

NOISE INDUCED HEARING LOSS THE NEW ASBESTOS





Could noise induced hearing loss (NIHL) be the new asbestos?

What we are learning about the long term effects of NIHL suggests this is possible. What you thought you knew about hearing protection may no longer be enough.

Although noise regulations currently remain unchanged since the 2005 Control of Noise at Work Regulations, the world has moved on dramatically.

We now know that the risks associated with noise are far greater than previously thought.

We can now monitor and protect hearing intelligently and to a deeper, more complex level.

And critically, HSE are preparing to re-appraise those 2005 regulations, to ensure that we are all fully engaged and compliant with modern hearing protection expertise, with the launch of a major programme of hearing safety inspections.

Are you sure you are compliant?





The changes since 2005:

1. Technological ability has increased exponentially.

Effectively mitigating the risk of Noise Induced Hearing Loss (NIHL) has changed beyond recognition. In 1985 the legal position for an employer was that they did all that was 'reasonably practical' to protect employees from noise exposure¹. But what was 'reasonably practical' with available technology at that time has now revolutionised – simply providing basic foam earplugs is no longer enough.

2. Moral Obligation - The damage is worse than we thought. .

Research into the effects of hearing loss means that we now know far more about the damage caused by excess noise, not only on the ear but the brain too. And we understand far more of the health and social ramifications.

3. Compliance - Your current provision could be outdated.

In 2018 new PPE regulations came into effect, reclassifying harmful noise from Category 2 to Category 3ⁱⁱ 'causing risk of irreversible damage to health', categorised alongside falls from height, chainsaw cuts, or even bullet wounds. The change means that PPE is subject to additional layers of testing. A five-year grace period for products bought at that time ended in April 2023.

Technological ability and understanding of NIHL ramifications is expanding all the time. In this document we examine why employers are now under massively increased pressure to be morally as well as legally responsible for NIHL, and how they can achieve full compliance in ways which will benefit their whole business. We cover:

The HSE CUFF campaign:

The crusade to prevent an avalanche of NIHL cases, and how it will affect your business.

NIHL and the Path to Dementia:

Research shows increased proof of the link with cognitive decline, leaving staff anxious about their future and businesses worrying about the distinct possibility of future claims relating to dementia care.

Your legal responsibility in a changing landscape:

Following 2021 WHO hearing loss reclassifications⁽ⁱⁱⁱ⁾, a greater number of NIHL cases may now be registered at more severe levels. At the same time the government has created ways of fast-tracking claims. We examine your legal responsibilities and the realistic risk of increased legal action.

How your business can take control:

Groundbreaking technology has been developed to allow better immediate analysis and accounting of noise hazards, enabling businesses to take complete control of how noise affects their workers.



New HSE Initiative: **CUFF**

Increased understanding of NIHL has led the Health & Safety Executive (HSE) to take a greater interest in the technological developments available to prevent the problem.

A 5-year plan to investigate the issue and to understand how the regulations should be geared in future began with a regulatory sandbox to discover what could be done and is continuing with a series of inspections which will assess the state of protection in industry from NIHL.

The CUFF initiative provides a framework for assessing the suitability of hearing protection for the workforce, covering equipment choice and cultural change. HSE will go through the four pillars of this framework to analyse the problems the initiative aims to overcome, and how best they may be addressed and mitigated by duty holders.

Questions HSE aim to address, using the CUFF framework, are:

- Has there been training on fit?
- Are wear rates being maintained?
- Is hearing protection correctly specified due to concerns of over and under protection?
- Is the hearing protection being maintained?
- What controls are being recommended?
- Is there a Buy Quiet scheme in place?
- Is there a control action list?



C - Condition

Is the hearing protection in a good state of repair?

U - Use

Are the workers using hearing protection when it is needed?

F - Fit the ear

Is the hearing protection fitted or worn properly?

