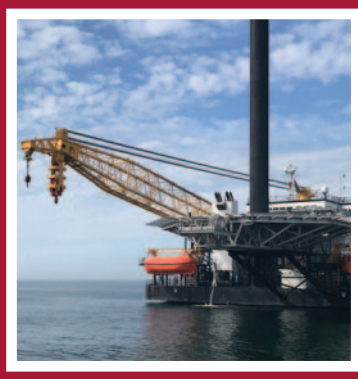
ROBERTSON GEO has always been integral to the innovation, development and in-house manufacture of this industry reference go-to probe.



ROBERTSON GEO®

Unlocking Your GeoData

GeoUnlocked©

GLOBAL GEODATA NEWS

ISSN 2754-7043 | ISSUE 14 | WINTER 21/22

PSLogger® since 79 issue

USA

Large-scale offshore wind energy project

DENMARK

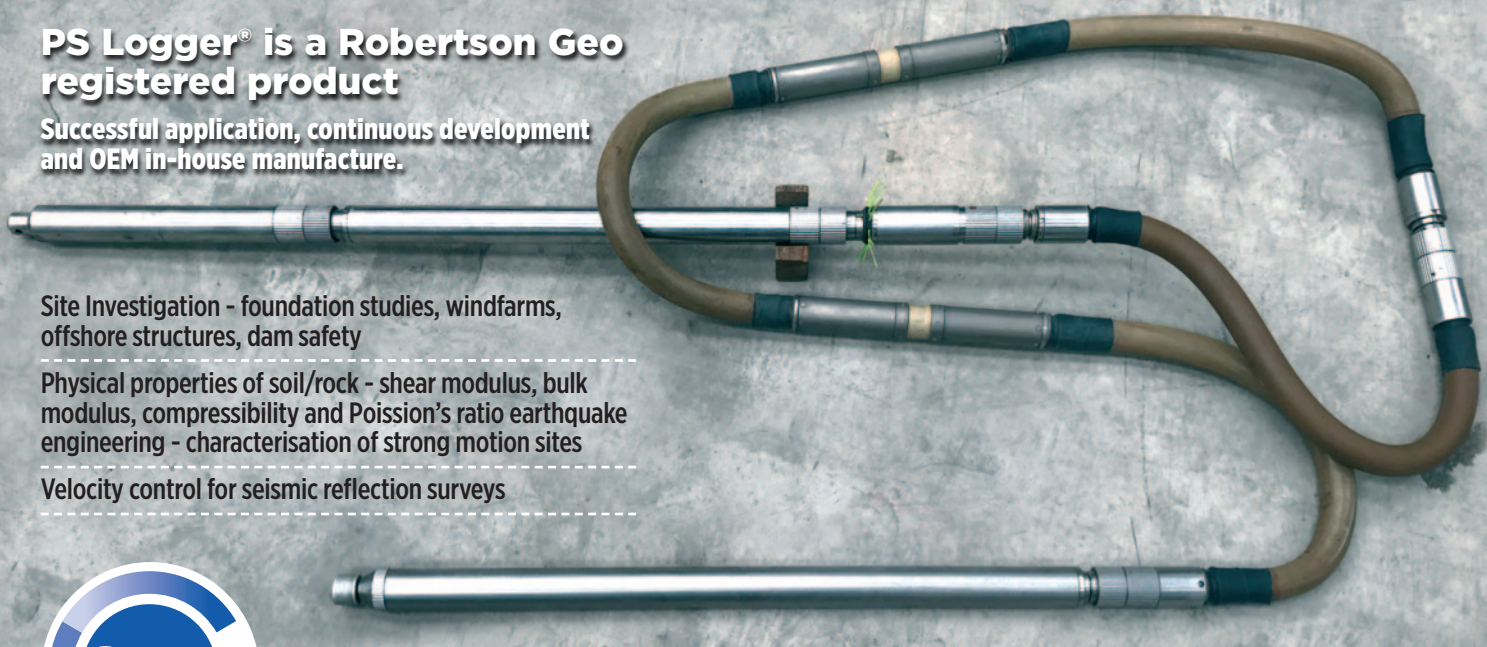
Three Danish offshore wind farms by 2030

UK

Windfarm to contribute to Scottish economy

PS Logger® is a Robertson Geo registered product

Successful application, continuous development and OEM in-house manufacture.



Site Investigation - foundation studies, windfarms, offshore structures, dam safety

Physical properties of soil/rock - shear modulus, bulk modulus, compressibility and Poission's ratio earthquake engineering - characterisation of strong motion sites

Velocity control for seismic reflection surveys

CPD CONTINUING PROFESSIONAL DEVELOPMENT

Ongoing Development of Geophysical Logging CPD for Professionals *see page 12*

No one can offer more experience of the field capabilities of the PS Logger® geophysical probe. It is experience based on thousands of boreholes globally accessed to provide subsurface data acquisition by our Operational Services teams over the years.

Our logging engineers are experienced, highly trained and fully certified for offshore working and can be deployed to any global location, providing a full turnkey or acquisition service.

