

ILEVE

Institute of Local Exhaust
Ventilation Engineers

BOHS

The Chartered Society for
Worker Health Protection

LEV 2020

Extracting the
Best Practices

Tuesday 25th February 2020 | Hilton East Midlands Airport

Welcome to LEV 2020 – Extracting the Best Practices

Thank you to our exhibitors & supporters



CASELLA

ILEVE



ILEVE

Institute of Local Exhaust
Ventilation Engineers

ILEVE Update

Presenter

Dean Greer, MILEVE

New Logo

Membership

Scotland and Northern England Regional Meeting

Membership Development meeting

ILEVE TC01

Industry and Regulatory Forum on LEV

- Competency Matrix
- Recirculating LEV.

AGM – Information Day

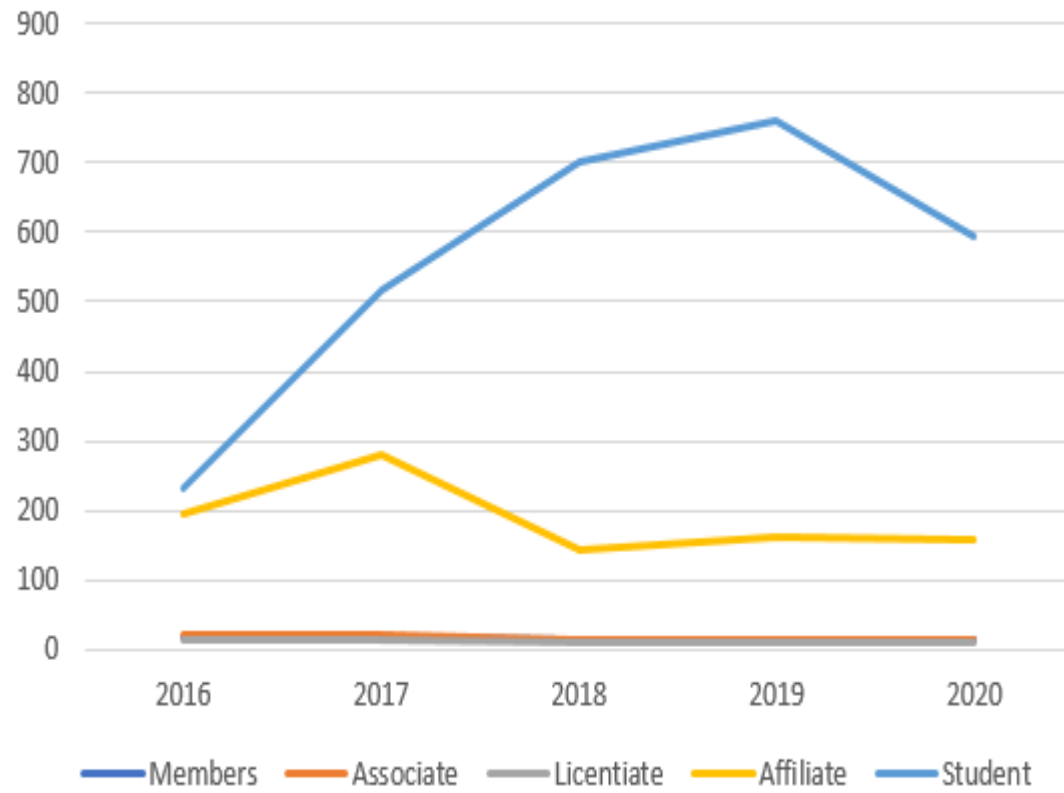
Strategic Partnerships

TR40



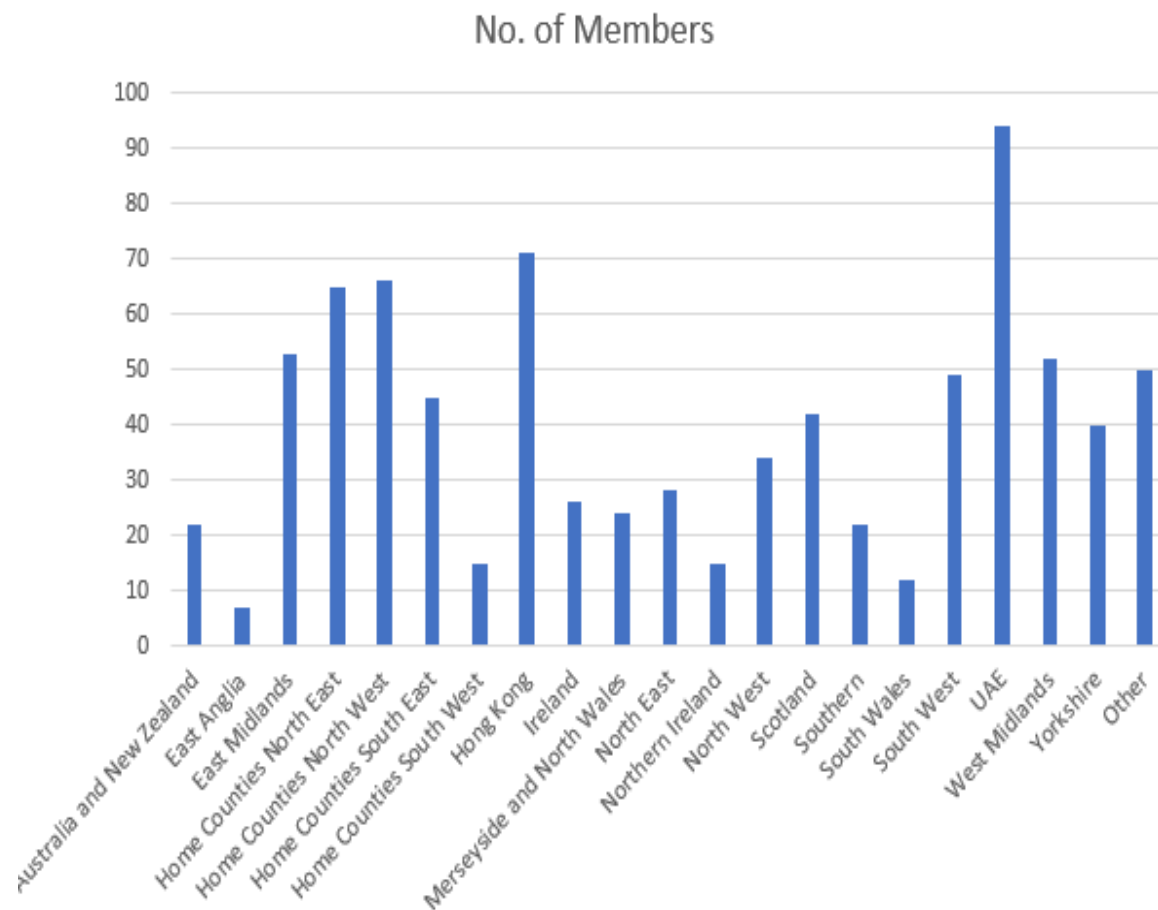
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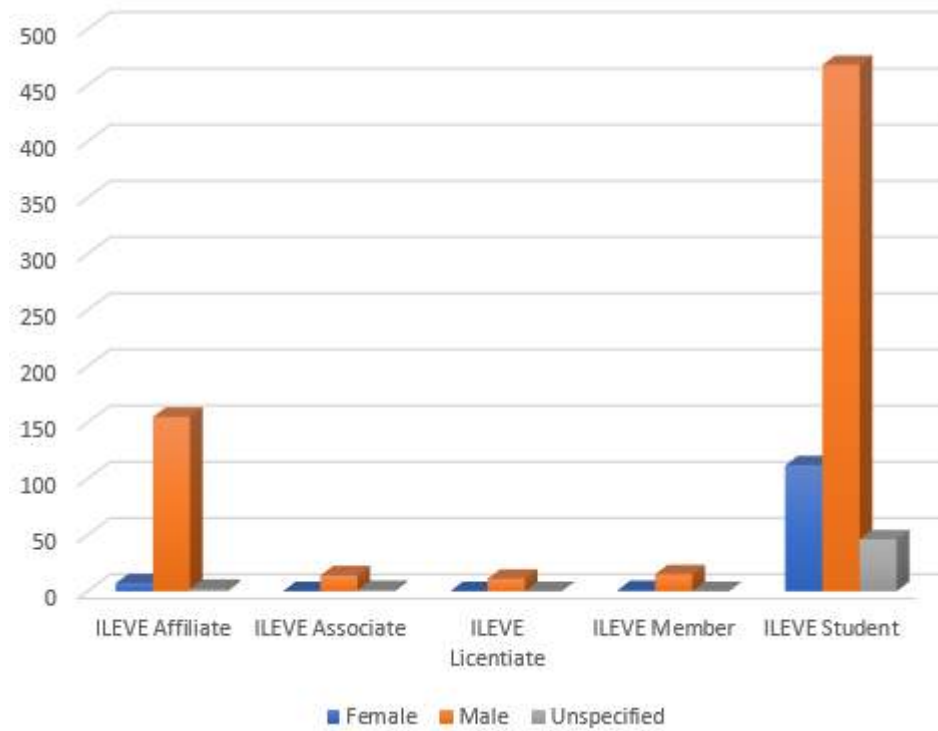
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A Guide to Good
Practice for:

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BESA
BUILDING ENGINEERING
SERVICE ASSOCIATION

LOCAL EXHAUST VENTILATION

TR40

OCTOBER 2019



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Questions?



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The Chartered Society for
Worker Health Protection

BOHS Breathe Freely Update

Tuesday 25th February 2020

Lee Heffernan
BOHS Chartered Member

The Breathe Freely Campaign

- BOHS initiative, aimed at reducing occupational lung disease in the UK, which causes significant ill-health and an estimated 13,000 deaths per year.
- Launched in 2015, initially focusing on the construction industry.
- Programme raises awareness of construction health hazards and gives options to control these hazards.



BREATHE FREELY

INTERESTING STATS...



Gone global, Breath Freely Australia launched last year



Breathe Freely in Manufacturing

- Breathe Freely for the manufacturing sector is a campaign which launched in May 2017.
- Launched in partnership with;



- Aims to improvement respiratory health protection in the manufacturing industry, focusing on welding.
- Welding is a top ten cause of work-related cancer, causing an estimated 152 deaths a year in the UK.

Welding Fume Control Selector Tool

- Web-based tool.
- Complements the information on the Breathe Freely website.
- Created by a panel of experts.
- BOHS has recently formed a partnership with ILEVE and EMADA to work together for future tool updates.



Control Selector Tool

This toolkit provides information for managers to better recognise the welding hazards and manage and implement the most appropriate controls through an easy to use online tool.

Breathe Freely in Manufacturing Roadshows

- BOHS has announced the launch of a new series of Breathe Freely in Manufacturing roadshows taking place in various locations in the UK throughout 2020. The **breakfast seminars** will focus on the prevention of lung disease amongst welders in the manufacturing industry.
- **Free-to-attend** events - provide important information for anyone who is responsible for the protection of welders' health in the manufacturing industry, especially Senior Managers and Directors.
- The Roadshows are sponsored by Plymovent, a global supplier of products for the extraction and filtration of polluted indoor air and advocate of 'clean air at work'.

Roadshow Locations and dates

- **Manchester**, 19 March 2020, Park Inn by Radisson, City Centre
- **Durham**, 13 May 2020, Durham Marriott Hotel Royal County
- **Bristol**, 18 June 2020, Village Hotel Bristol

You can find more information on the Roadshows and register via the Breathe Freely in Manufacturing website

<https://www.breathefreely.org.uk/breathefreelymanufacturing.html>



<https://www.breathefreely.org.uk>

Thank you



Controlling exposures to prevent
occupational lung disease in
MANUFACTURING



Do you
breathe freely?

Partners



Information hub



The screenshot shows the Breathe Freely website. At the top right is the Breathe Freely logo. Below it is a navigation bar with links for Manufacturing, Construction, and HI Management Standard. The Manufacturing section is active. Below the navigation bar is a banner for Breathe Freely with the tagline 'Controlling exposures to prevent occupational lung disease in industry'. To the right of the banner is the BOHS logo and a link to 'About BOHS'. Below the banner is a row of links: 'What is Breathe Freely', 'Latest News & Events', 'Courses and Training', and 'Contact Us'. To the right of these links is a search bar for 'Find an occupational hygienist'. Below the banner is a section titled 'Breathe Freely in Manufacturing' with sub-links for 'Introduction to Welding', 'Tools, Fact Sheets & Guides', and 'Partners & Supporters'. The main content area features a large image of a welder with the headline 'Controlling exposures to prevent occupational lung disease in manufacturing'. Below the headline is a paragraph: 'Manufacturing workers are at high risk from fumes given off by welding and hot cutting processes which give off very fine particles that cause cancer, COPD and an increased susceptibility to pneumonia.' Below this is a section titled 'New Roadshows' sponsored by PLYMOUTH, listing four events: Birmingham (19 February 2020), Manchester (19 March 2020), Durham (13 May 2020), and Bristol (18 June 2020).

BREATHE FREELY

MANUFACTURING CONSTRUCTION HI MANAGEMENT STANDARD

BREATHE FREELY Controlling exposures to prevent occupational lung disease in industry

BOHS The Chartered Society for Worker Health Protection

About BOHS

What is Breathe Freely Latest News & Events Courses and Training Contact Us

Find an occupational hygienist

Breathe Freely in Manufacturing

Introduction to Welding Tools, Fact Sheets & Guides Partners & Supporters

Controlling exposures to prevent occupational lung disease in manufacturing

Manufacturing workers are at high risk from fumes given off by welding and hot cutting processes which give off very fine particles that cause cancer, COPD and an increased susceptibility to pneumonia.

New Roadshows

sponsored by PLYMOUTH

Birmingham 19 February 2020	Manchester 19 March 2020	Durham 13 May 2020	Bristol 18 June 2020
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Information hub

[Introduction to Welding](#)

[Tools, Fact Sheets & Guides](#)

[Partners & Supporters](#)

An introduction to Welding



Why do workers need protecting?

Welding is one of the most common activities carried out in industry and there are a number of health hazards associated with welding in particular.

Page Includes:
Pdf and Powerpoint downloads.

[more>>](#)

Welding Guides & Factsheets



Monitoring Exposure to Welding Fume

Air monitoring and measurement may be needed where there is a serious risk to health from the inhalation of welding fume and the

likely exposure level of the welders to the fume is not known.

Page Includes:
Pdf download.

[more>>](#)

NOW LAUNCHED Control Selector tool microsite - online tool & PDFs



Control Selector Tool

This toolkit provides information for managers to better recognise the welding hazards and manage and implement the most appropriate controls through an easy to use online tool.

[Click here to visit the microsite](#)

[Launch the tool](#)

The Selector Tool criteria


- It is an online tool to help you make the right choice of welding fume control.
- It asks the following key questions:
 - What type of welding or cutting is it?
 - What type of metal is it?
 - What size is the workpiece?
 - How long will the welding take (arc time)?




Optimum control solution

- The Selector Tool provides advice on the best available control solution for the task criteria selected by the user.
- **This could include:**
 - **Extracted bench**
 - **On-torch**
 - **Flexible extraction arm**
 - **Respiratory protective equipment (RPE)**
- It also provides links to other suitable alternative fume control solutions, as it is recognised that for one-off jobs it may not always be possible to have the optimum control solution available.
- With every fume control solution there are limitations to its use and its ability to adequately capture fume and these are addressed on each control sheet.

