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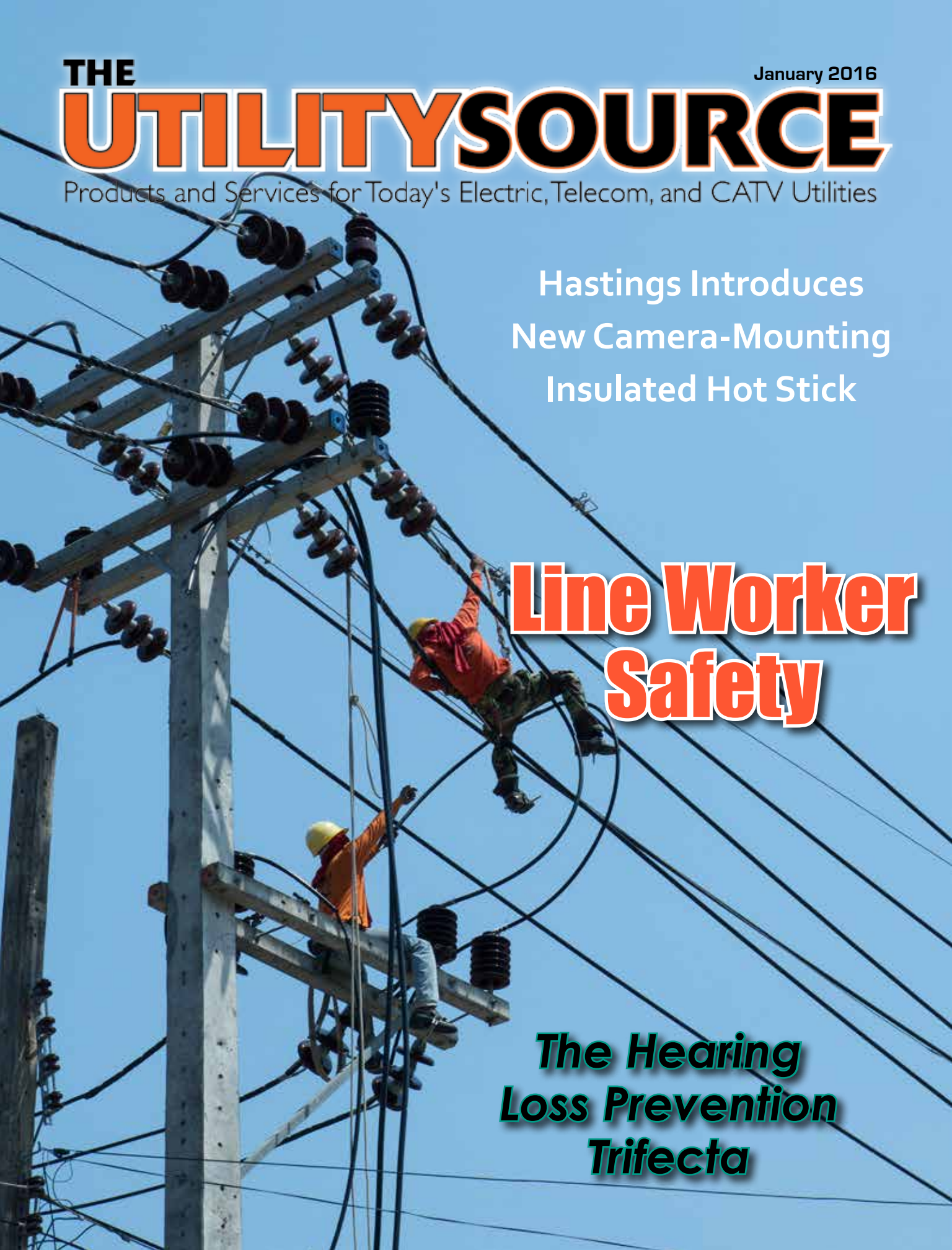
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# The Hearing Loss Prevention Trifecta:

## *Fit, Comfort and Communication While Wearing*

By Del Williams

At least four million workers go to work each day in damaging noise, ten million people in the U.S. have a noise-related hearing loss, and twenty-two million workers are exposed to potentially damaging noise each year, according to the Centers for Disease Control and Prevention (CDC).

Occupational hearing loss is the most commonly recorded occupational illness in manufacturing accounting for 1 in 9 recordable illnesses, states the Bureau of Labor Statistics, as cited in a 2010 CDC National Institute for Occupational Safety and Health (NIOSH) document. Although a traumatic noise exposure may cause an immediate hearing loss in some cases, most occupational hearing losses occur so gradually that workers are unaware they are losing their hearing, adds the document. With continued exposure, the hearing loss spreads into those frequencies most needed to understand speech.

In many workplaces, disposable foam earplugs are traditionally used to block noise. However, their effectiveness depends not only on proper fit, and the matching of the protector to their particular ear but also on compliance – that is, whether workers wear them consistently and correctly place them in their ears.

“Most people wear disposable foam earplugs incorrectly, which limits their effectiveness,” says John Franks, PhD, a former NIOSH Hearing Loss Prevention Section Chief. “Each foam earplug is supposed to be rolled tightly, put deep in your ear canal, then held in place with your index finger until it fully expands and you can just see the outer edge. Instead, most people leave them hanging out of their ears.”

