



# RB 80 HYDRAULIC PROP RISK ASSESSMENT

# CONTENTS

<b>Introduction</b>	<b>3</b>
<b>1. Product Description</b>	<b>3</b>
<b>2. Design Criteria</b>	<b>3</b>
<b>3. Risk Assessment Team</b>	<b>4</b>
<b>4. Objectives</b>	<b>4</b>
<b>5. Hazard Classification</b>	<b>4-5</b>
<b>Risk matrix</b>	<b>6</b>
<b>FACTOR/INDEX TABLE</b>	<b>6</b>
<b>6. Conclusion</b>	<b>7</b>
<b>Appendix 1 – Tabulated Hazards and Control Measures</b>	<b>8-10</b>
<b>INSTALLATION AND REMOVAL PROCEDURE</b>	<b>11-15</b>

## Introduction

This document has been compiled as a risk assessment for the RB 80 Hydraulic Prop designed and manufactured by ELBROC MINING PRODUCTS PTY Ltd. This assessment preempts any potential application and trials that will be conducted underground.

A comprehensive assessment will be carried out in accordance with the guidelines (QSP 111 Issue 1)

The aim of this assessment is to identify the potential hazards associated with the use of these temporary support units in underground stoping operations and to list control measures to eliminate or reduce that potential.

## 1. Product Description

The RB 80 Hydraulic Prop is designed to perform in general mining conditions, including seismic and high closure conditions as a blast on re-usable hydraulic prop support.

## 2. Design Criteria

The RB 80 Hydraulic Prop is designed as a blast on re-usable hydraulic prop support

1. Pre-stressed to a load of 130-150 kN and
2. To yield at 170-200 kN.
3. Dynamic yield load 400-500 kN.
4. Hydraulic prop available in the following lengths.

• Closed:	550mm	650mm	750mm
• Travel:	300mm	400mm	500mm
• Height at maximum travel:	850mm	1050mm	1250mm
• Minimum travel:	150mm	150mm	150mm
5. Prop extensions following lengths: 150mm 300mm 500mm
6. Steel headboard 400 x 180 mm

### 3. Risk Assessment Team

The team that compiled this provisional assessment consisted of:

Trevor Clements                      Operations Manager

Otto van der Merwe                      Operations Manager

Francois Malan                      Operations Director

### 4. Objectives

In order to effectively identify the hazards associated with this product, a process as set out below facilitates a logical approach to formulating the risk indices.

1. Utilize a task procedure for installing and transporting the prop to identify probable hazards.
2. Apply a risk rating for each hazard.
3. List preventative measures.

All the above are tabulated in Appendix 1.

### 5. Hazard Classification

The following definitions are appropriate to this risk assessment and will be referred to in this document:

**HAZARD**                      -something that has potential to cause harm.

**RISK**                              -the likelihood that harm from a particular hazard will occur.

**SEVERITY**                      -extent of the risk associated with the harm that a person might suffer as well as the number of persons likely to be harmed.

**PROBABILITY** -the chance that a person or persons will be harmed during the exposure period.

**CONSEQUENCE** -the degree of harm; the potential severity of injuries.

*The matrix below has been adopted from the **Anglogold policy and procedure** (QSP 111 Issue 1 – dated 1999–02-15) and appropriately incorporated into the risk rating of this product.*

Allocating a value for the **consequence** and **probability** from the index **column** and **row** does the process of attaching the risk.

		<b>Probability</b>					
		Expected result	Quite possible	Unusual but possible	Remotely possible	Very unlikely	Practically impossible
<b>Consequence</b>	<i>Index</i>	1	2	3	4	5	6
Catastrophic	1	48	47	45	42	38	33
Disaster (few fatalities)	2	46	44	41	37	32	27
Very serious (single fatal)	3	43	40	36	31	26	21
Serious (serious injury)	4	39	35	30	25	20	15
Important (temporary disability)	5	34	29	24	19	14	10
Of concern (minor injury)	6	28	23	18	13	9	6
No incident	7	22	17	12	8	5	3
Near miss	8	16	11	7	4	2	1

