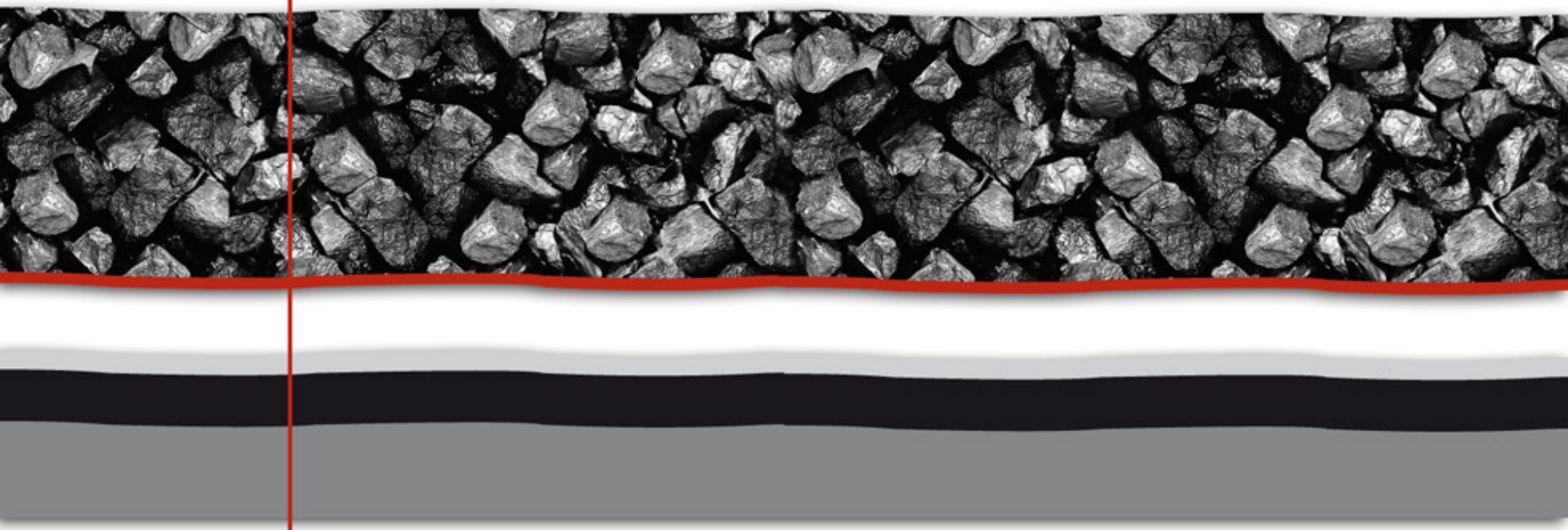
# Critical Control Risk Registers
# Anglo Coal Australia

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QUEENSLAND MINING INDUSTRY HEALTH & SAFETY CONFERENCE 2009

ANGLO COAL

# What Are Risk Registers



- A list or database for a site or project that includes:
  - hazards, their risk ratings and controls
  - reference to applicable legislation & other requirements
- A tool widely used for identifying, analysing and managing risks (usually referred to as WRAC)
- Allows importance of controls to be prioritised according to the risk of the hazard
- Over time, allows management of the organisation's risk profile
- Day to day, becomes a tool to review and update the effectiveness of controls to ensure the risk remains ALARA.

