



UG Coal Mining Equipment design project initiation

Ergonomics Conference - Kirkton Park
17th October 2006

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Xstrata Coal NSW

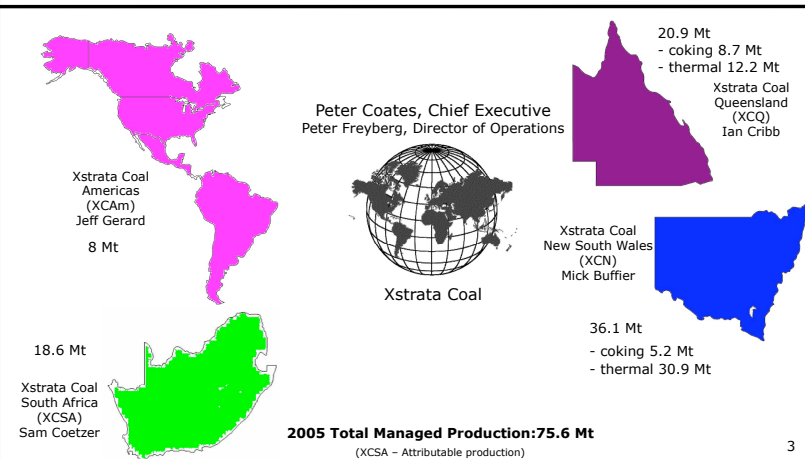


Presentation outline

- Xstrata's role in UG Equipment design project
- What initiated the the project
- What are our guiding principles
- How are we using the results
- What are the next steps

2

Structure 2006 Xstrata Coal employs 10,000 people worldwide

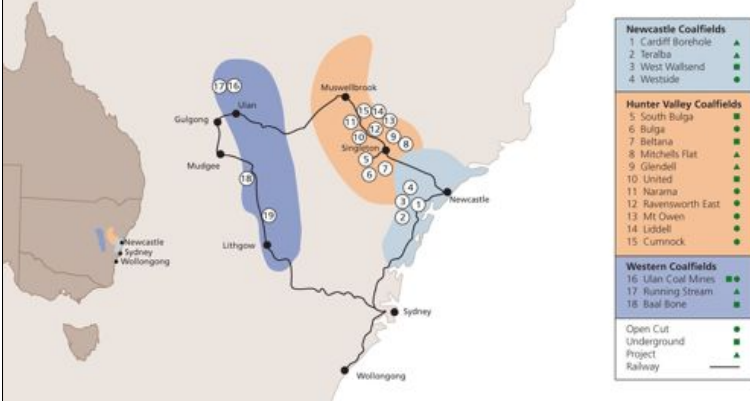


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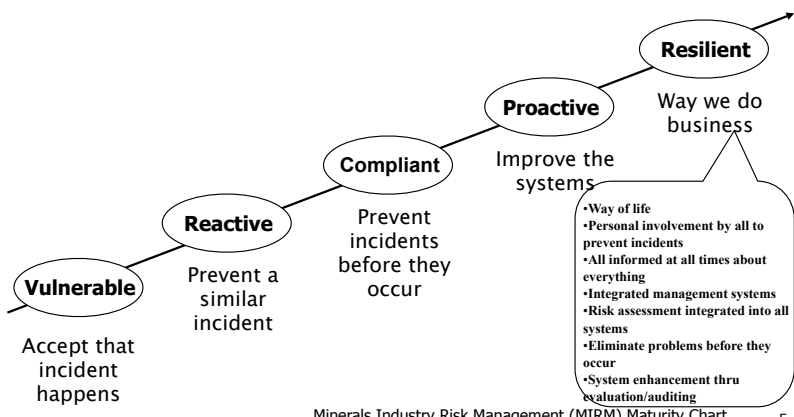
Xstrata Coal NSW