F - Fit for purpose

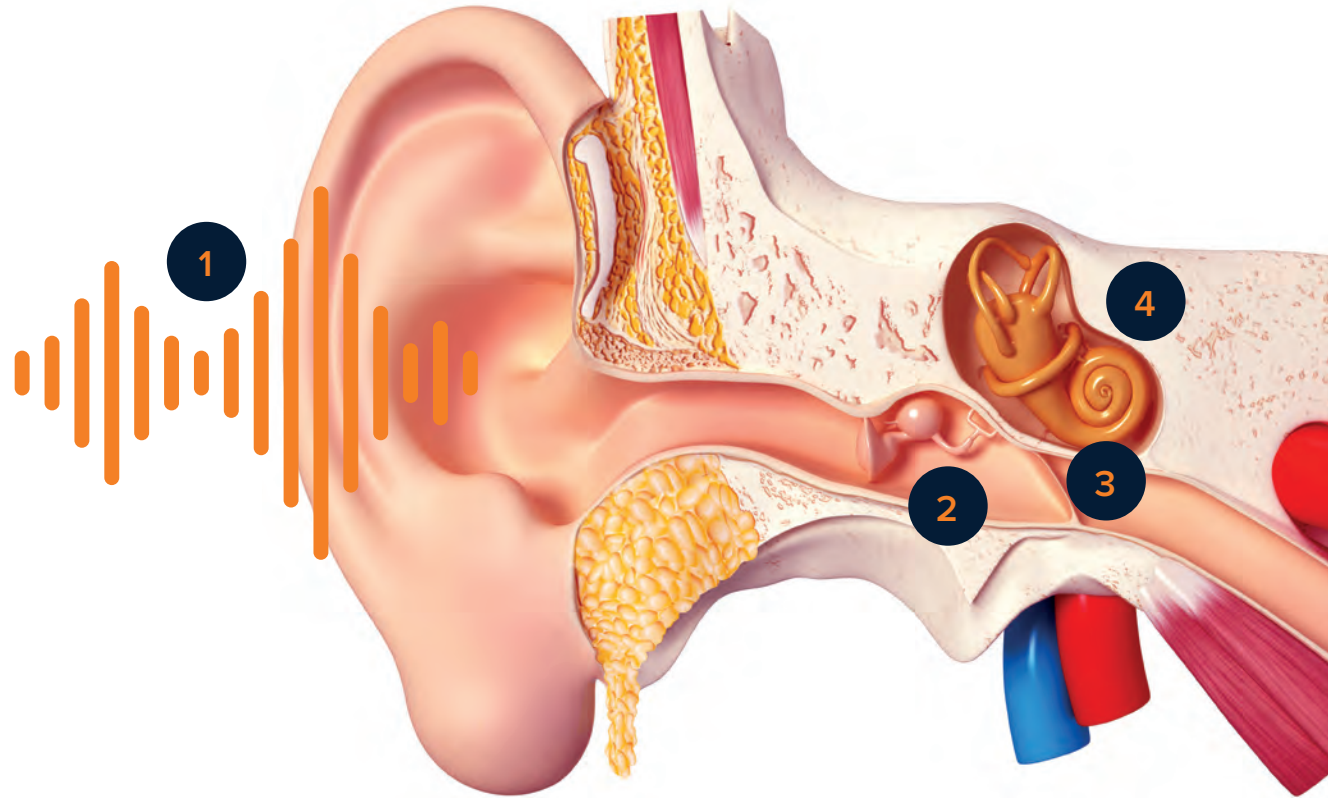
Has the hearing protection been correctly specified?



Understanding Noise Induced Hearing Loss

NIHL is a common, irreversible cause of sensorineural loss. To understand how this happens it is important to know some basics about how the auditory system works:

When sound waves reach the eardrum, they cause mechanical **vibrations (1)** which are passed through the **middle ear (2)** to **minute hair cells in the cochlea (3)**. This is effectively a technological centre for auditory processing, where the vibrations are translated into **nerve impulses**. These impulses are then transmitted to the brain's **auditory nerve (4)** via synapses and **neurons**.



The hair cells in the cochlea are what makes this conversion possible. These are the cells, along with the synapse and primary neurons which can be damaged by exposure to excess noise over time.

This may not be all.

Research published in Neurobiology of Disease in March 2023^{iv}, also suggests a physical link with Dementia. It claims excessive noise can cause neuroinflammation, similar to that seen in age related cognitive degeneration. Further research into this physical link is going on, including studies funded by the RNID, being carried out at the University of Northern Ontario^v.

Let's visualise this:

It takes surprisingly little noise to affect our hearing. This table shows how noises we might regard as ordinary every-day hazards can become dangerous. Compare these noises to those in your workplace, bearing in mind that the longer a loud noise is sustained, the more damage it will cause.

