



PRS-1 Coded Seismic Source System

- ❑ **Ideal for reflection surveys for faults, petroleum, water**
- ❑ **Replaces expensive vibrators or dangerous explosives**
- ❑ **Uses widely available, low cost construction tampers**
- ❑ **Works well in urban, high-traffic areas**
- ❑ **Low transportation costs; man-portable**

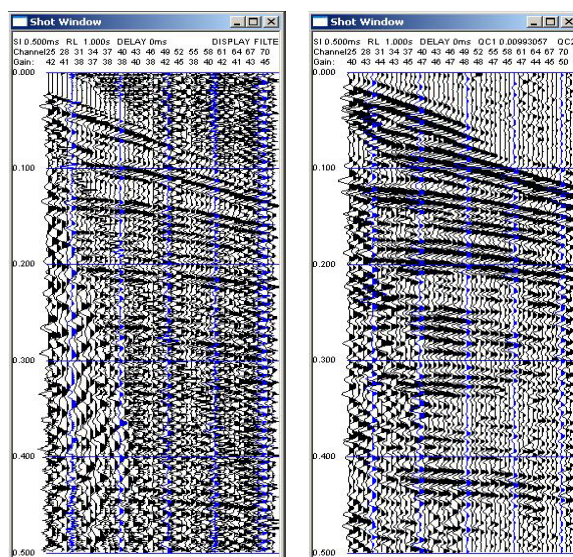
Seismic surveys in urban areas represent a significant logistics challenge. Vibrators are disruptive and expensive; explosives are dangerous and difficult to permit.

Geometrics offers an alternative to vibrators and explosives that is inexpensive and non-destructive. This technique uses widely available portable construction tampers to introduce a pseudo-random, encoded impact sequence into the ground. Reference signal is recorded with a special geophone near the base of the construction tamper and transmitted to a signal-conditioning module before being used to decode the encoded shot record.

The Geometrics PRS-1 package includes all of the benefits of a swept source, but at a fraction of the cost. Highly portable, it can be used anywhere a small ATV can be driven. But where this method really proves its worth is in high-noise, urban environments. Since the energy is introduced into the ground over a relatively long period of time (30-60 seconds), the effects of passing vehicles can be monitored and suppressed. The result is a much higher signal-to-noise ratio than that obtainable with an impulsive source.



Inexpensive construction tampers are used as the energy source. Picture from Langfang, China.



Hammer record on the left (10 stacks) compared to one 60-second acquisition with the PRS-1 system.

Since the energy is introduced through a series of small impacts over a relatively long period of time, the technique is environmentally friendly, and can even be performed on pavement.

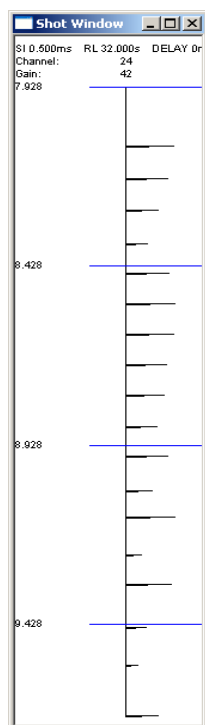
A typical PRS-1 system consists of:

Hardware:

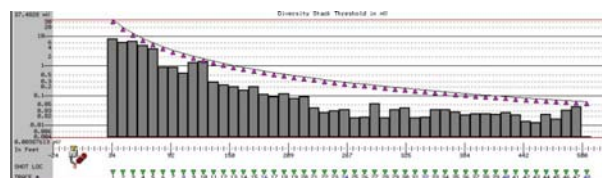
- ❑ StrataVisor NZ or Geode seismograph
- ❑ Pilot Processing Module for recording reference signal from 40 Hz geophone
- ❑ 64,000 samples/trace record length
- ❑ 40 Hz geophones

Software:

- ❑ Pilot conditioning
- ❑ Pilot summing (for multiple tampers)
- ❑ Acquisition and display-only correlation
- ❑ Real-time noise suppression
- ❑ Pilot QC analysis



Tamper blows are turned into a single impulse by signal processing software.



RMS noise display helps set up traffic noise suppression thresholds.

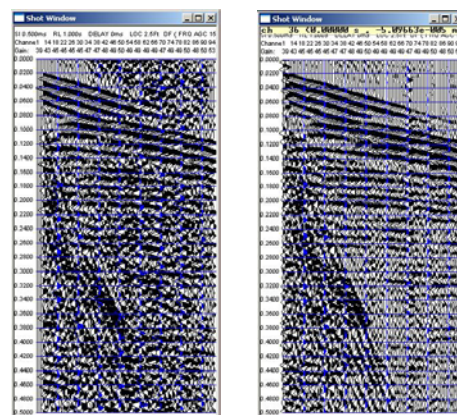
with unique frequencies. With a construction tamper, good data quality demands that the time intervals between impacts are unique. The PRS-1 quality control software analyses each record and reports a “randomness quotient”. If the randomness quotient drops below the user-selected threshold, the record can be discarded without adverse affects and the data re-acquired.

Noise Suppression

If you’ve ever conducted a seismic survey along a busy road, you know the aggravation of waiting for a quiet period. The PRS-1 system allows you to ignore traffic altogether. With noise suppression enabled, each channel is monitored for inappropriate noise levels that might degrade the final result. Operator settings help account for variations in signal level with distance from the source.

Quality control

When using a vibrator, data quality is improved by exciting the ground with a wide bandwidth signal



Effect of real-time noise suppression in high vehicle traffic area. Left record – noise suppression disabled. Right record – noise suppression enabled.

If you are finding it increasingly difficult to use explosives, or if you are doing more and more seismic surveying in urban settings, this real-time processing option for the Geode/NZ seismograph could be just what you’ve been looking for. Call Geometrics today to find out how the PRS-1 can improve your productivity.

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