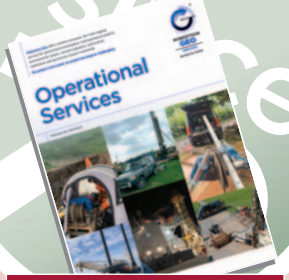
The complete catalogue of equipment is available on a service basis operated by these field crews. They are proven, capable of prolonged service logging operations with minimum outside support and are expert in data processing and interpretation.

All our probes are tested and calibrated using Robertson Geo's OEM test well facility and backed by ISO certified management systems and proven operation supervision and support.

Our technologies and products are "battle proven" through our own experience of logging and data acquisition in field service operations. We take care of our customers objectives delivering professional, standardised data processing and reporting. Helping with the presentation of job methodology, procedure and risk assessment when called for.

Graham Comber
Geophysical Service Manager

Check out the Operational Services literature



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PSLogger®

since 79

Today the PS Logger® is routinely deployed for major civil engineering and offshore projects as the industry reference go to probe for determination of soil and rock strength.

PS Logger® is a registered trademark of Robertson Geologging Ltd.

Industry Reference P & S Wave Velocity Determination from a Single Borehole

The PS Logger® is a unique sonic probe that determines P and S wave velocities from a single borehole without the need for an external source. Excellent data can be achieved across the spectrum of strata from unconsolidated sediments to the hardest of rocks. With minimal borehole preparation required and a high tolerance to surface noise the system has become the industry reference method for subsurface stiffness determination for many large civil engineering projects.

History

The PS Logger® was developed in the 1970's by the OYO Corporation to provide a full waveform tool that would produce reliable P and S wave velocity measurements in unconsolidated materials and rock formations at depth. The initial application was micro zonation, to characterise earthquake-prone zones with respect to geological and geophysical characteristics. From this beginning, the probe found applications for civil engineering projects in Japan and Asia.

In the 1980's the probe was introduced to the USA and was soon adopted for use in research projects, and since 1990 has seen ever-increasing use for bridges and dams, linear infrastructure, and power plants. The nascent Offshore Wind Farm (OWF) industry in NE USA has also adopted the PS Logger® as its preferred method for velocity determination.

In the late 1990's Robertson Geo began to promote the technology in Asia and the emerging Gulf markets for their growing and ambitious infrastructure projects, both onshore and offshore. This led to Robertson Geo updating the older OYO analogue technology and launching the first generation digital PS Suspension Logger 2003. Some of the major Gulf operators then adopted the technology for projects globally, including Europe and the developing OWF industry.

By 2010 Robertson Geo took over the manufacture and future developments of the PS Logger® from OYO and followed increasing global adoption. The PS Logger® method could be easily accommodated on jack-ups and drill-ships, so the tool became the method of choice in the OWF industry. On land, applications were initially confined to only the largest civil engineering projects such as nuclear power plants. In recent years the PS Logger® has been increasingly adopted for many civil and linear infrastructure projects, in preference to a conventional sonic probe.

> *Since 2010 and especially within the last 5 years the PS Logger® has been increasingly adopted for many civil and linear infrastructure projects, in preference to a conventional sonic probe.*

Advantages over Other Methods

There are numerous alternative methods and variants thereof for determining in-situ P and S wave velocities for stiffness determination including: refraction survey, reflection survey, surface wave methods, crosshole method, downhole method and seismic CPT. While each method may have its place depending upon the data required, site constraints and budget considerations, the PS Logger® provides a simple cost-effective alternative.

Purely surface based methods obviate the need for any boreholes but may be limited by noisy environments and site constraints. The crosshole method requires multiple boreholes to be drilled and cased as well as a verticality survey to determine borehole orientation.

The PS Logger® requires only a single borehole with minimal borehole preparation and can be run in tandem with the full range of slimline probes. The PS Logger® source has roughly twenty times the power of a conventional full waveform sonic and provides consistent energy delivery at all depths, resulting in a good tolerance to external noise. The frequency spectrum of the source covers 50Hz to 1kHz with 300Hz being the dominant frequency. This allows for high resolution while also providing enough energy to generate shear waves in unconsolidated sediments.

The ray paths used for velocity determination are all vertically polarised giving vertical stiffness and avoiding any complications with anisotropy. The high vertical resolution (0.5m typical) allows for measurement of thin layers and the method is not affected by high velocity layers above low velocity layers.

While eminently suitable for land-based surveys the PS Logger® method with no external source is ideally suited to deployment offshore on barges, jack-ups and drill ships and continues to dominate the OWF market.

> *No one has more experience of delivering the PS Logger® capabilities from thousands of boreholes globally often in harsh offshore conditions.*

Probe Architecture

The PS Logger® comprises a powerful hammer source and two receivers, separated by acoustic damping tubes. To acquire data, the probe is stopped at the required depth and the source is fired under surface command. Known as indirect excitation (conventional sonics use mode conversion), the resultant fluid motion produces a flexural wave at the borehole wall which propagates up the borehole wall.

There are five active sections to the PS Logger® - telemetry, receivers, filter, source and driver.

The telemetry section provides for all communications to the surface unit together with the logic circuitry for probe operation.

The receiver section has two receivers separated by 1m comprising two detectors each, held within a flexible damping tube. As the waves propagate parallel to the borehole axis, they set up

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corresponding fluid movements that are detected by the two-receiver combination (neutral-buoyancy 3D hydrophone for P waves and horizontally aligned geophone for S waves).

