

# HEALTH RISKS FROM HAND-ARM VIBRATION

**ADVICE FOR EMPLOYERS**



## **YOU SHOULD READ THIS LEAFLET IF YOUR BUSINESS INVOLVES REGULAR AND FREQUENT USE OF:**

- ▼ hand-held powered tools;
- ▼ hand-guided powered equipment;
- ▼ hand-fed powered equipment.

It will give you brief details of:

- ▼ what hand-arm vibration (HAV) is;
- ▼ the injuries it can cause;
- ▼ simple steps you can take to control the risk;
- ▼ where to get further information.

## **WHAT IS HAV?**

HAV is vibration transmitted from work processes into workers' hands and arms. It can be caused by operating hand-held power tools such as roadbreakers, hand-guided equipment such as lawn mowers, or by holding materials being processed by machines such as pedestal grinders.

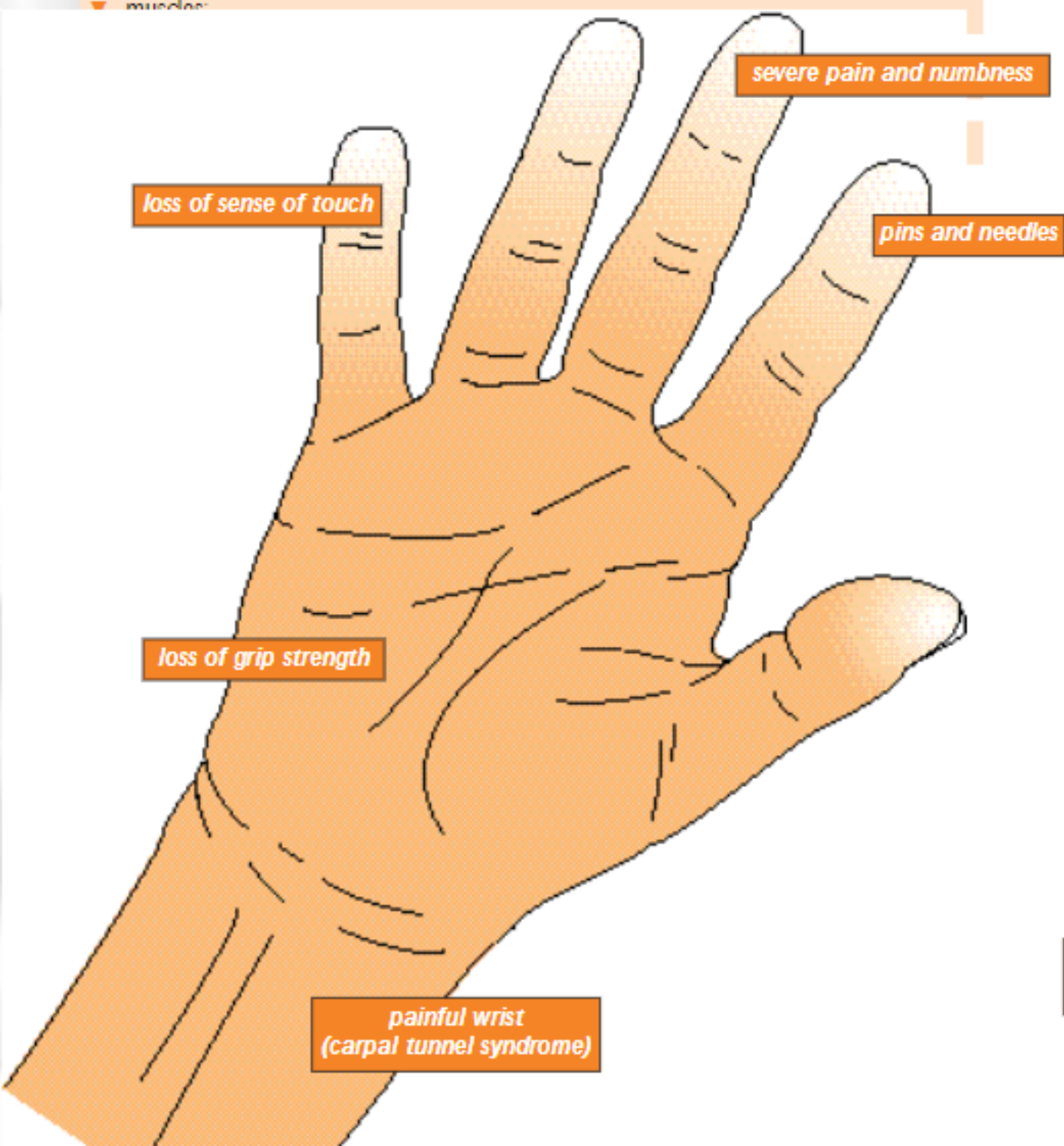
## **WHEN IS IT HAZARDOUS?**

Regular and frequent exposure to high levels of vibration can lead to permanent injury. This is most likely when contact with a vibrating tool or process is a regular part of a person's job. Occasional exposure is unlikely to cause injury, although it should be avoided by people with medical conditions such as Raynaud's Disease.

## WHAT INJURIES CAN HAV CAUSE?

Regular exposure to HAV can cause a range of permanent injuries to hands and arms, collectively known as hand-arm vibration syndrome (HAVS). The injuries can include damage to the:

- ▼ blood circulatory system (eg vibration white finger);
- ▼ sensory nerves;
- ▼ muscles;



## WHAT EFFECTS DO THESE INJURIES HAVE ON PEOPLE?

The injuries can be painful and disabling, for example:

- ▼ painful finger blanching attacks (triggered by cold or wet conditions);
- ▼ loss of sense of touch and temperature;
- ▼ numbness and tingling;
- ▼ loss of grip strength;
- ▼ loss of manual dexterity.

In addition, they may affect work and leisure activities. People may:

- ▼ need to avoid further exposure to vibration, or cold and wet conditions;
- ▼ have difficulty handling tools and materials and with tasks requiring fine finger manipulation.

## DO MANY PEOPLE GET THESE INJURIES?

HSE estimates that there are around 36 000 people with an advanced stage of vibration white finger (VWF), which is the most well-known form of hand-arm vibration syndrome. Hundreds of new cases of VWF are assessed each year by the Department of Social Security under the Industrial Injuries Disablement Benefit scheme. VWF is also one of the most common reasons for occupational ill health claims made against employers.

