



# VIBSIST-50 Surface Seismic Source

## MAJOR BENEFITS

### EXCEPTIONAL REFRACTION SOURCE

The VIBSIST-50 achieves a better first break detection than a sledgehammer as shown below. The improvement is obtained by accumulating higher impact energy over a period of time, i.e. the signal to noise ratio increases, and through a fine tuned deconvolution of the signal, in order to minimize the correlation noise.

## DESCRIPTION

The VIBSIST-50 is based on the Swept Impact Seismic Technique (SIST) which is a combination of the Vibroseis swept-frequency and the Mini-Sosie multi-impact ideas. The seismic signals are produced as a series of pulses, according to a specific pre-programmed sequence which makes the system similar to a smaller Vibroseis.

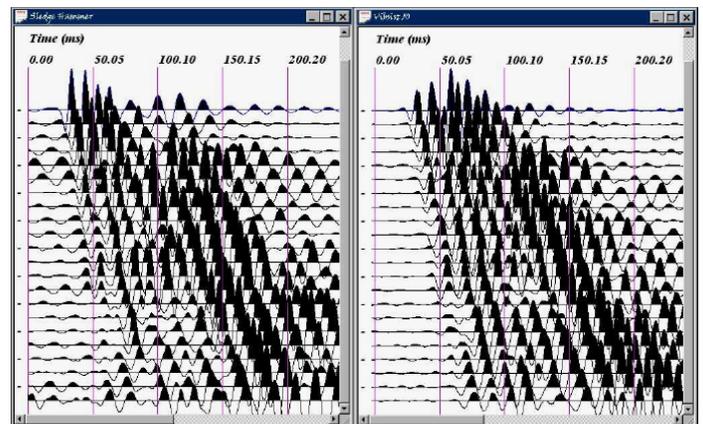
The use of the monotonous variation of the impact rate controls effectively the non-repeatability of the impact intervals and achieves a wide bandwidth even when the coupling to the rock or ground is relatively poor.

Using standard mining and construction equipment allows the VIBSIST-50 to become a safe, non-destructive and environmentally friendly high resolution seismic source. It also makes this seismic method reliable and highly cost effective

## APPLICATIONS

The VIBSIST-50 can be used in a wide range of applications, they include:

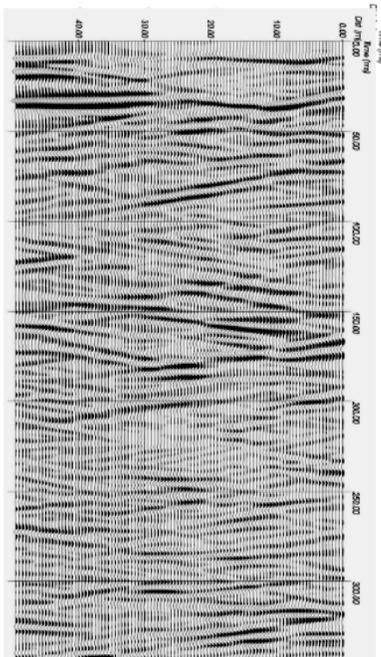
- Depth to bedrock
- Ground water exploration
- Location of fractured zones
- Foundation studies
- Placer exploration
- Gravel detection
- Shear and surface wave studies
- Static correction surveys
- VSP measurements
- Research and education



*Sledge Hammer vs. VIBSIST-50*

**EXCELLENT REFLECTION SOURCE**

The VIBSIST-50 is also an excellent reflection source because it obtains equivalent depth or better than would explosives while maintaining a higher resolution and an increased productivity. The high S/N Ratio is achieved by a signal energy of 15 kJ over a period of 25 seconds or the equivalent of 12 impacts per second. It is the accumulation of these low energy impacts which leads to significant depth penetration.



*Surface reflection at the Gardemøen airport, Oslo, Norway*

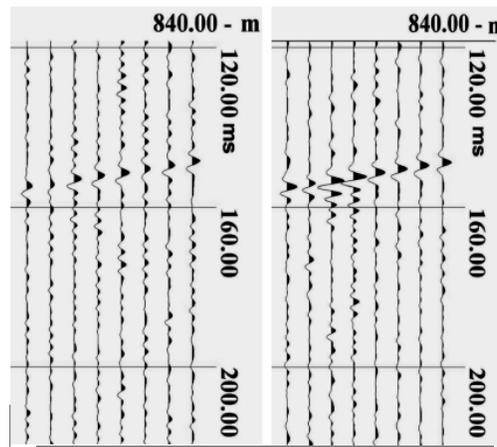
**INCREASED PRODUCTIVITY**

Significant productivity gains are obtained because the VIBSIST-50 is not dependent on the energy of the operator using a sledgehammer or on the lengthy preparation needed to use explosives, such as drilling holes, filling them in, setting up the wires, etc.

