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1. OBJECTIVE

The objective of this standard is to specify the requirements for the procurement, operation, control, maintenance, inspection and testing of Lifting Equipment, Lifting Tackle and Cranes.

2. SCOPE

This standard is mandatory and applies to all lifting equipment, lifting tackle, cranes and related tools used at Murray & Roberts Cementation Operations.
This standard is relevant to the following equipment

- Mobile and truck mounted cranes
- Mobilifts, Manitous and Hysters
- Overhead cranes
- Air powered hoists and winches
- Electrically powered hoists and winches
- Hand operated chain blocks
- Lever chain hoists
- Turfors
- All types of slings
- Crawls and crawl beams
- Shackles
- Beam clamps
- Plate clamps
- Spreader beams

3. RESPONSIBLE FOR REVIEW

It shall be the responsibility of the Engineering Manager and Engineering Executive to review this specification every 5 years from signature hereof or when legislation changes or relevant lessons have been learned.

4. RESPONSIBILITIES

The Responsible Person is responsible to:

a) Ensure that this standard is implemented and enforced on site.
b) Ensure that all relevant persons are conversant with the contents of this standard.
c) Ensure that the requirements of this standard are compiled to by all relevant persons.

d) Issue any instructions in writing deemed necessary by him/her to assist with the enforcement of this standard and to make allowance for site specific conditions.
e) Scrutinise and sign all inspection records monthly. Pre use inspection check lists need only be scrutinised by the responsible person on a random basis.
f) Ensure that persons whose responsibilities include the operation and maintenance of lifting equipment and cranes have been trained, been found competent and issued with certification in the use of such equipment.

5. ABBREVIATIONS

Term	Definition
FRCP	Fatal Risk Control Protocol
OEM	Original Equipment Manufacturer
MHSA	Mine Health & Safety Act
MRC	Murray and Roberts Cementation
SANS	South African National Standards
SWL	Safe Working Load – As determined by the Responsible Person
WLL	Working Load Limit – as determined by the designer / manufacturer.

6. DEFINITIONS

Term	Definition
Lifting Equipment	Means any equipment or machine or arrangement of equipment or machines intended or used for lifting, lowering, suspension or moving in suspension of any person or load.
Lifting Tackle	Means any attachment, including anchoring points, used to secure lifting equipment or a load to lifting equipment.
Lifting Operation	Means any operation using lifting equipment and lifting tackle that involves the lifting, lowering, suspension or moving in suspension of any person or load.
Responsible Person	Means an engineer as defined in the MHSA. In the event of there not being such a person on a site, the Responsible Person shall be a competent person appointed by the Manager.
Engineer	Means a person who is the holder of an appropriate mechanical or electrical engineer's certificate of competency appointed in terms of these regulations.

Competency Based Training	Means that a person has met all the requirements of the applicable unit standards and has been assessed and found competent by a registered assessor.
Competent Person	Means a person who: • Is qualified by virtue of his knowledge, training, skills and experience to organize work and its performance • Is familiar with the provisions of the Act and the regulations which apply to the work to be performed; and • Has been trained to recognize any potential or actual danger to health or safety in the performance of the work.

Note: From here on lifting equipment, lifting tackle and cranes shall be referred to as equipment unless otherwise stated.

7. STANDARD

7.1. Safety and Health

a) Risk assessments must be done prior to performing lifting operations.
b) No person should be allowed underneath a load suspended by equipment. If working under suspended loads is unavoidable controls shall be in place to eliminate or minimise the risks to personnel.
c) Ground conditions must be checked for suitability before commencing lifting operations using cranes.
d) Lifting operations using cranes equipped with outriggers may not be conducted before the outriggers have been deployed and locked except when “pick and carry” operations are being conducted.
e) An inspection of the area where lifting operations are to be performed using cranes must be conducted by the operator to assess the risks of working near:
   - Structures and or other obstacles
   - Other vehicles in the area
   - Persons working in the area.
   - Power lines in the area
   - Working over plant and equipment.
f) When picking up a load, bring the hook vertically in line with the centre of gravity of the load. Side loading is not permitted.
g) The overriding of safety systems and limit switches is expressly forbidden.
h) Loads shall not be left suspended whilst unattended.
i) Cranes without a physical locking system that disables and isolates its free-fall capability, shall not be used.
j) All crane cabins shall have signs to warn against interruption of the operator.
k) All hooks shall be fitted with a positive locking safety catch.