Control sheet example

 **BREATHE FREELY**
The Chartered Society for Worker's Health Protection


 **BOHS**
The Chartered Society for Worker's Health Protection

Controlling exposures to prevent occupational lung disease in
MANUFACTURING

Welding Selector Tool  **Control Sheet**

Fume Extraction:
Local Exhaust Ventilation (LEV)
Flexible Extraction Arm

Flexible Extraction Arm at a glance



Effectiveness rating

★★★★★

Appropriate workplace size

✓ Small (up to 1.0m x 0.5m) ✓ Medium (up to 2.0m x 1.0m)
✗ Large (up to 2.0m x 4.0m) ✗ Extra large (> 2.0m x 4.0m)

Purchase price and other costs

Supply and installation	£1500 + VAT for single arm mobile unit. For multi-arm systems the cost will depend on the specific design.
Other costs	Thorough examination and test every 14 months – cost will depend on number of systems to be tested.

www.breathefreely.org.uk

1 | 3

 **BREATHE FREELY**
The Chartered Society for Worker's Health Protection

 **BOHS**
The Chartered Society for Worker's Health Protection

Controlling exposures to prevent occupational lung disease in
MANUFACTURING

Welding Selector Tool  **Control Sheet**
Flexible Extraction Arm

Flexible Extraction Arm

These systems have a round or oval inlet on the end of a flexible arm which can be moved over the welding position.

The purpose of the system is to draw the welding fume into the capture hood. To achieve this, the capture hood needs to be positioned as close as possible to the source of the welding fume. The careful positioning and repositioning of the capture hood is essential to maintain the optimal effectiveness of these types of systems.

The system is particularly suitable for welding smaller or medium sized objects, where there are not too many welding points. When the extraction hood needs to be moved frequently, effective control may not be achieved.

When positioned correctly, they can be used without compromising weld integrity or shielding gas. Ideally, the capture velocity (a measurement of the air velocity at the point where the fume is released) would be 0.5 m/s.

The extracted air should be vented outdoors. Where this is not possible, suitable filters should be fitted to units, which recirculate the filtered air back into the workplace.

An airflow indicator should be fitted so that the welder can check there is sufficient airflow through the system.

Top tips
How to use the LEV effectively

Ensure the LEV visibly captures all the fume, so it doesn't pass through the worker's breathing zone.

Also make sure the welding is within the capture zone of the hood at all times. To achieve this:

- The hood normally needs to be positioned at a distance of 1 to 2 hood diameters from the welding point.
- Place the capture hood above the welding point to ensure an upward movement of the fume.
- Never position the welder between the capture hood and the welding point.
- As the welder changes position, the hood will need to be repositioned to ensure efficient capture of fume.

Fixed arm system



Standard Wheeled Mobile LEV



Portable Fume Extraction System

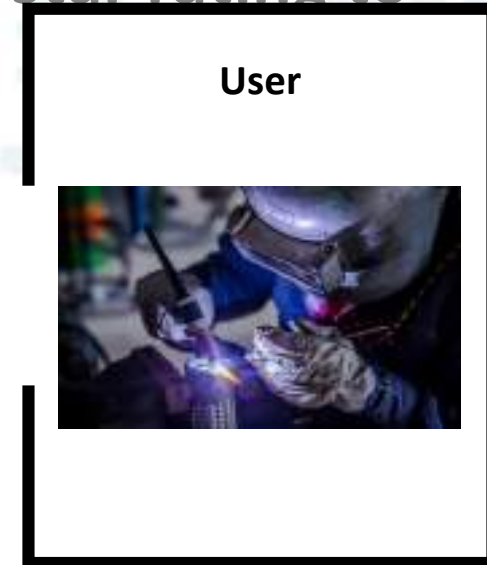
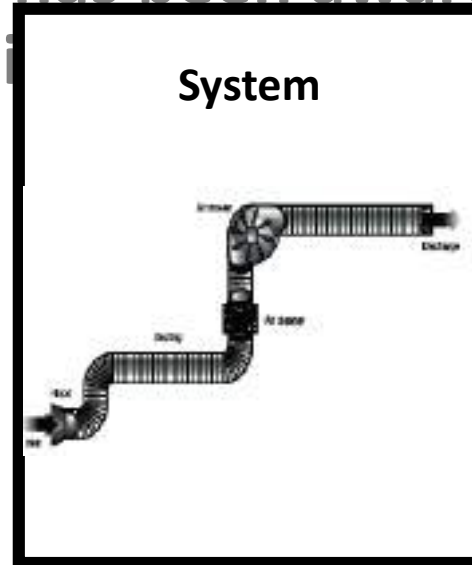
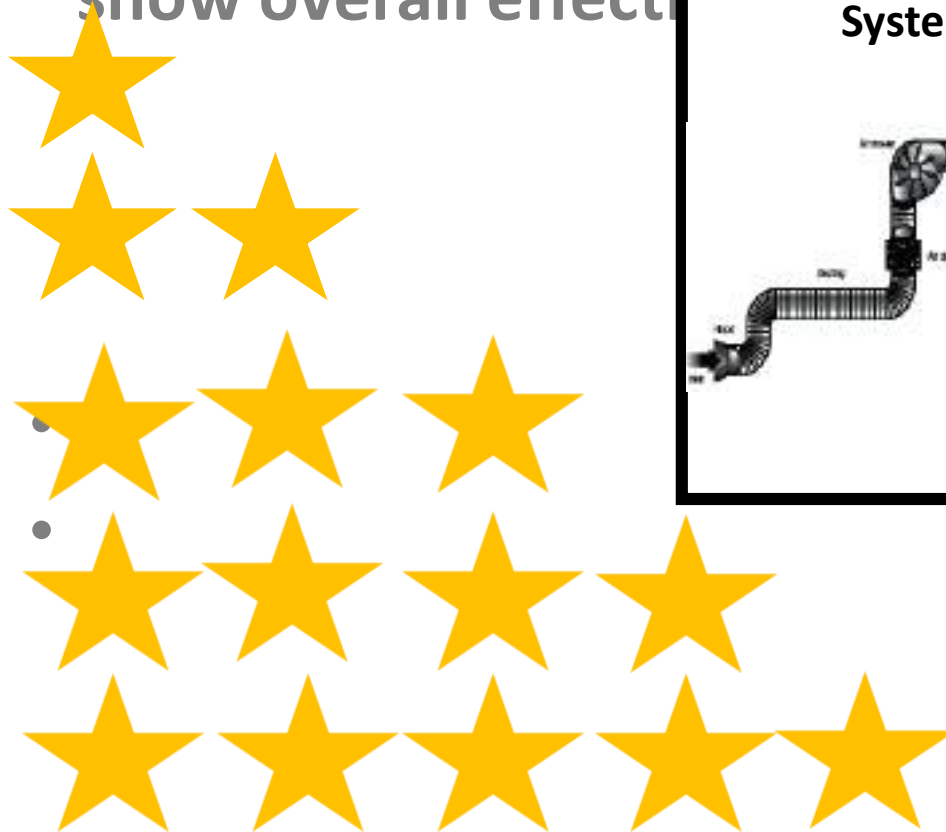


www.breathefreely.org.uk

2 | 3

Familiar 5-star rating system

- Now for welding fume extraction systems
- Each Control Sheet has been awarded a 5-star rating to show overall effectiveness



Management advice sheets

In addition to the Control Sheets, there are management sheets available via links in the text of the control sheet which provide appropriate advice on the following topics:

- General Ventilation
- Design of LEV
- LEV Installation, Commissioning, Maintenance and Testing
- Measurement of Welding Fume Exposure
- Health Surveillance
- Information, Instruction and Training for Welders



What are we waiting for?

- Use your mobile phone to access this tool now
- No need to download – it is responsive site!
- Lets work through an example:
- www.breathefreely.co.uk



What can YOU do?



The next phase?

Working Group met again on the 13th February, forming a partnership with ILEVE and EMADA.

2020 to bring more

- **Functionality**
- **Welding/cutting technique control solutions**
- **Control and management sheets**



Feedback?

Send to: breathefreely@bohs.org

Join us and be part of the solution!

