

Silence is golden

To avoid effects such as occupational deafness and hand-arm vibration, plants must adopt a best practice approach to noisy environments and processes. Steed Webzell reports

Keeping up to date with the legal requirements, and the latest monitoring instruments and equipment available to minimise noise and vibration problems, is never easy, particularly amid increasingly busy plant engineering schedules. The temptation is always there to cut corners: indeed, some might even query whether they need to carry out risk assessments at all.

If you're in that camp, note that, according to the HSE, more than a million employees in Great Britain are exposed to levels of noise that may put their hearing at risk – and these people must, by law, be protected. Why? Because, once noise-induced hearing loss has taken place, it is irreversible. Throw in the increasing UK claim culture and clearly companies must comply with their legal duties, as detailed in the Control of Noise at Work Regulations 2005, where mandatory limits for daily noise exposure are specified.

According to Pulsar Instruments, a simple five-step guide will help plant managers and engineers toe the party line on noise. First, establish whether there are any noise hazards within the workplace – and remember to use an acoustic calibrator to check your sound level meter before and after each measurement session. Secondly, identify all employees who might be at risk.

The third step requires a detailed series of noise measurements to determine ballpark exposures of those at risk. Pulsar says that the person carrying out the work should be competent in the use of a sound level meter compliant to BS EN 61672-1:2003 Class 1 or Class 2. The HSE exposure calculator spreadsheet (www.hse.gov.uk/noise/calculator.htm) can then be used to determine exposure level.

Step four is about developing a 'noise control action plan' – a list of prioritised actions to solve immediate problems and to deal properly with the general duty to reduce



noise levels in the workplace. Where noise can't be reduced at source, hearing protection must be provided. Refer to the HSE's publication 'Controlling noise at work' for full information.

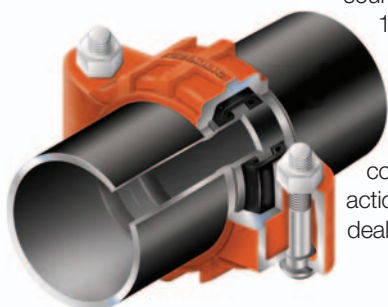
Finally, step five: the effectiveness of all noise control programmes should be reviewed regularly. This will be necessary particularly if new equipment has been introduced or there have been changes to the shopfloor layout or working hours.

Maintenance and repair specialist Eriks agrees that a noise assessment programme is the best way forward. And while this may seem like overkill – particularly when it appears that a simple pair of ear defenders is all that's required – if the wrong specification is chosen, they may be ineffective for the hazard concerned.

Seeing is believing

Sperian (Eriks' hearing protection partner) can assess current levels of protection and specify any necessary changes. One valuable tool is the Quiet Dose in-ear microphone system, which measures noise levels experienced by employees and enables employers to amend ear protection and shift patterns to comply with safety legislation. Dosimeters are usually worn on the shoulder of the person being monitored and measure noise exposure levels throughout the working day. This is particularly effective for workers with unpredictable work patterns, those on the move, or people operating in confined or restricted areas.

Of course, noise doesn't only emanate from





processes and equipment: resonances carried through piping systems are increasingly a challenge for plant managers, engineers and contractors. "Reasons include changing design requirements that place mechanical rooms on intermediate and top-floor building levels, as well as greater use of lightweight construction materials that tend to vibrate more than traditional heavy materials," explains Larry Thau, vice president of engineering at Victaulic.

Confined spaces

Victaulic's solution involves a grooved piping system that the company says is up to three times faster to install than welded pipework, and easier and more reliable than threading or flanging. The flexibility of grooved-pipe couplings reduces the transmission of stresses through piping, while their gasket and ductile iron housing arrangement combines to dampen vibration, leading to good sound attenuation. Victaulic's system is designed for roll-grooved or cut-grooved standard pipe, or roll-grooved light wall pipe, and, apart from being suitable for new build, works well with retrofits.

That point is confirmed by contractor Briggs & Forrester MEP Division, which used the system during its refurbishment of a large hotel that posed structural and access problems. The project included a sub-basement mechanical room where the chillers and boilers were located. Vertical risers ran to mechanical rooms on the ground and first floors, while another plant room, housing dry air coolers to supply the chillers with condenser water, was located on the 11th floor.


"With Victaulic, you need very little room to get in to make a mechanical joint," states Bill Teasdale, contracts director at Briggs & Forrester. "It's quicker and easier than a conventional system. If you have to change something and it's welded, it's expensive and time-consuming to remove it and re-weld it."

Meanwhile, vibration is the equal of noise in the workplace menace stakes, so it's an aspect requiring more than a cursory thought. And don't be lulled into a false sense of security by apparently comfortable figures. An HSE report last year concerning hand-held electric hammers, for example, showed that vibration emissions data provided by manufacturers under EN 60745 was generally well below the figures obtained by the Health and Safety Laboratory for the types of tool assessed.

Moreover, manufacturers' data also correlated poorly with real world field vibration values.

This is further confirmation of what every plant engineer ought to know – that you need to be careful with supplier data on risk assessments. The Industrial Noise and Vibration Centre says it knows of several techniques that suppliers might use to reduce their declared vibration values – by as much as 50% – while still following test protocols. You have been warned.

In a recent high profile case, electrical engineer Graeme Kelly has been awarded substantial compensation after suffering permanent damage to his hands, caused by vibrating tools used at work. Kelly developed carpal tunnel and hand arm vibration (HAV) syndrome after working with vibrating tools for 34 years at De La Rue Currency in Gateshead. His employer failed to prevent him from being exposed to excessive levels of vibration, which led to the conditions. The company admitted liability and agreed an out-of-court settlement.

"The control of vibration at work regulations is clear about what employers need to do to prevent these sorts of conditions," comments David Mole of Thompsons Solicitors. "The government constantly attacks health and safety regulations, but cases like this demonstrate how regulations, if they are properly observed, are there to protect employers from expensive legal action, as much as they are to protect the health of employees." 

Left and centre:
Pulsar noise level instrumentation in action on plant
Far left: Victaulic's grooved piping system
Left: Hansford Sensor instrument for machine vibration sensing

Technology shake-up

For vibration-prone machinery, sensors such as the new HS-109 Series vibration device, from Hansford Sensors, can prove useful. Like many other tri-axial accelerometers, this unit has been designed to be used both offline and as a permanently-mounted sensor on industrial machinery, such as fans, motors, pumps, compressors, centrifuges, conveyers, air handling units, gearboxes, rolls, dryers, presses, HVAC machinery and process equipment.

Alternatively, for workers on the move, a mobile device has been introduced by Reactec that helps monitor HAV exposure. The company behind the HAVmeter, which monitors and reports the amount of vibration workers are exposed to when using power tools, has now launched SMARTcharger.

This device allows operatives to work remotely for weeks at a time, before having to return their HAVmeters to a base station – allowing them to be offered to more mobile workers. As well as acting as a valuable health and safety device, the device can also be used to monitor workforce operations and tool utilisation.