# Activity Based Risk Registers ©

- Usually WRAC based

| Process/ Area | Sub Process | Position Resp | No | Critical Hazards | Additional Hazard Explanation | No | Potential Consequences/ Outcomes | Additional Consequence/ Outcome Explanation | No | Legislation | Existing Critical Controls | Critical Control Effectiveness | Loss Type P/ A/ E/ R | Norm/ Abnorm/ Em | Consequence | Likelihood | Risk Rank Number | Risk Rank Category | Risk ALARA? Y/N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General Production / Mining Department SHEC Risks | Vehicle movement | Production Department Manager | 8 | Mechanical {mobile} | Heavy vehicle/ heavy equipment interaction with mining activities by authorised personnel | 30 | Hit by moving objects - | 0 | p59 | QMSH Reg 76 (1) | HMP 0004 Vehicle Management Plan SOP 0021 Checking Mobile Plant SOP 0022 Using Mobile Plant | 2 | P | Abnormal | 4 | A | 2 | Ex | No |
| General Production / Mining Department SHEC Risks | Vehicle movement | Production Department Manager | 8 | Mechanical {mobile} | Light vehicle/ heavy equipment interaction with mining activities by authorised personnel | 30 | Hit by moving objects - | 0 | p59 | QMSH Reg 76 (1) | HMP 0004 Vehicle Management Plan SOP 0021 Checking Mobile Plant SOP 0022 Using Mobile Plant | 2 | P | Abnormal | 5 | B | 3 | Ex | No |
| General Production / Mining Department SHEC Risks | Vehicle movement | Production Department Manager | 16 | Community | Haul trucks crossing public roads -interaction with non-mine vehicles | 30 | Hit by moving objects - | 0 | p22 | QMSHR-Part 10-s76(1) | HMP 0004 Vehicle Management Plan HMP 0004 Public Access Management Plan SOP 0022 Using Mobile Plant | 1 | P, R | Abnormal | 5 | C | 5 | Ex | Yes |
| General Production / Mining Department SHEC Risks | Physical movement about the site, ie preparing for blast including dipping and dewatering holes, tying up with det wire | Crew Leaders | 2 | Biomechanical | Physical movement over rough / undeared terrain | 27 | Falls on the same level {inc- slips/trips} - | 0 | p70 | QMSH Reg 94 | SOP 0027 Check and Examine Work Areas | 2 | P | Normal | 3 | A | 6 | H | No |
| General Production / Mining Department SHEC Risks | Vehicle movement | Production Department Manager | 8 | Mechanical {mobile} | Vehicle/equipment interaction with mining activities by unauthorised personnel | 30 | Hit by moving objects - | Damage to reputation also possible | p22 | QMSHR-Part 10-s76(1) | HMP 0004 Vehicle Management Plan HMP 0004 Public Access Management Plan SOP 0022 Using Mobile Plant | 2 | PR | Abnormal | 5 | D | 7 | H | No |
| General Production / Mining Department SHEC Risks | Dragline and mobile equipment fires | Crew Leaders | 8 | Mechanical {mobile} | Equipment fires | 7 | Contact with heat - | 0 | p6 | QMSHR-Part 5- s37(3) | HMP 0001 Emergency Response Management Plan SOP 0003 Action to be Taken in Case of Fire | 2 | P | Emerg | 2 | A | 10 | H | Yes |

# From Activity to Hazard Risk Registers ©

- Activity based is baseline for Hazard based
- Establish hazard activity matrix

| Area | Process | Sub Process | Biomechanical (MH) | Mobile Mechanical | Hot Surfaces/Fire | Work at Heights | Noise | Vibration | Material Falling | Flying Debris | Sharp Objects | Suspended Loads | Uneven or slippery surfaces | Pinch Points | Stored Energy | Explosives | Batteries (explosion) | Toxic Gas | Greenhouse Gas Emissions | CFCs | Heat (ambient) | Sunshine | Dust | Community | Water Discharges | Confined Spaces | Moving Parts | Spon Combustion | Electricity | Radiation | Waste Disposal | Chemicals | Flora and Fauna | Cultural Heritage | Biological |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maintenance | Workshop and Field | Preventative Maintenace | x | x | x | x | x | x | x | | x | | x | x | x | x | x | | | x | x | x | x | | x | x | x | | x | | x | x | | | x |
| | | Lube Services | x | x | x | x | x | x | x | | x | | x | x | x | | x | | | | x | x | x | | x | | x | | x | | x | x | | | |
| | | Welding and cutting | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | | | x | x | x | | | x | x | | x | | | x | | | |
| | | Machining | x | | x | | x | | | x | x | x | | x | x | | | | | | x | | x | | | | x | | x | | x | | | | |
| | | Drive and Test of equipment | x | x | | | x | x | x | | | x | x | x | x | | | | | | x | x | x | | | | | | x | | | | | | |
| | | Component Changeout | x | x | x | x | x | x | x | x | x | x | x | x | x | | x | | | x | x | x | x | | x | x | x | | x | | x | x | | | |
| | | Tankfarm | x | | | | | | | | | | | | x | | | | | | x | x | x | | x | x | | | x | | | x | | | |
| | | Working alone | x | x | x | x | x | x | x | x | x | | x | x | x | | x | | | x | x | x | x | | x | | x | | x | | x | x | | | |

