Health and Safety

Vibration

Minimum Standard

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1 Aims and Principles

The aim of this Government of Jersey (GoJ) Minimum Standard is to provide guidance on the steps which should be taken to ensure employees are not exposed to harmful levels of vibration at work.

Departments responsible for carrying out works which give rise to high levels of vibration should develop their own procedures which detail the specific arrangements to be implemented. The procedures must include the standards set out in this document or be of an equivalent or higher standard.

2 Legislation and Guidance

a) Applicable Legislation

Health and Safety at Work (Jersey) Law, 1989

b) Guidance

Vibration Index (UK HSE)

Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

Hand-Arm Vibration – A Brief Guide (UK HSE)

Sources of Vibration Magnitude (UK HSE)

Vibration solutions: practical ways to reduce the risk of hand-arm vibration injury (UK HSE)

Whole-Body Vibration Index (UK HSE)

Vibration Ready Reckoner (UK HSE)

3 Definitions

Hand-arm Vibration (HAV)

Mechanical vibration which is transmitted into the hands and arms during a work activity.

Whole-body Vibration (WBV)

Whole-body vibration is shaking or jolting of the human body through a supporting surface (usually a seat or the floor), for example when driving or riding on a vehicle along an unmade road, operating earth-moving machines or standing on a structure attached to a large, powerful, fixed machine which is impacting or vibrating.

Daily Exposure

The quantity of mechanical vibration to which a worker is exposed during a working day, normalised to an 8-hour reference period, which takes account of the magnitude and duration of the vibration.

Exposure Action Value

The level of daily exposure set out Sections 9 and 19 for any worker which, if reached or exceeded, requires specified action to be taken to reduce risk.

Exposure Limit Values

Means the level of daily exposure set out in Sections 9 and 19 or any worker which must not be exceeded.

4 Who this Minimum Standard Applies to

Applies to the following persons who manage or carry out any work which gives rise to levels of vibration injurious to health or who engage contractors to carry out such work.

- All Government of Jersey (GoJ) and States' employees
- Voluntary staff or those on honorary contracts where there is no implied contract of employment

5 Links to other GoJ Policies, Minimum Standards and Guidance

a) Policies

Government of Jersey - Health and Safety Policy

b) GoJ Minimum Standards

Risk Assessment
Occupational Health – Assessment and Surveillance

6 Roles and Responsibilities

The department's arrangements must clearly set out the roles and responsibilities of those required to manage the risks to employees and others from exposure to excessive levels of hand-arm or whole-body vibration.

Reference should be made to the Government of Jersey Health and Safety Policy for general responsibilities.

7 Overview

Persons can be exposed to vibration either through hand-arm vibration (HAV) or whole-body vibration (WBV).

Regular and frequent exposure to hand-arm vibration can lead to two forms of permanent ill health known as:

- hand-arm vibration syndrome (known as HAVS)
- carpal tunnel syndrome (CTS)

These are painful conditions which can interfere with everyday life and ultimately can become very debilitating.

Early symptoms include:

- Tingling and numbness in the fingers
- Not being able to feel things properly
- Loss of strength in the hands
- Fingers going white (blanching) and becoming red and painful on recovery (particularly in the cold and wet, and probably 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 several years. They are likely to get worse with continued exposure to vibration and may become permanent.

The effects these symptoms can have on people include:

- Pain, distress and sleep disturbance
- Inability to do fine work (e.g. assembling small components) or everyday tasks (e.g. fastening buttons)
- Reduced ability to work in cold or damp conditions (i.e. most outdoor work) which would trigger painful finger blanching attacks
- Reduced grip strength, which might affect the ability to do work safely.

These effects can severely limit the jobs an affected person is able to do, as well as many family and social activities.

Exposure to whole-body vibration can cause or exacerbate existing back pain.

To ensure that the risks from HAV and WBV are adequately controlled, departments will need to:

- Identify activities which give rise to levels of vibration which could be harmful to the health of employees
- Determine if alternative equipment with lower vibration emissions is available
- Identify suitable controls to manage the identified risks
- Identify any employees who already have vibration-related ill health or those who may be at particular risk e.g. have blood circulatory disease
- Provide information, instruction and training to employees on the risks and the actions being taken to control risk
- Provide suitable health surveillance.

