

Single-ear Hearing Loss: a Red Flag

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Recently CavCom has received questions from customers who are concerned about a significant hearing loss or standard threshold shift (STS) observed in only one ear. Is this common with occupational noise exposures? The answer is, well, not really. Single-ear hearing issues could be a warning sign.

First, let's be clear - no hearing loss is a good one. That said, a significant change in hearing in one ear (much more so in one ear than the other) is unusual. A high number of single-ear shifts in hearing among your workers is suspicious, especially if concentrated in one department or work group.

In most work environments, the ears are exposed to similar sound levels at the same time. Even if the noise appears to be coming from one side more often, most workers are moving their head/body throughout a day, and there isn't that much distance between our two ears after all. Most sound waves easily bend around the head to reach the other ear, especially in a reverberant environment. Although there is some discrepancy in the scientific literature, most well-controlled studies have shown hearing loss among noise-exposed workers to be fairly similar (symmetrical) between ears.

For these reasons, a significant difference between the ears indicates the need for special review and follow-up. Medical issues or injury to the head can cause one-sided hearing loss, ranging from mild to serious in nature. Some of the more common noise-related causes include:

- **Impulse noise sources such as gunfire, explosions.** Because of the high concentration of sound energy associated with gunfire or other impulse sounds (peaks may exceed 135 dB SPL), the sound pathway is often directional, and damage is concentrated on the nearer ear. Asymmetrical hearing loss in the nearer ear is well-documented for shooters (if rifle resting on shoulder for example) and for those exposed to other loud impulses.
- **Poor fitting hearing protector or failure to use hearing protector in one ear.** Ears come in different sizes and shapes, so each ear should be fit individually. Some users have more difficulty inserting an earplug correctly in one ear than the other. Worse yet, some workers mistakenly remove an earplug or one cup of an earmuff when experiencing trouble hearing in their surroundings. They may feel hearing protection makes it more difficult to hear their machine or people talking. This is often a misconception, but at the very least is a communication challenge in need of solving.
- **Single-ear earphones or headsets.** Because some headsets or earbuds exhibit uncontrolled outputs at high volume settings, it is possible that workers are receiving significant noise exposures from their communication devices. Another complication, listening with only one ear typically requires a higher volume level to achieve intelligibility. If the employee is wearing an unlimited headset or earbud in only one ear, or places a lapel speaker mic on one shoulder without adequate hearing protection, a single-ear shift in hearing may result.

Whenever a shift in hearing is noted, timely individual follow-up with that worker is essential. When patterns in hearing shifts are observed, an evaluation of the entire hearing conservation program is warranted. Best practices include:

- **Professional review/referral.** Medical/audiological evaluation should include a case-by-case evaluation to determine if an event/exposure in the workplace caused or contributed to the change in hearing and if medical follow-up is advised.
- **Individual counseling/re-training.** Take time to evaluate employee concerns or objections about using hearing protection. Address misconceptions and alleviate apprehensions about communicating safely in the workplace; provide solid communication solutions that meet needs of the job and complement other PPE. Employees should also be counseled about the potential effects of off-the-job noise exposure, such as hunting or recreational activities, and the need for protecting hearing at home as well as at work.
- **Fit Testing.** Individual fit testing of hearing protectors is a vital component of an effective hearing conservation program, not a luxury. Especially for those who have shown a shift in hearing, individual fit testing will provide insight into the amount of real-world protection received for that worker. Subtle differences in fit or insertion between the ears may be illuminated. Another major advantage is the opportunity to refit and retrain individual workers in real time, so they clearly see the result of proper fit and insertion of their own personal hearing protector.
- **Specifications for communication headsets.** In order to facilitate effective communication while at the same time protecting workers' hearing, communication headsets or earsets must be carefully vetted. Insist on the following key specifications to achieve your goals:
 - **Effective hearing protection.** Require devices that sufficiently attenuate or block workplace noise; a good seal of the ear canal is essential. For best results, look for a microphone and/or receiver integrated into the hearing protector so that signals are delivered directly to the ear while simultaneously blocking outside noise.
 - **Binaural (both ear) listening.** Binaural listening provides a significant advantage over monaural (one ear) listening. The human auditory system is designed to work most effectively with input from both ears. The brain processes and compares signals from each ear for localization, understanding speech, and separating speech from background noise. As a result, signals such as radio transmissions do not need to be as loud if a listener is using both ears. The practical result of this phenomenon is that comfortable, and most importantly, SAFER volume settings are possible if using a binaural earset compared to one with a single-ear listening configuration. Preferred listening levels are typically 3-6 dB lower when using both ears, a significant and important advantage of binaural devices.
 - **Volume-limited outputs.** Whether a worker is in low or high noise areas, it is important that signals delivered to the ear do not add to noise exposure on the job. When purchasing a communication headset for any employee, make sure the device has an electronic feature to limit outputs to safer levels. And again, a binaural listening configuration allows most users to choose a lower, safer, listening level than would be possible with a monaural system.

At CavCom, we are committed to customizing solutions for your most difficult listening challenges. Don't hesitate to [contact us](#) if we can be of assistance with your communication systems and your hearing conservation program.

To learn more:

- Cavcom SoundBytes. [Effective 2-way communication.](#)
- Cavcom SoundBytes. [Non-occupational noise.](#)
- Cavcom SoundBytes. [The NRR - What's in a number?](#)
- Dobie, Robert (2014). Does occupational noise cause asymmetric hearing loss? *Ear & Hearing*, Vol 35(5).

- Masterson et al. (2016). Asymmetrical hearing loss in cases of industrial noise exposure: a systematic review of the literature, *Otology & Neurotology*, Vol 37.