

Simple solutions to Complex problems in Mining: HIAC Toolbox Talks Project

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- Barbara McPhee (Jim Knowles Group) and Gary Foster (Foster OHS)
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- Qld HIAC members (Coal) and CFMEU participants
- Qld SSHRs



Overview

- Why develop toolbox talks on vibration?
- What key messages need communicating?
- When do we communicate?
- What support do sites need to manage the messages? (How)
- Key findings from the project

Why develop talks on whole body vibration?

The value of tripartite committees and open communication



Why develop talks on whole body vibration?

- In 2008, Queensland DME (now DEEDI) formed a tripartite committee with a focus on mining health
- The Health Improvement and Awareness Committee (HIAC) used a collective risk assessment process to prioritise key mining health hazards
- Whole body vibration (WBV) was one of the top five hazards identified.





Why develop talks on whole body vibration (2)?

- HIAC held a meeting in June 2009 on WBV with guest speakers
- DEEDI funded a WBV seminar for industry and the Mines Inspectors at the same time
- A presentation to the Open Cut Checkies (short version of the seminar) followed in July 2009
- Based on feedback from the seminar, and some issues raised from the CFMEU attendee, the toolbox talk project was initiated

What key messages need communicating?

Where are the best sources of WBV information?

What do people want to know and what can we support at a site (and industry) level?

How can we keep it simple?



What key messages need communicating?

- Background information and content is linked to the publication “Bad Vibrations”
- Seminar presentation slides and recommended reading also available on HIAC webpages
- Toolbox talks incorporate generic content and site specific information





What key messages need communicating?

Suggested generic content

- What is whole body vibration (WBV)?
- Where does it come from?
- What effects does it have?
- What standards or guidelines are used to evaluate WBV?

Possible site specific content

- What do I need to do if I am part of the testing?
- What are the results and what do they mean?
- What is the site strategy for managing WBV?
- What can I do?



What key messages need communicating (2)?

Whole Body Vibration – what is it?

Example of the messages

- WBV is vibration, jolting and jarring (or transient mechanical shock) transmitted through a supporting surface.
- Humans are sensitive to some frequencies more than others. The sensitivity is determined by the direction of the vibration (Bad Vibrations)
- Whole body vibration (WBV) is a physical hazard.



What key messages need communicating (3)?

Why is exposure to WBV a problem for operators and drivers?

Example of the messages

- There is now strong evidence of a positive association between exposure to WBV and back disorders (NIOSH 1997, ongoing)

