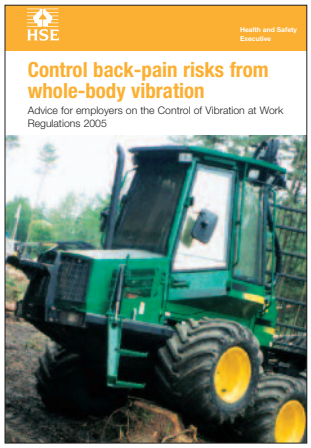
Control back-pain risks from whole-body vibration

Advice for employers on the Control of Vibration at Work Regulations 2005



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Introduction

Who should read this leaflet?

You should read this leaflet if you employ operators of off-road mobile machinery, agricultural vehicles or industrial trucks.

You may also find it helpful if:

- you employ drivers of other vehicles, particularly if they suffer from back pain;
- you are a driver or operator of a mobile machine or vehicle;
- you are a trade union safety representative or an employee representative for drivers or operators.

This leaflet will help you manage the risk of back pain in your employees and will tell you what you need to do to comply with the Control of Vibration at Work Regulations 2005.

Most people who drive road-going vehicles at work are not likely to experience high levels of whole-body vibration and so their employers are unlikely to have to take any action under these Regulations.

See HSE leaflet INDG175(rev2) for guidance on exposure to hand-arm vibration.

HSE's priced book on whole-body vibration will give you more information on all the topics in this leaflet. (Due to be published in late 2005, ISBN 0 7176 6126 1.)

Also see HSE's vibration web pages: www.hse.gov.uk/vibration.

The health effects of whole-body vibration

What can cause or aggravate back pain in mobile machine operators and drivers?

Over five million working days are lost each year due to back pain caused or made worse by work. Back pain can be caused by many work and non-work activities. It can lead to time off work, loss of productivity and compensation claims. Mobile machine operators and drivers (especially those who work off-road) are at increased risk from back pain.

There are things that you can do to help your employees avoid the problem, but you cannot prevent all back pain, so early reporting of symptoms, proper treatment and suitable rehabilitation is essential.

Reasons for back pain in drivers can 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.

The risk increases where the driver or operator is exposed to two or more of these factors together.

This leaflet mainly deals with whole-body vibration, but also tells you what you can do about other causes of back pain in machine operators and drivers.

What is whole-body vibration?

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.

Who is at risk?

When is exposure to whole-body vibration likely to lead to back pain?

Most exposure to whole-body vibration at work is unlikely on its own to cause back pain. It may pose a risk when there is unusually high vibration or jolting or the vibration is uncomfortable for a long time on most working days. In such situations, the risk from vibration is related to the overall time the operator or driver is exposed to the vibration and the number of shocks and jolts they experience each day.

In some cases whole-body vibration can aggravate a back problem caused by another activity, eg a muscle strain caused by an accident when lifting a heavy object or during physical activity such as sport.

Who is likely to have high exposures to whole-body vibration?

Among those most likely to experience high vibration exposures are regular operators and drivers of off-road machinery such as:

- construction, mining and quarrying machines and vehicles, particularly earth-moving machines such as scrapers, bulldozers and building site dumpers;
- tractors and other agricultural and forestry machinery, particularly when used in transportation, tedding (turning hay), primary cultivation and mowing.

Are road transport vehicle drivers at risk from whole-body vibration?

The risk for road transport drivers from vibration exposure is likely to be low unless the vehicles do not have effective suspension (eg some types of smaller rigid-body lorries or flat-bed trucks) or are driven over poor surfaces or off-road. But there may be other causes of back pain for road transport drivers, which should probably be considered first, such as poor posture, long periods in the same position and repeated lifting and carrying.

Who else might experience high exposures to whole-body vibration?

High exposures could occur where vehicles designed for smooth surfaces are driven on poor surfaces, eg when lift trucks with no wheel suspension or with solid tyres are used on a cracked or uneven yard. Poor operating or driving technique with most off-road machines or vehicles (eg driving too fast) can also lead to higher exposures which can be reduced by good driver training and instruction. High exposures also occur in small, fast boats.

Are any employees at particular risk?

Older people, those with previous back or neck problems, young people and pregnant women are more likely to be at risk of back pain and may be at higher risk from exposure to whole-body vibration.

Legal duties

What do the Regulations require employers to do?

