Guideline for the compilation of a*

Risk assessment

on the

Safety Pistol

**This guideline has been prepared by New Concept Mining (Pty) Ltd to assist a user in the compilation of its own Risk assessment as required by the Mine Health and Safety Act.*

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Section 1 Summary

Introduction

In order to compile this risk assessment guideline on the Safety Pistol, nominated members of New Concept Mining (Pty) Ltd met, and agreed on the Risk assessment guideline objective and approach. A team was formed to facilitate and develop the Jackpot Safety Pistol risk assessment guideline.

The Safety Pistol is used to inflate hydraulic pre-stress devices, (HPDs) for mine support props and inflatable roof tendons. It was designed to overcome some of the deficiencies of previous pistols, in particular the lack of a hydraulic pressure relief valve. The Safety Pistol incorporates an integral pressure relief valve on the delivery port, which opens when the required setting pressure has been achieved and thus prevents over-pressurisation. This pressure is typically factory set at 13MPa or 25MPa depending on the model.

This Risk Assessment guideline covers NCM Safety Pistols that are used in conjunction with NCM Airpumps and Safety Pistols used in Hydropower applications without the use of an Airpump.

A risk assessment guideline is required in terms of the Mine Health and Safety Act 1996.

From the Risk Assessment guideline, it is hoped that critical points in the correct operation and maintenance of the Safety Pistol will be apparent. By highlighting these points, it is hoped risks will be minimised and the overall safety of the system maximised.

Operational Risk Analysis

To identify the hazards, prioritise the risks associated, and highlight the controls required to eliminate/minimise the risks related to the Safety Pistol and its operation, as well as any risk of failure, primarily from the point of view of the health and safety of the workforce, but also production delay and asset damage and /or a combination of the three.

Section 3 - Risk analysis method

The risk analysis followed two accepted methods. All risk analyses follow a general scheme that can be described as follows:

- Describe the system under analysis (including equipment, personnel, procedures, work environment, management and supervisory systems etc.).
- Identify loss scenarios (i.e. sequences of events leading up to potential or actual losses i.e. incidents or accidents) in the form of hazards, potential productivity interruptions, asset damage events, environmental issues etc.
- Evaluate the risks of each loss scenario by determining the relative likelihood of each event, and the relative consequence of each event.
- Evaluate the currently planned controls, barriers and safeguards.
- Identify additional, potential controls, barriers and safeguards.

In the current exercise, a select team from New Concept Mining (Pty) Ltd accomplished these steps:

Define the operational system

The exercise was scoped to review risks related to the work process from transport to stope blasting to minimise loss to the workforce. An operational flow chart highlighting mining activities during operational use was derived. In addition, the equipment was broken down into component parts, within the flow chart.

Identify the possible system hazards

This step postulated the maximum reasonable consequence of loss scenarios or failures (i.e. of circumstances leading up to or resulting in hazards). The consequences were classified as losses to people (Health & Safety) in this instance. In the second instance, the effect of the failure was highlighted.

Determine the level of risks

Risks associated with each step in the operational process were considered. This is achieved by considering the event frequency or probability, and the event severity or consequence.

The ranking system used is described below:
Risk is defined as the product of **probability** and **consequence**.

Probability categories
Probability categories were defined as follows.

A = Common

B = Has Happened

C = Could Happen

D = Not Likely

E = Practically Impossible

Consequence categories

Consequence categories were defined for health and safety.

	Health & Safety
1	Fatality / Permanent disability
2	Reportable Injury
3	Disabling Injury
4	Dressing Station Case
5	Self Treated

Risk categories

Risk categories were defined by combining the probability and consequence categories above according to a matrix of prioritised risk ranking as follows.

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

A risk score of 1 denotes the highest (most significant) risk; and a risk score of 25 denotes the lowest (least significant) risk.

Define and describe the system controls and barriers

This step identified existing controls and barriers, and also considered planned, and possible additional controls and barriers which could be used to manage the operational risk. Controls and barriers include engineering devices, operational methods and practice, management action and principles and environmental and system amendments that the team agrees appropriate to consider.

Assess the adequacy of the controls

The adequacy of the nominated controls in terms of design devices, management and operational practices and system amendments was reviewed by the team to ensure that additional scope for risk reduction has not been overlooked within the time available. If the controls are considered inadequate, recommendations to improve the situation are made.

Document the study process and results

The report is presented so that the company can review the planned and proposed controls and barriers and can *devise an implementation plan* to incorporate additional approved controls established through the risk analysis.

Analysis logistics

The risk analysis was conducted over one day being the 22nd November 1999 at **New Concept Mining (Pty) Ltd** offices with a selected risk review team participating in the exercise. Participants are listed below:

	Section/Position	***Name***	***Signed***
1.	Managing Director……	Paul McKelvey B.Sc. MSc (Mech. Eng.)……	
2.	Manager…….	Nick Marvin B.Sc.(Min.Eng.)……..……..	
3.	Manager……	Owen McMahon……..	
4.	Technical Support + Safety	Simon Mangena……	
5.	Design Engineer…….	Dave Tyrer B.Sc (Mech. Eng.)…….……	

Section 4 - results

The risk analysis exercise generated a set of results presented in this section.

Format for results

The analysis team developed a format for the result based on the flow chart of the work activities.

Results

Results are presented overleaf in the following sequence.

- Risk analysis tables.

Safety Pistol

		Without controls				With controls			
STEP	**POTENTIAL ACCIDENT**	**Probability**	**Consequence**	**Rank**	**CONTROLS**	**Probability**	**Consequence**	**Rank**	**ISSUES**
1. Manufacture of units.	Unit fails underground.	B	1	2	1. Supplier Quality Management System 2. Materials used are checked when received for machining faults and quality. 3. All units tested prior to delivery. Set to 13MPa, 27MPa or to pressure stipulated by the mine	D	4	21	1. Factory set to 13MPa or 27MPa pressure. (Tamper free arrangement inside pistol)
2. Transport.	Unit is damaged whilst being transported.	D	5	24	1. Units are small and easy to transport. 2. Units are robust with all working parts protected.	E	5	25	
3. Storage.	Unit is damaged whilst in storage.	D	5	24	1. Units are robust and all working parts protected. 2. Entire unit is made from corrosive resistant material.	E	5	25	
	Unit is lost whilst in storage.	C	3	13	1. Units are small and could be mislaid but can only be used for pre-stressing.	C	5	22	
4. Maintenance/Repair **Only certificated persons may repair Safety pistols at prescribed workshops.**	Pistol fails underground.	A	1	1	1. Repair kits available. 2. Ensure Pistol is free of grit and fines prior to use. 3. Maintenance manual provided	C	3	17	1. All parts are made of non-corrosive materials. 2. Repairs only to be done in prescribed workshops by trained persons.

5. Training and standard operating procedures.	1. Props blast out due to inadequate pressurising. 2. Hydrabolts and X-Pandabolts not installed to correct pressure	A	1	1	1. All sections are trained on the product to ensure minimal blast out rates. 2. Instructors do follow up visits to sections to retrain. 3. Training done at training centres and in production sections.	B	3	9	1. Installation chart is supplied. 2. PPE supplied by the mine. (Goggles, hard hat, boots, gloves) 3. Mine standards. 4. Training by the mine. Refresher courses.
6. Protective equipment must be worn as high pressures are being dealt with.	Operator injured by pistol whilst using equipment. (water enters eyes)	A	1	1	1. Use PPE supplied by the mine. (Goggles, hard hat, gloves, boots)	D	2	12	1. Installation chart supplied 2. Follow all stope safety procedures whilst using equipment