

The Control of Vibration at Work Code of Practice

Reviews and Revisions

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1. Introduction

This guidance applies to all Northumbria University employees and any persons who may be using powered hand tools during the course of their work.

It sets down the measures to be taken by the University to ensure that all persons who are likely to come into contact with vibrating tools and machinery (staff and students) are protected from exposure to harmful levels of vibration while at work, and comply fully with **The Control of Vibration at Work Regulations 2005.**

What is Hand Arm Vibration?

Hand-arm vibration is vibration transmitted directly from work processes into workers' hands and arms. It can be caused by operating hand-held power tools, such as road breakers, and hand-guided equipment, such as powered lawnmowers, or by holding materials being processed by machines, as in pedestal grinders.

2. What harm can vibration cause?

Regular and prolonged exposure to high vibration levels (hand-arm vibration) can lead to permanent health effects. Hand Arm Vibration Syndrome (or HAVS).

This is most likely when contact with vibrating tools or a work process is a regular part of a person's job. Occasional short term exposure is unlikely to cause ill health.

Early signs include numbness, tingling and blanching of the fingers, painful attacks and aching limbs lasting 15 to 20 minutes – symptoms are usually worse in cold weather.

Exposure to harmful levels of vibration at work can cause damage that is both permanent and disabling. This damage can occur in three main areas:

Vascular:

Blood vessels and circulatory systems can be permanently damaged.

Nerve damage:

At the extremities – leading to loss of sensation, feeling and dexterity in the fingers and hands.

Musculo Skeletal issues:

Aching limbs and joints, loss of dexterity.

Safety Issues:

Hand Arm Vibration can interfere with a person's ability to handle, carry and hold, with significant reduction in grip strength. Occasional tool use is unlikely to cause any long term health effects, however, regular exposure to high vibration levels over extended periods is much more serious and may result in the destruction of nerve endings, blood vessels and musculature which is permanent, disabling and incurable.

Vibration may interfere with working efficiency by being an annoyance and causing stress. It may contribute to serious incidents, injuries and near misses through loss of feeling when using vibrating, rotating or percussive tools, hindering a person's ability to adequately grip or control objects or tools, this is particularly dangerous when working at height. These symptoms will continue to be felt after exposure has ceased. The risk of damage depends on the level and duration of exposure. Lower frequency vibration levels between 2 to100 Hz are thought to cause the most harm.

Initial symptoms include:

- Tingling and numbness in the fingers and hands.
- Pins and needles (poor blood circulation).
- Blanching (white fingers) and cold to touch.
- Painful episodes when the blood supply returns to the fingers (Chilblains).
- Aching limbs and joints usually in the hands and forearm.

Similar symptoms to HAVS may also be experienced by sufferers of Reynard's Disease (Nerve and vascular damage) and to a lesser extent through the normal ageing process.

Whole-Body Vibration (WBV)

The term 'WBV' refers to whole-body vibration and is the shaking or jolting of the body through a supporting body, e.g. when driving or riding a vehicle on an uneven road or operating earth moving equipment. Whole body vibration is unlikely to be an issue on Campus due to the limited time staff spend in vehicles on unmade or uneven roads.

3. Definitions

- Vibration Magnitude (m/s²) The unit of measurement for vibration is in metres per second squared.
- Exposure The amount of vibration to which a person is exposed to at work over a specified time period (generally 8 hours). The Control of Vibration at Work Regulations 2005 (CoVaWR). Regulations have determined two exposure levels of 2.5m/s² and 5.0 m/s².
- Daily Exposure Action Value (EAV) 2.5ms² is the level of daily exposure to vibration at or above which employers are required to take steps to reduce that exposure. Whole body vibration EAV = 0.5m/s².
- Daily Exposure Limit value (ELV) 5m/s² is the maximum amount of vibration an employee may be exposed to on any single day. Whole body ELV 1.15 m/s².
- **Control Measure** taken to reduce vibration levels or exposure time to the user.
- **Competent Person** A competent person is someone who has sufficient technical and practical knowledge of the vibration monitoring equipment to be able to measure the vibration levels of tools and equipment in a controlled, methodical fashion and correctly interpret those results.
- **Vibration risk assessment** to be used to identify the practical measures required to reduce and control exposure to persons in line with the Regulations.
- Daily exposure to be assessed through:
 - (a) Observation of working practices.
 - (b) Use of manufacturers information on the vibration magnitude of work equipment used;
 - (c) If necessary, measurement of the magnitude of vibration to which employees are liable to be exposed.

