

A NEW METHOD FOR ACCURATE DETECTION IN THE URBAN UNDERGROUND SPACE

Wenhan Li, College of Instrumentation & Electrical Engineering, Jilin University; He Li, College of Geology Engineering and Geomatics, Chang'an University; Xiu Li, College of Geology Engineering and Geomatics, Chang'an University; Kailiang Lu, College of Geology Engineering and Geomatics, Chang'an University

Proper development of underground space can effectively alleviate the problem of urban congestion and ensure the sustainable development of the city. High accuracy detection of urban underground space is an important prerequisite for the proper use of the underground space. However, since urban areas have strong interference and complex underground conditions, the existing geophysical survey methods can not satisfy the needs of underground exploration in aspects of the detection accuracy and depth. Aiming at these problems, this paper presents a new technique for high accuracy detection by transient electromagnetic method with a high-performance radiating antenna. This technique has the advantages of high radiant efficiency, high radiant power and good radiant directionality while ensuring the resolution capability. In this paper, a three-dimensional vector finite element method is applied to simulate the half homogeneous space model and the complex urban underground space model. The simulation results show that the transient electromagnetic antenna of high performance radiation has a good radiant directionality, which can realize the high accuracy detection in a strong interference environment. By comparing with the simulation result of the loop source, the transient electromagnetic high-performance radiating antenna has more obvious characteristics of the electric field. This indicates that the transient electromagnetic high-performance radiating antenna has a better performance than the traditional loop antenna in resolution, and it can be competent for the detection of urban underground space.