



Cyljet

PATENTED

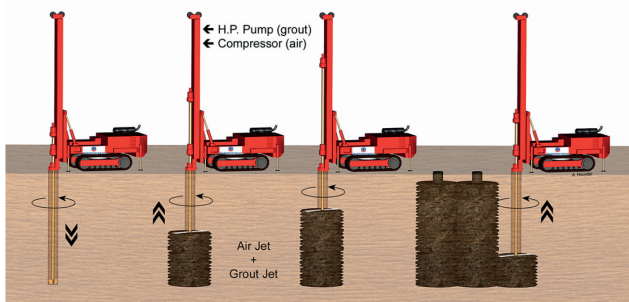
Estimation of the diameter of Jet Grouting columns

YOUR CHALLENGES

- Accurately **determine** the **actual diameter** achieved by the **Jet Grouting columns**
- **Optimise** the **Jet Grouting parameters**
- **Verify** the **conformity** of the **columns produced**



OUR SOLUTION



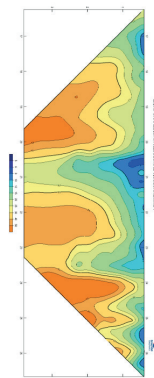
The Cyljet process uses electrical cylinder **resistivity measurement**, obtained via a slotted casing installed in the borehole.

The **measurement system is adaptable** to columns of any diameter. The measurement interval is 20 to 30 cm.

A **proprietary Sixense software suite** enables a rapid and reliable estimation of the calculated diameter.

THE BENEFITS

- **Rapid results:** report delivered the next working day
- **High accuracy:** diameter estimated to within $\pm 10\%$.
- **Superior reliability and versatility** compared to traditional inspection methods : core sampling, temperature, umbrella and others
- **Precise information** across the entire column height: vertical resolution of 20 cm
- Provision of useful supplementary **geological information** and **detection of surrounding anomalies:** boulders, obstacles or buried structures



Sixense's

The global specialist in accurate and meaningful measurements.

Tailor-made test campaigns, adapted to the soil type, the target diameter and the site conditions.

Comprehensive expertise: measurement, modelling and on-site project management: our teams understand your operational constraints and address them effectively.

CONTACT US

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TECHNICAL PRINCIPLES

The Cyljet method is based on geophysical measurements of the electrical resistivity of the ground surrounding the borehole. The process involves three stages:

1. Reference measurement (reference borehole)

A reference measurement is taken in a borehole equipped with a slotted casing, in natural ground condition, influenced only by the in-situ geology.

2. Measurement within the jetted column

Cyljet survey is performed within 24 hours of the column being jetted, by inserting a screened casing (often via re-drilling) into the axis of the fresh column.

3. Modelling of the diameter

The contrast in resistivity between the natural ground (generally more resistive) and the fresh column (highly conductive) allows the obtained diameter to be modelled with precision.



APPLICATIONS & ASSETS

Any structure built using Jet Grouting :

single columns, walls, waterproofing screens, ground reinforcement, etc.

SPECIFICATIONS

- Diameter accuracy: ±10 %
- Vertical resolution: 20 cm
- On-site measurement time: 1 hour 30 minutes per column
- Report delivery: next working day

LIMITATIONS

- Method not applicable in the presence of metallic objects near the borehole (3–4 m): sheet piles, cased piles or D-Walls
- Reduced reliability in the presence of brackish water, which is highly conductive
- Applicable to single columns only

RELATED TOOLS & SERVICES

- **Borehole deviation measurements:** SixGyro, 4DShape (inside the jet grouting string). Combining deviation measurements with diameter measurements ensures a clear understanding of the geometry of the jet grouting columns, particularly to verify that the columns intersect correctly.
- **Electrical resistivity measurements** also provide valuable information on the geology surrounding the borehole, as well as details on the presence of features: obstacles, boulders, buried structures.



REFERENCES

- CASTOR Project, RERC, Paris, France
- Multiple projects for the Grand Paris Express
- Ground Zero, New York, USA
- Metro tunnel, Melbourne, Australia
- Seac Pai Van Treatment Plant, Macau
- Lee Tunnel Beckton-Barking, UK

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