A 1m or 2m filter flexible filter tube separates the source from the receiver section and is designed to eliminate direct arrivals travelling up the probe body.

The source section contains a solenoid-operated shuttle aligned across the borehole axis to strike a cylinder on opposite sides of the probe in turn, setting up a pressure doublet in the surrounding fluid. To allow the correct frequency output, the strike cylinder is engineered so that it is suspended between a pair of 'O' rings and not in direct contact with the main source body. For the same reason the source body is held away from the borehole wall by an arrangement of whiskers.

The driver section contains the electronics necessary to drive the solenoid operated shuttle. For each shot a capacitor connected to the solenoid coil is charged up and then discharged producing a back EMF which drives the hammer. Due to the energy requirement this charging cycle takes several seconds. The process is reversible to be able to drive the hammer in opposite directions.

It is vital that the source and the receivers are aligned to detect the S waves. This alignment is pre-set at time of manufacture with alignment marks being evident on the source and receivers.

Robertson Geo has an ongoing commitment to certified quality management and is ISO 9001 certified by TÜV. It is the only ISO certified logging services provider, and the only company which comprehensively calibrates all of its logging systems.

ISO 9001
Certified
Quality Management System
www.tuv-sud.com/ms-cert

Calibration

To ensure that the PS Logger® is conforming to specification a multi-part calibration process is applied, principally at time of manufacture and thereafter at regular intervals.

Firstly, the probe undergoes a physical check including hanging the probe to check source-receiver alignment. Thereafter the communications and electronic functionality are checked through the acquisition software.

Secondly, the probe is run in a test borehole section where there is free standing steel casing of a known reference velocity and the results are checked.

Thirdly, the probe logs the open extent of the test borehole using a predetermined set of varying parameters and the resulting data is picked and compared to standard reference logs.

If all tests are passed satisfactorily then a conformance certificate will be issued.

Probe Deployment

The PS Logger® is plug compatible with the full Robertson Geo range of slimhole probes and can be deployed in fluid filled boreholes to 600m depth from a standard Robertson Geo winch. The probe dissembles into five sections which are packaged in two waterproof cases for transportation.

Once assembled, the probe is inserted in the borehole via a sheave or tripod and the depth reference is set. Unlike most conventional probes the PS Logger® takes its readings statically. At each depth point a series of three shots is conducted, one for P waves and two for S waves. Sample rates, gains, low pass and digital filters are optimised to produce the full required waveforms in the listening window. Readings are taken typically every 1.0m or 0.5m and where external noise is present shots may be stacked to improve signal to noise ratio. The result is velocity profiles for the borehole which can later be combined with a bulk density profile to provide small strain moduli.

Unlike most conventional probes the PS Logger® takes its readings statically.

At each depth point a series of three shots is conducted, one for P waves and two for S waves.

Borehole Considerations

The PS Logger® is typically operated in open fluid filled boreholes, though good data can also be obtained in PVC cased boreholes provided they are well grouted. A specification for the grouting can be supplied.

Borehole conditions can dictate data quality with rotary drilled boreholes providing the best data due to low rugosity. Diameter wise, the PS Logger® can produce good data in boreholes from 65mm to 400mm with the optimum range being from 75mm to 200mm. Inclined boreholes can also be logged providing the deviation is no more than 30° from vertical.

Where borehole stability is a consideration, the logging is often split into separate runs whereby the drill string is retrieved in stages. Liaison with the drillers, geologists and geotechnical personnel is required to confirm where the potentially unstable layers are (e.g. gravel beds). A shooting plan can then be drawn up whereby the drill string is withdrawn in stages to provide some open borehole while providing protection for the problematic zones.

Due to the PS Logger®'s tolerance to borehole muds, there is often no preparation required on the borehole. Polymer or Bentonite based muds can be extremely viscous with the limiting factor being the buoyancy of the probe. Where the use of thick mud fails to provide sufficient borehole stability the borehole can be PVC lined and grouted.

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The Horizon Geosciences ship 'Horizon Geobay'.

Numerous previously published editorial relating to PS Logger® applications is available at our GeoUnlocked© resource **CLICK FOR MORE**

New Bedford Massachusetts Wind Farm

First large-scale offshore wind energy project in the USA

ROBERTSON GEO IS contracted by Horizon Geosciences for this important project managed by Vineyard Wind LLC.

The objective is to build the first large-scale offshore wind energy project in the USA. The project is divided into two sections, with Vineyard Wind 1 functioning at a capacity of 800MW, enough to generate sufficient energy for one million homes. Vineyard Wind 2, further south is proposed to generate 400MW with the potential to develop a further 800MW at this location.

The Robertson Geo PS Logger® probe has been used for characterisation of the marine subsurface along with a 2,000m Marine Winch, Micrologger2 (the surface interface system for data acquisition) and winch controller system. The equipment was deployed from the Horizon Geosciences drill ship, the 'Horizon Geobay'; a total of six boreholes were completed in May/June 2018, with a further 10 completed in July/August 2019, with depths ranging from 50m to 70m.