4. Duties Imposed on the Employer/Employees/Others

The Control of Vibration at Work Regulations 2005 (CoVaWR), requires the risk to health through vibration to be prevented or controlled. Generally, any vibrating or rotating equipment or process, which is used by staff or contractors at work, is covered by the regulations.

The University shall:

- Ensure that employees and workers are not exposed to vibration magnitudes above the daily Exposure Limit Value (ELV) of 5m/s2 which would be detrimental to health.
- Where persons are exposed to daily vibration levels at or greater than 2.5m/s2, the University shall:
 - Take appropriate measures to implement a risk reduction programme.
 - Carry out health surveillance on those regularly exposed.
 - Keep up with good practice and relevant industry standards for vibration control.
 - Encourage continual improvement.

Line Managers shall ensure measures are in place to:

- Consider vibration levels in risk assessments and reviews for relevant activities.
- Record or estimate the exposure duration of employees (trigger times) in order to accurately assess the level of risk and exposure example form here
- Reduce vibration exposure levels so far as is reasonably practicable, by minimising or eliminating vibration at source, or reducing people's exposure (job rotation).
- Reduce vibration magnitude through the use of alternative processes, equipment and/ or working methods.
- "Buy smooth"- consider vibration levels when purchasing new equipment/specifying quieter equipment. HSE's "Buy smooth" guidance can be found here.
- Maintain equipment in good condition.
- Respond to concerns from persons experiencing early symptoms of Hand/Arm Vibration Syndrome in a timely fashion.
- Maintain a register of hand tools and likely vibration magnitudes (High, Medium, Low).
- Ensure suitable information, training and instruction is provided for those who may be potentially exposed to harmful levels of vibration (above 2.5m/s2).

The Central Health and Safety Team shall:

- Assist Faculties and Services as appropriate in preventing exposure and managing their vibration reduction programme through:
 - The provision of information, instruction and training as appropriate.
 - Estimating the potential exposure for the tools and equipment used through:

- Manufacturers data
- HSE vibration magnitude tables
- Actual vibration measurement and monitoring (if required)
- Advising on methods of recording exposure magnitude and duration.
- Advising on suitable risk assessment strategies.
- Assisting with management measures to reduce levels of exposure using the hierarchy of control: Eliminate, Reduce, Isolate, Control.
- Maintaining and retaining relevant records of vibration surveys undertaken.
- Ensuring that survey findings are made available together with advice on any remedial actions.
- Reporting through RIDDOR, any instances of HAVS occurring in the workforce.

Occupational Health shall:

- Arrange for appropriate health surveillance for relevant employees, if they are likely to be regularly exposed above the exposure limit value, or are at risk for any reason, e.g. they already suffer from similar symptoms (Reynard's disease).
- Utilising the Health Surveillance Questionnaire UNN/H&S/F/033 or similar.
- Arrange for suitable diagnosis and management of individuals conditions.

Staff/Students using vibrating tools and equipment shall:

- Cooperate with the University in following guidance and procedures to reduce exposure.
- Assist in the recording/estimating of their exposure time (trigger times) when using tools in order to accurately assess the level of risk and exposure.
- Report any symptoms (tingling or numbness) during cold weather.
- Attend health surveillance (questionnaires and physical checks) when requested by Occupational Health.



Finger blanching (White finger)

5. Understanding Vibration Levels and Exposure

Action Levels

The Control of Vibration at Work Regulations require the University to take specific action at certain levels of vibration exposure. These relate to exposure averaged over a working day or week and the maximum vibration magnitude to which staff may be exposed to.

Exposure Action Value (EAV): Daily or weekly exposure above **2.5 m/s² (A8)** Employers must:

- Implement a vibration reduction programme.
- Provide Exposed staff with annual health surveillance.

At Exposure Limit Value (ELV): Daily or weekly exposure of 5m/s² (A8) and above. Employers must:

• Take action to reduce the daily exposure below that level.

Exposure Limit Values

The Regulations set maximum limit of vibration exposure of **5m/s2 (A8)** for 8 hours which must not be exceeded.

A(8) Daily dose in m/s ²	Control of Vibration at Work Regulations 2005 Requirements
5 m/s²	Exposure
2.5 m/s ² and above	 Exposure Action Value (EAV) Where exposure is likely to exceed this action value :- Implement a HAV management programme to reduce exposure and risks (Limit exposure and usage times) Provide appropriate Health Surveillance
Below 2.5 m/s ²	Safe to use

Identifying if there is a Vibration problem in the workplace

This will depend on the vibration magnitude produced by tools or processes and how long people are exposed to it.

