

# Hand-arm vibration

## Explain dangers

Hand-arm vibration (HAV) is vibration transmitted into workers' hands and arms from work processes such as operating hand-held power tools. Frequent exposure to moderate- and high-intensity HAV can cause hand-arm vibration syndrome (HAVS).

HAVS is a general term that refers to the damage to nerves, blood vessels, muscles, and joints in the hands and arms due to HAV.

HAVS initially affects the nerves. Symptoms include numbness, tingling, pain, or weakness.

This can be followed by "Raynaud's syndrome" or "vibration white finger". Blood vessels become narrow and the reduced blood flow causes the fingers to become pale, waxy-white, or purplish.

HAVS can also cause muscle pain and fatigue, joint stiffness, and loss of manual dexterity.

The current HAV limit set by the European Standard (Directive 2002/44/EC) is a daily exposure action value (EAV) of 2.5 m/s<sup>2</sup> and a daily exposure limit value (ELV) of 5 m/s<sup>2</sup>.

The EAV is a daily amount of vibration exposure. If workers are exposed to more than the EAV, employers are required to take action to reduce HAV exposure.

The ELV is the maximum amount of vibration an employee may be exposed to on any single day.

This should never be exceeded. A worker who is exposed to vibration levels above the ELV is considered to be at high risk of developing HAVS.

## Identify controls

First, prepare an action plan to deal with the high-risk work tasks. Then, address the medium- and low-risk activities.

- Look for alternative work methods that eliminate or reduce exposure to vibration. For example, use an excavating machine rather than a breaker tool to break concrete.
- Make sure that the equipment selected for the task is the lowest vibrating tool that is suitable for the task and can do the work efficiently.

- Improve the ergonomic design of work stations. Awkward postures can increase the load on employees' hands, wrists, and arms.
- Use devices such as jigs and suspension systems to reduce the need to grip and support heavy tools.
- Do not use blunt or damaged tools and replace worn out items such as grinding wheels.
- Limit the time that workers are exposed to vibration. For example, put workers in teams where they switch tasks throughout the day. That way, one worker is not operating a vibrating tool for the entire day.
- Use gloves to keep hands warm and also provide some protection from vibration.

## Demonstrate

With your crew, review the vibration levels of the tools you use on site (see table below). The greater the exposure level, the greater the risk for HAVS and the more action the employer will need to take to reduce the risk.

Vibration Levels for Tools and Equipment		
Low risk ( $< 2.5 \text{ m/s}^2$ )	Medium risk ( $2.5 \text{ to } 5 \text{ m/s}^2$ )	High risk ( $> 5 \text{ m/s}^2$ )
Abrasive band	Air drill	Air chisel
Band saw	Angle grinder	Circular saw
Cordless screwdriver	Blower	Chainsaw
Jet washer	Core drill	Hammer drill
Spray gun	Crosscut saw	Impact drill
Threading machine	Chop saw	Impact wrench
Vacuum cleaner	Electric screwdriver	Jackhammer
	Floor sander	Pneumatic hammer
	Hand-held sander	Reciprocating saw

Note: The vibration levels are indicative only and will vary depending on equipment type, conditions of use, the age of the tool, how well the tool has been maintained, the task being carried out with the tool, and if the tool has been fitted with various accessories.