Hearing Loss

Whitepaper: Calling an Audible: Use Battery-Powered Equipment to Reduce Noise and Vibration

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As any construction worker can tell you, there's a difference between sound and noise. "Sound" is a vibration that you can hear. "Noise" is excessive sound that causes injuries, especially when it relentlessly screeches, pounds, echoes, and clatters across a jobsite.

Hearing loss from excessive noise is the most common work-related injury in the US, according to the Centers for Disease Control. The loss is permanent. Surgery and hearing aids can't restore full hearing after injuries damage the hairs and nerve endings in the inner ear.

The most recent results from a National Institute for Occupational Safety and Health (NIOSH) database study indicated that construction workers have the highest prevalence of hearing loss of any industry, outside of mining. This hearing loss continues to increase with age. Findings from the Building Trades National Medical Screening Program (BTMed), which examined construction workers with an average of more than 20 years of occupational exposure, show that over 58% of construction workers examined had hearing impairment.[1]

About 22 million workers are exposed to hazardous noise levels each year, according to NIOSH. Hearing damage can occur with long-term exposure to loud noises, or from an ear-splitting blast of noise that can burst an eardrum. Individuals might not notice the effects of cumulative exposure to noise over long periods of time. Noise that is just 2 to 3 decibels louder than normal can be easy for individuals to accept. Often, it isn't noticed in time to prevent hearing loss.

In daily life, decibel levels range upward from leaves rustling at 20 decibels to dangerous levels, as shown on the Decibel Sound Scale chart. The Occupational Safety and Health Administration (OSHA) requires employers to implement a worksite hearing conservation program when noise exposure is at or above 85 decibels averaged over 8 working hours.[3]

In addition to hearing loss, loud noise also can create physical and psychological stress; some studies link it to high blood pressure, cholesterol, and depression. Noise also affects concentration and sleep, which reduces productivity.

Solutions to prevent occupational hearing loss include using quieter machines, such as battery-powered equipment that operates at lower decibels. Other tactics: Isolate or encase the noise source, limit worker exposure, and use Personal Protective Equipment (PPE).

Jobsite vibration risks

The risk of harm from vibration, for which there is no OSHA standard, depends on intensity, frequency, and length of exposure. While excessive sound vibrations can injure the ears through noise, other vibrations affect the entire body. Whole-body vibration can bring symptoms like back pain or shakiness, experienced after a long car or boat trip, or after operating heavy equipment, including bulldozers and backhoes.

> ### Putting a human face on hearing loss:
>
> "Matt," a valued skilled trades worker for 15 years, noticed more conversations sounded muffled or faded out. Music on his truck radio became a hum with no lyrics. Matt had trouble hearing consonants in words; he could hear the "a" in "safe" but not the "f." Often frustrated, he had to ask co-workers to speak slower, clearer, and louder. Gradually, Matt withdrew from social conversations on crew breaks because he didn't want to misunderstand and give wrong answers. Background noise, a frequent jobsite condition, made it harder for him to follow single conversations.[2]

Skilled trades workers suffer localized Hand-Arm Vibration Syndrome (HAVS), when vibrations gradually cause permanent changes in tendons, muscles, bones, and joints. A well-known disorder from HAVS is "Vibration-Induced White Finger," or "Raynaud's disease," which causes fingers and toes to feel numb and cold in response to temperatures or stress. In Raynaud's disease, smaller arteries that supply blood to the skin become narrow, limiting blood flow to affected areas.

Here's what Raynaud's disease can feel like:

"Dave" operated a jackhammer at work for years. When he was diagnosed with Raynaud's disease, he adopted new daily habits to help prevent attacks. Dave learned to keep his hands warm and dry, monitoring thermostats and frequently rubbing his hands together. He worked on deep breathing and aerobic exercise to reduce tension, as anxiety or stress can cause an attack without any drop in air temperature. Dave made sure to have dry hair and skin when he left the gym, because sweat that cools on the skin can trigger an attack. Despite his best efforts, attacks occurred. Dave's fingers turned white and then blue due to lack of blood flow. His fingers felt cold, pain, and numbness similar to when extremities "fall asleep." When blood flow returned, Dave's fingers turned bright red and the skin felt warm.[4]

HAVS also has been linked to carpal tunnel syndrome, tingling, loss of sensation in the fingers, loss of light touch, bone cysts in fingers and wrists, pain, and cold sensations in-between attacks. Medication and surgery are sometimes required. In the most severe cases, gangrene can occur.

