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Noise in the Workplace

Fuel Retail | Charge | Wash | Systems | Fleet | Gas

Aims and objectives

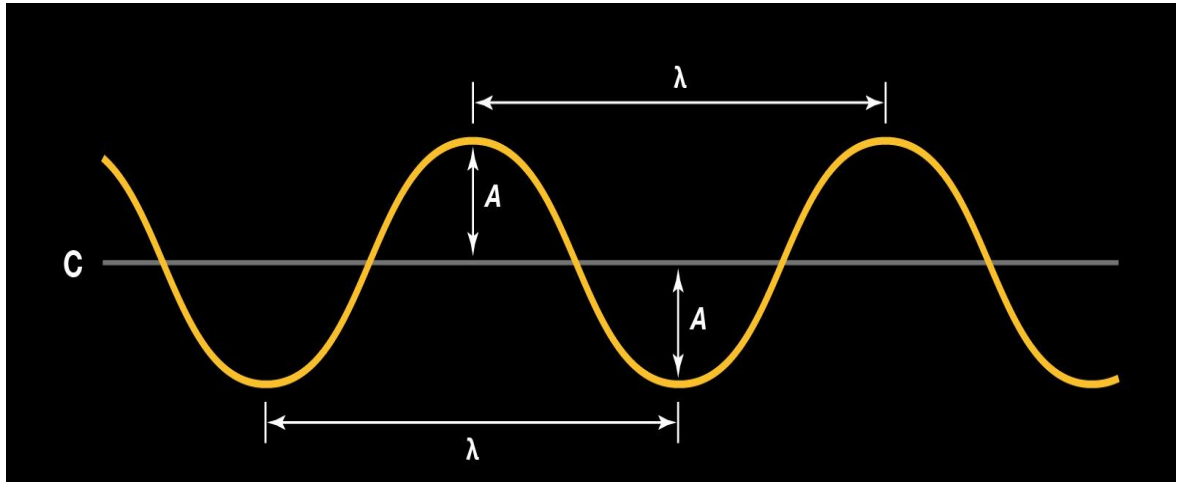
- Promote understanding of noise
- Discuss methods to limit exposure workplace noise
- Promote a healthier working environment
- Protect hearing in the short and long terms
- Reduce stress
- …to go home safe

