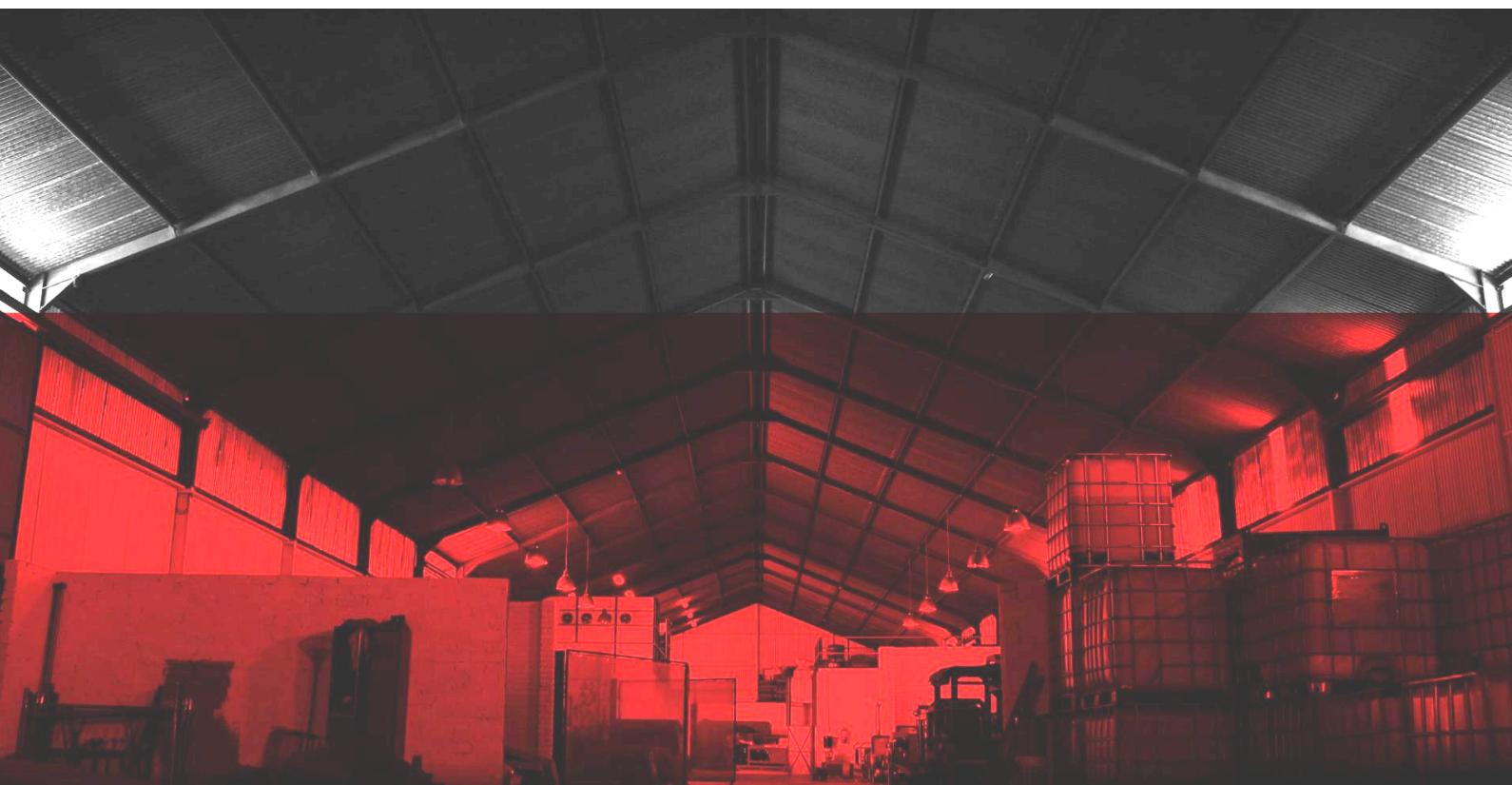
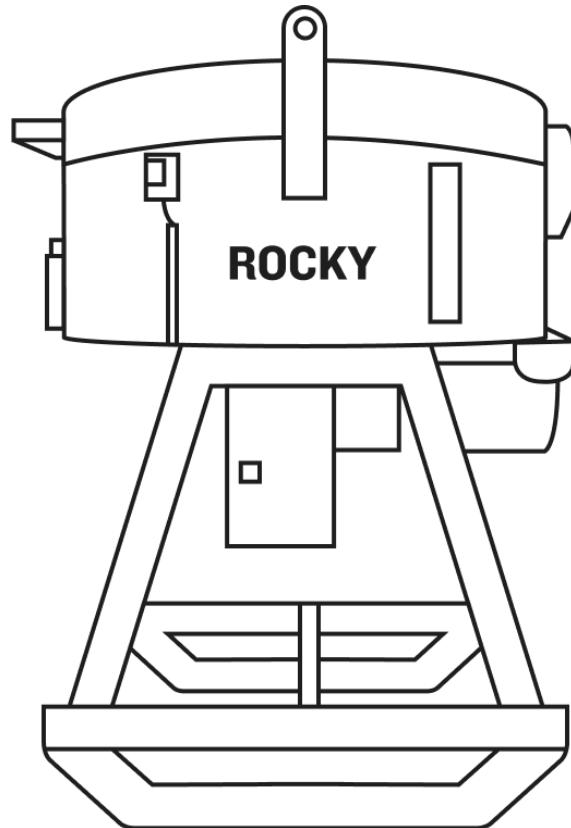


# OPERATORS MANUAL



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## 1. Rocky Mixer Technical Specifications

<b>Category</b>	Pan Mixer
<b>Mixer Type</b>	200 Liter
<b>Dry Filling Capacity</b>	135 Liter
<b>Wet Mixing Capacity</b>	380V, 525V, 1000V 3-Phase
<b>Power Supply</b>	3kW 380V, 525V, 1000V
<b>Drive Motor</b>	1000mm
<b>Discharge Height</b>	360mm
<b>Pan Wall Height</b>	1000 mm
<b>Pan Diameter</b>	Diesel, Air
<b>Optional Drives</b>	Pan Mixer

## 2. Operation & Safety

### 2.1. Introduction

The Rocky Mixer is a pan mixer for the fast and effective mixing of wet concrete and shotcrete mixtures. Drive power is supplied from a 380V, 525V or 1000V 3-phase electrical motor via a reduction gearbox.