l) Risks associated with all lifting operations, crane maintenance, assembly activities and environmental conditions shall be assessed as part of the planning process.
m) Barricading, warning signs or other means of ensuring personnel protection shall be in place during lifting operations and for those cranes left unattended in wind vane mode.
n) A training programme for operators based on the relevant procedures and systems applicable to the operation of vehicle loading cranes shall be in place.
o) Lifting equipment and tackle must be kept away from intense heat or corrosive environments.
p) The WLL must be marked in a conspicuous place on all equipment.
q) Equipment shall not be used to lift any load in excess of its rated capacity.
r) Persons operating equipment must place themselves as far as practical out of the line of action of the applied loads.
s) Major Accident Prevention, check sheets MRC-EXE-ERM-MAP-CHK-008 shall be completed for all non-routine or new lifting operations.

7.2. Design of Lifting Equipment and Lifting Tackle

a) Only lifting equipment and lifting tackle that is designed to the SANS specifications may be used for lifting operations.
b) The following table serves as a guide. For all other Equipment refer to the SANS specification as per Appendix 2

	Description of Equipment	Specification
A.	**Hoist and Blocks**	
	Electrically Operated Chain Hoist	
	Pneumatically Operated Chain Hoist	SANS 1638: 1995, SANS 1639
	Manually Operated Chain Blocks	SANS 1594: 2003 SANS 1640
	Manually Operated Chain Lever Hoist	SANSA 1636: 2003
B.	**Slings and Chains**	
	Wire Rope Slings	SANS 7531: 1987 / ISO 7531: 1987
	Chain Slings assembled by methods other than welding – Grade T (8)	SANS 7593: 1986 / ISO 7593: 1986
	Flat Woven Webbing Slings	SANS 4878: 1981 / ISO 4878: 1981
	Textile Slings: Flat Woven for General purposes	SANSA 94-1: 2003 / EN 1492-1: 2000
	Textile Slings: Round slings for General purpose.	SANS 94-2: 2003 / EN 1492-2: 2000
	Short-link Steel Chain (Medium Tolerance)	SANS 189: 2001
	Short-link Steel Chain (Close Tolerance)	SANS 1592: 1998
	Long-link and Extra Long-link steel chains	SANS 251: 1993
C.	**Hooks, Shackles and Spreader bars**	
	Forged Steel Lifting Hooks for the use with Steel chains of strength Grade M (4), P (5), S (6), T (8) & V (10).	SANS 1595: 2003
	Forged shackles for general lifting purposes	SANS 2415: 1987 / ISO 2415: 1987
	Wire Rope Clips (Crosby Clamps)	SANS 813

7.3. Procurement of Equipment

a) Equipment may only be purchased or hired from approved suppliers. A list of approved suppliers is available from the procurement department.

b) A selection and acceptance process based on the functional specification shall be in place for all new to site and modified lifting equipment and lifting tackle.

c) All cranes shall comply with the requirements of the relevant approved design standard. The minimum acceptable design standard shall be the relevant ISO standard. In countries where the requirements of the relevant national standard exceed the requirements of the ISO standard, the national standard shall apply.

d) For cranes the following should be made available:
- Load cells
- Load moment indicators
- External rated capacity indicators
- Stability monitoring devices (to prevent overturning).

e) All overhead and portal cranes must comply to the following minimum requirements:
- Shall have power supply isolation points capable of being positively locked
- Shall be ergonomically acceptable to the site and have fall protection systems provided for their operation, maintenance and inspection.
- Shall have overload protection. Plus a load indicator for all cranes with a lifting capacity of > 5000kg
- Shall have overwind protection.
- Risk assessment and methodology statement for the erection of the crane
- Commissioning plan
- Commissioning report on completion of the commissioning of the crane
- Training, certification, medical and induction records of persons involved in the erection of the crane on site
- Electrical and mechanical drawings
- Recommended spares list.