Discussion Topics

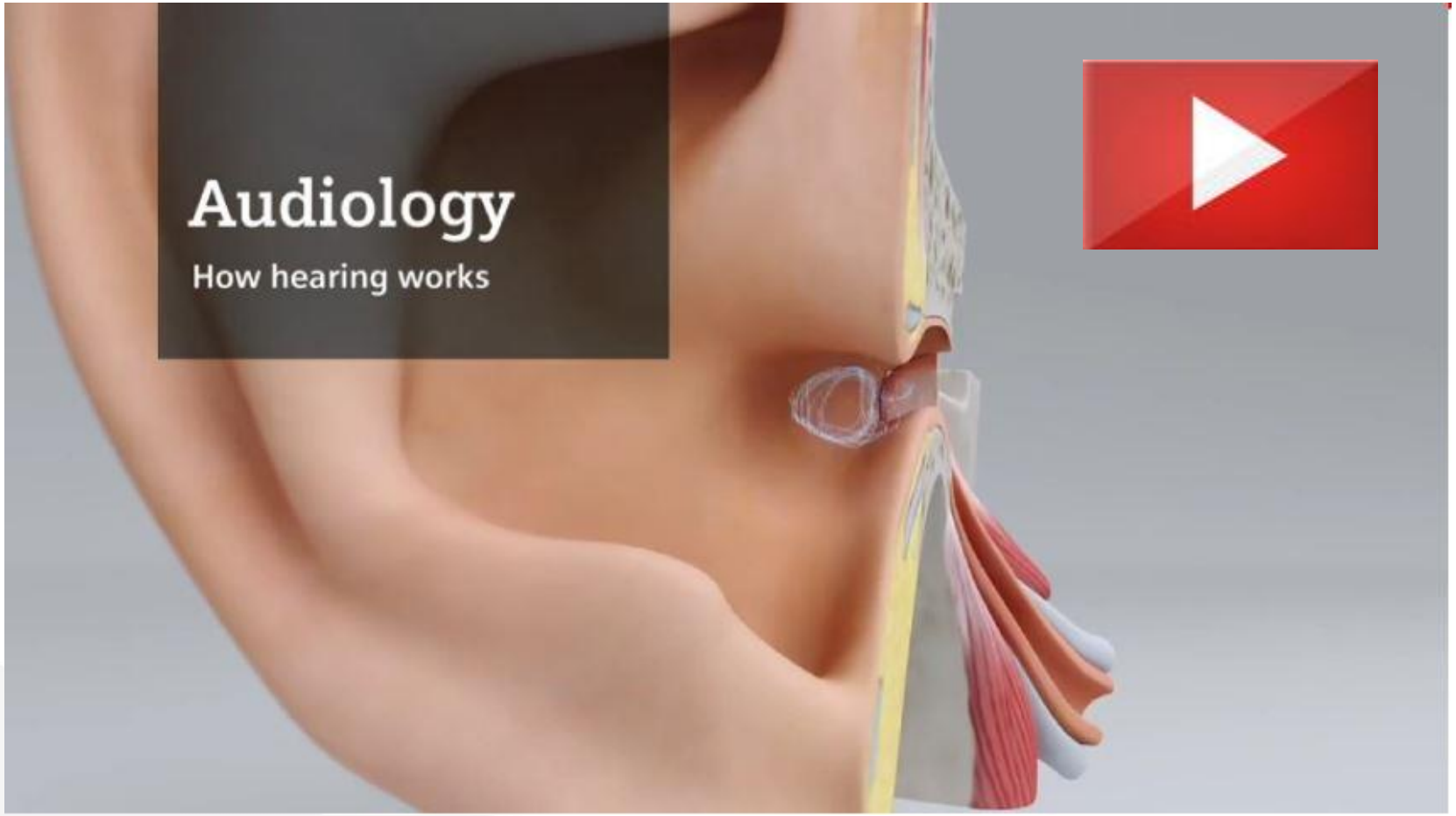
- What is sound?
- How the ear works
- What is noise?
- The effects of exposure to noise
- Facts & figures
- Quantification and assessment of noise
- Regulatory compliance
- Measures to control exposure to noise

What is Sound?

- Sound is energy movement through a media
- Transmitted in waves
- Structure of the wave dictates frequency and amplitude
- The distance λ dictates the frequency
- The distance *A* dictates the amplitude (loudness)
- The smaller the distance λ the higher frequency or pitch
- The larger the distance *A the louder the sound*
- Higher frequency sounds are generally more hazardous