The mixer is designed to take 210 kg of dry mixture or 7 x 30kg standard wetcrete ready-mix bags. Paddle arms are equipped with shearing bolts to prevent damage to the gearbox and other components.

### 2.2. Safety Before Operation

Rotating machinery is inherently dangerous. Safety is therefore extremely important when operating and maintaining the Rocky Mixer. The safety precautions provided in this manual must be used as a guide only and should not be seen as complete safety instructions.

Only personnel trained in the use of shotcreting pumps and systems must be allowed to operate the Rocky and Mixer.

Always refer to local mining or other site regulations before and during the operation and use of the equipment.

Always make sure the machine is clean and in good physical condition. This will reduce the possibility of injury or damage.

Before operating the machine, check and make sure of the following (Also refer to **Section 7: [Daily Check List](#)**):

- The machine is placed on a suitable horizontal surface
- Necessary signs or arrangements are in place for the use of the machine
- All guards and covers are in place and secure
- The grid is closed and in good condition
- The grid is equipped with a limit switch to stop the motor when the grid is opened to prevent injuries. **This safety device must at all times be operational and in good condition.**
- Pan is clean and free of foreign objects
- Online starter panel is closed and free of damage
- All switches are secured and in good working condition
- Electrical wiring and cables are correctly and securely connected and free of damage

### **2.3. Safety During Operation**

- Follow all local site regulations in terms of machine operation and personnel requirements
- Wear the required personal protective equipment
- Do not try to remove any foreign objects from the pan through the grid.
- Completely switch off and isolate the machine before entering any part
- Keep clear of all moving parts
- Never open the electrical panel while the machine is in operation
- Only trained personnel should operate the machine

### **2.4. Operating the Mixer**

- Set the machine up on a suitable horizontal surface
- Follow all precautions and safety regulations
- Make sure the pan is clean and free of foreign objects
- Close Grid
- Switch off the Main Breaker and connect the machine to a suitable power supply
- Make sure the rotation direction is correct. Rocky Mixers rotate Clockwise, looking from the top
- Start the mixer and make sure it runs freely
- Follow the supplier guidelines for adding and mixing admixtures or concrete
- Fibres should always be added last to ensure proper distribution and mixing
- Once the mix is of the prescribed consistency and specifications, slowly open the gate to let the mixture out into the pump hopper
- Follow guidelines for spraying concrete

## 2.5. Cleaning and Storage

- Always clean the machine properly after every use while the concrete is still wet.
- Wash out the pan through the grid while running.
- Make sure the limit switch is cleaned properly to ensure correct operation.
- Thoroughly clean the gate and gate slides after every use to ensure easy opening during operation.
- Apply a thin layer of grease or oil to gate slides to prevent corrosion and to ensure ease of operation
- Regularly grease all points on the mixer

## 3. Maintenance

### 3.1. Pre- and Post-Operational Inspections

Regular inspection and maintenance will ensure optimum pump performance and increased machine life expectancy. Regular inspection will reduce the risk of injury or plant and equipment damage. Worn and damaged parts should be replaced immediately with OEM-approved parts.

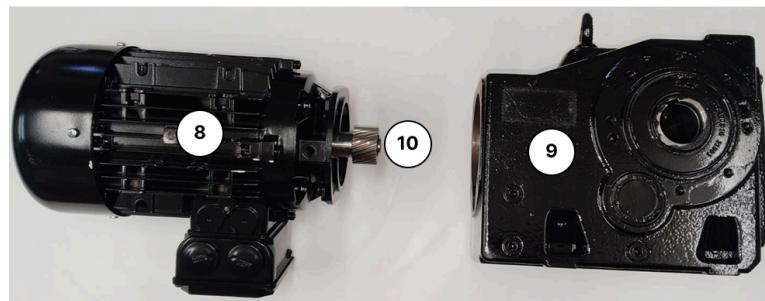
- General condition of the frame and structure
- Condition of paddles and paddle arms
- Proper closing of the grid
- Correct operation of the limit switch
- Condition of cables and starter box

### 3.2. Running Maintenance

- For replacement of parts, always refer to the Spare Parts List
- Greasing of all grease points
- Alignment of paddles
- Retightening of any loose bolts or fittings
- Replacement of worn parts

