WHITEPAPER

CONSTRUCTION: NOISE CONTROL

FOREWORD

Noise is more than a nuisance. Noise is a hidden health hazard, and the more information provided about the effects on hearing loss, the better.

In this whitepaper, Milwaukee highlights several impacts Noise can have on the people at work from the tools they use, strategies to reduce noise, and offers insights into what people need to know to protect themselves before it's too late.

Listen, noise is a problem. It damages people's health and costs millions, and it will come as no surprise that noise and its impacts are one of the main hazards in industry. I encourage everyone to take the opportunity to help improve their Noise management measures today.

David Cant, CFIOSH
Veritas Consulting Safety Services

Veritas Consulting is a specialist consultancy providing Health and Safety and CDM advice. The company supports, consults and coaches construction and the built environment industry professionals across the UK.

David Cant, Managing Director of Veritas Consulting, is a Chartered Safety and Risk Management practitioner (CFIOSH – Chartered Fellow of The Institution of Occupational Safety and Health) with over 20 years of industry knowledge, experience and expertise.

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ABOUT MILWAUKEE

Milwaukee Electric Tool Corp. is an industry-leading manufacturer and marketer of heavy-duty, portable electric power tools and accessories for professional users worldwide.

Since its founding in 1924, Milwaukee has focused on a single vision: To produce the best heavy-duty electric power tools and accessories available to the professional user. Today, the Milwaukee name stands for the highest quality, durable and reliable professional tools money can buy.

Milwaukee currently employs approximately 1,000 people globally. The company continues to set industry standards, targeting professional tool users of all types with a product line that includes more than 500 tools and over 3,500 accessories. Throughout its history

Milwaukee's commitment to quality remains steadfast, although the way that quality is ensured has changed drastically. Quality is designed in, using state-of-the-art technologies and sophisticated manufacturing techniques.

The people at Milwaukee are as much a part of the success as the tools themselves. All of Milwaukee's tool and accessory manufacturing operations have been arranged in manufacturing cells consisting of teams of motivated and empowered employees. Cellular manufacturing methods help Milwaukee employees focus on customer needs; allow for quick response to market demands; and increase employee productivity and product quality

INTRODUCTION

In the EU, more than 22 million people live with an untreated and disabling hearing loss. The cost to the EU economy is an astonishing 185 billion euros due to sufferers facing a lower quality of life, higher unemployment and premature retirement.[1]

Excessive exposure to loud noises can cause irreversible hearing damage. In 2017/2018 it was estimated that there were 17,000 existing employees in the UK suffering from work related hearing loss[2].

This 'silent' injury may not be visible but is a severe health risk for workers in the construction sector who are very easily exposed to excessive noise which can often reach hazardous levels. For site workers, it can have a cumulative effect, with hearing loss continuing to increase with age. Preserving hearing in the construction industry has never been more important.

The report Construction: Noise Control provides insight into the issue and causes of noise in the construction sector. Through studies on noise in the sector, the use of power tools along with information and guidance on EU and UK regulations, it is possible for employers to take steps to ensure the health and wellbeing of their workforce.

[1] **Labour Force Survey (LFS)**

[2] **Brunel University: Hearing Loss - Number and Costs**

NOISE IN CONSTRUCTION

There is no mistaking the fact that construction is a loud industry. Workers are exposed to hammers drills, concrete breakers, sanders and grinders, as well as other power tools and heavy equipment eight hours a day. Workers become accustomed to various types and levels of noise without realising the longer-term impact on their hearing.

Loss of hearing can be dangerous when working on a site, as it can prevent people hearing the sound of tools and machinery close by. It can also impact communication with other workers making warnings hard to hear and it can reduce an individual's situational awareness which can lead to accidents.

EU NOISE STUDIES

The most comprehensive study into noise and power tools in Europe has been made by OSHA (Occupational; Safety and Health Authority) and in common with existing EU directives, this dates back to 2002.

At the time, the EU strategy on health and safety at work (2002–06) called on the European Agency for Health and Safety at Work to 'set up a risk observatory'. One of the priorities identified in the strategy was the need to 'anticipate new and emerging risks, whether they be linked to technical innovation or caused by social change'.

The aim was to provide as comprehensive a picture as possible of the potential related risks and health effects in the world of work. This report:

osha.europa.eu/en/publications/report-noise-figures

sets out to describe the situation in Europe as regards exposure to noise at work, to identify groups at risk and to highlight trends and emerging issues of concern.