Coal production 36 Million tonnes p.a.
 Employment 2,100

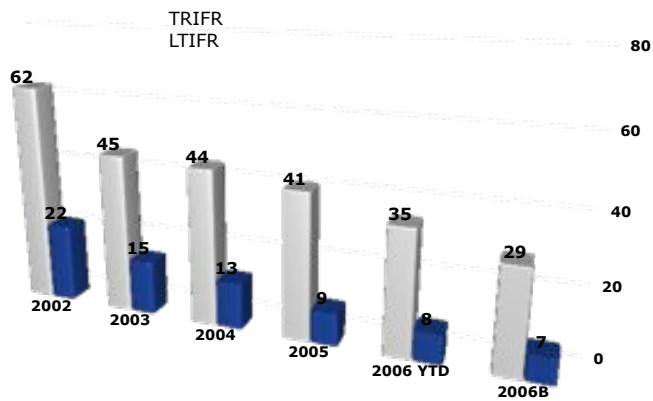


XCN - Developing a Healthy Culture



Minerals Industry Risk Management (MIRM) Maturity Chart

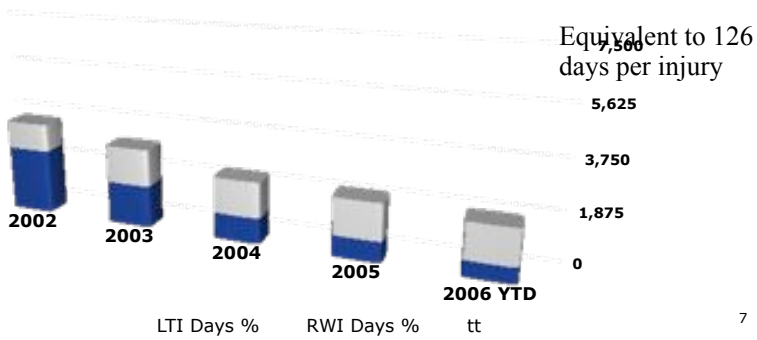
Safety Performance



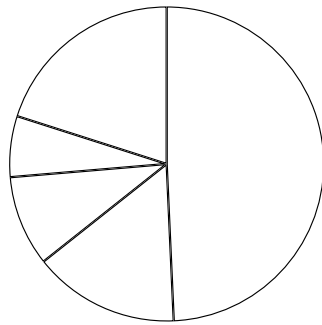
Safety Performance



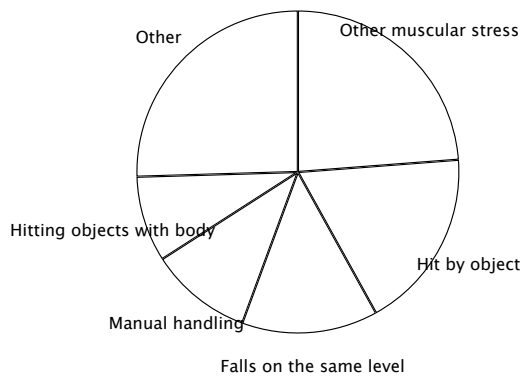
Disabling Injury Severity Rates
(shifts lost LTI & RWI/Million man hrs)



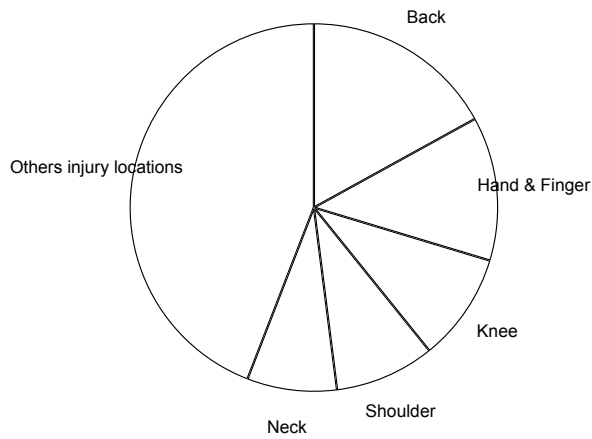
Nature Of Injuries



Mechanism of Injury

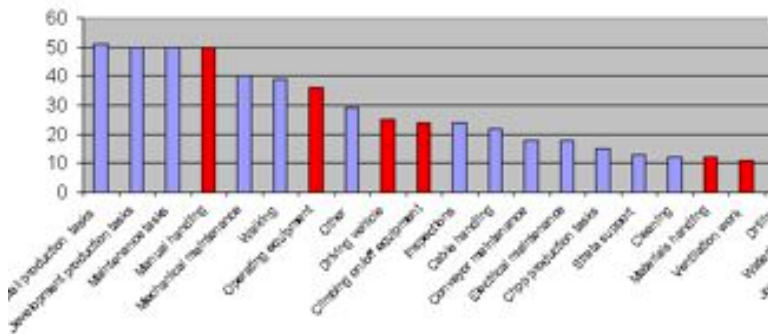


Part of body



10

Task at time of injury (2003-6)