## WHICH JOBS AND INDUSTRIES ARE MOST LIKELY TO BE AFFECTED BY HAV?

Jobs requiring regular and frequent use of vibrating tools and equipment are found in a wide range of industries, for example:

- ▼ building and maintenance of roads and railways;
- ▼ concrete products;
- ▼ construction;
- ▼ forestry;

- ▼ foundries;
- ▼ heavy engineering;
- ▼ mines and quarries;
- ▼ plate and sheet metal fabrication;
- ▼ public services (eg maintenance of watercourses, roadside verges and parks);
- ▼ public utilities (eg water, gas, electric, telephone).

## WHAT SORT OF TOOLS AND EQUIPMENT CAN CAUSE VIBRATION INJURY?

There are hundreds of different types of tools and equipment which can expose operators to high levels of hand-arm vibration. Some of the more common ones are:

- ▼ chainsaws;
- ▼ concrete breakers/road drills;
- ▼ hammer drills;
- ▼ hand-held grinders;
- ▼ hand-held sanders;
- ▼ nut runners;
- ▼ pedestal grinders;
- ▼ power hammers and chisels;
- ▼ powered lawnmowers;
- ▼ riveting hammers and bolsters;
- ▼ trimmers/brush cutters;
- ▼ swaging machines.

## HOW CAN TOOL AND MACHINE MANUFACTURERS HELP?

Equipment manufacturers are generally trying to improve the vibration performance of their products, so new tools and machines are likely to emit lower vibration than older equipment. You will gain the maximum benefit from these improvements if you introduce a policy of buying the most suitable equipment when you replace tools or machines.

For most types of equipment, manufacturers are required by law to:

- ▼ design and construct equipment which will cause the minimum risk of vibration injury;
- ▼ provide you with warning of any residual risks from vibration;
- ▼ provide you with information on vibration levels;
- ▼ provide you with instructions on how to use the equipment to avoid risks from vibration.

## BUYING NEW EQUIPMENT - SOME USEFUL TIPS

Before you buy, think whether there is any alternative way of working without using vibrating equipment. If not, introduce a low vibration purchasing policy in consultation with your managers and safety or employee representatives and let potential suppliers know about it.

