



# **THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

**CONTRACT NR: R.573**

**UPGRADING OF NATIONAL ROAD R573  
SECTION 2: WORK PACKAGE E FROM KM  
(10.700) TO KM (24.700)**

**PROJECT OCCUPATIONAL HEALTH AND  
SAFETY SPECIFICATION**

**OCTOBER 2022**

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## OCTOBER 2022

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#### Control and Revision

The appointed Construction Health and Safety Agent is responsible for the preparation and revision of this specification.

A controlled electronic "read only" version will be provided to all potential suppliers and contractors at the tender stage of their engagement with The South African National Roads Agency Ltd. Suppliers, service providers and contractors must make provision in their planning and costing to meet full compliance to this specification. Any electronic copies or hardcopy printouts made from this controlled version are considered to be "Uncontrolled".

The Appointed Construction Health and Safety Agent will issue revisions to the specification as necessary. Any changes to an individual section will cause the entire specification to be revised and re-issued.

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## 1. Purpose

This specification identifies the working behaviours and safe work practices that are expected of all employees, principal contractors (including subcontractors), suppliers, service providers and visitors engaged in activities associated with for the upgrading of National Road R573 section 2: work package E from km (13.000) to km (24.700) Project. This document provides the standards against which compliance will be measured. It has been derived from leading health and safety practices as well as legislative requirements.

## 2. Scope

The occupational health and safety requirements specified in this document apply to all construction activities forming part of the upgrading of National Road R573 section 2: work package E from km (13.000) to km (24.700) Project. All contractors, suppliers and service providers are required to read, understand and take note of these requirements and must ensure that these requirements have been taken into consideration and completely integrated with the project specific occupational health and safety management plan and other project areas such as scheduling, resourcing and costing.

**Note:** *This summary document was compiled to cover all possible construction activities. Each contractor is expected to conduct a project specific risk assessment based on its scope of work in order to determine the specific requirements that would be applicable to their work and which must be addressed in their health and safety management plan.*

The requirements specified in this document are applicable to the principal contractor as well as any contractors that may be appointed by the principal contractor. It is the principal contractor's responsibility to ensure that his or her contractors comply fully with all legal requirements as well as the requirements of this specification.

**Note:** *This document will be updated from time to time to include: Changes in legislation, client requirements, project or site-specific hazards identified during risk assessments or through analysing incident trends, and lessons learnt from incidents.*

## 3. Definitions

**All Injuries:** The sum of Lost Time Injuries, Medical Treatment Cases and Fatalities.

**Barricade:** A temporary structure that is erected as a physical barrier to prevent personnel from coming into contact with an identified hazard.

**Battering:** Sloping the sides of an excavation to a predetermined angle (usually less than the natural angle of repose) to ensure stability.

**Benching:** The creation of a series of steps on the sides of an excavation to prevent a collapse.

**Bund:** An impervious containment structure around and beneath a hydrocarbon / chemical storage facility, isolating the facility from ground and surface water reticulation. Bunds are designed to contain spillages and leaks, and to facilitate clean-up operations, thus preventing pollution of the surrounding environment.

**Client:** Means any person or registered company in South Africa for whom construction work is being performed. For this project, the client will be represented by the project manager from SANRAL.

**Critical Lift:** A lifting operation which crane operator cannot clearly see all movement of crane and lifting load and he will be depending on rigging supervisor / signalman is called as critical lift.

**Competent person:** A person who:

- (a) has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and
- (b) is familiar with the Act and with the applicable regulations made under the Act.

**Construction work:** Any work in connection with:

- (a) the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
- (b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

**Contractor:** An employer who performs construction work.

**Designer:** Means –

- a. A competent person who –
  - i. Prepares a design;
  - ii. Checks and approves a design;
  - iii. arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
  - iv. designs temporary work, including its components;
- b. an architect or engineer contributing to, or having overall responsibility for a design
- c. a building services engineer designing details for fixed plant;
- d. a surveyor specifying articles or drawing up specifications;
- e. a contractor carrying out design work as part of a design and building project; or
- f. an interior designer, shop-fitter or landscape architect;

**Electrical Equipment:** Generally, electrical equipment can be disconnected from its power source with a cord and plug at a receptacle or at a disconnect box. Equipment hardwired, such as but not limited to a breaker panel, is considered part of the facility electrical system and requires shutdown by qualified personnel.

**Employee:** Any person who is employed or works for an employer.

**Employer:** Any person who employs or provides work for any person.

**Excavation:** the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

**First aid Injury (FAI):** First aid describes a particular level of treatment for a work-related injury. First aid means the following treatments, regardless of the professional status of the person providing the treatment:

- Visit(s) to a health-care provider for the sole purpose of observation.

- Diagnostic procedures including the use of prescription medications solely for the diagnostic purposes
- Use of non-prescription medications including antiseptics at non-prescription strengths
- Simple administration of oxygen
- Administration of tetanus/diphtheria shot(s) or booster(s)
- Cleaning, flushing or soaking wounds on skin surface
- Use of wound coverings such as bandages, gauze pads, etc.
- Use of hot and cold therapy (e.g. compresses, soaking, whirlpools, non-prescription creams/lotions for local relief except for musculoskeletal disorders)
- Use of any totally non-rigid, non-immobilizing means of support (e.g. elastic bandages)
- Using temporary immobilization devices while transporting an accident victim (e.g. splints, slings, neck collars, backboards, etc.)
- Drilling of a nail to relieve pressure or draining fluid from a blister.
- Use of eye patches
- Removal of foreign bodies embedded in the eye only if irrigation or removal with cotton swab is required.
- Removal of splinters or foreign material from areas other than the eyes by irrigation, tweezers, cotton swabs or other simple means
- Using finger guards
- Using massages
- Drinking fluids for relief of heat stress.

**Frequency rates:** Measures of performance for each of the metrics of injury (i.e. First aid injury, Medical treatment cases, Lost time injuries and All Injuries) per 200,000 hours worked. For example, the lost time injury frequency rate (LTIFR) is calculated by multiplying the number of LTI's by 200,000 and dividing such by the actual hours worked.

**Grit blasting:** Grit includes chilled iron globules, powdered quartz, emery or other hard granular material used in blast/cleaning. Blast cleaning means the blowing of grit using a system energized by compressed air, water or steam with the purpose of removing scale, rust or old coatings from a surface prior to painting or coating.

#### **Hazardous chemical agents**

Any agent or material (solid, liquid or gas) that can harm a person's health, start a fire, explode or cause environmental damage.

**High Potential Incident (HIPO):** an actual HSEC event or a near miss with the realistic potential to result in:

- A fatality or permanent disability
- A class 4 or 5 environment, social, labour or security event

**Incident:** An event (or a continuous / repetitive series of events) that results or has the potential to result in a negative impact on people (employees, contractors and visitors), the environment, operational integrity, assets, community, process, product, legal liability and / or reputation.

**Injury:** Injuries are harm to a person or indirectly as the results of events in the work environment. Injury includes worsening of a pre-existing medical condition or previous injury.

**Injury on Duty: - Compensation for Occupational Injuries:** Where an employee has suffered an injury on duty and requires medical treatment then the "Employers report of Accident" form

must be completed and "Part B" must accompany the injured to the medical facility where they will be treated.

**Isolation and lockout procedure:** A system or equipment-specific procedure that describes the method, and sequence to be followed, for rendering equipment and systems safe to work on.

**Isolation bar:** A device used at a lockout station to which anyone is able to attach a personal lock making it impossible for an isolation officer to remove the key to the equipment locks, thus preventing the de-isolation of a system, plant or equipment while it is still being worked on. A discipline lock must always be the first lock attached to an Isolation Bar and last to be removed.

**Isolation officer:** A person who has been authorised (in writing) by the nominated project management representative to perform isolation / lockout procedures. A person may only be appointed as an isolation officer if he or she has undergone training and has been assessed and found competent in the isolation and lockout of systems, plant and equipment within the scope of his or her designation.

**Lifting Machine:** a power-driven machine that is designed and constructed for the purpose of raising or lowering a load or moving it in suspension, but does not include an elevator, escalator or hand-powered lifting device;

**Lifting Equipment:** Generic term "Lifting equipment" shall mean any appliance, structure, item or thing used to rise, lower, suspend or transport a load.