Passive Acoustic Monitoring (PAM) in combination with 24/7 visual monitoring for marine mammals is ongoing throughout the project to minimise the disturbance of ongoing drilling and surveying activities on the surrounding marine species. This is especially important off the coast of New Bedford as it is nicknamed 'The Whaling City' as it was one of the most important whaling ports in the world during the 19th century.

THE ROBERTSON GEO 2,000m Marine Winch was securely welded into a steel frame at the beginning of the project. This frame was then strapped to railing on the drill deck when not in use.

Before PS Logging of each borehole, the frame and winch unit is systematically lifted and secured onto the rooster box, and the cable head released down to the drill deck to connect to the probe.

After logging is completed, the frame and winch unit is then lowered back down to the drill deck, where it is secured until the next PS Logging opportunity.

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PS Logger® Waves

The hammer and strike cylinder arrangement provides what is essentially an impulse source. As the source is suspended in the borehole fluid with no direct contact to the borehole wall, all the energy is transferred to the fluid. The resulting wavefront, on contact with the borehole wall, produces a variety of waves which propagate along the borehole axis. Although all waves will be evident at all receivers to some extent, the receivers are designed to isolate the waves of interest. Low band pass filters are used to allow the desired waves through on each channel.

P Waves or compression waves vibrate along the axis of propagation of the wave energy

P waves are always the first arrival and for the PS Logger® the characteristic frequency is 8-12kHz. As the borehole is fluid filled and the surrounding formation generally saturated, the velocity of the compression wave will always exceed any direct fluid arrivals. The arrival of the P wave is characterised by a sharp onset and the arrival times are usually easy to pick.

S Waves propagate perpendicular to the wave oscillation

S waves are considerably slower than the P waves with a characteristic frequency around 1kHz. These waves exhibit a slow rise time which if superimposed with the decaying P waves means that they are often picked on the first identifiable maxima rather than the onset. For the PS Logger®, S waves are generated in left and right pairs which produces a 180° phase shift between the trace pair aiding unambiguous identification.

Stoneley Waves are wave guided along the fluid/wall interface

Stoneley waves are the last arrivals on the traces and are characterised by having a lower frequency than the S waves and do not exhibit the 180° phase shift as with S waves. These waves are not currently used in the analysis of PS Logger® data.

P waves are always the first arrival and for the PS Logger® the characteristic frequency is 8-12kHz.

S waves are considerably slower than the P waves with a characteristic frequency around 1kHz.

Data Processing

Full waveforms are recorded digitally at acquisition time across 6 channels (P wave, S wave left & S wave right at the near and far receivers) at a predetermined sample rate as low as 2.5µsec. The sample rate is carefully selected to be as small as possible to provide the best resolution but high enough to capture the arrivals within the listening window. Low pass filters can be applied at acquisition time and digital filters can be applied during or post acquisition.

Using the acquisition software, the waveforms can be displayed, scaled and filtered to allow for the picking of the first arrivals at each receiver. Automated picking is available but in most cases the arrivals are picked manually by experienced engineers. While the P wave arrivals are generally simple to pick, the S waves with their typically slow onset and possible superposition over the decaying P waves benefit from an experienced eye to avoid 'cycle skipping'. From the receiver separation (1 metre) and the arrival times the velocities are automatically calculated. An option to output the data in SEGY format is also available.

Once the arrival times and velocities have been determined, the data is opened in a second program (also supplied with all PS Logger® systems) that creates and manipulates logs of the data. If a bulk density profile by depth is available it can be combined with velocities to give the small strain moduli and Poisson's ratio. Finally, all data can be outputted in industry standard LAS format.

Small Strain Moduli Calculations	
Given: P wave velocity Vp, Shear wave velocity Vs and bulk density ρ	
Poisson's Ratio	v = ((Vp/Vs)^2 – 2) / (2*(Vp/Vs)^2 – 2)
Shear Modulus	G = ρ*Vs^2
Young's Modulus	E = 2*G*(1 + v)
Bulk Modulus	K = E / ((3*(1 - 2*v))