11

Ergonomics place within SMS



Health, Safety, Environment and Community				
System	People	Work Place	Work Process	Work Environment
Document Control	Roles & Accountabilities	Critical Equipment	Energy Isolation	Housekeeping
Risk Management	Medicals	Machine Guarding	Work Permits	Waste Management
Management Plans, Approvals & Licences	Fatigue Management	Demarcation & Colour Coding	Hazardous Task Management	Hazardous Substances
Baseline Survey	Drugs & Alcohol	Labeling, Notices and Signage	Safe Work Procedures	Workplace Environment Monitoring
Contractor Management	Rehabilitation	Electrical & Mechanical standards	Stacking & Storage	Ergonomics
Emergency Management	Health & Hygiene	Buildings and Mine Design	Manual Handling	Lighting
Training and Education	PPE	Equipment & Supplies Procurement	Exploration & Drilling	Noise Control
Communication & Consultation				Ventilation
Incident Management				Biodiversity and Land Management
HSEC Measurement & Reporting				Community Engagement
HSEC Planning				Land Acquisition and Compensation
Change Management				Mine Closure
Workplace Inspections				
Behavioural Management				
Auditing				

12

HSEC STD5.05 - ERGONOMICS

PURPOSE

- To minimise the risk of injury to our people that may occur as a result of poorly designed equipment or poor work practices.
- To minimize the risk of injury including Cumulative Trauma Disorder (CTD) and Occupational Overuse Syndrome (OOS) when using equipment.

STANDARD

An Operation should implement processes so that an ergonomically sound environment is provided through the identification and management of ergonomic hazards.

Ergonomic factors are to be considered when:

- designing the workplace
- purchasing materials, equipment and tools
- designing work procedures and practices
- changes are made to existing work procedures or equipment.

3.1 Ergonomic surveys

A baseline survey and ongoing reviews shall to be conducted to identify key risk areas and necessary remedial actions.

3.2 Training

Employees should be provided with training in ergonomics relevant to their work. Training should be both general and job specific.

3.3 Design

Ergonomic guidelines for design of work stations and layouts for machinery or computer operation should be applied, with consideration to:

- Work Station height and suitability
- Seating arrangements and suitability
- Lighting requirements
- Ventilation requirements
- Excessive vibration
- Individual differences, needs and requirements
- Equipment and tool design and placement
- Storage design and item placement
- Reducing the effects of, or where possible eliminating, repetitious tasks.

3.4 Controls and work practices

Administrative controls for consideration to reduce ergonomic stressors include:

- Repetition reduction
- Rest pauses
- Job rotation
- Job enlargement
- The number of employees required to perform a task
- Preventative maintenance
- House keeping.

16

When designing safe work practices consideration shall be given to CTD and OOS risk factors including:

- Repetitive or prolonged tasks
- Forced exertion
- Prolonged static postures
- Awkward positions of the upper body, for example, reaching above shoulders and twisting
- Excessive vibration
- Cold temperatures
- Inappropriate or inadequate use of hand tools.

3.5 Reporting and analysis

Hazard and injury reports and statistics should be used to aid analysing and identifying key ergonomic hazards to be addressed.

17

- We had a standard but our machinery did not reflect requirements fully
 - Safety Performance improvement had plateaued
 - Gut feel - we had a major issue with UG equipment design
1. In 2004 we asked Robin to assist in a review to determine where to start
 2. Initial Review (Phase 1) of XCN statistics and site equipment
 - identified issues around continuous miners, S/C's and LHDs
 3. ACARP funding application for a major review

18

Funding application



2004 Funding Shortlisted Proposal

Project Administration:
 Australian Research Administration Pty Ltd
 Phone: 07 3229 7661
 Fax: 07 3229 0061
 Email: anne@acarp.com.au

To: Robin Burgess-Limerick, Burgess-Limerick and Associates
 Email: rbl@pe@yahoo.com.au

Reducing Injury Risks Associated with Underground Mining Equipment (Ref No: 24013)

Your proposal has been considered by the ACARP selection committees and I am pleased to advise that it has been shortlisted for more detailed consideration.

