

The Delivery hub health, safety and environment
Raising the bar 24
Hand arm vibration

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Objective

This raising the bar guidance aims to provide advice on minimum standards for the management and control of hand arm vibration.

Background

Hand arm vibration is vibration transmitted from a work activity into workers' hands and arms. It can be caused by regular and frequent use of hand-held tools such as:

- Concrete breakers/road breakers
- Cut-off saws
- Hammer drills
- Hand-held grinders
- Power hammers and chisels
- Powered lawn mowers
- Strimmers/brush cutters
- Compactors

Exposure to hand arm vibration (HAV) can lead to a combination of neurological (nerve), vascular (circulation) and musculoskeletal symptoms collectively known as hand-arm vibration syndrome (HAVS), as well as specific diseases such as carpal tunnel syndrome.

The health effects include:

- Pain, distress and sleep disturbance;
- Inability to do fine work (e.g. assembling small components) or everyday tasks (for example fastening buttons);
- Reduced ability to work in cold or damp conditions (ie most outdoor work) which would trigger painful finger blanching attacks;
- Reduced grip strength, which might affect the ability to do work safely.
- Fingers going white (blanching) and becoming red and painful on recovery (vibration white finger)



Symptoms may appear after a few months of exposure for some people, for others they may take years. In all cases symptoms are likely to get worse with continued exposure to vibration and may become permanent.

The Health and Safety Executive have identified HAVS as one of the basic health and safety mistakes crippling British industry. This forms part of their fee for intervention (FFI) guidance.

There are two vibration exposure values specified within legislation:

- Exposure limit value (ELV) is $5 \text{ m/s}^2 \text{ A(8)}$ this is the maximum amount of vibration an employee may be exposed to on any single day.
- Exposure action value (EAV) is $2.5 \text{ m/s}^2 \text{ A(8)}$ this is the level of daily exposure to vibration above which action to reduce exposure needs to be taken.

Plan

Minimum requirements

Design teams should identify elements, materials and processes which present significant HAVS exposure for construction operatives and adopt the hierarchy of control below:

1. design out exposure to HAVS, if this is not possible
2. use mechanical means, if this is not possible
3. use vibrating hand held tools

CDM 2015 Designer roles and responsibilities;

<http://www.hse.gov.uk/construction/cdm/2015/designers.htm>

Alternative methods, as noted in Table 1, are used to eliminate or reduce exposure.

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Hand held tool activity	Alternative
Breaking hard made road surfaces using hand held breakers	<ul style="list-style-type: none"> ■ Machine-mounted (JCB, mini digger) hydraulic breakers (peckers) ■ Floor saws ■ Directional drilling to avoid open cut trenching ■ Hydraulic crushers or bursters ■ Diamond core drilling or wire cutting ■ Water jetting. Cast in ducts remove the need to break out new concrete. Use of plastic kerbs
Reinstatement of hard compacted surfaces	Use of remote controlled compaction
Pile cropping using hand held hammers or breakers	Link to pile cropping alternatives <ul style="list-style-type: none"> ■ Elliott method ■ Recipieux method ■ Suspended hydraulic pile cropper ■ Machine-mounted hydraulic breakers
Scabbling using needle scalers, hammer and pole scabblers	Surface preparation using: <ul style="list-style-type: none"> ■ grit blasting (wet or dry) ■ use of chemical retarders and pressure washing ■ cast in proprietary joint formers e.g. mesh formwork ■ UHP water blasting ■ Specify finishes that do not require scabbling.
Drilling masonry/ concrete using electric hammer drills	jig-mounted drilling robotic drills diamond core drilling (clamped in rig) cast-in anchors and channels for wall fixings instead of drill-and-fix types use of direct fastening tools

Organise

Minimum requirements

A procurement policy is in place to ensure low vibration tools and equipment are selected for work on site.

Roles and responsibilities to manage HAVS on site are established. Including provision of tool box talks and instruction to operatives, purchasing or hire of vibrating tools, identification of tool emission values, operative HAVS monitoring and occupational health surveillance.

Desirable / optional requirements

Dedicated trained site personnel (such as plant manager, storeman etc.) monitor the vibration emission values of tools delivered to site, limits the use of high vibration tools and substitutes them for tools with lower emissions.

Staff in these roles must have sufficient authority and determination to prevent operatives using high emission tools.

Control

Minimum requirements

Where the risk of HAVS cannot be eliminated at design stage. Tools and equipment that present a risk are identified on site and are known by site supervision and operatives. Specific HAVS risk assessments must be in place and available on site when vibrating tools are used.