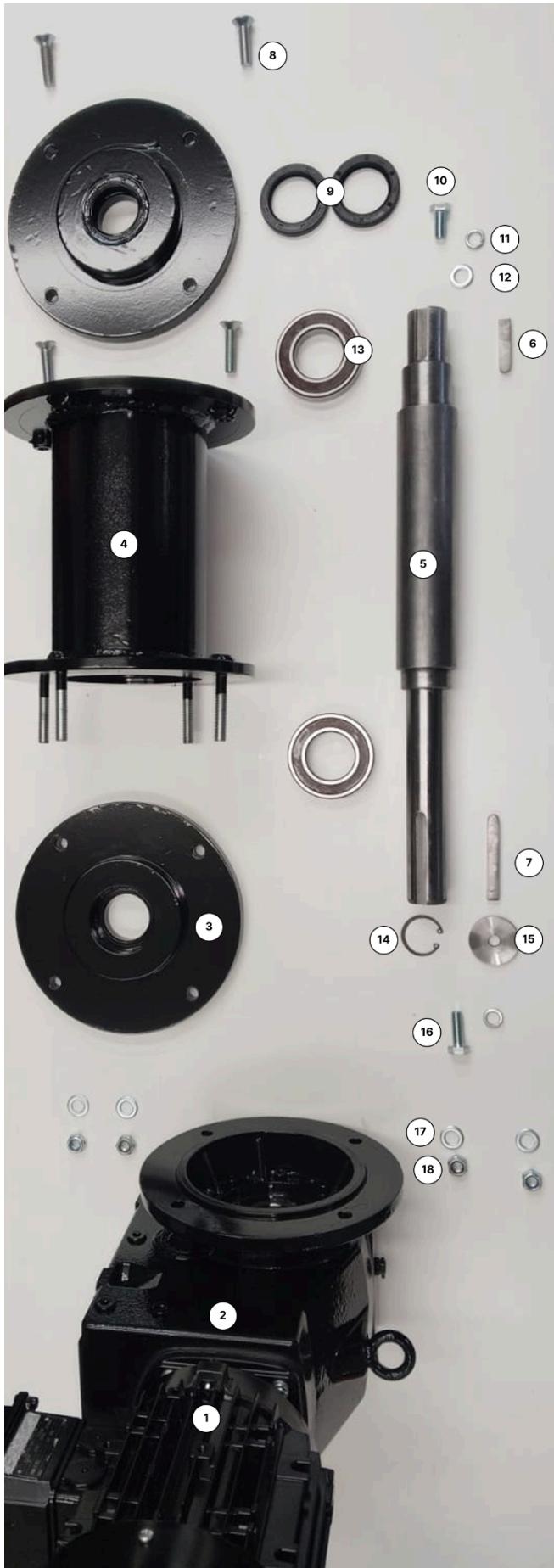
## 4. Parts Identification

### 4.1. Main Assembly



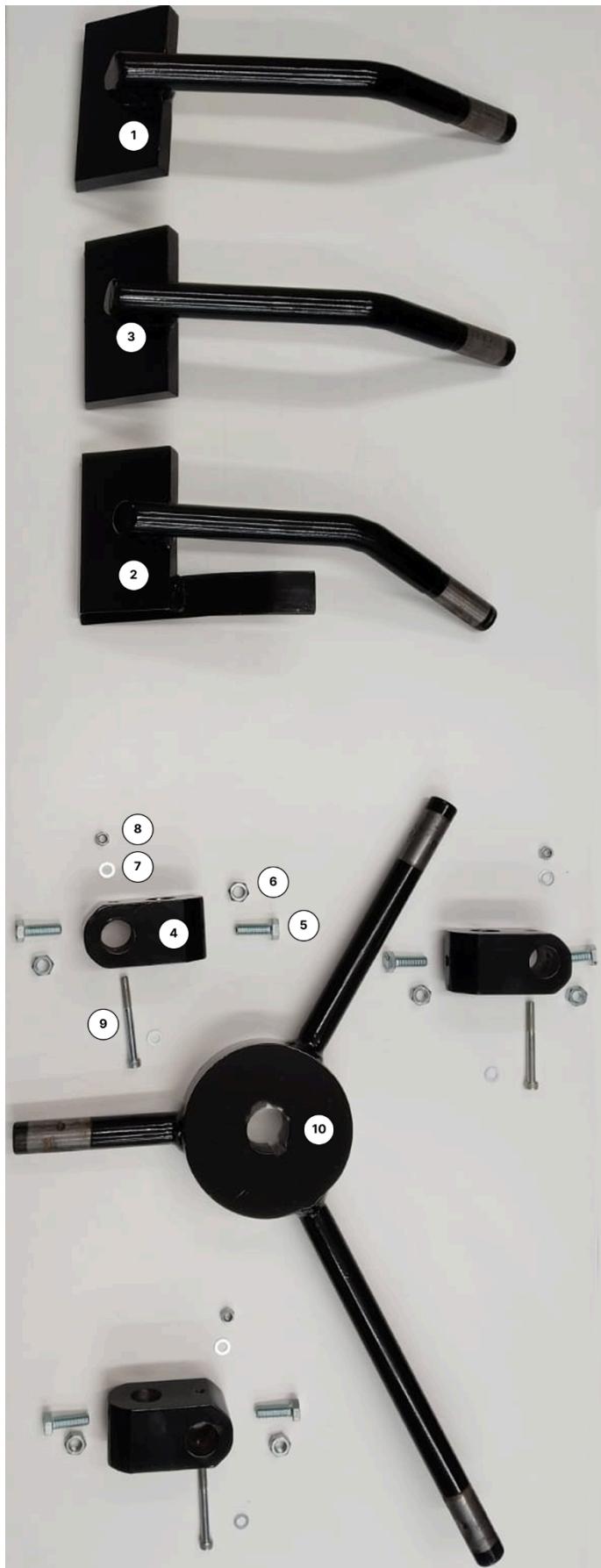
1	RM110	Rocky Mixer Frame	6	RSSM00-14	Rocky Mixer Sling Bracket
2	RM115	Skids for Rocky Mixer	7	RM4261	Male Plug
3	RM3141	Electric Panel for mixer Complete	8	RM3071	Electric Motor 3Kw
4	RM105	Mixer Grid	9	R307	Gearbox For Panmixer
5	RM420	Limit Switch Cover	10	RM316	Motor Pinion Gear