Action should be taken if any of the following apply:

- If staff are using vibrating power tools or machinery for extended periods (more than 1 hour each day).
- Indications of exposure in excess of the EAV or ELV.
- If there are noisy, rotating, percussive, pneumatic or impact tools in use.
- If staff are reporting any early symptoms associated with exposure to harmful levels of vibration.

If the answer to any of the above is 'yes', then a risk assessment should be undertaken, using the estimated vibration magnitude or direct readings obtained for those particular tasks to accurately assess exposure duration.

Using the HSE vibration calculator and Ready Reckoner can assist in this process.

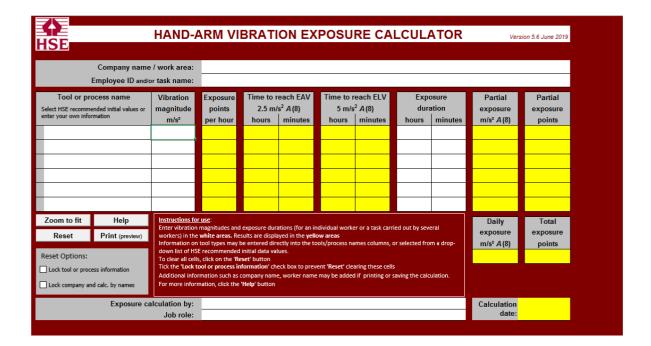
The HSE has compiled a list of typical vibration magnitude figures for a wide range of tools. These values can be used to risk assess potential exposure for individuals. <u>http://www.hse.gov.uk/vibration/hav/source-vibration-magnitude-app3.pdf</u> Appropriate control measures can then be implemented (see page 10).

6. Daily and Weekly Vibration Calculators / Ready Reckoner

The HSE have devised a simplified method of calculating the daily and weekly exposure by using the Vibration Exposure Calculator, and the Ready Reckoner.

Hand-arm vibration exposure calculator <u>'Hand-arm vibration exposure calculator</u>

Enter the vibration magnitude (in m/s2) and select the daily exposure duration (in hours and minutes) in the white areas for up to six tool types used by a person during their working day. The daily exposure points will then be calculated.



The Vibration Exposure Ready Reckoner

40	265	800									
30	150	450	900								
25	105	315	625	1250							
20	67	200	400	800	1200						
19	60	180	360	720	1100	1450					
18	54	160	325	650	970	1300					
17	48	145	290	580	865	1150					
16	43	130	255	510	770	1000					
15	38	115	225	450	675	900	1350				
14	33	98	195	390	590	785	1200				
13	28	85	170	340	505	675	1000	1350			
12	24	72	145	290	430	575	865	1150	1450		
11	20	61	120	240	365	485	725	970	1200	1450	
10	17	50	100	200	300	400	600	800	1000	1200	
9	14	41	81	160	245	325	485	650	810	970	1300
8	11	32	64	130	190	255	385	510	640	770	1000
7	8	25	49	98	145	196	295	390	490	590	785
6	6	18	36	72	110	145	215	290	360	430	575
5.5	5	15	30	61	91	120	180	240	305	365	485
5	4	13	25	50	72	100	150	200	250	300	400
4.5	3	10	20	41	61	81	120	160	205	245	325
4	3	8	16	32	48	64	96	130	160	190	255
3.5	2	6	12	25	37	49	74	98	125	145	195
3	2	5	9	18	27	36	54	72	90	110	145
2.5	1	3	6	13	19	25	38	50	63	75	100
2	1	2	4	8	12	16	24	32	40	48	64
1.5	0	1	2	5	7	9	14	18	23	27	36
1	0	1	1	2	3	4	6	8	10	12	16
			1		1		3 hours		5 hours	6 hours	8 hours

Instructions:

For each task or period of vibration exposure in the working day, look up in the table, the exposure points corresponding to the vibration level and duration (e.g. exposure to $9m/s^2$ for 1 hour equals **160** exposure points, a level of $5.5m/s^2$ for 6 hours is **365** points).

- Add up the points for each task or period to give the total exposure points for the day.
- Look up in the table on the right, the total exposure points to find the corresponding daily vibration exposure (e.g. total exposure points for the day of 260 points gives a daily vibration magnitude (A8) of 6m/s².

