

Ergonomics of Underground Mining Equipment: Queensland Mining Regulatory approach

July 13, 2010

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Points covered today

- Regulatory approaches to ergonomics in Mining (NSW and Qld)
- Mining equipment health and ergonomics issues and initiatives to date
- Mining ergonomics and human factors issues currently under review
- Future directions

Queensland approach to regulatory issues for ergonomics

- Qld may support some NSW MDGs (Mining Design Guides) for some design issues, but have found that with other issues (roof bolting design for example) that complying with the MDG may bring some unexpected outcomes
- Qld incorporates a consultative, risk based approach for equipment ergonomics issues and uses seminars as a way of encouraging consultation
- Coronial hearings or serious incidents in Queensland (and NSW) also contribute to the direction that equipment related issues may take

Qld DEEDI initiatives for ergonomics in underground mining equipment

- Proximity detection introduction to reduce known ergonomics issues with visibility 'blind spots' is a priority for 2009 and 2010
- Whole body vibration risk management is a also key priority for ergonomics and health in Underground and Open cut mining. Qld is taking a strong lead on this issue in mining.
- Issues with ergonomics of roof bolting equipment were discussed at an industry forum (aka the Boring Seminar) in October 2009 and are proceeding
- DEEDI (along with the Qld Mining Safety and Health Conference committee) provided funding for the upcoming publication "Human Factors in Mining Equipment"

Mining Equipment Ergonomics Seminar 2006



Qld DEEDI initiatives for human factors that also may apply to underground equipment

- The Human Factors Analysis and Classification System – Mining Industry (HFACS-MI) project was completed in 2009 and the report was released in February 2010
- A webpage focusing on human factors in mining has been developed and the report can be downloaded on the DEEDI (Mines) website
- A number of fact sheets will be developed once there is some consensus in terminology and wording for key concepts
- Some equipment ergonomics/human factors design issues will be incorporated into the fact sheets

Information available on DEEDI Mines Safety and Health website

Human Factors

Human Factors is a complex discipline that applies scientific, engineering and management approaches to identify, understand and prevent human errors and violations, and to improve human performance.

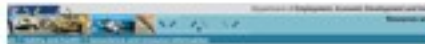
Investigating the role of human factors in an accident

- Human factors research is fundamental to the design of systems
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What are Human Factors issues?

- Human factors issues are concerned with a range of factors that are present under these headings:
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The interaction of human factors



Whole Body Vibration Seminar

Whole Body Vibration Seminar - 24 June 2009

DEEDI, in conjunction with the Health Improvement and Awareness Committee, has sponsored a seminar on Whole Body Vibration (WBV) on 24 June 2009.

The seminar was held at the DEEDI Mackay office. It was held in conjunction with the Health Improvement and Awareness Committee (HIAC) and was sponsored by DEEDI, the Queensland Government and the Queensland Coal Industry.

The seminar is available on YouTube.

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QLD DEEDI (Mines) support for raising awareness and seeking collaboration

- Qld DEEDI will continue to support industry seminars (such as this one) to ensure that a consistent message on equipment hazards are communicated to industry
- EMESRT is another initiative supported by the Mines Inspectorate as a way of setting achievable outcomes at the source of the equipment design cycle
- The Health Improvement and Awareness Committee (HIAC) is another forum for identifying health hazards associated with underground equipment

Snapshot of previous seminars on equipment ergonomics issues

- Previous ACARP seminar on October 17, 2006 in Pokolbin
- DEEDI sponsored Whole Body Vibration Seminar - 24 June 2009 in Mackay (In conjunction with the Health Improvement and Awareness Committee) also addressed cab design and ergonomics issues
- DEEDI sponsored Proximity Detection Seminars in 2009
- DEEDI sponsored "Roof Bolting" Seminar November 5th and 6th, 2009 in Mackay

Bolting: Safety vs. MSD vs. Production



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Bolting: Safety vs. Ergonomics vs. Production



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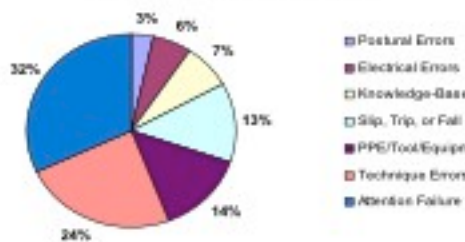
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Future initiatives

- Coronial recommendation - (Queensland Mines review safety and ergonomics issues in shuttle cars.
- John Smith (Senior Mechanical Inspector) has been tasked with chairing a representative working group to review the issue.
- Human factors causal factors in mining equipment errors will be further analysed
- MSD prevention (the next priority health hazard for HIAC) using evidence based risk management will be a focus in 2011

HFACS-MI focus on Skill-based Errors related to equipment operation

Skill-based Errors- Nanocodes



- Attention failures most identified (32%)
- These occur when operators are focused on multiple things at once.
- Technique errors refer to how things are done (24%)
- PPE/Tool/Equipment errors (14%)

Key Points

Equipment is seen to be a contributor to mining musculoskeletal disorders

Participatory ergonomics forms basis of risk assessment and controls

Use of case studies and good practice

Equipment design for operators, maintainers needs a 'safe design' approach



Thanks for your attention

Check out www.dme.qld.gov.au "Safety and Health"

QUESTIONS?



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