It included non-auditory effects and other health risks related to noise exposure, with a reference to research on noise and stress and combined exposures with chemicals.

OSHA concluded at the time that exposure to loud noise is not notably rising, and there are no new changes to be observed. Typical sectors for male workers affected by loud noise include construction, agriculture, forestry, manufacturing of metal and wood, mining and quarrying.

THE SITUATION IN THE UK

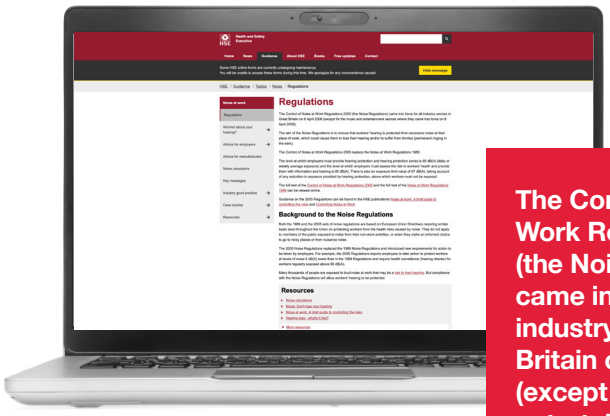
In the UK and the rest of Europe, the onus is once again on the employer as opposed to the manufacturer to take all possible steps to reduce noise for users of power tools. Frequent exposure to such noise is well documented and known to lead to hearing loss. In addition to hearing loss, loud noise can also 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.

GUIDANCE

a. Duty of Care Legislation

In the UK, the Control of Noise at Work Regulations came into force on 6 April 2006 to ensure that workers' hearing is protected from excessive noise at their place of work. Information on the Control of Noise Regulations can be found here:

www.hse.gov.uk/noise/regulations.htm



The Control of Noise at Work Regulations 2005 (the Noise Regulations) came into force for all industry sectors in Great Britain on 6 April 2006 (except for the music and entertainment sectors where they came into force on 6 April 2008).

This remains very much the situation today and is still appropriate in 2021.

In the rest of Europe, as might be expected legislation and duty of care is similar to the UK and has been enforced in the same way since 2002. General guidance relating to noise can be accessed vis this handbook:

ec.europa.eu/environment/archives/enlarg/handbook/noise.pdf

Please note that this guidance relates to all types of noise including that created by aircraft, cars etc but also applies to power tools and is the framework which covers all existing EU legislation.

Craftspeople, skilled workers, agricultural workers and armed forces are most exposed to noise at work — the percentage of workers exposed in these occupation groups is higher than average according to the report.

In selected sectors, women can be considerably exposed to noise. The percentage of women reporting noise exposure is much higher in the new EU member states than for the original 15 countries within the EU-15. In the Czech Republic, for example, 75 % of workers exposed to noise in the textile production are female, followed by 50 % in food production.

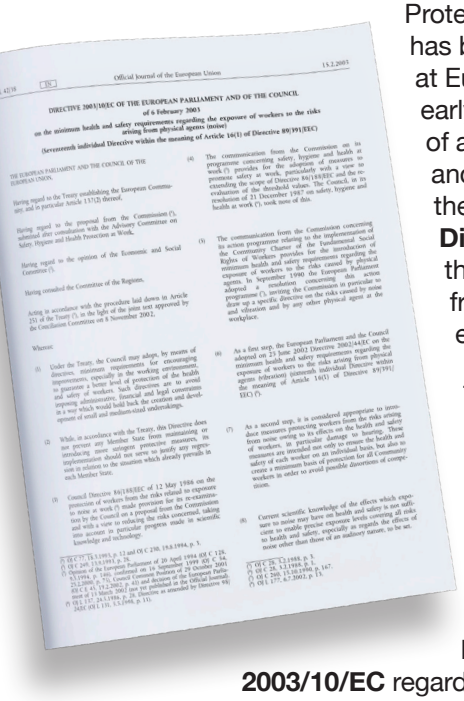
In the new member states, the sectors with the highest percentage of workers exposed to noise all or almost all the time are agriculture and mining, followed by manufacturing. It should be kept in mind that the proportion of workers working in these sectors is higher in the new member states.

Also, workers in the new member states generally report higher exposure to physical risk factors, such as noise, vibrations and working in painful positions. Conditions in some of these sectors (temperature extremes, noise, vibrations, etc.) may explain, at least in part, over-exposure to these physical risk factors.