## 4.2. Drive Assembly



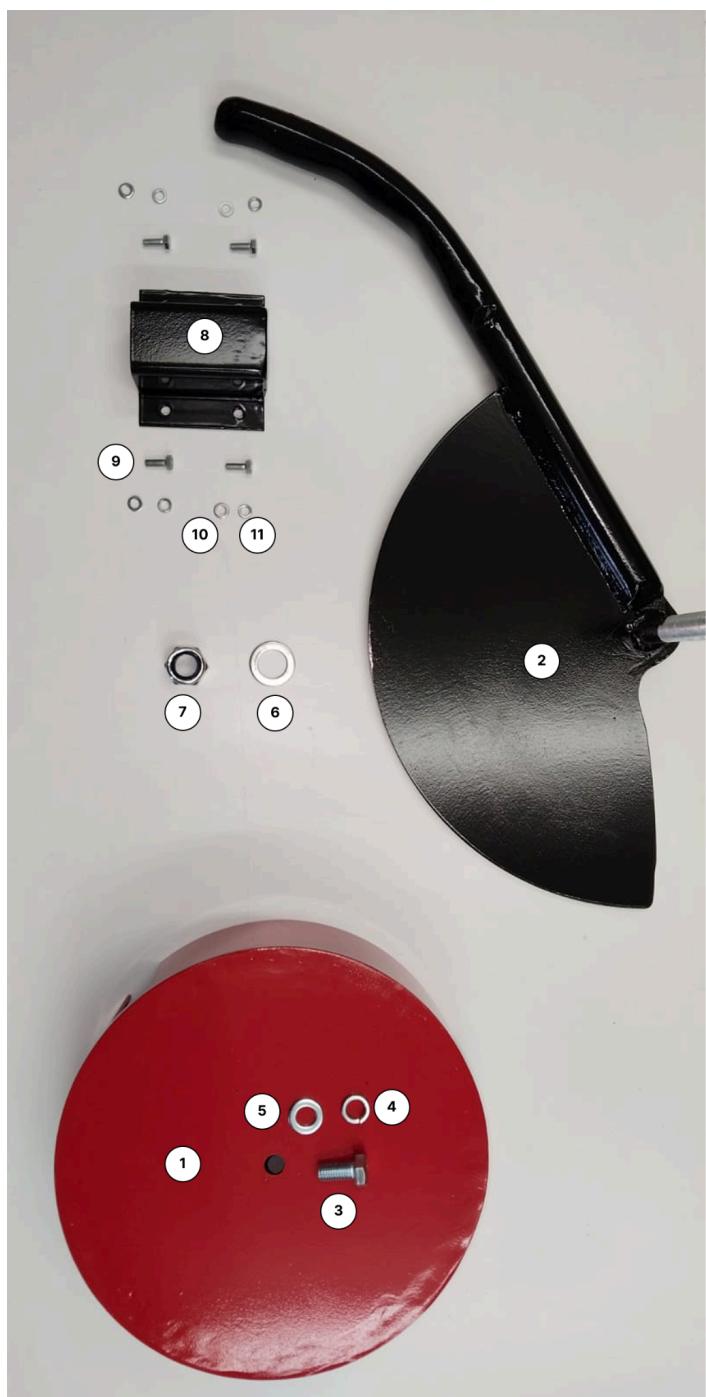
1	RM3071	Electric Motor 3Kw
2	R307	Gearbox For Panmixer
3	RM101	Bearing Flange
4	RM100	Bearing Housing
5	RM103	Shaft
6	RM099	Shaft Key 12x53
7	RM098	Shaft Key 12x93
8	CON0071	Cap Screw M12 x 50 (CSK)
9	RM305	Oil seal 50x72x10
10	CON0007	Hex Bolt M12 x 30mm
11	CON0090	Spring Washer M12
12	CON0036	Flat Washer M12
13	RM303	Bearing 6210
14	RM097	Circlip
15	RM095	Mixer Shaft Washer
16	CON0008	Hex Bolt M12 x 40mm
17	CON0036	Flat Washer M12
18	CON0111	Nylock Nut M12

### 4.3. Mixing Assembly



1	RM113	Paddle with arm Outer
2	RM111	Paddle with arm Inner
3	RM112	Paddle with arm Middle
4	RM109	Mixing Arm Connector
5	CON0095	Hex Bolt M12 x 45mm
6	CON0012	Nut M12mm
7	CON0055	Flat Washer M8
8	CON0112	Nylock Nut M8
9	CON0212	Cap Screw M8 x 80 (SKT)
10	RM106	Mixer Y Hub

#### 4.4. Additional

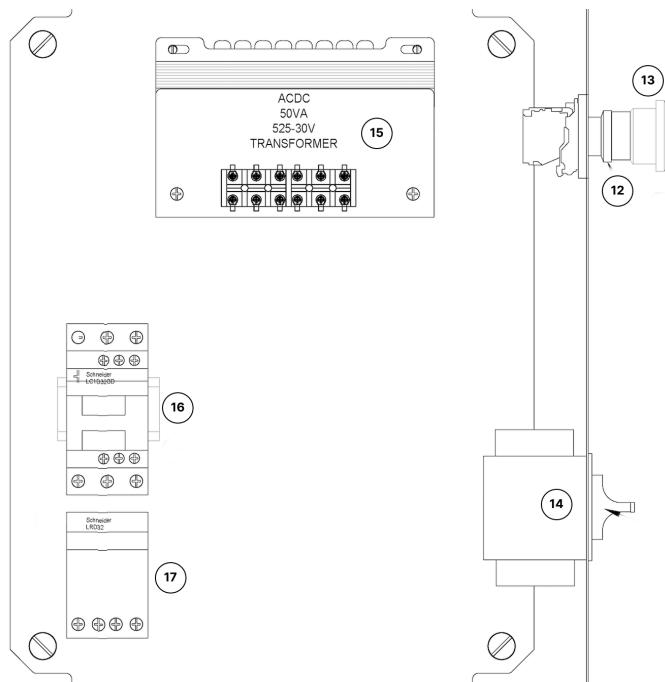


1	RM104	Hub Cover
2	RM114	Mixer Discharge Door
3	CON0117	Hex Bolt M12 x 25mm
4	CON0090	Spring Washer M12
5	CON0036	Flat Washer M12
6	CON0083	Flat Washer M20
7	CON0113	Nylock Nut M20
8	RM420	Limit Switch Cover
9	CON0137	Hex Bolt M6 x 16
10	CON0081	Flat Washer M6
11	CON0087	Spring Washer M6

## 4.5. Electric Assembly



1	RM4261	Male Plug	10	CON0067	Cap Screw M5 x 35
2	RM4261-Old	Male Plug Orange	11	CON0086	Spring Washer M5
3	RM309	Enclosure Orange	12	R408	Start button
4	R447	Panel Lock Door	13	R409	Emergency stop
5	R451	Panel Lock Padlock	14	RM311	Isolator 16Amp
6	CON0335	Rubber Shroud 16-20mm	15	RM310	Transformer 50VA 525V - 30V
7	TR100025	Trailing cable 2.5x4 screened	16	RM312	Contactor 3kw
8	R450	Limit Switch Cable	17	RM313	Overload 3kw
9	RM308	Limit Switch			



