

Hand-arm vibration

For hand-arm vibration syndrome (HAVS)

There were 155 new claims in 2019 compared to 266 and 160 in 2017 and 2018 respectively. The number of claims has steadily declined over the past 18 years. Of the 2676 new claims in the last 10 years, only 13 were female. (QBE statistics Nov 2022).

For carpal tunnel syndrome

There were 151 new claims in 2017 compared to 105 and 126 in 2018 and 2019 respectively. The number of claims has remained relatively steady over the past 18 years, showing increases in some years and declines in others. Of the 1438 new claims in the last 10 years, 248 were female. (QBE statistics Nov 2022).

Whatever the cause of this trend, these disease claims often require detailed and lengthy investigation. This undoubtedly impacts on an employer's time and can carry hidden cost implications for its business. Adopting a pragmatic approach to managing the risks from vibration exposure will ensure that employers and organisations are compliant with current regulation and make the task of investigating allegations of ill health from vibration exposure and new employers liability claims, a more straightforward, timely and cost effective exercise.

Hand-arm vibration:

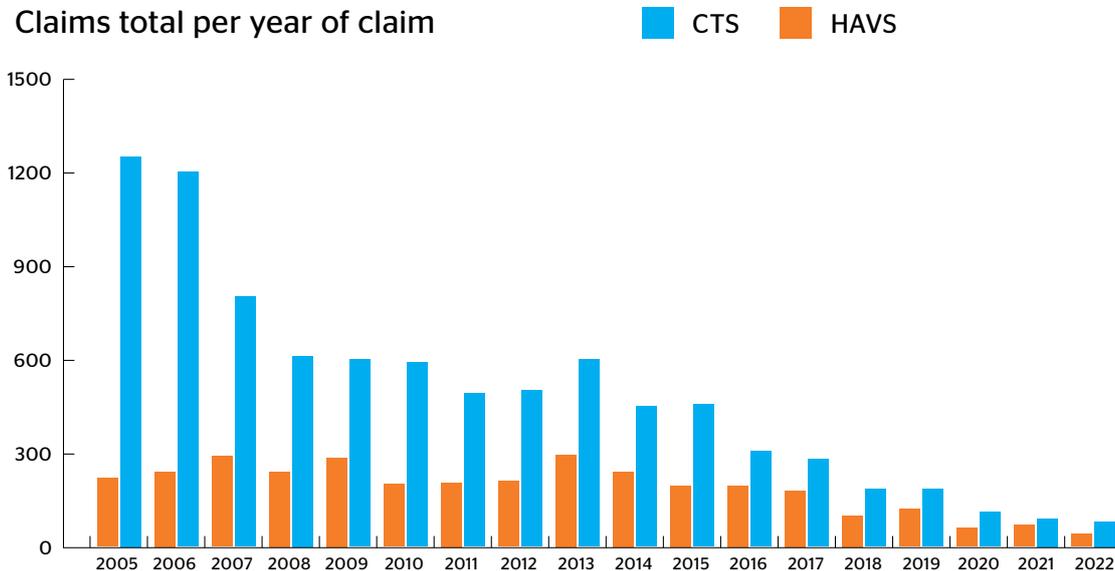
A complicated, technical subject?

The management of risks from hand-arm vibration (HAV) can appear daunting to many employers. This is perhaps because the subject is often discussed in terms of vibration magnitudes, daily exposure limits, action levels, exposure points, etc. which can appear complex or impenetrable to non-specialists. In reality it is no more complex in principle than any other workplace hazard - the law requires employers to identify where there is a risk to be managed and to apply good practice in the workplace to eliminate the risk, or reduce it so far as is reasonably practicable.

In this article, we offer a good practice approach to managing vibration risks in the workplace.

Trends in cases of CTS and HAVS

Claims total per year of claim



The case for taking action

Hand-arm vibration syndrome (HAVS) is a painful, distressing and potentially disabling condition and, like many occupational health disorders, the damage done by the daily exposure is not at first apparent. Work involving vibration exposure may continue over long periods, sometimes over many years, before the individual becomes aware of any symptoms, so it is important that the risk is recognised and controlled by the employer. The aim should be to ensure that every worker can reach retirement age without a disabling occupational disease.