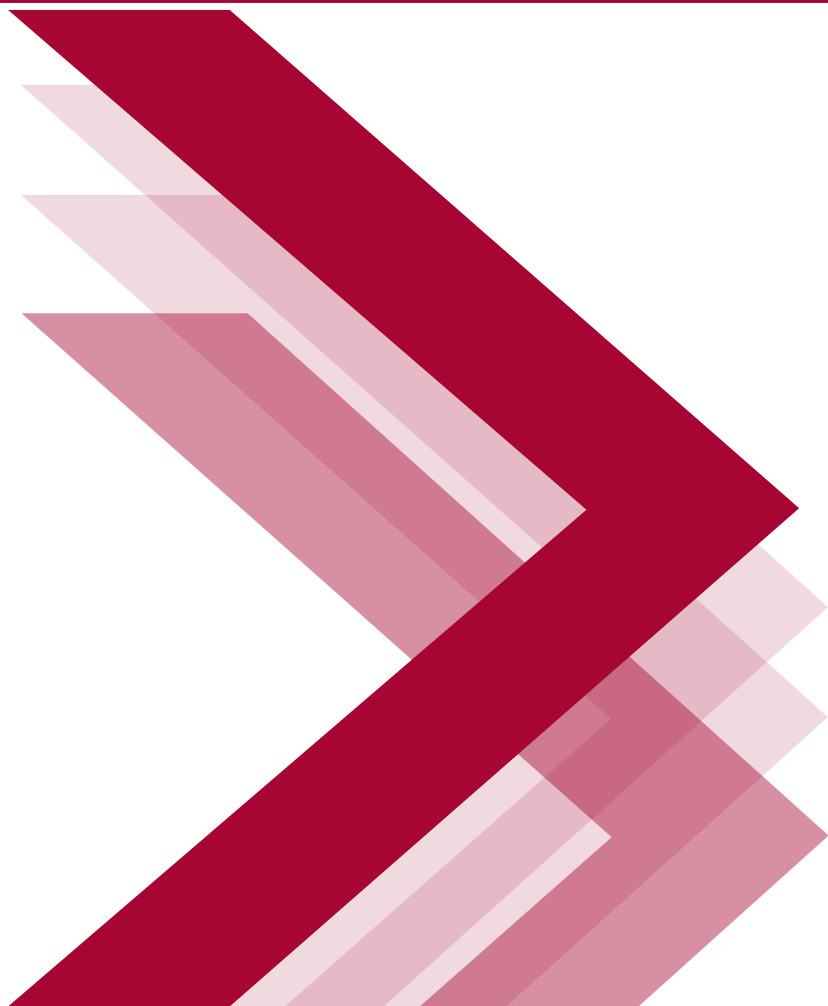
breathefreely.org.uk



Controlling exposures to prevent
occupational lung disease in
MANUFACTURING



Do you
breathe freely?



BOHS ILEVE 5th LEV Conference

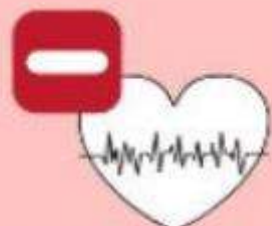
HSE – Noise Control for LEV Systems

January 2020

Chris Steel – Noise & Vibration Inspector

chris.steel@hse.gov.uk

**What is so bad about
occupational noise exposure?**



It has a negative effect on physical and mental health



It has a negative impact on social life and family relationships



It has negative consequences for work life and income



It has a strong negative impact on quality of life

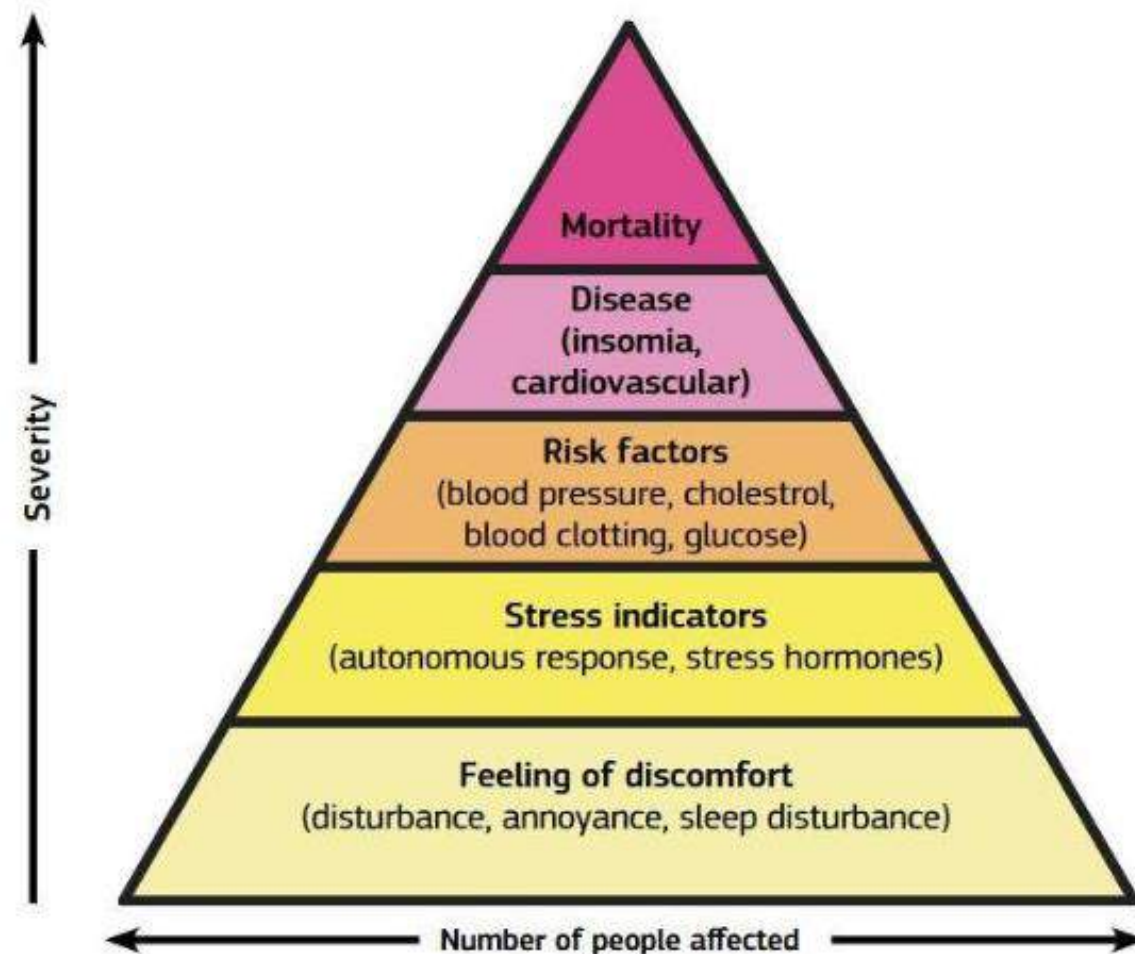


Figure 1: The pyramid of noise-induced health effects. Source: adapted from: Babisch, W (2002) The noise/stress concept, risk assessment and research needs. *Noise and Health* 4: 1-11.