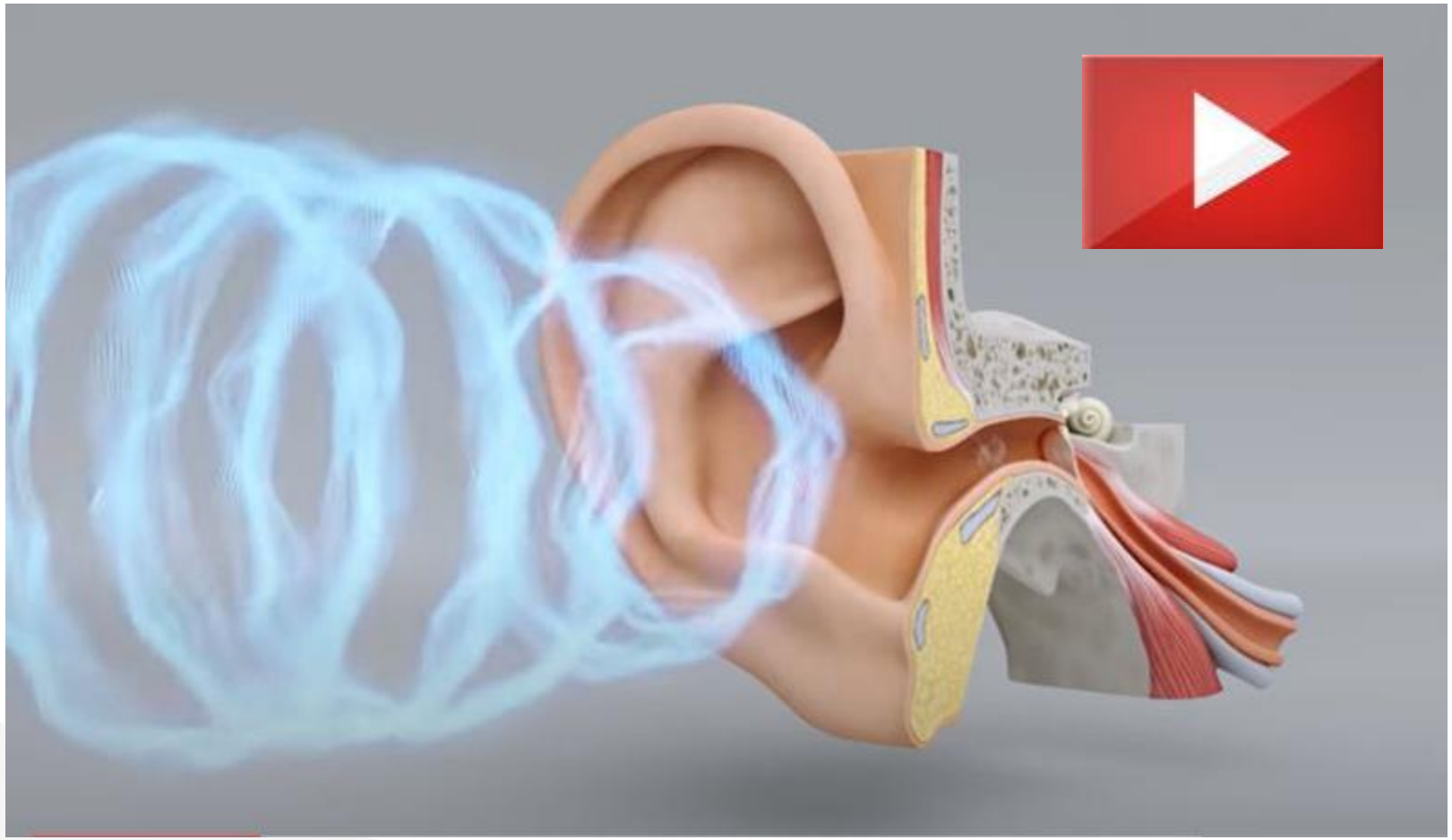
How the Ear Works



What is Noise?

- Noise can be a nuisance and cause stress
- Noise can be physically debilitating to the autonomic nervous system
- Noise can affect the hearing
- Noise is highly subjective
- Background hum, repetitious or single event

The Physical Effects of Exposure to Noise



Hearing Loss

- Age – the average 40 year old losses around 30dB high frequency hearing
- Illness – chicken pox, mumps, measles
- Agent/Substance – Ototoxic agents/drugs
- Work Related…
- Noise – single event or accumulation of exposure
- Acoustic Shock – gun shot, explosion, impact
- Temporary or Permanent Threshold Shift (NITTS, NIPTS)
- Tinnitus

Fact & Figures

- NHS figures from a 2017 study
- Over six million UK residents suffer hearing loss
- …many more are undiagnosed
- Employment rates are significantly lower among those with hearing loss
- Those suffering hearing loss felt their condition limited their potential
- £2,000 PA lower salary
- Hearing loss causes/contributes early retirement of over 40% of sufferers
- 1,125 new cases of industrial deafness (greater than 50dB) recorded between 2010 – 2019
- 95 new cases in 2019
- Only ***five cases*** *(of the 1,125)* are female