Another challenge occurs when workers must talk in person or via two-way radio in high-noise work environments. To hear and communicate, they remove their earplugs, which exposes them to damaging noise for the duration of the conversation. Such cumulative exposure to harmful workplace noise is a leading cause of hearing loss.

“People commonly remove earplugs to carry on a conversation,” says Franks. “But if they remove them 20% of the time, they have reduced their effectiveness by half.”

Essentially what is required to optimally protect workers is a hearing loss prevention trifecta: a device that delivers the proper fit, maximum comfort, and the ability to communicate verbally or over radios without having to remove it.

To tackle the severe occupational hearing loss problem, it is helpful to consider the ideal solution, which requires allowing for all three factors.

First, an ideal hearing protection device would be customized to meet the needs of every employee or worker on the floor. That means fitting all ears regardless of differences in size, shape, or depth. Like snowflakes, no two ears are the same – and they continue to grow throughout a person’s lifetime – so there is no such thing as one-size-fits-all when it comes to hearing protection. With better fit and comfort, workers would wear the devices more compliantly.

Second, the hearing loss prevention device would prevent high-noise sounds from entering the ear at levels that could cause instant damage or damage over time.

“NIOSH recommends reducing worker noise exposure to 85 dB for eight hours, but this can still leave 12-15% with hearing loss over their work lives,” says Franks.

Third, the device would prevent high-noise exposure with-



out limiting communication, and could be worn all day. In this way, the worker could simply wear it the entire workday, which would eliminate the hearing damage that occurs when typical earplugs are removed in high-decibel work settings to communicate.

Fortunately, a new generation of occupational hearing protection has been designed with the trifecta of custom fit, comfort and ability to communicate while wearing.

### Custom Fit

Unlike one-size-fits-most disposable earplugs, some cost-effective hearing protectors are fitted to the individual worker so every worker receives the same high level of hearing protection.

“If you make custom hearing protection available for everyone and ensure people know how to use it, studies have shown it can reduce occupational hearing loss to near zero in industry,” says Franks.

Such custom hearing protection can be rendered quickly and cost-efficiently in an industrial setting.

For instance, Custom Protect Ear ([www.protectear.com](http://www.protectear.com)), the largest personalized industrial hearing protector manufacturer in North America, custom molds hearing protection, such as its dB Blockers product line, to each worker’s ear. The company’s representatives go to the plant to take impressions of each worker’s ear canal and outer ear in a process that usually takes about ten minutes per worker.

The custom impression is sent to the lab for processing where the device, which is an exact replica of the wearer’s ear canal and outer ear, is manufactured. This ensures the device seals the ear both in the canal and around the ear, preventing damaging noise from entering while eliminating ear pressure. The company is increasing such precision by scanning the ear impression and is moving into 3D printing of the casting for even closer fit. Company representatives then return to the plant to train workers on how to ensure proper fit and fix any that do not fit perfectly.

“A custom hearing protector fit is a key part of preventing occupational hearing loss because everyone’s outer ear and ear canal is unique,” says Franks. “The closer the fit, the better the function and the less people take them out to relieve ear pressure or modify them as is common with disposable foam earplugs.”

### Comfort and Compliance

Since Custom Protect Ear’s hearing protection devices are made of a medical grade silicone, they are designed to be soft and flexible. The advantage of the softer devices is better comfort and function. They change shape slightly as the wearer’s ear canal changes shape when talking or chewing, thereby continuing to seal during those activities.

“While various silicone-based hearing protectors exist, it is important to use one made of medical grade silicone,” says Franks. “This can help ensure that it is sufficiently supple and can prevent someone from developing an allergy to it.”

Greater comfort addresses a significant problem facing health and safety managers who oversee hearing loss prevention programs: getting people to wear hearing protection products and policing their use.



Improved comfort enhances workers’ ability to comply with wearing hearing protection for extended periods, and so do certain design aspects. Since they are custom molded, they only fit the correct way like a key fits a lock so it is not necessary to check insertion. When improperly inserted, discomfort encourages workers to correct insertion. Checking for compliance is also simplified because the hearing protector’s colored exterior makes it easy for safety officers to see at a glance if workers are wearing them.

### Communication Without Removing Device

Since workers often need to communicate in person during their work shift, they typically remove disposable earplugs to talk. To prevent occupational hearing loss, it can be important to provide custom hearing protectors that can be worn the entire work shift without removal.

Including a filter and vent in custom ear protectors like Custom Protect Ear’s can make speech more understandable by reducing attenuation at higher speech frequencies. This allows leaving them in while talking, and isn’t possible with typical solid foam earplugs.

Talking by two-way radio is also common in workplace settings. But because a radio must be louder than background noise for a worker to hear it, it usually is the loudest sound source in the work setting, which must be protected against to avoid hearing loss.

To deal with this problem, Custom Protect Ear connects incoming radio audio to the outside of the hearing protector so the device’s filter reduces dB volume and the worker does not have to remove the hearing protector during his or her shift. Because the proprietary filters “squeeze” high and low frequencies to block potentially harmful sound waves, communication comes through, but harmful noise does not.

For robust hearing protection both in person and via radio, the company offers a convertible hearing loss protector. This provides the convenience of a detachable cord and a filtered vent for interpersonal communication, and attaches easily to various radio cords for seamless integration with radios.

“If you’re using a radio to communicate, it is better to run a tube from the radio receiver to the custom hearing protector so workers can lower radio volume and protect their hearing,” says Franks.

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[www.protectear.com](http://www.protectear.com) •