

# Article: Killer Noise!



## We're all killing ourselves with noise!

Persistent noise in the workplace more than doubles the risk of heart disease, according to Canadian research (Wen Qi Gan, 2010). With Over 1 million employees in Great Britain exposed to levels of noise that puts their hearing at risk (HSE), this provides a worrying figure, presenting a significant additional risk of heart disease to Britain's workers.

The researchers looked at 6307 people in the US, all of who were employed and all over the age of 20. They then went on to compare those exposed to 'loud' noise at work against those who were not - with "loud" defined as loud enough to force workers to shout to be heard. The study found that employees who endure chronic exposure to noise on the job are more than two times likelier to suffer serious heart disease and high blood pressure than those in quieter occupations.

A further report from the World Health Organization (WHO, 2005) identifies a chronic 50dB night time level (this means a persistent level at 50dB) as being sufficient to cause strain on the cardiovascular system. Translated into the workplace, where levels of 80dBA are considered acceptable, and even taking into account the fact that this is daytime noise, it clearly presents a significant potential problem.

It has been known for some time that continual noise exposure presents more health risks than just hearing damage. A quick search on Wikipedia will show these to include hypertension, bowel movements, sleep disturbance, tinnitus and even premature ejaculation (Wikipedia)! The relative risks of many of these issues are not clear which is why the Canadian study is important. This new information presents a cause for concern and employers are going to have to find new ways to look at noise exposure.

The problem faced by industry, then is to deal with this as a problem that cannot be solved with the use of hearing protection alone! That is something that could be phenomenally costly to businesses and technically very difficult to achieve

## What do you mean hearing protection doesn't work?

The Noise at Work Regulations 2005 (Health and Safety Executive, 2005) does not tackle the issue of conditions other than Noise Induced Hearing Loss. What the regulations and guidance does say, however, is that noise should always be reduced to a lower level as is reasonably practicable. This is irrespective of the action values given and any effect of PPE in the form of hearing protection.

Logically then, if there is a responsibility to reduce the risk caused by noise exposure and we now know that persistent noise well below the level of 80dBA presents a risk of heart disease, then surely there is a direct duty to significantly reduce levels well below the current best practice.

There is an added complication, which is that, according to the regulation guidance, ‘protectors that reduce the level at the ear to below 70dBA should be avoided’ (Health and Safety Executive, 2005, p. 81). This may sound contradictory to the requirement to reduce noise to as lower level as possible, but relates to hearing protection of too high a protection value ‘masking’ other sounds such as warnings and alarms.

Before being able to even think of reducing noise to these incredibly low levels, it is essential that companies begin with the implementation of a hearing conservation programme, as this will form the foundations of any future noise reduction efforts.

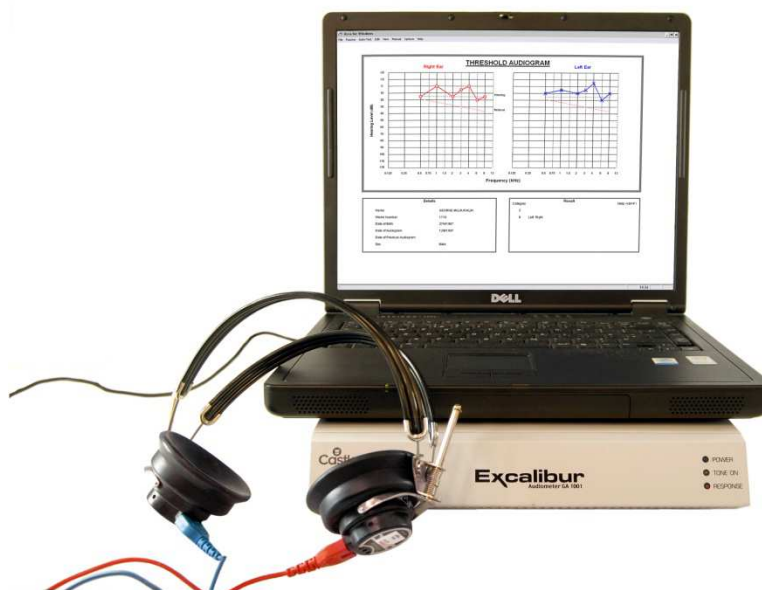
## The Secrets of Hearing Conservation...

Hearing conservation programmes are the key to preventing hearing damage to employees from exposure in the workplace. This is a process that involves 3 main parts, all of which must be effectively implemented for the system to work; Health Surveillance, Risk Assessment and Noise Control.

### The One Secret of Health Surveillance!

Health surveillance for noise induced hearing loss really means only one thing – hearing tests! Sure there will be questionnaires and interviews and that is necessary for the system to be complete. Without audiometry, however, there can be no system.

