



# Vibration

**Minimum requirements for the protection of workers from risks to their health and safety arising or likely to arise from exposure to mechanical vibration at workplace.**

This includes mainly for the aggregates sector:

*Whole-body vibration (WBV): Whole-body vibration (WBV) is the mechani-*

*cal vibration that, when transmitted to the whole body, entails risks to the health and safety of workers, in particular lower-back morbidity and trauma of the spine, transmitted through the seat or feet of employees who drive mobile machines, or other work vehicles, over rough and uneven surfaces as a main part of their job. Large shocks and jolts may cause health risks including back-pain.*

## Why is dealing with vibration important?

### **Whole-body vibration (WBV)**

WBV is associated mostly with low back pain. However, back pain can also be caused by other factors, such as manual handling and postural strains, and while exposure to vibration and shocks may be painful for people with back problems, it will not necessarily be the cause of the problem. 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 are at increased risk from back pain.





## What do Employers have to do?

- Control the risks; Determine and Assess vibration risks to workers
- Avoid or reduce the risks arising from exposure to mechanical vibration:
  - For whole-body vibration:
    - (a) the daily exposure limit value standardised to an eight-hour reference period shall be  $1,15 \text{ m/s}^2$  or, at the choice of the Member State concerned, a vibration dose value of  $21 \text{ m/s}^{1,75}$ ;
    - (b) the daily exposure action value standardised to an eight-hour reference period shall be  $0,5 \text{ m/s}^2$  or, at the choice of the Member State concerned, a vibration dose value of  $9,1 \text{ m/s}^{1,75}$ .
- Provide information, instruction and training to workers on the risk and the actions being taken to control risk
- Consult workers about the risks and actions' plan
- Provide suitable Health Surveillance; Keep a record of the risk assessment and control actions; Review and update risk assessment regularly.

A(8)  $\text{m/s}^2$

**1,15**

Above this value, actions to **reduce** this risk

**0,50**

Above this value, actions to keep this risk under **control**

**0**





## EXAMPLES

### National Examples (non exhaustive list):



- The Health and Safety Executive UK (HSE) has set guidance documents and vibration calculator for hand-arm and whole-body vibration on its website ([www.hse.gov.uk/vibration/hav/index.htm](http://www.hse.gov.uk/vibration/hav/index.htm) and [www.hse.gov.uk/vibration/wbv/index.htm](http://www.hse.gov.uk/vibration/wbv/index.htm)).
- HSE 2005, Whole-body vibration on construction, mining and quarrying machines, Evaluation of emission and estimated exposure levels
- WBV paper published in 'Quarry Management' magazine in 2001

### Company Examples (non exhaustive list):

- Machine WBV emission and operator daily exposure levels fell into three broad categories:
  - Low WBV exposure levels, not exceeding the Exposure Action Value (EAV) in a typical working day;
  - Moderate WBV exposure levels, above the EAV, but not approaching the Exposure Limit Value (ELV) in a typical working day;
  - Higher levels of WBV, potentially approaching the ELV in a typical working day.
- Suspended seats, if appropriately selected and properly maintained, may provide useful reduction of vertical (Z-axis) whole-body vibration on machines.



- Online Datenbanken Vibrationen/ Databases for Vibration Machines: <http://laermvibrationsarbschv.de/index.php/vibrationen/8-linkszumthemavibrationen/11-onlinedatenbankenvibrationen>
- The Quarry and Mining Spanish Administration with the Spanish Aggregates Association ANEFA produced a clear and simple guidance document as reference for companies: [Link to the pdf](#)



- The most important factors in controlling/reducing operator exposure to WBV are likely to be adequate information and appropriate training in 'Best Practice'. Maintenance of haul roads and/or other operating surfaces can help to reduce machine WBV emission/operator exposure levels, but only if vehicle travel speeds are also controlled. Care is required in measuring operator WBV exposure levels in instances when the operator spends a proportion of the measurement period absent from the vehicle seat.



**Some ideas  
(non exhaustive list):  
How can I reduce whole-body  
vibration?**

- Choose vehicles or machines designed to cope with the task and conditions
- It is possible to lower the vibration on mobile equipment when using seats, which are manufactured due to ISO-standard 7096. In more than 80 % of all cases OEL could be fulfilled.
  - Regulation of antivibration seat: Improper adjustment increases vibration (Z) received by the worker (20 - 50%)
  - A simple adjustment of the seat can noticeably reduce vibration
  - Seats should be changed after 2000 hours
- Keep site roadways level, fill in pot-holes and remove debris
- Drivers to operate machines and attachments smoothly, to drive at appropriate speeds for the ground conditions and to adjust suspension seats correctly
- Maintain and repair machine and vehicle suspension systems, tyre pressures and suspension seats



- Develop a prevention policy which covers technology, organisation of work, working conditions and the influence of factors relating to the working environment
- Give appropriate instructions and training to workers
- Adapt to technical and safety standards progress
- If other preventive measures do not reduce the exposure enough, limit the time that your employees are exposed to vibration
- Plan work to avoid individuals being exposed to vibration for long, continuous periods – several shorter periods are preferable

**Find out more**

Directive 2002/44/EC: [eur-lex.europa.eu](http://eur-lex.europa.eu) - Document 02002L0044-20081211  
EU-OSHA : [osha.europa.eu/en/legislation/directives/19](http://osha.europa.eu/en/legislation/directives/19)  
HSE: [vibration website](#) ( including Guidance and Calculator)

**The EU law**

**Directive 2002/44/EC** – Minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration). The Directive aims at ensuring health and safety of each worker and at creating a minimum basis of protection for all Community workers by timely detection of adverse health effects arising or likely to arise from exposure to mechanical vibration, especially musculo-skeletal disorders.

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