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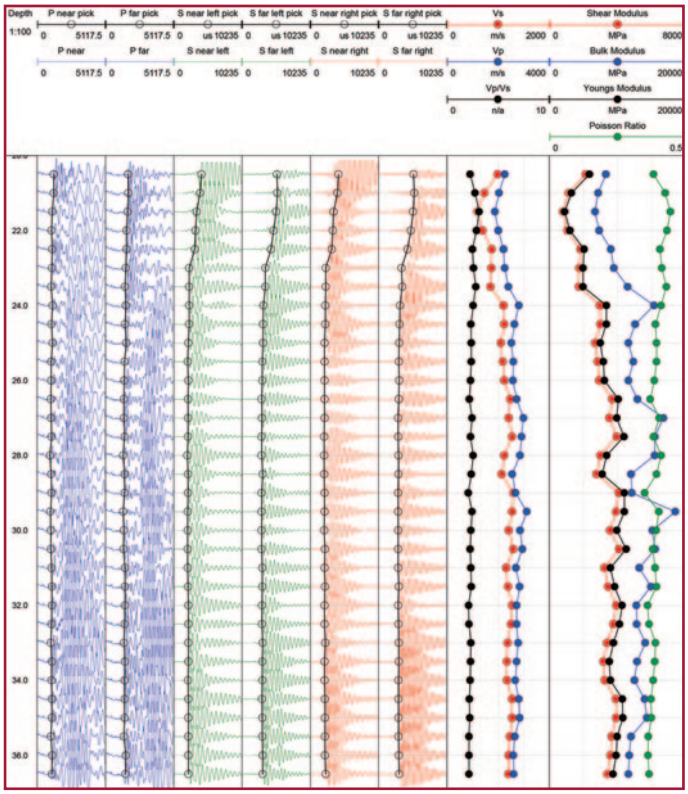
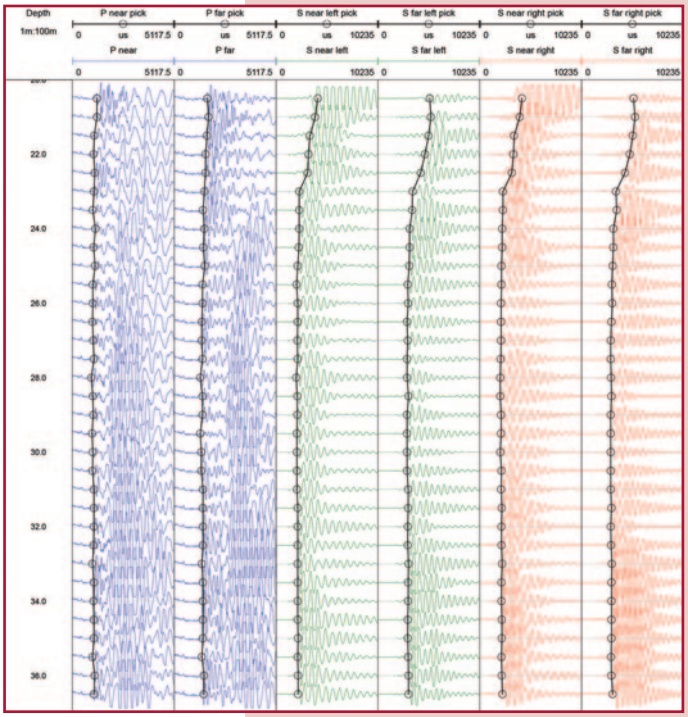
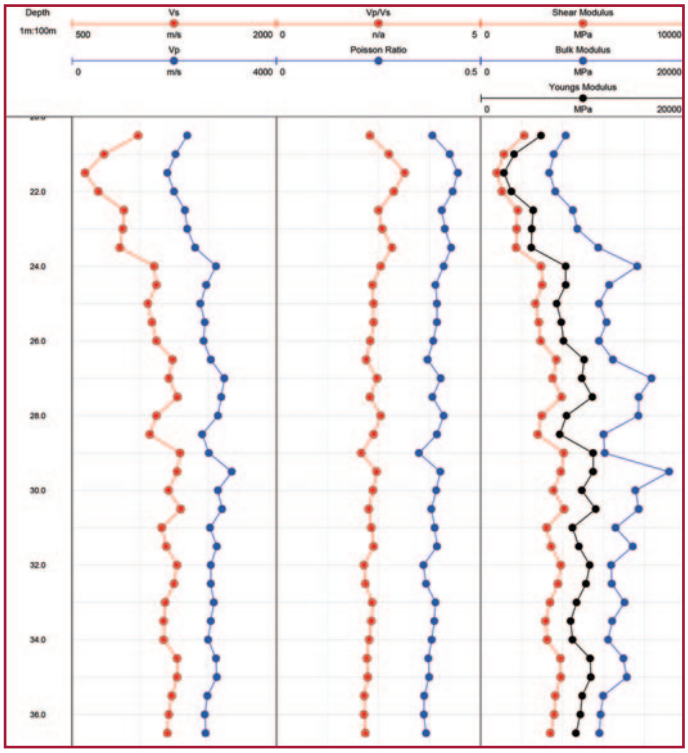