**Lifting Tackle:** means chain slings, wire rope slings, woven webbing slings, master links, hooks, shackles and swivels, eye bolts, lifting or spreader beams, tongs, ladles, coil lifters, plate lifting clamps and drum lifting clamps used to attach a load to a lifting machine;

**Light vehicle:** A vehicle that: Can be registered for use on a public road; has four or more wheels and seats a maximum of 12 adults (including the driver); requires the driver to hold only a civil car driving licence; and does not exceed 4.5 tones gross. Examples of light vehicles include cars, four- wheel drive vehicles, sports utility vehicles (SUV's) pick-ups, minibuses, and light trucks.

**Load cell:** An electronic device (a transducer) that is used to convert a force into an electrical signal. A load cell is used to measure the mass of a load being lifted by a crane / hoist and provide an output signal that can be displayed on a digital indicator.

**Load limiting device:** A device that assesses the load being lifted by a crane / hoist and causes the driving effort to be automatically arrested when the rated capacity of the crane / hoist is exceeded.

**Lost time injury (LTI):** A Lost Time Injury is any occupational injury or disease that results in the worker's inability to perform routine work functions on the next calendar day after the injury. Inability to perform routine work functions includes cases where:

- a. The employee was assigned to another job on a temporary basis; or
- b. The employee worked at a permanent job less than full time; or
- c. The employee worked at his or her permanently assigned job but, due to the job-related injury, was physically or mentally unable to perform all the duties normally connected with it. Normal duties are considered as those that the employee would be expected to perform at least once per week.



**Major Repairs:** Is a measure whereby the original state of an appliance will be restored by rebuilding or exchanging parts or units. If essential parts with safety functions are to be rebuilt or exchanged, this is considered to be a "Major Repair."

**Mandatory:** Includes designers, suppliers, service providers, principal contractors and any other person or organisation engaged to do work, but without derogating from his or her status in his or her own right as an employer or user.

**Medical treatment case (MTC):** Any injury which requires treatment by medically trained persons (Doctor, Nurse or Paramedic).

**Mobile equipment:** A vehicle (wheeled or tracked) that generally requires: The driver to hold a specific state or civil licence; or the operator to hold a nationally recognised certificate of competency. Examples of mobile equipment include, but are not limited to, dump trucks, water trucks, tractors, graders, bulldozers, loaders, backhoes, excavators, bobcats, forklifts, telehandlers, mobile cranes, drill rigs, buses, and trucks larger than light vehicles.

**Multiple Lift:** If more than one lifting appliance is used to lift a material, the lift is called a Multiple Lift.

**Near miss:** An incident that has occurred that did not result in any injuries, illnesses, environmental or property damage but had the potential to cause an injury, illness, environmental or property damage. Also referred to as a near hit.

**Nominated project management representative:** A SANRAL employee who has been assigned specific responsibilities with regard to this occupational health and safety specification.

**Occupational Disease:** The disease which results from exposure to any physical, chemical, biological or radiant material in the workplace that affects the function of the body organs and health of employees.

**Personal lock:** A single lock with one unique key, controlled by an employee. Used for personal protection as part of an isolation and lockout system.

**Principal contractor (PC):** A person or organisation providing construction work to the client at a project site in accordance with an agreed scope of work/services, specifications, terms and conditions.

**Recordable cases:** The sum of fatalities, lost time injuries (LTIs), medical treatment cases (MTCs) and any injury resulting in loss of consciousness.

**Restricted Work Cases (RWC):** Any injury as direct or indirect result of work-related activity leading to a person being unable to perform any part of their normal job duties, not including the day or shift when the incident occurred.

**Service provider:** A person or organisation providing services to the Client or any other party associated with the project which does not qualify as construction work. This will typically include servicing and supply of chemical toilets, cleaning of offices, delivery of stationary to site, waste removal and any other deliveries to site.

**Shoring:** A system of sloping or temporary support used to prevent the collapse of the sides of an excavation.

**Substantial / Major Alteration:** It is a measure whereby either the original equipment state will not be restored or the exchange of existing parts with those of alternative size or style. The use of interchangeable parts or components is not an alteration if this has been considered within the original design and specification.

The following shall be considered “Substantial / Major Alterations” or any other measure not specifically detailed, that affects the safe use of the appliance:

- a) Increase of the safe working load or an increase in performance
- b) Increase of the rated speeds
- c) Increase of the reach (outreach, lifting height, etc.)
- d) Alteration to safety devices
- e) Alteration to load carrying parts
- f) Alteration to driving mechanisms
- g) Alteration to controls
- h) Alteration to base anchoring arrangements

**Supplier:** A person or organisation supplying and delivering goods to the Client or any other party associated with the project

**Unsafe Act:** It is an action of a person which deviates from the required safe practice and creates a hazard to themselves or others. Unsafe acts are about people, what they do or what they failed to do.

**Unsafe Conditions:** A situation that deviates from an accepted safe condition and could cause injury, interruption of work, damage, spillage or contamination. Unsafe conditions are about equipment and physical situations.

## 4. Acronyms

**ALARP** - as low as reasonably practicable

**CR** - Construction Regulations

**EA** - Environmental Authorisations

**EIA** - Environmental Impact Assessment

**EMP** - Environmental Management Plan

**LOTO** - Lock out and Tag out

**SDS** - Safety Data Sheet

**PTO** - Planned Task Observation

**PTW** - Permit to Work

**RPMR** - Responsible Project Management Representative

**SHE** - Safety Health Environment

**SHEQ** - Safety Health Environment Quality

## 5. Health and Safety Tender Deliverables

The below requirements must be submitted with tender submission or with the kick-off meeting.

**Table 1 - Tender Deliverables**

#	Requirement
1	<p>The contractor will develop and submit the project specific construction health and safety plan.</p> <p>The attachment must be marked <b>"HSE Management Plan – Attachment A "</b>.</p>
2	<p>The contractor will develop and submit the project specific baseline risk assessment covering the contractor's scope as tender deliverables.</p> <p>The attachment must be marked <b>"HSE Management Plan – Attachment B – Risk Assessments"</b>. The assessment must as a minimum comply with the requirements set out in this document for conducting risk assessments.</p> <p>The Risk Assessment will be checked for comprehensiveness by the Tender adjudicators during the Tender process.</p>
3	<p>The contractor will make provision in their tender for the cost of Health and Safety. The contractor must show this in an acceptable format , for example as part of the BOQ. It must be comprehensive and not just include the cost of PPE and Safety Resources but include items such as training, shoring, dewatering or drainage of any excavations, medical surveillance, hygiene assessments and surveillance, etc.</p> <p>The attachment must be marked <b>"HSE Management Plan – Attachment C – Safety Budget"</b>. The budget must be managed and tracked as part of the normal QS process.</p>
4	<p>An organogram with potential candidates to be appointed to key positions, with proof of competence and registration with statutory institutions, must be submitted with the Tender documentation and marked <b>"HSE Management Plan – Attachment D - Organisational Structure and Proof of Competence"</b>.</p>
5	<p>The contractor will provide its current CIDB grading certificate to proof corporate competence. <b>"HSE Management Plan – Attachment E – CIDB Grading"</b>.</p>
6	<p>An organogram indicating all potential sub-contractors of the main contractor must be submitted with the Tender documentation and marked <b>'HSE management Plan – Attachment F – Sub-Contractors'</b>. The organogram must indicate:</p> <ul style="list-style-type: none"> <li>• The expected number of employees and level of the sub-contractor;</li> <li>• Duration that the sub-contractor will be on site;</li> <li>• The scope of work; and</li> <li>• Any sub-contractors to the sub-contractor</li> </ul>

## 6. Health and Safety Management Plan

Every contractor must prepare, implement and maintain a project-specific Health and Safety Management Plan. The plan must be based on the requirements set out in this specification as well as all applicable legislation. It must cover all activities that will take place on site, from mobilisation and set-up through to rehabilitation and site demobilisation.