f) All cranes shall comply with the requirements of the relevant approved design standard. The minimum acceptable design standard shall be the relevant ISO standard. In countries where the requirements of the relevant national standard exceed the requirements of the ISO standard, the national standard shall apply.

g) The purchase requisition must stipulate that the supplier will supply the following documentation:
- The particulars of the original equipment manufacturer (OEM)
- The certification details of the OEM
- The technical specifications of the crane

- The rope batch sample destructive test certificate where applicable
- The product health, safety and risk information where applicable. This information must comply with the requirements of section 21 of the MHSA
- Training, certification, medical and induction records of persons involved in the operation and maintenance of cranes
- Maintenance plans and schedules for cranes
- Records of previous 12 months inspections, maintenance and work done on cranes
- Register and inspection check lists in use for cranes
- Crane load cell calibration certificates
- Registration documents for hired vehicles (certified copies)
- The proof load test certificates where applicable at 110% of SWL over the complete lifting range.
- The load chain batch sample destructive test certificate
- The product health, safety and risk information. This information must comply with the requirements of section 21 of the MHSA
- The OEM operational and maintenance manual
- Quality assurance documentation – data pack

h) Only chain blocks and air hoists equipped with closed eyes at the suspension point may be procured for vertical shaft operations.

i) Only >1.5ton lever operated chain blocks must be ordered for wire meshing and lacing and also for tensioning mono-winch ropes.

j) All general purpose slings used shall be constructed from flexible steel wire rope of 1770 MPa material (6 x 36 construction). Chain slings are also permissible with the Engineer's approval.

Pipe slings and brackets must be designed and approved by a Professional Engineer. Only M20 grade 8.8 bolts are allowed on brackets.

All slings made shall be designed by the Engineer and test loaded to 300% of normal load prior to use. Reference to the rope's coil number must be entered in the sling for log book if available.
Slings may be constructed by mechanically crimped ends (swaged or pressed sleeve) and, only if required, be fitted with a thimble.
All slings must be marked with a washer attached so that they are easily identified.

k) Rope fitting shall mean shackles, eyebolts, turn-buckles, swivels, thimbles, Crosby clamps or any other similar type of device.
All rope fittings, besides thimbles, shall be of drop forged material.
The safe working load of any rope fitting must not be less than that stated on the hook of the lifting gear to which it is attached, or if used on a sling, shall be as strong as the test load of that sling.

7.4. Issuing, Storage and Transporting of Lifting Equipment and Lifting Tackle

The Responsible Person must draft and implement a site specific standard for the storage, transporting, control and issuing of lifting equipment and lifting tackle. The following should be used as a guide to drafting such policy:

a) Equipment should be cleaned after operation and before storage.
b) Hang equipment vertically in a vibration free environment.
c) Store in a dry and acid free environment.
d) Equipment has to be stored separately and hung so that its identification marks are clearly visible.
e) Ensure that equipment is transported in a safe manner to prevent damage.
f) Do not drag equipment, slings or chains on the ground.
g) Do not use equipment as load binders, to lash loads onto cars for transport unless supported by a safety sling and shackles. This practice subjects the equipment to shock loads that can do serious harm.
h) Equipment is not to be dumped / dropped.
i) Do not load other material on top of equipment.

7.5. Training, Authorisation and Appointments

a) No person may operate equipment unless that person has been authorised to do so in writing by the Responsible Person.
b) The Responsible Person may only authorise persons to operate equipment who have successfully undergone competency based training at a training facility approved by MRC. Contracting companies are responsible to ensure that their employees undergo competency based training.
c) The authorised operator must be issued with a license which must be kept on the operator's person at all times when operating equipment.
d) Subject to approval by the Responsible Person, a person may operate a crane as a learner operator under the immediate supervision and control of an authorised operator for the purpose of obtaining an operator's license
e) In the case of cranes owned by M&R Cementation only persons authorised by the Responsible Person may conduct maintenance or repair of the cranes on site.
f) In the case of hired cranes the Responsible Person must stipulate the necessary conditions under which repair work to cranes may be conducted on site.
g) Crane operators must be trained in slinging operations where applicable.