# Uncontrolled & Controlled Risk Concepts ©

## Uncontrolled Risk (or Raw Risk)

- Credible Worst Case Scenario – Risk rating if no controls exist *or if all controls fail*
- Determines 'which controls are important'
  - senior management needs assurance that these are being controlled adequately
- Without uncontrolled risk, can get false sense of security

## Controlled Risk or Residual Risk

- Measured by observation of the effectiveness of existing controls
  - fix what is not working well

# Controls



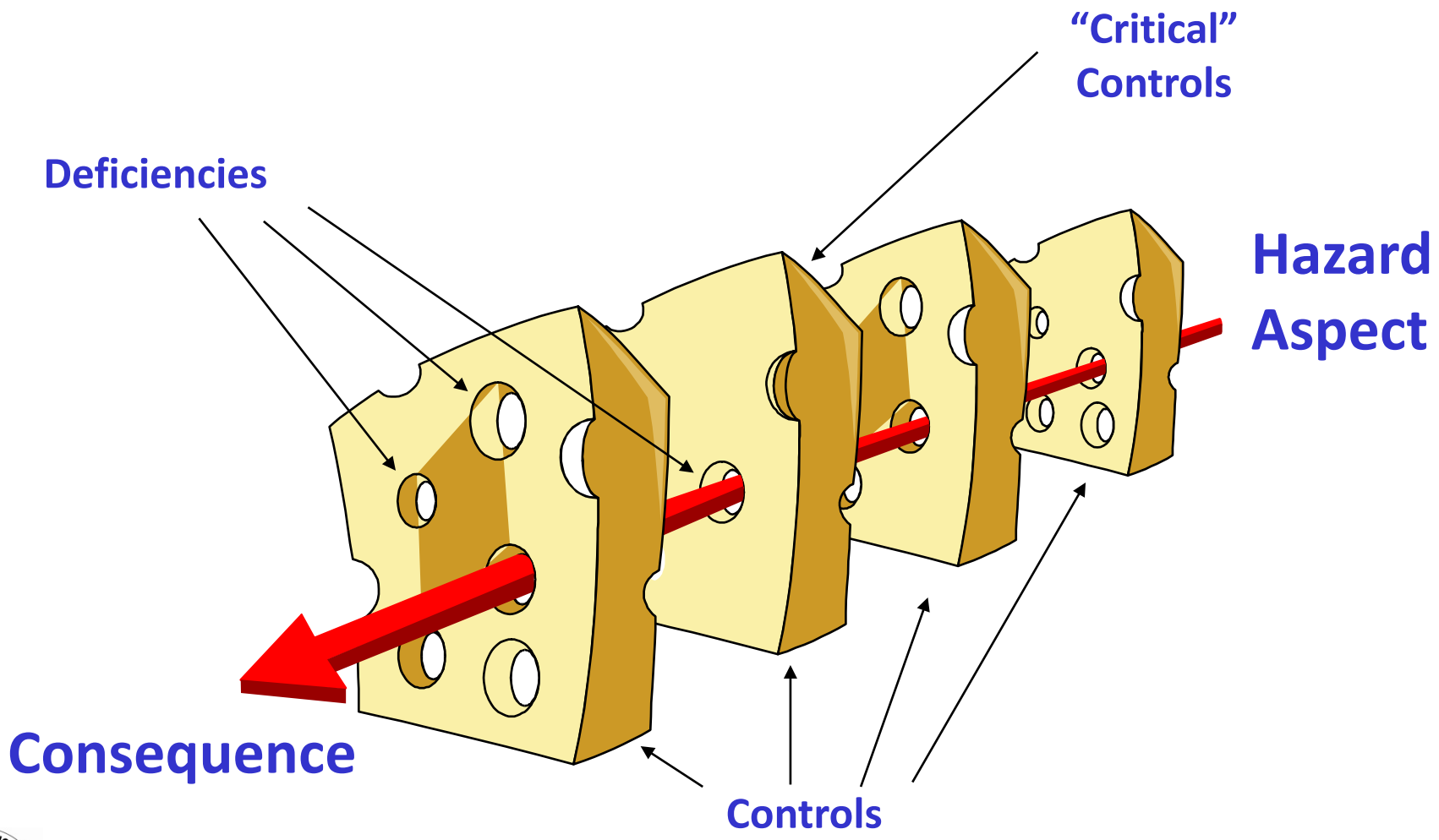
**Control**: A barrier that prevents the hazard from causing harm. One of three types:-