Part 1 – Hand-Arm Vibration

8 Identifying Activities involving Hand-Arm Vibration (HAV)

The first step to controlling exposure to HAV is to identify working activities which give rise to levels of vibration which may pose a risk to health.

Typical jobs which involve regular and frequent exposure to vibration include:

- Construction and civil work
- Engineering
- Arboriculture
- Motor vehicle maintenance
- Maintenance of parks, gardens, verges, grounds etc.
- Utilities

Typical tools likely to give rise to high levels of vibration include:

- Chainsaws
- Grinders (all types and sizes, e.g. angle, die, straight, vertical etc)
- Impact drills
- Pedestrian operated equipment including mowers, floor saws, floor polishers
- Gardening equipment including strimmers, leaf blowers etc.
- Powered hammers for road breaking etc.
- Sanders and polishers

9 Exposure Action Values, Exposure Limit Values and Exposure Points

Vibration can cause harm at certain levels which are defined in UK legislation. Aligning with these is considered to be best practice for the purposes of this Minimum Standard.

The following table shows the current UK daily exposure values for hand-arm vibration.

Daily Exposure	***A(8)**	****Exposure Points**	
Exposure Limit Value (ELV)	5 m/s2	400	The **maximum** amount of vibration an employee may be exposed to on any single day
Exposure Action Value (EAV)	2.5 m/s2	100	The level of daily exposure to vibration at or above which the employer is required to take certain actions to reduce exposure

* A(8) values are the level of exposure averaged over an 8-hour period, taking into account the magnitude of vibration and exposure time

** Exposure points can be calculated using the HSE Ready Reckoner and can be easier to work with than A(8) values. Exposure points are calculated using the vibration magnitude and exposure time.

Departments should aim to reduce the risks from vibration to the lowest level reasonably practicable. If the levels of vibration are found to be above the Exposure Action Value, then they must be reduced to as low as is reasonably practicable. Exposure levels must not exceed the Exposure Limit Value.

If regular and frequent use of modern, well-designed, well-maintained powered hand-tools is occurring, a general rule of thumb is that the permitted times which can be spent using the tool before the levels are reached will be as follows:-

	Exposure Action Value (EAV)	**Exposure Limit Value (ELV)**
Hammer Action Tool	15 minutes	1 hour
Non-hammer Action Tool	1 hour	4 hours

However, where tools are old and/or receive inadequate maintenance, these levels are likely to be reached sooner as the vibration levels from the tool will be higher.

10 HAV Risk Assessment

When carrying out a HAV risk assessment, departments should:

- Carry out a brief survey of the workplace
- Find out who is exposed to hand-arm vibration and what is causing the exposure
- Estimate the time workers spend holding the equipment or work-piece while it is vibrating (Ref. Section 11)
- Identify environmental factors which could increase the risk e.g. exposure to cold
- Begin to set priorities i.e. very short periods may not be a problem; but the longer the equipment or work-piece is held the higher the exposure will be so it is more important that the vibration is low.
- Identify the actions required to ensure that the amount of exposure does not exceed the defined levels
- Ask users of equipment if they feel tingling or numbness during or after exposure to vibration from the tool. If they do, their exposure to vibration could be causing them harm
- Identify any employees who need to be provided with health surveillance and whether any are at particular risk. It is important to find out if any employees already have HAVS or CTS as steps will need to be taken to prevent their symptoms from getting worse, even if they are exposed to levels below the EAV

The checklist in Appendix A can be used to determine if HAV may be an issue in the workplace and can help to identify areas which may need improvement.

The risk assessment should be reviewed if:

- There is any reason to believe that it does not reflect the current vibration risks in the workplace e.g. if processes have changed, new machinery is installed, older machinery is no longer used, shift patterns alter etc.
- Improved vibration-control techniques or ways of working become available and could be applied
- Health surveillance shows that employees' health is being damaged, suggesting that vibration risks are not being properly controlled
- Control measures that could not be justified at the time of the original risk assessment, usually due to cost, become reasonably practicable, e.g. due to changes in technology and therefore cost.

Further information on noise risk assessment is available in Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

11 Estimating Vibration Exposure Levels

As part of the risk assessment process, departments must prepare a soundly based estimate of their employees' exposures to vibration.

A highly precise or definitive assessment of an individual employee's vibration exposure i.e. actual measurement, is not usually required but the assessment of exposure must be a reliable estimate with sufficient precision to be able to show whether the EAV or ELV are likely to be exceeded.