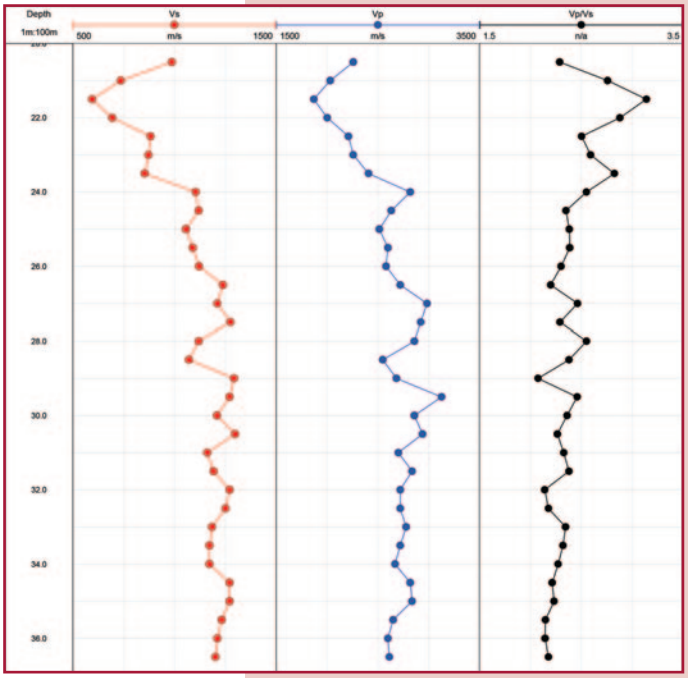
Full PS Logger® Output



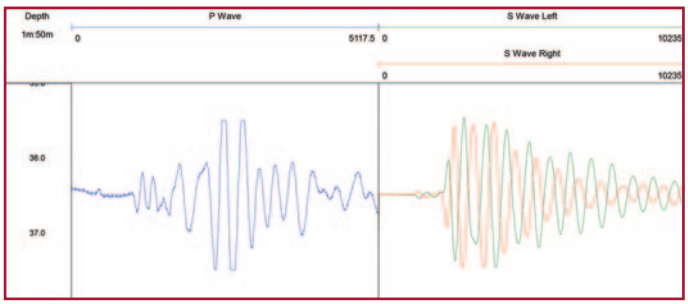
PS Logger® Waveforms



PS Logger® Derived Data



PS Logger® Velocities



PS Logger® Single Waveforms

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The versatile Robertson Geo 2,000m marine winch is lifted on board the Omalius prior to it being fixed into its location frame and probe deployment.

Numerous previously published editorial relating to PS Logger® applications is available at our GeoUnlocked© resource
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This windfarm is *15.5km* off the FIFE COAST of Scotland

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The windfarm is estimated to generate on completion 450 megawatts of clean energy, enough electricity for around 375,000 homes (all the homes in a city the size of Edinburgh) and displace 400,000 tonnes of carbon dioxide annually.

It is estimated that over the project's 25-year lifespan, it will contribute 0.6% of GDP (£827m) to the Scottish economy and create thousands of jobs during the construction phase as well as operations and maintenance jobs over its lifetime.

Initial work on the project began in September 2018 on a jack-up rig called the Apollo, where a total of four boreholes were logged using a suite of Robertson Geo specialised probes. The probes involved included the 3-Armed Caliper (3ACS), High Resolution Acoustic Televiewer (HRAT) and PS Logger®, the latter being the most commonly used probe for offshore work. These tools were used for characterisation of lithology, locating fractures and to determine rock strength.

The Robertson Geo 2,000m marine winch, along with the probes and accompanying equipment was then transferred from the jack-up to a drill ship called the Omalius. A further five boreholes were successfully logged on this vessel.

For the Omalius logging application the winch was bolted into a steel frame which was mounted on the underside of the rooster box. The depth cable and data cable were connected to the winch and stored on the rooster box, along with the sheave wheel to reduce the risk of leaning out of the rooster box to reach the winch below. These cables were carefully lowered and fed into a container on deck, where the Robertson Geo Micrologger2, winch controller and laptop system was set up for logging.

Robertson Geo's engineers were actively involved in the project for around two months. Total depth of each hole drilled was 45m.

PS Logger® Development

Robertson Geo is investing significantly into further development of the PS Logger®, drawing on over 40 years of experience in manufacturing and global field operations. The application of this knowledge and know how will ensure the technology is continuously evolving and delivering high value and proven geodata for some of the biggest projects in the world, and is the default trusted technology of choice for offshore wind developments.

In addition to direct development of the PS Logger® Robertson Geo have also developed a marine resistant winch and associated components in response to the demands for PS Logging on offshore wind farms.

How to Engage with the PS Logger®

The PS Logger® is manufactured exclusively by Robertson Geo and is available as a full turnkey service, for rental or for outright purchase.

RGeo Operational Services have a team of ten engineers available to provide a full turnkey service anywhere in the world, in any environment, including deployment on heave compensated drill ships and jack-ups. A full range of slim-hole tools is also available which will run on the same surface system. From planning thorough mobilisation to acquisition and processing our experienced professionals will deliver a project that is fully certified together with full back-up and support.

PS Logger® systems are also available for rental from RGeo Operational Services to those clients who have the required in-house expertise. Full training programmes can also be arranged for client staff.

"From planning thorough mobilisation to data acquisition and processing our experienced professionals will deliver a project that is fully certified from any global location, together with full back-up and support."

PROVEN GLOBALLY IN OVER 150 COUNTRIES

ROBERTSON GEO is the market leader of slim-hole logging instrumentation, with in-house design and manufacturing facilities.

CUSTOMERS INCLUDE WATER authorities, mining houses, civil engineering consultants, aid organisations, drilling contractors and oil companies. Its logging equipment is in action in around 150 countries worldwide. As a first choice provider of proven and results driven products, services and techniques, Robertson Geo is committed to certified quality management and the confidence it brings to its customer relationships - it is ISO 9001 certified by TÜV.

All tools that leave for the field are tested at the **Deganwy calibration and test well facility** prior to despatch. With no other European manufacturer offering this combination of onsite testing and calibration capability, customers can be confident that Robertson Geo tools are good to go, tested and fully operational prior to downhole use.

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Three new Danish OFFSHORE WIND FARMS by 2030

Robertson Geo's 2,000m marine winch secured to the drilling deck with the PS Logger® laid out to its left and ready to be deployed.