The colour of the square containing the exposure points value tells you whether the exposure exceeds, or is likely to exceed the exposure action or limit value:

Above limit value
Likely to be above limit value
Above action value
Likely to be above action value
Below action value

If a worker is exposed to more than one tool or process during the day, repeat steps 1-3 for each one, add the points, and compare the total with the exposure action value (100) and the exposure limit value (400).

You <u>must NEVER be exposed</u> to more than 400 points per day.

Weekly Exposure

Where hand tools are not being used on a daily basis, it is more useful to calculate the equivalent weekly exposure.

Example:

If the tools were used 3 days per week (Monday, Tuesday and Thursday) and the daily exposure (8 hours) is calculated at:

Mon = 2.1, Tue = 3.7, Thu = 6.3 - then the weekly exposure would follow the formula

$$A(8)week \sqrt{\frac{1}{5} (A \mod (8)^2 + A tue (8)^2 + A thu (8)^2})$$

$$A(8)week \sqrt{\frac{1}{5} (2.1^2 + 3.7^2 + 6.3^2)} = A(8)week = \sqrt{11.558} = 3.39 \text{ m/s2}$$

3.39 m/s2 is equivalent to approximately 190 points per day (using ready reckoner table).

190 points is ABOVE the action value (therefore health surveillance for the individual and the risk reduction programme should be put in place.

7. Control Measures

The first control measure is to eliminate the task and to avoid exposure altogether.

If exposure cannot be eliminated, then individual exposure must be reduced to below the EAV of 2.5m/s² using the following measures:

- Can it be done with other tools. (i.e. lower vibration tools) which will give the same result?
- Mechanize or automate the task in part or in full.
- All tools and equipment to be inspected before use to avoid worsening vibration.
- Select the lowest vibration tool that is suitable and can do the work efficiently.
- Limit the use of high-vibration tools wherever possible.
- Equipment to be maintained to the manufacturers specification and records kept by site.
- Replace worn or damaged consumables, so that the equipment is efficient and keeps the employee's exposure as short as possible.
- Consideration will be given to workers being job rotated to lower the exposure to vibration.
- Rest breaks and shift patterns structured to limit time spent on the equipment to short well-spaced periods.
- Break up periods of continuous equipment use (high intensity, repetitive) by introducing other tasks (more variety, less repetition).
- The use of vibration type equipment will be recorded using the exposure record form.
- Design the job so that poor posture is avoided and to isolate the operator from vibration.
- The appropriate PPE will be provided to keep the hands and body warm, help to maintain good blood flow to the fingers and reduce the risk of injury.
- Operatives will be provided with information on the hazards of vibrating equipment.

• Supervisors are to check the condition of tools/plant at regular intervals. The frequency of checks should be based on the harshness of the conditions in which tools are used, the experience of the user and the user's ability to care for them correctly.

8. Training

All staff should be aware of the risks they may be exposed to and the findings of the risk assessment with any results of vibration monitoring shared.

A HAVS awareness training course can be booked here.

9. Health Surveillance

Health Surveillance is managed through line management and will be provided by the University's Occupational Health Service for those who are likely to be regularly exposed above the Exposure Action Value of 2.5m/s² (determined by vibration monitoring and risk assessment), or are at additional risk for any reason, e.g. have a pre-existing medical condition.

Health surveillance is likely (in the first instance) to be in the form of a health questionnaire – an example of which is <u>here</u>.

More rigorous testing may take place if exposure symptoms are exhibited by individuals. See HSE guidance on health surveillance <u>here</u>.

Health Surveillance can be introduced at any time, even if they have already been exposed to high vibration levels or if dictated by risk assessment. This would be followed by routine and planned checks (usually annually).

10. Monitoring & Review

The effectiveness of this guidance will be monitored through a number of indicators:

- Incident and injury statistics/sickness absence data.
- Results of inspections and dip checks.
- RIDDOR incidents reported to the HSE.
- Legal action/claims data.
- Occupational health data on health surveillance.

Records of employee's exposure to vibration shall be retained for 40 years. Faculties and Services will monitor risk assessments and control measures through their Health & Safety Committees and support can be provided by the central H&S team.