You should aim to buy the lowest vibration equipment suitable for the job. Manufacturers identify vibration levels in units of metres per second squared ( $m/s^2$ ).

## Manufacturers' vibration data needs careful interpretation:

- ▼ Standardised laboratory tests provide data which helps identify equipment that might have lower vibration levels in use at work. However, vibration levels at work can vary widely and may be much higher than laboratory data quoted in instruction books.
- ▼ For some types of equipment, the range in manufacturers' laboratory data can be wide (eg more than 10 m/s<sup>2</sup>). But if the range is narrow (eg within 1 m/s<sup>2</sup>) the differences are unlikely to be meaningful when the equipment is used at work.
- ▼ Even equipment with vibration reported as 'less than 2.5 m/s<sup>2</sup>' (based on laboratory tests) may not be without risk and may have a vibration hazard warning because levels at work can be much higher.
- ▼ Vibration controls may reduce the equipment's efficiency - if it is less efficient it may have to be used for longer, wiping out any advantage.

## To make best use of this data you should:

- ▼ check equipment manufacturers' literature for standardised laboratory test vibration levels and warnings of vibration hazard;
- ▼ shortlist the equipment within 50% of the lowest levels for further consideration (eg if the lowest level is 4 m/s<sup>2</sup>, the shortlist should include equipment with levels between 4 and 6 m/s<sup>2</sup>). Such a shortlist will usually include the equipment with the lowest vibration at work;
- ▼ seek information on vibration levels at work for your shortlisted equipment. Discuss with potential suppliers the ways you will use the equipment and ask them for vibration data for these types of use - it is best to compare vibration levels measured during work similar to that you intend to do;
- ▼ check with your trade association to see if they know of any data that meets your needs;
- ▼ check whether any vibration controls have reduced the equipment's efficiency;
- ▼ arrange for independent tests to be carried out, perhaps through your trade association, if you are still in doubt about vibration performance.

Examples of how companies have applied purchasing policies to reduce risk are included in HSG170 *Vibration solutions*. Further advice on the use of vibration data to determine risk is in HSG88 *Hand-arm vibration* (see page 13).

## HOW QUICKLY WILL USING THESE TOOLS AND MACHINES START TO CAUSE HEALTH PROBLEMS?

This depends on a number of factors including the level of vibration which reaches the hands and how long they are exposed to it. The people most likely to be harmed by vibration are those who regularly use high-vibration tools and machines. For some people, symptoms may appear after only a few months of exposure, but for others it may take several years.

## WHAT DOES THE LAW REQUIRE ME TO DO ABOUT THESE RISKS?

Health and safety law requires you to do a number of things to protect your employees. You should:

- ▼ assess the risk to the health of your employees and plan for its control;
- ▼ manage the risk;
- ▼ provide suitable equipment for your employees' use;
- ▼ maintain equipment correctly;
- ▼ give your employees information and training on health risks and safe use of the equipment;
- ▼ provide health surveillance of your employees where risks cannot be completely eliminated;
- ▼ provide reports to the relevant enforcing authority on cases of HAVS in your workforce;
- ▼ consult your safety or employee representative on your proposals to deal with vibration hazards.



## HOW DO I KNOW IF MY EMPLOYEES ARE AT RISK?

The documentation supplied by the equipment manufacturer should warn you of risks from vibration. You can also check yourself to see if hand-held power tools, hand-guided and hand-fed machines are regularly used, and if so, whether anyone is, in particular:

- ▼ using hammer action equipment for more than half an hour each day;
- ▼ using rotary or other action equipment for more than 2 hours each day.



hammer action



rotary action

If so, your employees are probably at risk. Even where employees are using vibrating tools or machines for less than these times, there may still be a risk and you should regularly (at least every six months) ask them if they are getting any symptoms of HAVS. Some simple questions you could ask are:

- ▼ Have your fingers gone white on exposure to cold?
- ▼ Have you had any tingling or numbness in your fingers after using vibrating equipment?
- ▼ Are you experiencing any problems with muscles or joints in your hands or arms?
- ▼ Do you have any difficulty picking up small objects such as screws or nails?

If the answer to any of these questions is 'yes', assume that there is a risk from HAV to your employees. You should refer the employee to a doctor and take action to reduce exposure.

