



## Full Wave Sonic

- Interpretation of lithology
- Applied to calculate  $V_p/V_s$ , Young's and shear modulus
- Integrated natural gamma sensor
- Starting at 75mm borehole diameter

### Field of Application

The application of sonic waves is frequently used in the fields of engineering and hydrogeology, especially in order to gain important information on mechanical properties of rock such as porosity, shear and Young's modulus. In combination with the integrated gamma sensor, the lithology of the material surrounding the borehole can be determined, and information on fissuring can be gained. The probe is working in every borehole filled with water, since water favours the travelling of sonic waves and therefore guarantees a good transmission to the surrounding rock.

### Technical Description

The probe emits a sonic wave (acoustic) which penetrates into the rock formations surrounding the borehole. The transmitted waves are recorded by 3 receivers, arranged at defined distances from the transmitter (60cm ; 90cm ; 120cm). The full waves are digitised and recorded. A full wave contains compressional waves (P) as well as shear waves (S) arriving at different speeds at the receivers.

These different times of arrival allow to determine the wave speeds. The mechanical parameters of the surrounding rock can therefore be determined, because these wave speeds directly depend on the properties of the penetrated material.

- 1) Full wave sonic probe(FWS)
- 2) Results of a measurement (waves and natural gamma) compared to an optical scan (OPTV) on the right
- 3) Setting of a measurement

## Technical Data

<b>Full Wave Sonic (FWS)</b>	
Diameter of probe	60 mm
Length of probe	295 cm
Weight of probe	15 kg
Maximum working temperature	70°C
Maximum working pressure	200 bar
Filling of borehole	Water
Diameter of borehole	75-500 mm
Type of sensor	Piezoelectrical 18 KHz
Transmitter-receiver spacing	Tx-Rx1:60cm; TX-Rx2:90cm; Tx-Rx3:120cm
Measuring speed	Approx. 3m/min. (depending on the resolution)
Length of cable (winch)	175 or 530 m