The assessment of exposure will only be reliable if it uses data which are reasonably representative of an individual's exposures.

Assessment of daily exposure to vibration should be carried out by:

- Observing specific working practices
- Referring to relevant information on the probable magnitude of the vibration corresponding to the equipment used in the particular working conditions
- Measurement of the magnitude of vibration to which employees are liable to be exposed (if necessary).

The exposure estimate will only be soundly based if it uses data which can be judged to be reasonably representative of the work process. In most cases where the assessment evidence suggests that exposure is unlikely to exceed the EAV, it is sufficient to record that fact, but departments are still required to reduce the risk to as low as reasonably practicable (ALARP).

The guidelines in Section 9, where tools are well-designed and well maintained, can be used to determine when users of powered hand-tools are likely to reach the EAV and if there could be a risk.

Further advice on the Sources of Vibration Magnitude Data and how to ensure that the data is representative of the work being carried out is available on the UK HSE website.

The UK HSE also has two tools available to assist with the calculation of vibration exposure levels.

Vibration Exposure points system and ready-reckoner
A 'ready-reckoner' which can be used if the vibrations magnitude (level) and exposure time are known.

Hand-arm vibration exposure calculator
This is a Microsoft Excel spreadsheet which is particularly useful where operators use more than one vibrating tool.

12 Measuring HAV Exposure Levels

Vibration measurements will be necessary when:

- It is not clear from the information otherwise available (as detailed in Section 11) whether the daily exposure is likely to be at or below the ELV or EAV
- Checks on the effectiveness of actions taken to control vibration exposure by making before and after measurements are required
- A machine is used for an unusual purpose, of which the manufacturer approves but has limited previous experience and so cannot provide vibration information.

If insufficient information is available to enable a reliable estimate of vibration exposure to be calculated, then the vibration levels should be measured and exposure calculated.

This must be carried out by a competent person who will be able to determine whether any of the daily exposure levels, detailed in Section 9 are being exceeded.

Any person undertaking vibration measurement and identifying control measures and vibration management measures in response to the data collected, must have received adequate training.

Whilst there are no formally recognised qualifications, any persons offering this service should be able to demonstrate that they have received training on the topics set out in Appendix 7 of the guidance Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

13 Reduction of Exposure to HAV

Where employees are exposed to vibration in the workplace, practicable steps should be taken to reduce, so far as is reasonably practicable, the levels of vibration those employees are being exposed to.

Exposure to vibration can be reduced by reducing one or both of the following:

- The vibration transmitted to the hand
- The time spent holding vibrating equipment or work-pieces.

Examples of action to reduce exposure to hand-arm vibration include:

- Eliminate vibration exposure by changing the work processes so that there is no exposure to vibration
- Avoid high-vibration machines and accessories through careful selection at the purchasing stage
- Maintain machines and accessories to prevent unnecessarily high vibration levels and ensure efficient operation
- Reduce the transmission of vibration to the hand

- Reduce the duration of exposure including job rotation
- Keeping warm and dry e.g. gloves
- Providing information and training to employees to influence behaviour
- Other measures including encouragement of maintaining good circulation, encouraging employees to quit smoking etc.

It should be noted that some employees, e.g. those with existing health problems, may be at risk from exposures below the EAV and need to be protected by additional control measures. If their exposure is likely to be above the EAV, a more systematic assessment will be required.

Further information is available in the guidance Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

14 Purchasing of Vibrating Hand-held Tools and Equipment

Advances in material and manufacturing technology have brought about improved designs of hand-held and hand-guided machines, and lower levels of vibration emission. However, simply buying newer machines may not eliminate or minimise the vibration exposure and there may still be a residual risk from exposure to vibration which must be managed.

Equipment purchased must be:

- Used only for operations and in conditions for which it is suitable
- Selected to reduce the risk from vibration
- Used only by workers trained to use it safely
- Properly maintained (as necessary) throughout its working life to sustain minimum vibration.

Ergonomic factors should also be considered which include:

- Weight of the equipment
- Machine efficiency and suitability for the task
- Handle design/comfort
- Grip and feed forces needed
- Ease of use/handling
- Warmth of hand grips
- Direction of exhausts away from hand-grip areas on compressed air tools

When purchasing work equipment which gives rise to vibration, the supplier has duties to provide the following:

- Warning of any vibration-related risks from using the equipment
- Information on safe use and, where necessary, training requirements

- Information on how to maintain the equipment
- A statement of the vibration emission (or a statement that the vibration test has produced a vibration emission of less than 2.5 m/s^2) together with information on the test method used

The above information should also be taken into consideration when hiring equipment.