The Control of Vibration at Work Regulations require you to control the risks from whole-body vibration. This should be based on an assessment of the risk and exposure. In most cases it is simpler to make a broad assessment of the risk rather than try to assess exposure in detail, concentrating your main effort on introducing controls.

The requirements of the Regulations are that you must:

- assess the vibration risk to your employees;
- decide if they are likely to be exposed above the daily exposure action value (EAV) and if they are:
  - introduce a programme of controls to eliminate or reduce their daily exposure so far as is reasonably practicable;
- decide if they are likely to be exposed above the daily exposure limit value (ELV) and if they are:
  - take immediate action to reduce their exposure below the limit value;
- provide information and training on health risks and controls to employees at risk;
- consult your trade union safety representative or employee representative about the risks and what you plan to do;
- keep a record of your risk assessment and control actions;
- review and update your risk assessment regularly.

What is the exposure action value (EAV)?

The exposure action value is the amount of daily exposure to whole-body vibration above which you are required to take action to reduce risk. It is set at a daily exposure of 0.5 m/s^2 A(8).

Whole-body vibration risks are low for exposures around the action value and only simple control measures are usually necessary in these circumstances.

What is the exposure limit value (ELV)?

The exposure limit value is the maximum amount of vibration an employee may be exposed to on any single day. It is set at a daily exposure of 1.15 m/s^2 A(8). Operators of some off-road machines and vehicles (see 'Who is at risk?') may exceed the limit value but this will depend on the task, vehicle speed, ground conditions, driver skill and duration of the operation.

The Regulations allow a transitional period for the limit value until July 2010 (or until 2014 for the agricultural and forestry sectors). This only applies to machines or vehicles first supplied to employees before July 2007. The exposure limit value may be exceeded during the transitional periods as long as you have complied with all the other requirements of the Regulations and taken all reasonably practicable actions to reduce exposure as much as you can.

Assess the risks

How do I get started?

Start by making a risk assessment. This will help you decide if any of your employees is likely to be at risk from vibration.

How do I make a risk assessment?

You can collect the basic information you need by observing work tasks, talking to your managers, employees and others. This should produce enough information to allow you to make a broad assessment of the risk and to introduce simple control measures to reduce risk to a reasonable level.

Exposures may be high where you find one or more of the following:

- machine or vehicle manufacturers warn in the machine/vehicle handbook of risks from whole-body vibration;
- the machines or vehicles you are using 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, eg driving too fast or operating the machine too aggressively;
- your employees are operating or driving, for several hours a day, any of the machines or vehicles described earlier in this leaflet as likely to cause high vibration exposures (though note that the list is not comprehensive);
- your 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.

Record your findings and assess which groups of your employees might be most at risk.

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.

However, it is likely that whole-body vibration is not the only cause, or the main cause, of back pain. Employees may, when driving, identify vibration as the source of back pain because it is their exposure to vibration that causes them discomfort. When you investigate you may find that something else is the most likely cause of the back pain.

Measuring exposure

Do I need to measure my employees' exposure to vibration?

No, you don't have to do this as long as you have done the broad risk assessment and take all the appropriate and reasonable control actions described in this leaflet.

If I don't measure, how will I know if my employees are exposed above the exposure limit value?

Most machine and vehicle activities in normal use will produce daily exposures below the limit value. But some off-road machinery operated for long periods in conditions that generate high levels of vibration or jolting may exceed the exposure limit value. If you want to check you may be able to use the information in the vehicle manufacturer's handbook (see 'Duties of manufacturers and suppliers'). You could also use data published by HSE and the exposure calculator on its website at www.hse.gov.uk/vibration for a range of machines and vehicles in different working conditions to make an estimate. But it will be more effective for most employers to direct their efforts towards controlling the risks rather than trying to assess vibration exposures precisely.

Duties of manufacturers and suppliers

How can vehicle and machine manufacturers help?

You should seek advice from suppliers on those machines and vehicles that are most suitable, and with the lowest vibration, for the work you plan to do. You should avoid any machines or vehicles reported to have unusually high vibration. Choosing unsuitable machines or vehicles could increase vibration exposure as well as being less efficient.

Manufacturers of machines, other than agricultural tractors and road vehicles, are required to:

- design and construct vehicles and machines which reduce whole-body vibration to the minimum that can be achieved;

- provide you with 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.

Vibration information from machine manufacturers

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.