The Control of Vibration at Work Regulations 2005 requires employers to eliminate or control risks from vibration. Where a risk to health remains, health surveillance must be provided by the employer. The Health and Safety Executive (HSE) has, in recent years, been taking enforcement action on HAV and employers have been prosecuted in cases where preventable cases of vibration-related ill health have been found. Fines in excess of £200,00 have been applied in recent cases (2021) where the companies concerned were found to have failed to assess and control vibration risk.

Probably the most significant risk to a business associated with HAV exposure is that of civil claims. Compensation awards can be costly; particularly where a claimant is young and a ruling on loss of future earnings can result in an award of hundreds of thousands of pounds. Controlling vibration risks today should assist with defending future claims and controlling the risk to employees' health by identifying and assessing the risk and need for action.

The first stage is to identify tasks and processes that expose the hands to vibration and which may put the employee at risk of developing HAVS. The sources of HAV exposure generally fall into three categories: hand-held machines (for example power tools such as grinders, breakers, sanders, scrubblers, drills); hand-fed machines (for example pedestal grinders in which vibration is transmitted to the hands through the work piece) and hand-guided machines (for example lawnmowers, vibrating road rollers).

The level of risk associated with HAV is dependent on the level of the vibration (the vibration magnitude) and also on the duration of the exposure. If a high vibration tool is used for a few minutes on very rare occasions, the risk to health is likely to be insignificant. However, a lower vibration tool used for a prolonged period on a daily basis may result in a significant risk.

The HSE suggests a simple first step to identifying where there may be a risk to be managed. It is likely that control action is required if:

- > a percussive or hammer-action tool (e.g. breaker, chipping hammer, hammer drill) is used for more than about 15 minutes per day; or
- > a rotary tool (e.g. grinder, drill, polisher) is used for more than about one hour per day; or
- > any operators experience tingling or numbness in their fingers during or after using vibrating tools and equipment.

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The Vibration Regulations require employers to eliminate risks from vibration at source, or reduce them to as low a level as is reasonably practicable. This duty applies no matter what the level of exposure. However, the Regulations define two levels of daily vibration exposure, the exposure action value and the exposure limit value, to help employers to understand when the risk is at a level where action is required, and when the risk becomes unacceptable.

In order to decide whether the level of exposure associated with a particular job or task is likely to reach or exceed the exposure action or limit values, it is necessary to have information on the likely vibration magnitudes associated with the tool, machine or process and on the daily duration of exposure to that vibration.

Vibration magnitudes

The vibration magnitude to which an operator's hands are exposed is quantified in units of acceleration: metres per second squared.

This is abbreviated to m/s^2 . Vibration magnitudes for different types of power tool, for example, can range from around $2 m/s^2$ to more than $20 m/s^2$.

Useful information on typical vibration magnitudes will often be available through trade associations, consultants, technical publications and on-line databases and it may be helpful (although not always necessary) to engage someone with the necessary expertise to make some vibration measurements. The HSE also publishes lists of tool vibration magnitudes for some common tools and machines, in its publication L140, and using this data may be sufficient to complete a first exposure assessment.

It is not necessary measure the vibration on every tool, or to seek a precise vibration magnitude for every particular task, since the vibration transmitted to the hands is usually highly variable and subject to a large degree of uncertainty. The objective is to assess whether it is likely that the exposure action value or exposure limit value will be reached or exceeded, not to determine a precise level of exposure.

Information on vibration emission is available from machinery manufacturers and suppliers, but the magnitudes they declare will usually be based on tests conducted in a laboratory to a standard protocol; these may not represent the vibration experienced by tool operators in real world conditions. If using manufacturers' information, it is advisable to ask for assurance that the figures given are representative of real use.

