Hand-Arm Vibration Syndrome

1. Current legislation in UK

Control of Vibration at Work Regulations 2005 implimented the reqirements of the european directive regarding exposure of employee to vibration. These imposed duties on employers to protect employees (and others) who maybe exposed to the risk of ill health because of vibration at work.

The regulations place legal duties on employers and employees with regard to the control and management of exposure to vibration. The regulation provides exposure limits and action values along with the duties.

2. What is HAVS?

Hand-**a**rm **v**ibration **s**yndrome is a widespread industrial disease affecting tens of thousands of workers.

The term HAVS is used to describe any damage to the blood vessels, nerves, muscles and joints that is caused by the transfer of vibration from tools to a workers hand and arm.

2.1. General information

Regular and frequent exposure to hand-arm vibration can lead to permanent health effects. This is most likely when in contact with a vibrating tool or work process is a regular part of a person's job. Expsosure to vibration can also lead to other related diseases such as carpal tunnel syndrome. However occasional exposure is unlikely to cause ill health.

2.2. Who's at Risk?

Any jobs requiring regular and frequent use of vibrating tools, equipment and the handling of vibrating materials. This is present in a wide range of industries:

- Building and maintenance of roads and railways;
- Construction;
- Heavy engineering;
- Estate management (eg maintenance of grounds, parks, water courses, road and railside verges);

There are hundreds of different types of hand-held power tools and equipment which can cause ill health from vibration. Some of the more common ones are:

- Chainsaws;
- Concrete breakers/road breakers;
- Cut-off saws;
- Hand-held grinders;

2.3. What are the symptoms and how it can be recognised?

Identifying signs and symptoms at an early stage is important. It will allow you, as the employer, to take action to prevent the health effects from becoming more serious or developing into a disability. Some workers may deleop the early signs even at low exposures. The symptoms include any combination of:

- Tingling and numbness in the fingers;
- Loss of feeling in fingers/hands;
- Loss of strength in the hands;
- The fingers going white (blanching) and becoming red and painful (particularly in the cold and wet, in most cases starting only in the tips at first);

For some people, symptoms may appear after only a few months of exposure, but for others they may take a few years. They are likely to deteriate with continued exposure to vibration and may become permanent. These effects can severely limit the jobs an affected person is able to do, as well as many family and social activities.

3. What are the preventions?

Anyone exceeding the EAV is considered to be at risk, once these employees have been identified, you must be seen to be taking action to reduce the risk. Risk controls include:

3.1. Alternative work methods

- Look for alternative work methods which eliminate or reduce the level/time exposed to vibration;
- Mechanise or automate the work if possible;

3.2. Equipment selection

- Enssure that the equipment provided/allocated is suitable and able to carry out the work efficently. Equipment that is unsuitable, too small or not powerful enough is likely to take much longer to complete, therefore exposing employees to vibration for much longer than necessary;
- The lowest level of vibration tool that is suitable to carry out the work efficiently should be assigned;
- Limit the use of high-vibration tools wherever possible;

3.3. Maintenance

- Introduce appropriate maintenance programmes for your equipment to prevent avoidable increases to vibration (following manufactures advice and guidance);
- Replace consumables such as grinding wheels and blades to keep equipment sharp and effeicent;
- Avoid using blunt/damaged breakers and hammer chisels;

3.4. Replacing old equipment

- Work equipment will need to be replaced over time as it becomes worn out, it is important to choose replacements which are both suitable for the type of work, efficent and emits lower vibrations as reasonably practical;
- When liasing with suppliers, compare specifications with different makes and models;
- Seek advice with suppliers on maintenance, training and additional features;

3.5. Work Schedules

- Limit the time that your employees are exposed to vibration;
- Plan work schedules to avoid employees being exposed to vibration for long periods of time, several shorter periods are prefered;
- Introduce rota systems to limit exposure times when continual or frequent use of tools is required. Operatives working in groups can switch tasks to avoid high exposures in any one person;

3.6. Clothing

- Provide your employees with protective clothing when necessary to improve blood circulation;
- Gloves can be used to keep hands warm but should not be relied upon to provide protection from vibration

3.7. Monitoring/Supervision

- Exposure calculators can give accurate time scales that each piece of equipment can be used for without causing harm;

- For more accurate readings, vibration sensors can be used. These sensors record the trigger time from tools/equipment to calculate the vibration levels to ensure limits are not exceeded;

4. Health Surveillance

You must provide health checks to all employees who are regulary exposed above the EAV or are considered to be at risk for any other reason. It is importaint to reassure your employees that the aim of a Health Surveillance is to protect them from developing ill health, You will need their co-operation if they are to be effective. The purpose of Health Surveillances are to:

