

# Let the quiet

ONCE a machine or production line comes on site, it becomes your responsibility to deal with any noise issues. If the noise level is 85dB(A) or more, the need to introduce PPE, audiometry and a risk management programme will increase your operating costs. In last month's HSW we discussed simple engineering tweaks to attenuate noisy plant without bulky and costly enclosures. But how much easier would it be to avoid the noise problem at the start?

The obvious solution is to set a noise specification for plant suppliers. But unless you get this right, you are potentially giving them a licence to spend your money on noise control measures that you may even have to discard once the plant is in production. The key phrase to remember is: don't let your suppliers spend your money on noise control measures that are not best practice.

As most suppliers have little or no expertise when it comes to noise, they tend to purchase off-the-shelf enclosures, silencers and materials which they then mark up and sell on, instead of going through a diagnostic process to determine why the machine is noisy.

For example, in one case, supposedly quiet versions of wrapping machines had been fitted with double-skinned "acoustic" guards filled with exotic mass-loaded foam at a cost of around £4000 extra per machine. But it was obvious to the trained eye and ear that the improved guards had no effect, as the noise was all escaping through gaps in the guarding. On delivery, the machines were no quieter than standard units. The client had to invoke the penalty clause for not meeting the noise specification in the purchasing policy.

## Tough specification

The main elements to include in any practical "buy quiet" policy are as follows.

- ☒ Set a target noise level; typically 79dB(A) to 82dB(A).
- ☒ Prescribe a simple measurement procedure and results format for all suppliers.
- ☒ Insist noise levels must be measured under realistic operating conditions.
- ☒ Insist suppliers provide a detailed diagnostic process (see last month's HSW or [www.healthandsafetyprofessional.co.uk/think-outside-the-box](http://www.healthandsafetyprofessional.co.uk/think-outside-the-box)) to justify any noise control measures they may propose.

- ☒ Purchase subject to the supplier using an agreed set of noise control modifications based on an accurate diagnosis.
- ☒ Insert a penalty clause in the contract that will be triggered if they don't implement agreed noise control measures or if the measures don't achieve the target noise level for the machine.

As the objective is to achieve an installed noise level of less than 80dB(A) (where the process needs no regulation under the Noise at Work Regulations), or less than 85dB(A) (advisory PPE, no audiometry), the target noise level for an individual machine has to be set lower than these figures to allow for the additive effect of multiple pieces of plant. The measurement used is the highest (Leq) noise level at any point 1m from the plant at a height of 1.5m and at any operator position(s) under realistic operating conditions.

Any noise control measures suggested by your suppliers must be justified by supporting evidence, based on the diagnostic process outlined last month. If they can't provide this information, their suggestions are based on guesswork and are highly unlikely to constitute best practice, and that has cost and productivity implications. If the supplier doesn't have the necessary expertise, then you should look for an expert engineering evaluation of the options (at the supplier or on similar plant elsewhere) and make your purchase of the plant subject to implementation of agreed best practice controls.

## Rapid response

The following are some of the most common problems and excuses you're likely to come up against when implementing a noise purchasing standard, along with suggested responses.

- ☒ *"It's a bespoke installation, assembled on your site, so we can't give you noise levels."*

The installation uses standard motors, pumps, fans, etc, so while it might not be completely accurate, it's almost always possible to provide reasonable estimates of noise levels.

- ☒ *"The reason you've measured 85dB(A) while we quoted 82dB(A) is due to the room correction. Your production facility is a different acoustic environment from our test area."*



Peter Wilson summarises the ways to ensure a "buy quiet" policy to reduce plant noise is practical and effective

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While it's true you should apply a room correction to noise measurement data, unless you install your plant in a room that is only 50cm larger than the machine, in practice this correction is less than 0.5dB so is negligible.

✘ *"The measured noise level for this machine is 81.8dB(A)."*

Any noise data with tenths of a dB is suspect, as measurement accuracy is limited to the nearest 0.5dB, or more often the nearest 1dB. It's not unknown for a supplier to make several measurements round the quiet side of a machine (where no one ever goes) and only two readings on the operator side so that, when averaged, it gives the right answer (adjusting the number of measurements as required).

Make sure the noise data you get matches your use of the plant under normal operating conditions. In the case of fans, for example, there is a fifth power law relating noise to fan speed. Increasing fan speed slightly (after installation and noise testing) results in a substantial increase in noise.

### Case specific

One firm's order for several multi-spindle auto lathes was on the point of being cancelled as they generated 90dB(A) rather than the target 83dB(A). The company stood firm to its buy quiet policy and, based on accurate diagnosis, a change in the assembly procedure was recommended that reduced the noise to 83dB(A) at negligible cost. Subsequent purchasers received quieter machines as a result.

In another case, a weighing machine supplier had little noise expertise and was struggling to meet the 75dB(A) noise specification other than via enclosure (without proof that this was the best option). The purchaser insisted that the noise control options be evaluated independently during proving trials. The buyer went ahead with the machines subject to the implementation of a set of engineering modifications based on an accurate diagnosis of the noise sources. These reduced the noise from 83dB(A) down to 75dB(A) at a fraction of the cost of enclosure and without any of the hygiene and maintenance issues.

Sometimes, part of an effective noise purchasing policy can be something as simple as a change in the specification of components. Some electric motors are substantially noisier than others, for example. In one case, the motor on one of two otherwise identical oil pumps was 12dB quieter than the other. The ordering system was changed in favour of the quieter units, which also tend to be more efficient. This example illustrates the benefits of integrating health and safety requirements into buying decisions: a slightly lower capital cost for a noisy piece of equipment could be more than offset by the costs of PPE and risk management.

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