



# How capable are detection companies using innovative no-dig techniques for cable and pipeline detection?

Cables and pipelines are vital in the supply of essential services such as electricity, drinking water, gas, data traffic and sewers. The Dutch subsoil is full of them and the number of cables and pipelines is expected to increase further in years to come. The public importance of securing supply of essential services demands for an improved detection of cables and tubes (tubes, mains and pipes). In order to reduce the risk of damage to cables and tubes due to excavation activities, test trenches are dug or tubes are physically detected with poles, water or air. These time-consuming techniques only provide information of a limited area. To provide more complete information companies providing innovative detection technologies, such as ground penetrating radar and radio detection, are on the rise.

The Innovation Platform Cables and Pipelines, which is part of the Netherlands Knowledge Centre for Underground Construction (COB), initiated a study of the quality and utilization of innovative detection techniques. The results of this study made clear that there is no single technique that can completely and correctly detect all cables and tubes in all types of soil. The available time, approach and expertise of the technician of detection techniques proved to affect the results considerably.

## Field test

Following an exploratory study a field test was conducted, which focused on detection companies instead of detection techniques. The field test provided insight into the application of innovative detection techniques by the companies.

## Field lay-out

The testfields are representative for networks in the Netherlands. Locations were chosen with differences in complexity, material of cables and tubes and soil and surface material. One field was prepared specifically for this test.

The field test consisted of three separate tasks based on actual situations that are relevant for cable and tube network operators, excavators and area managers (e.g. municipalities). The detection companies were asked to perform a complete inspection of the surface to detect underground objects without any information (task 1), checking and correcting a provided cable and pipeline map (task 2), and tracking an electricity cable and a gas tube (task 3).

Following a written announcement outlining the conditions of participation, ten detection companies registered for the execution of one or more tasks. The companies carried out these tasks independently. An observer was always present to report and safeguard the boundary conditions. After executing the tasks eight detection companies presented their results.



## Results

The detection companies were assessed on three aspects. First of all an assessment of the quality of the submitted Plan of Action, second how it was executed. The third and main aspect of the assessment was the completeness and accuracy of the detection results.

The assessment of the results shows that the detection companies vary widely in terms of the number of detected cables and tubes. It turned out that a considerable number of cables and tubes can be detected, but not across the entire length. Some detection companies detect a large number of cables and tubes that were actually not present.

The field test proved that there are major differences between the methods used by the various detection companies in terms of execution, preparation, and presentation of results.

During detection it turned out that paved surfaces and clustering of cables have a negative effect on detectability. The results also show that detection of cables and tubes in clay is less accurate than in sandy soils.

Comparison of the results obtained through radio detection and ground penetrating radar, shows that radio detection generates more accurate results; this technique, however, can only be applied on metal cables and steel tubes which can be connected to a radio signal.

## More information

Report (in Dutch): *Kabels en leidingen detecteren zonder graven. Waartoe zijn innovatieve detectiebedrijven in staat?*

Reference: O10\_ER\_11\_47157

ISBN: 9789077374474

Free download: [tinyurl.com/report-O10](http://tinyurl.com/report-O10)

Publisher: COB - Netherlands knowledge centre for underground construction and use of underground space, Gouda, 2011

For more information on this project please contact Richard van Ravesteijn, programme coordinator at COB, Platform Cables and Pipelines:  
[richard.vanravesteijn@cob.nl](mailto:richard.vanravesteijn@cob.nl)

## Conclusion

The field test shows that innovative detection techniques have great potential with regard to mapping the location of cables and tubes. Further improvement of detection accuracy is expected if quality improvements are implemented by detection companies. The possibility of detection without need of subsequent digging or physical detection is not anticipated. The implementation of innovative techniques is expected to reduce the number of necessary test trenches and to increase the accuracy of determining the location of cables and pipelines.

## Recommendations

Innovative detection companies are advised to strive for quality improvement on various fronts, for example the exchange of knowledge within the industry, standardization of work processes, uniform presentation of data and increasing the expertise of employees. Considerable improvement is possible with regard to the basic knowledge of cables and tubes.

Cable and tube network operators and area developers and managers will benefit from the further development of the innovative detection sector. We recommend they make a contribution to the further professionalization of this sector, for example by striving for uniform terms and conditions of tenders and tender specifications, or by insisting on quality characteristics of detection companies, such as certification.

Policymakers are advised to give attention on the unique contribution that innovative detection techniques can make to obtaining and checking information on the location of cables and tubes.

Finally, insurance companies are advised to discuss the results of the field test and take a position on the potential effects of the above conclusions on the insurance terms.



Netherlands Knowledge Centre  
for **Underground Space** and  
Underground Construction

In addition to its network function the Netherlands knowledge centre for underground construction and use of underground space (COB) has a central role in formulating knowledge agendas and managing research platforms. At these platforms knowledge is exchanged and projects are organized, which are carried out by a consortium of institutions and companies. COB also contributes to training courses in the field of underground construction.

[www.cob.nl](http://www.cob.nl) | [info@cob.nl](mailto:info@cob.nl) | +31 182 540 660