30 db	Whispered voice	Sounds at these levels generally cause no hearing damage.
40 db	Refrigerator hum	
60 db	Normal conversation	
70 db	Dishwasher	
85 db	Heavy city traffic, a crowded restaurant	Noises above 70 decibels over a prolonged period of time may start to harm your hearing.
95 db	Hair dryer, lawnmower	
100 db	Fork-lift truck, motorcycle	Loud noise above 120 decibels can cause immediate harm to your ears.
110 db	Chain saw, rock concert, hammer drill	
115 db	Sandblasting, pneumatic drill	
120 db	Ambulance siren	
140-165 db	Fireworks, firearms	Sounds at this level could immediately cause pain and ear injury.

It is estimated that approximately 16% of hearing loss in adults worldwide results from exposure to excessive noise in the workplace and is responsible for over 4 million disability adjusted life years^{vi}.

The British Safety Council estimates that 2.3 Million British workers are still working in harmful levels of noise^{vii}.

By the time that you notice your hearing is adversely affected, **the damage is already done.**



NIHL is permanent and incurable and has been recognised as an occupational disease since the 18th century.

Damage to your hearing is not only about the effect on what you can hear, but the ramifications of impaired communication on the rest of your life, including educational and job opportunities, social ability and emotional issues following a drop in self-esteem and confidence. All of these areas can affect your ability to work effectively.





Stress:

Excess noise triggers a stress response in the amygdala, a region of the brainstem. Stress has been implicated in the development of disorders of the cardiovascular system, sleep, learning, memory, motivation, problem-solving, aggression, and annoyance.



High Blood pressure:

Studies carried out in China in 2022 prove a link between NIHL and hypertension^{viii}.



Cardiovascular disease:

Stress factors caused by long term noise exposure promote vascular dysfunction and high blood pressure, elevating the risk of cardiovascular disease^x.



Tinnitus:

The first sign that hearing has been damaged. Tinnitus can affect mood, sleep and concentration, to the point where you may be unable to cope with normal activities.



Sleep disturbance:

Evidence shows that in addition to the effects of tinnitus, NIHL has a detrimental impact on sleep quality^{*}.



Balance issues:

The ear picks up subtle cues which help maintain stability which can be muted with hearing loss, leading to clumsiness and fall risk.



Depression:

Psychologists report that developing hearing loss in later life is an extremely disorientating experience^{xi}, requiring a huge adjustment. Sufferers often report an identity crisis, frequently experiencing extreme loneliness and depression.



Cognitive Decline & Dementia:

The loneliness and isolation resulting from hearing loss can lead to an increased risk of cognitive decline and dementia. A recent study of 82,000 men and women by Oxford University research^{xii} puts the increased risk of dementia at 91%. In recent research from John Hopkins^{xiii}, it was found that even moderate hearing loss tripled the risk of dementia.

NB. It should be noted that compensation lawyers are now including psychological damage as part of their claims against hearing loss in the workplace.^{xiv}

Will noise hazards be the next asbestos?

Noise induced hearing loss shows similarities to illnesses caused by asbestos in that they both often take years to manifest. Affected workers tend to claim damages for personal injury late in life after a considerable latency period. Despite the dangers of asbestos being known to employers since 1965, it wasn't until the 70s, 80s and 90s that the avalanche of claims began.