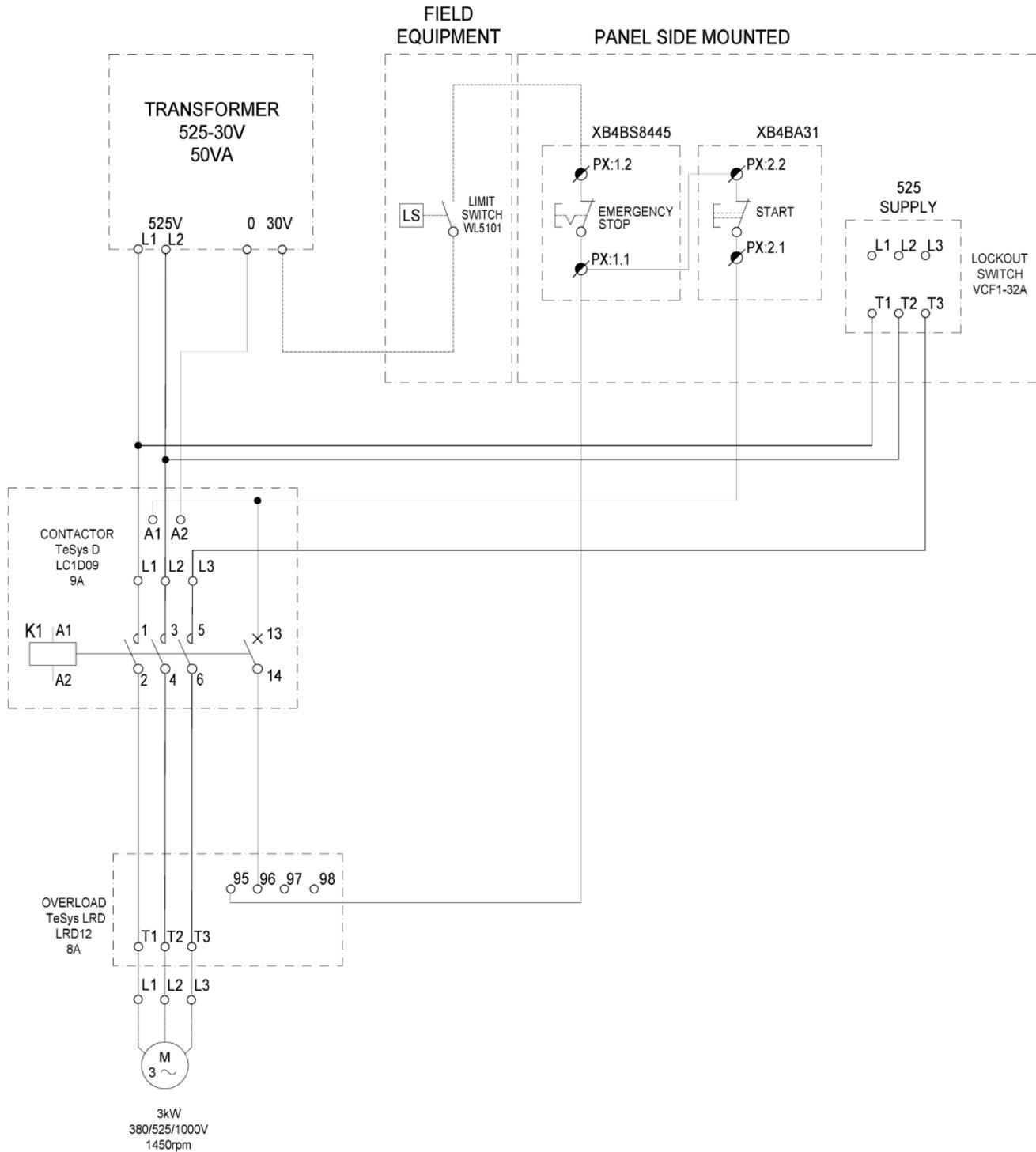
#### 4.6. Air Conversion



1	RM319	Dead Man 1" Ball Valve
2	RSEA029	Air Motor 7Hp
3	RSEA037	Air Motor Exhaust
4	RSEA038	Lubricator 25mm
5	RSEA043	Exhaust Manifold Air Motor
6	RN5050	Ball Valve 1"



## 5. Electric Diagram



## 6. Daily Check Lists

Pre-Use Check List				
Checked By:				
Date:				
PUMP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Comment	Action
Hopper Grid	<input type="checkbox"/>	<input type="checkbox"/>		
Top Hopper	<input type="checkbox"/>	<input type="checkbox"/>		
Bottom Hopper	<input type="checkbox"/>	<input type="checkbox"/>		
S-tube spacing	<input type="checkbox"/>	<input type="checkbox"/>		
Cleaning Door	<input type="checkbox"/>	<input type="checkbox"/>		
Concrete Cylinders	<input type="checkbox"/>	<input type="checkbox"/>		
Outlet	<input type="checkbox"/>	<input type="checkbox"/>		
Water Box	<input type="checkbox"/>	<input type="checkbox"/>		
Electrical Panel	<input type="checkbox"/>	<input type="checkbox"/>		
Oil Level	<input type="checkbox"/>	<input type="checkbox"/>		
Electrical Motor	<input type="checkbox"/>	<input type="checkbox"/>		
Electrical Cables	<input type="checkbox"/>	<input type="checkbox"/>		
Hydraulic Cylinders	<input type="checkbox"/>	<input type="checkbox"/>		
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>		
Lock Outs	<input type="checkbox"/>	<input type="checkbox"/>		
DOSING PUMP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Comment	Action
Guard	<input type="checkbox"/>	<input type="checkbox"/>		
Flow Control	<input type="checkbox"/>	<input type="checkbox"/>		
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>		
Do a pressure test	<input type="checkbox"/>	<input type="checkbox"/>		

Pre-Use Check List				
Checked By:				
Date:				
<b>MIXER</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>Comment</b>	<b>Action</b>
Grid for obstructions	<input type="checkbox"/>	<input type="checkbox"/>		
Inner Mixer, Paddles and Arms	<input type="checkbox"/>	<input type="checkbox"/>		
Discharges Door	<input type="checkbox"/>	<input type="checkbox"/>		
Gearbox	<input type="checkbox"/>	<input type="checkbox"/>		
Electrical Motor	<input type="checkbox"/>	<input type="checkbox"/>		
Guards	<input type="checkbox"/>	<input type="checkbox"/>		
Grease Nipples if they are greased	<input type="checkbox"/>	<input type="checkbox"/>		
Limit Switches	<input type="checkbox"/>	<input type="checkbox"/>		
Oil Leaks	<input type="checkbox"/>	<input type="checkbox"/>		
Lock-outs	<input type="checkbox"/>	<input type="checkbox"/>		
<b>NOZZLE SYSTEM:</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>Comment</b>	<b>Action</b>
The 75mm-50mm Reducer	<input type="checkbox"/>	<input type="checkbox"/>		
If the Clamps are available and in position	<input type="checkbox"/>	<input type="checkbox"/>		
If the Gaskets are available and in place	<input type="checkbox"/>	<input type="checkbox"/>		
The condition of the delivery hoses	<input type="checkbox"/>	<input type="checkbox"/>		
The condition of the spraying hoses	<input type="checkbox"/>	<input type="checkbox"/>		
The condition of the nozzle and tip	<input type="checkbox"/>	<input type="checkbox"/>		
The nozzle clamp if in position	<input type="checkbox"/>	<input type="checkbox"/>		
That the valves are operating and in good condition	<input type="checkbox"/>	<input type="checkbox"/>		
If the 25mm non return valve is in position	<input type="checkbox"/>	<input type="checkbox"/>		
The air hose condition and if the whip lashes are in place	<input type="checkbox"/>	<input type="checkbox"/>		
The condition of the accelerator hose	<input type="checkbox"/>	<input type="checkbox"/>		
The Injector	<input type="checkbox"/>	<input type="checkbox"/>		

## 7. Risk Assessment

### 7.1. Introduction

This Risk Assessment was conducted for and on behalf of RSS Mining (Pty) Ltd, and the assessment was carried out on the Rocky 2.5, Rocky 6 and Rocky Mixer equipment.

