



Encouraging purchasers of work equipment to Buy Quiet

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Why the need for encouragement?

- Motivation?
- Genuine choice?
- Reliable data to inform choice?
- Benefits?
- Examples?



Why is HSE interested in Buy Quiet?

- High noise at work is causing disability
- Workers reliant on hearing protection
- Easier to apply proven noise control technology during design/build
 - Enforcement of retrospective noise control can be complicated
 - Is enforcement against manufacturers more efficient?



HSE's Buy Quiet launch (2010)

- Interest from wide range of stakeholders
 - Manufacturers
 - Employers
 - Unions
 - Insurers
 - Labour inspectorate
 - ...
- Common agreement
 - Noise could and should be lower

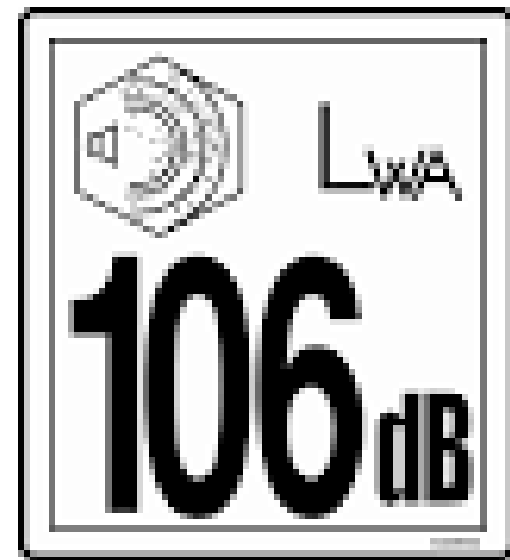
Why are purchasers slow to act?

- NOMAD showed 80% of noise data is unreliable
 - Will noise data become clear?
 - Are there competing noisy and quiet machines?
 - Does low noise equipment need promotion?
 - Is the noise reduction benefit disproportionate to Buy Quiet effort?



HSE observations on noise data

- Inconsistent noise emission values – L_{pA} , L_{WA}
- Confusion over sound power and sound pressure
- Duty holders seek examples of good practice
 - Wood chipper model noise declaration
- Noise test codes
 - Representation of noise hazard?
 - Reliability?
 - Repeatability?
 - Reproducibility?