Noise levels still regularly exceed limit values in many sectors, such as agriculture, construction, engineering, foods and drinks industry, woodworking, foundries or entertainment. The exposure to loud noise seems to be affecting more and more younger workers.

According to European and some national sources, employees with full-time non-permanent contracts are most exposed to loud noise. This group often has less information available relating to health and safety issues, less training and less formal supervision and control in the workplace.

b. Direct Legislation



DIRECTIVE 2003/10/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 6 February 2003
on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise)
(Seventeenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

Protection against noise effects has been one of the priorities at European level since the early stages of development of an occupational health and safety policy. By 1986 the Council had adopted **Directive 86/188/EEC** on the protection of workers from the risks related to exposure to noise at work.

This directive had already set up exposure limit values for workers as well as the main elements of the prevention policy to be applied by employers.

In 2003, **Directive 2003/10/EC** regarding the exposure of workers to the risks arising from physical agents (noise) was also adopted.

The main characteristic of the noise directive was to establish a clear and coherent prevention strategy capable of protecting the health and safety of workers exposed to noise.

Article 5(1) of the directive requires that, taking into account technical progress and the measures available to control the risk at source, 'the risks arising from exposure to noise shall be eliminated at their source or reduced to a minimum'.

In order to avoid irreversible damage to workers' hearing, the directive foresees exposure limit values of 87 dB(A) and a peak sound pressure of 200 Pa, above which no worker may be exposed; the noise reaching the ear should, in fact, be kept below these exposure limit values.

The directive also established upper and lower exposure action values of 85 dB(A) (and 140 Pa) and 80 dB(A) (and 112 Pa), which determine when preventive measures are necessary to reduce the risks to workers.

On the basis of a risk assessment (similar to that of the UK) and as soon as the exposure action values are exceeded, the employer shall establish and implement a programme of technical and/or organisational measures to reduce the exposure to noise.

c. Manufacturer Liability

Under the directive, manufacturers of machinery and other equipment also have the responsibility to reduce noise levels. According to the Directive 98/37/EC, machinery should be 'designed and constructed to ensure that risks resulting from the emission of airborne noise are reduced to the lowest level, taking account of technical progress and the availability of means of reducing noise, in particular at source'.

The directive requires the designer to use all available means to reduce noise by design such as:

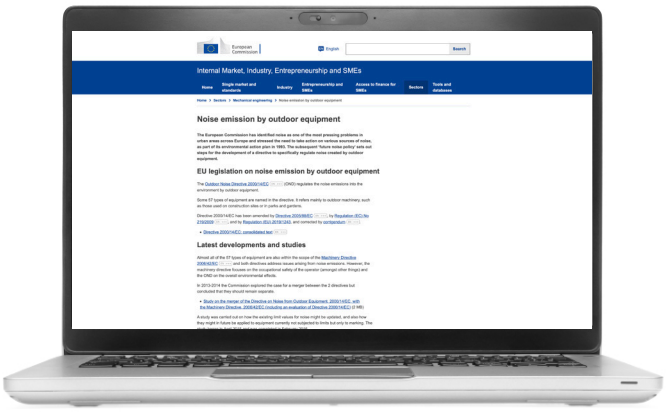
- **choosing non-metallic materials**
- **assembling components of a shape, thickness and size calculated to avoid resonance**
- **inserting joints to damp vibration**
- **preventing parts from falling from too high**
- **regulating the flow of compressed air exhaust**

The directive does not lay down limit values for noise emission. However, the CEN memorandum **(CEN/CR 1100)** states that standards could indicate the average levels achieved at a given date for a type of series-manufactured machinery (where appropriate by power category, technological type, etc.).

d. Manufacturer Directives

More relevant are the current EU Directives from 2017 which cover all types of power tools.

ec.europa.eu/growth/sectors/mechanical-engineering/noise-emissions

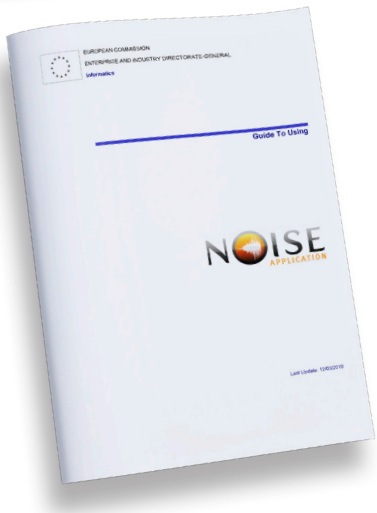


In real terms the EU is not as proactive as the UK in terms of legislation and regulations that affect hearing, but are more concerned with CE marks and other accreditations which ensure that power tools deliver.

eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:162:0001:0078:EN:PDF

Manufacturers are expected to record declarations of conformity concerning their own products. This relates to noise and all other relevant declarations.

assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/402468/noise_quickguide_en.pdf



IMPROVING SAFETY

As with all health and safety advice the overall message, aimed at employers, seems to be very obvious:

Wear ear protectors

Choose the quietest power tools

The main salient points and guidance for employers are as follows:

a. Who is at risk?

Employers are asked under the regulations to identify and assess all noisy activities on site. In the case of construction this would be:

- Workers are at higher risk if they regularly use or work near to power tools such as concrete breakers, pokers and compactors, sanders, grinders, disc cutters, hammer drills, chipping hammers, cartridge-operated tools, scabblers and needle guns.
- Anyone who operates or works close to heavy plant / machines is also at risk.

Particular consideration must be given to anyone who is known to have an existing hearing problem and this would be documented through regular health surveillance.

b. Controlling Noise Overview

Solutions to prevent occupational hearing loss include using quieter machines, such as battery-powered equipment that operates at lower decibels than petrol engines. Other tactics include isolating or encasing the noise source, limiting worker exposure, and using Personal Protective Equipment (PPE).

c. Simple actions

Employers are expected to take action under the following circumstances for smaller sites:

- If workers have to raise their voices when talking while about two metres apart for at least part of the working day.
- If they are using noisy powered tools or machinery for more than half an hour each day.
- If they are exposed to noise from regular impacts, such as pneumatic drills, or explosive sources like cartridge-operated tools. These noises can be particularly harmful especially when on top of constant background noise levels.

d. Larger sites

Under the regulations employers need to implement controls for larger sites to ensure that noise levels are not exceeded. These include:

- **Lower exposure action value** – daily or weekly personal noise exposure (LEP,d or LEP,w) of 80dB.

  As a general rule of thumb, the noise level is probably at 80db or more if the noise is intrusive, but normal conversation is possible between people two metres apart – this is comparable to a busy street, a typical vacuum cleaner or a crowded restaurant.

- **Upper exposure action value** – daily or weekly personal noise exposure (LEP,d or LEP,w) of 85dB.

  As a general rule of thumb, the noise level is probably 85 dB or more if it is necessary to shout to talk to someone two metres away, for more than about two hours per day in total.

- **Peak sound pressure** – these very loud 'impact noise' levels can be more damaging than the daily / weekly noise exposures and present a risk of immediate and permanent hearing loss. The lower and upper action values for these are 135 and 137 dB (LCpeak) respectively. Damage caused by them will be in addition to any damage resulting from the daily / weekly noise burden.

Where employees are likely to be exposed at or above the upper exposure action value, Employers must take action to reduce noise exposure with a planned programme of noise control.

e. Actions to be Taken

Employers need only to take simple and inexpensive actions if the risks are low. For higher risks, employers have to do much more to protect workers by giving priority to the greatest risks first.

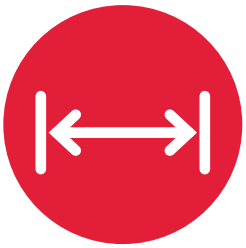
These include:

- **Eliminating unnecessary noisy tasks at the design stage.**
- **Isolating workers from noisy tasks by keeping doors and windows of vehicle cabins closed or using remote controlled equipment**
- **Shutting down equipment, such as vehicles, when they are not needed or in use.**
- **Don't buy or hire a problem. Select low-noise tools and equipment.**
- **Using an alternative process that does not generate as much noise. For example:**
  - **– block splitters instead of cut-off saws**
  - **– bursting or crushing instead of pneumatic drilling**
  - **– boring instead of pile driving**
  - **– limiting vehicle reversing on site (reversing alarms add to the total noise on a site)**

Regardless of how noisy power tools are employers are still expected to take further action which includes:

Sound barriers – to be used to stop noise escaping by using temporary shields / sound barriers.

Noise exclusion zones – keep people away by limiting access to noisy areas.



