‘Third generation’ VR Training for the Mining Industry

“Training for Tomorrow”

Presenter: Bruce Dowsett
Manager VR Technologies
Coal Services Pty Limited
Vision: to be the trusted provider of services that protect worker safety & health and worker’s compensation insurance

Mission: to maintain leadership & best practice in training to improve the coal industry safety standards

Coal Services Pty Ltd
- Business Structure -

CSPL
(Parent Company)
COAL INDUSTRY ACT 2001

shareholders:

CFMEU

NSW Minerals Council

Board:
Ron Land
Wayne McAndrew
Tony Haraldson
Kieren Turner
James Mackrill
Ross Taylor
Mark Coyne

Mandate: to provide workers with Quality Training in Mines Rescue and in Health & Safety

Coal Mines Insurance

Coal Services Health

Mines Rescue Service

Regulation & Compliance

Virtual Reality Training
CSPL Services
- Worldwide Service Provision -
NSW Mines Rescue Station Locations
- Training Centres of Excellence -
VR as a Training Tool
- Industry “Step Changes” –

<table>
<thead>
<tr>
<th>TECHNOLOGY INDUSTRY</th>
<th>MINING INDUSTRY</th>
<th>TRAINING INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming</td>
<td>Computer Based Training</td>
<td>Blended Learning Solutions</td>
</tr>
<tr>
<td>3D</td>
<td>Skills Shortages</td>
<td>National Training Packages</td>
</tr>
<tr>
<td>Computer Power</td>
<td>Safety Standards</td>
<td></td>
</tr>
<tr>
<td>Portability</td>
<td>Industry Consultation</td>
<td></td>
</tr>
</tbody>
</table>

Saving lives by putting people at risk…
VR Concept Development
- A Decade of Progress -

1999...
- Funding from CSPL
- Concept development
- Simulation evaluation

2002...
- Flat screen trial
- “Proof of Concept”

2005-07...
- Curved Screen trials
- Software (module) development

2007-08...
- VR Training Centres established at 4 Mines Rescue Stations

2009-11...
- VR Training Centres commissioned
- Re-engineering of original modules for improved flexibility and commercialisation
- Next generation modules developed - whole of UG & surface mines & full mining processes
- Improved hardware devices for Trainers
VR Hardware & Facilities
- VR Platforms -

The Curved Screen, the 360 Degree Theatre and the Domes.

Three Platforms across all sites
Mines Rescue Activities

**CORE ACTIVITIES**
- Provide emergency response capability to collieries
- Provide & maintain equipment for emergency response
- Provide training to brigadesmen

**OTHER ACTIVITIES**
- Provide gas analysis & interpretation to collieries
- Provide expert advice regarding emergency preparedness to collieries

**COMMERCIAL ACTIVITIES**
- Generic Coal Inductions
- Safety Refresher Training
- Statutory Mining Supervisor Training
- Emergency Preparedness
- Customised Company Training
- Workplace Trainer & Assessor Training
VR and Industry Training
- Participation -

Training:
• mines rescue brigades
• industry refresher training
• contractors inductions
• mine specific training
• mine supervisor training
• fire teams
• mines rescue comps
• Associated industries & delegations

Animations:
• fully functioning Underground & Open Cut
• from face to delivery is shown
• operational longwall
• capability to trigger emergency events
• strata control
• safe standing zones
VR and Industry Training

- Participation -

2010 Facility Use:
- 2000 people per month
- 20,000 VRT platform usages
  ...across our 4 training facilities in NSW

Wide Industry Interest:
- UG & OC
  ✓ across NSW
  ✓ Interstate (QLD)
  ✓ International (China, US, Russia)
NSW Mines Rescue Training Philosophy
- The Training Triangle -

- Training Room Delivery
- Practical Demonstration
- Virtual Reality Scenario
Tell me...
and I may forget,

Show me...
and I may remember,

Involve me...
and I will understand
The Virtual Mine Environment

- The Training Benefits -

EASY ACCESS

SAFE EXPOSURE

EXTENDED SCOPE

RETENTION & RECALL

ASSESSMENT
The Virtual Mine Environment
- The Training Benefits -

SAFE EXPOSURE
The Virtual Mine Environment
- The Training Benefits -

EXTENDED VIEW
The Virtual Mine Environment

- The Training Benefits -

EASY ACCESS

SAFE ENVIRONMENT

EXTENDED VIEW

ASSESSMENT

RETENTION & RECALL
The Virtual Mine Environment
- The Training Benefits -
Training with a Virtual Learning Environment
Learning Retention Rates

Source: adapted from National Training Laboratories, USA
“Performance” Underground Mine

PERFORMANCE UNDERGROUND COAL MINE LAYOUT

Main East Panel
Place Change - Cut / Flit
Mains Development
Maingate 4 Panel
ABM25
Gateroad Development
Maingate 4 Panel
ABM25
Gateroad Development
Longwall 3 Panel

12 North Panel
Pillar Extraction - 'Wongawilli'
Breaker Line Supports

Longwall 1
Longwall 2

Main West Panel
Twin Bolter / Miner
Mains Development

U/G Garage & Workshop

Surface to seam
Access Drift

Main East Panel
Place Change - Cut / Flit
Mains Development

Main West Panel
Twin Bolter / Miner
Mains Development
“Birdland” Open Cut Mine
Detailed and realistic operating mines providing full immersion for trainees

Include environmental features such as mine gases, airflows and smoke

Dynamically controlled and altered by events

Events include fires, roof falls and explosions adaptable to training requirements

Environmental changes in real time, wirelessly communicated to trainer and trainee

‘Infopads’ (iPods) for interaction with trainees
3rd Generation Detail

- Ability to modify scenarios expanding potential of VR training
- Trainees experience consequences of their actions, increasing learning retention
- Demonstrates mine core risks, providing perspectives not available at mine sites
- Adaptable to mine specific training
- Flexibility providing training for new employees through to mine officials
- Ability to apply to most hazardous industries
3rd Generation Detail

- Captures coal process from point of pick through to surface CHP

- MRS training to national competencies

- Applicable to 12 MRS Courses – UG Coal to Diploma and Emergency Preparedness

- Designed to meet ongoing training needs

- Importantly, ongoing consultation with stakeholders to meet challenges facing our industry
What is most important is what is done in the virtual environment, not simply the technology itself.
VIRTUAL TRAINING

SAFETY FOCUS

REAL RESULTS

“Training for Tomorrow”

THANK YOU