CRU – Compensation Recovery Unit, part of DWP

They collect Employer Insurance Liability Claim statistics

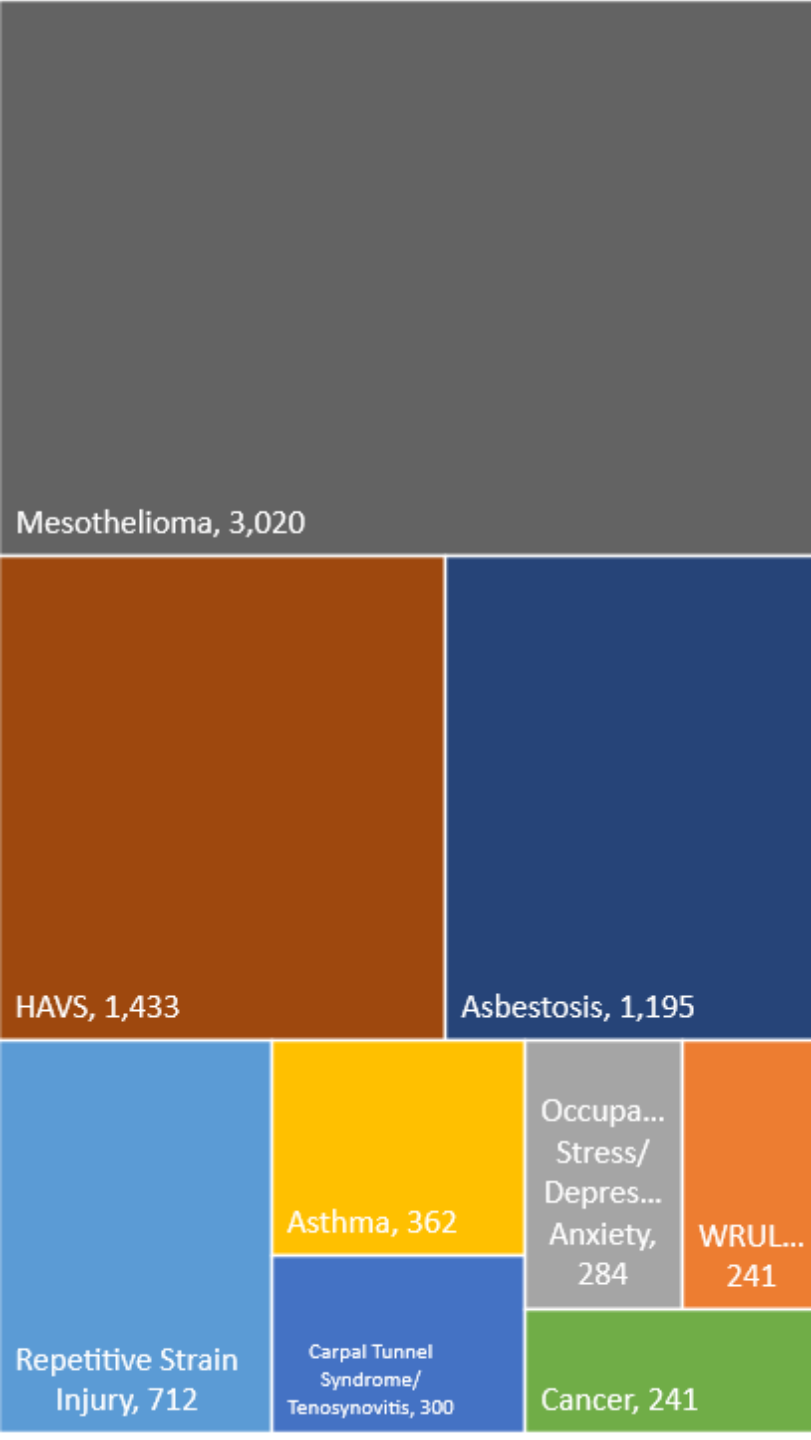


Health and Safety
Executive

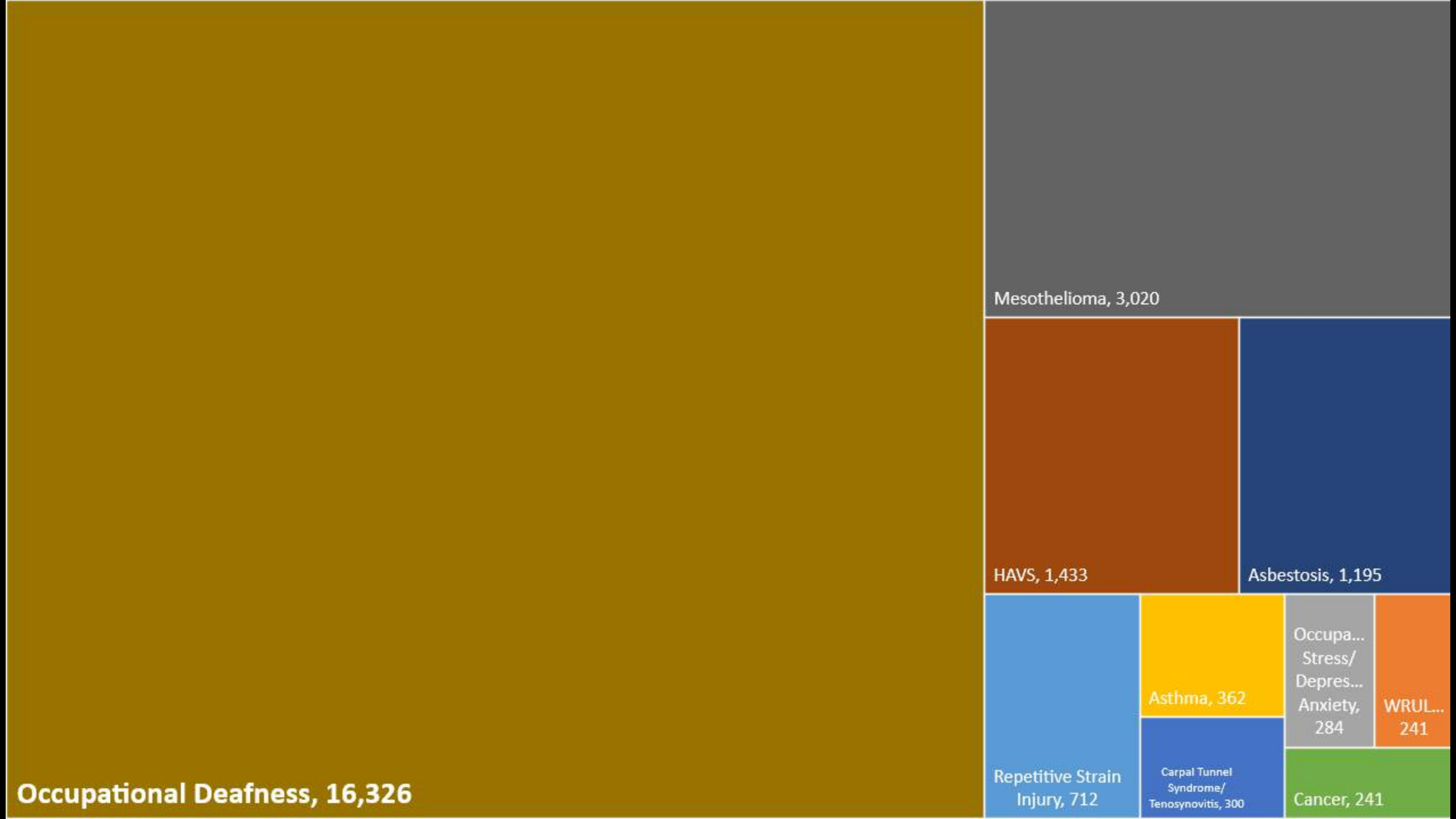
**Employers' Liability
(Compulsory Insurance) Act 1969**

**Does occupational
hearing loss make it into
the Employers Liability
Claims Health Top 10?**

These are the diseases where claims are being made.