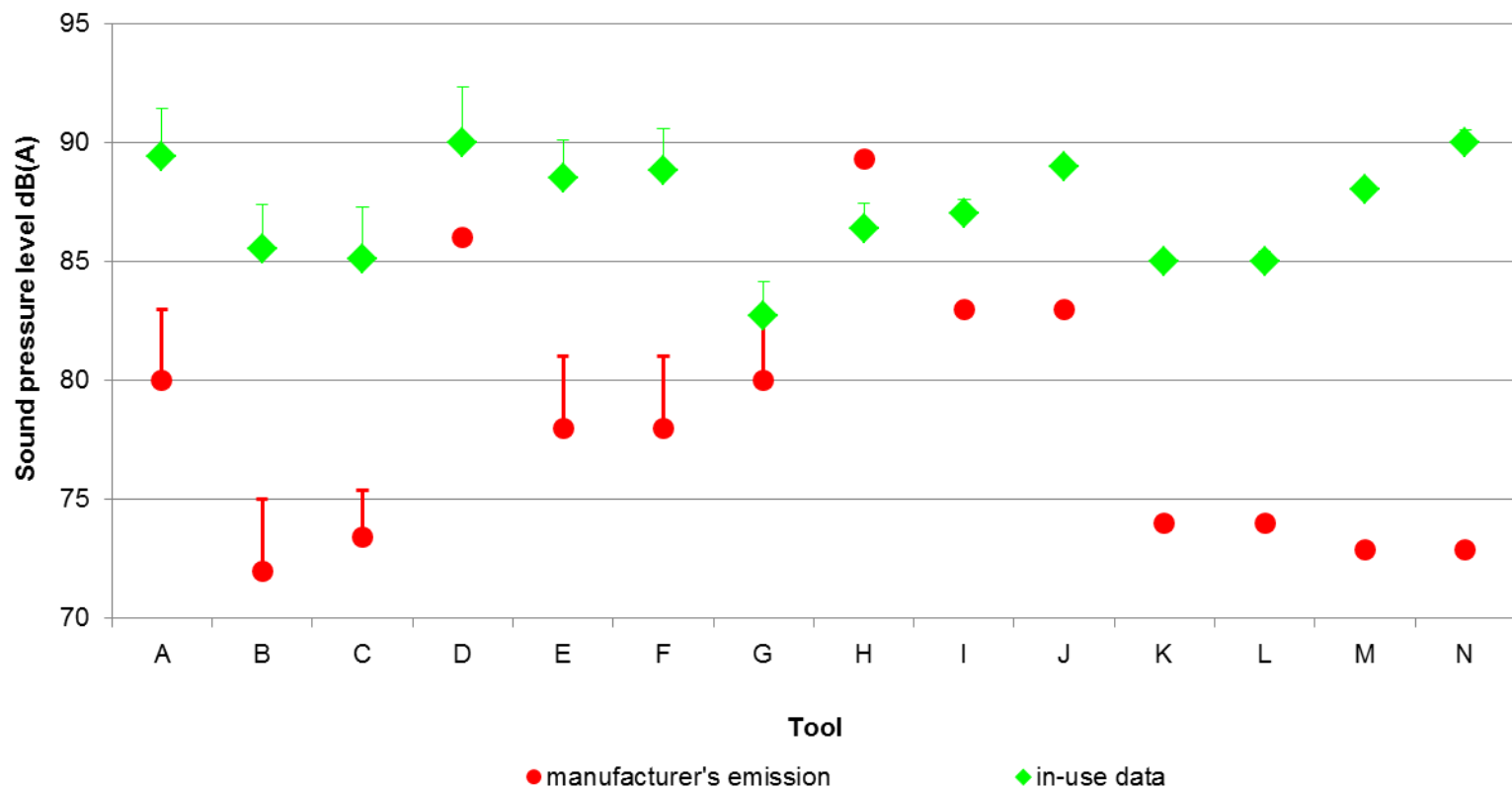
Machinery Directive (noise)

- Machine can be used without (noise) risk
 - Hazards to be eliminated/ protected/ reported
- Report
 - Instructions for use without risk from noise
 - Emission data in instructions and sales literature
 - Noise hazard known before purchase
- Noise data used to verify noise minimisation

Sanders



Sanders – relative hazard?



What is key for purchasers of sanders?

- Manufacturers claim 17 dB difference
 - HSL found less than 7 dB in normal use
- Why no action by purchasers?
 - Manufacturers data known to be unreliable?
 - Difference in hazard much greater than risk?
 - Duration of use too short?
 - Apathy? Ignorance? Confusion? ...

Wood chippers



Wood chippers

- L_{pA} measurements simple at operator's position
 - L_{pA} values indicate high noise hazard
- Up to 7 dB difference between competing machines
 - Choice for purchasers
- Noise test codes for L_{WA}
 - Unclear – too many decisions by tester (OND)
 - Scope for L_{WA} emission values to vary by 6 dB

A model noise declaration

- Stakeholders seek model declaration
- See Brereton InterNoise16
 - L_{pA} according to standards
 - L_{WA} according to OND
 - L_{pCpeak} above threshold
- Challenging task!

The tables below give the noise emission values required by Machinery Directive 2006/42/EC.

Emission sound pressure levels at the operator position (infeed hopper)
The emission sound pressure level is a measure of how loud a machine is at a specified position for a specified operation when working on open ground. The sound pressure level will be higher than the emission sound pressure level if noise cannot escape into the open air, for example, because of vegetation, buildings, walls or ceilings. The emission sound pressure level can be used as a preliminary guide to noise hazard and to compare the noise hazard of woodchippers measured in the same way doing the same task, that is, measured to the same standard.
You must manage the noise hazard of this wood chipper to avoid putting operators' hearing at risk.

DECLARED DUAL-NUMBER NOISE EMISSION VALUES in accordance with ISO 4871	
Measured A-weighted emission sound pressure level, L_{pA} (ref. 20 μ Pa) at the operator's position at the infeed hopper, in decibels	113
Uncertainty K_{pA} , in decibels	4
Measured C-weighted peak emission sound pressure level, L_{pCpeak} (ref. 20 μ Pa) at the operator's position, in decibels	141

The numerical values reported here are measured according to the noise test code given in BS EN 13525:2005 + A2:2009, using the basic standard BS EN ISO 11201:2010. During these emission tests the woodchipper was chipping pine laths.