7.6. Inspection and Maintenance

a) All equipment must be inspected by the operator before use and the results of the inspection must be recorded on the equipment pre use check list. The responsible supervisor must scrutinise and countersign the pre use checklists weekly. Irrespective of the condition of chain

blocks and air hoists, they shall be sent to an approved supplier for inspection, repair and testing at 3 monthly intervals from date of installation. The extension of the replacement interval for un-used chain blocks and air hoists still in storage shall be approved by the Engineer.

b) Damaged or defective equipment may not be used. The Responsible Person must draw up and implement a site specific standard for the handling of damaged equipment that must include quarantined storage of such equipment.

c) A person appointed by the Responsible Person must:
- Inspect all the equipment monthly or more frequently as directed by the Responsible Person and record the results of the inspection in the appropriate logbook.
- Colour code the lifting equipment and lifting tackle as per Appendix 1 after completing the monthly inspections.
- Have a system in place to ensure that all monthly inspections are conducted on equipment.
- Perform minor maintenance on lifting equipment and lifting tackle. This maintenance is confined to cleaning, lubricating and tightening of external fasteners.

d) The Responsible Person must ensure that a maintenance plan is in place for cranes and that they are maintained in accordance with the OEM requirements.

e) Services may be done on site by a person appointed by the Responsible Person in accordance with the OEM recommendations and maintenance manual and subject to the approval of the Responsible Person.

f) Mobile Cranes must be inspected by the operator at the end of the shift before they are parked to ensure that there are no fuel or oils leaks that could pollute the parking area

g) The Responsible Person must draw up and implement a system which details at what intervals and which equipment must be withdrawn from service and sent for overhaul and testing on a rotational basis.

h) Chain slings must be inspected weekly by an appointed Rigger and the results of the inspection must be recorded in a book.
- The Rigger to keep and record the following information in this book:
  - Serial number of chain.
  - Size, type and reach.
  - Date when placed in service.
  - Date of each inspection
  - Date of any repairs.
  - Reasons and nature of repairs.
  - Date of return to service.
  - Date of discard.

- For proper inspection, the chain should be cleaned and checked for any marks, nicks, wear or any other defects.
- A link by link inspection must be made to detect the following:
  - Twisted or bent links.
  - Nicks or gouges.
  - Excessive wear at bearing points of links.
  - Stretched links.
  - Spread in throat opening of links.
  - Distorted or damaged master links, coupling links or attachments.

i) A stretched chain indicates overloading.

- This can be avoided by the use of the proper chain.
- Sometimes only a portion of a chain is stretched.
- When considered by overall length, the percentage of stretch may be well within the allowable limit, but individual links may be elongated dangerously.

Therefore link inspection is the best way of detecting stretched links.
The least sign of lack of free movement between links indicates collapse in the sides of the link due to stretch.
Such a condition is dangerous and the chain must be withdrawn from service.
If chain slings become worn to the extent indicated in the following Table, they must be withdrawn from service and discarded.

Table for Chain Wear Allowance:

SIZE	MAXIMUM ALLOWANCE FOR WEAR AT ANY POINT OF THE LINK
5, 6 mm	1, 0 mm
7, 1 mm	1, 4 mm
9, 5 mm	1, 9 mm
12, 7 mm	2, 5 mm
15, 9 mm	3, 0 mm
19, 0 mm	3, 8 mm
22, 2 mm	4, 4 mm
25, 4 mm	5, 0 mm
31, 8 mm	6, 0 mm

7.7. Services and Repairs Equipment by 3rd Party Companies

a) Lifting equipment and lifting tackle shall be restored to their original condition and performance to comply with the manufacturer specifications and to the following SANS specifications.