Daily exposure

The daily vibration exposure, or A(8) value, depends on both the vibration magnitude and the duration of exposure in a day. It is also expressed in m/s^2 . The exposure action and limit values in the Regulations are set at $2.5 m/s^2$ A(8) and $5 m/s^2$ A(8) respectively.

For many tasks involving vibrating tools and equipment the operation is intermittent and the total 'trigger time' can often be surprisingly short in comparison with the overall task time, and tool operators will typically overestimate their vibration exposure time. Careful observation of some typical tasks can be very informative, and useful for predicting likely daily exposure levels when planning work.

Combining the information on vibration magnitudes and 'trigger times' to determine an individual's daily vibration exposure (for comparison with the exposure action or limit value) need not be difficult. For example, the HSE currently provides a 'ready reckoner' and a vibration exposure calculator spreadsheet in the Hand-Arm Vibration section of its website. These allow the daily exposure to be expressed in 'exposure points' where the exposure action and limit values are 100 and 400 points respectively.

The Vibration Regulations require the employer to take action if the exposure action value is likely to be reached or exceeded during a working day. In our experience, some employers spend more time and money that is necessary attempting to refine their understanding of the vibration exposure levels before moving on to taking preventive action. However, it is acceptable, and often more appropriate, to assume that the exposure action value is likely to be reached and to use the available resources for the most important stage - establishing and implementing an action plan for the control of the risk.

Elimination of risk

It is always preferable to eliminate a risk rather than seeking to control it to a 'safe' level and this is an important principle of the Vibration Regulations. Risk from hand-arm vibration can, where practicable, be eliminated by changing the method by which a task involving vibrating equipment is done. Generally, this means applying established good practice, which is often also cost effective. For example:

- > The breaking of asphalt or concrete using a machine-mounted pick or other 'hands free' method in preference to hand-held breakers;
- > Using modern foundry technologies to improve casting quality and accuracy, to eliminate, or reduce, the need for fettling with hand-held grinders;
- > Preparation of steel surfaces for painting using methods such as abrasive blasting or water jetting in place of needle guns and other percussive scaling tools.

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Control of residual risk

When an employer has done all that is reasonably practicable to eliminate vibration risks, there may still be some tasks that require the use of vibrating equipment and which put employees' health at risk. The Vibration Regulations require a programme of preventive measures where such a risk is identified and in any case if the exposure action value is likely to be reached or exceeded.

Selection of equipment

Vibration should be taken into account when selecting power tools and other work equipment, and here the manufacturers' declared vibration emission values can be useful for comparison. However, it is important to ensure that the equipment is of good quality, is suited to the work and is efficient; an inefficient tool with a relatively low vibration magnitude can result in a higher daily vibration exposure than one with a higher vibration magnitude but which does the job in a fraction of the time. It is good practice to establish a procurement policy that takes health and safety matters, including vibration into account when selecting products, and to select the lowest vibration product from a short-list of tools that are suitable, efficient and safe for the task.

Ergonomic aspects of tools and equipment will also play a part; for example, a tool with well-designed comfortable handles is likely to be safer and more efficient to use, and will encourage a lower grip force, with reduced transmission of harmful vibration to the hands.

Operator training

One of the least understood aspects of vibration risk control is the need to train operators in the correct use of some types of tool, particularly vibration-reduced designs. For example, a road breaker fitted with anti-vibration handles will not produce the lower vibration magnitude of which it is capable if the operator pushes down too hard against the springs. The equipment supplier should be asked about any training requirements, and may be able to offer a training service.

Maintenance

Some tools and equipment can cause an increase in vibration exposure as they become worn. Examples include blunt chisels and points used with road breakers which will prolong the task and vibration exposure time, and worn grinding discs or grinder bearings that can increase vibration magnitudes.

Maintenance of equipment to prevent avoidable increases in vibration exposure will always be considered reasonably practicable. Where appropriate, the manufacturer's advice on maintenance should be followed.