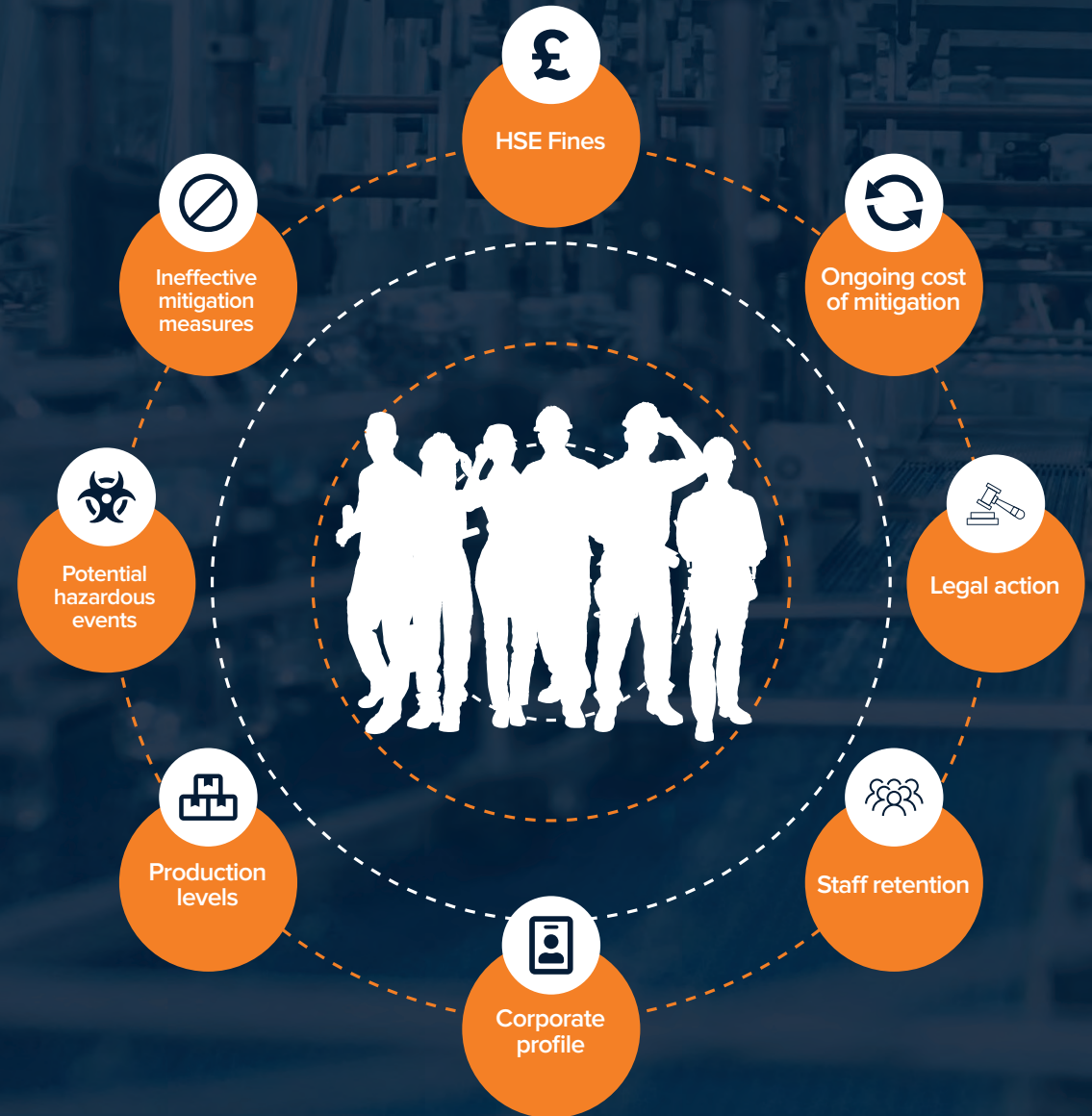
Only in recent years has the significant link between NIHL and Dementia been examined further and proven. Scientists are now researching possible evidence of inflammation in the auditory neurons similar to patterns seen in Alzheimers. Dementia care costs are an enormous burden to both family and state, (Laing Buisson's report into care for the elderly puts average costs at £1,053 per week^{xv} – that's nearly 55,000 per year). Will an avalanche of compensation claims for the long-term effects of NIHL be a logical next step?

The RNID reports that:

-  mild hearing loss **doubles** the risk of developing dementia
-  moderate hearing loss leads to **three times** the risk
-  severe hearing loss increases the risk **five times**



How does noise induced hearing loss affect my business?
The direct and indirect costs could be enormous:



HSE Fines:

Unlimited fines possible depending on the contravention and the date of occurrence^{xvi}. (Prosecutions brought by the HSE in the UK have a 94% conviction rate.)

Ongoing cost of mitigation:

Third party acoustic analysis costs, which allow only a snapshot in time and offer no ongoing auditable information.

Legal action:

New fixed recoverable costs will be introduced in October '23, however in extreme cases costs can reach well into six figure sums. Just this year an ex Royal Marine was compensated over £700,000 when the MoD were shown to have been negligent.

Staff retention:

Respect, recognition and remuneration are known to be the key factors in staff retention. Poor sound management shows a lack of respect for staff safety and wellbeing, at a time when the American company review website, over half of all companies are currently struggling to retain and recruit staff.

Corporate profile:

Non-compliance can also hurt business reputation, amongst investors, potential business partners and customers.