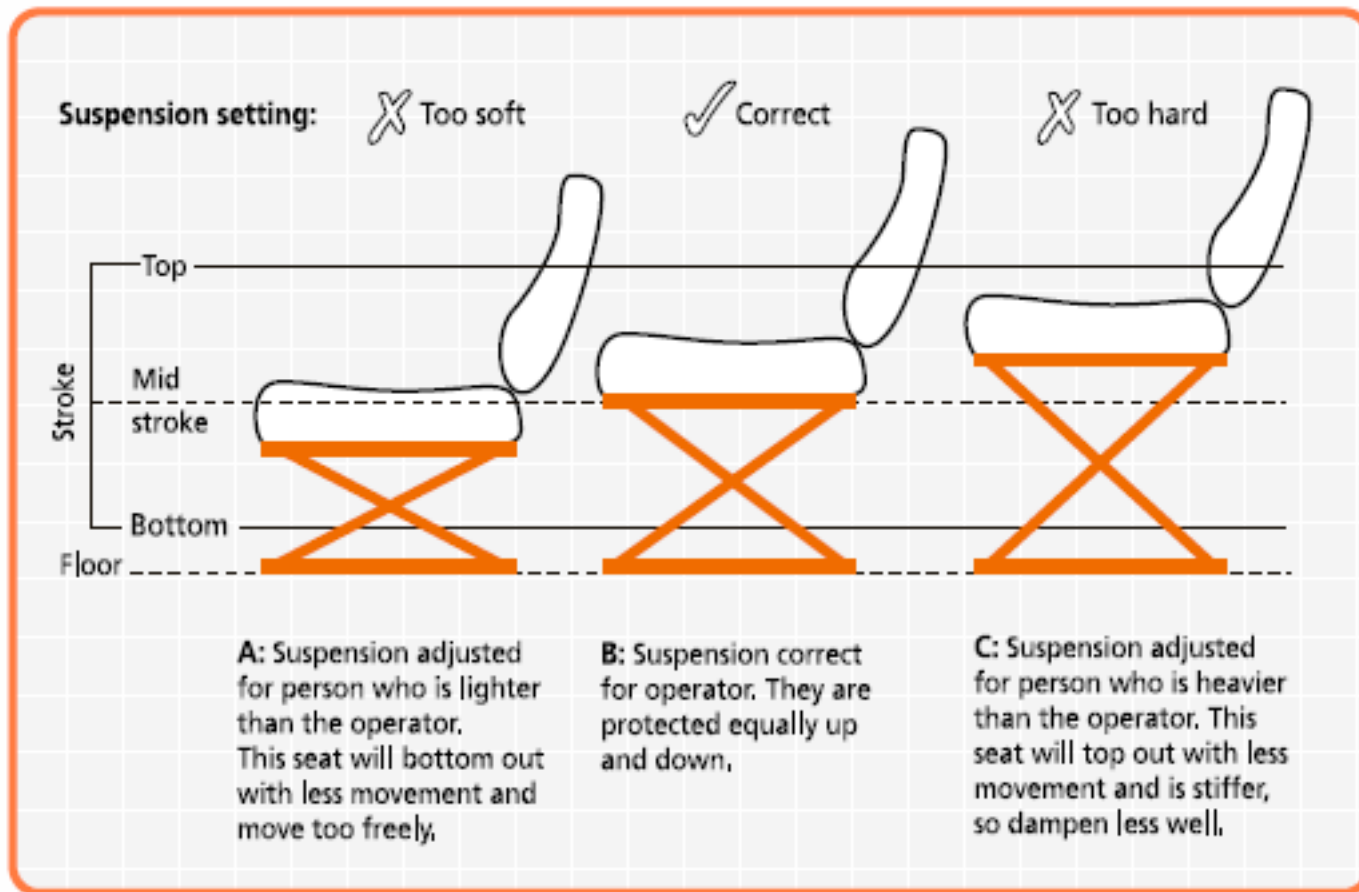
From Barbara McPhee, WBV presentation. Used with permission

When do we communicate?

Toolbox talks have a role before starting a testing or monitoring program as well as in communicating results and the site strategy