NOTES:
The standard operating condition (chipping 4m x 50mm x 50mm pine laths) provide emission L_{pA} values that are particularly noisy. A common operating condition is when chipping pine logs; under these conditions:

- The measured A-weighted emission sound pressure level L_{pA} is 106 dB re 20 μ Pa with uncertainty K_{pA} of 3 dB.
- The measured C-weighted peak emission sound pressure level L_{pCpeak} is 130 dB re 20 μ Pa.

Sound power level of the woodchipper
The sound power is a measure of how much noise a machine produces rather than how loud it is at any position. It can be used to compare the noise emission with other woodchippers measured in the same way doing the same task, that is, measured to the same standard. The table below gives the guaranteed sound power level obtained in accordance with the Outdoor Equipment Directive.

Noise declaration in accordance with the Outdoor Noise Directive	
Measured A-weighted sound power level L_{WA} (dB re 1 pW)	116
Guaranteed A-weighted sound power level (95% certainty) L_{WA} (dB re 1 pW)	119

NOTES:
The operating conditions were chipping single pine logs in accordance with the chipper/shredder noise test code in Annex III, Part B of the Outdoor Equipment Directive as amended by M1 (2005) and C1 (2006).

Controlling the noise risk for the operator
The emission sound pressure levels at the operator's ear during the operation of this woodchipper may reach 113 dB(A). It is likely that operator noise exposures will exceed the upper action values defined in Directive 2003/10/EC during normal use of this machine. Hearing protection is required for the operator that will reduce the L_{pA} at the ear to below 87 dB and preferably to between 75 to 80 dB during normal working operations. It may be necessary to use a combination of earplugs and earmuffs to obtain adequate protection. Hearing protectors that provide sufficient protection against these high continuous emission sound pressure levels are likely to provide adequate protection against the declared peak sound pressure levels.
Operators wearing hearing protection adequate to protect against noise risks from this machine may not be able to hear warning signals or other signs of danger, for example, approaching vehicles when working at roadsides.
The noisiest location during chipping is in front of the infeed hopper. The operator can reduce their noise exposure by moving away from the front of the hopper once it is filled.

Figure 2 – Sample noise declaration for woodchippers

Printing machinery

- L_{pA} values provided
- Reliable indicator of real use risk
 - Large machines – L_{WA} not required
 - Operating conditions represent noise at workstations
 - Declared noise describes effectiveness of Enclosures, Havens, ...



Does Buy Quiet work?

- Yes, Buy Quiet works from first principles
 - Recognise hazard
 - Specify for noise
 - Evaluate against specification
 - Give preference to lower noise machinery
- Must be genuine differences between machines
 - Works for high value, high risk, eg printing
- Can we make it work for moderate purchases?

How do we get purchasers started?

- Examples of the benefit of Buy Quiet
 - Where are they?
- SIMPLIFICATION
 - Focus on hazard – L_{pA}
 - L_{pA} gives comparison based on hazard
 - Tabulation of ‘emission’ corrections
- Can use be made of manufacturers’ noise data?

What will make the system work?

- Willing participation by all manufacturers
- Knowledgeable participation by purchasers
- Reliable noise test codes
- SIMPLIFICATION
- Enforcement
- ...

What else might work?

- Tabulation of what we know
 - Guide values to noise by industry
 - Identification of high and low noise processes
 - Naming of high and low noise machines
 - Participation by willing manufacturers
- SIMPLIFICATION

Will a change in presentation help?

- Promote low noise with colour
- Noise rainbow?
- Describe noise hazard
 - SPL or emission SPL?
 - Data verified accurate?

Noise level	Rainbow colour
More than 95	Red
90-95	Orange
85-90	Yellow
80-85	Green
75-80	Blue
70-75	Violet
Less than 70	Black

What next steps?

- Choose targets carefully
 - Differences in hazard must also apply to risk
 - Moderate selling, moderate size machines
 - With obvious higher and lower noise models
 - Easier management of quieter option
 - Hearing protection unnecessary
- SIMPLIFICATION

Any questions?

