  
Electrical Resistivity, Multi-channel Analysis  
of Surface Wave

Sinkholes that have occurred in South Korea have been created mainly due to artificial causes rather than natural causes, it is necessary to have a technique that can predict and evaluate risk factors related to ground subsidence(Han and Hwang, 2017).

Representative methods for exploring the Earth's subsurface include ground penetrating radar (GPR) exploration, MASW(Multi-channel Analysis of Surface Wave) exploration, and electrical resistivity survey. In this study, a test bed (depth of 5m) was constructed for exploration of underground cavities, and GPR, electrical resistivity and MASW field survey were conducted and compared. As a result, GPR (100MHz) exploration was possible to depth of penetration depth of 3.0m at low frequency. In the region where the soil is loosened in the electrical resistivity survey, the conductivity of the soil is high because of the characteristic of low resistivity. Therefore, it is difficult to detect underground cavities with small depths less than 1.5m depth. MASW(Multi-channel Analysis of Surface Wave) survey showed a sensitive response depending on the loose and dense condition of the ground.



Construction of Test bed (left top of Cavity construction, left bottom of Cavity burial location).



Detection results of Underground Cavity (right top of GPR result, right middle of electrical resistivity result, right bottom of MASW result).

### ACKNOWLEDGEMENTS

This research was supported by the Korea Agency for Infrastructure Technology Advancement under the Ministry of Land, Infrastructure and Transport of the Korean government. (Project Number: 17SCIP-B108153-03)

### REFERENCES

Han, Y. and Hwang, H. W. (2017): Discussion on the Sinkhole forming Mechanism, , International Conference on Recent Innovations in Engineering and Technology, pp. 9~11.