The plan must demonstrate the contractor's commitment to health and safety and must, as a minimum, include the following:

- A copy of the contractor's Health and Safety Policy
- Arrangements concerning the identification of applicable Legal and Other Requirements, measures to ensure compliance with these requirements, and measures to ensure that this information is accessible to relevant personnel
- Procedures concerning Hazard Identification and Risk Management, including Risk Assessments and Pre-Task Hazard Assessments (a systematic method of managing hazards according to risk priority must be employed)
- Details concerning Organisational Resources, Accountabilities and Responsibilities – this includes the assignment of safety responsibilities to applicable roles within the organisation; the identification of the Safety Officer(s) as well as site agents, managers and supervisors; and the identification of personnel responsible for carrying out safety inspections (additional resources need not be provided, as this task may be shared with other duties and may be rotated within a team)
- Details concerning Training, Competency and Awareness – this includes procedures regarding the selection, placement and training of personnel, including induction training, ongoing training in basic safe work procedures, and occupational health and safety training for newly hired or promoted supervisors; initiatives / programmes for promoting safety awareness should be described
- Supplier and Contractor Management procedures – a process must be in place for the assessment of sub-contractors and suppliers with regard to occupational health and safety requirements / performance
- Documentation and Document Control – a system of health and safety related plans, procedures, work instructions, registers, forms and checklists must be developed and maintained, and procedures must be in place for the control of these documents
- Communication and Consultation arrangements concerning occupational health and safety, including project health and safety meetings, Daily Safe Task Instructions, Toolbox Talks, notice boards, and Safety Observations and Coaching; details concerning contractor senior management involvement with their staff in consultative processes and daily management safety walkabouts should be included
- Operational Control – rules and regulations pertaining to health and safety (particularly safety critical issues such as traffic management, isolation and lockout, working at height, confined spaces, hazardous agents, etc.); procedures that are in place for recurring work activities; and rules pertaining to the provision of Personal Protective Equipment (PPE) including a PPE matrix for the project (the contractor must provide PPE free of charge to all of his employees)
- Management of Change – a process must be in place to ensure that health and safety risks are considered before changes are implemented
- Business Resilience and Recovery procedures, including evacuation and emergency response plans
- Measuring and Monitoring plans, including monitoring employee exposures to noise, dust, etc. to ensure the provision of a healthy and safe work environment (Note: If occupational hygiene monitoring is required, an AIA (Approved Inspection Authority) must be used.)

- Non-conformance, Incident and Action Management procedures which describe the protocols to be followed with regard to accident / incident reporting, recording, investigation, analysis and follow-up on corrective and preventative actions
- Procedures relating to Data and Records Management – measures must be in place to ensure that all health and safety related records and data are maintained, accurate, current and secure
- Performance Assessment and Auditing procedures concerning documented daily site health and safety inspections; inspections (by a competent person) of plant, tools and equipment prior to establishment / use on site and at least monthly thereafter; and monthly internal audits to ensure compliance with the health and safety management plan (the contractor must audit his own systems as well as those of his sub-contractors); and

Prior to mobilisation, the Health and Safety Management Plan must be forwarded electronically, and as a hard copy, to the Appointed Construction Health and Safety Agent for review and approval before work commences on site. The plan will be audited for completeness and, if found to be adequate, will be accepted (typically “with comments”). Work may not commence until the plan has been accepted.

Once the plan has been accepted, the contractor must action and resolve any issues within 30 days from the start of work.

If the issues requiring corrective action are not resolved within this 30-day period, the contractor will be required to stop any work related to the outstanding actions until they have been resolved.

Any proposed amendments or revisions to the contractor’s Health and Safety Management Plan must be submitted to the nominated project management representative for acceptance.

**Note:** Should it be identified that the contractor has overlooked a high-risk activity, and as a result has omitted the activity and associated control measures from the Health and Safety Management Plan, the plan will not be approved.

## 7. Health and Safety Policy

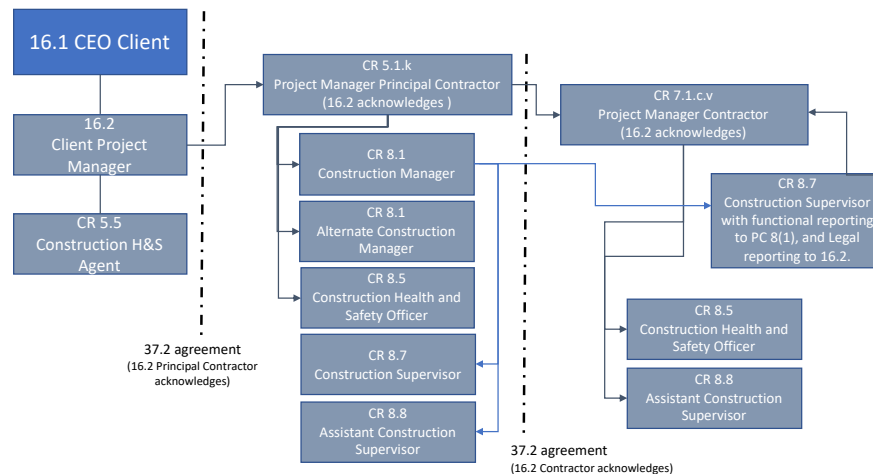
Each contractor must develop, display and communicate a health and safety policy that clearly states the contractor’s principles and objectives for the effective management of health and safety. These principles and objectives must be endorsed by the contractor’s management representatives and must be consistent with those adopted for the project. The policy must be signed and dated and must be reviewed annually. The policy must commit to:

- Compliance with all applicable legal requirements;
- the effective management of health and safety risks;
- the establishment of measurable objectives and targets for improving performance,
- the provision of the necessary resources to meet these objectives;
- the prevention of incidents; and
- achieving continuous improvement with regard to health and safety performance.

## 8. Legal and Other requirements

Contractors to define the project specific legal framework within their OHS Plan. Refer below to the figure that represents a generic legal framework: -

### Generic Legal Framework: Construction Projects



**Figure 1 - Generic Legal Framework**

Contractors must comply with all applicable national, provincial and municipal legislation. In addition to the requirements above, the contractor must comply with any national standard that has been incorporated into legislation and this specification.

As a minimum without limiting the applicability of any law not listed, the contractor will ensure compliance to the following:

- Compensation for Occupational Injuries and Diseases Act, 1993
- Occupational Health and Safety Act, 1993 and all applicable regulations
- Basic Conditions of Employment Act, 1997
- National Environmental Management Act, 1998
- Any applicable municipal bylaws

The contractor must compile a register of all requirements applicable to the work that will be carried out / services that will be provided. For each requirement, the current compliance status as well as actions to gain or maintain compliance must be indicated. This register must be updated regularly to ensure that it remains relevant.

The principal contractor must ensure that his direct employees as well as the employees of his subcontractors have been informed of all such applicable laws and standards. The requirements as described in this section is applicable to all activities under the contractual scope as described in the contractor's commercial contract.

## 9. Hazard Identification and Risk Assessment

Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must demonstrate to the satisfaction of the nominated project management representative that a detailed hazard identification and risk assessment process has been followed for all work to be performed as well as for all associated equipment and facilities.

The contractor is responsible and accountable for ensuring that effective procedures and assessment systems are in place and documented into a formal HIRA procedure to control hazards and to mitigate risks to as low a level as is reasonably practical.

The process of analysing and managing risk must follow the following steps:

- Establishing the context of the risk assessment, including acceptability criteria for the risk analysis
- Identifying hazards, determining risk scenarios and selecting a suitable level of risk evaluation
- Evaluating risks by qualitative or quantitative assessment(s) and assigning ratings (classification) – this process must be aligned with the standard of consequence and probability matrix as defined in ISO 31010
- Recording the risk analysis in a risk register
- Managing risks (prioritising for action) according to their classification
- Identifying and implementing controls to ensure that risk levels are as low as reasonably practicable (ALARP) – the following hierarchy of controls must be applied:
  - **Elimination** of the risk scenario
  - **Substitution** with a less hazardous material, process or equipment
  - **Isolation** – isolating the hazard from the person or the person from the hazard
  - **Engineering** – redesigning equipment / work processes or introducing engineering / process controls
  - **Administration** – introducing administrative controls or management strategies, e.g. permitting systems, procedures, training, etc.; and
  - **Personal Protective Equipment (PPE)** – issuing and use of PPE as a last resort.
- Developing action plans for reducing risk levels / managing risks
- Verifying the completion of actions
- Re-evaluating the risks and classifications as appropriate
- Reviewing and updating the risk register
- Monitoring of risk assessments with minimum of three outputs leading to review of the risk assessments, retraining of employees and verifying adequacy; and
- Review of risk assessments when an incident has occurred, when the working environment has changed or when identified during the monitoring process.

