Control of Vibration at Work

(Policy on Hand-Arm Vibration Syndrome (HAVS))

Scope

This document aims to:

- highlight those work activities that have the potential to cause hand-arm vibration syndrome,
- give information on identifying the level of risk associated with such activities and
- to suggest ways of reducing any significant risks to an acceptable level.

Application

This document is most likely to be relevant to University workshops, the Grounds Department of the Estate Office and the Farm. Generally, it is anticipated that the level of risk is not high because of the nature of the work taking place i.e. vibration exposure is not prolonged and is frequently interrupted.

Contents

1. Introduction

Hand-Arm Vibration Syndrome or HAVS is a condition that has the potential to affect any worker who uses powered hand-held or hand-guided tools as a major part of their job. Workers whose hands are regularly exposed to high vibration may suffer from several kinds of effects to the hands and arm, including impaired blood circulation and damage to the nerves and muscles. It is felt as a tingling or numbness in the fingers or where finger blanching occurs. There are other names for the condition: 'vibration white finger', 'dead finger' and Secondary Raynaud's Syndrome.

The affects are cumulative and as time passes the attacks may involve considerable pain and loss of manual dexterity, resulting in clumsiness and reduced grip strength. In severe cases, blood circulation may be permanently impaired and fingers may take on a blue-black appearance.

As indicated above, the primary cause of HAVS is work involving holding vibrating tools or workpieces. The risk depends on the magnitude of the vibration and how long an individual is exposed to it. Other aspects that can have an affect are the grip, push and other forces used to guide and apply vibrating tools or workpieces, the pattern of exposure, how much of the hand is exposed to the vibration, temperature, smoking and individual susceptibility.

2. Potential sources of high vibration at the University

The following is an indicative list of the types of equipment found in the University that may present a vibration hazard:

- Grounds work, e.g. chainsaws, strimmers, mowers, blowers, hedgetrimmers, etc.
- Workshop equipment, e.g. grinding tools, rotary burring tools, powered hammers, concrete breakers, sanders and drills
- Grinders and other rotary tools
- Timber and wood machining tools
- Percussive metal-working tools
- Percussive tools used in stoneworking, quarrying, construction

3. Exposure Limits

The Regulations define two types of exposure limit.

The **Exposure Action Value** (EAV) is the level of daily exposure to vibration, which if exceeded requires certain actions to reduce exposure.

The **Exposure Limit Value** (ELV) is the maximum amount of vibration an employee may be exposed to on any single day.

The vibration level produced by equipment is usually assessed by measuring the acceleration level in m/s2. The Regulations set an Exposure Action Value (EAV) of 2.5m/s2 over 8 hours (A8) and an Exposure Limit Value (ELV) of 5m/s2 over 8 hours (A8).

It is the aim of the University to minimise the risk of HAVS to staff by keeping

exposure to vibration as low as is reasonably practicable and where the 2.5m/s2 is exceeded, control measures will be put in place to reduce it.

The vibration dose received by the worker over a typical working day depends on the duration of exposure as well as the vibration magnitude.

To allow different exposure patterns to be compared they are adjusted or normalised to a standard reference period of 8 hours, similar to the approach taken for noise levels. The Control of Vibration at Work Regulations 2005 describe how an exposure normalised to 8 hours, A(8), can be calculated. The table below gives the average vibration levels over a working day and the times to reach the exposure levels.

Vibration Magnitude (m/s2)	2.5	3.5	5	7	10	14	20
Time to reach Exposure Action Value (in hrs)	8	4	2	1	½	¼	8 mins
Time to reach Exposure Limit Value (in hrs)	>24	16	8	4	2	1	½

Exposure Action Value = 2.5m/s2 per 8hr working day

Exposure Limit Value = 5m/s2 per 8hr working day

The following table lists some indicative vibration levels for typical equipment.

Examples of Equipment	Typical Vibration Levels (in m/s2)
Hedgecutter	6.3
Flymo mower	3.0
Chainsaw	3.5-5.5
Blower (hand-held)	7.5
Kango hammer	4-15 (depending on power/size)

For example, a hand held blower with a vibration level of 7 m/s2 would result in exposure of the operator to the equivalent of the EAV in just one hour, hence typical use greater than this would require reasonably practicable exposure reduction measures to be taken. If this was used for 4 hours a day the ELV would be exceeded and no further use would be permitted.

Generally at the University, the nature of the work lessens the risk. For instance, work may be seasonal or related to particular projects, exposure is normally not prolonged on a regular basis. University workshops tend not to be operated in the same way as industrial environments so individuals are not continuously carrying out repetitive high-vibration tasks on a daily basis. There is still a need to assess each situation.

However, the diversity of work that an individual may be involved in can cause difficulty in accurately assessing exposure because a number of different tools are being used in any one day for variable lengths of time. It should be possible to estimate a cumulative exposure by summing up the typical exposure pattern from the range of equipment used.

4. Duties of Employers - (at any exposure level)

- Assess vibration risks to health and safety
- Eliminate vibration risk at source, or reduce to lowest reasonably practicable level
- Provided information and training for employees on vibration risks and control measures

If the Exposure Action Value (EAV) 2.5m/s2 is likely to be exceeded

- Reduce exposure to the lowest practicable level
- Provide health surveillance (this is available through Occupational Health)

The Exposure Limit Value (ELV) 5m/s2

- Ensure employees are not exposed above the ELV
- If they are, take immediate action to prevent recurrence

Note: There will be a transitional period until 2010 for complying with the ELV in respect of equipment that:

- Is in use before 6 July 2007, and
- It is not (yet) reasonably practicable to comply with the ELV.