Production levels:

Poor health associated with exposure to noise is likely to increase the number of work days lost. Additionally, the ear picks up subtle cues which help maintain stability and these can be muted with hearing loss, leading to clumsiness and fall risk.

Depression:

Stress and concentration loss, related to lack of sleep, tinnitus and headaches may lead to a drop in output. In some situations, noise can lead to as much as a 66% drop in productivity, according to an article produced for the World Economic Forum 2016^{xvii}.

Hazardous events:

Both hearing loss and working in very noisy environments both contribute to the incidence of work-related injuries. For example, a hearing loss of 20 dB corresponds to a rise of accident risk equal to 1.14^{xviii}.

Ineffective mitigation measures^{xix}:

Ear defenders may lead to a reduction in situational awareness. Workers can become isolated from their environment, at risk of injury from moving hazards or missed alarms. This may also lead workers to remove protection. In-ear protection, such as foam plugs, may also exacerbate earwax issues, leading to compacted wax.

Businesses need a dynamic solution.

Imagine a solution which could:

- ◆ Pinpoint exact areas of risk
- ◆ Consistently monitor noise levels and protection levels
- ◆ Allow effective adaptation of working practices
- ◆ Offer live information of unprotected events
- ◆ Provide constant data to prove effectiveness
- ◆ Allow you to be selective in your workforce health surveillance, according to the environmental factors
- ◆ Enable the creation of achievable improvement targets or KPIs
- ◆ Use adaptive hearing solutions which make no compromise on situational awareness
- ◆ Encourage people to make the right decisions, without dictating to them



The Legal Landscape - The numbers you need to know

Currently defined legal sound limits are as follows:



80 dB

The lower exposure action values are:

- A daily or weekly personal noise exposure of 80 dB.
- A peak sound pressure of 135 dB.

Lower exposure action:

- Carry out a risk assessment of level/type/duration and the measures needed to reduce or control noise exposure.
- Provide employees with information and training on the risks associated with noise.
- Make hearing protection available upon request.

85 dB

The upper exposure action values are:

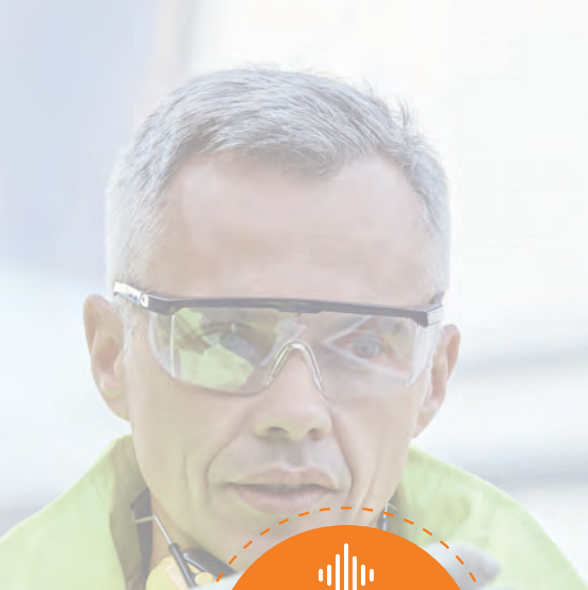
- A daily or weekly personal noise exposure of 85 dB.
- A peak sound pressure of 137 dB.

Upper exposure action:

- Implement a program to reduce noise or exposure straight away.
- Make hearing protection mandatory in designated zones.
- Provide employees with appropriate hearing protection devices.

135 dB

137 dB



87 dB

The exposure limit values are:

- A daily or weekly personal noise exposure of 87 dB.
- A peak sound pressure of 140 dB.

140 dB

Exposure limit:

These are levels that must NOT be exceeded once controls are in place.

Current WHO definitions of hearing loss:

Despite most organisations still publishing old definitions of moderate hearing loss at a level of 40dB or more, the WHO in 2021 published the world report on hearing using revised figures of 35dB. This lower recategorization of the hearing levels considered debilitating may affect the numbers of claims cases filtering through.