Regulatory Compliance

- The Control of Noise at Work Regulations 2005
- Assess the risks to employees from noise at work
- Take action to reduce the noise exposure that produces those risks
- Provide hearing protection
- Ensure legal limits on exposure are not exceeded
- Provide information instruction and training
- Carry out health surveillance where a risk to health exists

The Quantification and Assessment of Noise

- The Control of Noise at Work Regulations 2005
- The Regulations set standards for control
- Three key action values based on an averaged eight hour working day
- >80dB(A) Hearing protection made available on request

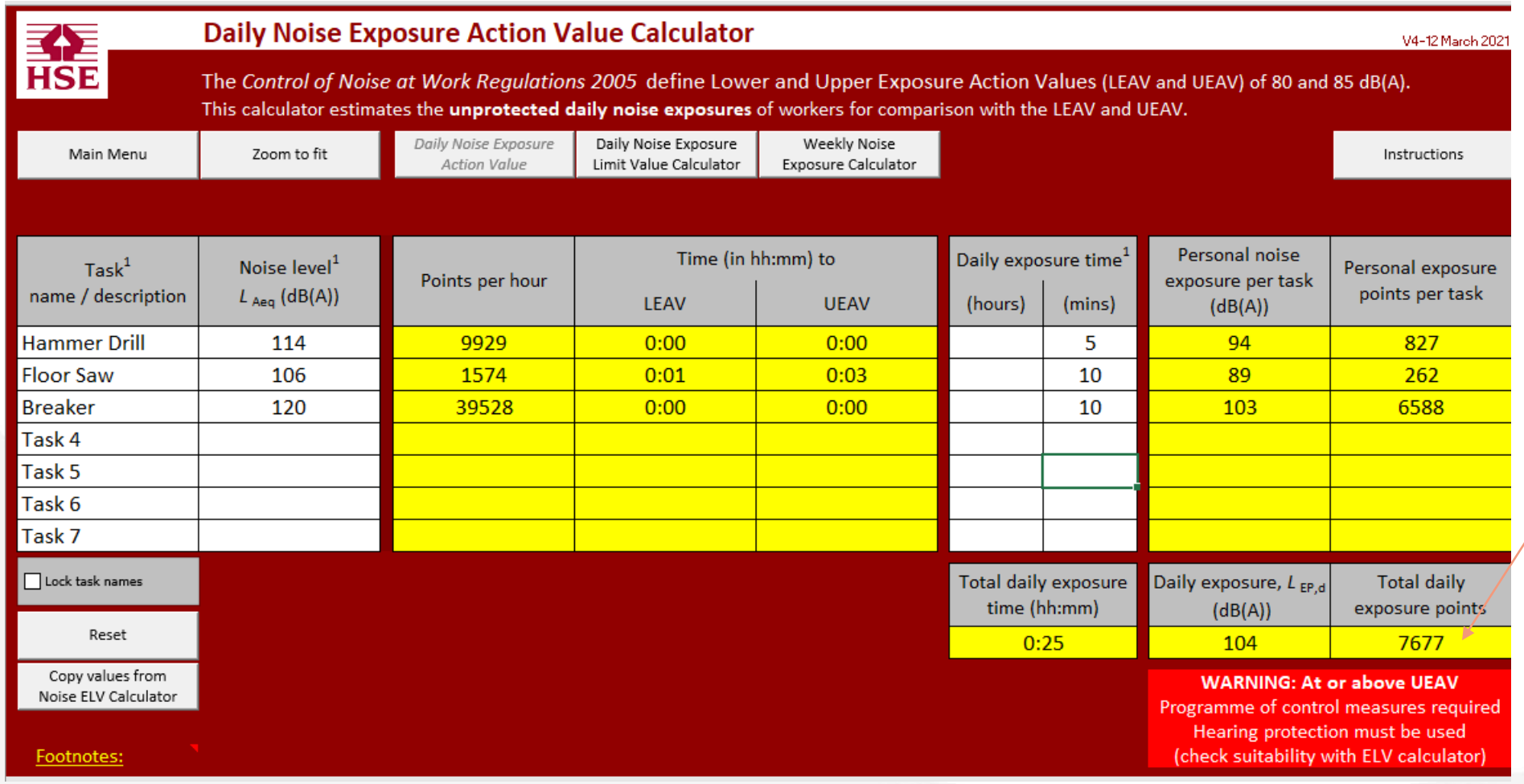
- >85dB(A) technical and organisational changes must be made (where reasonably practicable) and hearing protection must be made available and worn
- No one shall be subject to >87dB(A) when wearing hearing protection