Prior to site establishment, the contractor must conduct a baseline risk assessment identifying foreseeable hazards and risks on site. Details concerning proposed mitigation measures / controls must be included in the baseline risk assessment for acceptance by the nominated project management representative.

Once established on site, the contractor must ensure that detailed project-specific issue-based risk assessments are developed, approved by the contractor and communicated to all relevant employees prior to the scheduled start of any work. The contractor will ensure that a 3-week rolling horizon based on the project schedule is kept up to date, to ensure risk assessments are developed in time, prior to scheduled start.

The contractor's site management representatives, supervisory personnel, technical experts (as required) and workforce personnel directly involved with the task being examined must

participate in the risk assessment processes. Nominated project management representatives must be invited to attend the risk assessments to provide input where required.

**UNDER NO CIRCUMSTANCES may the contractor's Health and Safety Officer perform a risk assessment in isolation. The active participation of all staff referred to above is mandatory.**

An Issue-Based (Task-Based) Risk Assessment must at least:

- Be accompanied by a work method statement (the work method statement will describe in detail the specific job or task to be performed)
- Provide a breakdown of every job or task into specific steps
- Identify the hazards or potential hazards associated with each step
- Assess the risk that every hazard identified presents
- Include consideration of possible exposure to noise, heat, dust, fumes, vapours, gas, chemical handling / use, ergonomics, vibration or any other identified health exposure risk on site; and
- Describe how the hazard is controlled such that the residual risk is as low as reasonably practicable (ALARP) to allow work to commence and be completed safely.

Hazards and risk scenarios must be communicated to all persons potentially affected.

Particularly for significant risks, the contractor should develop action plans (in writing) to reduce the risks to levels as low as is reasonably practicable.

The contractor will ensure the applicability and effectiveness of the implemented Issue-Based (Task-Based) Risk Assessment by performing a planned task observation (PTO) based on the employee's awareness of the identified hazards and effective implementation of the controls. The results from the observations must be analysed and if any changes are required a review of both the Issue-Based (Task-Based) Risk Assessment as well as the baseline must be undertaken.

After every completed accident or incident investigation, the contractor will ensure a review is undertaken of all applicable Issue-Based (Task-Based) Risk Assessments incorporating all the lessons learned and action items.

## 10. Health and Safety Management Improvement Planning

In order to drive continuous improvement, each contractor must set project-specific objectives and targets concerning health and safety and must establish improvement action plans to achieve them. These objectives and targets must be aligned with the objectives and targets set for the project as a whole.

Significant health and safety hazards and risks, environmental impacts, and legal requirements must be the primary considerations for setting objectives and targets. The intention is to eliminate health and safety hazards, minimise health and safety risks, reduce / prevent environmental impact, prevent incidents, injuries and illnesses, and ensure legal compliance. When establishing objectives and targets, consideration must be given to the following: Leading indicators such as inspections, audits, observations and training; lagging indicators (to be used purely for identifying areas that require improvement) e.g. Incident frequency rates (i.e. LTIFR and AIFR) with due understanding that the goal is "no harm"; and best practices and lessons learnt.



The objectives and targets must be specific and measurable. The improvement action plans must specify the resources required to achieve the objectives and targets, the persons responsible, and realistic timeframes for completion. The contractor must ensure that adequate resources are allocated, and that performance is monitored.

The objectives and targets and associated improvement action plans must be documented, must be submitted to the nominated project management representative for agreement, and must then be communicated to all employees.

Furthermore, objectives and targets must be reviewed at regular and planned intervals and whenever significant change has taken place on the project (i.e. changes to activities, scope of work, operating conditions, etc.). Contractor employees may partake in planning the project level objectives and targets.

Performance reviews must be carried out at quarterly intervals to review performance against established objectives and targets. Where reward and incentive schemes are in place, they must be designed in such a manner that health, safety and environmental performance is not compromised in order to maximise financial reward.

## **11. Organisational Resources, Accountabilities and Responsibilities**

The contractor is responsible for carrying out the work under the contract having the highest regard for the health and safety of all persons on the project site (including visitors).

Health and safety is the responsibility of each and every individual on site, but particularly the contractor's management team who will be required to set the tone. Visible commitment is essential to providing a safe work environment. Contractor managers and supervisors at all levels will be required to demonstrate their commitment and support by adopting a risk management approach to all health and safety issues. They will need to consistently take immediate and firm action to address violations of health and safety rules and actively participate in day to day activities with the objective of preventing harm to people, the environment and property / equipment. The contractor's management representatives are responsible and accountable for health and safety performance on the project. Key responsibilities include the following:

- Preparation, implementation and maintenance of a risk based Health and Safety Management Plan specific to the work that will be carried out;
- Implementing an effective hazard identification and risk management programme to ensure that all reasonably foreseeable hazards are controlled in order to minimise risk;
- Participation in a health and safety review with nominated project management representatives prior to site establishment;
- Ensuring that all contractor employees have clearly defined responsibilities with regard to health and safety, and that these responsibilities are clearly communicated, understood and fulfilled;
- Establishing a needs based system for ongoing training and assessment of skills and competence;
- Establishing procedures to ensure that only competent personnel are permitted to work on site;
- Ensuring that all personnel are kept up to date with regard to health and safety information (e.g. risk assessment reports, incident reports, etc.) and that feedback is provided promptly concerning issues / concerns raised;

- Establishing and maintaining consultative processes with employees for the duration of the project, and implementing programmes that encourage continuous improvement and provide recognition for suggestions made by employees;
- Establishing and implementing health and safety programmes and procedures to ensure that all work is carried out in compliance with the requirements of this document, the contract, and all applicable legislation;
- Maintaining operational control for the protection of site personnel and the public, including, erecting and maintaining safeguards, providing all facilities necessary for the maintenance of proper personal hygiene, preventing unnecessary interference due to the passage of people and equipment / materials at or near the site, preventing nuisance / excessive noise and unreasonable disturbances, and ensuring the adequacy, stability, structural integrity and safety of all construction works, installations and operations;
- Ensuring that the contractor's Project Manager, Health and Safety Officer(s) and Health and Safety Representatives attend site health and safety meetings;
- Providing the nominated project management representative with accurate health and safety statistics; and providing the necessary resources for health and safety audits to be conducted and supporting the auditing process.

### **11.1 Appointments and Delegations**

Each contractor working on a project or occupying the project premises is an employer in his own right and must comply with the requirements of all applicable legislation with regard to health and safety related appointments and delegations for the project. Documented proof of all signed appointments must be available for inspection by the nominated project management representative, or anyone authorised to do so.

The contractor must provide organisational charts that indicate the internal (company) and site resource hierarchy. The site organisational chart must clearly indicate which persons have been assigned health and safety related responsibilities (i.e. are carrying appointments).

Proof of training and competence as well as a valid medical certificate of fitness must be attached by the contractor to each legal appointment.

### **11.2 Project Manager**

The contractor must nominate and appoint (in terms of section 16.2 of the OHS Act. 85 of 1993) a competent person (the Project Manager) who will be responsible and accountable for the successful and safe completion of the project.

This person will act as the single point of contact for liaison concerning the project and must have the authority to bind the contractor with respect to the contract. The contractor's Project Manager will be responsible for the management of health and safety on the site.

Key obligations in this regard include: Implementation of the contractor's Health and Safety Management Plan; implementation of effective hazard identification and risk management processes; and; ensuring workforce competence.

The contractor's Project Manager must ensure that provision has been made for all of the health and safety requirements specified in this document, in particular: Health and safety planning, leadership and control; specific technical competencies for critical and skilled work; supervision and control on each shift; regular monitoring, auditing and assessment; and; workplace inspections.

The contractor's Project Manager must act consistently and strictly against any individual who transgresses a health and safety rule or requirement.