Equipment operators should be trained and instructed to report equipment in poor condition or any unusual increase in vibration or loss of efficiency, and equipment should be repaired or replaced with a minimum of delay. Some employers and equipment suppliers have included vibration testing as part of their servicing procedure for vibrating tools. This is not a requirement, it increases costs and is unlikely to be an effective way of controlling vibration risk, a subjective test for unusually high vibration, after reassembly, is likely to be just as effective.

Personal protective equipment

Although anti-vibration gloves are available the HSE advice is that this PPE cannot be relied upon to protect from vibration. They will likely provide minimal protection at the important frequencies of vibration and are often expensive, have poor durability and can impair dexterity (with potential safety implications). Furthermore, recent research suggests that, while they produce some reduction in vibration transmitted to the palm of the hand, they may increase vibration exposure at the fingers, potentially increasing the risk. A pair of good quality industrial gloves will usually be appropriate for use with powered hand tools, etc.

For vibration-exposed outdoor workers, gloves and other clothing should be selected, and worn when required, to keep the hands and body warm and dry; this is likely to be of benefit in maintaining circulation of blood to the fingers.

Limiting exposure time

It is common for employers to mark vibrating tools and equipment with a maximum daily usage time. This can be helpful when planning or allocating work, to prevent an individual's vibration exposure from exceeding the exposure limit value, or any other maximum level of daily exposure set by the employer. However, it is not usually appropriate to rely on individual employees to control their own vibration exposure using such information and this is likely to result in a failure to complete the allocated work. Furthermore, it is difficult for tool users to monitor their cumulative vibration exposure time throughout the day and, where more than one tool is used during a day, the task becomes more complex.

It is good practice to control vibration exposure time, where necessary, by allocating work to employees, or groups of employees, taking likely vibration exposure into account. It may be necessary to prevent an individual from exceeding the exposure limit value, and this can be done by sharing work equally between a number of colleagues, or planning the work with vibrating equipment to be spread over an appropriate number of days. However, be aware that managing vibration risks only by aiming to restrict duration of tool use up to the exposure limit value is poor practice.

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Health surveillance

It is recognised that there are situations where exposure to hand-arm vibration at potentially harmful levels is unavoidable and personal protective equipment has no or minimal benefit. It is therefore essential that employees at risk are included in an appropriate health surveillance programme for HAVS and other conditions, such as carpal tunnel syndrome (CTS) that are associated with work involving vibration exposure. This allows the condition to be identified in the early stages, so that action can be taken to prevent progression to an advanced stage in which the symptoms are severe and disabling.

It is also important that employees are given HAVS awareness training and information, ideally with refresher training at appropriate intervals, and that they are encouraged to report any relevant symptoms.

The Vibration Regulations require health surveillance to be provided for employees whose vibration exposures are likely to reach or exceed the exposure action value (on more than just rare occasions) or who are otherwise identified as being at risk (for example if they have existing HAVS or other vascular or nerve disorders affecting the hands).

The HSE recognises the potential cost of health surveillance and has recommended a 'tiered approach' in which routine (e.g. annual) screening of individuals, and screening on first employment, is done using a questionnaire; if the responses indicate the need, the individual is referred for a structured interview with a qualified person, such as an occupational health nurse. If this assessment suggests that the employee has HAVS, the individual will be referred to a doctor for a formal diagnosis and the doctor may, if required, refer the person for standardised tests to assist in the diagnosis. Employers can manage the health surveillance programme in house, or contract out all or parts of the programme to an external provider, whilst noting that responsibility for the programme always rests with the employer.

Where an individual has been diagnosed with HAVS or another relevant condition, the employer should receive information on the diagnosis (subject to the employee's agreement) and on the individual's fitness to continue working with vibrating tools. The occupational health service provider may make recommendations for reducing a person's vibration exposure (in which case the employer will need to pay particular attention to the allocation of that person's work) and may, if necessary, recommend removal from further exposure.

Monitoring exposure - is it necessary?