To prevent vibration injury, experts recommend that employers purchase equipment with lower vibration, monitor their workers, and educate users on HAVS. Workers are advised to wear PPE, reduce the hours of exposure, and not apply excessive force on the tool.

Avoid injuries

The good news is that injuries from noise and vibration, while permanent and progressive, are also

preventable.

What can bring improved safety? A new way of working on jobsites.

Today, power is being redefined because equipment is being redefined. With combustion engines, noise levels increase with engine size, leading some to believe the myth: “noise equals power.” However, power today performs on sleeker platforms, with the proof in results, not noise. For instance, global computerized data centers accomplish “silent running” on a massive scale. Lithium-ion batteries propel machines, from cars to tools and light equipment, with reduced vibration and noise.

In addition, today’s crews have a new mindset and expectations. They realize traditional risks, including from noise and vibrations, are addressable on a jobsite. In one example, Koetter Construction tried MX FUEL™ battery-powered light equipment in the field for several months. Koetter is one of the largest full-service, design-build general contractors and commercial developers in Southern Indiana and Greater Louisville, Kentucky. As a result of the field trial, Koetter crews realized the benefits of eliminating gas-powered equipment and its maintenance. “You don’t know what you don’t know,” Hardscape Manager Nick Moses said. “We accepted the problems but now we realize we don’t have to.”

It’s time to work in new and safer ways. Battery-operated equipment reduces harmful noise and vibrations, and offers user-driven solutions that supply safety, productivity, and ease of use.

> **"Everyone agrees: Workers need to return home each day just as healthy as when they arrived at work. This not only improves short-term health for valued workers but keeps a healthy workforce in place to stay on the job longer. In September 2020, 83% of contractors reported moderate to high difficulty finding skilled workers, and it’s becoming more important than ever to keep workers on the job." 8**

Battery-powered solutions

The lower noise level of battery-powered solutions means users can communicate while they’re operating the tools, adding safety and productivity. The equipment eliminates gas engine vibration, adding to the safety and comfort of the worker.

Freedom from gas engines means no carbon monoxide emissions. Work can be done conveniently and safely in a confined space or enclosed area, adding more productivity. With no gas engines, there’s no mixing gas and oil, or maintenance. The push-button start provides instant power with no priming, choking, or pull-starting, even in cold weather.

Here are some new options to reduce vibration and noise:

- The **MX FUEL™ Breaker**, the world’s first cordless breaker, uses leaf springs to support the motor and gearcase inside the body of the tool. This design allows the tool to absorb vibration and use

the weight of the tool to its advantage, contrasting with the competitive set that uses springs in the handles. Since workers feel less vibration, they can use the Breaker for longer periods of demolition, adding productivity.

The Breaker has equal or greater impact energy and faster beats per minute vs. the competitive set, which allows it to work through material faster, with the lowest vibration in class. Using one XC battery, the Breaker delivers a 40-foot trench 1 foot wide and 6 inches deep, or two sidewalk slabs that measure 5 feet by 4 feet by 6 inches deep.

- The **MX FUEL™ Backpack Concrete Vibrator** cuts the noise of gas-powered competitors, reduces the vibration, and eliminates the emissions from a gas engine. For the operator, the equipment adds safety and comfort.

The Backpack Concrete Vibrator provides portability and a one-person operation ensuring aggregate is evenly distributed. The push-button activation reduces downtime, allowing users to get jobs done faster.

On one XC battery, the Backpack Concrete Vibrator can consolidate concrete 50 feet wide by 75 feet long by 6 inches deep – about 3,800 square feet. The Backpack Concrete Vibrator delivers the power to push up to 2½" heads at over 11,000 VPM for optimal consolidation, even in the stiffest concrete.

References

1 The Construction Chart Book: The U.S. Construction Industry and Its Workers, Sixth Edition, eChartBook. The Center for Construction Research and Training, CPWR. February 2018. Page 50.

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6 National Safety Council. *https://injuryfacts.nsc.org/work/costs/work-injury-costs/*

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8 US Chamber of Commerce Commercial Construction Index.
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