### 11.3 Construction Manager

The Principal Contractor must appoint (in terms of Construction Regulation 8.1 of the OHS Act. 85 of 1993) a Construction Manager who will be responsible and accountable for all construction activities of the principal contractor as well as the contractors performing work for the principal contractor. The principal contractor must ensure that in the absence of the construction manager from the site an alternate construction manager has been appointed under construction regulation 8.1. A documented handover process must be in place between the construction manager and the alternate construction manager to reflect accountability at any time.

The Construction Manager will be responsible for managing all construction work, including the duty to ensure compliance to health and safety requirements on the site.

Key obligations in this regard include: Compliance to the principal contractor's Health and Safety Management Plan; ensuring the effective use and implementation of hazard identification and risk management documentation and ensuring task performance by a competent workforce.

The principal contractor's Construction Manager must:

- ensure implementation of Health and safety planning, leadership and control.
- ensure supervision and control on each shift; and
- workplace inspections.

The principal contractor's Construction Manager must act consistently and strictly against any individual who transgresses a health and safety rule or requirement.

A construction manager must be fluent in English, and must have the following minimum qualifications, training and experience:

- Appropriate training with regard to construction related hazard identification and risk management processes;
- Relevant training with regard to incident investigation procedures and causation analysis;
- Relevant competency, as per the definition of a competent person in the construction regulations;
- Legal liability, inclusive of construction regulation 2014;
- Fire prevention and protection training; and
- Registration with the SACPCMP as construction manager is advisable.

**Note:** By legislative requirement, no work may be carried out without an appointed construction manager being physically present at the work site.

### 11.4 Supervisors

The principal contractor must ensure that all project / construction works are supervised at all times by an adequate number of qualified, competent and appointed supervisors who have experience in the type of work being carried out.

The construction manager must appoint construction supervisors with reference to the legal framework as per section 8 of this document. Each supervisor will be appointed as per construction regulation 8.7 by the construction manager, clearly defining the functional and legislative reporting line for the supervisor as per the legal framework.

The principal contractor and contractor must appoint assistant construction supervisors as per construction regulation 8.8 after considering the size of the project and the amount work phases to be supervised.

Each supervisor must accept responsibilities (in writing as part of his appointment) for ensuring that all work carried out under his or her supervision is done so in accordance with all applicable legislation, rules, standards, specifications, codes of practice, safe work procedures, and guidelines.

**Note:** No work may be carried out without an appointed supervisor being physically present in the work area.

Each site supervisor must:

- Be equipped with a mobile telephone (or 2way radio) to ensure that effective communication can be maintained for the duration of the contract;
- provide and maintain a list of contact persons (names and telephone numbers) for the contractor and all appointed sub-contractors;
- ensure that a record of all personnel under his supervision (including the date of induction, relevant skills and licenses for each person) are kept and be able to produce this list at the request of a nominated project management representative;
- notify the nominated project management representative of any new starter with evidence of competency and site-specific induction before he or she commences with any work;
- ensure that the requirements specified in this document are discussed with relevant personnel and are adhered to at all times; and
- take necessary action whenever rules or requirements are not adhered to.

A supervisor must be fluent in English, and must have the following minimum qualifications, training and experience:

- Appropriate training with regard to construction related hazard identification and risk management processes;
- Relevant training with regard to incident investigation procedures and causation analysis;
- Relevant competency, as per the definition of a competent person in the construction regulations;
- Legal liability, inclusive of construction regulation 2014; and
- Fire prevention and protection training.

## 11.5 Construction Health and Safety Officer

The principal contractor must appoint a full time Health and Safety Officer for the duration of the contract.

Where a principal contractor deploys up to 100 employees (directly or through contractors), at least one full time Health and Safety Officer must be appointed, with an additional Health and Safety Officer appointed for every 100 thereafter. Every contractor that deploys up to 100 employees must have a full time Health and Safety Officer appointed with an additional Health and Safety Officer appointed for every 100 thereafter.

Where a principal contractor deploys more than 2 safety officers at least one health and safety administrator must be appointed.

Where the principal contractor appoints more than 2 safety officers at least one will be registered as a construction health and safety manager and assume the responsibilities thereof.

The Construction Health and Safety officer (CHSO) or manager (CHSM) must be registered with the SACPCMP in the appropriate category.

A Health and Safety Officer must be on site when work commences at the start of each day and must remain on site until all activities for that day (including the activities of subcontractors) have been completed.

A Health and Safety Officer must be present during all shifts; therefore, if work is carried out over more than one shift per day, the contractor must make provision for an additional Health and Safety Officer.

The contractor must ensure that the Health and Safety Officer is adequately equipped to enable him or her to perform his or her duties effectively.

The Safety Officer must be provided with the following:

- A computer with access to all necessary systems, including access to e-mail and the internet;
- A means of positive communication e.g. cellular telephone or radio; and
- Available transportation where required.

A Health and Safety Officer must be computer literate, fluent in English, and must have the following minimum qualifications, training and experience:

- At least 3 years' experience as a Health and Safety Officer on construction projects;
- SAMTRAC or equivalent training course as a minimum qualification;
- Must be registered with the SACPCMP in the category which he or she is appointed;
- Experience and appropriate training with regard to implementing and maintaining a health and safety management system compliant with the construction regulations of 2014;
- Traffic Safety Officer (TSO) Training.
- Experience and appropriate training with regard to construction related hazard identification and risk management processes;
- Competence, experience and relevant training with regard to incident investigation procedures and causation analysis;
- Health and safety auditing experience and training;
- A valid First Aid certificate;
- Fire prevention and protection training; and
- A valid Driving Licence (light motor vehicle; code B).

## **11.6 Health and Safety Representatives**

Where 20 or more people are working on a project, a Health and Safety Representative must be elected and appointed. Taking into consideration the number of people employed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of Health and Safety Representatives (at a minimum ratio of one Health and Safety Representative per 50 employees) are elected and appointed to effectively represent all site personnel.

The contractor must ensure that a documented process for the nomination or election and period of office is developed and implemented.

Each Health and Safety Representative is required to attend an accredited training course for health and safety representatives. The contractor must make the necessary allowances for the Health and Safety Representatives to carry out their duties as specified in the applicable legislation. The contractor must ensure that an appropriate method of identification for Health and Safety Representatives is implemented.

### First Aiders

The contractor must ensure that an appropriate number of First Aiders are trained and appointed. First Aid training must be done through an accredited training institution. The contractor must ensure that an appropriate method of identification for First Aiders is implemented.

## 12. Training, Competency and Awareness

The principal contractor must ensure that all employees (including contractor employees) are trained and competent, and they understand the risks and controls associated with the work to be executed.

The principal contractor must ensure that all presented competence is aligned with portion (a) and (b) of the definition of a competent person as per the construction regulations 2014.

The contractor must implement systems and procedures to ensure that:

- The necessary competencies required by employees are identified (by occupation), along with selection, placement and any training requirements. Note: Specific competency profiles and selection criteria (fitness for work) must be developed for all roles where significant health, safety or environmental risk exists and a formal training needs analysis must be carried out based on competency profiles and a training matrix must be developed for the project;
- Roles requiring technical certification, registration or licensing are identified and documented, and these roles are filled only by suitably qualified personnel;
- Minimum core health and safety skills required by employees in leadership and supervisory roles are identified and suitable training is provided including hazard identification and risk assessment, incident investigation, and health and safety interactions (observations and coaching);
- Competency-based training is provided, and it includes operational controls (procedures / work instructions), management of change, and emergency response;
- All employees hold and maintain the required competencies (including appropriate qualifications, certificates and licenses) and are under competent supervision;
- A site-specific principal contractor induction and orientation programme that highlights health and safety requirements, procedures, and significant hazards and risks is in place for all new employees and visitors (understanding must be assessed);
- Personnel are trained / briefed on new or amended standards, rules, safe work procedures, risk assessments, etc.;
- Refresher training is carried out as required (e.g. re-induction following an absence from site);
- Records of education, qualifications, training, experience and competency assessments are maintained on site for all employees;

The effectiveness of training is reviewed and evaluated. Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must provide, to the satisfaction of the nominated project management representative, current documentation verifying that the contractor's employees, as well as the employees of any appointed contractors, are competent and have the necessary qualifications, certificates, licences, job skills, training and experience (as required by this document and applicable legislation) to carry out the work that is to be performed. An Employee Personal Profile must be completed for each employee that will be performing work on site.