To be able to conduct a hearing testing programme, you are going to need an Audiometer (possibly in a noise reducing booth), a person who is competent to conduct the tests and a system for dealing with results that show a potential problem. Your competent person can be trained to be such by attending the BSA (British Society of Audiology) course such as the one run by Castle Group.



## Picture of Castle Excalibur, PC-based Audiometer

Now here's the real trick; you have to find the people who need looking after! Not perhaps what you might expect, but it is a fact that there will be only a few people in any organisation that are truly at risk of suffering noise induced hearing loss. These people are the ones who may simply be more susceptible to hearing damage, they might be the ones who don't wear their hearing protection properly, or they might just be exposed more than anyone realised.

Find these people and you can really make a difference because it is easy to focus on a few individuals and solve the problem. Audiometric testing programmes are the ideal way to find these key people and it is quite easy to learn how to interpret the results to highlight employees who are showing the very first signs of damage.

## Risk Assessment is Simple!

Assessing the risk of injury to an employee from noise means working out how much noise they are being exposed to, and it is really as simple as that! Up to the recent Canadian study, we have been quite sure what levels of exposure are going to cause problems and these are dealt with in the regulations. There is even more reason now to know what the levels are so that any reductions can be quantified in consideration of all the risks posed by the noise.

To determine how much noise an employee is being exposed to means measuring the levels. There really isn't another way to do this properly and without it, the solutions are going to be incomplete. If there needed to be another reason, then it is also true that no claims will be defensible without actual measurements from the workplace.

## The biggest mistakes



There are only really 2 mistakes consistently made by people carrying out noise at work assessments and this includes some 'consultants', who clearly need to read this article.

The first mistake is a really basic one that is simple to correct and concerns the measurement position. The guidance to the regulations says that the noise should be measured at the position of the operators head, preferably without the operator present! If they are needed to be present then the measurement should be made at least 15 cm away but near enough to be representative. See the picture of a Castle SONUS sound meter in the correct measuring position for this task

Without proper training, there is a strong temptation to produce noise maps as a means of carrying out risk assessment. Through work at Castle Group, we have also seen reports produced by so-called noise consultants with noise maps at their core. Noise



maps are simply a plan of a workplace with noise levels shown at various points and sometimes with contour lines joining levels of equal loudness together, the idea being to show what noise levels are at any given place in a factory. For risk assessment, measurements should only ever be taken at the operators head position and everywhere that operator is going

to work during the course of a day – noise maps have no place in this process and should only be used if there is a specific need – for example, in noise control when mapping out noise activated signage (shown).

The second mistake people make is based on the understanding of exposure and what the action values actually mean. It is not a simple concept and can catch out the unaware.

The Lower action value in the Noise at Work Regulations is set at 80dBA, but this is only half the story. That value is only relevant if the exposure is for 8 hours (that’s just an arbitrary reference ‘day’). If an employee works at a machine where the sound level is a constant 80dBA, then he will only be at the action level if he stays in that noise for a full 8 hours. If the process is only worked for 4 hours, then that employee would only have half the exposure.

To put it another way, if the noise level is well above 80 or 85dBA, but the time spent in that noise is only short such that the exposure is below 80dBA, then the action value is not exceeded. Just be careful that this time is NEVER exceeded! The fact we use decibels makes this calculation more complicated, but the HSE website has a calculator on it, that simply gives you the answer. For the example above, the answer would be 77dBA (see picture)

<b>Exposure Calculator</b>				
	<b>Noise Level (<math>L_{Aeq}</math> dB)</b>	<b>Exposure duration (hours)</b>	<b>Exposure points (job/task)</b>	<b>Exposure points per hour</b>
Job / task 1	80	4	16	4
Job / task 2				
Job / task 3				
Job / task 4				
Job / task 5				
Job / task 6				
Job / task 7				
Job / task 8				
	<b>Total duration</b>	<b>4</b>		
	<b>Daily noise exposure (<math>L_{EP,d}</math>)</b>	<b>77 dB</b>	<b>16 points</b>	

The only further complication on this is the fact that an employee may well work on 2 or more different processes in one 8 hour period. The HSE calculator simply deals with this by combining the exposures for each task (see picture)

<b>Exposure Calculator</b>				
	<b>Noise Level (<math>L_{Aeq}</math> dB)</b>	<b>Exposure duration (hours)</b>	<b>Exposure points (job/task)</b>	<b>Exposure points per hour</b>
Job / task 1	80	4	16	4
Job / task 2	84	3	30	10
Job / task 3				
Job / task 4				
Job / task 5				
Job / task 6				
Job / task 7				
Job / task 8				
<b>Total duration</b>		<b>7</b>		
<b>Daily noise exposure (<math>L_{EP,d}</math>)</b>		<b>82 dB</b>	<b>46 points</b>	

## Noise Control is where it's at!

It is even implicit in the title of the law; 'The Control of Noise at Work Regulations 2005'. So the legislators are very keen that 'control' is the way to deal with noise in the workplace. This is also backed up by the fact that hearing protection must only be considered as a 'last resort' measure. As we now know, hearing protection alone is not going to protect against some of the 'other' risks associated with noise at work.

