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# FACTS

European Agency for Safety and Health at Work

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## An introduction to noise at work

Every day, millions of employees in Europe are exposed to noise at work and all the risks this can entail. While noise is most obviously a problem in industries such as manufacturing and construction, it can also be an issue in a wide range of other working environments, from call centres to schools, orchestra pits to bars.

One in five of Europe's workers has to raise their voices to be heard for at least half of the time that they are at work and 7 % suffer from work-related hearing difficulties <sup>(1)</sup>. Noise-induced hearing loss is the most common reported occupational disease in the EU <sup>(2)</sup>.

This factsheet outlines the key issues surrounding noise at work, including the risks, legal responsibilities and solutions. Other factsheets deal with these issues in more detail, supported by online information and advice (<http://ew2005.osha.eu.int>).

### What is noise?

Noise is an unwanted sound; its intensity ('loudness') is measured in decibels (dB). The decibel scale is logarithmic, so a three decibel increase in the sound level already represents a doubling of the noise intensity. For example, a normal conversation may be about 65 dB and someone shouting typically can be around 80 dB. The difference is only 15 dB but the shouting is 30 times as intensive. To take into account the fact that the human ear has different sensitivities to different frequencies, the strength or intensity of noise is usually measured in A-weighted decibels (dB(A)).

It is not just the intensity that determines whether noise is hazardous. The duration of exposure is also very important. To take this into account, time-weighted average sound levels are used. For workplace noise, this is usually based on an eight-hour working day.

Other factors that can affect how hazardous noise is include the following.

- ☑ Impulsiveness — are there sound 'peaks' (for example, produced by electric arcs)?
- ☑ Frequency — measured in hertz (Hz). The pitch of a sound is the perception of a frequency. For example, 'concert pitch' (the 'A' above middle 'C') is 440 Hz.

- ☑ Time distribution — when the sound occurs and how often.

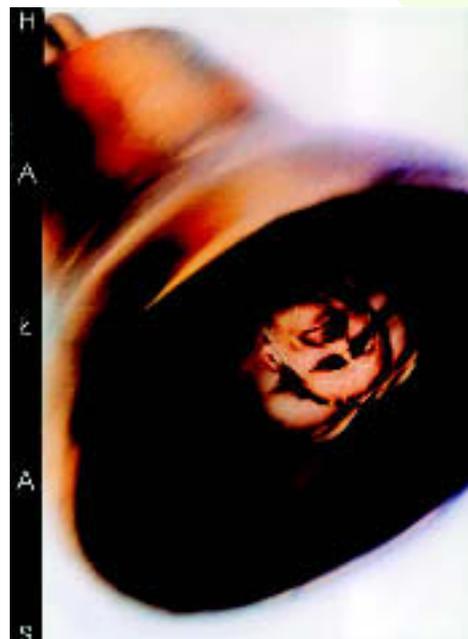
Noise need not be excessively loud to cause problems in the workplace. Noise can interact with other workplace hazards to increase risks to workers by, for example:

- ☑ increasing the risk of accidents by masking warning signals;
- ☑ interacting with exposure to some chemicals to further increase the risk of hearing loss; or
- ☑ being a causal factor in work-related stress.

### What problems can noise cause?

Exposure to noise may pose a variety of health and safety risks to workers.

- ☑ **Hearing loss:** Excessive noise damages the hair cells in the cochlea, part of the inner ear, leading to loss of hearing. 'In many countries, noise-induced hearing loss is the most prevalent irreversible industrial disease.' <sup>(3)</sup> It is estimated that the number of people in Europe with hearing difficulties is more than the population of France <sup>(4)</sup>.
- ☑ **Physiological effects:** There is evidence that exposure to noise has an effect on the cardiovascular system resulting in the release of catecholamines and an increase in blood pressure. Levels of catecholamines in blood (including epinephrine (adrenaline)) are associated with stress.



© "Noise" by Rafał Pankowski. Courtesy of the Occupational Safety Poster Competition organised by the Central Institute for Labour Protection - National Research Institute, Poland.

