

VIBSIST-20S

CODED-Impact Seismic Source

DESCRIPTION

The VIBSIST-20S is a swept-impact, time-distributed seismic source.

The seismic signals are generated by an electric hammer, which produces a rapid sequence of impacts according to a pre-programmed time function.

The VIBSIST-20S is a non-destructive alternative that does not create environmental pollution such as chemicals and sound. Legal risks fre-



The VIBSIST-20S Controller.



The VIBSIST-50S with Hand Cart and Impact Rod

KEY FEATURES

Portable and versatile

The VIBSIST-20S is portable, safe and versatile. It allows jobs to be done fast in very different conditions, from imaging ahead of tunnels to shear wave surveys on ground surface.

The VIBSIST-20S can also be used to generate and measure surface waves.

APPLICATIONS

The VIBSIST-20S is intended for detailed P/S and surface waves surveys with a typical penetration range up to 250 m, in reflection mode.

The fields of use include:

- *tunnel prediction*
- *foundation engineering*
- *roadbed and dam inspection*
- *placer exploration*
- *ground water exploration*
- *ore delineation*
- *research and education*



High-Resolution portable Seismic Source

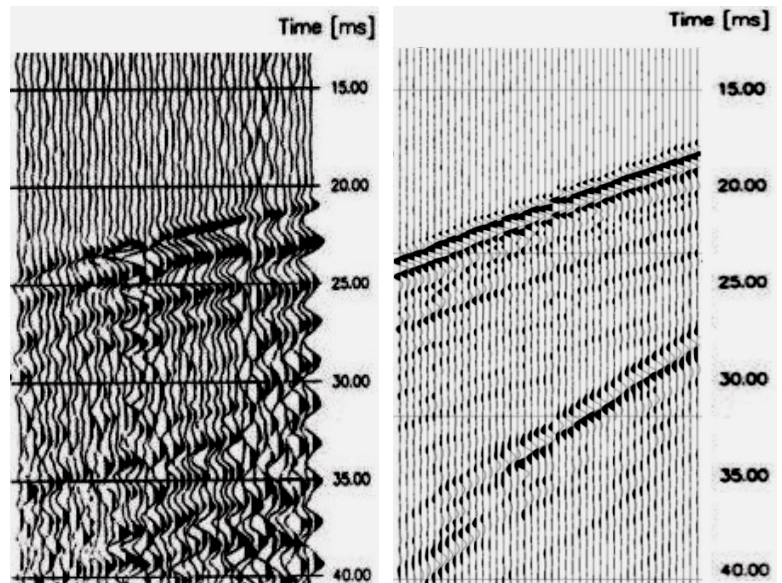
HIGHER RESOLUTION AND DATA QUALITY

The VIBSIST-20S achieves equivalent or better data quality than would sledge hammers and small drop-weights, especially in noisy environments. The improvement is obtained by accumulating higher impact energy over a period of time. A signal energy of 15 kJ is produced over a period of 25 seconds at an average rate of 25 impacts per second. The build-up of individually low energy impacts leads to significant depth penetration while conserving the high frequency component and leading to higher resolution surveys. All types of noise - cultural, natural, and instrumental - are canceled by the swept impact technique.



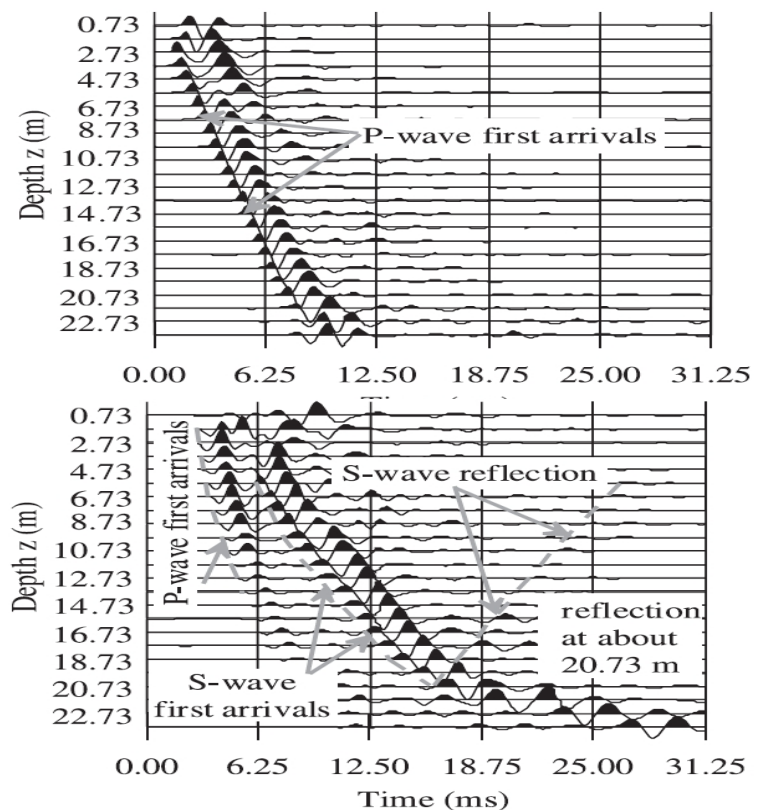
The VIBSIST-20 used in boreholes for tomographic imaging to assess the seismic properties of permafrost in northern Quebec, Canada. Both P- and S-waves are generated

