

Vibration from construction activities such as blasting, rock excavation, general excavation, pile driving, and tunneling can lead to property damage, litigation, project delays, and increased costs. Automated vibration monitoring provides a reliable and cost-effective way to control for excessive vibrations, protecting project owners, construction companies, and nearby properties.



Automated vibration monitoring helps prevent property damage and litigation.

Monitoring Construction Vibration

Construction activities generate ground vibrations that propagate outward in waves, causing particle motion at the wavefronts. The velocity and frequency of particle motion are the basis for most regulatory limits.

Monitoring Equipment: Essential components include a triaxial geophone to sense particle motion; a vibration monitor, also called a seismograph, to record and process signals from the geophone; and software to produce compliance reports.

Additional hardware and services, such as weatherproof enclosures, solar panels, wireless data retrieval, smartphone alerts, and automated reports, can increase the efficiency and reduce the cost of monitoring.

The Monitoring Process: The vibration monitor samples the three channels of the triaxial geophone continuously, checking incoming values against limit thresholds.

At regular intervals, the monitor stores the peak particle velocity (PPV) value for each channel. These values are used to generate a histogram report later. If any incoming value exceeds the limit threshold, the monitor records all of the incoming values for a few seconds. These values are used to generate a waveform report.

Alerts: Any exceedance of the limit thresholds should generate an alert so that site engineers can take mitigating actions to bring vibrations within regulatory limits.

Compliance Reports: Histograms are used to demonstrate that the site has been actively monitored and that vibration levels have stayed within regulatory limits. Waveform reports show the distribution of velocities and frequencies during exceedance events and are used for further analysis of the events.

Advantages of Automation

Automated Vibration Monitoring is a rental service from GEO-Instruments that provides reliable, cost-effective monitoring.

Unattended Monitoring: Automated systems can record, process, alert, and report without the presence of an operator. This autonomous operation provides significant cost savings.

Protected and Powered: Automated systems are supplied in weatherproof enclosures with larger batteries and solar or AC charging. They can stay on site and on line for long periods of time. Manual monitors must be retrieved nightly for protection and battery charging.

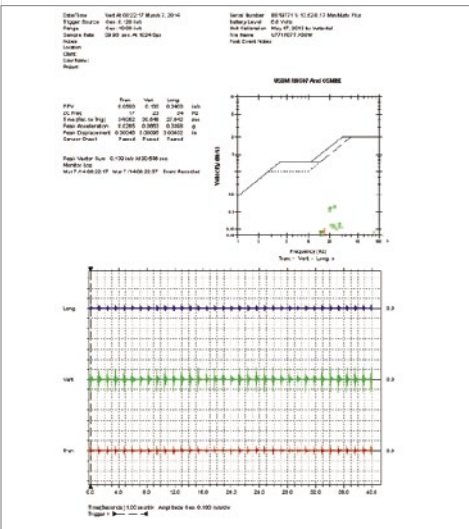
Automated Data Transfers: Automated systems send data off site for processing at regular intervals. Manual systems require hands-on data management, which typically delays processing until the end of the day.

Timely Alerts: Automated systems send alerts to smartphones and PCs when an exceedance event occurs. They also support on-site alarm units. Manual systems cannot send alerts.

Automated Reports: Automated systems generate compliance reports at specified intervals. This saves time, eliminates complicated workflows, and frees staff for less repetitive work. Reports can be customized to the client's requirements.

Easy Access to Data: Automated systems store data and reports on a secure server, ensuring that compliance records are safe and complete. Reports are accessed easily by browsing to the password-protected project website.

Enhanced Safety: Automated systems provide safe, unattended monitoring in high-risk areas such as tunnels, railways, and crowded construction sites.



Waveform report from pile driving event



PVM – Portable AVM

The PVM adds the convenience of automation to a portable vibration monitor. The rental includes an InstanTel vibration monitor in a strong, weatherproof case, a triaxial geophone with 6 ft cable, a 15 Ah battery with charging regulator, a cell modem, an AC wall adaptor for charging, and automation services.

Monitoring Time: Approximately 5 days, depending on the environment.

Dimensions & Weight: 20 x 15 x 7 in, 26 lb.



AVM – Wall-Mounted AVM

The AVM is supplied in a lockable, weather-proof enclosure that can be mounted on a wall or pole. The rental includes an InstanTel vibration monitor, a triaxial geophone with 6 ft cable, a cell modem with external antenna, a 7 Ah battery, a charging regulator, an AC power adaptor, and automation services.

Monitoring Time: No limit to monitoring when battery is charged by AC line power.

Dimensions & Weight: 20 x 15 x 7 in, 29 lb.



Included Automation Services

- Continuous monitoring
- Cellular data service
- Automated data transfers
- Automated data processing
- Automated alert notifications
- Automated reports
- Secure data storage on project website
- Easy web access to data & reports



SVM - Solar AVM

The SVM is a self-standing AVM supplied with a lockable, weatherproof enclosure and a 35 watt shatterproof solar panel. The rental includes an InstanTel vibration monitor, a geophone with 6 ft cable, a cell modem with external antenna, a solar controller, a 35 Ah battery, and automation services.

Monitoring Time: The battery and solar panel can provide weeks of operation, depending on the environment.

Dimensions & Weight: 30 x 18 x 11 in, 80 lb.



RVM – Rugged AVM

The RVM provides power autonomy and heavy-duty protection. It features a 35 watt, shatterproof solar panel, two 100 Ah batteries, and a lockable steel enclosure. The rental also includes an InstanTel vibration monitor, a triaxial geophone with 6 ft cable, a cell modem with an external antenna, a solar controller, and automation services.

Monitoring Time: Weeks or months of operation, depending on the environment.

Dimensions & Weight: 31 x 21 x 18 in, 250 lb.



Optional Equipment

- **On-site alarm unit:** Shown above on a PVM, this weatherproof unit activates its strobe and siren when triggered by the vibration monitor. Includes relay, connecting cable, and magnetic and screw mounting brackets.
- Air-overpressure microphones
- Sound level microphones
- Specialized geophones
- Extension cables for geophones and microphones.