Page 38 of WHO report: World report on Hearing 2021

Grade	Hearing threshold in better hearing ear in decibels (dB)	Hearing experience in a quiet environment for most adults	Hearing experience in a noisy environment for most adults
Normal hearing	Less than 20 dB	No problem hearing sounds	No or minimal problem hearing sounds
Mild hearing loss	20 to < 35 dB	Does not have problems hearing conversational speech	May have difficulty hearing conversational speech
Moderate hearing loss	35 to < 50 dB	May have difficulty hearing conversational speech	Difficulty hearing and taking part in conversation
Moderately severe hearing loss	50 to < 65 dB	Difficulty hearing conversational speech; can hear raised voices without difficulty	Difficulty hearing most speech and taking part in conversation
Severe hearing loss	65 to < 80 dB	Does not hear most conversational speech; may have difficulty hearing and understanding raised voices	Extreme difficulty hearing speech and taking part in conversation
Profound hearing loss	80 to < 95 dB	Extreme difficulty hearing raised voices	Conversational speech cannot be heard
Complete or total hearing loss/deafness	95 dB or greater	Cannot hear speech and most environmental sounds	Cannot hear speech and most environmental sounds
Unilateral	< 20 dB in the better ear, 35 dB or greater in the worse ear	May not have problem unless sound is near the poorer hearing ear. May have difficulty in locating sounds	May have difficulty hearing speech and taking part in conversation, and in locating sounds

REMEMBER: Employers are responsible for conducting regular risk assessments.



The UK Government is working to simplify the claims process and ensure that claimants rather than the lawyers benefit: a new fast track process for NIHL claims valued below £25,000 in damages will be introduced in October 2023. While the HRC suggests that claims are currently low because of lack of awareness of the availability of compensation and a possible lack of awareness of the source of their disability, this is likely to change, with the claims process becoming more straightforward and knowledge of the research into NIHL becoming more widespread.

Cost implications if you are found liable:

The cost implication if your business is found to be liable for damage caused to a person's hearing is significant. Judicial College guidelines provide an outline:



With costs like these, it is clear that as well as protecting their staff from harm, businesses need to protect themselves from litigation. Evidence based protection is the only way to prove that your staff have not only been given protection but are making correct use of it.

Figures shown are approximate.

Why do you need to protect your business from litigation NOW?

- ❖ Proven links between hearing loss and health issues mean that claims may widen in scope and increase in significance.
- ❖ Increased availability of new, innovative technology means that the Employer is now able and morally bound to improve protection. Not doing so becomes an issue according to HSE legislation.
- ❖ Simpler claims process launching in October 2023, ensuring compensation goes to the claimant.
- ❖ Lower WHO definitions of hearing impairment may mean more claimants.

50%

According to the DWP, 50% of the top 10 industrial disease claims in the UK are for NIHL.

\$6.01B

3M vs American Military lawsuit

On August 29th 2023, 3M agreed to pay \$6.01 Billion to American soldiers who had suffered hearing damage after wearing earplugs which did not meet the necessary standards.^{xx}



Dr David Greenberg

Dr David Greenberg, a clinical and research audiologist for the NHS, saw firsthand the far-reaching, costly and devastating impact of NIHL. After studying for a PhD in auditory neuroscience, Dr Greenberg developed a dynamic noise management solution which can genuinely answer both the moral responsibilities and the business needs of industry settings.

EAVE

The Eave Solution - Level Dependent Hearing Protection with Noise Monitoring.

Developed in London by expert engineers, Eave FocusLite™ Ear Defenders have sensors that can measure and monitor sound levels as they reach both the internal and external sides of the ear cups, this data being transmitted wirelessly to the Peak noise monitoring platform.

By doing this, the FocusLite™ environmental noise monitoring headset can calculate both the noise levels in the environment and the noise levels that reach your ears. It is also able to calculate your noise exposure dose as part of your daily and weekly noise exposure limits.

The speakers play back the surrounding sounds to your ears but limit it with Limal™ technology so that the headsets do not damage your hearing. This gives you environmental and situational awareness without causing over protection that interferes with your hearing.

