

Some pointers when considering noise

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I quite often come across companies who have received incorrect advice about noise and have got into difficulties when trying to enforce the wearing of hearing protection where people do not believe it is necessary. This goes against one of the key approaches to effective health and safety management which is that you can “sell” the control measures to those affected. So where are mistakes being made?

Noise level and noise exposure

In most cases, the legal requirements relate to noise *exposure* and not noise *level*. The only time this is not true is where you have high peak noise levels, say from nail guns. Noise exposure is the combination of noise level and the time to which you are exposed to it. And that is where we have the first problem, because noise is measured using a logarithmic scale, dB. Unfortunately, this means that you can't multiply noise level by the exposure time, much as you would multiply electrical power by time to get energy in kWh.

What we have instead is a daily equivalent noise exposure ($L_{ep,D}$) which is specified in dB, ie exactly the same units as noise level. And that is where the confusion arises. An $L_{ep,D}$ of 80 dB is a pattern of exposure to maybe different levels for different times which gives you the same noise “dose” as a continuous level of 80 dB for 8 hours.

Mistake No. 1 Noise level

This leads us to the first mistake where people take the worst case noise level on a machine and base their requirements on this. One recent case was a hopper which had a noise level of 85 dB(A) when standing next to it. But once loaded, you didn't need to go anywhere near it. The other parts of the extensive machine were much quieter, but following the consultant's advice, the company had a mandatory hearing protection requirement on the whole line because of the hopper noise.

Mistake No. 2 Duration

Another case had an 85 dB(A) noise level when next to one part of the machine which was never accessed when it was running. What actually happened was that it took 10 minutes to set up the machine, at about 75 dB(A), and then a very short run length of about 20 minutes during which the operators were exposed to about 81 dB(A). The run lengths and noise levels in different positions were not taken into account by the assessor and the company were having difficulties enforcing their mandatory hearing protection policy.

So how do we measure noise exposure?

There are two ways of doing this.

Sampling monitors

These may be a badge type which operators wear over a significant period, say a complete shift. Data from these can then be downloaded to a PC which will give you both an $L_{ep,D}$ value and a graph. They give a very accurate snapshot during that shift, but are limited in their “what if” capability.

Level measurement and calculation

The other approach is to measure noise levels for different activities or positions on the machine and then use these and the exposure times to calculate the noise exposure.

This is less accurate than sampling monitors as it does depend on getting the exposure durations correct, but it has the big advantage of being able to ask questions like, “What is the effect of short or longer production runs?”

You can either use the ready reckoner process or spreadsheets to calculate the exposure. I created the SSS spreadsheet many years ago for this purpose, but the HSE have recently introduced their own. All methods can be accessed from the references below.

By far the best approach is to use both methods. Use the level measurement/calculation method for to test the sensitivity of the noise exposure to different conditions and take samples for the snapshot and use these to cross-reference your calculations.

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Hours	Mins	dBA	f
		75	
		76	
1		77	0.009
		78	
		79	
2		80	0.025
		81	
		82	
3		83	0.075
		84	
1		85	0.040
	30	86	0.025
		87	
		88	
	30	89	0.050
		90	
		91	
		92	
		93	
		94	
		95	
		f TOT	0.223
		L _{ep,D}	83

Enter the exposure times for different noise levels and this calculator works out the daily noise exposure $L_{ep,D}$

Not shown on this view, but available in the same calculator, is the function where you can calculate $L_{ep,D}$ over a week. This is particularly useful where you have a great variety over the week or work shift patterns of say, 3 x 12 hour shifts.

This is available from

www.strategicsafety.co.uk/Excel/NoiseCalc.xls

Mistake No. 3 Reliance on hearing protection

As with all risks, personal protective equipment is the least preferred control measure. However, some organisations fail to take even simple measures to control noise at source.

One recent example was a continuous waste stream from a roll label press which passed down a tube made from 40mm plastic pipe. The noise it made as it rubbed on the edge of this pipe was amplified by the pipe's megaphone effect and caused a noise level of 86 dB(A). Preventing this pipe rubbing action by a bit of coat hanger wire reduced the noise level to 78 dB(A). The operators had complained but the company had not taken this trivial action. And in other cases, I have experienced a group of similar machines, one of which was much noisier than the others; it was quite obvious that a bearing had failed but no action was being taken.

Mandatory hearing protection areas

In some cases, noise assessments will conclude that an area is one where the wearing of hearing protection is mandatory. There are several questions you must address:

Does the high noise exposure occur only when the machine is running?

If so, you need to put a statement under the mandatory signs saying "only when machine is running".

If there are short-term visitors, do they need to wear PPE?

Technically, their exposure is low, but in my opinion, the only way you can "police" your control measures is to require everyone to wear hearing protection.

Is there an exception to this?

The one exception to this is where the exposure of some people is low and the wearing of PPE increases other risks. I have one client who has equipment which requires mandatory PPE for operators but forklift trucks deliver material occasionally. The forklift truck drivers have a low noise exposure and, were they to wear hearing protection, then other risks would increase. What they have done is make it clear to all people by methods including notices, that short-term visits by forklift trucks do not require the wearing of hearing protection.

Noise can be a major health hazard, but if it is approached sensibly, then the risks can be controlled.

Can we get help from Strategic Safety Systems?

Strategic Safety Systems provide a service of noise assessment, using sampling monitors and/or level measurement and calculation where appropriate. We can also provide advice if required.

Contact us at info@strategicsafety.co.uk