

## Establishment of a Test Bed for Integrated Map of Underground Space and Verification of GPR Exploration Equipment

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**Abstract :** The paper discusses the process of establishing a reliable test bed for verifying the usability of Ground Penetrating Radar (GPR) exploration equipment based on an integrated underground spatial map in Korea. The aim of this study is to construct a test bed consisting of metal and non-metal pipelines to verify the performance of GPR equipment and improve the accuracy of the underground spatial integrated map. The study involved the design and construction of a test bed for metal and non-metal pipe detecting tests. The test bed was built in the SOC Demonstration Research Center (Yeoncheon) of the Korea Institute of Civil Engineering and Building Technology, burying metal and non-metal pipelines up to a depth of 5m. The test bed was designed in both vehicle-type and cart-type GPR-mounted equipment. The study collected data through the construction of the test bed and conducting metal and non-metal pipe detecting tests. The study analyzed the reliability of GPR detecting results by comparing them with the basic drawings, such as the underground space integrated map. The study contributes to the improvement of GPR equipment performance evaluation and the accuracy of the underground spatial integrated map, which is essential for urban planning and construction. The study addressed the question of how to verify the usability of GPR exploration equipment based on an integrated underground spatial map and improve its performance. The study found that the test bed is reliable for verifying the performance of GPR exploration equipment and accurately detecting metal and non-metal pipelines using an integrated underground spatial map. The study concludes that the establishment of a test bed for verifying the usability of GPR exploration equipment based on an integrated underground spatial map is essential. The proposed Korean-style test bed can be used for the evaluation of GPR equipment performance and support the construction of a national non-metal pipeline exploration equipment performance evaluation center in Korea.

**Keywords :** Korea-style GPR testbed, GPR, metal pipe detecting, non-metal pipe detecting

**Conference Title :** ICGPRDMT 2023 : International Conference on Ground Penetrating Radar Design and Modulation Techniques

**Conference Location :** London, United Kingdom

**Conference Dates :** December 11-12, 2023