ADASTRA ENGINEERING
GEOLOGICAL SERVICES

www.adastra.it

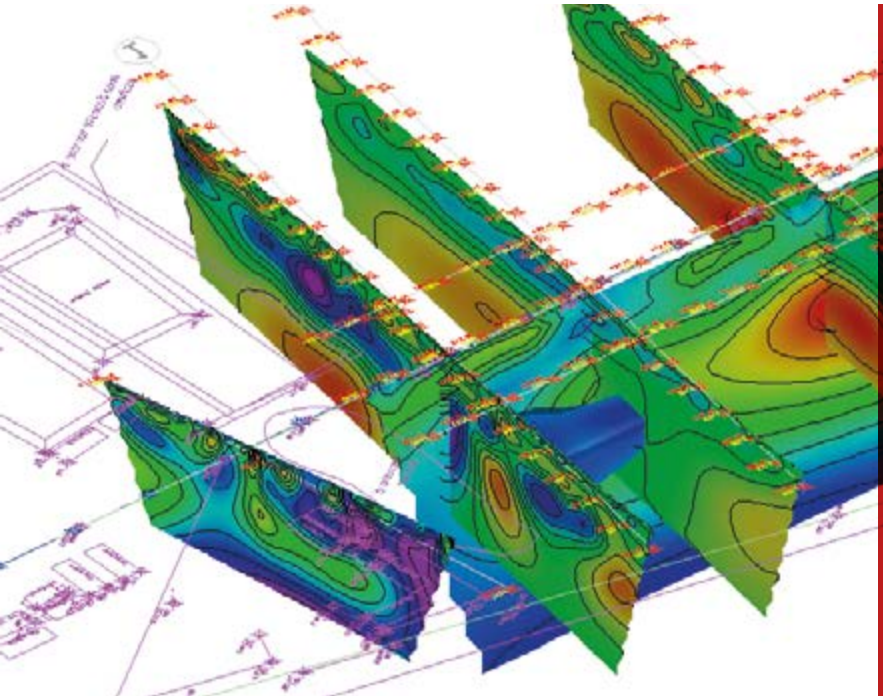
QUALITY ASSURANCE OF **DIAPHRAGM WALLS** AND **JET GROUTING**

THE NEW FRONTIER OF 3D GEOELETTRIC SURVEYS

Adastra Engineering carries out quality controls **to check leaky or defective diaphragm walls**, measure the volume affected by the **injections** or **check the continuity of the jet grouting**. This method allows investigation of very large sectors at extremely reduced costs compared to traditional test through drillings. The geophysical survey through **Electrical Resistivity Tomography (ERT)** is particularly suitable for the study of **diaphragms walls and jet columns.** It is possible to acquire information both from **deep and superficial layers**, to perform both two-dimensional and three-dimensional surveys and to adapt the geometries to the morphological and geo-lithological setting of the areas to be investigated.

A RESOLUTIVE TECHNIQUE

Individual sections or the entire length of the diaphragm wall can be tested, both in linear and in complex geometries. Each segment of the diaphragm wall is **modeled three-dimensionally** with the aid of electrodes positioned in a drilling hole and / or on the surface. The geometry of the surface lines and the electrode columns in the hole depends on the type, size and horizontal and vertical extension of the diaphragm wall and on the geological composition of the subsoil. Measurements can be performed both in groundwater and in unsaturated ground.



ADVANTAGES: NON-DESTRUCTIVE TESTING

- The artifact is not altered in any way
- 2D and 3D reconstruction
- High depth of investigation
- Possibility to investigate both plastic and reinforced concrete diaphragms walls
- Testing of long tracts
- Low costs