The Quantification and Assessment of Noise

- Sound is measured in dB across three frequency ranges A, B and C
- Decibels are recorded on logarithmic scale compared to a simple unitary scale like millimetres on degrees Celsius
- 100mm is 10x10mm or 100x1 or 50x2
- On the Decibel scale, the quietest audible sound (perceived near total silence) is 0 dB.
- Starting from near silence - A sound 10 times more powerful is 10 dB.

- A sound 100 times more powerful than near total silence is 20dB
- A sound 1,000 times more powerful than near total silence is 30 dB,
- A sound 10,000 times is 40 dB and so on
- 86 dB has 26% more energy than 85 dB

The Quantification and Assessment of Noise



HSE

Daily Noise Exposure Action Value Calculator

V4-12 March 2021

The *Control of Noise at Work Regulations 2005* define Lower and Upper Exposure Action Values (LEAV and UEAV) of 80 and 85 dB(A).
This calculator estimates the **unprotected daily noise exposures** of workers for comparison with the LEAV and UEAV.

Main Menu | Zoom to fit | *Daily Noise Exposure Action Value* | Daily Noise Exposure Limit Value Calculator | Weekly Noise Exposure Calculator | Instructions

Task[1] name / description	Noise level[1] L_{Aeq} (dB(A))	Points per hour	Time (in hh:mm) to LEAV	Time (in hh:mm) to UEAV	Daily exposure time[1] (hours)	Daily exposure time[1] (mins)	Personal noise exposure per task (dB(A))	Personal exposure points per task
Hammer Drill	114	9929	0:00	0:00		5	94	827
Floor Saw	106	1574	0:01	0:03		10	89	262
Breaker	120	39528	0:00	0:00		10	103	6588
Task 4								
Task 5								
Task 6								
Task 7								

☐ Lock task names

Reset

Copy values from Noise ELV Calculator

Total daily exposure time (hh:mm)	Daily exposure, $L_{EP,d}$ (dB(A))	Total daily exposure points
0:25	104	7677

WARNING: At or above UEAV
Programme of control measures required
Hearing protection must be used
(check suitability with ELV calculator)

Footnotes:

The maximum exposure point value is 160 (when wearing hearing protection)

Measures to Control Noise

Can the task be done differently?

- Off site for instance…

Can less noisy equipment be used?

- Procurement to review specification

Measures to Control Noise

Baffles on plant & acoustic barriers

Switch of equipment not in use

- Multiplier effect – 3dB Rule

Distance & Time

- Inverse Square Law 6dB/20m
- Time – limit exposure

Measures to Control Noise

- Administrative Controls
- Hearing Protection
- Must be comfortable
- Must accommodate other PPE
- Must be of the Correct SNR Rating
- Rating based on 100dB – SNR 25 reduces to around 75dB and 4dB for factor of safety so 79dB
- Too great a sound reduction is disconcerting and potentially hazardous

A-weighted noise level (dB)	Select a protector with an SNR of...
85-90	20 or less
90-95	20-30
95-100	25-35
100-105	30 or more

Avoid reducing below 70dB

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Thank you

Any Questions?