There is more detailed guidance on what you can do to assess the risk in HSE's publication *Hand-arm vibration* (see page 13).

## WHAT CAN I DO TO CONTROL THE RISK?

There are many things you can do, several of which may cost very little and could also improve productivity and product quality, for example:

- ▼ Look for alternative ways of working which eliminate the vibrating equipment altogether.
- ▼ Make sure your employees use the most appropriate equipment for each job (inappropriate equipment may take longer to do the job or vibrate more).
- ▼ Minimise the time individuals use the equipment, eg job rotation.
- ▼ Break up periods of continuous equipment use by individuals (introduce other tasks).
- ▼ Design the job so that poor posture (which may cause strain on hands and arms) is avoided.
- ▼ Construct jigs to hold materials or tools.
- ▼ Maintain tools to the manufacturer's specifications to avoid worsening vibration. For example:
  - ▼ replace vibration mounts before they are worn out;
  - ▼ ensure rotating parts are checked for balance and replace them if necessary;
  - ▼ keep tools sharp.
- ▼ Get advice from your trade association on best practice.
- ▼ Get advice from the equipment manufacturer on safe use of the equipment.
- ▼ Introduce a purchasing policy specifying low vibration performance for new equipment (see 'Buying new equipment - some useful tips').
- ▼ Mechanise or automate the work or change the way of working.
- ▼ Ask the manufacturer to add anti-vibration mounts to isolate the operator from the vibration source.
- ▼ Provide tool support to take the weight of the tool (eg tensioners or balancers) allowing the operator to reduce grip and feed force.

## WHAT INFORMATION AND TRAINING DO I NEED TO GIVE MY EMPLOYEES?

Employees need to know about the hazard and what they should do to reduce the risk, for example:

- ▼ potential sources of hand-arm vibration;
- ▼ the health effects of hand-arm vibration;
- ▼ risk factors (eg high levels of vibration, daily length/regularity of exposure);
- ▼ how to recognise and report signs of injury;
- ▼ ways to minimise risk, including:
  - ▼ changes to working practices to reduce vibration exposure;
  - ▼ correct selection, use and maintenance of equipment;
  - ▼ how to use tools to reduce grip force, strain etc;
  - ▼ maintenance of good blood circulation at work, eg by keeping warm, exercising fingers and not smoking.

You should consult with your safety or employee representative on your proposals for training and information.

## WHAT ELSE SHOULD I DO?

Even where you have taken precautionary measures, some employees may still be at risk. In cases where regular exposure to hazardous vibration continues or employees are reporting symptoms (see page 9 'How do I know if my employees are at risk?'), you need to arrange for regular health checks (known as health surveillance) of those employees. This should mean that harm from vibration is detected early and will allow you to:

- ▼ arrange for a medical assessment and for medical advice to be given to the employee about the risks of continuing exposure;
- ▼ take steps to avoid serious injury of the employee.

The health surveillance programme should be under the supervision of a suitably qualified medical practitioner who may train people, for example a nurse or first aider, to help with the administration of the programme. Non-clinical information can be fed back to you so that you can check whether your control measures continue to be effective.

The health surveillance programme can include pre-employment and regular health checks including:

- ▼ questioning about symptoms;
- ▼ completing questionnaires (there is a sample in HSE's publication HSG88 *Hand-arm vibration*);
- ▼ physical examination;
- ▼ advice to the employee.

## **HOW DO I KNOW IF THE STEPS I HAVE TAKEN TO CONTROL THE RISKS ARE WORKING?**

Regularly questioning your employees about symptoms will let you know if there are still problems (see page 9 'How do I know if my employees are at risk?'). If you arrange health surveillance the occupational physician will also advise whether your controls are working effectively.

## **WHAT DO I DO IF A DOCTOR CONFIRMS THAT AN EMPLOYEE HAS HAVS?**

If you receive written confirmation from a doctor that an employee has hand-arm vibration syndrome, you should notify the relevant enforcing authority as required by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995. You will also need to take action to reduce the exposure of injured people to vibration to avoid worsening their symptoms.