Numerous previously published editorial relating to PS Logger® applications is available at our GeoUnlocked© resource **CLICK FOR MORE**

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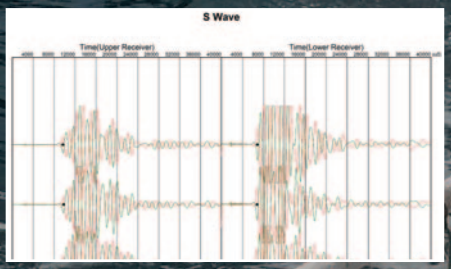
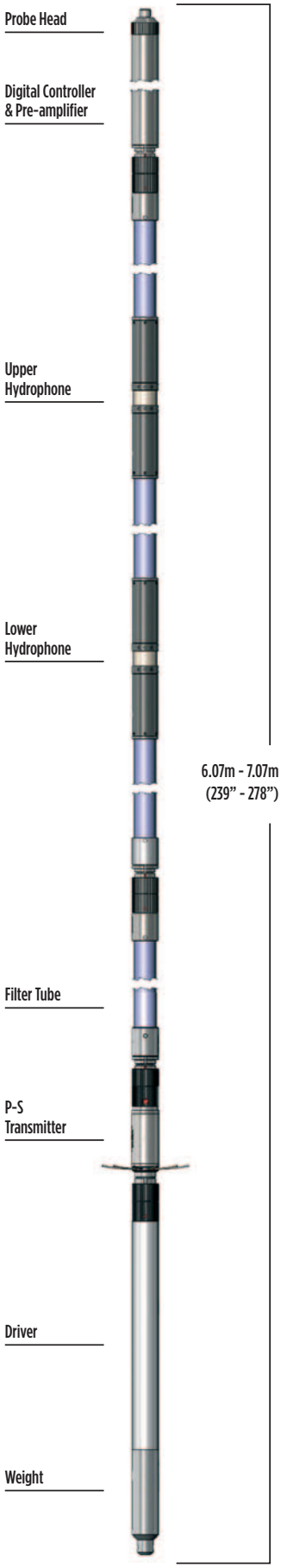
BY CONSENSUS OF political parties in the Danish Parliament and as part of the Energy Agreement of June 29, 2018 three new offshore wind farms are to be established before 2030.

Fred Olsen Windcarrier's jack-up vessel Jill is nearing completion of the preliminary geotechnical surveys at the Thor offshore wind project. The wind farm is planned to have a capacity of minimum 800 MW and maximum 1,000 MW and planned to be in full operation no later than 2027. The offshore wind farm will be established in the North Sea, west of Nissum Fjord, some 20 km from shore and will be named "Thor" after the name of the town "Thorsminde".

As part of the preliminary geotechnical surveys, Robertson Geo conducted PS Logger® operations on four 70m boreholes over a two-week period. The geology encountered was mainly moderate to stiff clay with some dense sands, predominately producing excellent data from the PS Logger® with both the compression and shear waves being well defined.

The PS Logger® probe measures P (compression) and S (shear) wave velocities in a single borehole without the need for external energy sources, making it simple and quick to deploy. When combined with bulk density values (from a density log or in this case from core sample tests) small strain moduli (Young's, Shear and Bulk) can be calculated using simple formulae. The data is logged and processed onboard by the Robertson Geo service engineer and further assessed at the HQ by a senior engineer.





PS Logger® Probe

The PS Logger® probe is a low-frequency acoustic probe designed to measure compressional and shear-wave velocities in soils and soft rock formations.

It operates using indirect excitation rather than mode conversion as in a conventional sonic. It is capable of acquiring high resolution P and S wave data in borehole depths of up to 600m in water.

Principle of Measurement:

The PS Logger® probe contains a unique design of powerful hammer source and two receivers, separated by acoustic damping tubes.

To acquire data, the probe is stopped at the required depth and the source is fired under surface command. Firing causes a solenoid-operated shuttle aligned across the borehole axis to strike plates on opposite sides of the probe in turn, setting up a pressure doublet in the surrounding fluid. The resultant fluid motion produces a tube wave at the borehole wall with velocity close to the shear velocity of the formation together with a compressional wave.

As the waves propagate parallel to the borehole axis, they set up corresponding fluid movements that are detected by the two neutral buoyancy 3D hydrophone receivers and geophones, allowing the wave velocity to be determined.

The facility to stack multiple shots and filter the data as in normal seismic data acquisition is included in the operating software.

