EUROPEAN GEOPHYSICAL SERVICES

BOREHOLE CONDITION ASSESSMENT

Tool overview

The condition of a borehole is paramount to its on going performance. Checks on newly drilled boreholes ensure that design and specification have been met and allow benchmark readings for monitoring future hydro-geological changes. Checks to existing boreholes should be made part of an ongoing maintenance programme, thus highlighting any potential problems before they develop into major problems or disruptions in supply.

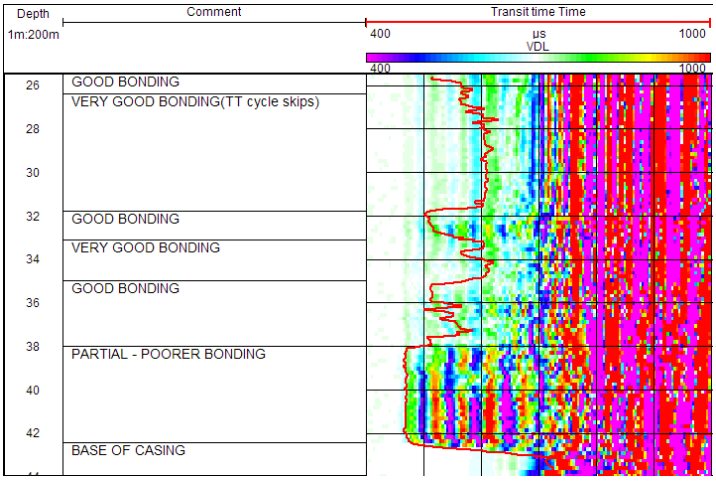
Prior to the decision to rehabilitate a borehole, various methods can provide vital information so that the most suitable and economical decisions can be made. European Geophysical Services assessment service utilises a combination of down-hole video cameras and various geophysical techniques to provide a cost effective solution to borehole evaluation.

Existing Boreholes

- Locates and identifies causes of obstructions
- Determines the condition of casings
- Identification of corrosion and bio-fouling
- Evaluation of cement grouts
- Location of voiding behind linings
- Measurement of water quality

New Boreholes

- Verifies correct type, size and positions of casings and screens
- Checks the integrity of casings, grout seals and borehole stability
- Provides benchmark data for monitoring changes



Example Cement Bond Log

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Services available	
ROV Inspection surveys	ROV (Remote Operated Vehicle Inspection Surveys) allow inspection of reservoir dam walls, water tanks, underground service reservoirs, flooded tunnels and adits, wells and shafts. Contact us for further information.
CCTV Inspection surveys	We offer a specialist wide diameter well and shaft CCTV survey service, which can help identify any possible defects/unwanted ingress or casing leaks and plan for any remedial action.
Casing Investigations	We can ascertain casing thickness, locate joins and collars and determine cement-bond between both casing-cement and cement formation. Contact us for further information.

Why European Geophysical Services?

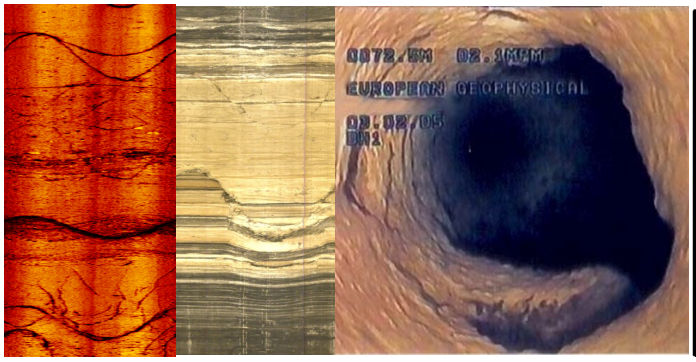
European Geophysical Services offers excellent and reliable field service coupled with many years of geophysical interpretation experience, efficient data processing and high-quality reporting. All our field operators are graduate geologists or geophysicists with data acquisition and interpretational experience able to give on site analysis and interpretations. For more information, please call 01939 210710. or email office@europeangeophysical.com.