Description of Equipment	Specification
Reconditioned Pneumatically Operated Chain Hoist	SANS 1639: 2002
Reconditioned Manually Operated Chain Blocks	SANS 1640: 2003
Reconditioned Manually Operated Chain Lever Hoist	SANS 1637: 2002

b) Unserviceable components shall be replaced with genuine spares obtained from the OEM. The Responsible Person shall approve alternatives.
c) No welding is permitted on any components of equipment.
d) Proof load testing:
   - Proof load tests shall be conducted on all equipment that has been repaired and test certificates must be supplied when the equipment is returned to site.
   - The lifting equipment and lifting tackle and the lifting mechanisms of the cranes shall be subjected to a proof load 1.5 times the work load limit through a distance which will ensure that every part of the mechanism, hook and chain comes under load.
   - The gauge lengths across each hook opening shall be checked for deformation.

7.8. Documentation and Record Keeping

The Responsible Person must ensure that the following documents are kept:

a) The documentation supplied by the OEM as specified in section 6.4 of this standard.
b) Pre use checklists - retained for a minimum of 3 months.
c) A logbook of all equipment on site which must contain:
   - All the relevant details of all the equipment on site.
   - Records of all the inspections (other than pre use inspections) conducted on the equipment.
   - Records of all modifications, maintenance, repairs and tests done on the equipment.
   - Record of all repairs and tests done on the equipment and equipment failure or damage.
   - Record of all equipment lost or destroyed.

7.9. Control of Cranes

a) The Responsible Person must appoint a person who will be responsible to control the movement and parking of the cranes on the site.
b) The Responsible Person must draw up, implement and enforce a site specific standard for the control and parking of the cranes which must ensure that:
   - It cannot be used by an unauthorised person
   - It is parked when not in use at a designated place which is safe and secure

7.10. Identification

All equipment must have the following information conspicuously displayed and marked on the equipment:

a) A unique serial number for all equipment.
b) The WLL of the equipment.
c) Where the SWL varies with the conditions of use, a table showing the SWL with respect to every variable condition shall be posted up in a conspicuous place in the operator's cabin which is easily visible to the operator.
d) The manufactures or suppliers name.

7.11. General Conditions of Use of Equipment

a) Manufacturers' operating manuals and load charts shall be available in English to the operator.
b) If the operator is not conversant with the language of the operating manuals and load charts, provisions shall be made to ensure that the operator can understand the operating manuals and load charts.
c) Equipment may only be used to perform lifting operations if:
   - It is done from designated lifting points or be authorised by a competent person.
   - The condition and design of the lifting points on the loads to be lifted are suitable for the intended operation.
   - The SWL will not be exceeded.
   - There are no defects.
d) In the event of any malfunction of equipment the lifting operation must cease and the malfunction brought to the attention of the Responsible Person.
e) Equipment known or suspected to have been overloaded must be withdrawn from service and sent for re testing and certification before being returned to service.
f) The lifting of any load greater than 3 tons must be performed by a qualified rigger or a person authorised by the Responsible Person.
g) The competency levels shall be appropriate to the load to be lifted.
h) Controls shall be in place to prevent objects from equipment and loads falling from above.
i) Cranes shall not be used for lifting operations until crane operators have been given sufficient time to familiarize themselves with relevant aspects of the crane.
j) The risk under prevailing environmental conditions under which equipment are required to be operated shall be assessed by the person in charge of the lifting operation. Risks and appropriate actions shall be assessed in emergency situations.
k) Only suitably trained and experienced person/s shall be involved in the planning, supervision and implementation of the lifting operations.
l) The roles and responsibilities for lifting operations shall be clearly defined.

m) Crane operators and crew shall be able to communicate in a common language and to use the correct crane signals. Only the designated person may signal the crane operator.