**FACTOR**

**INDEX**

<b>Consequences</b>	
1. Catastrophic (many fatalities)	<b>1</b>
2. Disaster (a few fatalities).	<b>2</b>
3. Very serious (one fatality).	<b>3</b>
4. Serious (serious injury).	<b>4</b>
5. Important (temporary disability).	<b>5</b>
6. Of concern (minor injury).	<b>6</b>
7. No incident	<b>7</b>
8. Near miss	<b>8</b>
<b>Probability</b>	
1. Is the most likely and expected result if event occurs.	<b>1</b>
2. Quite possible (50/50).	<b>2</b>
3. Unusual but possible.	<b>3</b>
4. Only remotely possible (has happened somewhere).	<b>4</b>
5. Conceivable but very unlikely (hasn't happened yet).	<b>5</b>
6. Practically impossible (one in a million).	<b>6</b>

## **6. Conclusion**

*Primary hazards associated with the direct use of these products within the designed specifications and controls will be minimized if the correct installation and transport procedures are applied.*

*This provisional risk assessment is restricted to the application of these products for underground permanent stope support only.*

# **APPENDIX 1**

## ELBROC RB 80 Hydraulic Prop

PROCESS	ACTIVITY	HAZARD	CONS	PROB	RISK	PREVENTATIVE MEASURES
Installation	Making work and support area safe	Falls of ground resulting in injuries to persons	3	2	40	Employ mine standard / procedure for barring down the hanging wall and creating a stable footwall
	Determining and installing the hydraulic prop in accordance to the mine standard	Decrease in areal coverage - increased area of possible instability (FOG)	4	3	30	Demarcation of installation pattern
	Hydraulic prop support to be positioned at right angles to the dip of the strata	Uneven load distribution - uneven load distribution on hydraulic prop support and increased risk of being dislodged by mining operations	5	3	24	Training on installation of temporary support
	Correct sizing of the unit for the applicable stope width	Undersized units would lead to ineffective support resistance and possible dislodging resulting in hanging wall collapses and injuries to persons	3	3	36	Order the correct size of the unit for the relevant working place. (use correct hydraulic prop extension)
	Positioning the sized hydraulic prop support in place	Injury to extended bodily limbs and toppling of the prop before pre-stressing has taken place.	6	2	23	Two people to install hydraulic prop Wear protective clothing and ensure that hands are not sited between the hydraulic prop and hanging- or footwall
Removing	Removing of hydraulic prop support when moving hydraulic prop forward	Falls of ground resulting in injuries to persons	3	2	40	Use of remote release tool to remove props Position at up dip side of prop next to last permanent support 3-5 meters from prop

## ELBROC RB 80 Hydraulic Prop

<b>PROCESS</b>	<b>ACTIVITY</b>	<b>HAZARD</b>	<b>CONS</b>	<b>PROB</b>	<b>RISK</b>	<b>PREVENTATIVE MEASURES</b>
Transport In Stope	To be secured on both ends to the mono winch rope	Prevent damage of props by dragging	6	2	23	Apply mine standard for mono rope procedures for securing objects
	Physical transport	Bodily injuries due to weight of the unit.	6	3	18	Ensure that two persons carry the unit simultaneously Make use of two carrying straps where provided on the unit.

## ***TRAINING FOR RB 80 HYDRAULIC PROP INSTALLATION***

On implementation of new products one of our Underground Instructors, Underground Technicians or Underground Sales Managers will be available for advice as well as technical backup. After the approval of new products by the Mine the Training center will be supplied with the relevant information for them to incorporate the information into their lesson plan. The trainers will then be trained.

### **Recommended installation procedure**

*It is assumed for this procedure that:*

1. The User's safety procedures and standards are fully complied with. The RB 80 hydraulic prop is intended to complement such standards and in no way supersedes or replaces any safety standard.
2. The complete RB 80 hydraulic prop with extension pieces and headboard is available at the point of installation.
3. Stope-width measuring devices.
4. Adequate air and water supplies and hydraulic pump are available.
5. The high pressure hose fitted with filler spout and high pressure pump with an output of 28-32 MPa to pre-load the RB 80 hydraulic prop ;
6. The correct clothing and PPE is worn.