The ROCKY equipment in question is a skid-bound hydraulic concrete pump with an attached pan mixer that is manually operated and loaded with the spray-crete product of choice. This pump feeds an application hose and nozzle, which an operator physically holds.

### 7.2. Scope of Assessment

The scope of this assessment is to identify and evaluate all activities and equipment that could lead to injuries, production loss or property damage when operating the hydraulic concrete pump. The assessment shall be carried out based on the entire operation of the pump and its components.

### 7.3. Objective

The objective of this assessment is to identify, evaluate and risk-rank the hazards and associated risks when operating the hydraulic concrete pump, as well as to identify the required controls to eliminate or reduce the severity of the outcomes should an incident occur while operating the pump.

### 7.4. Methodology

In general, a risk assessment involves identifying the hazards present in some work activity or associated with the layout of the premises, the construction of the machinery or the failure of critical parts. This is followed by an evaluation of the extent of the risk involved, taking into account these precautions already being taken. In this guidance, the following definitions shall apply:

- A “**hazard**” is something that has the potential to cause harm. This includes substances, machines, and methods of work or other aspects of work organisation.
- A “**risk**” is the probability that the harm from a particular hazard will occur. The
- “**extent of the risk**” depends not only on the severity of the harm to a person, but also on the number of people who shall be harmed as well as the severity of a possible production fatality.
- “**Risk**”, therefore, reflects both the probabilities that the harm shall occur and its severity in terms of the degree of harm and the number of people and assets harmed.

## 7.5. Bottom-up Risk Assessment Techniques

In this case, the approach is one of breaking down the system or problems into small components and then seeing how they or others may fail, building up to a major event.

Examples of this type of technique include Hazard and Operability Studies (HAZOP), which may address both hardware and human safety. A type of Failure Modes and Effects Analysis and its extension, in terms of critical analysis, will be applied.

## 7.6. Risk Measurement

Once hazards have been identified, it is necessary to prioritise them so that action can be programmed and so that they can be dealt with in a way which will satisfy the “Reasonably Practicable” requirement in the Customer Health and Safety Act.

The aim of risk assessment is to enable management to make better decisions. Risk assessment in itself does not make decisions; it only provides the basis for decision-making.

The setting of priorities is an important way to change employee understanding and to establish hazard awareness. It also sets the direction for management.

## 7.7. Due Diligence

This assessment was conducted to adhere to the requirements of the following legislation:

- Section 10 of the Occupational Health and Safety Act 58 of 1993.
- Section 2-21 of the Customer Health and Safety Act 29 of 1996.

A “**manufacturer**” is regarded as any person or organisation which designs, manufactures, imports, sells or supplies any article for use at work. Legislation requires that the equipment used is safe and without risk to the safety and health of the user when properly used.

This company therefore embarked on this assessment process to risk assess the pump, identifying the hazards and risks associated with the use of the product. It also identifies the training required, under which conditions it may be utilised, how it should be utilised and when it should be replaced or repaired.

## 7.8. Consequence/Severity Assessment

Here, the consequence shall relate to the potential severity or degree of harm or injury or losses that could result from an event taking place.

## 7.9. Probability

This is a compound of two separate factors, the first being **exposure**, which gives an indication of how often and how long employees are exposed to the hazard.

The second factor includes the **probability** that a person or a number of persons will be harmed or that production may suffer, and property damage may occur.

The matrix on the next page was used to determine the criticality and risk ranking of the hazards and associated risks identified.

#### 7.10. Risk Matrix Used for Assessment 1

## Safety of Personnel

PROBABILITY		DEFINITELY	VERY POSSIBLE	POSSIBLE	REMOTELY POSSIBLE	NOT AT ALL POSSIBLE
SEVERITY		A	B	C	D	E
Multi-fatalities	1	1	2	4	7	11
Fatality/Paralysis	2	3	5	8	12	16
Reportable injury	3	6	9	13	17	20
Loss time injury	4	10	14	18	21	23
Minor/no loss injury	5	15	19	22	24	25

## RISK RANKING

Between 16 and 25 is a <b>LOW</b> risk	Probability "C" with Severity "3" = Risk Ranking of "13", which falls into the <b>MEDIUM</b> risk range
Between 7 and 15 is a <b>MEDIUM</b> risk	
Between 1 and 6 is a <b>HIGH</b> risk	

### 7.11. Risk Matrix Used for Assessment 2

## Safety of Equipment

PROBABILITY		DEFINITELY	VERY POSSIBLE	POSSIBLE	REMOTELY POSSIBLE	NOT AT ALL POSSIBLE
SEVERITY		A	B	C	D	E
Permanent Damage	1	1	2	4	7	11
Multiple Damages	2	3	5	8	12	16
Major Cost implication	3	6	9	13	17	20
Loss time/ production	4	10	14	18	21	23
Minor/no cost implic.	5	15	19	22	24	25

## RISK RANKING

Between 16 and 25 is a <b>LOW</b> risk	Probability “C” with Severity “3” = Risk Ranking of “13”, which falls into the <b>MEDIUM</b> risk range
Between 7 and 15 is a <b>MEDIUM</b> risk	
Between 1 and 6 is a <b>HIGH</b> risk	