Anne-Marie LeBlanc, et. al., *Tomographic imaging of permafrost using three-component seismic cone-penetration test* GEOPHYSICS, VOL. 71, NO. 5, SEPT-OCT 2006; P. H55-H65, 10.1190/1.2235876



Single pulse source vs. VIBSIST-20, VSP measurements from tunnel, GTS, Switzerland.

ASSESSING DYNAMIC PROPERTIES OF PERMAFROST



P-wave first arrivals recorded with a vertical accelerometer Z (top) and of the S-wave arrivals recorded with the horizontal accelerometer X (bottom) at 1 m depth interval and for 24 receiver positions with depth.



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SYSTEM MODULES

The impact assembly is built as a sandwich of aluminum, steel and rubber plates and bells and several types are available to customize the VIBSIST-20S for specific applications and ground or rock conditions.

The Electric impact hammer operates in accordance with the coded sequence, produced by the instrument controller. A power source such as a gas/Diesel generator is needed to power the hammer. The seismic response recorded by the controller processor of the source is conveyed to the recording station by cable or optionally by a coded radio signal. A variety of seismographs can be used, which include all industry-standard recording systems.

SOFTWARE

- Control Software used to program and operate the sweep control sequence
- Sweep Decoder; correlates the sweeps. This module can either be used for fast on-line monitoring or elaborate off Line processing
- Signal Conditioning, includes a collection of filters used for processing of the records before and/or after correlation
- Signal Display Interface allows the operator to visualize the data conveniently and flexibly.

The VIBSIST can be used all WINDOWS seismographs and a number of UNIX/ LINUX seismographs.

A dedicated correlator is included with the VIBSIST software.

SPECIFICATIONS

Power supply:

115 V/60 Hz / 20 A - 230 V/50 Hz / 10 A

Repetition rate: programmable between 15 to 35 impacts per second

Impact energy:

approximately 25 J / impact

Sweep time adjustment: 2.5 to 30 seconds (possibly limited by the maximum number of samples per channel of the recorder).

Controller

Dimensions: 300 x 120 x 60 mm

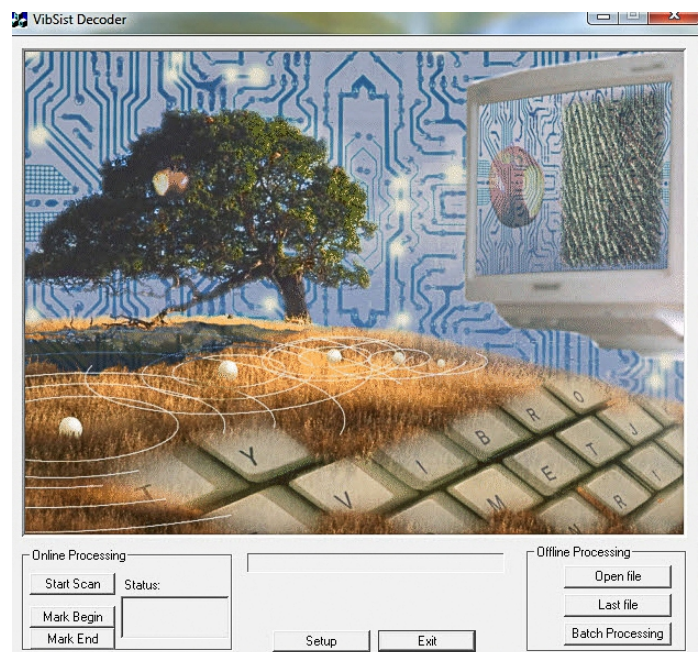
Weight: 2.5 kg

Impact Hammer

Length: 650 mm

Handle span: 300 mm

Weight: 12 kg



ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE



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VIBSIST-20S Seismic Source

The data quality is also increased because the VIBSIST-20S is not dependent on the force or skill of the operator using a sledgehammer or on setup variations of other impulsive sources.

Compared with frequency swept vibrators, a wide bandwidth is achieved with the VIBSIST-20S even when the coupling to the rock or ground is relatively poor.

With the VIBSIST-20S, you can finish the job quite sooner than with alternative methods.

The VIBSIST-50S with Impact Rod and impact head for hard rock coupling.



The VIBSIST-50S with Hand Cart and Impact Plate for soft ground.

The VIBSIST-20S source can be used in urban and noisy environments, as well as in working mine conditions.