- Identify anyone exposed or about to be exposed to hand-arm vibration who may be at risk from illness;
- Identify any vibration –related disease at an early stage in employees regulary exposed;
- Help to prevent disease progression;
- Check the effectiveness of your vibration control measures

Once you have obtained health records you will need to:

- Keep records of the health checks and fitness for work advice provided by the employee;
- Ensure records are avaliable to employees;
- Act upon any recommendations made by their doctor with regards to their continued exposure;
- Use results to review and revise (if necessary) the risk assessment including the control of risks;
- Discuss any chages to risk assessment with your safety/employee representive beforehand;
- Notify the relevent enforcing authority when advised in writing by a doctor that an employee has HAVS or any other vibration related illness, e.g. Carpal Tunnel Syndrome

5. Employee education

You should consult your safety/employee representive on your proposals for training and information supplied to employees. Also seeking advice from manufacturers is reccomended. You should provide your employees with information on the following:

- The effects of HAVS
- Whether they are at risk, if so which category – High (above ELV) Medium (above EAV) Low (below EAV);
- Risk factors (levels of vibration, exposure duration, regularity of exposure);
- Recognising and reporting symptoms;
- The need for Health Surveillance
  - Benefits for their health;
  - How it will be provided;
  - What will be done with the results;
  - Assured confidentiality;
- Ways to minimise risks;
  - Changes to working practices to reduce vibration exposure;
  - Correct selection, use and maintenance of tools/equipment;
  - Correct techniques for equipment, methods to reduce grip and correct hand placement ect;
  - Importance of good blood circulation;

6. Measurement/ Exposure limits & Action Values

Exposure to hand-transmitted vibration is calculated in terms of acceleration on the surface in contact with the hand. The acceleration of the surface is normally expressed in units of 'metres per second' m/s^2.

The extent of damaged caused to the hand and arm depends on the frequency of the energy being transmitted from the vibrating surface. Low frequency motion 5-20hertz is thought to be more damaging than higher frequency motion. Vibration at frequency below 2hertz or above 1500hertz is not thought to be as damaging. To allow for this frequency dependance, a frequency weighting is applied to measurements of vibration magnitude.

The Exposure Action Value (EAV) is the daily amount of exposure subjected to employes that presents a low risk of illness through vibration. Any vibration above the EAV (2.5 m/s^2) is considered to be a medium risk. Control measures will need to be put in place to reduce the levels were possible. The higher the level of exposure, the greater the risk and the more action the employer will need to take to reduce the risk.

The Exposure Limit Value (ELV) is the maximun amount of vibration that an employee should be subjected to on any single day. Any level of vibration above the ELV (5 m/s^2) is seen as a high risk and so employees should not exceed this limit.

The levels of vibration can be estimated with the table below. For more accurate readings, you will need to use an exposure calculator.

Tool Vibration (m/s^2)	3	4	5	6	7	10	12	15
Points per Hour (Aproximate)	20	30	50	70	100	200	300	450
Multiply the points assigned to the too vibration by the numbers of hours of trigger time on tools/equipment and compare with the Exposure Action Value and Exposure Limit Value points								
2.5 m/s^2 - 100 points per day = Exposure Action Value (EAV)								
5 m/s^2 - 400 points per day = Exposure Limit Value (ELV)								

7. Manufacturers Guidance

Manufacturers and suppliers are obliged to design their equipment to reduce the vibration leveles to as low as possible. The equipment should be CE-marked to show that it complies with these requirements. Several suppliers use a traffic light system for simplification when indicating the level of vibration emissions

Manufacturers must supply you with the following:

- Provide you with instructions manual that should contain:
  - Safe and correct use of machine including any features;
  - Maintanence instructions;
  - Any training requirements;
- Warnings of any vibration-related risks and accurate vibration values;
- Statement of vibration emissions together with information on test methods used;