All documentation pertaining to an employee's competence (i.e. certified copies of qualifications, certificates and licences as well as proof of job skills, training and experience) must be maintained in this profile. The contractor must provide proof that the training

institutions and trainers that are used are appropriately registered with a governing authority. The following must be made available for verification purposes: Proof of registration of the training institution including the training programmes that the institution is accredited to provide.

## 12.1 Specific Training and Competency Requirements

The following specific training and competency requirements must be complied with. Note: An employee must be trained, assessed and found competent before he or she will be given authorisation to perform certain tasks or fill certain roles. The contractor must allow for a minimum of 3 days for Medical examinations, plant induction and project induction. Below table prescribes the specific training and competency requirements for the project, this list is not exhaustive and must be complimented with all legislative competency requirements:

**Table 2 - Project Training and Competency requirements**

Training	Applicable to
General Health and Safety Induction	All employees
Safety Observations and Coaching	All supervision
Health and Safety Representatives	All elected Health and Safety Representatives
First Aid Level 1	All nominated First Aiders and Safety Officers
Risk Assessment	All managers and supervisors
Incident Investigation	Selected managers, supervisors and safety officers
Legal Liability	All managers, supervisors and safety officers that carries a legal appointment
Working at Heights	All employees required to work at height, fall protection plan developer and safety officers
Rescue from heights	All rescue team members and fall protection plan developer
Fall protection plan development	Fall protection plan developer
Fire Extinguisher Use	All employees
Confined Spaces	All Confined Space Officers and Emergency Standby Persons
Isolation and Lockout	All Authorised Persons
Work permit training	All Authorised Persons
Scaffolding erectors	Training as per SAQA published unit standards and SANS10085 section 16
Scaffolding inspectors	Training as per SAQA published unit standards and SANS10085 section 16
Scaffolding supervisors	Training as per SAQA published unit standards and SANS10085 section 16
Mobile elevated work platform (MEWP) operators	Licensed as per DMR 18.11 (license number C53) No familiarisation certificates from equipment suppliers will be accepted as proof of competence

## 12.2 General Health and Safety Induction Training

The Principal Contractor must ensure that all site personnel undergo the contractor's risk specific health and safety induction training program before starting to work. A record of attendance must be kept in the health and safety file. All employees of the contractor must be in possession of proof of induction training.

No worker is allowed to commence activities until inductions have been completed

All visitors must undergo a visitor induction briefing entering the site. However, this induction does not permit a visitor to enter the site unescorted. Visitors must be accompanied at all times by an appropriately senior employee who has been fully inducted.

### **13. Supplier and Contractor Management**

The principal contractor must ensure that processes are in place to ensure that the health and safety risks associated with the procurement of materials, equipment, services and labour are effectively managed: A process must be in place for the assessment and selection of all contractors, to ensure suitability PRIOR TO the awarding of any contract or purchase order. The activities / performance of all contractors and service providers must then be managed throughout the contract period; and before work begins on any contract, all contractor / service provider personnel must receive orientation and induction training in the same way that a direct employee of the principal contractor would receive orientation and induction training.

The principal contractor will ensure that the legal framework referenced in section 8 is implemented with each contractor appointment. All contractors will be appointed as per the requirements of construction regulation 7.

Where the principal contractor has appointed a contractor, it is the responsibility of the principal contractor to ensure the following:

- Provide contractors who are tendering with this specification, baseline risk assessment and the approved health and safety plan of the principal contractor;
- Contractors who are tendering has made sufficient provision for the cost of health and safety;
- Each appointed contractor has the necessary competencies to perform the required construction work;
- Each appointed contractor has a letter of good standing with the compensation fund or with a licensed compensation insurer;
- Periodic audits are completed at least every 30 days;
- Each appointed contractor submits a health and safety plan that must be approved by the principal contractors 16(2) appointee for the project.

### **14. Documentation and Document Control**

The principal contractor must develop, implement and maintain a documented system of health and safety related manuals, plans, procedures and work instructions. Safe Work Procedures must be developed and implemented for all activities involving significant health, safety or environmental risk.

All documents and data related to the health and safety management system must be effectively controlled. The document control process must:

- Provide for the review, revision and version control of documents;
- Uniquely identify documents (as appropriate) to control their business use and function;
- Require approval of the documents for adequacy prior to issue;
- Clearly identify changes and record the status of any revisions to documents; and
- Provide for the effective distribution of documents to, and where necessary the timely removal of obsolete documents from, all points of issue and use.

A file containing all required health and safety related documentation (approved) must be compiled and maintained as per construction regulation 7.1.b. The contents of the file will be audited by the Appointed Construction Health and Safety Agent on a monthly basis. On appointing a contractor, the principal contractor must ensure that the contractor opens and keeps on site a file containing all required health and safety related documentation (approved)



must be compiled and maintained as per construction regulation 7.2.b. The responsibility for auditing the contractor falls on the principal contractors and must be completed at least once every 30 days.

Documentation required by the principal contractor includes, but is not limited to, the following:

- Letter of Good Standing from the Workman's Compensation Commissioner (where applicable); Proof of Public Liability Insurance; and scope of work under the contract;
- List of Contacts and their Telephone Numbers;
- Health and Safety Policy; and Health and Safety Management Plan;
- Legal Register (electronic or hard copy); and Organisational Chart for the project;
- Appointment Letters (appointment of the contracting company, and appointments for all persons with health and safety related responsibilities);
- The Construction Work Permit
- Register of Risks, Baseline and Issue-Based (Task-Based) Risk Assessments, Safe Work Procedures, Work Instructions; Work Method Statements; and Planned Task Observations;
- Fall Protection Plan (for work at height);
- Inspection Registers, Forms and Checklists (e.g. for portable electrical tools, ladders, safety harnesses, vehicles, cranes and lifting equipment, first aid boxes, fire extinguishers, etc.);
- PPE Issue Registers and relevant Material Safety Data Sheets;
- Emergency Response Procedures;
- Incident Records;
- An Employee Personal Profile for each employee;
- Health and Safety Meeting Minutes;
- Copies of Inspection and Audit Reports Daily Safe Task Instructions (DSTI's) and Toolbox Talks;
- Environmental Management Plan (EMP); and Waste Management Plan.

## 15. Communication and Consultation

All external communication must be routed via the client representative in all aspects.

The principal contractor must establish and maintain effective communication and consultative processes for the duration of the project to ensure that:

- All personnel are kept up to date with regards to health and safety matters (e.g. hazards and risks, incidents and lessons learnt, best practices, performance against objectives and targets, etc.);
- general health and safety awareness levels are kept high and prompt feedback is given to personnel with regard to health and safety issues / concerns that they raise; and
- Relevant, and often critical, health and safety related information (e.g. design changes, instructions, reporting of hazardous conditions / situations, etc.) is effectively disseminated throughout the contractor's organisation as well as to his contractors.

Details concerning how this will be achieved must be included in the contractor's Health and Safety Management Plan, and must include the following:

### 15.1 Leadership, Safety Observations and Coaching

The principal contractor's and contractor's leadership teams (Managers and Supervisors) must participate in the project's Leadership program or process. Each member of the leadership team must, as part of his normal duties, perform Safety Observations and Coaching. The intention of this program is to encourage interaction between supervisors and workers concerning health and safety matters in order to:

- Reinforce behaviours consistent with standards, procedures and management system requirements;

- Correct behaviours inconsistent with standards, procedures and management system requirements; and
- Verify whether employees have the necessary training, certification, equipment, etc. to perform the work that they are carrying out.

The number of Safety Observations and Coaching that must be carried out by each senior person will be set for the project and all individuals will be required to participate accordingly. The Safety Observations and Coaching that are recorded must be submitted to the nominated project management representative on a daily or weekly basis (as agreed).

The principal contractor will analyse the results from the Safety Observations and Coaching, to determine the leading indicators and ensure the management focus for the period following the analysed observations address the identified shortcomings.