### **PREPARING TO INSTALL HYDRAULIC PROP**

- Step 1** Regulation 8.1.0, 8.2.1, 8.2.2 and 8.2.3 must be adhered to at all times
- Step 2** The installation Supervisor must inspect all tools, material, equipment and PPE before use as per checklist provided.
- Step 3** The installation Supervisor must carry out pre-use inspection on components as per the pre-use inspection lists supplied.
- Step 4** The client's examination and making safe, safe barring, environmental and support procedures should be adhered to at all times.
- Step 5** The hangingwall must be washed by spraying water with a 12mm hose from a safe position. All geological discontinuities must be identified and marked with yellow paint.
- Step 6** The installation Supervisor must examine the hanging and sidewall for a distance of 2m from installed support and make safe. If necessary temporary support to be installed.
- Step 7** Geological discontinuities must be taken into account when support is marked to ensure it is supported to mine standard.
- Step 8** The footwall must be cleaned and solid.

- Step 9** Install permanent support according to mine standard.
- Step 10** Hydraulic prop positions to be marked on the dip where props are to be installed taking into account geological discontinuities
- Step 11** Determine 90 degrees by placing a 1.8kg hammer on the footwall at the position on the hangingwall. The direction of the hammer's handle indicates 90 degrees to the footwall.
- Step 12** Place and secure the pump unit, accessories and support units in a safe, dry and secure position between permanent installed support units.

### **INSTALLATION OF THE HYDRAULIC PROP**

- Step 1** Two persons are required to install a prop. One person to hold the prop upright in position and the other person to install the extension and the headboard.
- Step 2** Lift and place the prop to be installed on the selected mark on the footwall with the filler valve housing facing away from the face and towards the strike gully.
- Step 3** Open water valve on the water manifold and allow water to flow for a short period to remove all grit and dirt from the hose, close water and connect the water hose to the manifold.
- Step 4** Flush out the air and water hoses to remove dirt and grit, close air and water and connect to hydraulic pump. Fill pump with water to indicated mark.
- Step 5** Connect the filler pistol before the pump unit is under pressure to prevent water flowing out of the pump unit.
- Step 6** Check for air and water leaks from the supply pipes to the latch to ensure adequate pressure.
- Step 7** Clean filler release valve and release port by using water from the latch by pressing the filler pistol trigger which will release water from the pump, to prevent leakage to the prop and clear the release port.
- Step 8** Insert the setting pistol partially into the filler valve housing to allow the latch to have rotation on the setting pistol.
- Step 9** Rotate the latch and spout so that the angled ends points upward for easy locking purposes.
- Step 10** Push the latch fully into the filler valve and turn latch so that the angled end points downwards, to lock the setting pistol in position.
- Step 11** Fit extension pieces to the prop if required, to prevent the ram from over extending, which will render the prop ineffective. This will ensure the prop reaches the hangingwall.
- Step 12** Correct extension lengths must be selected to ensure a minimum of 200mm of ram is extended when the prop is firmly installed.

- Step 13** Fit the headboard to the prop. Connect the latch and spout before putting on extensions and headboard to prevent possible injury caused by the headboard falling down whilst the latch is connected to the prop.
- Step 14** To extend the prop in its position against the hanging wall, one person to keep the prop in position whilst the other operates the filler pistol.
- Step 15** The person pumping the prop must, release the filler pistol as soon as the prop starts to take pressure and can stand on its own, and withdraw to a safe position before final pumping is done.
- Step 16** When all persons are safely positioned, the person operating the filler pistol can again press the trigger to extend the prop until it is firm against the hanging wall.
- Step 17** The pump must stop pumping to ensure that the pressure applied to the prop has stopped.
- Step 18** If a prop loses pressure, it must be replaced.
- Step 19** Prop installation must be done from the top of a panel towards the bottom. If the mine standard requires installation from the bottom, apply the mine standard.
- Step 20** Workers must be up dip side of installations being carried out.
- Step 21** Remove the latch once the prop installation is complete. To remove it from its locked position, turn the latch so that the angled end faces upwards. Remove the latch from the prop.
- Step 22** Use the filler pistol to wash grit out from between protective plastic sleeve and the prop casing so that protective sleeve is loose on the prop. This will prevent damage to the prop during blasting.