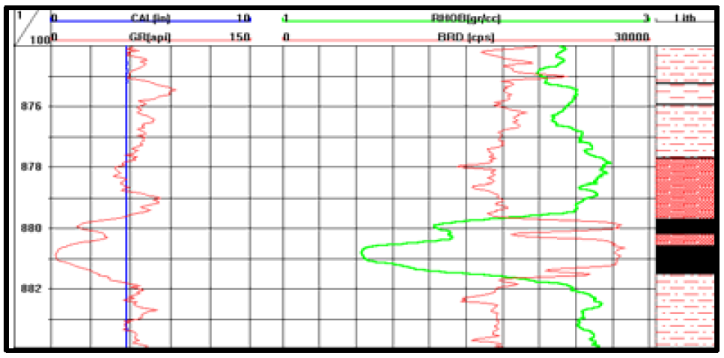
EUROPEAN GEOPHYSICAL SERVICES

BOREHOLE GEOPHYSICAL LOGGING

Tool overview

Geophysical logs are obtained from electronic probes lowered into a borehole. They provide an independent and continuous in-situ profile of the various visual, physical and chemical properties of the construction and fluid within a borehole and its surrounding geology.





Geophysical Logging

- Environmental and geotechnical investigations
- Evaluation and monitoring of groundwater systems
- Mineral exploration and mining
- Geological studies
- Hydrogeological investigations
- Borehole inspection, rehabilitation investigations
- New borehole construction-design development and verification

CCTV Surveys

Colour video surveys using a wide range of CCTV systems to suit various conditions including:

- Water wells/boreholes
- Large diameter water wells
- Water filled adits and tunnels
- Mine shatfts

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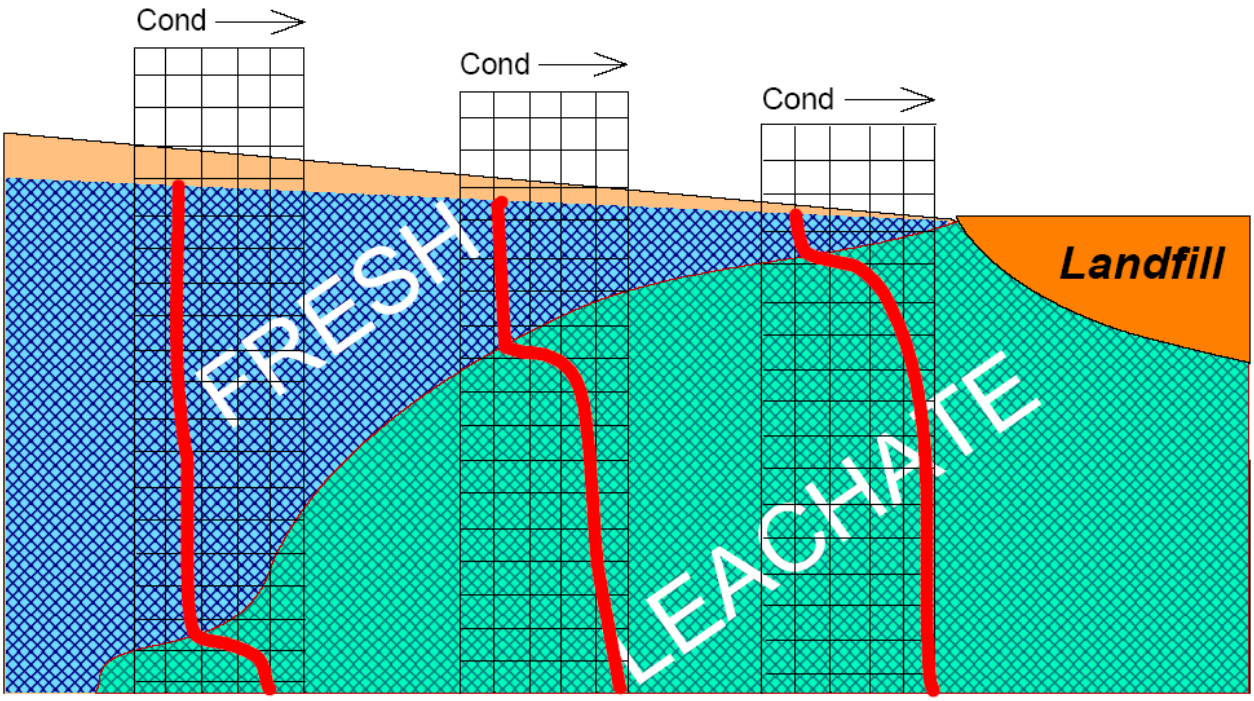