n) A procedure shall be in place to address amongst others:
- The compilation of a lifting study for abnormal lifts.
- That the load and reach do not exceed the capacity of the lifting equipment.
- Lifting operations when the arcs of operation of two or more cranes can overlap.
- Multiple crane lifting operations.
- That “pick up and carry” operations using multiple mobile cranes is is prevented.
- The danger to lifting operations when adverse weather conditions are present or imminent e.g. electrical storm and high winds.
- The effective hand-over from one operator to another for cranes with complex boom, jib or tower configurations.
- People safety when equipment is operating in the vicinity of live conductors. Refer MRC-ENG-MEQ-STD-022: Standard for TMM’s moving or Working under Power Lines.
- When working near or over unprotected plant, equipment or services, including live processes or hydrocarbon processes
  - It must be ensured that a spotter must be placed in position to guide the operation.
  - A lifting plan must be developed and implemented for such operations.
- Availability and use of check-lists for pre-use inspections.

o) The lifting of personnel with cranes shall only be carried out using approved baskets. Cranes used for this purpose shall be approved as suitable for man riding operations. A recovery plan should be in place before personnel are lifted.

p) No person shall be raised, lowered, transported in suspension or supported by means of equipment unless written permission is obtained from the Responsible Person.

q) Never insert the points of hooks into load chain links.

r) Never use a load chain as a sling i.e. choke-hitch the hook onto its own load chain.

s) It is always safer to use a single chain block to lift a load rather than two smaller units as it is difficult to balance the loads.

t) Where two or more chain blocks are used to balance or move a load each must be capable of carrying the full load weight.

u) Chain Slings
- Take up slack, and then apply the load slowly
- Ordinary chain slings can be annealed (not recommended – replaced)
- Alloy chain slings which must not be annealed, because they are heat treated to provide high strength and long wear life.

- Chain slings must be oiled before prolonged storage and hung in a clean dry place.
- In vertical shafts a spare set of chains must be available for 6 monthly inspections.

7.12. Suspension of Lifting Equipment and Tackle Underground

a) Lifting tackle may not be suspended from anchors used to support the hanging wall or side wall.

b) Lifting eyebolts or size >M20 must only be installed in hanging that is permanently supported to Mine standards. The eyebolts holes must be drilled at least 300mm apart and 30° to the direction of pull.

c) A competent person shall inspect the soundness of the hanging wall and the condition and installation of the eyebolts.

d) In poor rock conditions, special suspension configurations are to be approved by the person designated by the Manager.

e) When lifting loads up to 3000kg, a cluster of 3 pig tail eyebolts with an equalising sling must be used to suspend the lifting tackle.

f) The length of the pig tail eye bolts must be as per the client standards.

g) When lifting loads in excess of 3000kg, the following will apply:

- An additional cluster of 3 pig tail eyebolts with an equalising sling must be installed for each additional 3 tons to be lifted. i.e.
- 3001kg -6000kg a total 6 pig tail eyebolts with equalizing slings must be installed.
- 6001kg-9000kg a total 9 pig tail eyebolts with equalizing slings must be installed

7.13. Factors of Safety

The factors of safety for all equipment must comply with the requirements of the MHSA.

a) Any rope or chain forming part of a lifting machine shall have a factor of safety of at least 10 for fibre robes and at least 6 for steel ropes, and 5 in the case of steel chains or 4 for tensile alloy steel chains. When the load is shared equally by two or more ropes or chains the factor of safety may be calculated on the sum of their breaking loads.

b) All slings will typically be colour coded and with safety factors as set out below:

DIAMETER (MM)	SAFE WORK LOAD (TON)	FACTOR OF SAFETY	ESTIMATED BREAKING FORCE (KN)	TYPICAL COLOUR CODE
10	1	6,0	58,4	RED
16	2, 5	6, 0	156,3	BLACK
20	4	6, 0	242,4	ORANGE
24	5, 5	6, 0	342,2	BLUE
32	10	6, 0	627, 2	WHITE

7.14. Hooks

a) Every hook used for the lifting of loads shall be suitably designed and proportioned, or shall be provided with a device, so that no accidental disconnection of the load can take place.

b) All hooks will have pop marks, in order to measure the amount of permanent deformation, during examinations

7.15. Attachment of Loads

No person shall attach and no person shall cause or permit the attachment of any sling or any rope or chain to any load, lifting machine or lifting tackle unless:

a) It is so attached that no accidental disconnection can take place; and

b) The stability of the load and of the lifting machine during lifting or transportation is ensured and maintained.