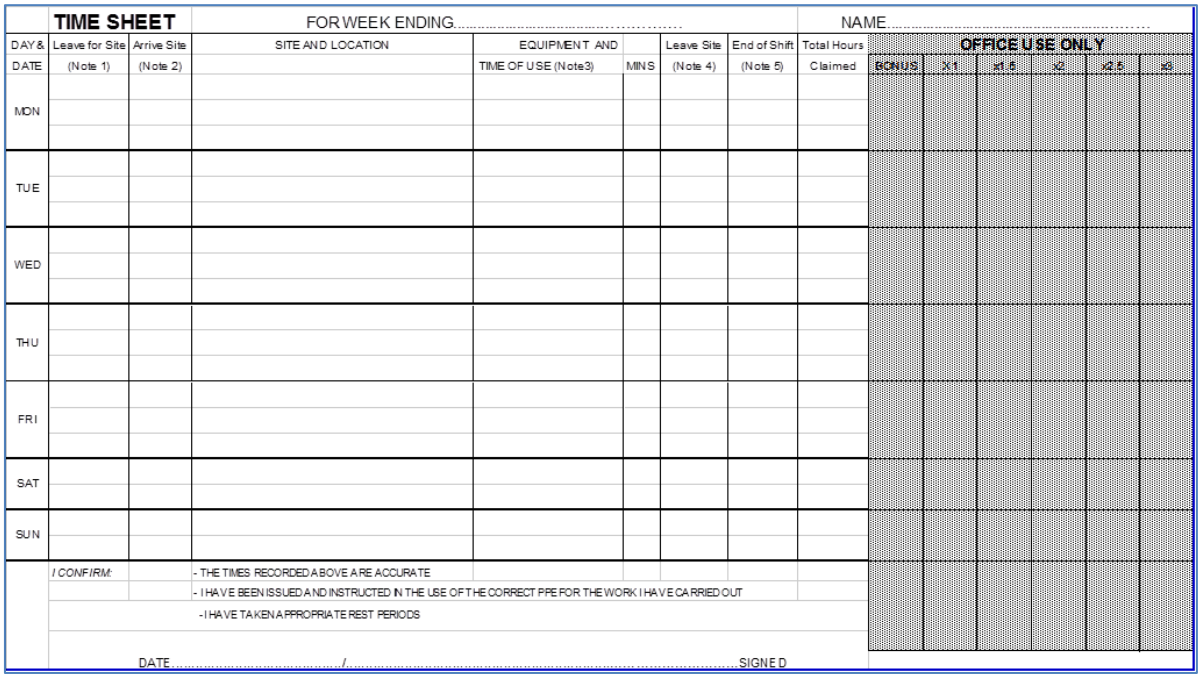
8. Control measures

Your duties as an employer are to reduce the risks/exposure from vibration to as low as reasonably practicable. If workers are to be exposed above the daily Exposure Action Value (EVA), you must adopt a programme designed to reduce/eliminate the risk. Provide health checks to those regulary exceeding the EVA. Workers must not exceed Exposure Limit Value (ELV) under any cirmcumstance.

To follow regulations employers must:

- Assess and manage the risk of vibration to workforce;
- Provide suitable equipment and maintain correctly;
- Provide information and training on health risks and safe use of equipment;
- Provide and keep records of health surveillance of your employees;
- Keep records of Risk Assessments – Review and update regulary;
- Consult with your safety representive on proposals to deal with vibration hazards;
- Provide reports to the relevant authorities of HAVS cases in your workforce;

9. Monitoring Methods



TIME SHEET	FOR WEEK ENDING.....					NAME.....		OFFICE USE ONLY					
DAY & DATE	Leave for Site (Note 1)	Arrive Site (Note 2)	SITE AND LOCATION	EQUIPMENT AND TIME OF USE (Note3)	MINS	Leave Site (Note 4)	End of Shift (Note 5)	Total Hours Claimed	BONUS	X1	x1.5	x2	x2.5	x3
MON														
TUE														
WED														
THU														
FRI														
SAT														
SUN														
	I CONFIRM:		- THE TIMES RECORDED ABOVE ARE ACCURATE											
			- I HAVE BEEN ISSUED AND INSTRUCTED IN THE USE OF THE CORRECT PPE FOR THE WORK I HAVE CARRIED OUT											
			-I HAVE TAKEN APPROPRIATE REST PERIODS											
	DATE...../.....						SIGNED							

NOTE 1 Leave for site (the start of your working day) is either:

a) The time you arrive at the depot to load.

b) The time you leave for site from your colleague's house if you are required to pick someone before going to work.

c) The time you leave home to go to site if travelling alone.

NOTE 2 Arrive Site: You must record here the time you actually arrive on site as opposed to the start of your working day.

NOTE 3 Equipment and time of use: You must record here each day the equipment which you have used and the amount of trigger time on each item.

NOTE 4 Depart Site: You must record in this column the time you leave the site

NOTE 5 End of Shift: You must record the time you finish your shift. This should not include any additional hours you may expect to be paid if you have finished early.

The following table shows some of the equipment that we use and the manufacturers' vibration reading and the time it takes to reach the EAV and ELV.