## 7.12. Equipment/Part-Based Risk Assessment

EQUIPMENT/PART BASED RISK ASSESSMENT CONDUCTED ON THE ROCKY SHOTCRETE EQUIPMENT				RISK RANKING (no controls in place)			MANUFACTURER OR SUPPLIER'S STRATEGIES OR CONTROLS	RECOMMENDED CONTROLS TO BE IMPLEMENTED BY THE CUSTOMER	RISK RANKING (with Supplier and Customer controls in place)		
Component and Function	Functional Failure	Cause of Failure	Failure Effect or Consequence	S	P	PR			S	P	PR
Pan Mixer Cover Hinges <b>Function:</b> to secure the lid of the Pan Mixer	The hinge pins or bolts come loose.	1) Lack of maintenance or checking of the hinge fixtures 2) Bolts corrode and break	The Pan Mixer cover comes loose, and the entire cover falls on someone's feet or legs	3	C	13	Substantial hinges have been provided to prevent sudden hinge failure	Follow the supplier's procedures	4	C	18
Pan Mixer Cover <b>Function:</b> to prevent unauthorised hands in the Pan Mixer during operation	The cover drops down, once lifted for inspection or maintenance, onto the fingers or hand of the operator	1) Cover hinges become dislodged, or the hinge pin is removed 2) Lack of concentration by the operator	Serious injury to fingers, hands and/or arms	3	C	13	1. Being redesigned to make it easier to open and close 2. Lockout Switch	Lock-out procedure to be followed as per <b>Appendix 1</b>	4	D	21
Hopper Bin and Swing Tube <b>Function:</b> where the concrete product is pumped and dispatched from	S-Tube becomes lodged or jammed	Product has solidified, and the S-Tube has to be manually moved or cleared	1. Hand or arm gets jammed between the hopper side and the S-Tube 2. Loss of production and extended downtime	3	B	9	Continuous on-the-job training and formal training to prevent the product from solidifying	1. Training requested by the customer from the supplier is regular 2. Lock-out procedures apply as per <b>Appendix 1</b>	4	C	18
Pump Coupling	Misalignment of the motor and pump	Coupling breaks under normal wear and tear	Loss of fingers	4	B	14	Steel guard fitted to the dosing pump coupling	Supervisors are to ensure that the guard on the dosing pump is always fitted, especially after maintenance and repairs	5	D	24

EQUIPMENT/PART BASED RISK ASSESSMENT CONDUCTED ON THE ROCKY SHOTCRETE EQUIPMENT				RISK RANKING (no controls in place)			MANUFACTURER OR SUPPLIER'S STRATEGIES OR CONTROLS	RECOMMENDED CONTROLS TO BE IMPLEMENTED BY THE CUSTOMER	RISK RANKING (with Supplier and Customer controls in place)		
Component and Function	Functional Failure	Cause of Failure	Failure Effect or Consequence	S	P	PR			S	P	PR
Piping and Clamps	1) Over-pressurised pipe and fittings 2) Pipe bursts under pressure if the nozzle is blocked	Blocked Nozzle and pipe during pump operation	Injury to the operator holding the nozzle	4	B	14	1. Single-piece clamps fitted to existing product 2. Only OEM seals to be supplied 3. SAE-rated hosing to be utilised on the application hose	1. Only OEM clamps to be fitted 2. The supervisor is to ensure that a pre-start checklist includes the checking of the clamps' security is carried out before every application	3	D	17

### 7.13. Task-Based Risk Assessment

TASK-BASED RISK ASSESSMENT CONDUCTED ON THE INSTALLATION OF THE ROCKY SHOTCRETE EQUIPMENT				RISK RANKING (no controls in place)			EXISTING CONTROLS	RECOMMENDED CONTROLS TO BE IMPLEMENTED BY THE CUSTOMER	RISK RANKING (with Supplier and Customer controls in place)		
TASK	HAZARD	CAUSE OF FAILURE	UNDESIRED EVENT	S	P	PR			S	P	PR
Potential Electrical shock from the electrical system	Unauthorised entry to the electrical control panel	Electrical inspection or breakdown, or electrical fault	Electrocution of a person or persons	4	B	14	Lock-out procedure is in place on all customer sites	1. Lock-out procedure enforced 2. Only authorised electrical personnel are to work on the electrics	4	D	21
Working in and around the hopper during operation	Jammed S-Tube or other blockage	Solidification of the product	Crushed arm whilst clearing blockage around S-Tube	3	C	13	Formal training to review the training and operating procedure	1. Supervisor to carry out task observations and planned inspections regularly 2. Follow up to ensure	3	D	17

TASK-BASED RISK ASSESSMENT CONDUCTED ON THE INSTALLATION OF THE ROCKY SHOTCRETE EQUIPMENT				RISK RANKING (no controls in place)			EXISTING CONTROLS	RECOMMENDED CONTROLS TO BE IMPLEMENTED BY THE CUSTOMER	RISK RANKING (with Supplier and Customer controls in place)			
TASK	HAZARD	CAUSE OF FAILURE	UNDESIRED EVENT	S	P	PR			S	P	PR	
Hydraulic oil contamination during filling or topping up	The damage to hydraulic components, pumps, valves, etc	Ingress of dirt or silica into the hydraulic system by using dirty or contaminated filling devices	Costly replacement of hydraulic components and major down-line delays	B	2	5	1. The Supplier fits the machine with suitably rated in-line filters 2. Dedicated training on the filling of hydraulic/diesel compartments	1. Oil sampling to be carried out as per maintenance manuals 2. Refresher training to be carried out	D	4	21	
Opening the Pan Mixer cover	Dropping the Pan Mixer cover onto hands and arms during the filling action	Cover being heavy and hard to deep in the upright position	Fracturing of limbs or the head whilst bending down over the mixer	3	C	13	None	1. Warning signs of "Heavy Object" to be fitted to the machine 2. Gloves issued and worn by all persons handling the Pan Mixer	3	E	20	
Cleaning of the lubricator box	The pump is operated during the cleaning or repair operation	Maintenance of the lubricator box	Arm or hand injured or lost during this operation	2	B	5	Formal training on all underground or surface application units	Lock-out procedures to be followed	3	E	20	
Cleaning and loading of Pan Mixer	The turbine accidentally started during these operations or tasks	Routine maintenance or loading of Pan Mixer	Loss of limbs if the turbine is accidentally started during loading or maintenance cleaning.	2	B	5	1. Formal training to be carried out with all operational staff regularly 2. Lock-out procedures to be followed as per <b>Appendix 1</b>	Lock-out procedures to be followed as per <b>Appendix 1</b>	3	E	20	

