Control of Risks from Hand-arm Vibration

HSE guidance and expectations
Hand-arm vibration syndrome (HAVS)

Serious, disabling and costly …

… but preventable
Talking head
The new Vibration Regulations - employers’ duties

- Ensure health and safety of employees
- Risk assessment
- A hierarchy of measures to achieve control
- Information, instruction and training for employees
- Health surveillance if required
- Already expected for HAV since 1994, under general H&S legislation and HSE guidance on HAV (HSG88, 1994)
What’s new?

• Exposure Action Value (EAV) $2.5 \text{ m/s}^2 \ A(8)$
  – lower than the old HSE recommended action level
  – but still not a “safe” level of exposure

• Exposure Limit Value (ELV) $5 \text{ m/s}^2 \ A(8)$
  – higher than the old HSE recommended action level
  – a difficult challenge for some sectors of industry
  – should prevent the worst exposures
  – transitional arrangements until 2010, but only where not reasonably practicable to comply
Duties of employers (at any exposure level)

• Assess vibration risks to health and safety

• Eliminate vibration risk at source, or reduce to lowest reasonably practicable level

• Provide information and training for employees on vibration risks and control measures
Duties of employers if the exposure action value is *likely* to be exceeded:

- Reduce *exposure* to the lowest reasonably practicable level; and

- Where exposure still remains above EAV, implement health surveillance
Duties of employers: the exposure limit value

• Ensure employees are not exposed above the ELV

• If they are, take immediate action to prevent recurrence

• Note: transitional period until July 2010 for the ELV where:
  – equipment in use before 6 July 2007; and
  – not (yet) reasonably practicable to comply with ELV
Who is exposed to HAV?
(from Medical Research Council study, 1999)

• About 5 million exposed to HAV at work
• About 1.7 million exposed above EAV
• About 1 million exposed above ELV

• Greatest numbers in construction industry and related trades
• Highest levels of exposure in heavy fabrication, foundry fettlers, stone masons
The approach to HAV risk assessment

• Look for evidence of risk:
  – Industry/process/tools with known HAVS risk?
  – Significant daily operating time?
  – HAVS symptoms in workforce?
  – Tingling, etc. during/after tool use?

• Look for solutions:
  – Good practice being applied?
  – Can more be done?
Exposure assessment

• Exposure likely to be above action value?
  – Action plan to reduce exposure and start health surveillance

• Exposure above limit value?
  – Immediate action

• Get vibration information from:
  – equipment manufacturers (check declared emission represents ‘in use’)  
  – other sources of relevant vibration data
  – workplace measurements if necessary
Rules of thumb

• Rotary tools
  – EAV exceeded within 1 hour
  – ELV exceeded within 4 hours
    • Some tools exceed ELV within 1 hour

• Percussive tools
  – EAV exceeded within ¼ hour
  – ELV exceeded within 1 hour
    • Some tools exceed ELV within 2 or 3 minutes

• Note: These are ‘trigger times’
Risk Assessment and Control

• The emphasis in the new regulations is on control, not simply risk assessment.

• In many cases a risk assessment will be essential to indicate the options for an action plan to control or manage exposure.

• In future, HSE is likely to be asking for evidence of the action plan, and that the key measures identified are being implemented.
Control of exposure

• Change the process
  – eliminating or reducing vibration exposure at source;
  – often essential where exposures are very high.

• Select suitable (reduced-vibration) equipment
  – purchasing policies

• Operator training

• Maintenance of equipment

• Time limits, job rotation
  – exposure points system may help
Case study: changing the process

Mechanisation removes the risk

- Machine-mounted pick replaces hand-operated breakers
Case study: changing the process
Demolition without vibration

• Use hydraulic crushers instead of demolition hammers
Case study: changing the process
Fettling eliminated by improved casting quality

Green sand casting  →  Lost foam casting
Case study: changing the process
Pile cropping

- In construction the biggest reduction in exposure can often be achieved at the design stage
Case study: engineering control

Jigs

• Benefits:
  – Reduced vibration exposure
  – Good ergonomics
  – Increased productivity and quality
Case study: process change