You are invited to submit a full proposal. Please ensure that the expected beneficial outcomes of the research are clearly enunciated and the disposition of the funds requested is itemised. Your proposal will be enhanced if you identify key milestones or stages that can be used to monitor progress during the course of the proposed research. A copy of the "Preparation of ACARP Full Proposals" Guidelines will follow.

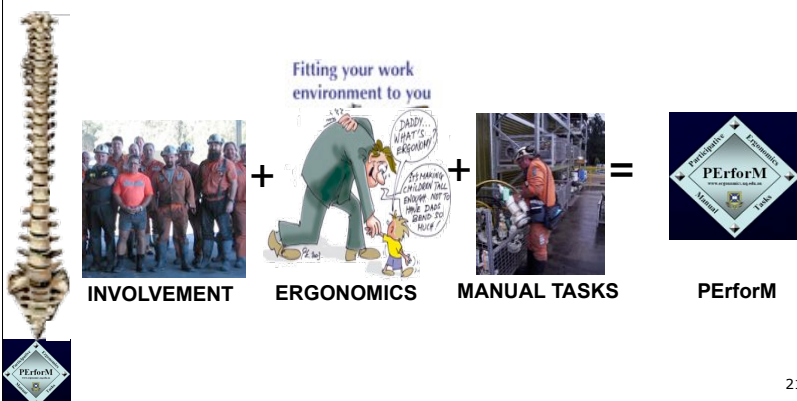
A large proportion of incidents and injuries continue to occur that are related to the ergonomic design of, and operation of processes around continuous miners and shuttle cars. Xstrata Coal have initiated this project and Phase 1 has been completed, identifying areas to be improved. A schedule of activities has been identified to deliver improved equipment design and work process improvement which will involve all stakeholders.

XCN commitments



- 2004 Phase 1 studies, mine site involvement
- Incorporation into HSEC Strategy & Plans
- 2005/6 involvement in ACARP funded Phases 2 and 3
- Real commitment to planning and expenditure on new and upgraded equipment:
 - Continuous miners
 - Shuttle cars
 - LHD's
 - Man transporters
 - Materials Handling

Site based initiatives - United



WHAT IS INVOLVED?



1. Training session
 - **Manual Tasks Risk Management Process**
2. Workshop session
 - **Prioritise and select projects**
 - **Conduction Perform RA**
3. Implementation of control measures
4. Evaluation and follow-up sessions



Changing a DA Ram



DA RAM

The task has been identified as a major cause of musculoskeletal injury, with numerous incidences reported. This task is performed only a few times per month but is very strenuous.



Exertion					Body part
1	2	3	4		
No effort		Moderate force/speed			
Awkward posture					
1	2	3	4		
All postures neutral		Moderately uncomfortable			
Vibration					
1	2	3	4	5	
None		Moderate		Extreme	
Duration					
1	2	3	4	5	
< 10 minutes	10 – 30 min	30 min – 1 hr	1 – 2 hrs	> 2 hrs	
Repetition					
1	2	3	4	5	
No repetition		cycle time < 30 s		cycle time < 10 s	

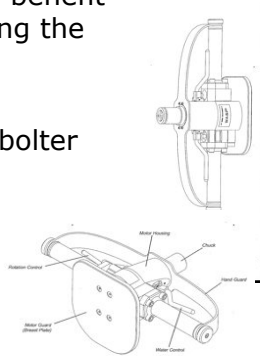
Body part	
Back	Shoulder
Wrist/hand	Wrist/hand
Elbow	Elbow
Hip	Hip
Thigh	Thigh
Knee	Knee
Lower leg	Lower leg
Back	Back

Other Projects



Over 40 tasks were identified to benefit from the PEFoM analysis during the workshops e.g..

- Rib Bolting with handheld rib bolter
- Hose and Cable Management



25

Next Steps



- Introduction of new machinery & vehicles
- Modifications where change outs not imminent
- Development of tender specifications incorporating design criteria
- Smaller project identification and control
- Focus on more difficult issues such as vibration and noise
- Continued monitoring of impact on health & safety performance

26



.....end presentation

27