TASK-BASED RISK ASSESSMENT CONDUCTED ON THE INSTALLATION OF THE ROCKY SHOTCRETE EQUIPMENT				RISK RANKING (no controls in place)			EXISTING CONTROLS	RECOMMENDED CONTROLS TO BE IMPLEMENTED BY THE CUSTOMER	RISK RANKING (with Supplier and Customer controls in place)		
TASK	HAZARD	CAUSE OF FAILURE	UNDESIRED EVENT	S	P	PR			S	P	PR
Low oil level in the lubrication box	1. Lack of lubrication to the product cylinders 2. Scoring or seizing of the product cylinders	Insufficient oil due to the oil level not being checked regularly	Costly damage to the cylinder bores, resulting in replacement	B	2	5	1. Operator and maintenance instructions highlighting this potential problem 2. Dedicated training about the regular checking of the oil level in the lube box	Correct supervision is carried out over operational staff	E	4	23
Un-manned discharge nozzle whilst the pump is started and the distributor valve is operated	The spray Nozzle shall spray the product freely in any direction, with possible injury to persons in the near vicinity	1. The Pump is accidentally started with no operator handling the spray nozzle 2. The distributor valve is accidentally operated	Injury to personnel in the near vicinity of the nozzle head	2	B	5	Formal training of operators is currently being carried out before the pump is fully commissioned	1. Secure nozzle to sidewall 2. Refer to the OME manual for operating procedures 3. PPE to be worn	3	C	13
Pan Mixer discharge door	The discharge door has a guillotine effect when closing on the floor of the Pan Mixer. This could seriously injure hands and fingers if caution is not applied during operation	The door is accidentally closed whilst a person is carrying out cleaning or maintenance tasks in the Pan	Loss of or injury to hands or fingers	3	B	9	Formal training is currently being carried out before the pump being fully commissioned		4	C	18
Cleaning and loading of Pan Mixer	The turbine accidentally started during these operations or tasks	Routine maintenance or loading of Pan Mixer	Loss of limbs if the turbine is accidentally started during loading or maintenance cleaning.	2	B	5	1. Formal training to be carried out with all operational staff regularly 2. Lock-out procedures to be followed as per <b>Appendix 1</b>	Lock-out procedures to be followed as per <b>Appendix 1</b>	3	E	20

## 7.14. Appendix 1: Lockout Procedures

### 7.14.1. Definitions

- It is a safety standard used to control hazardous energy.
- It is a formal set of good practices that emphasises avoiding shortcuts and effective communication, ensuring that no one gets injured.
- It is a procedure that keeps machinery from being started up unexpectedly
- It also keeps energy stored within equipment from being released
- It should be used when servicing or repairing equipment.

### 7.14.2. Objectives

The objective of this procedure is to identify and establish a means of control to prevent the accidental energising or start of machinery or equipment, or release of stored energy, which could harm employees.

- Establish a safe and controlled means of shutting down machinery and equipment.
- Prohibit unauthorised personnel from starting machinery or equipment while it is being serviced.
- Establish responsibility for implementing and controlling lockout/tagout procedures.
- Ensure that only approved hardware (locks, tags, fastening devices) provided by the employer will be utilised in the lockout/tagout procedure

### 7.14.3. Lock-Out Steps

Because machines and equipment contain hazardous energy, it is important to adhere to site-specific lockout tagout procedures.

#### Step 1: Notify affected employees.

Authorised personnel need to notify all employees who will be affected by the shutdown and lockout before it occurs. The authorised employee shall know the type and magnitude of energy that the machine or equipment utilises and shall understand the hazard thereof.

#### Step 2: Identify procedures and hazards

- Energy type (electrical, mechanical, hydraulic, chemical)
- Energy magnitude (volts)
- Energy hazards
- Methods to control the energy

#### Step 3: Shut down

This step requires operating machines or equipment to be shut down.

Orderly shutdowns are necessary to avoid additional hazards caused due to stopping abruptly.

Mixers - Shut down with the stop button on the electrical panel as well as depressing the emergency stop button.

Pumps - Shut down with the stop button on the electrical panel, as well as depressing the emergency stop button.

#### **Step 4: Isolate equipment from the energy source**

This can be achieved by switching off the main isolator and locking the isolator in the off position with a padlock.

#### **Step 5: Verify Isolation, Try-out and test**

Verify that the equipment is disconnected from the energy source by pushing the ON button. By performing this step, you're ensuring the equipment is now locked out.

#### **Step 6: Bring equipment back online**

Make sure that the equipment is fully reassembled and the electrical panel is closed and locked

Survey the work area, checking to see that all personnel are in a safe spot or removed from the area. Inform affected personnel that the equipment is ready for use

#### **Service or Maintenance Involving More than One Person**

When servicing and/or maintenance are performed by more than one person, each authorised employee shall place his/ her own lock or tag on the energy isolating source. This shall be done by utilising a multiple lock scissors clamp if the equipment is capable of being locked out. If the equipment cannot be locked out, then each authorised employee must place his/ her tag on the equipment.

#### **7.14.4. Emergency Procedures**

Emergency procedures for removing lockout/tagout should include the following

1. Verification by the employer that the authorised employee who applied the device is not at the facility by checking the clock-in system, parking lot, etc.
2. Making all reasonable efforts to contact the authorised employee to inform him/her that the lockout or tagout device has been removed.
3. Ensuring the machine or equipment components are operationally intact.

Each location must develop written emergency procedures to be utilised at that location.

#### **7.14.5. Training**

Each authorised employee who will be utilising the lockout/tagout procedure must be trained in the recognition of applicable hazardous energy sources, type and possible magnitude of energy available in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee (all employees other than authorised employees utilising the lockout/tagout procedure) must be instructed in the purpose and use of the lockout/tagout procedure, and the prohibition of attempts to restart or re-energise machines or equipment which are locked out or tagged out.

#### **7.14.6. Periodic Inspection**

The effectiveness of the entire program must be evaluated at least annually. The date of the inspection will be documented and maintained as part of this program until the next annual evaluation replaces it.

Where a tagout system is used, the inspection will be extended to include affected persons, because with tags, the role of the affected employee is important in avoiding accidental or inadvertent activation of the equipment or machinery being serviced.