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Assessing Risk Assessments at Mount Isa Mines

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Introduction

Through statutory change and increasing improvement in Occupational Health & Safety systems, the Health & Safety department of Mount Isa Mines found it necessary to review the Risk Management standard. The Risk Management standard aims to provide a guideline in the identification of workplace hazards, assessment of the risks posed by them, introduction of the most appropriate control and monitoring the effectiveness of this control. Whilst this is not a new process and was aligned specifically to AS-4360 Risk Management, it prompted the development of tools to assist workers in performing formal risk assessments of their daily routine work, two of these tools were Task Analysis and Effectiveness of Controls. This paper aims to briefly describe the risk management process using task analysis and in particular analysing the effectiveness of the controls recommended.

The Evolution of Task Analysis

Task analysis is the process of systematically listing the steps within a workers task, with the intent of having enough detail to easily identify the hazards in each step. Within the Copper Mining Stream we adopted a system developed by the Industrial Foundation for Accident Prevention (IFAP) to improve the quality of Incident Investigations, monitor the development of Standard Work Instructions (SWI's) and improve the quality of Workplace Inspections. Each of these three components are controlled by a small working team. The investigation and inspection components are quite rigid documented processes and relatively easy to implement and drive change, however applying a 'scientific' approach to when, where and why an SWI should be developed proved more challenging.

The SWI Team developed a scorecard system for Copper Mining Superintendents. This system allowed Superintendents to list all the tasks in their respective areas and prioritise the order of review using a simple risk calculator which considers consequence, likelihood and frequency of task. Once the scorecards were developed the Task Analysis was completed by the workers.

Following the standard risk assessment principles, the worksheets were changed to provide a more systematic and simplified approach of working through each hazard scenario. The participant identifies the hazard scenario, existing controls, risk score, additional controls and residual risk across one line on the same page. The Task Analysis (and risk assessment) process was proceeding well, however through the review facility provided by the SWI Team, it was evident that the level of understanding with risk assessments varied, in addition there was conjecture regarding what determined the requirement for an SWI. Whilst there was agreement that SWI's should be developed for critical tasks - what score or process determined the task critical?

Risk Assessment Quality Check

Focus was changed to developing a rigid process to review the quality of the risk assessment in order to determine whether all controls were considered before relying on an SWI to control the task. The review needed to capture the entire risk assessment process. The document concentrated on key areas:

- Determining whether the hazard scenario's were well defined
- Confirming the risk scores were credible
- Determining whether the additional controls were adequate
- Confirming the residual risk score
- Determining whether the task was critical

'Hazard Scenario'

Stringent criteria was applied to the hazard scenario in particular each scenario had to include a target (person/equipment/environment etc) a consequence (injury/damage etc) and a hazard source. This achieves the benefit of allowing the person reviewing the risk assessment to understand the hazard and confirm/re-calculate a realistic risk score, whether this be through the quality check process or reviewing the risk assessment at a later date for currency.

'Risk Score'

The method we have used to calculate the risk score considers consequence and likelihood. Consequence is measured using a numerical indicator on the most credible outcome and likelihood is measured using an alpha indicator considering probability and exposure ie how often the target may come in contact with the hazard source resulting in the consequence described. A 5x5 risk matrix is used to obtain a value of the consequence and likelihood.

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Risk Analysis Matrix

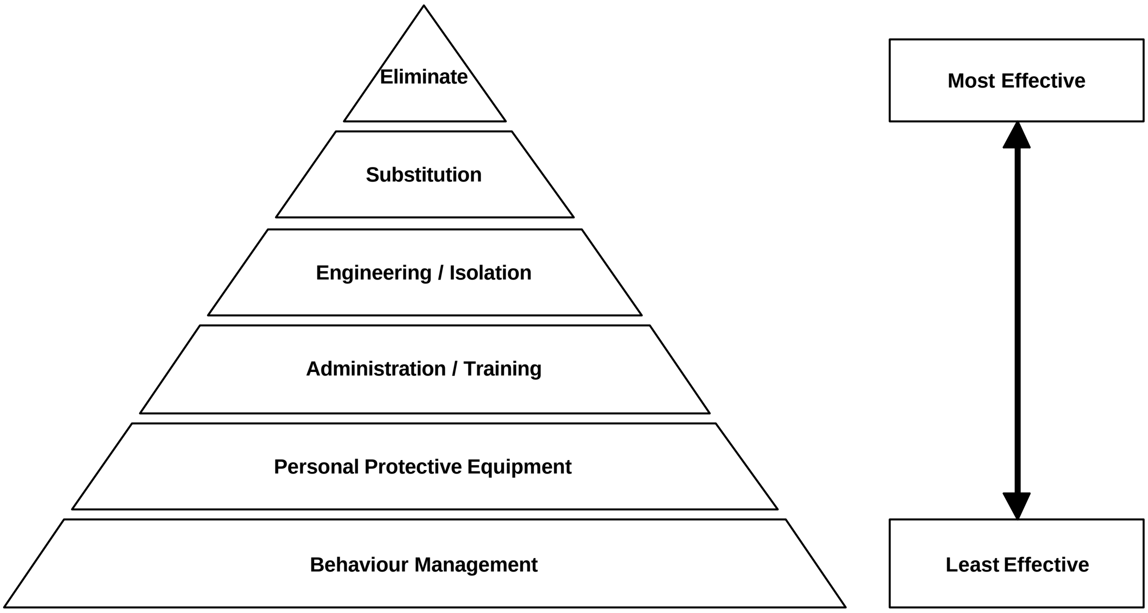
A	11	16	20	23	25
B	7	12	17	21	24
C	4	8	13	18	22
D	2	5	9	14	19
E	1	3	6	10	15
	1	**2**	**3**	**4**	**5**