Further guidance on the information from manufacturers and suppliers of machinery is contained in Appendix 5 of the guidance document, Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

15 Provision of Personal Protective Equipment

Although anti-vibration gloves are available on the market, these are generally ineffective at reducing the lower frequencies of vibration that have the greatest effect on vibration exposure i.e. they do not attenuate the vibration frequencies which cause damage.

Therefore, anti-vibration gloves provide no additional protection in terms of reducing the level of vibration to which the wearer's hands are exposed.

Further advice on this is available in Appendix 4 of the guidance, Hand-arm vibration - The Control of Vibration at Work Regulations 2005 (UK HSE)

The primary item of clothing which could be considered to be personal protective equipment to protect against vibration is gloves which keep the hands warm as getting cold increases the risks when exposed to vibration.

16 Provision of Training and Information

Appropriate training should be provided to employees who are at risk from exposure to vibration. The training/information should include:

- Details of work equipment and processes giving rise to vibration and the respective levels of risk
- How the employees' personal daily exposures compare with the exposure action and limit values
- The symptoms of ill health they should look out for, to whom they should report them and how they should report them;
- The control measures you have taken and/or plan to introduce to reduce risks
- The requirement to use gloves to prevent hands from getting cold
- That arrangements are in place to ensure exposure is being controlled e.g. through correct selection, use and maintenance of equipment or restriction of exposure times
- Details of the importance of health surveillance, how it will be provided and the

overall findings (anonymously)

- Confirmation that employees are expected to:
  - Follow instructions they are given on safe working practices;
  - Report problems with their equipment, such as unusually high vibration levels;
  - Co-operate with the program of control measures and attend health surveillance.

Further information for employees is available at the UK HSE website including the leaflet Hand arm Vibration – Advice for Employees

Part 2 – Whole-Body Vibration (WBV)

17 Risks Associated with WBV

Exposure to WBV alone is unlikely to lead to back pain. However, mobile machine operators and drivers, especially those who work off-road, are often exposed to other hazards which combined with WBV will increase their risk.

Typical factors include:

- Poor design of controls, making it difficult for the driver to operate the machine or vehicle easily or to see properly without twisting or stretching
- Incorrect adjustment by the driver of the seat position and hand and foot controls, so that it is necessary to continually twist, bend, lean and stretch to operate the machine
- Sitting for long periods without being able to change position
- Poor driver posture
- Repeated manual handling and lifting of loads by the driver
- Excessive exposure to whole-body vibration, particularly to shocks and jolts
- Repeatedly climbing into or jumping down from a high cab or one which is difficult to get in and out of.

18 Identifying Activities involving Whole-Body Vibration (WBV)

Persons who regularly operate or drive off-road machinery will potentially be exposed to WBV.

Typical industries involving off-road vehicle movements include:

- Construction and quarrying machines and vehicles, particularly earthmoving machines such as scrapers, bulldozers and building site dumpers

- Tractors and other agricultural and forestry machinery, particularly when used in transportation and mowing
- Landscaping machinery such as ride-on mowers.

Vehicles designed to be used on the road are unlikely to give rise to unacceptable levels of WBV unless driven on uneven surfaces or off-road.

19 Exposure Action Values and Exposure Limit Values

Whole-body vibration can cause harm at certain levels which are defined in UK legislation. Aligning with these is considered to be best practice for the purposes of this Minimum Standard.

The following table shows the current UK daily exposure values for vibration.

Daily Exposure	**A(8)**	
Exposure Limit Value (ELV)	1.15 m/s2	The **maximum** amount of vibration an employee may be exposed to on any single day
Exposure Action Value (EAV)	0.5 m/s2	The level of daily exposure to vibration at or above which the employer is required to take certain actions to reduce exposure

Departments should aim to reduce the risks from vibration to the lowest level reasonably practicable. If the levels of vibration are found to be above the Exposure Action Value, then they must be reduced to as low as is reasonably practicable. Exposure levels must not exceed the Exposure Limit Value.