There are several products on the market for the monitoring of daily vibration exposures. These include devices that aim to measure only the duration of tool use (with a device that attaches to the tool, or in some cases is worn by the tool operator), or that aim to measure both duration and vibration. A common feature is the facility to alert the operator when the exposure action value and/or exposure limit value is calculated to have been reached. In the case of duration-only devices, this relies on pre-programmed vibration magnitudes. For devices measuring vibration, in this class of device it is unlikely that vibration will be measured according to the appropriate standards.

These devices may provide useful information during the risk assessment phase. Monitoring duration of tool use over a representative period can help the employer to understand the extent of vibrating tool use during typical work. However, there is no requirement in the Control of Vibration at Work Regulations 2005 for continual monitoring of exposures and QBE does not expect this as a condition of insurance.

The caveat around monitoring devices that alert the user that they have reached the exposure action or limit value is that they can provide a temptation to control the risk only by stopping work when the limit value is reached. However, this will not achieve compliance with the Vibration Regulations, which require that the risk is reduced to as low a level as is reasonably practicable. This can only be done by means of a risk assessment and appropriate actions to eliminate risk or reduce it to the lowest level that is reasonably practicable.

[Adopting a pragmatic approach to managing the risks of vibration exposure will ensure that employers and organisations are compliant with current regulation.](#)

Demonstrating compliance and defending claims

Successful defence of a claim for damages, by an employee (or former employee) alleging failure to control risks adequately in the past will require evidence of compliance with the Vibration Regulations and the following of good practice.

Experience has shown that many employers have developed policies on managing risks from vibration which draw on good practice discussed earlier in this document.

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However, some Employers fail to provide evidence that such policies were applied effectively in the case of a particular claimant. Documentary evidence produced to defend a claim successfully may include:

- > Policy and procedures regarding the assessment and control of risks to health associated with vibration exposure;
- > Risk assessments which should identify the tools and equipment used and whether control action is required; this will normally include an assessment of the likely daily exposure, for comparison with the exposure action value, although this is not essential if a decision is taken (and recorded) to take action to reduce exposure so far as reasonably practicable and it can be established that the exposure limit value is not exceeded;
- > Records of action taken (or considered) to eliminate or reduce exposure to vibration; this may take the form of an action plan following a risk assessment, with accompanying records of actions subsequently taken;
- > Where appropriate, a method statement for the work; this might include the equipment/tools to be used, the maximum amount of work to be done within a day, instructions for rotation of tool use between colleagues, any training requirements, etc.;
- > Records of HAVS awareness training (including the importance of reporting symptoms) and the content of that training;
- > Records, where appropriate of operator training on correct use of tools and equipment to minimise vibration exposure;
- > Health surveillance records, to include any recommendations for the individual's management following a diagnosis of HAVS, CTS, etc. and any actions taken (e.g. to reduce to, or maintained at exposure);

Where appropriate, it is helpful to provide witness statements from managers and/or supervisors with direct experience of the claimant's work, who can explain, from a position of knowledge, how the employer's policies, procedures and actions have been used to control a claimant's vibration exposure and minimised the risk to his or her health.

Conclusions

The key to achieving compliance with the Control of Vibration at Work Regulations 2005, preventing or minimising vibration-related ill health and defending claims for HAVS or vibration-related CTS is a well-designed and managed system of vibration risk management and the ability to demonstrate (primarily through appropriate record keeping) that it is, and has been, effective.

Eliminating vibration exposure at source (through automation or the adoption of alternative working methods) should always be the first priority. Where vibration risks remain, they should be demonstrably reduced to or maintained at the lowest reasonably practicable level, and health surveillance should be provided to ensure that any early stages of disease are identified and appropriate interventions are made to prevent progression to an advanced and disabling stage.

The assessment of vibration exposure should be seen as a means to an end (identifying vibration risks to be managed) and not as an end in itself. Precise, refined assessments of exposure are not generally required. Resources used in the measurement and monitoring of vibration exposure can often be usefully diverted to controlling the exposure and risk (so far as reasonably practicable), once sufficient work has been done to identify that risk.

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