## 15.2 **Toolbox Talks**

The principal contractor must ensure that a Toolbox Talk is prepared on a daily basis and shared with all personnel for which the contractor is responsible (including all contractors). Toolbox Talks must address health and safety issues that are relevant to the work performed on the site and may include information / knowledge sharing, lessons learnt from incidents that have occurred, information concerning specific hazards / risks and control measures to prevent injury, etc. Attendance records must be kept and maintained in the contractor's health and safety file.

## 15.3 **Daily Safe Task Instructions (DSTI's)**

A Daily Safe Task Instruction (DSTI) is a pre-start discussion amongst the members of a work team, led by the appointed supervisor, aimed at anticipating potential hazards associated with the day's activities and ensuring that the necessary controls are in place to prevent incidents.

At the start of each day / shift, before work start, each supervisor must inspect the work area for which he is responsible and ensure that it is safe. He or she must then conduct a DSTI with his work team / crew specifically concerning the tasks that they will be performing during the course of the day / shift. The relevant risk assessment for the activity must be used as the basis for the discussion.

The correct work method must be reiterated, and the identified hazards, risks and controls must be discussed with the team (the team must be given the opportunity to contribute and participate in the discussion).

Any team member arriving late must first be taken through the information that was discussed (work method, hazards, risks and controls) before he or she may start work. If the work method changes after activities have already begun, the DSTI must be revisited and updated with the team, and the changes must be signed off by the contractor's Health and Safety Officer. Every member of the work team / crew must sign the DSTI attendance register.

The attendance records must be kept and maintained in the contractor's health and safety file. The contractor's Health and Safety Officer must evaluate the content of the DSTI's daily to ensure that they are task-specific. Furthermore, the Health and Safety Officer must attend at least one DSTI per day prior to the start of work. The Health and Safety Officer may not lead the DSTI discussions, as this is the responsibility of the appointed supervisor.

## 15.4 **Health and Safety Meetings**

### 15.4.1 ***Contractor Health and Safety Meetings***

The principal contractor must schedule and consistently hold weekly health and safety meetings.

These meetings must be chaired by the contractor's Construction Manager and the following personnel must be in attendance:

- Principal contractor and contractor's supervisors;
- Principal contractor and contractors appointed Health and Safety (Employee) Representatives;
- Principal contractor and contractors Health and Safety Officers;

The meeting must address the following as a minimum: New incidents for the period and corrective / preventive actions taken or to be taken; and implementation status of outstanding actions associated with previous incidents; and Safety Observations and Coaching, PTO's and DSTI's carried out for the period and action required to correct trends identified; Results of any audits, inspections (including H&S Rep inspections) or site visits carried out; A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work; Risk Assessments, Safe Work Procedures, etc. that are outstanding or due for review (as well as the quality of these documents); and any other health and safety related matter. The contractor must compile minutes of each meeting and attendance records must be kept. These records must be maintained in the contractor's health and safety file which must be made available to a nominated project management representative on request.

#### **15.4.2 Site Health and Safety Meetings**

In addition to the weekly Contractor Health and Safety Meetings, project management will schedule monthly Site Health and Safety Meetings that the contractor will be required to attend. Attendance will be as follows:

The contractor management representative; the contractor Health and Safety Officer(s); a contractor Health and Safety (Employee) Representative; a project management representative; the project Health and Safety Manager; and the meeting will address the following as a minimum:

- Feedback from each contractor concerning health and safety performance for the period;
- New incidents for the period and corrective / preventive actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;
- Safety Observations and Coaching, PTO's and DSTI's carried out for the period and action required to correct trends identified;
- Results of any audits, inspections or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work; Risk Assessments, Safe Work Procedures, etc. that are outstanding or due for review; and
- Any other health and safety related matter.

#### **15.4.3 Health and Safety Performance Review Meeting**

Based on the frequency and severity of incidents and injuries, the rate at which corrective and preventive actions are implemented, the results of compliance audits, and other considerations, the contractor may be required to take part in health and safety review meetings. The contractor will be required to develop an action plan to improve his health and safety performance and must report on progress with regard to the implementation of this plan at the performance review meetings.

#### **15.4.4 Health and Safety Management Information Notice Boards**

For each area, the contractor must provide a portable Health and Safety Management Information notice board to be placed in the work area. The following information / documents, as a minimum, must be posted on these boards:

- The relevant Risk Assessments for the work that is being performed that day;
- The DSTI(s) for the day; the most recent Toolbox Talk;

- Where applicable, all required permits and permissions for the work that is being performed (including daily excavation inspection checklists where excavations are present);
- Emergency procedures; Material Safety Data Sheets (SDS's) for any chemical agent being used; and the appointed Supervisor's contact details.

#### **15.4.5 Supplementary**

Additionally, the contractor must:

- Encourage the participation of employees and sub-contractors in activities that promote improvements in health, safety and environment performance. In particular, this must include their appropriate involvement in: Hazard identification; risk analysis and determination of controls; incident investigation; and the development and review of the Health and Safety Policy and objectives.
- Ensure that all regulations, instructions, signage, etc. pertaining to the work is communicated in a language understood by all employees; and
- Ensure that health and safety personnel are actively involved in planning activities so that they have the opportunity to highlight hazards and risks associated with upcoming work well in advance to ensure sufficient time to arrange / implement the necessary control measures.

## **16. Operational Control**

The contractor must develop and document procedures and / or work instructions that detail the controls required for effectively managing the health and safety risks associated with its work activities. These procedures must reference applicable operating requirements, be communicated to all relevant personnel, be available to the appropriate users, and be implemented / followed.

Furthermore, the contractor must develop, document, communicate and implement procedures and / or work instructions for the operation and maintenance of plant and equipment. Plant and equipment must be maintained, inspected and tested to ensure safe operation and to ensure that it meets design descriptions and specifications.

The contractor must ensure that all moving parts of Machinery and equipment is effectively guarded to ensure no accidental contact can be made with the moving part. The contractor must ensure that those covers that are removable for maintenance purposes cannot be accessed during the normal operation of the machinery or equipment.

The contractor must comply with the following operational control requirements for the project:

### **16.1 General rules of conduct**

All persons required to conform to the rules of conduct while on the project. The following acts are prohibited:

- Engaging in practical jokes, horseplay, scuffling, wrestling, fighting, or gambling;
- Assault, intimidation, or abuse of any person;
- Insubordination towards any supervisor or manager; or refusing to carry out a reasonable and lawful instruction concerning health and safety;
- Entry into any restricted area (including barricaded areas), unless authorised to do so by the responsible person; or no unauthorised use / operation of any equipment or machinery;
- Negligently, carelessly or wilfully causing damage to any property; or damaging, tampering with safety devices, signs, or signals;
- The wilful and unnecessary discharging of fire extinguishers;
- Refusing to give evidence or deliberately making false statements during incident investigations;

- Bringing alcohol, drugs, or any other intoxicating substance onto site;
- Bringing a firearm, ammunition, or any other offensive weapon onto site;
- Bringing animals onto site;
- Not following all emergency instructions during an emergency situation;
- The use of an iPod (or similar) whilst working on site;
- The use of a mobile phone for other reasons than work related whilst working on site, mobile phone use for work related activities must take place in a safe environment away from moving machinery and work activities while stationary;
- Tampering with safety devices and guards.
- Sleeping on the job;
- Building fires on site, unless in a suitably constructed barbequing facility; and
- Pouring / pumping / flushing any substance (chemical / hydrocarbon / wastewater) into a storm water drain, onto bare soil, or into any area where the substance is not effectively contained.

Any of the above actions may result in the temporary or permanent removal of the offending person(s) from site, as well as possible prosecution. The decision of the nominated project management representative shall be final and binding in respect of any dispute that may arise from the interpretation of these requirements.

## **16.2 Site access and security**

The contractor may not hire any security services for the project site unless authorization has been obtained in writing from the nominated project management representative.

### **16.2.1 Trespassing**

The principal contractor shall ensure as far as is reasonable that no employee (including contractor employees) trespass on any land lying beyond the boundaries of the project site. If instructed by a nominated project management representative to do so, the contractor must remove from the project any employee who fails to comply with this requirement.

The contractor's activities must be confined to the specified construction areas, and access to these areas may only be gained by means of specified routes. All required fencing must be erected and maintained by the contractor as per the contract agreement.