<sup>(1)</sup> EU-15 figures. Reported in Eurostat, *Work and health in the EU: a statistical portrait*, ISBN 92-894-7006-2.

<sup>(2)</sup> EU-15 figures. Reported in European Agency for Safety and Health at Work, *Data to describe the link between OSH and employability 2002*, ISBN 92-95007-66-2.

<sup>(3)</sup> World Health Organisation, *Prevention of noise-induced hearing loss*, 1997.

<sup>(4)</sup> SIH study group at the University of Maastricht (1999).

- ☑ **Work-related stress:** Work-related stress rarely has a single cause, and usually arises from an interaction of several risk factors. Noise in the work environment can be a stressor, even at quite low levels.
- ☑ **Increased risk of accidents:** High noise levels make it difficult for staff to hear and communicate, increasing the probability of accidents. Work-related stress (in which noise may be a factor) can compound this problem.

### Who is at risk?

Anyone who is exposed to noise is potentially at risk. The higher the noise level, and the longer you are exposed to it, the more risk you have of suffering harm from noise. In manufacturing and mining, 40 % of employees experience significant noise levels for more than half of their working time. For construction, the proportion is 35 % and in many other sectors, including agriculture, transport and communications, the figure is 20 %. It is not only manufacturing and other traditional industries where noise is a problem. Noise is being recognised as a problem in service sectors such as education and healthcare, bars and restaurants.

### How loud?

- ☑ A study of noise in kindergartens found average noise levels to be over 85 dB.
- ☑ During a performance of Swan Lake, a conductor was recorded as being exposed to 88 dB.
- ☑ Truck drivers can be exposed to 89 dB.
- ☑ Staff in nightclubs can be exposed to up to 100 dB.
- ☑ Noise on pig farms has been measured up to 115 dB.

### Employers' responsibilities

Employers have a legal duty to protect the health and safety of staff from all noise-related risks at work. They should:

- ☑ conduct a risk assessment — this may involve carrying out noise measurements, but should consider all the potential risks from noise (e.g. accidents as well as hearing loss);
- ☑ based on the risk assessment, put in place a programme of measures to:
  - where possible, eliminate sources of noise;
  - control noise at source;
  - reduce worker exposure by work organisation and workplace layout measures, including the marking of, and restriction of access to, workplace areas where workers are likely to be exposed to noise levels exceeding 85 dB(A);

- provide personal protective equipment to employees as a last resort;
- ☑ inform, consult, and train workers about the risks faced, low noise working measures, and how to use noise protection;
- ☑ monitor the risks and review preventive measures — this may include health surveillance.

### Employee involvement

Consulting the workforce is a legal requirement, and helps to ensure that the workers are committed to safety and health procedures and improvements. Using their knowledge helps to ensure hazards are correctly spotted and workable solutions implemented. Worker representatives have an important role in this process. Employees must be consulted on health and safety measures before the introduction of new technology or products.

Manufacturers of machinery and other equipment also have the responsibility to reduce noise levels. According to Directive 98/37/EC, machinery should be 'designed and constructed (so) that risks resulting from the emission of airborne noise are reduced to the lowest level!'

### Legislation

In 2003, Directive 2003/10/EC of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) was adopted. This directive is to be transposed into the national legislation of all Member States before 15 February 2006 <sup>(1)</sup>.

Article 5(1) of the directive requires that, taking into account technical progress and the measures available to control the risk at source, 'the risks arising from exposure to noise shall be eliminated at their source or reduced to a minimum'. The directive also sets a new daily exposure limit value of 87 dB(A).

<sup>(1)</sup> Replacing Directive 86/188/EEC.

### Where can I find more information?

This factsheet is part of the European Week for Safety and Health at Work 2005 campaign.

Additional factsheets and information on noise can be found at <http://ew2005.osha.eu.int>.

EU safety and health legislation is online at <http://europa.eu.int/eur-lex/>

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