Monitoring of groundwater around a landfill site using fluid conductivity logging

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EUROPEAN GEOPHYSICAL SERVICES

FRACTURE DETECTION & ANALYSIS

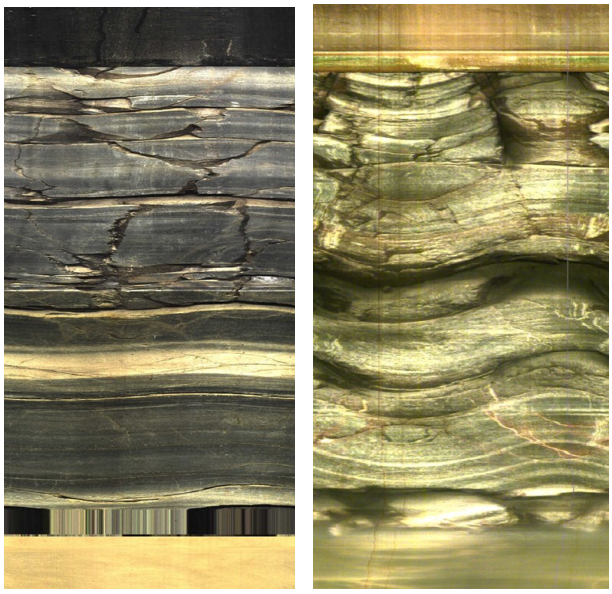
Overview

The detection, location, orientation and size of fractures are important in most geotechnical, hydrogeological and geological investigations. Acoustic and optical imaging is a convenient and cost effective way of obtaining detailed structural information. The Acoustic image has the ability to detect fractures less than 0.1mm.

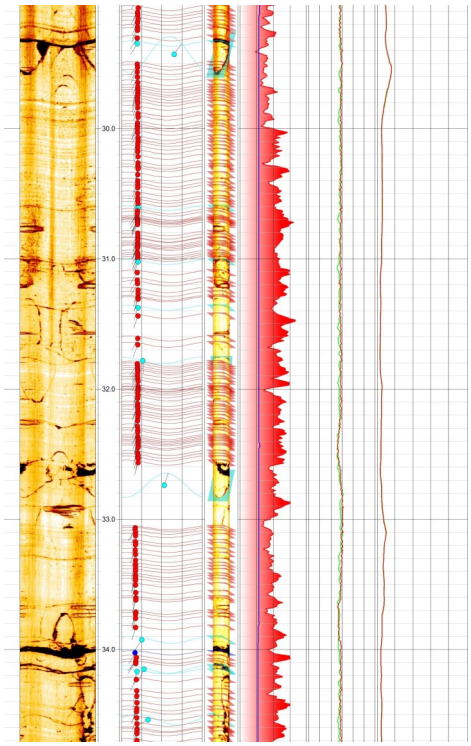
Acoustic Imager (Televiewer)

The Acoustic Imager (right) produces an image of the borehole wall using the travel time and amplitude of an acoustic signal transmitted and received by the tool.

The variance of the acoustic properties of the formation and associated features enable the nature of fractures, fissures, veins, bedding planes and lithological changes to be determined.



Optical Image example



Acoustic Image example

Optical Imager

The Optical Imager contains a precision machined prism and high definition digital camera assembly which permits high quality images of the borehole wall to be recorded