## HOW CAN I FIND OUT MORE?

HSE has published a range of leaflets and books and a video on hand-arm vibration to help employers manage the problem. Further details of these publications are given below:

*Hand-arm vibration* HSG88 HSE Books 1994 ISBN 0 7176 0743 7

A handbook with chapters for: managers, safety advisers, safety representatives and machinery suppliers; for engineers and technicians; and for health professionals. It covers: hazard and control programmes; technical ways to reduce vibration; clinical effects and the health surveillance programme; and measuring hand-arm vibration.

*Vibration solutions: Practical ways to reduce the risk of hand-arm vibration injury* HSG170 HSE Books 1997 ISBN 0 7176 0954 5

A book of 51 case studies showing how vibration problems were tackled in 16 different industries plus practical guidance on how to approach a vibration problem and how to avoid pitfalls when introducing controls.

*Health risks from hand-arm vibration: Advice for employees and the self-employed* INDG126 HSE Books 1998

This leaflet provides brief information on hand-arm vibration syndrome, its causes and its effects and what the employer and the employee can do to reduce the risk. It is available free for single copies and in priced packs of 15 (ISBN 0 7176 1554 5) and is an effective way of providing background information to your employees.

*Power tools: How to reduce vibration health risks. Guide for employers* INDG338 HSE Books 2001 (single copy free or priced packs of 15 ISBN 0 7176 2008 5)

This leaflet is aimed at employers in companies where vibrating hand-held or hand-guided power tools and machinery are used. It is part of a campaign to reduce hand-arm vibration injuries in the workplace by alerting employers to the damage that can be done by vibrating tools and machinery and encouraging them to choose those with low levels of vibration.

A 15 minute HSE video *Hard to handle* is available giving an introduction to the risks from hand-arm vibration and how to manage them. The video is available from HSE Books (ISBN 0 7176 1881 1) and costs £40.00 + VAT.

*The successful management of hand-arm vibration* CD-ROM is an interactive multimedia information and training tool to help managers, health and safety advisors, occupational health professionals and other duty holders address the control and management of HAV exposure. It is available from HSE Books (ISBN 0 7176 1713 0) and costs £95.00 + VAT.

## **FURTHER READING**

*Management of health and safety at work. Management of Health and Safety at Work Regulations 1999. Approved Code of Practice L21* HSE Books 2000 ISBN 0 7176 2488 9

*Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22* HSE Books 1998 ISBN 0 7176 1626 6

*RIDDOR explained* HSE 31(rev1) HSE Books 1999

## **FURTHER INFORMATION**

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: [www.hsebooks.co.uk](http://www.hsebooks.co.uk) (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: [www.hse.gov.uk](http://www.hse.gov.uk).)

For information about health and safety ring HSE's Infoline Tel: 08701 545500 Fax: 02920 859260 e-mail: [hseinformationservices@natbrit.com](mailto:hseinformationservices@natbrit.com) or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

ISBN	Title/description	Unit price	Quantity	Total price
0 7176 0743 7	Hand-arm vibration HSG88	£7.50		£
0 7176 0954 5	Vibration solutions HSG170	£13.75		£
0 7176 1554 5	Health risks from hand-arm vibration: Advice for employees and the self-employed. Pack of 15 leaflets INDG126	£5.00		£
			Total	£

#### ORDERED BY

Title	Initial	Surname
Job title		
Company name		
Delivery address		
Postcode		Telephone

#### PAYMENT DETAILS

I enclose a cheque/PO\* for £ \_\_\_\_\_ made payable to HSE Books

or Please debit my Mastercard/Visa\* with the amount of £ \_\_\_\_\_

Card no. \_\_\_\_\_ Expiry date \_\_\_\_\_

Cardholder's name \_\_\_\_\_

Signature \_\_\_\_\_

or Please charge my HSE Books Account No. \_\_\_\_\_

My reference \_\_\_\_\_

\*Delete as appropriate

Return this form to: HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA  
Tel: 01787 881165 Fax: 01787 313995

HSE priced publications are also available through good booksellers

**This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.**

This leaflet is available in priced packs of 10 from HSE Books, ISBN 0 7176 1553 7. Single free copies are also available from HSE Books.

© *Crown copyright* This publication may be freely reproduced, except for advertising, endorsement or commercial purposes. First published 4/98. Please acknowledge the source as HSE.

INDG175(rev1)

Reprinted 8/03

C250

Printed and published by the Health and Safety Executive