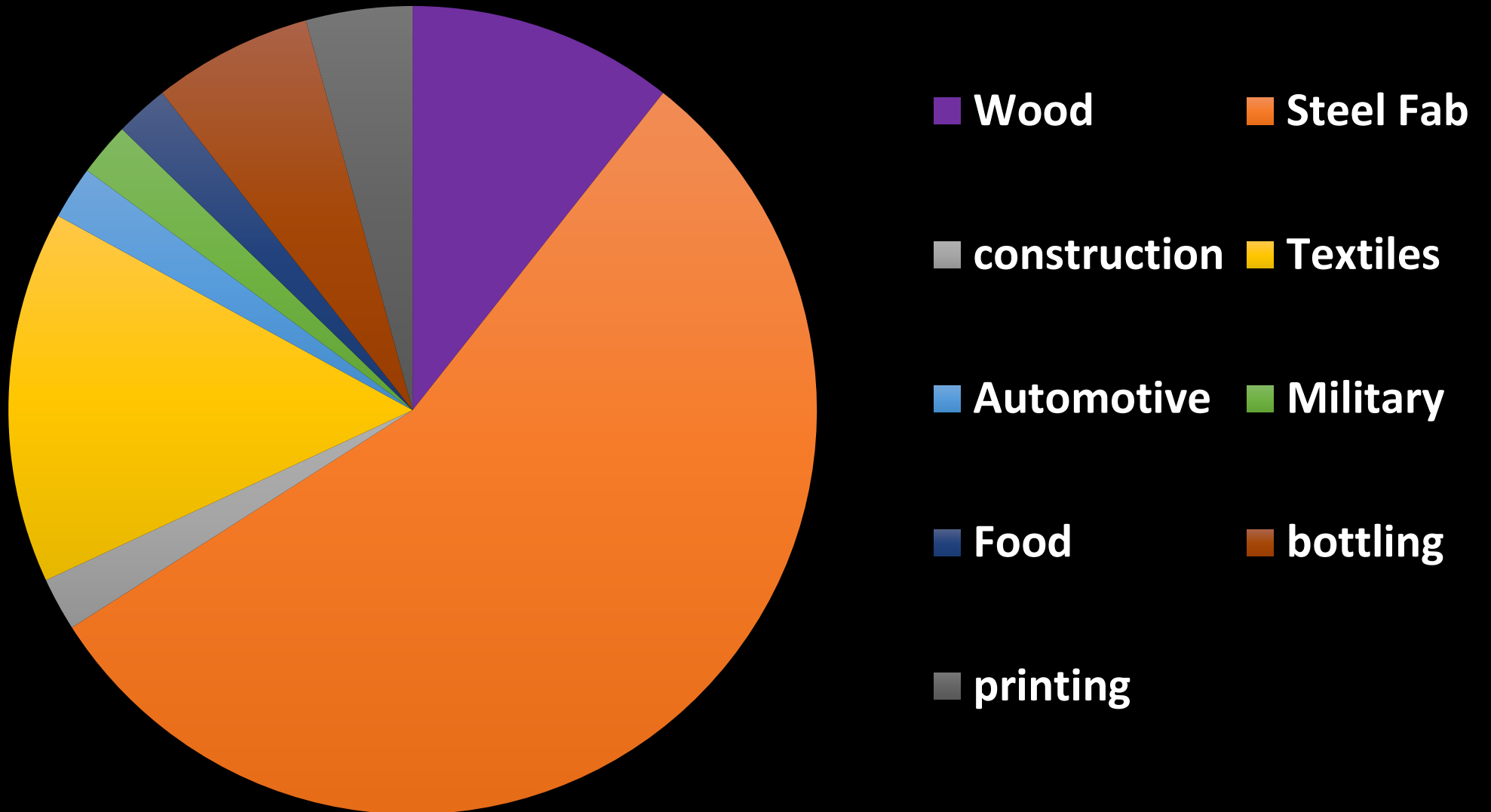


2015-2016 - Top 10 Occupational Diseases by Employer Liability Insurance Claim (CRU at DWP)



**Why am I talking to you about
noise from LEV now?**

NIHL Claims by Industry per 10,000 employees (based civil claims snapshot 2019 expert witness cases)



**Why would an increase in the
use of LEV in metal
fabrication be a cause of
concern for a Noise Inspector.**

**Lets have a look at what we
see in the wood industry for
comparison**

Spot the Difference



Identical saws bought at the same time



99dB at operators position cutting timber



90dB (A) at operators position cutting timber



99dB at operators position cutting timber

97dB at operators position LEV only



90dB (A) at operators position cutting timber



99dB at operators position cutting timber

97dB at operators position LEV only



90dB (A) at operators position cutting timber

**We made a quick
adjustment, now
spot the difference**



99dB at operators position cutting timber



**96dB (A) at operators position cutting timber
(- 3dB = half the risk)**



99dB at operators position cutting timber



**96dB (A) at operators position cutting timber
(- 3dB = half the risk)**



**Do you think the
noise level will be
higher or lower?**

Cutting wood – LEV on

100dB (A)



Not cutting
wood – LEV on

Higher or
Lower than
100dB (A)?



Not cutting
wood – LEV on

Higher or Lower
than 100dB (A)?
105 dB (A)



Not cutting
wood – LEV on

Higher or Lower
than 100dB (A)?
105 dB (A)

This machine is
louder when it is
doing nothing (it is
15dB quieter when
cutting with LEV off)



**There have been some
significant improvements in
noise control from (some)
machinery manufactures
(particularly in woodworking)**

So are HSE inspectors seeing instances where air systems are the primary source of workplace noise?

LEV system for 4 occasionally used planers

- **90dB(A) at 1 m**
- Levels of 80-85dB(A) in surrounding work shop area just from LEV
- Poor state of maintenance
- Running full tilt all day





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LEV system for 4 occasionally used planers

- 90dB(A) at 1 m
- Levels of 80-85dB(A) in surrounding work shop area just from LEV
- Poor state of maintenance
- **Running full tilt all day**

**That one is a bit old and
scabby, a newer system should
be better?**



Basic wood shop extraction units bought as a replacement system

- 90-93 dB (A) at operators position, rated at 83 dB(A)
- Loudest item in the workshop
- Not a great design
- Could it be improved?



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Basic wood shop extraction units bought as a replacement system

- 90-93 dB(A) at operators position, rated at 83 dB (A)
- Loudest item in the workshop
- Not a great design
- **Could it be improved?**



Multi- head saw – Air fan at operators position

- 91dB(A) at operators position
- 84dB (A) with air fan off



Multi- head saw – Air fan at operators position

- 91dB(A) at operators position
- **84B (A) with air fan off**

Noise from LEV is becoming a dominant noise source in some industries and it is being used with few breaks in operation?

**What is particularly frustrating
is that we sometimes see
noisy systems that also don't
managing to perform the task
for which they were built?**



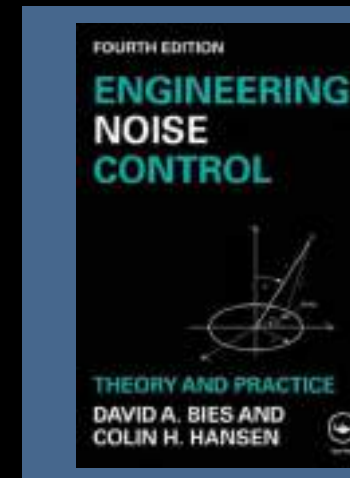
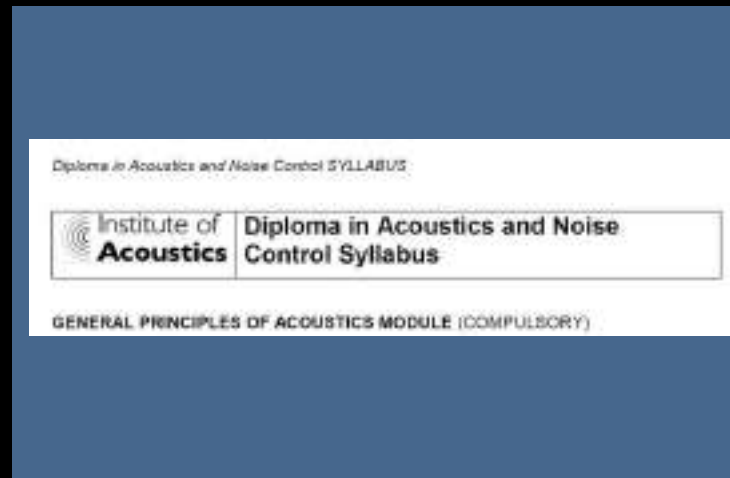
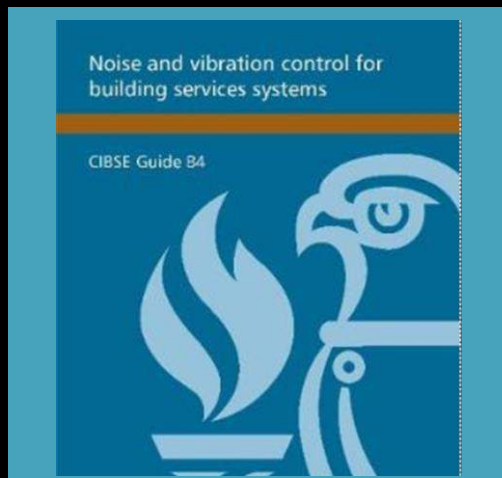
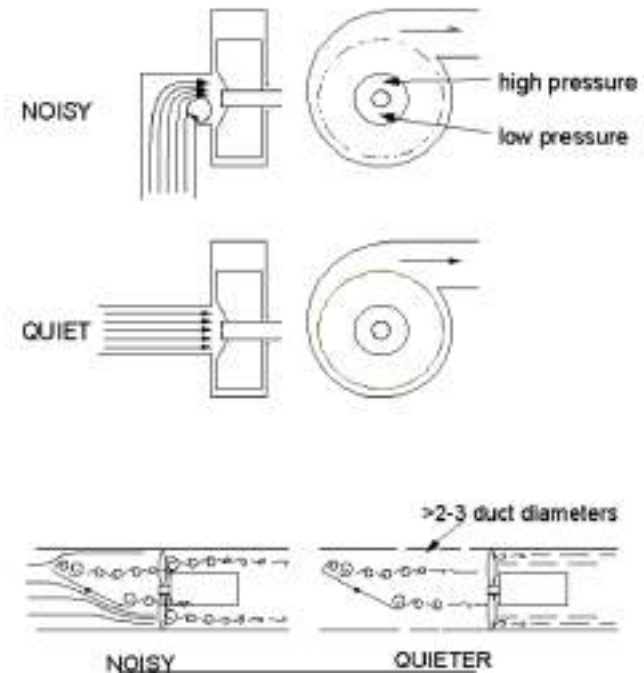
95 dB(A) in this area where staff were required to sweep up excess dust