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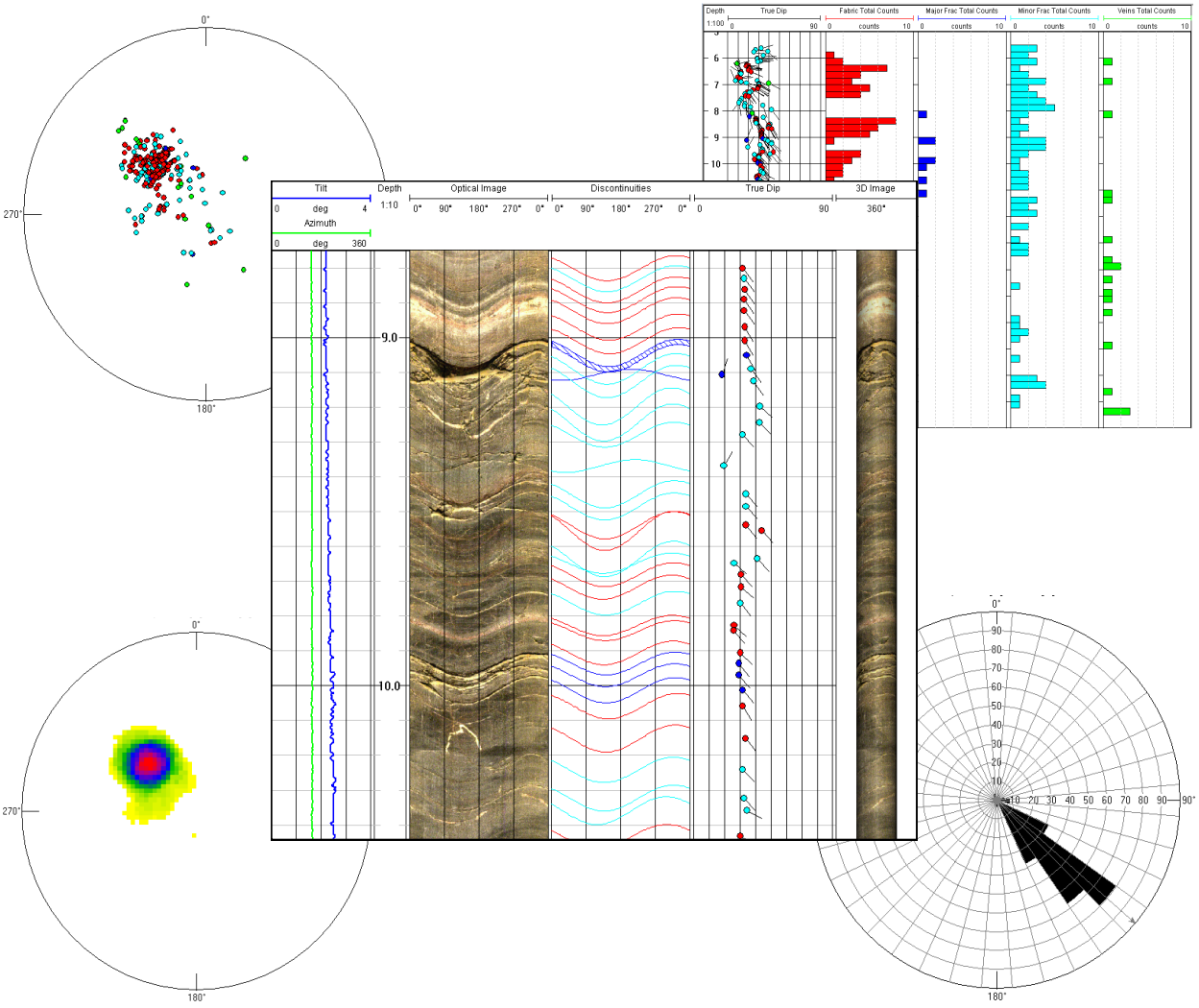
Processing and presentation of imager results

Detailed logs of the imager data can be produced at any vertical scale. The image of the borehole wall is presented in an unwrapped form with a horizontal scale marked 0˚, 90˚, 180˚, 270˚and back to 0˚.

Structural features and discontinuities are picked from the images in the form of colour coded sinusoidal projections blue-fractures, red-bedding/fabric features, green-veins). This structural log is presented as 'Discontinuities' with a horizontal scale as the image data. Using the borehole diameter, dip and azimuth along with the geometric parametres of the sinusoids the true azimuth and dip of the discontinuities are calculated and presented as "tadpole" plot. The true dip data can then be used.



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EUROPEAN GEOPHYSICAL SERVICES

REMOTE OPERATED VEHICLE VIDEO INSPECTIONS

Tool overview

European Geophysical Services Ltd offers a specialist survey service using a Remote Operated Vehicle (ROV) which allows underwater inspection of reservoir dam walls, water tanks, underground service reservoirs, flooded tunnels and adits wells and shafts. A narrow access ROV is also available-contact us for details.