20 WBV Risk Assessment and Estimating Exposure

Activities which could expose employees to WBV should be identified and exposure to WBV may be high where one or more of the following applies:

- The machine or vehicle manufacturer warns in the machine/vehicle handbook of risks from whole-body vibration
- The machines or vehicles are unsuitable for the tasks for which they are being

used (check the handbook or ask the supplier)
- Operators and drivers are using poor techniques, e.g. driving too fast or operating the machine too aggressively
- Employees are operating or driving, for several hours a day, on any of the machines or vehicles detailed in Section 18 which can cause high vibration exposures (though note that the list is not comprehensive)
- Employees are being jolted, continuously shaken or, when going over bumps, rising visibly in the seat
- Vehicle roadways or work areas are potholed, cracked or covered in rubble
- Road-going vehicles are regularly driven off-road or over poorly-paved surfaces for which they are not suitable
- Operators or drivers report back problems.

This kind of broad risk assessment can be done without needing to estimate or measure vibration exposure.

Most employers of drivers or operators will not need to do any measurements or employ vibration specialists to help with the risk assessment. Instead, it is recommended that employers direct their efforts towards controlling the risks.

Further information is available in Control back-pain risks from whole-body vibration (UK HSE)

21 Information from Manufacturers

Manufacturers providing machines or vehicles which can give rise to WBV are required to:

- Design and construct vehicles and machines which reduce whole-body vibration to the minimum that can be achieved
- Provide a technical handbook giving information on:
    - Safe use of the machine in its intended application
    - Vibration emissions*
    - Any maintenance procedures to maintain the performance of vibration reduction features
    - Whether there is likely to be any remaining risk from vibration
    - Instructions on how to use the equipment to avoid risk from vibration.

*The vibration emission information should describe the operating conditions of the machinery during the test and, if representative of actual use, it could be used to estimate the daily vibration exposure.

For some types of machine there is no standardised vibration test code, so it is

unlikely that the vibration emission information from different manufacturers can be compared unless the test conditions and quoted methods of measurement are the same – and even then there are uncertainties in measurement of up to 40% that can contribute to differences in values.

In most cases, taking into account the variation in vibration with different machine duties and operating conditions, it is unlikely that a single vibration emission value could be suitable for assessing exposure.

22 Controlling Risk of Exposure to WBV

Where exposure to WBV is likely to be high and other factors set out in Section 17 are also present, actions which could be taken to control the risks include:

Train and instruct operator and drivers

Drivers and operators should:

- Adjust the driver weight setting on their suspension seats, where it is available, to minimise vibration and to avoid the seat suspension 'bottoming out' when travelling over rough ground
- Adjust the seat position and controls correctly, where adjustable, to provide good lines of sight, adequate support and ease of reach for foot and hand controls
- Adjust the vehicle speed to suit the ground conditions to avoid excessive bumping and jolting
- Steer, brake, accelerate, shift gears and operate attached equipment, such as excavator buckets, smoothly
- Follow worksite routes to avoid travelling over rough, uneven or poor surfaces.

Choose machinery suitable for the job

- Select vehicles and machines with the appropriate size, power and capacity for the work and the ground conditions.
- Consult trade associations for advice
- Refer to vehicle handbooks prepared by the manufacturer which will include advice on the risks from whole-body vibration, how to reduce the risks and how to train drivers to operate vehicles safely and efficiently

Maintain machinery and roadways

- Make sure that paved surfaces or site roadways are well maintained, e.g. potholes filled in, ridges levelled, rubble removed
- Maintain vehicle suspension systems correctly (e.g. cab, tyre pressures, seat suspension)
- Replace solid tyres on machines such as fork-lift trucks, sweepers and floor scrubbers before they reach their wear limits
- Obtain appropriate advice (from seat manufacturers, machine manufacturers and/or vibration specialists) when replacing a vehicle seat. Seats need to be carefully matched to the vehicle to avoid making vibration exposure worse.

Other measures

- Introduce work schedules to avoid long periods of exposure in a single day and allow for breaks where possible.
- Avoid high levels of vibration and/or prolonged exposure for older employees. people with back problems, young people and pregnant women.
- Carry out health monitoring (Ref: Section 24).

23 Information and Training

A system should be put in place to ensure that employees are provided with information on:

- The possible link to back pain from exposure to whole-body vibration, including from large shocks and jolts
- The likely sources of hazardous vibration
- The risk factors (e.g. severity of vibration and length of exposure, increased risk from poor posture or manual handling of heavy objects)
- The findings of the risk assessment
- The measures being taken to control the risks
- The role and system of health monitoring
- How to report back problems
- The ways employees can help you minimise risk.

