

Guide for Tunnels and Voids Detection Using High Resolution Microgravity

Gravity measurements indicate variations in the earth's gravitational field caused by lateral differences in density of the subsurface soil or rock or the presence of natural voids or man-made structures. Microgravity surveys are used for the near-surface geologic investigations, as geotechnical, environmental and archaeological studies. Geologic and geotechnical applications include the locations of buried channels, voids, tunnels, caves, and low-density zones in the foundations materials. The modern Gravity meters such as CG-5 Scintrex Autograve can detect these small relatively low gravity anomalies, which result from the large voids, like tunnels or weapon production facilities. Modeling of the resulted gravity data can indicate the exact locations of the tunnels and weapon facilities. This study acts as a guide that includes the optimum way to deal with microgravity survey for detecting the voids and tunnels. Some theoretical examples for tunnels and their corresponding gravity signals required to detect these tunnels are included. The study created flow chart which summarizes the steps of the high resolution microgravity measurements. This study can be considered as important step to introduce a standard operating procedure for one of the geophysical techniques (Gravity methods) to apply as a continuation period technology for On-Site Inspection (OSI).

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