Features and Benefits

- The use of the ROV greatly reduces the health and safety implications of using specialist divers by allowing an initial survey of the hazards before divers enter the water, or even negating the need for diver entry at all.
- HD camera with Ethernet Interface (IP)
- Up to 16 x Digital zoom

ROV operational Conditions

Minimum access hole	400x400mm
Minimum well/ shaft diameter	1200mm round or equivalent
Maximum speed	4.4 knots
Maximum depth	305m
Suitable for any water filled location	

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Video images are recorded onto both DVD and hard drive

Specifications	
Size	496 x 347 x 223mm
Weight	10kg

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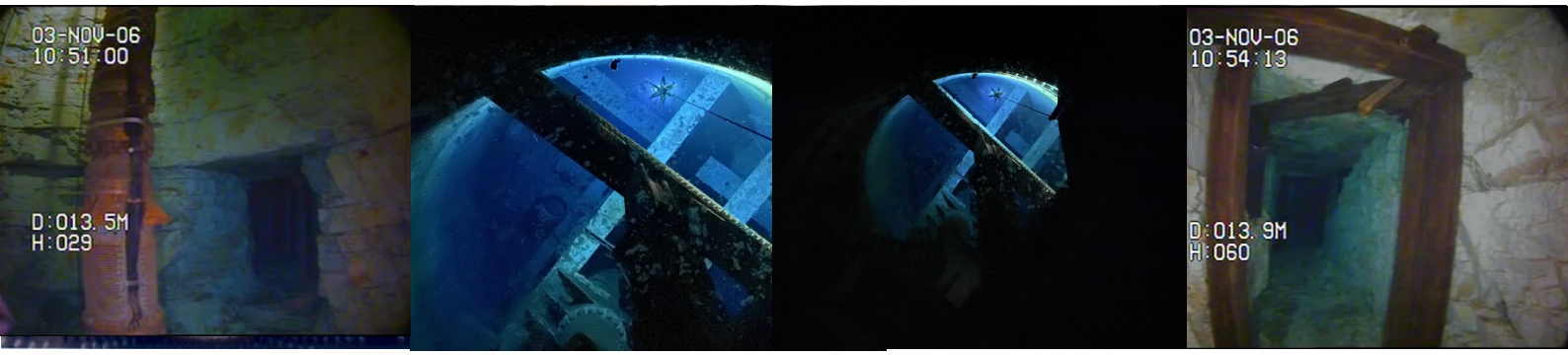
EUROPEAN GEOPHYSICAL SERVICES

WIDE DIAMETER WELL SURVEYS

Tool overview

European Geophysical Services Ltd offer a specialist wide diameter well and shaft CCTV survey service including the use of a Remote Operated Vehicle (ROV). Our vast experience in this area has allowed us to carry our successful surveys in wells over 10m in diameter and over 300m deep. Both CCTV camera and ROV can provide orientation data on features and tunnel directions.

The ROV provides the facility for detailed surveys of the well or shaft walls with the ability to survey up to 250m along water filled adit systems and tunnels. This greatly reduces the health and safety implications of using specialist divers by allowing an initial survey of the hazards before divers enter the water, or negating the need for diver entry at all. The ROV can be used with a sonar attachment which provides measurements of well or shaft diameters and tunnel widths (tunnel heights are measured with the ROV depth ratings).



Rov Operational Conditions	CCTV Operational Conditions
Minimum access hole: 400 x 400mm	Minimum access hole: 150mm round or equivalent
Minimum well/ shaft diameter: 1000mm round or equivalent	Dry or water filled
Water filled	Please contact us with your requirements

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Specifications ROV Pro 5	
Size	496 x 347 x 223mm
Weight	10kg
Maximum Depth	Up to 305m

Specifications ROV Pro 3 (for narrow access)	
Size	304 x 347 x 233mm
Weight	3.6kg
Maximum Depth	152m

Specifications CCTV (dual camera)	
Size	1300mm x 80mm
Weight	15kg
Maximum Depth	1500m

Specifications CCTV (narrow camera)	
Size	650mm x 42mm
Weight	6kg
Maximum Depth	1500m

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