Scabbling

• Alternative methods of working:
  – Eliminate process entirely
  – Design out process
Case study: changing the process:
Foundry furnace lining removal

Old: Pneumatic pick
Slow process with exposure to noise, vibration, dust, heat

New: Hydraulic push-out
Safer process with shorter down time and reduced long-term cost
Choose a suitable tool

- Vibration can be very different between tools
- An under-powered or inefficient tool can increase vibration exposure
- Consider the vibration emission of the suitable tools
Selecting new equipment

• Choose the right tool for the job
  – safety, economy, efficiency

• Declared vibration emission
  – which standard or test condition?
  – realistic vibration level?

• Ask about likely vibration for your intended use
  – effect of consumables, materials, etc.
  – operator training requirements?
  – maintenance requirements?
Suppliers can help

• Suppliers must warn of vibration risk
• Suppliers must declare vibration emission
  – or state that it is below 2.5 m/s²
• Manufacturers’ information:
  – Can help identify (and avoid) unusually high vibration equipment
  – Standard emission data is sometimes poor for estimating exposure
  – Supplementary data on residual risk should help
Information, instruction and training for operators

• Correct selection of equipment
• Correct operation of equipment
  – especially important with some vibration-reduced designs
• How to recognise (and report) symptoms of HAVS
• How to minimise risk (exercising fingers, keeping warm, breaks from exposure, not smoking, etc.)
Operator training requirements

- Example - vibration-reduced breaker:
  - Keep the moil point sharp
  - Break a little at a time, don’t get jammed
  - Don’t force anti-vibration handles
  - Stop breaker before pulling out
Controlling daily exposure

• Limit daily exposure durations
• Job rotation
• New exposure points system:
  – EAV = 100 points
  – ELV = 400 points
  – Points can be added - easier to manage and record exposures
  – Often presented as ‘points per hour’ (or ¼ hour)
“Traffic lights” system

- Some tool suppliers and hirers have established a three colour system of tool classification:
  - **Green**: use up to 8 hours (before ELV likely to be exceeded)
  - **Amber**: use up to 2 hours (before ELV likely to be exceeded)
  - **Red**: refer to supervisor

- Construction industry enthusiastic

- HSE currently working with industry to improve quality of vibration data and accompanying guidance
# HAV exposure calculator

[www.hse.gov.uk/vibration](http://www.hse.gov.uk/vibration)

## Hand-Arm Vibration Exposure Calculator

<table>
<thead>
<tr>
<th>Tool or process</th>
<th>Vibration magnitude m/s² r.m.s.</th>
<th>Exposure points per hour</th>
<th>Time to reach EAV 2.5 m/s² A (8)</th>
<th>Exponential time to reach ELV 5 m/s² A (8)</th>
<th>Exposure duration hours</th>
<th>Partial exposure m/s² A (8)</th>
<th>Partial exposure points</th>
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### Instructions for use:

- Enter vibration magnitudes and exposure durations in the white areas.
- To calculate, press the Enter key, or move the cursor to a different cell.
- The results are displayed in the yellow areas.
- To clear all cells, click on the 'Reset' button.
- For more information, click the 'HELP' tab below.
HAV exposure ready-reckoner

- All values are exposure points
- Colours show exposures re. EAV & ELV

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Health surveillance

• Required when the EAV is likely to be exceeded
  – or where risk assessment shows the need
  – Intended to prevent progression
    …..

• Important for HAVS because:
  – Some high exposures are unavoidable;
  – there is no effective personal protective equipment

• More on this later in the day
HSE’s Priorities

• Target interventions at industries where there are:
  – high exposures; and/or
  – large numbers of people at risk

• To minimise the number of exposures above the ELV by 2010:
  – ensure the application of established good practice; and
  – encourage the further development of good practice where required
HSE’s guidance

• New employees’ pocket card
• New employers’ leaflet
• New Handbook:
  *Hand-arm vibration: Control of Vibration at Work Regulations 2005. Guidance on Regulations (L140)*
• Plus existing video and case studies book