Applying a human factors lens to vehicle interactions
Forward looking statements

Disclaimer

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TAKE THE MONEY... AND RUN?

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TAKE THE MONEY... AND RUN?

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Cloudbreak Mine Site
Hierarchy road rules

- **Priority** levels 1 - 4
- **Reduce** LV – HV interaction
- HV **Efficiency** increase
- CME Safety **award finalist**

Video: Hierarchy Road Rules Priority vehicles
Right of way

Fundamentally different in hierarchy road rules
Vehicle Interactions Events

Cloudbreak Journey

- Remove 4 way intersections
- Safety pause,
- LV segregation
- Hierarchy Rules introduced

Number of events

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
2013 2014 2015 2016
Safety Pause - intervention

- 7 near misses in a week
- 24hrs: production halted
- Asking the question “how can we reduce vehicle interactions”
- 16 working groups – all involved
- 105 items raised = 74 actions
- VIIP – Vehicle interaction Improvement Plan
Human Factors Lens - 105 ideas, 16 working groups

Mine control assignments, screen messages, radio congestion, cross-dept communications

LV roads, Intersection design, in cab screen placement, light saturation/distractions, DT visibility at night

Alertness, fatigue, home distractions, fitness, vision

Consultation Just Culture, team pressures

Line trainer competence & training content scenarios

Investigations, depth, findings, ‘situational awareness’

Human and organisational factors

Safety-critical communication

Organisational change

Staffing and workload

Training and competence

Usable procedures

Managing human reliability

Emergency response

Health and safety culture

Maintenance, inspection and testing error

Fitness for work

Designing for people

Consultation

Competence & training content scenarios

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Alertness, fatigue, home distractions, fitness, vision

Consultation Just Culture, team pressures
• Leaders **spending time** in trucks
• Employee **feedback daily**
• Supervisor pit reviews – interaction focus
• Engaged an operational **Hierarchy champion**!
Designing for people: Reduce blind spots

Extensive trials of mirror positioning for better visibility

Before

After
Training and competence: effective training

Used go-pros to build interactive simulators instead of paper training
Safety critical communication: more ‘eyes on road’ time

Pre-programmed channels and standardised buttons
Designing for people: increased visibility of DTs at night

Project is evolving in response to feedback
Deep dive analysis of incidents

No trends in:
- **Day/night**
- **Time into shift**
- **Gender**
- **Experience**

Trends:
- **72%** occurred on the one Haulroad with **20% at 2 particular intersections**
Human Factors independent review

Formal assessment using an independent expert

- Conducted **causal analysis**
- Mainly **perceptual errors**
  - Ambient **environment**
  - Human Machine **interaction**
  - **Communication** factors
  - **Personal** factors
Situational awareness & performance are shaped by a number of factors

Opportunity for improvement: Investigations

Up + Down + Around
Vehicle Interactions Events

Cloudbreak Journey

4 way intersections, pit restrictions, redesigned the ROM

Safety Pause, vehicle interaction plan

LV roads introduced

Hierarchy Rules introduced
Key Learnings

- Less errors if we change **conditions** rather than **people**
- Lots of little things (1%ers)
- Additional Human Factors analysis
- Upskill leaders in human factors
- Listen to your people
Our Vision: The safest, lowest cost, most profitable iron ore producer