For refraction applications, the VIBSIST technique is at least 5 to 10 times faster than using a sledgehammer and for reflection more than 10 to 20 times faster than using explosives, depending on the operator. With the VIBSIST-50, you can finish the job quite sooner than with alternate methods.

**HIGHER DATA QUALITY**

The VIBSIST-50 produces high frequency content (up to 1500 Hz) while achieving significant depth penetration. The high frequency content of the signal emitted by a seismic source tends to decrease when the power of the source increases, which makes higher resolution and wide investigation range difficult to achieve simultaneously. The investigation range can however be increased with little or no expense of resolution if the signal energy is built over time, rather than being emitted as a short high-power burst.



*90 g dynamite vs. VIBSIST-50 deep VSP measurements*

**ADDITIONAL BENEFITS**

**ENVIRONMENTALLY FRIENDLY**

The VIBSIST-50 is an environmentally friendly seismic source. It is a non-destructive alternative that does not create environmental pollution such as chemicals, sound, etc. Legal risks frequently associated with using explosives are eliminated.

**MECHANICALLY RELIABLE**

The VIBSIST-50 incorporates and upgrades standard rock breaker equipment commonly used in the construction industry. The many thousands of impacts per day used by the Swept Impact Technique require a rugged electro-mechanical hammer that is already well proven and that also meets established environmental (sound) standards

**COMPATIBLE WITH MANY SEISMOGRAPHS**

The VIBSIST can be used with any Windows 2000/XP seismographs. A correlator is included with the VIBSIST software. A large enough memory per channel is required. Compatible seismographs include the Geometrics GEODE & StrataVisor NZ

**INTEGRATED WITH VSP SURVEYS**

The VIBSIST-50 is ideal for VSP surveys. It generates enough energy to be used with borehole seismic systems at depth of 500 meter or more

**SURFACE WAVE CAPABILITY**

The VIBSIST-50 can be used to produce and measure surface waves, which can be processed and analyzed.

**MODULAR AND PORTABLE**

The reduced numbers of modules makes the VIBSIST-50 portable and highly mobile. It allows jobs to be done faster and in difficult field conditions that would otherwise have been almost inaccessible such as mountainous regions, underground mines, confined areas, etc.

## SYSTEM COMPONENTS

### SYSTEM MODULES

1. The **controller** transfers to the impact hammer the sweep control sequence provided by the computer
2. The **impact hammer** is modified to operate in accordance with the sweep control sequence. A power source such as a motor generator is needed to operate the hammer
3. The **impact stand** includes an impact rod, a pressure plate on which the operator stands on and a ground coupling plate.
4. A variety of **seismographs** can be used; they include Geode & StrataVisor.
5. A **laptop** may be required with most seismographs but not provided with the VIBSIST-50.

### SOFTWARE

Four software modules are included as part of the VIBSIST-50 system, they are:

- **Controller**, used to program the sweep control sequence
- **Signal Decoder**, deconvolves the long sweeps. It may also be used for On Line monitoring or Off Line processing.
- **Signal Conditioning**, includes a collection of filtering programs used for processing of the records before or after deconvolution
- **Signal Display Interface**  
Allows the operator to visualize the data

### SPECIFICATIONS

**Power supply:** 115 V/60 Hz - 230 V/50 Hz

**Maximum consumption:** 25 A

**Repetition rate:** Programmable between 5 to 18 impacts per second

**Impact energy:** Approximately 55 J /impact for a typical 1.8 kW impact hammer

**Impact frequency band:** Approximately 50 to 1500 Hz, depending on ground

**Programmed sweep characteristics:** Computer controlled (any shape) or preset (linear) sweep.

**Impact rate ratio:** minimum 2 / 1

**Sweep time adjustment:** 4 to 30 seconds

(this is restricted by the number of samples available per channel).

#### Controller

- Dimensions: 300 x 120 x 60 mm
- Weight: 2 kg

#### Impact Hammer

- Length: 760 mm
- Handle span: 600 mm
- Weight: 32 kg

#### Impact Stand / Trolley / Coupling plate

- Weight: 25 kg