### **REMOVE PUMP AND ACCESSORIES**

- Step 1** Close the water supply to the manifold.
- Step 2** Flush out pump unit with compressed air.
- Step 3** Close the air supply at the manifold.
- Step 4** Disconnect the air and water hoses from the manifold and pump.
- Step 5** Remove the hoses, pump, high-pressure hoses, latch and filler pistol to a safe area.
- Step 6** Attach a 12mm straining rope or a chain through the transport holes of the props. Secure with a clamp.

## **PROP INSTALLATION FOR WORKINGS OF GREATER THAN 35 DEGREE**

- Step 1** All steps as per installation of hydraulic props must be adhered to.
- Step 2** Props must be installed starting only from the top of the panel towards the bottom.
- Step 3** No person is permitted below the position where the prop is being installed.
- Step 4** Install gum planks at strike across props already installed to create a foothold. Secure gum planks/gate stulls with chain or manila rope to the props to prevent slipping.
- Step 5** Attach two chains to the prop to enable two persons to hold the prop from a safe position prior to pumping. A third person is required to pump the prop.

## **PROP REMOVAL IN NORMAL WORKINGS**

- Step 1** Check for fractures and slips in the hangingwall and bar down where necessary.
- Step 2** Install support as per mine standard before removing the props.
- Step 3** Remove all persons in the vicinity where the prop is to be removed. All workers to be positioned on the up dip side in a safe area not closer than 3m from the prop to be removed.
- Step 4** Flush out filler valves of props to be removed to ensure that valves are clean from grit from blasting operations.
- Step 5** Fit the remote releasing tool to the filler valve housing of the prop in the same way as the latch.
- Step 6** Clean the remote releasing tool to prevent grit from getting into the valve before releasing props.
- Step 7** The Operator must position himself in a safe position up-dip between installed support before releasing the prop.

## **PROP REMOVAL IN STEEP STOPE GREATER THAT 35 DEGREES**

- Step 1** All steps as per prop installation for workings of grater than 35 degree.
- Step 2** Secure a 5m chain between an installed prop and the prop to be removed, to prevent the prop falling down the stope face when it is released.
- Step 3** Ensure that there are no people below the position where the prop is being removed.
- Step 4** Install gum planks on strike across installed props. This will prevent injuries due to rolling rock/items and create a good foothold.

- Step 5** The remote release tool is fitted with a 5m long wire extension cable which will enable the operator to release the prop from a safe position, up dip from the prop being removed from under supported hanging wall.
- Step 6** The remote releasing tool must always be in the possession of the Supervisor in charge or the trained competent team leader.
- Step 7** Pressure from the prop will be released when the extension cable is pulled towards the person operating it.
- Step 8** If the prop fails to release, install temporary support on either side of the prop, break up the footwall around the foot of the prop and remove the prop by pulling on the remote releasing tool wire or rope.
- Step 9** Check the hangingwall condition again in the area where the prop was removed, to ensure that the hangingwall conditions have not deteriorated.
- Step 10** Under no circumstances must the prop be blasted out, pulled out by hand, hammered or barred out.
- Step 11** Only remove 1 prop at a time and move it forward.
- Step 12** Remove and secure all props, headboards and extensions to the next required position.

### **GOOD HOUSEKEEPING**

- Step 1** Ensure that transport of props is done carefully to prevent damage to the prop and valves.
- Step 2** Always clean the setting valve before connecting the latch and spout.
- Step 3** Never hammer an incorrectly installed prop to move it into its correct position.
- Step 4** Never leave installed props in old areas.
- Step 5** Any prop that is defective must be transported in a safe manner to surface. Defective props must be marked as such.
- Step 6** Check the props installed to have the correct ram travel – minimum of 200mm or maximum ram extension in rapid converging areas.
- Step 7** Do not strip or dismantle props underground. Only trained persons can repair defective props as only they have the tool and equipment to effective repairs.
- Step 8** Props not in use must be stored in a safe and dry place.
- Step 9** Place props on gum planks in the safe storage areas provided.
- Step 10** Props not in use must be depressed.