SPECIFICATION:

Features

- High energy shear-wave source has typically 20x power of conventional sonic probes
- Low-frequency measurement, more representative of engineering situations
- Stacking of multiple shots
- Probe separates for shipping
- Real-time wavelet (wiggle) display
- Compatible with Robertson Geo Micrologger2

Measurements

- Formation compressional wave velocity
- Formation shear-wave velocity

Applications

- Site Investigation - foundation studies, windfarms, offshore structures, dam safety
- Physical properties of soil/rock - shear modulus, bulk modulus, compressibility and Poission's ratio
- Earthquake engineering - characterisation of strong motion sites
- Velocity control for seismic reflection surveys
- Engineering

Operating Conditions

Borehole type:	open-hole, water-filled
Recommended Logging Speed:	Static measurements

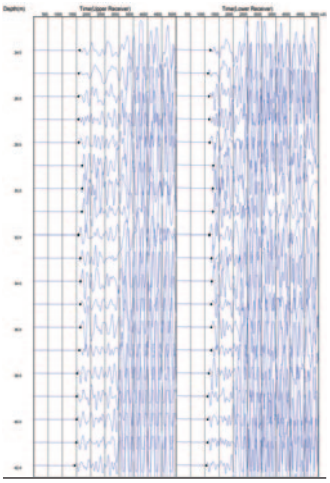
Specifications

Diameter:	50mm
Assembled length:	6.07m - 7.07m (1 or 2m filter)
Shipping case length:	1.45m (4.75ft) supplied in two transport cases
Assembled weight:	26.5kg - 28kg (1 or 2m filter)
Max. temperature:	70°C
Max. pressure:	6.5MPa
Transducer type:	solenoid and hammer
Receiver type:	3D hydrophones (p), geophones (s)
Receiver spacing:	1000mm (3.28ft)
Waveform acquisition period:	5.12mS to 409.6mS
Sampling:	2.5µs minimum
Down-hole gain:	0db to 42db (surface control)

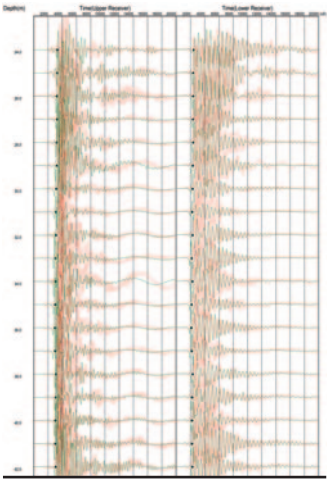
Part Numbers

1002244	PS Logger® probe in carrying case

P Waves



S Waves



Examples of logging data

CLICK HERE FOR ENQUIRY FORM

Continuing Professional Development (CPD)

Geophysical Logging CPD for Professionals

What is CPD?

CPD (Continuing Professional Development) is a term that describes the ongoing development of knowledge and skills for professionals, with a range of activities that can be defined as CPD including seminars, on-line training, workshops, and mentoring.

Many businesses now consider CPD to be an essential part of staff learning while also meeting obligations within certain professions. Robertson Geo is now increasing the offer of ***free interactive seminars to relevant UK professionals and organisations*** who engage with geophysical borehole logging.

Benefits of CPD

Individuals benefit from CPD by broadening their knowledge and keeping up-to-date with the latest technology, methods, and practices. CPD certification can also form an integral part of the path to chartered status.

It can be invaluable for businesses with increased in-house knowledge base and the provision of a framework for individuals to progress their careers. The progression of individuals within a company provides a synergistic benefit leading to higher standards and commitment from staff.

Robertson Geo also benefits from these CPD seminars by engaging face to face with the professionals who matter within our industry.

The Robertson Geo CPD Offer

As a market leader, of some 40 years experience, providing geophysical logging services and equipment, Robertson Geo are keen to continue to engage with logging professionals. Based on the provision of market relevant seminars that have been and continue to be provided to many organisations over the past five years Robertson Geo is now formalising the process for the delivery of CPD presentations in-house at the Client and for groups of six to thirty.

The seminars offered are highly technical, practical and focussed, and cover many aspects of the geophysical industry including equipment, methods and procedures.

Geophysical borehole logging service provision is essentially a data business and the principle aim of the seminars is to provide information which will promote the achievement of the best possible data quality.

Eligibility

The seminars on offer are aimed at groups of individuals within organisations who are involved with borehole geophysical data collection. For geotechnical work this includes companies in civil engineering, consulting, design, drilling and ground investigation. Seminars will also be available for other industry sectors such as water, mining and renewables.

The seminars are free and will be provided on-site at client UK premises they will only be available to groups, not individuals.

Group sizes may range from six to thirty individuals and the seminars are typically provided during lunchtime as this allows for better attendance. The only requirements from the client will be to have a large screen available for presenting material and to provide a list of attendees. The provision of lunch for attendees will be at the client's discretion but is not discouraged.

Seminar Structure

The seminars will be timed to run for one hour, comprising 45 minutes of interactive presentation and 15 minutes for Q and A afterwards. Lunch may be eaten during the seminar.

Certification

Those attending the seminar will all receive an individual certificate confirming completion of the individual seminar, and as the material is highly specialised this is certified by Robertson Geo.

List of Courses

The following courses are currently available, with further titles to come:

RGSO1
Specifying and Managing a Programme of Geophysical Borehole Logging

RGSO2
Overview of Geophysical Probes used for Ground Investigation

RGSO3
Probe Series: PS Logger® - Theory and Operations

RGSO4
Probe Series: NMR – Theory and Operations

Contact

If you are interested in organising a UK seminar please contact Graham Comber, Geophysical Services Manager at Robertson Geo, email: gcomber@robertson-geo.com

Ask about our overseas seminars for Robertson Geo clients.

CPD CONTINUING PROFESSIONAL DEVELOPMENT

ROBERTSON GEO®
Unlocking Your GeoData

SAFETY IS KEY©

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