Distance – noise levels drop significantly with distance. Position stationary noise sources as far as possible from workers. Locate walkways away from noisy tasks.

Rotate workers – limit the time workers are exposed to noise. 'Weekly Averaging' may be used to ensure exposures are managed. Include 'quiet days' when scheduling work.

Hearing protection – provide workers with hearing protection.

Train – Tell workers about the risks to their hearing from loud noise and how to use the controls properly.

The HSE have produced a table and further guidance for assessing noise

www.hse.gov.uk/construction/healthrisks/physical-ill-health-risks/assessing-noise.htm

CASE STUDY: LOREM IPSUM

INTRODUCTION

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CASE STUDY: LOREM IPSUM

INTRODUCTION

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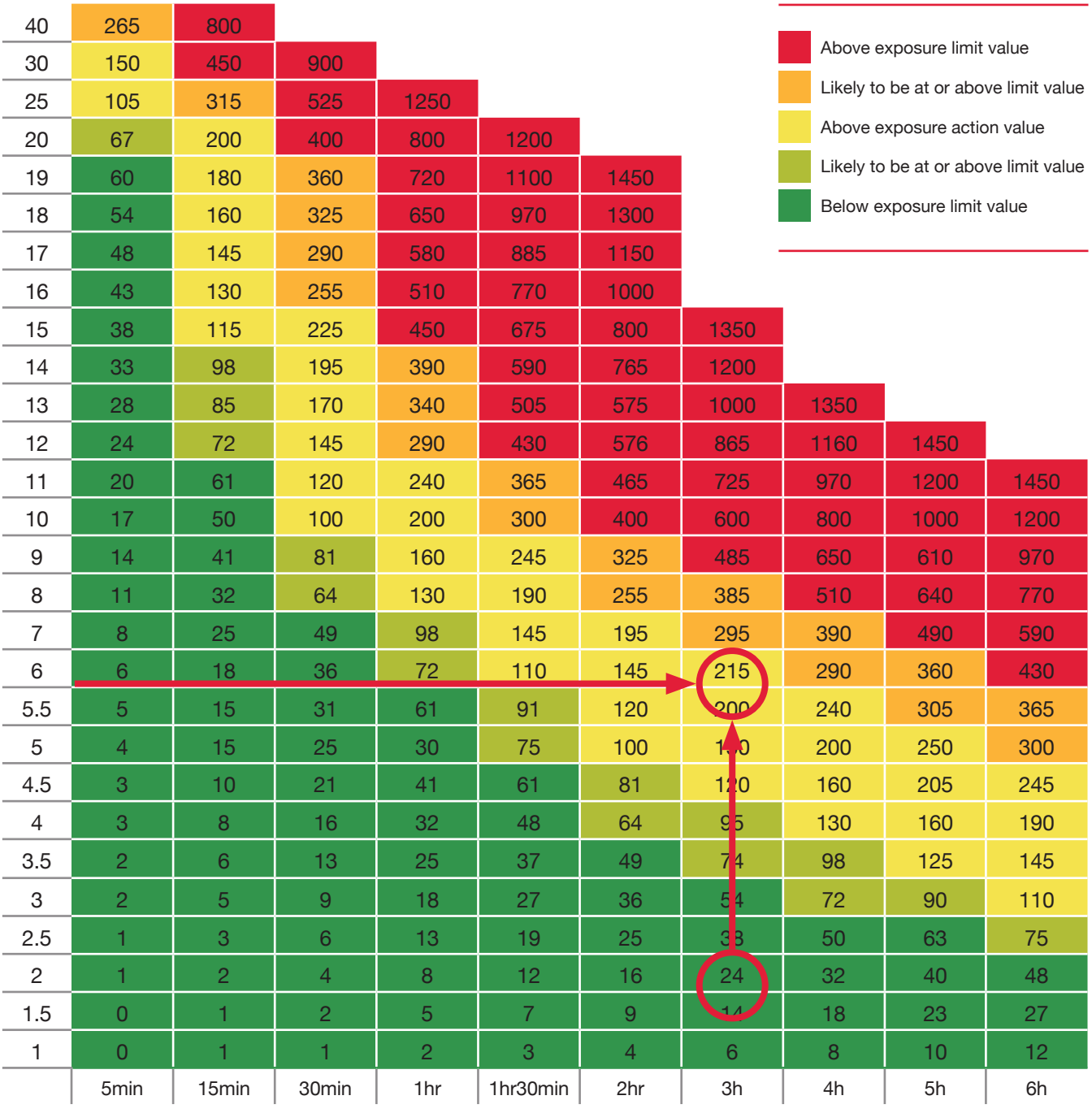
FURTHER READING

Independent noise testing was undertaken on a wide range of power tools by The National Institute for Occupational Safety and Health (NIOSH) as long ago as 2011, but reviewed again in 2018. There have been clearly many advances in reducing sound levels since then, particularly with regard to battery-powered equipment.