A machine with an LEV system that had just had a "thorough" examination

**Should we expect more
control of noise from LEV
systems?**

Noise control for other air handling systems is well established



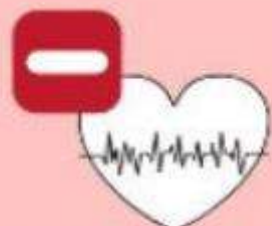
“Guide B provides guidance on the practical design of heating, ventilation and air conditioning systems. It represents a consensus on what constitutes relevant good practice guidance. This has developed over more than 70 years”

Noise and vibration control for
building services systems



CIBSE Guide B4





It has a negative effect on physical and mental health



It has a negative impact on social life and family relationships



It has negative consequences for work life and income



It has a strong negative impact on quality of life

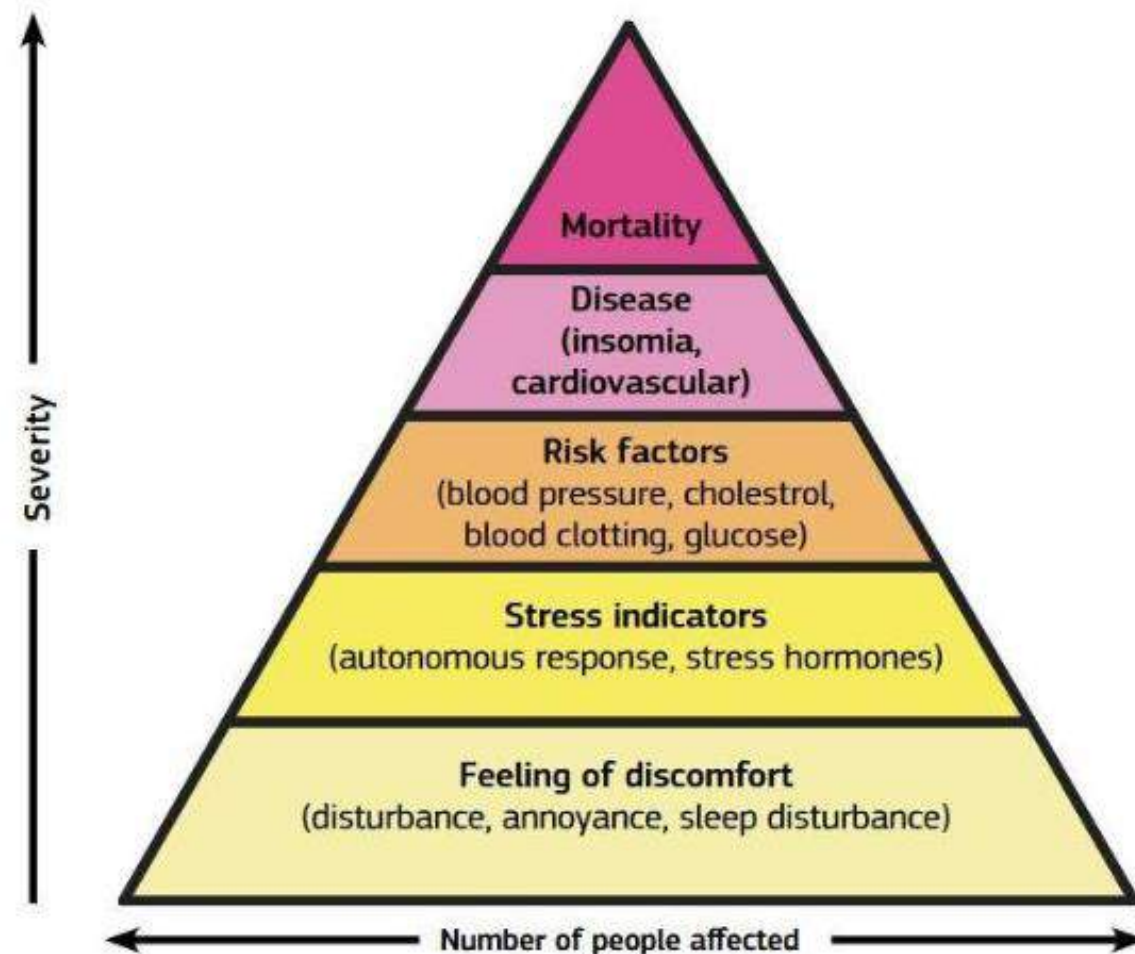
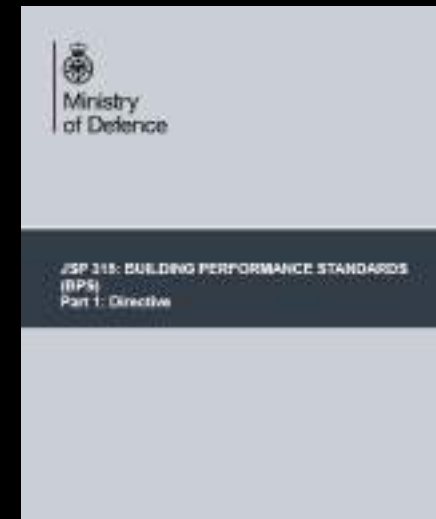


Figure 1: The pyramid of noise-induced health effects. Source: adapted from: Babisch, W (2002) The noise/stress concept, risk assessment and research needs. *Noise and Health* 4: 1-11.

You are expected
to control noise
from air
movement
systems for the
occupants of
almost every type
of building



**You tend only to
get asked to
control industrial
noise when it
affects the
neighbours**





We don't see basic design for noise
Avoid turbulence, isolate plant, 2 ½
times diameter between fan and
junction and lag ductwork...