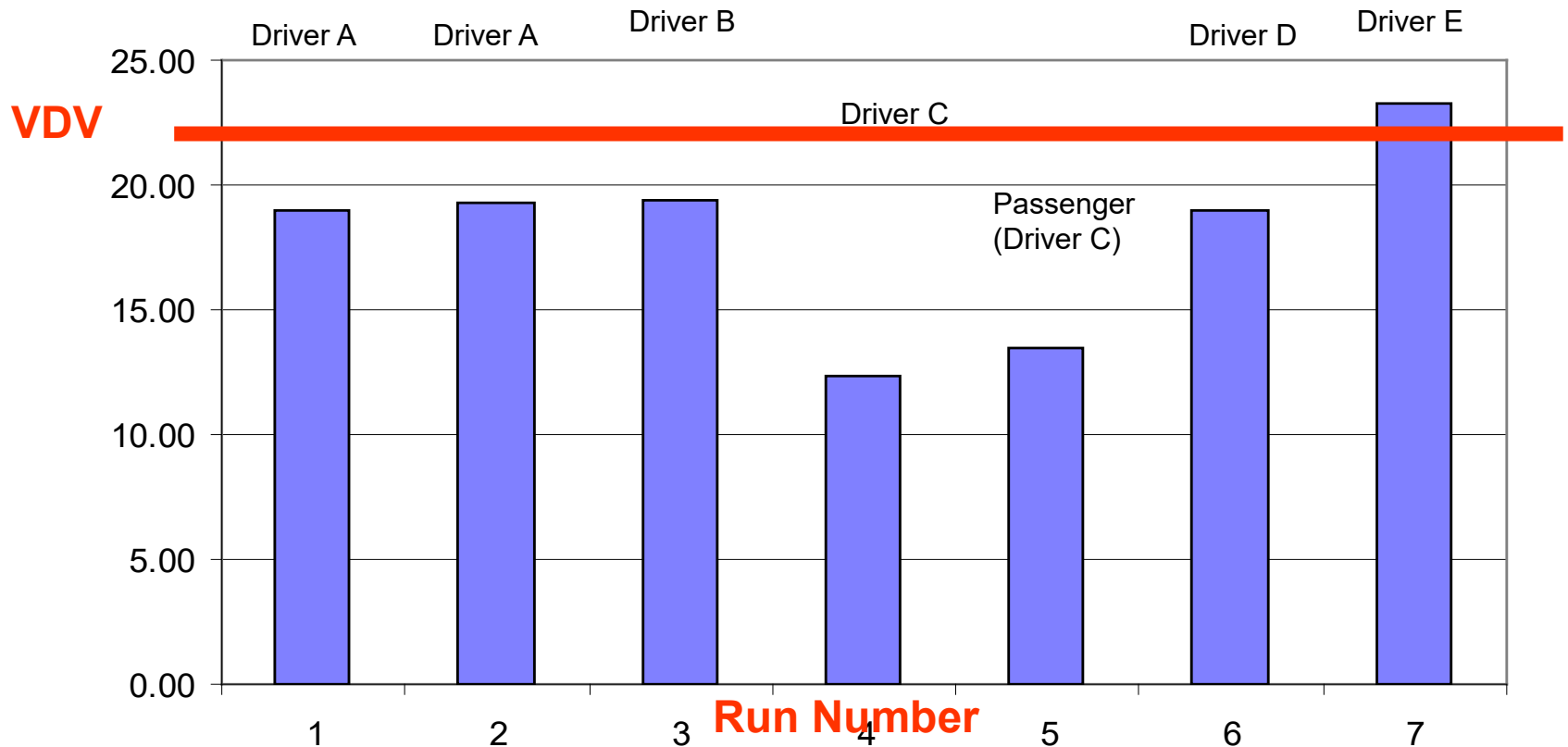
Communicate during operator training



Bad Vibrations, page 19. Reproduced with permission

Communicate prior to testing

VDV values for rail personnel carrier runs with different drivers (from [Bad Vibrations](#), pg 22)



Communicate results after testing

- communicate results in a way that makes sense to workers, and
- explain why the results show a range of values

		Caution	Likely health risk
Dump truck Transporting material	Mean Range	9 4-19	24 17 - >24
Loader Loading material	Mean Range	8 0.75 - 8	13 4 - >24
Track dozer Ripping & Pushing	Mean Range	2 0.5 - 4	9 3 - 14

From B McPhee, 2008, used with permission

What support do sites need to manage the messages? (How)

The importance of understanding WBV and allocating site resources and support





Lessons learned from previous work in WBV (B McPhee)

Need involvement of a team

1. Senior Management/corporate – allocate appropriate resources and support the effective management of WBV
2. Engineers/Mechanical Operational area – specify, order and maintain equipment (using appropriate standards)
3. Safety and Health – schedule testing, assist with data collection, analyse results, assist with specific issues
4. Users – care of equipment, reporting defects, reporting adverse conditions
5. Production scheduling – ensure patterns of work minimise the risk of vibration exposure including work breaks and job rotation



Lessons learned from Toolbox Talks project

Keeping it simple and consistent

1. There is variability in exposure between operators and due to conditions. This is a key message. Explain this in the results.
2. Jolts and jars are a priority for reduction, as well as levels over the health risk zone.
3. Fact sheets and handouts can stay on site and supplement the toolbox talk message

Fact sheets and handouts

DEEDI Mining Health Information Toolbox: Whole Body Vibration

Overview of Whole Body Vibration

What is Whole Body Vibration (WBV)?

- WBV is vibration, jolting and jarring (energy) transmitted through a supporting surface.
- Equipment operators are exposed to WBV in both sitting (most equipment operation in mining and extractives) and standing (for example via some roof bolting operations or at CHPPs).

There are three main sources of harmful vibration in vehicles and machines (from "Bad Vibrations"):

- rough road and poor work surface condition
- vehicle activity - for example ripping versus pushing material in a dozer
- engine vibration, but to a lesser extent.