Milwaukee Tool have conducted product sound power tests in fully isolated Hemi-Anechoic Sound Chambers. The investment in this type of research allows Milwaukee® to collect objective noise data to positively influence product design. For instance, the MX FUELTM Concrete Backpack Vibrator reduces noise when compared to a gas-engine backpack vibrator.



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8	11	32	64	130	190	255	385	510	640	770
7	8	25	49	98	145	195	295	390	490	590
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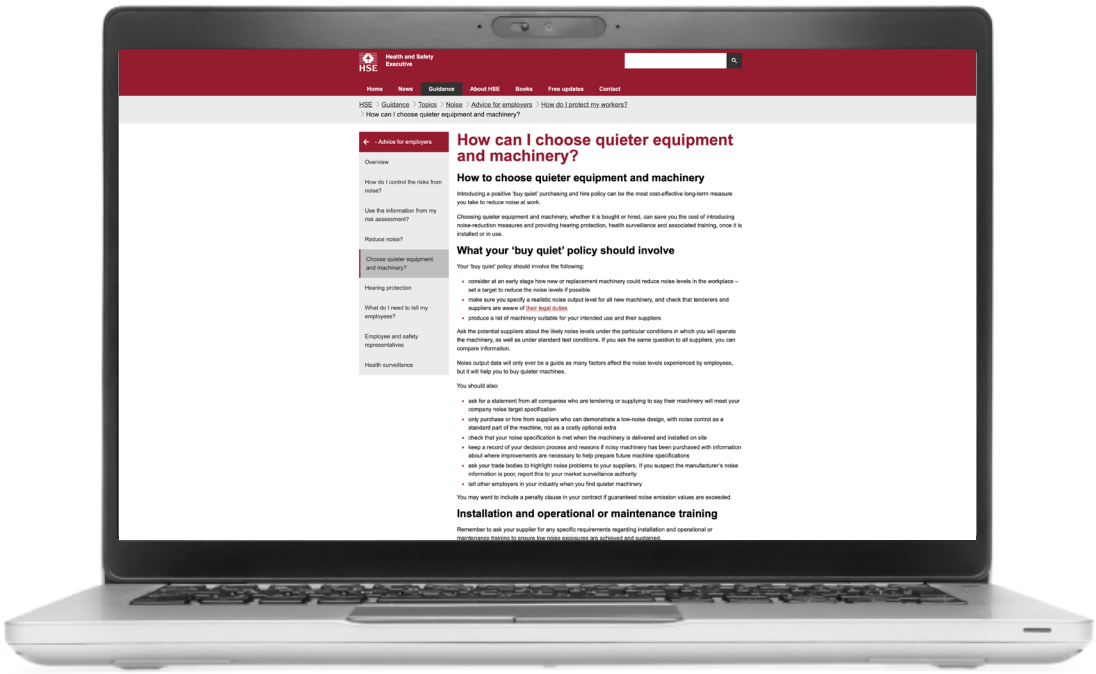
This is supported in the UK by the HSE with their ‘Buy Quiet’ campaign which helps manufacturers, importers, suppliers and users of equipment to work together to reduce the risk of noise-induced hearing loss in the workplace. It supports users in their duty to avoid high noise equipment when suitable lower noise equipment is available and manufacturers in their duty to minimise noise by technical means.

www.hse.gov.uk/noise/choosequieter.htm



CONCLUSION AND RECOMMENDATIONS

Most existing legislation relating to noise has been in existence for some time. As already mentioned, the onus is very much on the employer to set safety standards with relation to noise. The good news is that injuries from noise are also preventable. Manufacturers such as Milwaukee Tool can provide quieter, battery-powered equipment as an effective alternative to noisy petrol engines. These solutions can prevent occupational hearing loss and play an important part in creating a safer work environment for employees.

milwaukeetool.com