



Hearing Loss

Hearing Conservation: Fit Testing For Heavy Fabrication

Theresa Schulz | Jul 24, 2017

Fit testing advances hearing protection at the steel mill: even the best earplugs won't work — if they're not properly worn.

Even the best hearing protector won't work if it's not properly worn. That's the lesson learned at a mid-Atlantic steel manufacturer that sought to expand its worker hearing conservation efforts. Making steel is not exactly a quiet business. Like at other mill complexes, the ambient noise levels at the site are often high. Localized levels can reach 105 decibels (dBA) in areas where 6 ft circular saws cut steel beams, or even 106 dBA near the electric arc furnaces.

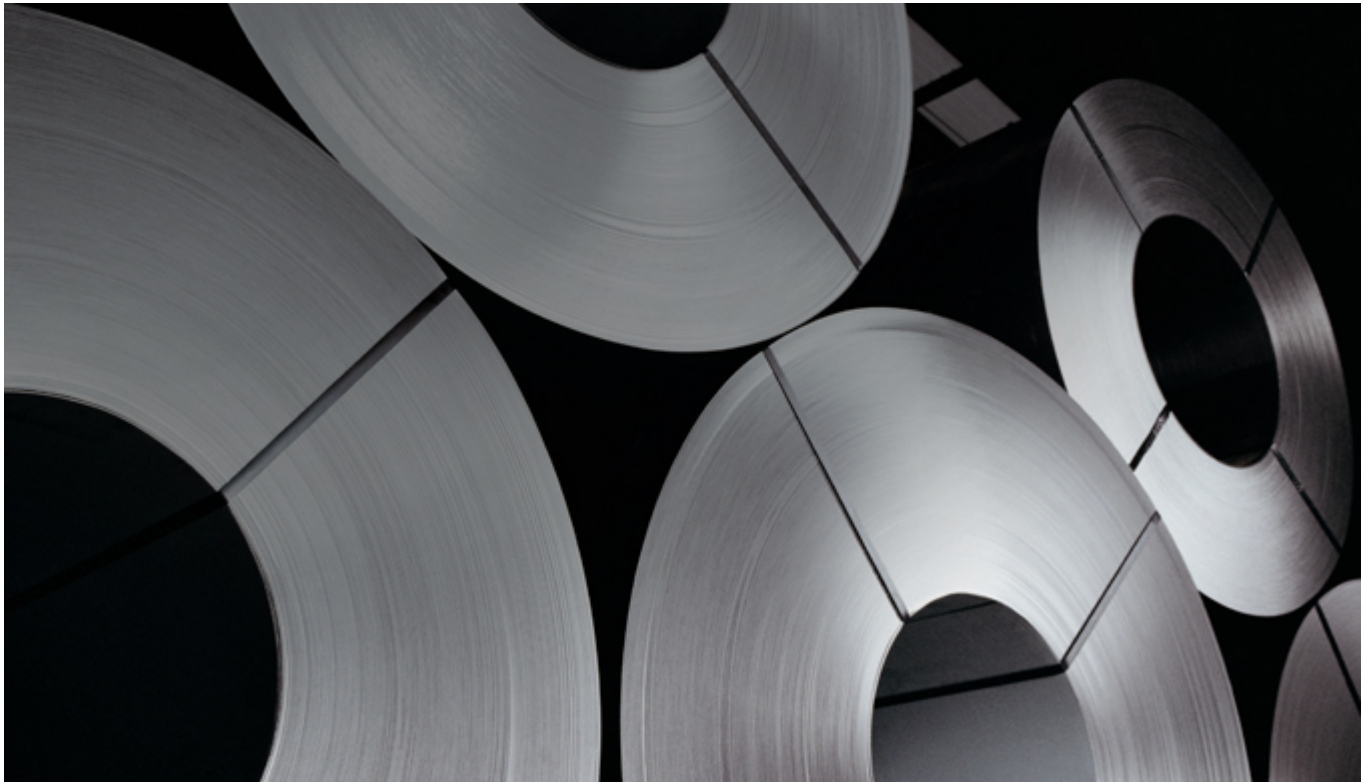
Mill management had a longstanding commitment to worker safety, including protecting their workers from Noise-induced Hearing Loss (NIHL). In fact, the mill required hearing protection for all employees entering the factory, regardless of reason or location. Moreover, the company provided more than a dozen types of earplugs, from a variety of personal protection equipment (PPE) providers, to meet the specific needs of various job environments as well as to satisfy the wants of individual workers.