24 Health Monitoring

Where there is an increased risk of back pain from exposure to WBV and other factors as described in Section 17 are present, health monitoring should be undertaken.

Departments should:

- Agree with employees an ongoing system for early reporting of back pain symptoms
- Review and analyse the results to identify vulnerable individuals and groups of workers
- Refer employees with back problems to the GoJ occupational health service provider
- Treat personal information about the health of individual employees as confidential
- Use any feedback from employees to check that risk controls are working and make changes to your risk controls if necessary.

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Appendix **A**

Vibration Checklist

This checklist can be used to determine if vibration is a problem in the workplace and can help to identify improvements which can be made to ensure the risks are reduced

	Yes	No	Comments
Observe the work processes and the tools used. Where practicable and safe to do so, try the tool yourself.			
How many employees use powered hand-held tools and where do they work?			
Is there a high turnover of people in any departments using powered hand- held tools?			
Ask operators about vibration levels when the tool or machine is in use. Do they get numbness or tingling in their fingers?			
Have operators complained about recurrent pain or throbbing in their hands, or difficulties with gripping objects, or completing fiddly tasks such as fastening or unfastening a button?			
The Process			
Could you redesign the process to avoid or reduce the use of powered hand-held tools, e.g. by substitution or mechanisation?			
Are alternative lower vibration processes or methods available?			
Could you introduce remote or power-assisted control?			
Could you use mechanical aids to help move the components or tools?			
The Installation			
Could you reduce vibration from fixed machines by improving the mounting?			
Could you isolate the vibration directly?			
Could you use jigs to hold components firmly in place?			
The Task			
Could you reduce or mechanise the force which the operator has to exert to do the job?			
Could you use balancers or tensioners to take the weight of the tool from the operator's hands?			

The Tools			
Are you providing the most appropriate tools for the job? Check with suppliers whether lower vibration tools or components are available.			
Could you use an alternative type of tool, for example a grinder instead of a chipping hammer, to reduce vibration exposure?			
Could you buy better-balanced wheels or discs for cutting or grinding?			
Are you using the optimum quality and grade of cutting or grinding wheels and discs?			
Are the tools and machinery performing in accordance with the vibration values declared by the manufacturer?			
Could you reduce the airline pressure on hammer action tools and maintain cutting rates?			
Maintenance Requirements			
Do your maintenance schedules conform to the manufacturer's specifications?			
Are your maintenance arrangements adequately supervised, monitored and recorded?			
Do you know how often tools or their components should be replaced? Do you need to replace anti-vibration mounts or dampers? Ask the manufacturer or supplier for information.			
Could you make balance checks on your tools and machines?			
Do you keep the tools sharp? Could vibration exposure from tool sharpening operations be reduced?			
Work Schedule			
Could you reduce exposure by introducing job rotation?			
Are there enough breaks in the work for recovery during tasks with a risk of high vibration?			
Operator Usage			
Are operators using the tools correctly in accordance with manufacturer's instructions?			
Do you train operators to use the correct tool for the job?			
Are the correct tools available?			
Should you introduce a 'permit to use' system for tools and processes with a high-vibration risk?			

Would closer supervision help?			
Operator Protection			
Do operators know what they can do to minimise vibration risks?			
Could you improve operators' information, instruction and training?			
Is the workplace warm enough to maintain good blood circulation, so preventing hands and fingers from becoming cold?			
Do operators need gloves or clothing to help keep them warm?			
Do operators need gloves or clothing to help keep them warm?			
Does the exhaust air from pneumatic tools need to be diverted away from the operator's hands?			
Costs and Benefits			
Compare the costs and benefits of the various control measures. How many employees will benefit?			
Are there other benefits, e.g. reduced noise or improved productivity?			
What will be the cost per employee protected?			
Symptoms			
Have you instituted a programme for identifying early adverse health effects?			
Do you have access to a medical practitioner to supervise the programme and for referral of symptoms?			
Do workers know what to look out for and are they encouraged to report symptoms such as finger blanching?			
Do you keep adequate records of these reports?			
Do you investigate any adverse health effects reported?			
Do you feed your findings back into your risk assessment and control measures?			