7.16. Ropes

a) Materials for the use of ropes on all lifting gear may be either of steel wire, manilla fibre, synthetic fibre (Nylon, Dacron or Polypropylene) or chain links.

b) The use of manilla an synthetic fibre ropes on equipment must approved by the Responsible Person

c) When ordering or fitting ropes to sheave blocks ensure that the diameter of the pulley is correct.
For manila and synthetic fibres - D / d > 5
For steel wire ropes D / d > 10
(Where D = diameter of pulley; d = diameter of rope)

7.17. Crawls and Crawl Beams

a) All crawl beams must be manufactured and erected in accordance with an approved drawing.

b) All crawl beams must be suitably marked stating its safe working load in tons.

c) All protruding sections of the crawl beams must be taken as a hazardous condition and be painted with black and yellow diagonals – 75mm wide.

d) All crawl beams must be fitted with stop blocks at each end to prevent the crawl from becoming detached.

7.18. Lifting Tackle

a) Applicable lifting tackle besides thimbles, shall be of drop-forged material.

b) The SWL of any lifting tackle must not be more than that stated on the hook of the lifting equipment or crane to which it is attached, or if used on a sling, shall be as strong as the test load of that sling.

7.19. Behaviour Observations

Behaviour observation must be performed at each operation. The frequency of such observations will be at the discretion of the site manager.
Behaviour observations shall include activities and tasks associated with the operation and maintenance of equipment. Any need for additional specific retraining shall incorporate the results of these observations.

7.20. Training

The contents of this document must be included in the employee induction syllabus at Bentley Park Training Academy and site based training centres

7.21. MAP

When first carrying out a new task or using new equipment or personnel new to the task, the MAP check sheet MRC-ERM-MAP-CHK-008 must be completed.

8. ANNEXURE/S

Annexure 1: Colour Coding of Slings

Month	Colour	Month	Colour
January	Red	July	Red
February	Blue	August	Blue
March	Orange	September	Orange
April	Yellow	October	Yellow
May	Green	November	Green
June	White	December	White

Annexure 2: SANS Specifications for Lifting Equipment

SANS NUMBER	EDITION	TITLE
SANS 7592:1983/ISO 7592:1983, IDT, Ed. 1	1	Calibrated round steel link lifting chains – Guidelines to proper use and maintenance
SANS 4301-3:2002/ISO 4301-3:1993, IDT, Ed. 1	1	Cranes - Classification - Part 3: Tower cranes
SANS 4301-2:2010/ISO 4301-2:2009, IDT, Ed. 2	2	Cranes - Classification Part 2: Mobile cranes
SANS 4301-5:1991/ISO 4301-5:1991, IDT, Ed. 1	1	Cranes - Classification Part 5: Overhead travelling and portal bridge cranes
SANS 61-1:2009/ISO 10245-1:2008, IDT, Ed. 2	2	Cranes - Limiting and indicating devices Part 1: General
SANS 4310:2002/ISO 4310:1981, IDT, Ed. 1	1	Cranes - Test code and procedures
SANS 4306-3:2007/ISO 4306-3:2003, IDT, Ed. 3	1	Cranes - Vocabulary Part 3: Tower cranes
SANS 4302:2002/ISO 4302:1981, IDT, Ed. 1	1	Cranes - Wind load assessment
SANS 4309:2005/ISO 4309:2004, IDT, Ed. 3	2	Cranes - Wire ropes - Care, maintenance, installation, examination and discard
SANS 4301-1:2002/ISO 4301-1:1986, IDT, Ed. 2	1	Cranes and lifting appliances - Classification Part 1: General
SANS 4308-1:2005/ISO 4308-1:2003, IDT, Ed. 3	2	Cranes and lifting appliances - Selection of wire ropes Part 1: General
SANS 4308-2:2007/ISO 4308-2:1988, IDT, Ed. 1	1	Cranes and lifting appliances - Selection of wire ropes Part 2: Mobile cranes - Coefficient of utilization
SANS 4304:2008/ISO 4304:1987, IDT, Ed. 1	1	Cranes other than mobile and floating cranes - General requirements for stability
SANS 4348:1983/ISO 4348:1983, IDT, Ed. 2	1	Flat-top chains and associated chain wheels for conveyors
SANS 2415:2005/ISO 2415:2004, IDT, Ed. 3	2	Forged shackles for general lifting purposes – Dee shackles and bow shackles
SANS 8539:2010/ISO 8539:2009, IDT, Ed. 2	2	Forged steel lifting components for use with Grade 8 chain
SANS 1595:2003	2	Forged steel lifting hooks for use with steel chains of strength grade M(4), P(5), S(6), T(8) and V(10)
SANS 71:2010	1.01	Inspection and testing of vehicle hoists