- Physical (e.g., guarding, separation distances, etc)
- System (e.g., procedures, job rotation, etc)
- Behavioural (e.g., people's willingness and ability to engage in 'at-risk' behaviour)

**'Critical' Control:** A barrier, whose integrity is so important that if it is compromised, then there is a good chance that the hazard/aspect will cause harm

- Example – no one under a load being lifted. Other controls like cranes checked, etc still required but if person not underneath, cannot get hurt
- Critical controls usually listed in SOPs, PHMPs, etc

# Swiss Cheese Model




(Ref: Reason, 2000)

# Controls

**‘Critical’ Activity:** Activities that are not high risk in themselves, but would render a critical control ineffective if not performed competently

- Parachute analogy

Examples:-

- inspection of a lifting device (eg, crane)
- daily checks of forklifts
- maintenance on guards, forklifts, etc
- completing a risk assessment prior to purchasing a new chemical

These activities usually are linked to competency.

# Critical Control Risk Register by Hazard ©

| Hazard or Aspect | Raw Risk | Critical Controls | Critical Activities | Legal Requirements | ALARA? Yes/No |
|---|---|---|---|---|---|
| Mobile Plant (vehicle Interaction) | Extreme | Correct plant being operated safely | Site specific ticket/competency for operator | CMSH Regs 2001 secs 74-77 | Yes |
| | | Plant operating as designed | Inspection of plant by competent person | CMSH Regs 2001 secs 71 and 73 | Yes |
| | | | Monitoring of tyre usage | None | Yes |
| | | | Maintenance and service of plant | CMSH Regs 2001 sec 66(2) | Yes |
| | | Adhering to Mine Transport Rules (eg, approach distances for HVs, comms, etc) | Site induction and Area Induction | CMSH Regs 2001 sec 76(2)(a), 83 and 260 | Yes |

- Raw Risk focuses on most damaging energies (prioritises)
- CCRR based on RAW RISK - quickly see what risk will be realised if controls fail
- No complex risk matrix just 4 simple classifications to indicate priority

# Commonly Misunderstood Fact ©

Most incidents occur not because we do not understand the

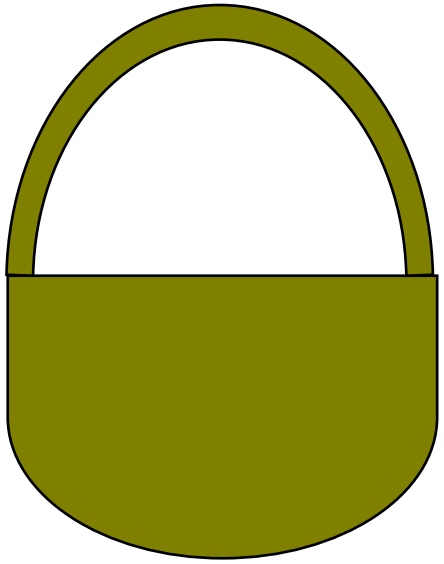
- hazard (SH)
- aspect (E)

but because we

***thought we had effective processes and controls in place, when in fact, we didn't***.

# Basket of Critical Controls ©

- We should be intent on monitoring what's NB – critical controls



Critical Controls

**Monitor for Effectiveness**
***(collect data and review periodically)***

**Identify Critical Activities**
***(ensure people carrying these out are competent)***

# Safety Interaction (or PTOs) ©

- Each Extreme Uncontrolled Risk is where Safety Interactions can be focused
- Safety Interactions count the correct and incorrect observations for each observation criteria
  - So a % effectiveness is generated
  - with the added benefit that management information will be generated about the effectiveness of critical controls and activities
- CC & CA that aren't working can be included in HHIs

