GEO INSTRUMENTS

Soil Resistivity Profiler

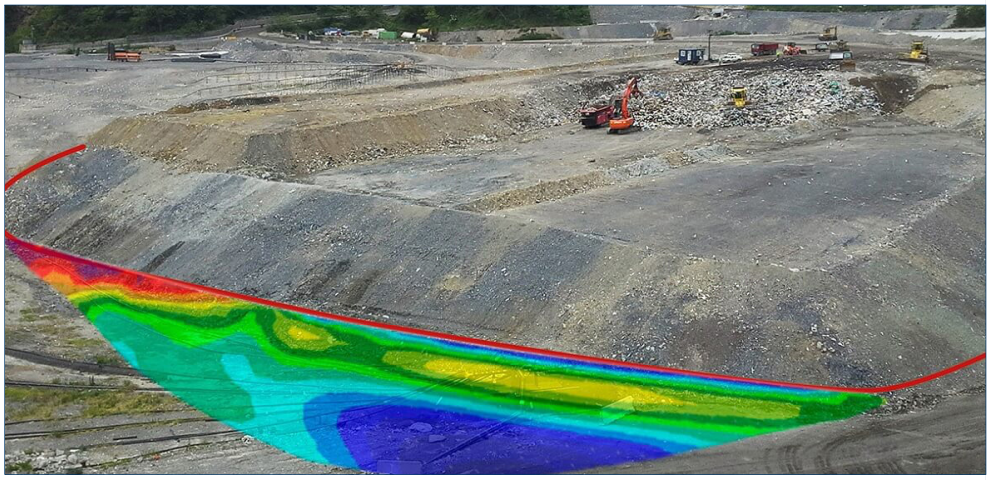
Overview

The G.Re.T.A.® Soil Resistivity Profiler is an electrical resistivity tomography (ERT) system that automates Wenner-type tests along an array of 48 electrodes.

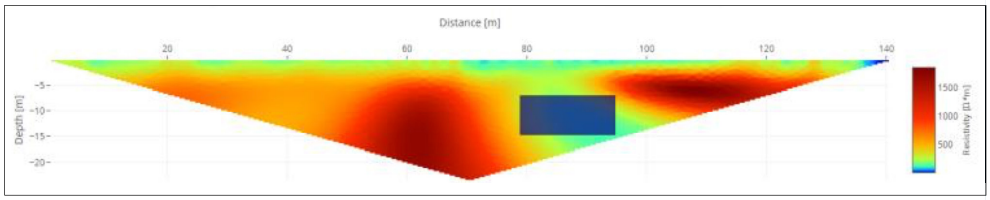
The system can generate resistivity profiles of retaining structures, embankments, and landslide areas for spans up to 820 ft and depths to 120 feet.

Automation allows more frequent surveys and provides more consistent measurements. This makes it easer to distinguish seasonal variations from more important changes that may indicate the need for corrective action.

The profiler transmits every survey to the cloud via a cellular connection. The receiving server processes and stores the data and provides visualizations via a website.



The Soil Resistivity Profiler automates electical resistivity surveys for spans up to 820 feet.



The system automatically compares incoming surveys with a baseline survey to test for alarm conditions. Alarm thresholds can be based on rate of change, percent of variation, or absolute value of resistivity. Specific areas can be selected for comparison (blue rectangle above).

Field Components

Electrode Cables: Electrode cables are typically embedded permanently in shallow trenches. Electrodes have 1, 2, 3, or 5 meter spacing. Thin stainless steel contact plates are attached to the electrodes at installation time.

Acquisition Unit: The acquisition unit includes a controller with noise filtering and a communications module that sends measurements to the cloud.

Power Unit: The unit has four step-up transformers to supply the required voltages for testing, a battery, and a charging module for a solar panel.

Cloud Component

The Cloud component processes the survey data and provides visualization via a website.

- Geo-localization of the installed systems
- Comparison of measurements over different periods of time with simple and intuitive graphic models.
- The display of additional environmental and piezometric data if available.
- Water content calculation.
- Automated alarm messages when preset thresholds are crossed. Thresholds can be based on % change or absolute values.

Technical Specifications

System: G.Re.T.A (GeoRestivimeter for Time lapse Analysis) performs automated ERT testing using permanently installed electrodes.

Current Injection Circuit (transmitter)
Number of channels: 48 electrodes.
Current modulation: 0.001 to 0.4 A.
Resolution > 120 µA.

Current measurement
Resolution: 1 µA.
Stability: 0.0025% VM.
Accuracy: > 60 µA.

Electrode Voltage Measurement (receiver)
Automatic scale change.
Automatic filtering: 50 and 60 Hz.
Input impedance: 1.6 * 1010 Ω.

± 0.47 V Scale
- Resolution: 1 µV.
- Stability > 0,12% VM.
- Accuracy: 70 µV.

± 4.7 V Scale
- Resolution: 10 µV.
- Stability: > 0.03% VM.
- Accuracy: 700 µV.