SANS 500:2009	1	Inspection, examination and testing of manually operated chain blocks and chain lever hoists in use
SANS 4347:2006/ISO 4347:2004, IDT, Ed. 4	1	Leaf-chains, clevises and sheaves - Dimensions, measuring forces and tensile strengths
SANS 1594:2007	2.01	Manually operated chain blocks
SANS 1636:2007	2.01	Manually operated chain lever hoists
SANS 4305:2007/ISO 4305:1991, IDT, Ed. 2	1	Mobile cranes - Determination of stability
SANS 3056:1986/ISO 3056:1986, IDT, Ed. 2	1	Non-calibrated round steel link lifting chain and chain slings - Use and maintenance
SANS 50818-4:2007/EN 818-4:1996, IDT, Ed. 1	1	Short link chain for lifting purposes - Safety Part 4: Chain slings - Grade 8
SANS 50818-6:2000/EN 818-6:2000, IDT, Ed. 1	1	Short link chain for lifting purposes - Safety Part 6: Chain slings - specification for information for use and maintenance to be provided by the manufacturer
SANS 1592:2005	1.02	Short-link steel chain (close-tolerance) for lifting appliances
SANS 189:2010	4.02	Short-link steel chain (medium-tolerance)
SANS 1819:2006	1.02	Snatch blocks
SANS 2408:2005/ISO 2408:2004, IDT, Ed. 3	2	Steel wire ropes for general purposes – Minimum requirements
SANS 4344:2005/ISO 4344:2004, IDT, Ed. 2	2	Steel wire ropes for lifts - Minimum requirements
SANS 10295-1:2003	1	Suspended access equipment Part 1: Permanently suspended access equipment
SANS 10295-2:2010	1.01	Suspended access equipment Part 2: Temporary suspended platforms (TSPs)
SANS 94-2:2003/EN 1492-2:2000, IDT, Ed. 1	1	Textile slings - Safety Part 2: Round slings made of man-made fibres for general purpose use
SANS 10388:2008	1	The inspection, examination and testing of lift trucks
SANS 19:2007	1.01	The inspection, testing and examination of mobile cranes
SANS 10375:2006	1	The inspection, testing and examination of overhead cranes
SANS 522:2007	1	The inspection, testing and examination of tower cranes
SANS 94-1:2003/EN 1492-2:2000, IDT, Ed	1	Textile slings - Safety Part 1: Flat woven webbing slings made of man-made fibres for general purpose use

EN 818-1:1996+A1:2008		Short link chain for lifting purposes -Safety Part 1: General conditions of acceptance
EN 818-2:1996+A1:2008		Short link chain for lifting purposes -Safety Part 2: Medium tolerance chain for chain slings - Grade 8
EN 818-3:1996+A1:2008		Short link chain for lifting purposes -Safety Part 3: Medium tolerance chain for chain slings - Grade 4
EN 818-5:1996+A1:2008		Short link chain for lifting purposes -Safety Part 5: Chain slings - Grade 4
EN 818-7:1996+A1:2008		Short link chain for lifting purposes -Safety Part 7: Fine tolerance hoist chain, Grade T (Types T, DAT and DT)

9. REVISION HISTORY

Revision	Reason for Change	Author	Date
0	Document drafted; includes reference to MAP checklists.	T. Wakefield	September 2017