# Risk Register by Hazard

| Hazard or Aspect | Raw Risk | Critical Controls | # ✓ | Critical Activities | # ✓ | Legal Requirements | ALARA ? Yes/No | # Tot | Effectiveness Score % |
|---|---|---|---|---|---|---|---|---|---|
| Mobile Plant (vehicle Interaction) | Extreme | Correct plant being operated safely | 1 | Site specific ticket/competency for operator | 10 | CMSH Regs 2001 secs 74-77 | Yes | 10 | 55 |
| | | Plant operating as designed | 5 | Inspection of plant by competent person | 9 | CMSH Regs 2001 secs 71 and 73 | | 15 | 47 |
| | | | 5 | Monitoring of tyre usage | 1 | None | | 5 | 60 |
| | | | 25 | Maintenance and service of plant | 20 | CMSH Regs 2001 sec 66(2) | | 25 | 90 |
| | | Adhering to Mine Transport Rules (eg, approach distances for heavy vehicles, communications, etc) | 9 | Site induction and Area Induction | 10 | CMSH Regs 2001 sec 76(2)(a), 83 and 260 | | 50 | 19 |

# SHEC Risk Management Dashboard ©

- An icon on their PCs - that provides information about the % effectiveness of:-
  - the site as a whole
  - each Department
  - each hazard/aspect
- So that ‘intelligence’ about how well SHEC is being managed can be at their fingertips
- Low scores can be interrogated to explain the reasons for this and focused actions undertaken to rectify.

