

Advanced Solutions for Mining Noise & Vibration Monitoring & Exposure

- Manage & Analyze Your Own Data
- Prevent Costly Injuries



 **LARSON DAVIS**
A PCB PIEZOTRONICS DIV.



Semi-permanent

SoundAdvisor Kit Model NMS044

- Network access 24 / 7
- Control via web browser
- Receive real-time alerts
- AC or solar powered
- Own your measurement data
- Weather monitoring available



Portable

NoiseTutor NMS

- Medium term: 2 wks - 2 yrs
- Web publishing & email/SMS alerts
- Event sound recording available
- AC/DC power options



SoundExpert® LxT NMS

- Short term: 2 weeks continuous battery power
- Lightweight, compact & affordable
- D-cell battery pack



Mining Noise Monitoring Solutions

The management of noise from mining operations is recognized as a fundamental responsibility of the mining industry. Implementing a noise management system that includes noise surveys, day and night noise mitigation, and some level of noise monitoring is a primary function that is required to meet environmental impact standards in most locations.

Some potential noise sources within a mining operation include: vehicles such as scrapers, dozers, excavators, and trucks; fixed equipment such as conveyors and crushers; and blasting of rock and ore.

Larson Davis provides a complete suite of noise monitoring options that allows each operation to easily implement their own noise monitoring solution. **Own your data and take full control of the Noise Management Plan. No subscription necessary.** Each mine can develop practical mitigation solutions that are acceptable to the mining company, demonstrating that they effectively meet regulatory and community expectations.

With Larson Davis monitoring solutions, you can:

- Survey your operations
- Evaluate your compliance to regulations and standards
- Evaluate your mitigation efforts
- Continuously monitor your noise to confirm compliance
- Receive "alerts" for implementing immediate countermeasures
- Record sound file for noise source identification
- Publish noise measurements and sounds online for remote viewing

Hand-held

SoundAdvisor Model 831C

- Easy setup & download
- Web-based controls
- Data on demand
- Flexible integration
- LCD color interface

SoundExpert LxT

- Time history logging
- 1/1 and 1/3 octave bands
- Community noise metrics



Managing Your Community Noise

Community noise complaints can lead to costly regulatory investigations and requirements for operational limitations and constraints. Larson Davis monitoring systems allow a mining operation to gather detailed data and sound recordings that can be used for addressing community concerns and perceptions. The data can be shared with communities and sound events can be listened to and correlated with complaints to identify sources. **By proactively managing your community noise perception you can avoid costly delays and unnecessary countermeasures.**



Occupational Safety: Noise and Vibration Exposure in Mines

Noise and vibration will always be present in a mining operation and it can potentially create a negative impact on worker health. Therefore, it is very important to have an accurate understanding of worker exposure in order to ensure a healthy working environment, develop the appropriate safety procedures, and comply with regulations.

Mining Noise Exposure

In the mining industry, noise exposure is prevalent in all areas of the operation: surface, processing plants, and underground. The negative impact of exposure to this noise can include hearing damage, interference with speech and audible warning signals, and physical nuisance such as irritability, fatigue, and circulatory effects. Most mining operations are governed by local safety regulations that require actions to be taken based upon the dose level of noise that a miner experiences. Mine Safety and Health Administration (MSHA) for example, has three levels of noise exposure where corrective actions are required. These are the AL – Action Level, PEL – Permissible Exposure Level, and DHPL – Dual Hearing Protection Level, all of which can be monitored by Larson Davis dosimeters and sound level meters.

Larson Davis Noise Dosimeters

Larson Davis provides the Spark® series noise dosimeters that are very rugged, reliable, affordable, and tamper-proof and they measure to the applicable IEC and ANSI standards. These dosimeters are used to monitor and measure noise levels over time and then determine the dose that a miner experiences. This instrument includes a microphone that is worn on the shoulder by the miner, and it generally collects noise data for the entire work shift. This data can then be downloaded into the Larson Davis Blaze® software via USB, serial, or an IR connection and one can easily prepare reports and presentations.

Larson Davis SoundTrack LxT Sound Level Meter for Industrial Hygiene

Personal hearing protection (PHP) is an often-used countermeasure for noise exposure in mines. However, industrial hygiene and safety practices suggest that engineering approaches to noise control combined with administrative controls should be the primary methods to limit exposure. The Soundtrack LxT sound level meter is a tool to conduct engineering studies to determine noise doses, analyze the frequency content of the noise sources, and to evaluate the mitigation plans that are put into effect for reduced noise exposure.



Mining Vibration Exposure

Vibration in mining-related workplaces is created by the operation of tools and plant machinery. Different parts of the human body have resonances and as you would expect, vibration at a resonant frequency is especially disturbing. As the transmissibility of vibration to an operator increases in amplitude or duration, it can cause annoyance, fatigue and, at higher exposures, a risk of injury.

Excessive vibration exposure through your hands can cause carpal tunnel syndrome or hand arm vibration syndrome (HAVS). These issues can be very disabling as they affects the nerves, blood vessels, muscles and joints of the fingers, wrist, and arm.

Human vibration in the workplace is categorized in two ways:

- Whole-body vibration (WBV) where the transmission is from the source through the feet or the buttock and into the body.
- Hand-arm vibration (HAV) where transmission is through the hands and arms when using vibrating tools.

Larson Davis Human Vibration Meter

Larson Davis Human Vibration Meter (HVM200) is well suited to the mining industry for measuring whole-body and hand-arm vibration and calculating exposure metrics. This device is used with a miniature accelerometer that can be mounted using various handle and seat adapters available with the HVM200. Using the Larson Davis G4 software, the operator can gather, manage, graph, and report the vibration exposure data.



Model HVM200
Human Vibration Meter

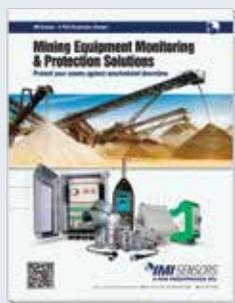


Audiometer Calibration

In most countries, mining regulations require that audiometric tests be routinely performed on the worker. There are specific requirements for conducting baseline audiograms, annual audiograms, and revised baseline audiograms for miners enrolled in a hearing conservation program.

The audiometer is an important tool for audiologists. Its accuracy determines the effectiveness of the noise conservation programs as it evaluates a miner's baseline hearing and the change in the miner's hearing over time, at different frequencies.

To ensure audiometer accuracy, calibration is generally required on an annual basis. Larson Davis supplies a complete Model 824 Audiometric Calibration System, including a full line of artificial ear couplers, accessories, and software to reliably calibrate audiometer performance.



For our complete line of mining sensors to monitor and protect your facility, request our **Mining Equipment Monitoring & Protection Solutions** brochure, or contact our MSHA certified Application Engineers.



pcb.com/mining



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Larson Davis offers a full line of noise and vibration measurement instrumentation such as Class 1 and 2 sound level meters, outdoor noise monitoring systems, personal noise dosimeters, human vibration meters, audiometric calibration systems, microphones and preamplifiers, and data analysis software. Instrumentation is used in community and environmental noise monitoring, measurement of building acoustics, managing worker exposure to noise and vibration, and various automotive, aerospace, and industrial applications. Larson Davis is a division of PCB Piezotronics, Inc., a wholly owned subsidiary of MTS Systems Corporation. Visit Larson Davis at www.larsondavis.com. Additional information on MTS can be found at www.mts.com.