



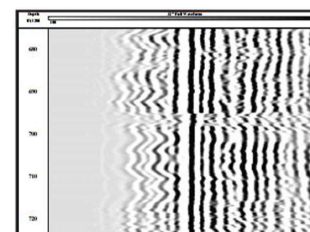
FULL WAVEFORM SONIC & CASING BOND LOG

Full Waveform Sonic (FWS) is a geophysical measurement of sound properties in open-hole, fluid filled formations. Designed specifically for mining and geotechnical applications, acoustic energy is transmitted through borehole fluid into the surrounding rock from a piezoelectric transducer. The acoustic signals are then captured by three receivers, digitized and transmitted to the surface electronics. Acoustic waveforms can be viewed and processed for amplitude and travel time (velocity) information.

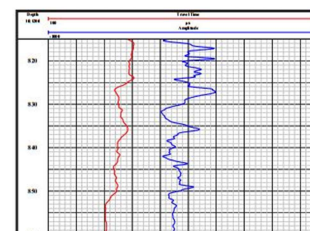
This same probe can be configured to run in the fluid-filled portion of cased wells, and the results evaluated as a Cement or Casing Bond Log (CBL). These logs provide critical information on cement integrity and casing-to-formation coupling necessary for evaluating overall well integrity.

APPLICATIONS:

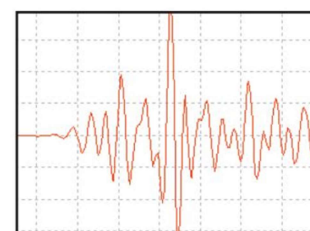
- + Well completion evaluation in fluid-filled cased holes
- + Formation rock strength properties
- + Fracturing / fracture zone identification
- + Lithologic analysis and porosity calculations
- + Permeability determination using tube wave analysis
- + Compressional, shear, tube wave analysis



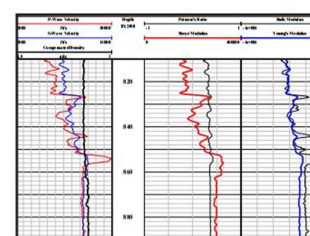
Variable Density Display



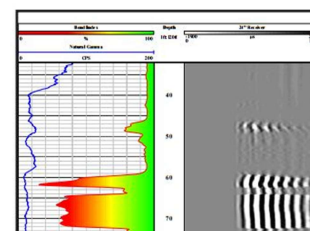
Amplitude and Travel Time



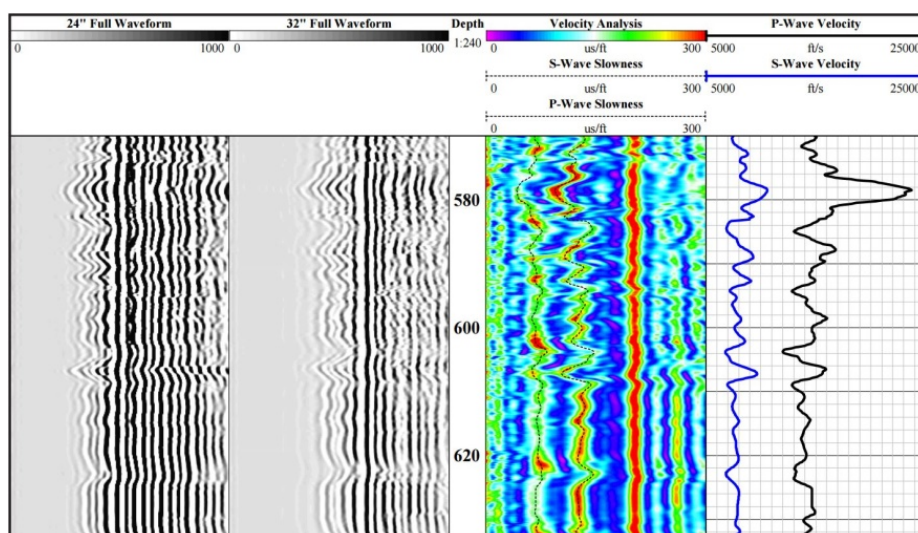
Compression, Shear, Tube Wave



Engineering Properties



Cement Bond Log



PROBE SPECIFICATIONS:

Diameter:	45 mm (1.8 in.)
Length:	2.55 m (8.37 ft.)
Max Temperature Rating:	70°C (158°F)
Max Pressure Rating:	200 bar (2900 psi)
Transmitter-Receiver Spacing:	60, 80, 100 cm (24, 32, 40 in.)
Transducer Frequency:	23 kHz
Borehole Diameter Range:	51 – 510 mm (2 – 20 in.)

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