Consequence		**Likelihood**	
5	Catastrophe	**A**	Almost Certain
4	Major	**B**	Likely
3	Moderate	**C**	Occasional
2	Minor	**D**	Unlikely
1	Insignificant	**E**	Rare

Extreme	**STOP** work and Contact Supervisor
High	**Immediate** Action Required
Moderate	**Action** Required
Low	**Monitor**

‘Additional Controls’

The area that caused the most consideration was the level of additional control. Controls reduce risk of an incident by lowering the consequence or the likelihood or both, in many cases a combination of controls will be used. When assigning controls to a hazard emphasis should be on systematically working through each level of the hierarchy of controls from the most effective control to the least effective control. Once again this was not a new concept, however we focused on measuring the effectiveness of the control recommended ie does the control reduce the consequence, the likelihood, or both?



Control	Reduces	Action
Elimination	Consequence/Likelihood	Remove, redesign the process or plant so the hazard does not exist
Substitution	Consequence/Likelihood	Hazard substituted with something of a lesser risk eg red rating chemical with amber rating chemical
Engineering/Isolation	Consequence/Likelihood	Hazard controlled through isolation using an engineering measure eg machine guarding
Administration/Training	Likelihood	Hazard controlled by influencing people eg SWI’s, procedures, job rotation and signage
Personal Protective Equipment	Likelihood	Hazard controlled by the use of personal protective equipment eg hearing protection in noisy areas
Behaviour Management	Likelihood	Hazard controlled by individuals attitudes, personality, beliefs, actions, assumptions, reactions, skills, knowledge, abilities eg driving within the speed limit

A simple scoring system in line with the 5x5 risk matrix (1 – 25 numerical score) was applied to the additional controls. To meet the intent of the review, each type of control could only be scored once:

Elimination	25 points
Substitution	20 points
Engineering/Isolation	15 points
Admin/Training	5 points
PPE	2.5 points
Behaviour Mgt	1.5 points

The additional control scores are totalled and if they did not reach the risk score confirmed previously then they were not acceptable to control the level of risk.

'Residual Risk Score'

Fundamentally if the additional controls 'did not' fall into the control groups of Engineering/Isolation, Substitution or Elimination, then the consequence remained the same. The additional controls are considered when calculating the residual risk score using the risk score method described earlier.

'Critical Task'

We firstly determined that generally a high or extreme residual risk score would require an SWI, however after reviewing the residual risk scores often risks which fell into the moderate range relied solely on administration controls – these could well be considered as critical tasks. This prompted the introduction of a number of checks and balances against the additional controls when they did not reach the desired score:

- Were the additional controls Administration/Training, PPE and Behaviour Management?
- Was there scope to introduce higher or additional controls?

By answering yes to the first question and no to the second question this would warrant consideration of a critical task and development of an SWI.

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Guidance on the Use of Administration Controls

The requirements of procedures, SWI's and training were layed across the top of our 5x5 risk matrix and are based on residual risk scores. In addition definitions exist for the different levels of training.

We recommended that SWI's were not developed in isolation – that they should form part of procedures and structured training programs.

11 Procedure Formal Training Stringent Testing Level 2	**16** Procedure Formal Training Stringent Testing Level 2	**20** Procedure SWI Formal Training Stringent Testing Level 1	**23** Procedure SWI Formal Training Stringent Testing Level 1	**25** Procedure SWI Formal Training Stringent Testing Level 1
7 Procedure Self directed learning with general assessment Level 3	**12** Procedure Formal Training Stringent Testing Level 2	**17** Procedure Formal Training Stringent Testing Level 2	**21** Procedure SWI Formal Training Stringent Testing Level 1	**24** Procedure SWI Formal Training Stringent Testing Level 1
4 Provision of information general assessment Level 4	**8** Procedure Self directed learning with general assessment Level 3	**13** Procedure Formal Training Stringent Testing Level 2	**18** Procedure SWI Formal Training Stringent Testing Level 1	**22** Procedure SWI Formal Training Stringent Testing Level 1
2 Provision of information no assessment Level 5	**5** Provision of information general assessment Level 4	**9** Procedure Self directed learning with general assessment Level 3	**14** Procedure Formal Training Stringent Testing Level 2	**19** Procedure SWI Formal Training Stringent Testing Level 1
1 Provision of information no assessment Level 5	**3** Provision of information general assessment Level 4	**6** Procedure Self directed learning with general assessment Level 3	**10** Procedure Formal Training Stringent Testing Level 2	**15** Procedure Formal Training Stringent Testing Level 2

Summary

This process is being used by the workforce through the facilitation and review of risk assessments and is fundamentally accepted. Discussion continues with regard to the use of some engineering controls for example engineering controls that rely on procedures to enforce - isolation and lockout, barricading etc would be scored in the process as an administration control given that to be effective, it relies solely on the person to implement.

We have encouraged consideration to defences in layers, particularly when relying on administration controls you may have many things (SWI, procedures, pre-starts, inspections etc) that would need to fail before the target came in contract with the hazard source.

Whilst we do not suggest that we have answered all areas of conducting a risk assessment as it still relies on the participants perception of the risk when scoring, we believe that we have implemented a sound tool to review the quality of the risk assessment and effectiveness of the control implemented.