Control the risks

How do I control the risks from whole-body vibration?

The actions you decide to take should be in proportion to the risk identified. Where exposures are likely to be high, and where other factors such as manual handling or postural strain may be significant, you may need to give higher priority to controlling them. On the other hand, where vibration exposure is likely to be low, and no other risk factors are present, you will probably need to do very little. When you have decided what actions to take, you should also decide who will be responsible for taking them and by when. Record these details in your risk assessment.

Actions for controlling risks could include the following:

Train and instruct operators and drivers

They 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 your trade association for advice.

Vehicle handbooks prepared by good manufacturers will include advice on the risks from whole-body vibration, how to reduce them 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, eg potholes filled in, ridges levelled, rubble removed.
- Maintain vehicle suspension systems correctly (eg 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 (see ‘Health monitoring’).

What can I do about back pain risks from poor posture and manual handling?

Select vehicles and machines with:

- a seat which gives good support to the back, buttocks, thighs and feet;
- sufficient and easy adjustment of the seat for height, backrest and seat position and which will suit a wide range of driver sizes;
- controls which do not require high levels of muscular effort, stretching, leaning or twisting to operate them;
- access to the cab which is not awkward or difficult.

Other things you can do include:

- plan work, where possible, to avoid employees having to sit in the same position for too long;
- follow HSE’s guidance on correct manual lifting and carrying techniques (leaflet INDG143(rev2)).

How do I know if the steps I have taken to control risks are working?

- Ask and/or observe whether drivers are experiencing fewer and less severe shocks and jolts and whether reports of back pain have been reduced.
- Check that the programme of controls you have introduced is being carried out properly by your managers and employees.
- Use the results of health monitoring to help you decide if your controls are working.

Information and training

What information and training do I have to give my employees?

You should provide your employees 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 (eg severity of vibration and length of exposure, increased risk from poor posture or manual handling of heavy objects);
- the findings of your risk assessment including your decisions on which employees' vibration exposures need to be managed;
- the measures you are using to control the risks;
- the role and system of health monitoring;
- how to report back problems;
- the ways they can help you minimise risk.

Consultation

You must consult your trade union safety representative or employee representative and your employees about your proposals to manage risks from vibration exposure and other causes of back pain. Consultation should cover the results of your risk assessment, your proposals for control, for providing information and training for employees and for any health monitoring system.

Health monitoring

What do I do about health monitoring?

HSE recommends that you set up a simple system of health monitoring for your employees whose jobs carry a higher than average risk of back pain.
You should:

- agree with your employees and safety or employee representatives an ongoing system for early reporting of back pain symptoms;
- review and analyse the results to identify vulnerable individuals and groups of workers;
- periodically (HSE recommends once a year) complete a questionnaire checklist for employees at risk (an example questionnaire is provided on the MSD back pain website www.hse.gov.uk/msd);
- refer employees with back problems to your occupational health service provider, where available;
- treat personal information about the health of individual employees as confidential;
- consider the results to check if your risk controls are working;
- make changes to your risk controls if necessary.

What do I do if my employees report back pain?

Advise them to avoid any activities which aggravate back pain. Generally, it's best for them to stay active, as back pain is rarely serious. They could try simple pain relief to help with the pain. But they should see their doctor if they are worried, or if the pain persists or suddenly gets worse.

How can I find out more?

Whole-body vibration. Control of Vibration at Work Regulations 2005. Guidance on Regulations L141 HSE Books 2005 ISBN 0 7176 6126 1 (due to be published late 2005)

Drive away bad backs: Advice for mobile machine operators and drivers Pocket card INDG404 (single copy free or priced packs of 25 ISBN 0 7176 6120 2)

Getting to grips with manual handling: A short guide Leaflet INDG143(rev2) HSE Books 2004 (single copy free or priced packs of 15 ISBN 0 7176 2828 0))

Control the risks from hand-arm vibration: Advice for employers on the Control of Vibration at Work Regulations 2005 Leaflet INDG175(rev2) HSE Books 2005 (single copy free or priced packs of 10 ISBN 0 7176 6117 2)

The back book: The best way to deal with back pain (Second edition) The Stationery Office 2002 ISBN 0117029491 (Tel: 0870 600 5522)

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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 6119 9. Single free copies and a web version can be found at: www.hse.gov.uk/pubns/indg242.pdf.