**Should employers be
considering noise control
on LEV if it is likely to create
a workplace noise issue?**

YES



Control of Noise at Work Regulations 2005

6.—(1) The employer shall ensure that risk from the exposure of his employees to noise is either eliminated at source or, where this is not reasonably practicable, reduced to as low a level as is reasonably practicable

6 (3) The actions taken by the employer in compliance with paragraphs (1) and (2) shall...shall include consideration of—

(b) choice of appropriate work equipment emitting the least possible noise, taking account of the work to be done

(f) appropriate maintenance programmes for work equipment, the workplace and workplace systems;

YES



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(f) appropriate maintenance programmes for work equipment, the workplace and workplace systems;

"BUY QUIET"

Advice for buyers of machinery

- This leaflet helps you buy or hire lower noise machinery and meet your legal duties.
- Noise has hidden costs and harms workers.
- It is likely that you have a choice between noisier and quieter models of machinery. The only way to know is to have a "Buy Quiet" policy.
- Why buy a noisy machine when you could buy quieter machinery?
- If you and your industry ask for quiet machinery – "Buy Quiet" – suppliers will see a commercial advantage to making lower noise machinery. And if your suppliers market quiet machinery – "Sell Quiet" – the cost and effort to manage noise risk in your company will reduce.
- ALWAYS consider noise before buying or hiring new machinery.

Why should I Buy Quiet?

Noise is bad for health. It causes hearing damage and deafness, stress, poor productivity, and interferes with communication. Inability to hear causes workplace accidents and deaths.

Your company is legally responsible for managing risks from noise for its employees - the quieter the machinery you buy for your company, the easier this will be.

Buying Quiet:

- Reduces the costs of managing noise risks.
- Increases productivity and reduces the number of sick days.
- Reduces the need to buy and manage health surveillance, noise control, hearing protection.
- Reduces compensation costs and insurance premiums (depending on country).

What noise information should I obtain before buying or hiring machinery?

Where manufacturers have been unable to eliminate noise risk, they must:

- Provide noise emission data in their sales literature and instruction manuals:
 - Noise emission values provided should be for the noisiest typical operation.
 - Manufacturers may be able to provide noise emission data for other common applications.
- Tell you how to use their equipment without risk from noise:
 - What noise control options are available and appropriate for your operation.
 - How to install and assemble the machinery so that noise risk is minimised.
 - What special training in noise control is required

We also spent a good amount of time producing EU wide advice on how to buy quiet equipment

<https://www.av.se/globalassets/filer/halsa-och-sakerhet/nomad-buy-quiet-guide-edition-2018.pdf>

**Should suppliers and
manufactures of LEV systems
be considering noise control if
it is likely to cause a workplace
noise issue?**

YES



Health & Safety at Work etc. Act – Section 3(1)

...ensure so far as is reasonably practicable, that persons not in his employment...are not thereby exposed to risk to their health or safety

The Supply of Machinery (Safety) Regulations 2008 – Schedule 1 annex 1

Machinery must be designed and constructed in such a way 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.

YES



Health & Safety at Work etc. Act – Section 3(1)

...ensure so far as is reasonably practicable, that **persons not in his employment...are not thereby exposed to risk to their health or safety**

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Machinery must be designed and constructed in such a way 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.

**Can these issues not just be
dealt with through the use of
hearing protection?**

Hierarchy of Control

- **Eliminate** - don't do it
- **Substitution** – find a safer way to do it
- **Engineering controls** - Source safer tools or equipment/adaptations
- **Administrative Controls** – Job rotation, time limiting
- **PPE**

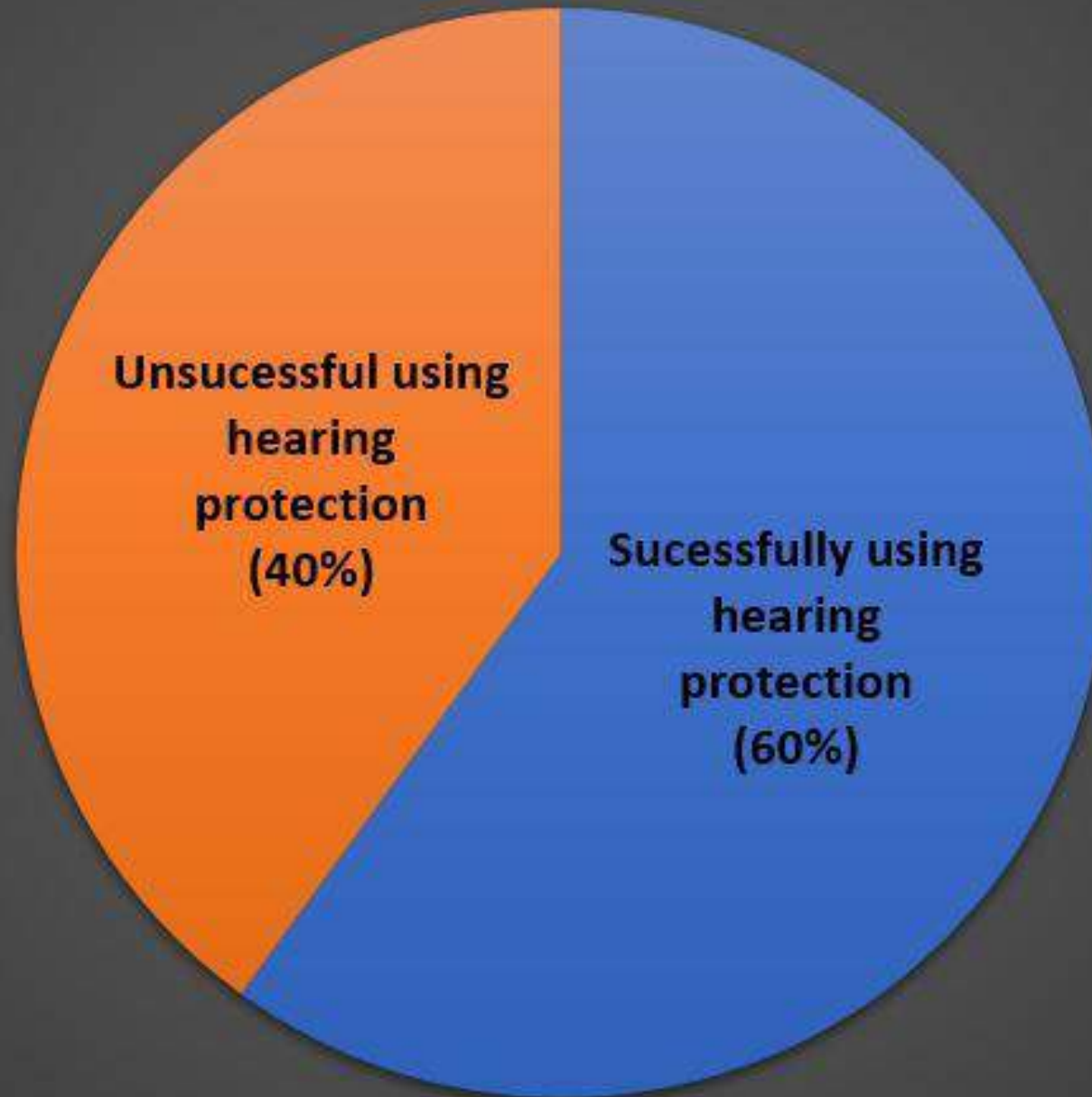
Hierarchy of Control

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- **PPE**

**This photo was
taken on site last
year by one of
our inspectors**



Estimated Successful use of hearing protection in the UK as a % of the exposed workforce (HSL report RR720)



**So what is the root cause of the LEV
noise problem**

The problem



- **Systems are often put together by duty holders who has little or no experience in LEV design.**
- We need LEV specialists to add noise control to the reasons why good design is necessary.

The problem



- Systems are often put together by duty holders who has little or no experience in LEV design.
- **We need LEV specialists to add noise control to the reasons why good design is necessary.**

What is HSE's aim...

**We would like to see compliance with
the Noise regulations**

**We would like to see the LEV industry
place some focus on noise control**

**The noise & vibration inspectors will
be undertaking priority local
inspections for noise in metal
fabrication. If we see LEV noise issues
we will take action**

What is HSE's aim...

**Eliminate by 2030 as an
occupational disease, new
cases of noise induced
hearing damage....**

<http://www.hse.gov.uk/noise/workingwithus.htm>