Controlling noise using engineering means is what we are talking about and if you want to become a noise control engineer then it will take years to learn. The point is that health and safety professionals cannot be expected to design or implement noise control measures. For that, you need a specialist.

Having said that, there are some actions that can be taken that can give significant results and there are other things that should be treated with extreme caution.

## Absorption

It's a lovely thought to put special materials on the walls to 'absorb' all the noise. This is a bit of wishful thinking though as the results will be limited compared with the cost of installation. Absorption certainly has a place as part of a control programme, but should only be used following the advice of a noise control expert.

## Enclosures

A lot of focus is often put on enclosing machinery to reduce the noise. This is a very expensive operation and has severe problems associated with it such as ventilation, access and on-going maintenance. For some machinery, enclosures may be the only solution, but once again, these should be specified and installed under professional guidance.

## Air noise

This is an area where significant improvements can be made for minimal input. Ensuring leaks are controlled, low-noise nozzles on blowing lines are used and exhaust filters are all working properly highlights just a few examples of actions that can lead to significant noise reductions. The problem often seen here is the upkeep of these measures, which has to be on-going to ensure their effectiveness.

## Engineering and Maintenance

Well maintained machinery makes less noise – it really is as simple as that. Following on from that, to reduce the inherent noise a machine or process emits will require an engineering approach. Very often, there is a huge amount that can be done by someone who knows what they are looking for and this can often be enough to avoid the use of enclosures and absorption methods.

## It's a Circle of Life kind of thing

Hearing conservation should be viewed as a circular process where all the parts highlighted above are linked and interdependent. This might sound obvious but there are many companies who really don't have a fully functional line of communication between Health and Safety and Occupational Health! The results of audiometric testing should trigger specific assessments, which, in turn should inform and guide the process of control and the use of PPE. Audiometric testing should also be prompted by risk assessments, highlighting certain people in high risk jobs. And round it goes until you end up with an air-tight system that truly stops people going deaf at work!

## Moving on...

So where does that leave the Canadian study? It is early days for information like this and it is, after all, only one study. Over time, information like this cannot be ignored though and the control of noise in the workplace is going to have to undergo a step-change at some point if we are going to have a positive effect on the health of the nation.

## The Author

Simon Bull is a leading expert in the fields of Safety and environmental compliance. He is Managing Director of Castle Group Ltd, Safety and Environmental Compliance specialists and has been involved

with health and safety and environmental issues for 20 years. He regularly lectures on a variety of health, safety and environmental subjects and is often asked to speak at regional meetings to groups of professionals.

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# Simon Bull

## Biography and Fact Sheet

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Simon is a leading expert in the fields of Safety and environmental compliance. He has been involved with health and safety and environmental issues for 20 years, and was instrumental in the early stages of the assessment of hand-arm vibration. He regularly lectures on a variety of health, safety and environmental subjects and is often asked to speak at regional meetings to groups of professionals.

*It is to Castle's credit that they have offered these free seminars. City of York Council has done business with Castle in the past and today's seminar can only reinforce our business relationship. (John Stokes – City of York Council)*

*I was very impressed with your road show on Thursday. It was more informative and professional (and less of a hard sell) than I had thought it might be. I think it showed Castle in a very strong, professional light and I hope they generate the business they deserve to.*

*(Richard C Topliss - Croft Occupational Hygiene Ltd.)*

Simon is Managing Director of Castle Group, specialist Compliance Company and has a passion for good practice within the safety and environmental professions. He has appeared on TV shows including 'Inside out' looking at vibration caused by pot-holes in the road and has been on radio on numerous occasions. He has also been interviewed for articles in numerous journals, magazines and newspapers.

*Simon is very good at thinking on his feet and giving a comprehensive answer to any question put to him. I always know I can rely on Simon for a good, well balanced quote when looking for a reaction to breaking news.*

*(Laura Crothers, Scarborough Evening News)*

Simon is able to provide informed and entertaining comment on many areas of health and safety, or environmental issues and is just as comfortable talking about running a burgeoning business in a struggling economy.

To book Simon for an interview, call him on 01723584250 or 07768835822