# SHEC Risk Management Dashboard ©

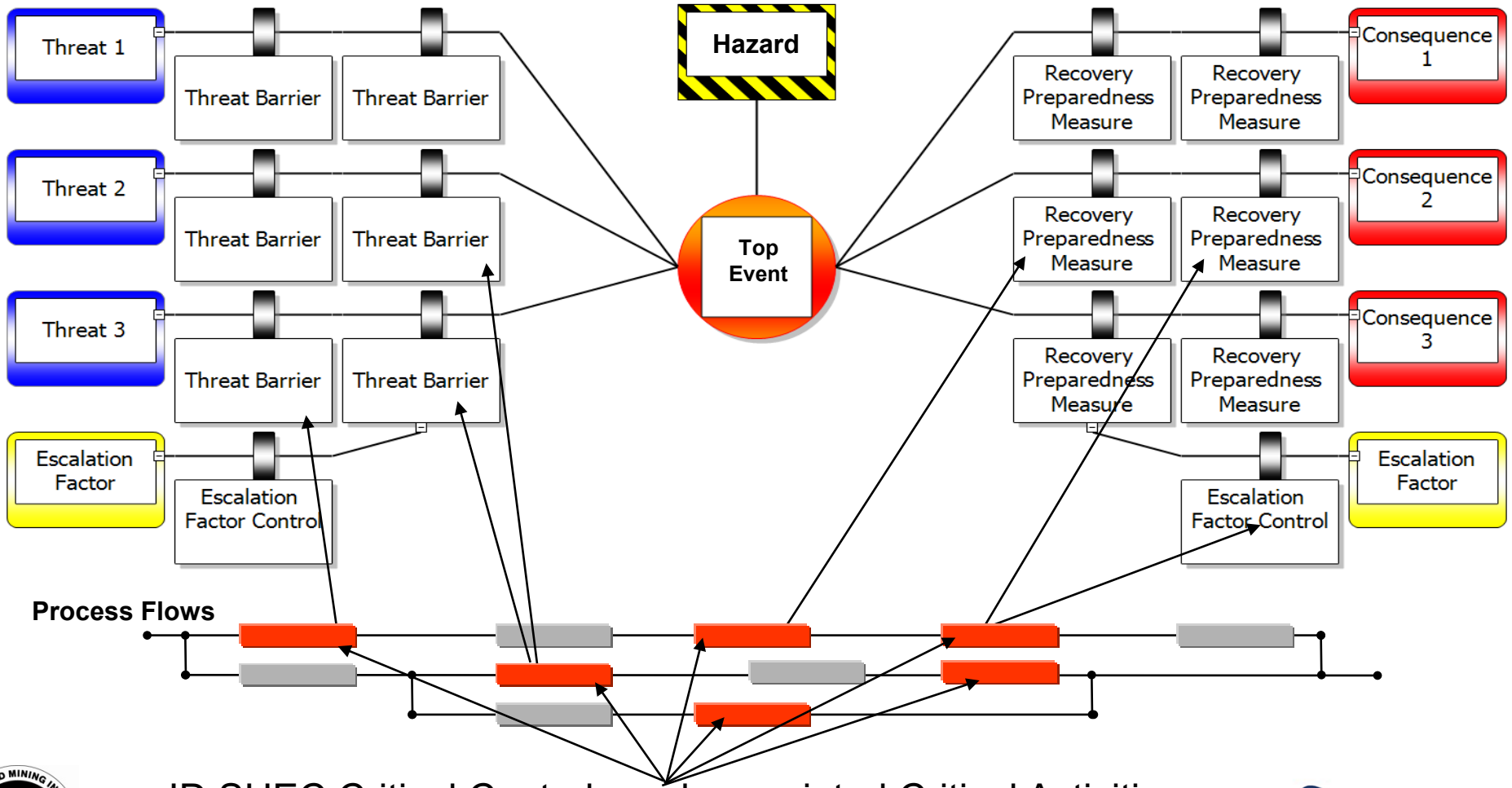
| | Classification | Production | CHPP | Maintenance | Exploration | Other | Site Total |
|---|---|---|---|---|---|---|---|
| AFRS | | | | | | | |
| | Light Vehicles | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| | Surface Mobile Equipmen | 90 | 92 | 97 | 100 | 100 | 97 |
| | Hazardous Substances | 98 | 97 | 75 | 91 | 98 | 96 |
| | Equipment Safeguarding | 80 | 99 | 94 | 78 | 100 | 92 |
| | Isolation | 64 | 95 | 76 | 92 | 97 | 89 |
| | Working at Heights | 100 | 89 | 84 | 84 | 98 | 89 |
| | Lifting Operations | 91 | 90 | 87 | 90 | 89 | 89 |
| GRs | | | | | | | |
| | Confined Space | 80 | 81 | 71 | 100 | 98 | 91 |
| | Explosives | 80 | | 92 | | | 91 |
| | Water Bodies | 50 | 97 | 94 | 100 | 98 | 97 |
| Safety | | | | | | | |
| | Electricity | 80 | 100 | 100 | 97 | 100 | 99 |
| | Manual Handling | 80 | 79 | 96 | 87 | 76 | 82 |
| | Slips Trips Falls | 85 | 64 | 91 | 75 | 91 | 79 |
| | Caught between | 90 | 74 | 89 | 76 | 91 | 83 |
| | Heat | 100 | 100 | 95 | 95 | 100 | 98 |
| | Spon Com | 80 | 95 | | | | 94 |
| Occ Health | | | | | | | |
| | Noise | 20 | 35 | 59 | 25 | 69 | 42 |
| | Dust | 70 | 85 | 93 | 62 | 94 | 83 |
| | Vibration | 90 | | 92 | | | 92 |
| | Ergonomics | 91 | 89 | 85 | 75 | 81 | 84 |
| Enviro | | | | | | | |
| | Water | 100 | 87 | 94 | 100 | 100 | 95 |
| | Bidiversity | 100 | 100 | 100 | 82 | 98 | 95 |
| | Modified landscapes | 100 | 100 | 100 | 100 | 100 | 100 |
| | Spills | 80 | 76 | 73 | 98 | 93 | 85 |
| | Watse Disposal | 89 | 95 | 91 | 89 | 98 | 93 |
| | Cultural heritage | 99 | 100 | 100 | 97 | 95 | 98 |
| | Green House Gases | | | 89 | | | 89 |
| TOTAL | | 81 | 88 | 88 | 86 | 94 | 88 |