What are the health effects of Whole Body Vibration?

- There is now strong evidence of a positive association between exposure to WBV and back disorders (NIOSH, 1997; Bovensli and Hulshof 1999)
- Other health effects are less well verified (and vary with the exposure), but could include:
 - cardiovascular, respiratory, endocrine and metabolic changes
 - digestive problems
 - reproductive damage in females*
 - impairment of vision and/or balance

* this health effect has the least amount of research to support it
Information sheet 2 has more info on health effects.

What are the typical contributors to WBV on site?

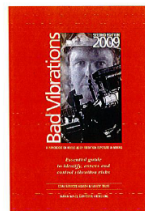
There are many factors that can either increase or decrease the exposure for the operator. These include (from "Bad Vibrations"):

- road construction and maintenance (for example, grading, road base)
- shotfiring techniques
- vehicle type and design
- age and condition of the vehicle
- maintenance of vehicle suspension systems
- seat design, suspension and maintenance
- cab layout, design and orientation
- vehicle or machine speed, driver skills and awareness
- lighting and visibility
- task design and work organisation

Where can I get further information?

"Bad Vibrations" is the most specific guidance for Mining in Australia

http://www.dme.qld.gov.au/zone_files/blac_files/badvibrations2april109final.pdf



Other fact sheets on WBV

Info sheet 1: Overview
Info sheet 2: Health effects
Info sheet 3: Measurement and Standards
Info sheet 4: Understanding WBV evaluation reports
Info sheet 5: Good practice in WBV Management for Open Cut Coal Mining
Info sheet 6: Good practice in WBV Management for Underground Coal Mines

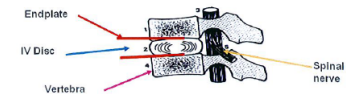
DEEDI Mining Health Information Toolbox: Whole Body Vibration

Information Sheet 2: Health Effects

What is Whole Body Vibration (WBV)?

- WBV is vibration, jolting and jarring (energy) transmitted through a supporting surface.

This picture shows where the end plate sits in the low back.



What are the health effects of Whole Body Vibration?

- There is now strong evidence of a positive association between exposure to WBV and back disorders (NIOSH, 1997; Bovensli and Hulshof 1999)
- Most of the evidence strongly supports the link between jolts and jars (for example when seats bottom out or top out, or with unsprung seats causing people to 'jolt')
- Other health effects are less well verified (and vary with the exposure), but could include:
 - cardiovascular, respiratory, endocrine and metabolic changes
 - digestive problems
 - reproductive damage in females*
 - impairment of vision and/or balance

* this health effect has the least evidence to support it

What part of my body will most likely be affected by high levels of vibration?

- The lumbar spine (or low back) is most affected by high levels of jolting and jarring
- The area of the back at higher risk of long-term damage is the vertebral end plate. This is the part of the spine that sits between the bone (vertebral body) and the disc (gel like shock absorber).

I developed neck problems after being jolted and hitting my head. Does that happen often?

Many underground coal workers in transport vehicles have been jolted when the driver hits a pothole - especially at speed. Because most of these incidents aren't reported (except when there was immediate and severe pain) not much has been studied about how many neck problems are caused by jolting and jarring.

What about those vibration machines - isn't vibration actually good for you?

The effects of vibration depend on the frequency, intensity, time that people are exposed and direction that the vibration travels. Jolts and jars are more common types of vibration exposure in mining and they usually are at the frequencies that cause the most effect on the spine. The intensity of jolts and jars are usually more traumatic to the body as well - very different to vibration machines used to get muscles working harder. Info sheet 3 has more information on how vibration is measured and technical details.



Lessons learned from Toolbox Talks project continued

Examples and solutions must be specific to the sector – Underground Coal is very different to Open cut mining

- Realistic timeframes and strategies for Underground coal will require input from a number of sources
- Open cut examples and issues can in some cases be more complex

Expertise in WBV and appropriate advice to sites is very limited.

Research in WBV in mining is also too general for many applications – e.g. the focus on seating as a single solution

Questions?

www.dme.qld.gov.au

'search for vibration'

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