Daily Exposure Action Value (EAV) 2.5 m/s^2 this is a trigger or threshold limit where it does not stop exposure above this level, but you have a duty to control/limit exposure.

Daily Exposure Limit Value (ELV) 5.0 m/s^2 this is a stricter limit that prohibits exposure above this in a single day.

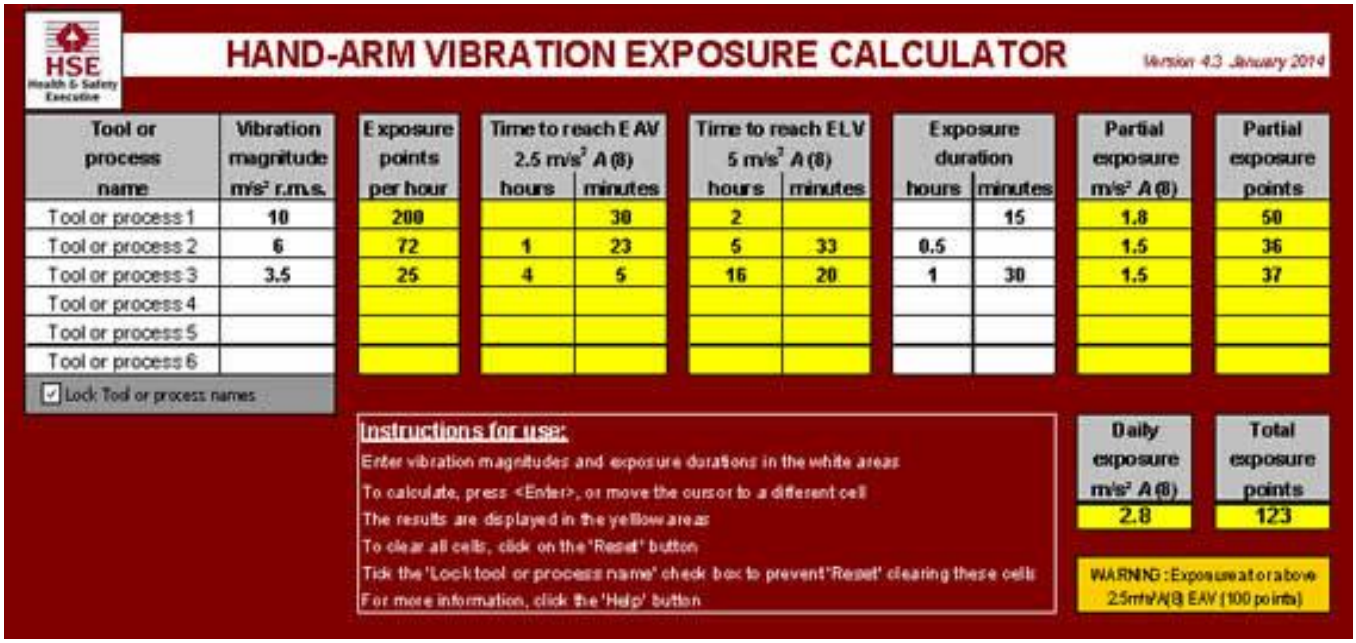
Equipment	Vibration Reading (Z Axis)	Time to reach EAV 2.5m/s^2	Time to reach ELV 5.0m/s^2
Hilti TE80	8.5	42m	2hr 46m
Hilti TE905 Breaker	8.5	42m	2hr 46m
Hilti TE76 (ATC)	13	18m	1hr 11m
Hilti TE1000	6.5	1hr 11m	4hr 44m

Equipment	Vibration Reading (Z Axis)	Time to reach EAV 2.5m/s^2	Time to reach ELV 5.0m/s^2
Hilti Wall Chaser	1.8	15hr 26m	>24hr
Petrol 2 Stroke Stihl Saw	3.9	3hr 17m	13hr 9m
Makita HR4011C	10	30m	2hr
Weka DK13	2.8	8hr 23m	>24hr
9" Angle Grinder	5.5	1hr 39m	6hr 37m
K2500 (16" saw)	7.0 (rear handle)	1 h 1m	4hr 5m
K3600 (Ring Saw)	4.4 (rear handle)	2hr 35m	10hr 20m

If the equipment you are using is not contained in the table above then contact your supervisor to obtain the vibration reading.

The EAV and ELV can then be calculated using the scale below.

m/s^2	2.5	3	4	5	6	7	8
Hours to reach EAV	8	5 ½	3 ¼	2	1 ¼	1	¾
Hours to reach ELV	>24	22 ¼	12 ½	8	5 ½	4	3



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