# Activity based vs Hazard based

| | Activity Based RRs | Hazard Based RRs |
|---|---|---|
| Pros | •Low maintenance | •Manageable # of entries<br>•Easy to refer to<br>•Mgmt tools<br>•More likely to be used as a live dynamic tool through monitoring<br>•Potential to be updated in real time<br>•Establish effectiveness through monitoring |
| Cons | •Repetition<br>•1000s of entries<br>•Not referred to<br>•Mostly used for system certification<br>•Too cumbersome to be used as a dynamic tool<br>•Updated annually at best | •Not a list of everything |

# What next?

- BTA to improve Critical Controls for high risks




ID SHEC Critical Controls and associated Critical Activities

# Journey Model ©

- Anglo American Safety Risk Management Process (SRMP) - 23 elements one of which is Risk Management Adoption (below)

| CATEGORIES DEFINITION | GUIDELINES | BASIC<br>Little formal interest, exposed, regressive, vulnerable, starters | REACTIVE<br>Responsive, awareness | COMPLIANT<br>Preventative, compliance, understanding | PROACTIVE<br>Competent | RESILIENT<br>Generative, creative, excellence |
|---|---|---|---|---|---|---|
| Process followed by the organisation to organise risk management activities and extent to which risk management activities/ considerations are integrated among themselves and with all other aspects of the business. | Risk Management is really about tackling the source of problems rather than the consequences (injuries, illnesses, spills, waste, losses, etc.). To have a safe work place the organisation needs well designed equipment and facilities, competent and committed individuals and a systems platform that regulates the interfaces between these elements. Therefore, the attention must be focused on business processes/decisions that affect or have the potential to affect these elements and ensure they are designed to enhance workplace safety. | The organisation has limited, if any, safety risk management activities. The site has no formal safety systems. | The organisation has safety risk management **activities (not systems)** as suggested by externally sourced safety standards. The safety personnel incorporate the information into site documents. | The organisation has a well defined SHE risk management system, not just activities, as required by corporate expectations. The SHE personnel develop it for line management. | The organisation has a well defined SHE risk management system as well as some other management systems where safety risk management has been integrated. Examples are contractor management, project management, etc. This has happened because line management see the value. | The organisation has **fully integrated** SHE risk management into all site management systems where relevant risks need to be managed. The consideration of SHE risk has become part of the way the site does business. Very few exclusively SHE Management Systems remain. The focus is now on operational excellence in management systems. |

**Do it because I have to (even passionate lip service)**

**Do it because I want to (internalised and see value)**

# Tools at Different Levels



**BASIC**
Little formal interest, exposed, regressive, vulnerable, starters

None

**REACTIVE**
Responsive, awareness

CCRR
or
WRAC

**COMPLIANT**
Preventative compliance, understanding

CCRR (Live)

**PROACTIVE**
Competent

CCRR
(Live w BTA)
or
SQRA

**RESILIENT**
Generative, creative, excellence

CCRR
(with QRA)
or
QRA

# Conclusion

- Creating, maintaining and utilizing a Critical Control Risk Register is a great tool for successful risk management
- CCRR helps focus resources on high risks and work towards ensuring:-
  - hazard focused
  - critical controls remain effective over time
  - SHEC critical activities are carried out competently
- Unless resources begin to focus harder at the critical controls and critical activities (instead of at the RAs), organisations will not be able to achieve the most risk reduction possible in a resource limited world, and thereby, injuries will continue.

# Acknowledgement

- Anglo Coal Australia's Risk Registers were initiated and adapted on work developed by Cristian Sylvestre of SafeTrain Pty Ltd
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SAFE TRAIN

Helping you comply, conform and improve OH&S/Environmental Performance


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