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FACTS

European Agency for Safety and Health at Work

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The impact of noise at work

Exposure to noise at work can harm workers' health. The most well-known effect of noise at work is loss of hearing, a problem observed among coppersmiths in 1731. However, it can also exacerbate stress and increase the risk of accidents. This factsheet describes the effects of workplace noise.

Hearing impairment

Hearing impairment can be due to a mechanical blockage in the transmission of sound to the inner ear (conductive hearing loss) or damage to the hair cells in the cochlea, part of the inner ear (sensorineural hearing loss). Rarely, hearing impairment may also be caused by central auditory processing disorders (when the auditory centres of the brain are affected).

Noise-induced hearing loss

Noise-induced hearing loss (NIHL) is the most common occupational disease in Europe, accounting for about one third of all work-related diseases, ahead of skin and respiratory problems⁽¹⁾.

NIHL is usually caused by prolonged exposure to loud noise. The first symptom is normally the inability to hear high-pitched sounds. Unless the problem of excessive noise is addressed, a person's hearing will deteriorate further, including difficulties detecting lower-pitched sounds. This will normally occur in both ears. The damage of noise-induced hearing loss is permanent.

Hearing loss can occur without long-term exposures. Brief exposure to impulsive noises (even a single strong impulse), such as from gunshots or nail or rivet guns can have permanent effects, including loss of hearing and continuous tinnitus. Impulses can also split the eardrum membrane. This is painful but the damage is healable.

Tinnitus

Tinnitus is a ringing, hissing or booming sensation in your ears. Excessive exposure to noise increases the risk of tinnitus. If the noise is impulsive (e.g. blasting), the risk can rise substantially. Tinnitus can be the first sign that your hearing has been damaged by noise.

Noise and chemicals

Some dangerous substances are ototoxic (literally 'ear poisoning'). Workers exposed to some of these substances and to loud noise appear to be at greater risk of hearing damage than those exposed to either noise or the substances separately.

This synergy has been particularly noted between noise and some organic solvents, including toluene, styrene, and carbon disulphide. These substances may be used in noisy environments in sectors such as the plastics and printing industries, and paint and lacquer manufacturing.

Noise and pregnant workers

Exposure of pregnant workers to high noise levels at work can affect the unborn child. 'Prolonged exposure to loud noise may lead to increased blood pressure and tiredness. Experimental evidence suggests that prolonged exposure of the unborn child



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

⁽¹⁾ Reported in *Data to describe the link between OSH and employability*, European Agency for Safety and Health at Work, 2002, ISBN 92-95007-66-2.

⁽²⁾ Communication from the Commission on the guidelines on the assessment of the chemical, physical, and biological agents and industrial processes considered hazardous for the safety or health of pregnant workers and workers who have recently given birth or are breastfeeding (Council Directive 92/85/EEC).

⁽³⁾ Council Directive 92/85/EEC of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding.

to loud noise during pregnancy may have an effect on later hearing and that low frequencies have a greater potential for causing harm.⁽²⁾

Employers are required to assess the nature, degree, and duration of exposure of pregnant workers to noise⁽³⁾ and where there is a risk to the safety and health of the worker or of an effect on the pregnancy, the employer must adjust the working conditions of the pregnant woman to avoid exposure. It should be recognised that the use of personal protective equipment by the mother will not protect the unborn child from physical hazard.

Increased risk of accidents

This link between noise and accidents is recognised in the 'Noise directive'⁽⁴⁾, where there is a requirement for it to be considered specifically in the risk assessment for noise.

Noise can lead to accidents by:

- ✓ making it harder for workers to hear and correctly understand speech and signals;
- ✓ masking the sound of approaching danger or warning signals (e.g. reversing signals on vehicles);
- ✓ distracting workers, such as drivers;
- ✓ contributing to work-related stress that increases the cognitive load, increasing the likelihood of errors.

Disturbance of speech communication

Effective communication is essential in the workplace, whether it is a factory, building site, call centre, or school. Good speech communication⁽⁵⁾ requires a speech level at the ear of the listener that is at least 10 dB higher than the surrounding noise level.

Surrounding noise is very often felt as a distinct disturbance of speech communication, especially if:

- ✓ there is often surrounding noise;
- ✓ the listener has already a slight hearing loss;
- ✓ the speech is in a language that is not the listener's mother tongue; or
- ✓ the listener's physical or mental condition is affected by ill health, tiredness, or increased workload under time pressure.

The impact of this for occupational safety and health will vary depending upon the work environment. For example:

- ✓ surrounding noise may force teachers to raise their voices, leading to vocal problems;
- ✓ a verbal instruction may be misunderstood by a driver or mobile plant operator on a construction site due to background noise, leading to an accident.

Stress

Work-related stress occurs when the demands of the work environment exceed the workers' ability to cope with (or control) them⁽⁶⁾. There are many contributors (stressors) to work-related stress, and it is rare that a single causal factor leads to work-related stress.

The physical work environment can be a source of stress for workers. Occupational noise, even when it is not at a level that requires action to prevent hearing loss, can be a stressor (e.g. the frequent ringing of a telephone or the persistent hum of an air-conditioning unit), although its impact is usually in combination with other factors.

How noise affects workers' stress levels depends on a complex mix of factors including:

- ✓ the nature of the noise, including its volume, tone and predictability;
- ✓ the complexity of the task performed by the worker, for example, other people talking can be a stressor when tasks require concentration;
- ✓ the worker's occupation (e.g. musicians can suffer work-related stress as a result of concern over hearing loss);
- ✓ the worker him/herself. Noise levels that in some circumstances may be a contributor to stress, especially when that person is tired, can at other times be harmless.

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⁽⁷⁾.

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).

Further information

This factsheet is part of the European Week for Safety and Health at Work 2005 campaign. Additional factsheets and information on noise are available at <http://ew2005.osha.eu.int>. EU safety and health legislation is online at <http://europa.eu.int/eur-lex/>

⁽⁴⁾ 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 the physical agents (noise).

⁽⁵⁾ Where the listener gets 90 % of syllables and 97 % of sentences.

⁽⁶⁾ European Agency for Safety and Health at Work, *Research on work-related stress*, 2000.

⁽⁷⁾ Replacing Directive 86/188/EEC.

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