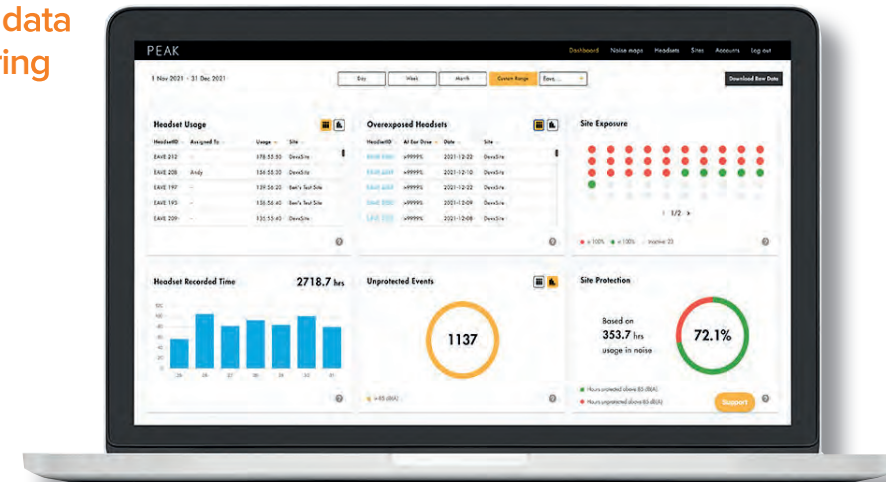
Level Dependent for your safety: because passive protection is like a blindfold for your ears.



EAVE

FocusLite ear defender headsets gather data and transmit it to the Peak noise monitoring platform for analysis and management action. This allows your business to:

- 🔊 Obtain analytics and reports based on the data
- 🔊 Visualise each employee's individual daily exposure to noise levels
- 🔊 See a snapshot of noise levels mapped to your workspace





EAVE fully supports your business within the framework of CUFF

In 2023, Eave's experts were invited to work on the next steps for regulation with the HSE's Safety Accelerator regulatory sandbox.

CUFF reflects a growing belief amongst safety experts that Eave has supported for some years – that the conventional approach to hearing protection fails workers and their personal safety.

The Eave system combines truly smart hearing protection and an intuitive online dashboard to provide an integrated solution for ensuring employee safety in a way that is transparent and demonstrable.

In fact, Eave provides fully quantifiable answers to every question that HSE will be asking in their planned programme of investigations.



E A V E

Factor	PASSIVE Hearing Protection	ACTIVE Hearing Protection	SMART Hearing Protection
Condition	✘	✘	✔
Use	✘	✘	✔
Fit	✘	✘	✔
Fit for purpose	✘	✘*	✔

*Some active hearing protection.

C - Condition

The Eave system flags up immediately any drop in protection due to poor condition of equipment.

U - Use

Sound level recording within the equipment makes it immediately apparent when it is not being used properly, making it clear if further training or engagement is required.

F - Fit the ear

Sound level recording within the equipment makes it immediately apparent if protection is not at the proper level due to poor fit.

F - Fit for purpose

Specification is fully quantifiable and accountable, not only at one moment, but on an ongoing basis.



A complete and intelligent solution, this could address every area of challenge for your business.

By integrating the Limal™ and HearThrough™ technology of Focuslite™ headsets, and the noise-mapping capability of the Peak™ platform, into one comprehensive solution the EAVE proposition will enable your business to:

🔊 Reduce accidents & near misses

- through a transformation in hearing capability and environmental awareness
- through reduced noise stress and effects on health

🔊 Increase productivity

- through improved site communication
- through reduced downtime

🔊 Improve both short and long-term employee health & wellbeing

- by preventing noise stress, NIHL & tinnitus
- by eliminating the need to remove passive hearing protection to communicate

🔊 Improve staff recruitment and retention

- enhance your corporate and social business reputation with a focus on staff welfare

🔊 Enhance risk management and mitigation

- through better quality RAMS

🔊 Reduce costs of site noise assessments

- by providing ongoing real-time measurement and monitoring of noise levels

🔊 Reduce costs of continuous workforce health surveillance

- with the ability to selectively target those at risk accurately

🔊 Improve demonstrable compliance

- with a complete audit trail – including real-time monitoring and feedback on PPE wear rates in high-noise areas

🔊 Allow clear and achievable improvement targets

- positive action which will be both welcome to HSE inspectors and will increase staff engagement

🔊 Enhance engagement and self-care

- by encouraging the workforce to make the right decisions for their own health

🔊 Improve behavioural reliability / reduce occupational exposure

- eliminating the need to remove passive hearing protection to communicate
- through exposure-specific data and targeted employee feedback and training

🔊 Enhance sustainability

- by eliminating the use of disposable earplugs

🔊 Lead the way in Safety

- show innovation and technology for industry / sector recognition
- showcase state of the art safety credentials to customers



References

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<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0425>
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- ^{xv} <https://www.laingbuisson.com/shop/care-homes-for-older-people-uk-market-report-34ed/>
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