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If vibrating hand held tools are to be used the predicted exposure must be calculated in the HAVS risk assessment prior to the activity commencing. It is not sufficient to solely measure trigger time as this does not prevent exposure.

Assessments detail:

Equipment used and its suitability for the job in terms of safety, size, power, efficiency, etc. However, there are occasions where it is beneficial to use tools with higher emissions, as heavier duty tools may be able to do the job in less time than lighter tools, thus reducing overall exposure.

Tool emission data is derived from (in order of preference)

1. Real life tool data (Tool databases, OPERC etc.)
2. In house tool emission measurements during use
3. Manufacturer's declared emission data

Note: 1. and 3. emissions are based on new tools and do not factor in wear and tear which increases emission values with age. Account must be made for the deterioration of tools and equipment over time.

- Anticipated length of use or trigger time
- The control measures required, for example ergonomic aids to reduce the forces needed, provision of warm clothing and gloves, regular breaks from tool use etc

Arrangements must be in place to ensure that tools are maintained (e.g. service grinders, sharpen drills/chisels etc.) and consumables are available (e.g. abrasive discs, chisels etc.). Pneumatic power sources used to supply compressed air to vibrating tools are maintained to ensure pressure does not decrease.

Employees must have ready access to reliable information regarding tool emission values by way of points values, traffic lights, coloured tags on tools (red, amber, green) or maximum trigger times. All information must be derived from sound real use emission values.

Employees at risk from HAVS must be provided with regular information on the risks, how to reduce exposure and the arrangements for health surveillance during briefings, tool box talks and stand down days. See Appendix 1 for contents of a tool box talk.

An instruction session should be planned during colder months of the year when symptoms may be more apparent.



HAVS stand used during stand down session

The risk from HAVS and the required controls must be included in daily task briefings when work with vibrating tools is required.

Where tools incorporate specific vibration reduction features, for example concrete breakers with suspended handles, employees must receive specific training in their use and how to optimise the benefits.

Monitor

Minimum requirement

Operatives exposure to HAVS must be monitored at regular intervals to gauge the effectiveness of controls.

Exposure to HAVS must be reduced to the lowest level that is reasonably practicable. Exposure limit values should not be used as a target (i.e. maximum trigger times are set at limit values) if a lower exposure is reasonably practicable.

Site supervisors must undertake regular checks to monitor tool use, for example vibration dampened handles on tools are used correctly, pneumatic hoses are in serviceable condition, operatives are aware of any tool restrictions (trigger time limit) and they are observed.

Annual HAVS health surveillance must be arranged for employees likely to exceed the exposure action value. Pre-employment health assessments must also include HAVS exposure.

Employees identified with potential HAVS during surveillance must be referred to an occupational health physician for further assessment and diagnosis. Action must be taken to limit or prevent individual employee exposure to HAVS in response to occupational health advice. Diagnosed HAVS cases must be investigated following notification by the occupational health physician to identify where additional controls are required to protect exposed individuals or groups. Diagnosed cases of HAVS are reported to the Health and Safety Executive under RIDDOR 2013.

The HSE will follow up on all cases of reportable illness so sites should expect to have a visit from the HSE following the RIDDOR report.

Occupational health practitioners can be used to audit the provision of health surveillance conducted by suppliers which include the annual recall process, no show management, competency of occupational health staff performing surveillance.

Desirable / optional requirements

If a site vibration exposure limit of 100 points (2.5 m/s²) or less per day is set, after which operatives cease use of vibrating tool, then this can remove the legislative need for HAVS health surveillance.

Additional sources of information

For further information please refer to the following additional sources of information: Constructing better health – hand arm vibration

The control of vibration at work regulations 2005. Guidance on regulations (L140)

Hand arm vibration at work: a brief guide for employers (INDG 175) Hand arm vibration advice for employees (INDG 296)

[Link to hand arm vibration statistics](#)

[Link to occupational health raising the bar.pdf](#)

Appendix 1

HAVS tool box talk contents

1. Equipment and processes that cause vibration and the level of risk
2. Employees daily exposures compared with the exposure action and limit values
3. The symptoms of HAVS they should look out for and who and how they should report them to
4. The control measures in place to reduce the risk
5. The use of PPE where required (eg the need to keep warm)
6. The training planned for operators, supervisors and managers to ensure control of exposure
7. The health surveillance provided, why it is important and the overall findings (in anonymous form)
8. Employees' duties to:
 - follow instructions they are given
 - report problems with their equipment (eg unusually high vibration)

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