THREE-DIMENSIONAL MODELING

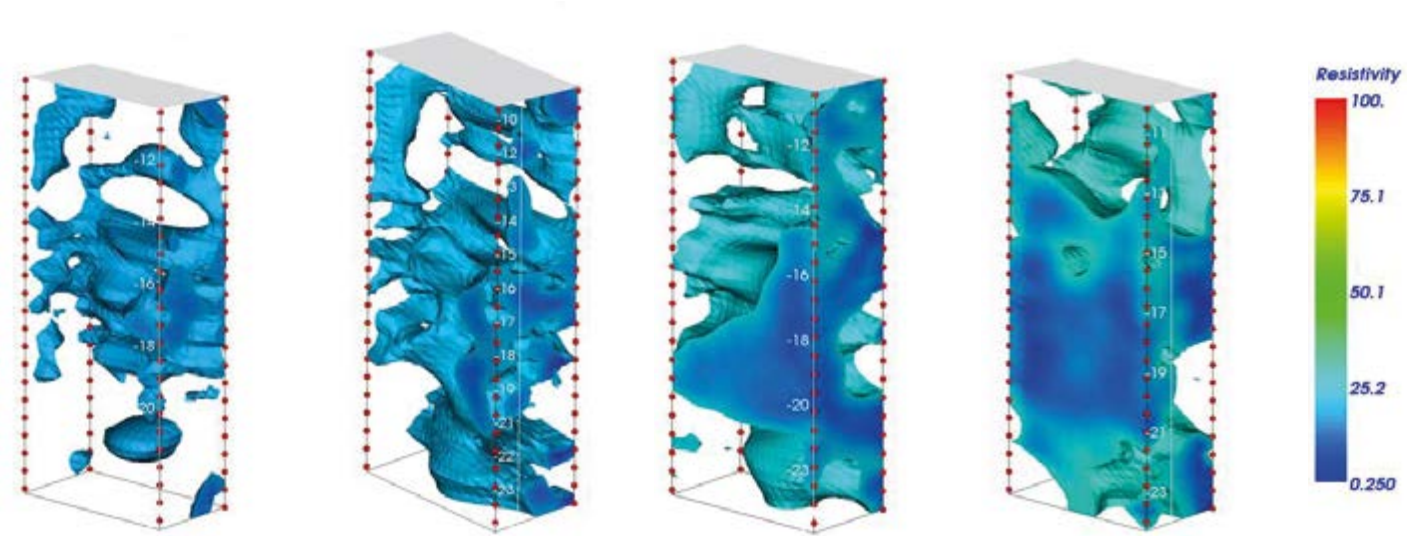
Depending on the used geometry, multiple measurement sessions are performed. The individual column-column or column-surface measurement sessions are aggregated into a single set of data that is simultaneously inverted. Also, the diaphragm wall, with its resistivity characteristics, is inserted in the model. The result is a **full three-dimensional modeling** of the structure that makes it possible to identify any **constructional defects** (irregularities, gaps, sand or foreign material cores, open panels, etc.).

METHODOLOGY OF OPERATIONS

To allow for in-depth measurement, **disposable electrode columns** are installed by means of **core drilling**. The columns are laid with the support of a 1-inch pvc rod along the entire length of the holes. The survey geometry can be completed by **surface lines** of variable lengths (generally at least 6 times the investigated depth). The resistivity measurements are acquired with **IRIS Syscal series resistivity meters** with 10 simultaneous control channels of the measurement quadrupole and 48-72-96 electrodes. The used resistivity meters are unique in their kind for the quality and quantity of the acquired measures as well as for the speed of field operations. The electrodes are connected by means of **low-impedance multi-pole cables**, to a switching unit which directs the individual quadrupoles controlling all the possible pairs of electrodes of the line. In this way it is possible to acquire a **very high number of measurement points** that allow to get a **high-resolution response** and, at the same time, to **reduce the uncertainties** linked to the two-dimensional nature of the structures present in the subsoil.

DATA PROCESSING AND RESULTS

For the **numerical data processing, in-house** and **commercial softwares** (RES3DINV and ERTLab64) are used. The results of the prospections are represented in graphic tables and are interpreted and commented in a dedicated technical report.



Subsequent phases of jet grouting in a test field. The blue volume indicates the progressive saturation of the ground by the ternary mixture.

Adastra Engineering Srl
Registered office: via Xola 41/B, 30020 Torre di Mosto (VE)
Operational headquarters: via Confin 87/B, 30020 Torre di Mosto (VE)
Tel. / Fax: 0421 325683
Email: info@adastra.it / adastraengineering@pec.it