5. Responsibility for Risk Assessment and Risk Reduction

It is the responsibility of Schools and Departments to identify activities where the hazard of HAVS is a problem and include it in risk assessments. Ways to establish whether there is a problem and how to reduce it are as follows:

To identify the extent of the problem:

1. Identify the equipment that vibrates and find out about the levels of vibration - information should be available from suppliers/manufacturers (they have a duty to supply it). Staff are likely to have a subjective opinion from using the equipment. Consider vibration monitoring (see below).
2. Rank equipment in terms of hazard contribution, i.e. the level of vibration and how much they are used.

3. Discuss with staff whether they have noticed any particular problems with certain types of equipment or individual machines.
4. Check the workload of individuals who use vibration tools and at least estimate the exposure they may be receiving.

To reduce the risk:

1. Check whether it is necessary to use the current types of tool or whether a task may be achieved a different way.
2. Minimise the need for operations and tools that expose workers to hazardous vibration.
3. Minimise the forces needed to control tools.
4. Consider the maintenance of the equipment and whether there is likely to be deterioration in anti-vibration mountings, etc. Ageing and/or poorly maintained equipment is likely to give worse levels of vibration.
5. Reduce exposure times, e.g. by breaking up activities to minimise prolonged exposure.
6. It is important that operators are able to maintain good blood circulation, gloves can be helpful although alone, they are not the solution to a vibration problem.
7. Heated handles, warm, weatherproof clothing, heating pads are amongst the other aids that can be considered.
8. Further suggestions on how risk reduction may be achieved are given in the publications listed on page 4.

6. Vibration Monitoring of Existing Equipment

It is possible to monitor vibration levels of equipment. For reliable results, it is best for an external occupational hygienist to be employed to carry out the testing. Please contact the Safety Office for further information.

Guideline measurements can be taken by hiring in monitoring equipment and taking advice from local experts on its use. The use of the equipment is not particularly straightforward therefore the results should be taken as rough estimates only.

The results of monitoring can be compared with the manufacturer's information and this might show the effect of age or poor maintenance or that there is something wrong with a particular item of equipment. The method of monitoring should be carried out in line with the strategy given in HS(G)88, 2002.

The results can be used in conjunction with estimates of time spent using each type of tool. This will give an approximate exposure.

Equipment with high levels of vibration

If it is found that there are items of equipment with high vibration levels (greatly exceeding 2.5m/s2), action is required to reduce this. The solution might include:

- Purchase of different/new equipment,
- Improved maintenance/servicing,
- Using the equipment for shorter periods of time and
- Information to staff on how to minimise the risks.

7. Purchasing of new equipment

Whenever new equipment is to be purchased, the supplier's vibration information should be checked in advance and every effort made to ensure that equipment with the lowest vibration levels and best protection is obtained. Any second-hand equipment should also be assessed before being put into use.

8. Maintenance of equipment

In order to minimise the deterioration of equipment, items should be inspected and serviced on a regular basis. Advice from the suppliers/manufacturers should be taken into account. There may be certain routine checks that lead to early identification of problems or accessory replacements, in which case these should be carried out at a set frequency.

Individual users must be made aware that if at any point they feel a machine performance has deteriorated in terms of vibration, they must report it at the earliest opportunity so that further investigations can be made.

9. Health Surveillance

If there is a significant risk of HAVS, i.e. where an individual's vibration exposure exceeds 2.5m/s2, then a health surveillance programme via the University's Occupational Health provider must be arranged. The aim of this is to identify at an early stage any member of staff who may be showing medical signs of developing HAVS. If at any time between the routine checks, a member of staff notices any of the signs of HAVS, they should report it to their line manager in order that referral to Occupational Health can be organised and investigation of the equipment carried out by the School/Department.

10. Training and Information for those at risk

Members of a School/Department at risk of HAVS must be provided with adequate information. This should include the following:

- information on vibration levels relevant to the machinery they are to use, particularly identifying pieces of equipment that are known to have higher vibration levels,
- the need to interrupt work using vibrating machinery on a regular basis with other tasks and or to divide such work with other colleagues,
- to be aware of other factors that can increase the likelihood of HAVS such as low temperature, smoking
- who to report problems to.

There is an HSE leaflet on HAVS which is a good general information source for employees. Reference IND(G) (rev1) 126L Health risks from hand-arm vibration for employees and the self-employed (HSE 2002).

11. Publications held by the Safety Office

L140 The Control of Vibration at Work Regulations 2005
HSG88 Hand-Arm Vibration 2001 - Guidance for employers.
HSG170 Vibration Solutions - Practical ways to reduce the risk of hand-arm vibration injury.

HSG175 (rev2) Advice for Employers on the Control of Vibration at Work Regulations 2005.
IND(G)126 (rev1) Health risks from Hand-Arm Vibration for Employees and Self-employed, 2002.

12. Whole Body Vibration

There is also a risk of whole body vibration that can affect those who work with vibrating equipment they need to stand or sit on, e.g. tractors and other farm vehicles. The assessment is similar to that for HAVS in that identification of a significant risk should lead to control measures such as equipment modification/maintenance, minimising length of exposure and providing information to staff.