Yet, it was difficult for the site's safety manager to get a true assessment of hearing protection effectiveness. While the earplugs they were distributing to workers carried a Noise Reduction Rating

(NRR) on the package, no one was actually sure if an individual was achieving the proper protection they needed. Rating methods for the published NRR are based on idealized conditions within a laboratory setting. Industry derating schemes which took this into account generally produced as much confusion as help — and still only provided blind estimates of protection levels, not true measurements of real-world protection.

The NRR is an estimate of how much attenuation a hearing protector might provide some workers under ideal conditions, not a predictor of how much protection a given individual will achieve. Whether a worker actually achieves the rating on the package depends mostly upon proper fit, but also things like proper sizing, and the unique anatomy of the user's ear canal. In all likelihood, some workers were protected and others were not. In other words, on the mill floor, when it came to hearing protection, it was YMMV — “your mileage may vary.” In terms of worker safety, however, that variability is never acceptable. Ultimately the workers were risking hearing loss, while the factory was risking liability for claims and potential regulatory citations.

The problem was how to determine if a worker was actually benefitting from optimal real-world attenuation for their noise environment. The answer turned out to be earplug fit-testing technology that measures real-world protection levels.



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THE FIT TESTING SOLUTION

Unlike a threshold-based hearing test, that measures the softest level at which a listener can hear a tone, one of the leading fit-testing systems uses a relative measurement of hearing level. The loudness of a tone in one ear is balanced to a tone in the opposite ear at a known level. This unique “loudness-balance” method allows an accurate test of earplug fit in background noise levels common to lunchrooms or breakrooms— a sound booth is not required for valid testing. Via the software's user-friendly interface, a tester can determine the actual attenuation provided by the earplug for a specific employee. This measure is called the Personal Attenuation Rating (PAR) and is the amount of noise being blocked by that earplug for that specific employee.

According to the safety manager, “we saw immediately that the new fit-testing technology should give us a tool to determine which earplugs offered the best protection for each individual.” After acquiring a fit-testing system, the steel mill began offering earplug fit tests to all its employees on a rolling basis as

part of mandated annual training. Everyone, including office workers, is enrolled in the site's Hearing Conservation Program. If a worker has any sign of a progressing hearing loss (such as a Standard Threshold Shift, or STS), they are required to undergo fit-testing; otherwise, it's optional.

The test is first administered with the employee's favored earplugs inserted and fit just the way they are normally worn by the employee. If results show that suitable attenuation isn't achieved, the session continues while the employee adjusts the fit or tries other models of earplugs, until retesting shows satisfactory results. It's not unusual for half of the workers to initially show inadequate protection levels on their first test. Coaching is provided via videos included in the software, as well as hands-on instruction. The site policy mandates that workers in nearly all areas must achieve a minimum of 30 dB of attenuation from their chosen hearing protectors.

With the fit-testing system, the safety manager — and the workers — received immediate feedback. Unlike other training, a fit test gives an individual a true indication of what protection he's getting with that particular earplug. The training also demonstrates the importance of proper protection in the workplace, and helps workers select and compare protectors to find the best choice for their ears and specific applications. Studies have determined that the most influential factor in achieving good attenuation from an earplug is individual training. Individual fittesting provided that training, and the employees were happy to find out which earplugs, fitted in which way, actually work for them.

For the safety manager and mill management, fit testing provides an array of benefits. First and foremost, it determines whether employees receive optimal protection for their environment, require additional training on earplug fit, or should try a different model. Also important, fit testing provides a level of documentation that has been unavailable to Hearing Conservation programs in the past. Instead of relying upon published NRRs of estimated protection, fit testing provides real measurements of actual protection, just the way the worker normally wears the earplugs. Such documentation provides a benchmark to assess a Hearing Conservation Program's overall effectiveness.

Not only does a fit-testing system fulfill regulatory requirements for training with documented results, but it also proves to be an invaluable resource in reducing compensation claims for NIHL at the worksite. Proper fit-testing records can help document that effective steps were taken to select appropriate hearing protectors, train workers in their proper use, and to document an adequate fit with a particular protector — all critical steps in stopping noise-induced hearing loss at the workplace.