

Fugro Engineering Services Limited

MICROGRAVITY SURVEYING



This geophysical technique involves measurement of variations in the earth's gravitational field. In general, the magnitude of the field is dependent on several factors, including latitude, elevation and earth tides. However, by applying corrections to remove the effects of these factors, variations can be attributed to lateral changes in subsurface density only.

Measurement of the gravitational field in Micro-Gravity investigations is carried out using a gravimeter, such as the Scintrex CG-5 Auto Grav. The unit is based on a fused quartz electric system and measures the relatively small electrostatic restoring force needed to move the proof-mass to its original position when stretched by a gravitational force. The unit is sensitive to 1 microgal.

Microgravity surveys are conducted along survey lines or on a grid basis to highlight anomalous subsurface areas. In either case, frequent visits are made to a nominated base station throughout the survey to monitor changes in the readings due to earth tides and instrument drift, which can then be corrected for during data processing.



APPLICATIONS

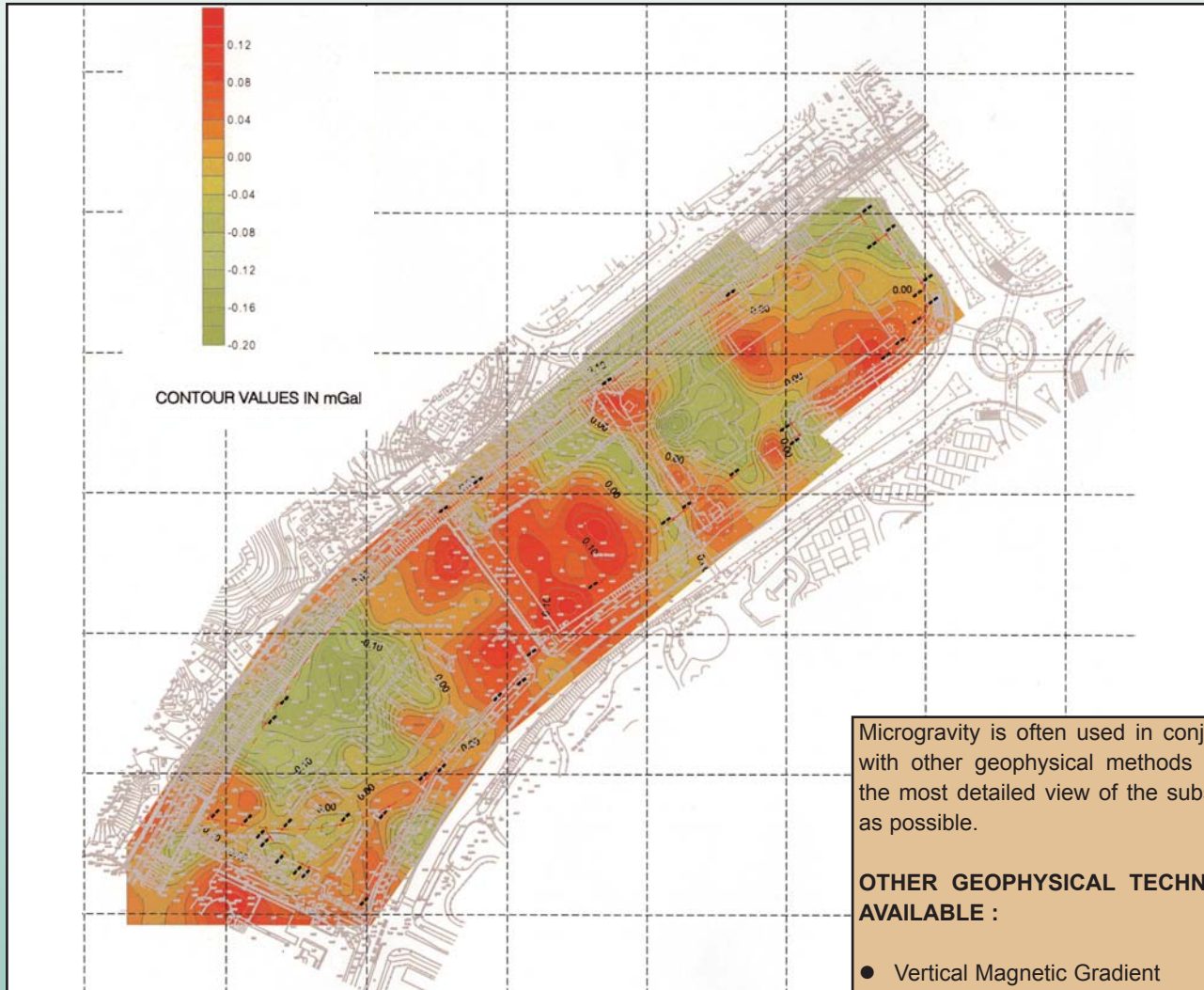
- Mapping of dissolution cavities and voids
- Identifying areas of wash-out beneath concrete slabs
- Location of abandoned mine-workings and shafts
- Location of tombs in archaeological investigations
- Mapping variation in bedrock depth

ADVANTAGES

- Non-intrusive technique
- Compact versatile instrument - allows measurements to be taken inside buildings
- Insensitive to electric/magnetic noise - can be used in environments where other geophysical techniques are not suitable
- Good resolution and depth penetration

The Fugro Group is an international organisation with around seven thousand staff in over fifty countries. Our major disciplines are Geotechnics, Environmental Services and Survey.

In order that Micro-Gravity data can be accurately interpreted a series of site specific corrections must be applied. The fully corrected data is known as the Bouguer Anomaly, measured in microGals (mGal). Results are either presented as a contour plot as shown below or as a profile of Bouguer Anomaly against distance.



Microgravity is often used in conjunction with other geophysical methods to give the most detailed view of the subsurface as possible.

OTHER GEOPHYSICAL TECHNIQUES AVAILABLE :

- Vertical Magnetic Gradient
- Electromagnetic Induced Conductivity
- Resistivity Depth Profiling and Imaging
- Ground Probing Radar
- Seismic Refraction & Reflection
- Cross-hole & Down-hole Seismic
- Borehole Geophysics

The data above was collected in Hong Kong where the aim of the survey was to map the general geological variations over the site and to highlight abnormal subsurface conditions. This is an example of the Bouguer Anomaly with the regional effect removed leaving the residual component. The residual component represents the effects of small geological features located at relatively shallow depths, which are perceptible over short distances as short wavelength anomalies.

Fugro Engineering Services Limited

Fugro House
Hithercroft Road
Wallingford
Oxfordshire OX10 9RB
Tel: +44 870 4021 400
Fax: +44 870 4021 499
Email: wallingford@fes.co.uk

Armstrong House, Unit 43
Number One Industrial Estate
Medomsley Road, Consett
Co. Durham DH8 6TW
Tel: +44 1207 581120
Fax: +44 1207 581609
Email: consett@fes.co.uk