11. Appendices

11.1 Guidance Documents and Useful Links



INDG296(rev2) Hand arm vibration, a guide for employees This pocket card is aimed at people who use handheld powered work equipment or workpieces which vibrate while being processed by powered machinery, such as pedestal grinders. <u>HSE INDG296</u>



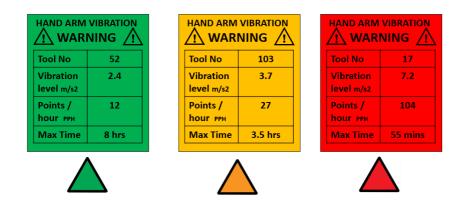
INDG175: Vibration at work a brief guide to controlling risks. Provides an outline of the requirements of what the University, as an employer, needs to do under the Control of Vibration at Work Regulations 2005 to protect your employees from the harmful effects of vibration. <u>HSE INDG175</u>



HSE L140: Controlling Vibration at Work (July 2019 edition) This guidance provides general information about the requirements of the Control of Vibration at Work Regulations 2005. It describes what the University may need to do to protect persons in the workplace and is available at the following link: <u>HSE L140</u>

HSE Advice

- <u>Guide to using HSE hand-arm vibration calculator</u>
- <u>'Hand-arm vibration exposure calculator</u>
- <u>http://www.hse.gov.uk/vibration/hav/vibrationcalc.htm</u>
- <u>http://www.hse.gov.uk/vibration/hav/yourhands.htm</u>
- 11.2 HSE Typical vibration magnitude values for common tool types can be found here.
- 11.3 Identification of equipment example of HAV hazard warning signs to be affixed to equipment:



Name		D	ate				
Date of birth		E	mploye	e num	ber		
					ince no.		
Faculty / Department				-	you used		ars
1-1-T-1-			ibrating			mo	nths
Job Title		P	revious	job ro	le		
	Please tick all equipr	nent th	at vou l	have v	vorked on		
Hedge Trimmer	Grass cutter with roller		ngle Gri			Drill	
Extendable trimmer	Push collection mower	D	ie grind	ers		Hammer d	rill
Leaf Blower	Mulching mower		eedle g e-scaler			Impact wre	ench
Strimmer	Box mower	0	rbital s	ander		Concrete b	reakers
Kubota triple decker	Flymo	C	ut off sa	aws		Plate compactors	
Other	Other	0	ther			Other	
Signs and Symptoms			Yes	No	Comments	if you answe	ered YES
	bness or tingling of the f	fingers			Which	Left	Right
lasting more than 20 mi equipment?	nutes after using vibrati	ng			hands?		
	ss or tingling of the finge	rs at			How many	fingers?	
3 Do you wake at night	with pain, tingling,						
or numbness in your har							
· · · -	ers gone white* on cold				How many	fingers?	
exposure? 5 Have you poticed any	change in your response	to					
your tolerance of worki	ng outdoor s in the cold?						
6 Are you experiencing a hands or arms?	any other problems in yo	our					
7 Do you have difficulty	picking up verv small		+				
objects; screws, button							
	other discomfort while	2					
using work equipment							
	eck, arm or hand injury or				If so give de	etails	
operation?	ale ages as been distort				lf an aire air	ataile	
9 Have you ever had a ne operation?	eck, arm or hand injury or				If so give de	etalls	
	vers given above are true	to the	best of	my kn	owledge.		
I certify that all the ansv							

Hand Arm Vibration Health Questionnaire



Northumbria University NEWCASTLE

Please deta	il previous roles where Vibrating Tools and Equipment have been used
Dates	Job Title
	Duties
Dates	Job Title
	Duties
Dates	Job Title
	Duties
Dates	Job Title
	Duties
Dates	Job Title
	Duties
Dates	Job Title
	Duties

Additional Information: Hand-arm vibration syndrome (HAVS)

- is a disorder which affects the blood vessels, nerves, muscles and joints of the hand, wrist and arm;
- can become severely disabling if ignored; and
- its commonly known form is vibration white finger (VWF) which can be triggered by cold or wet weather and can cause severe pain in the affected fingers.

Signs to look out for in hand-arm vibration syndrome:

- tingling and numbness in the fingers;
- in the cold and wet, fingers go white, then blue, then red and are painful;
- you can't feel things with your fingers;
- pain, tingling or numbness in your hands, wrists and arms;
- loss of strength in hands

Report any symptoms IMMEDIATELY to your Supervisor

UNN/H&S/F/033 Nov 2019

Name		Signed					
Supervisor		Faculty			Univ	thumbria /ersity CASTLE	
Date	Tool number / Type	Vibration level m/s²	Exposure Points per hour (P)	Trigger time (T) Hours / minutes	Points total P x T	Daily total	
				ay - If the exposu nanged, or user tir		permissible Imits ,	