### **16.2.2 Visitors**

Visitors (including reps and suppliers) must be advised in advance of the mandatory Personal Protective Equipment (PPE) requirements for the site and must arrive with all the necessary PPE and identification documentation. Upon arrival, all visitors must report to the Security Office where they must sign in. All visitors must undergo a visitors induction briefing before entering the site. Visitor access will be issued to each visitor on conclusion of the induction briefing.

All visitors must comply with the requirements for site access. Whilst on site, visitors must be accompanied at all times by an appointed "Host" who has been inducted fully. The visitor(s) must be met at the Site Office, before proceeding to the site.

Note: Visitors are not permitted to perform any work on site. Any request (typically made by a government official) to carry out a site inspection must be referred to the nominated project management representative. The contractor must not arrange any such inspection without prior approval from the nominated project management representative.

### **16.2.3 Alcohol, drugs and other Intoxicating substances**

The contractor must ensure that all personnel under its authority do not at any time enter the site or perform any work whilst under the influence of alcohol, a drug, or any other intoxicating substance. Selling or possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.

A substance abuse testing program will be implemented by the principal contractor. Persons entering the site will be randomly tested. Any person who tests positive for alcohol or drug consumption will be subject to disciplinary action and may be permanently removed from the site. Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing.

Note: All personnel involved in an incident / accident could be subjected to an alcohol test and or drug test as part of the investigation.

#### **16.2.4 Firearms, ammunition and offensive weapons**

Firearms, ammunition, and offensive weapons of any kind are strictly prohibited. No person may enter / will be permitted to enter the site carrying any such item.

#### **16.2.5 Vehicles**

Every construction vehicle to be used on-site must be inspected and approved by the principal contractor before a site access permit will be issued for the vehicle / equipment. No vehicle will be permitted to enter the site unless it is carrying a valid access permit (sticker affixed to the inside of the windscreen).

Access permits are vehicle-specific and may not be transferred between vehicles. The contractor must allow any vehicle that is brought onto site (including privately owned vehicles) to be searched at any time while on the premises, or when entering or leaving the premises.

The contractor is solely responsible for the safety and security of all construction vehicles that it brings onto the site. All road-going vehicles used by the contractor on the site must be roadworthy and registered with the relevant traffic authority. Driver / operator appointments must be signed by each employee intending to drive or operate construction machinery on the project.

A vehicle will not be permitted to enter the site in an un-roadworthy condition. Access will be denied if, for example:

- The vehicle has a defective exhaust system;
- A serious oil or fuel leak is evident;
- The vehicle has unsafe bodywork or is carrying an unsafe load;
- The vehicle is fitted with extraneous or non-standard equipment;
- Passengers are not seated properly; or the vehicle is not fitted with a seat belt for each occupant; or
- The vehicle has any obvious mechanical defect.

Overloaded vehicles will not be permitted to enter the site. The driver / operator of any vehicle / mobile equipment must carry a copy of his licence with him at all times. Each driver / operator must:

- Comply with all site / project rules and regulations pertaining to traffic and the safe operation of vehicles / mobile equipment; obey all road signs; obey all instructions given by security or emergency services personnel; remain within the boundaries of the site; and ensure that the vehicle that he or she is operating is never overloaded, and that loads are always properly secured.

In the interest of safety, only the minimum number of vehicles required by the contractor to complete the work under the contract will be permitted to enter the site. When not in operation, the contractor's vehicles / mobile equipment must be parked within the boundaries of his lay-down area or yard or as indicated by the project representative. Parking is only permitted in designated parking areas. All cars are parked on site at the owner's risk and the principal contractor will ensure that a sign stating this is erected at the entrance to the project site.

In the event of a vehicle accident on site, the driver(s) must report the incident immediately and must remain at the scene until a nominated project management representative arrives, or until a nominated project management representative authorises him to leave (unless, the driver requires medical attention).

### **16.3 Signs and notices**

The contractor must ensure that all required safety signs and notices are prominently displayed in accordance with the applicable legislation, the South African Road Traffic Signs Manual for Roadworks Signing (were applicable) and good safety practice. Signs and notices must be in English as well as any other language(s) commonly spoken on the project site.

All symbolic signs must comply with the applicable national standard. No person may deface or damage any safety sign or notice. No person may remove or alter any safety sign or notice unless authorised to do so.

### **16.4 Traffic management**

For all work areas, including work areas where there is a concrete jersey barrier, a traffic management plan with drawing, depicting the traffic management required, must be developed by the principal contractor. The required traffic controls must be implemented prior to the activities starting under the supervision of a competent Traffic Safety Officer (TSO). The supervisor of the team that must work in the area must in conjunction with the TSO complete a checklist to verify the implementation against the traffic management plan prior to starting the activities.

A complete video of the site must be done by the TSO or CHSO at the start and at the end of the day to ensure evidence of traffic management installations are available. These videos must be kept for the duration of the project by the principal contractor and must be available on-site for auditing.

Appropriate traffic calming measures must be identified by the principal contractor and after consultation with the Resident Engineer be put in place to ensure the safety of employees.

The video logs must form part of the consolidated health and safety file that will be handed over by the Principal Contractor. Please refer to section 16.42 for the project close out requirements.

### **16.5 Vehicles and Driving**

#### **16.5.1 All Vehicles (Including Mobile Equipment)**

All vehicles operating on site must be equipped / fitted with:

- Fixed seats and seat belts for all occupants, unless a risk assessment specifies otherwise;
- amber flashing lights (rotating or strobe);
- a reversing alarm / warning device;
- A fire extinguisher;
- chock blocks for preventing uncontrolled movement of the vehicle when parked;
- a horn;
- effective windscreen wipers;
- a speedometer (if the vehicle is capable of exceeding the lowest applicable speed limit).

The contractor must provide evidence to the nominated project management representative that all vehicles and mobile equipment to be used on the project (including, but not limited to, lift and carry cranes (or mobi-lifts), mobile cranes, forklifts, mobile elevating work platforms (e.g. cherry pickers), tractors, bulldozers, dump trucks, haul trucks, graders, excavators, front-end loaders, back actors, drill rigs, and road-going cars, light delivery vehicles, and trucks) comply

with the requirements of applicable legislation. This evidence must be provided prior to the equipment being brought onto the project site.

The contractor remains responsible for meeting this requirement even if the equipment to be used is leased or provided by a sub-contractor (i.e. not owned directly by the contractor). An Equipment Profile must be compiled for each vehicle / item of mobile equipment to be used on the project site. All vehicles must be serviced and maintained as prescribed by the manufacturer.

No major repairs or services may be carried out on site unless authorised by the project management representative. No repairs may be carried out by a driver / operator. Only suitably qualified and competent persons may carry out vehicle repairs.

An appropriate pre-operation safety check must be carried out for any and all vehicles driven / operated for work purposes. For each vehicle type, an appropriate risk based checklist must be in place (and must be used). The pre-operation check must include, but not be limited to, inspection / testing of the following safety critical items: Brakes (testing); wheels and tyres; lights and indicators; steering; seats and seat belts; windscreen and windows, including windscreen wipers and washers; pneumatic (air) / hydraulic systems; and oil leaks.

Should any critical feature be defective or damaged, the vehicle may not be operated until it has been fully repaired. Supervisors must review the completed checklists on a daily basis to satisfy themselves that there are no major deficiencies that could place a driver / operator at risk.

No person may drive / operate any vehicle without authorisation. All drivers / operators must be appointed in writing by the contractor's Construction / Project Manager. No driver / operator may be appointed without proof that he is trained, competent, tested and licensed; is 18 (eighteen) years of age or older; does not suffer from defective sight or hearing or any other infirmity, mental or physical, likely to interfere with the efficient discharge of his duties; and has received suitable training and has been found competent or is in possession of a national driving licence that is applicable to the class of vehicle that is to be driven / operated.

The principal accountability for preventing incidents / accidents resides with the driver / operator of a vehicle, as he or she is in full control of any given situation at any given time. It must be stressed to each driver / operator that safety is his or her prime responsibility – this must be clearly instructed and understood.

Drivers / operators must be empowered to stop operating immediately should an unsafe condition arise and refuse to drive any vehicle that is defective and / or has any inoperative safety features. Similarly, supervisors must not force drivers / operators to operate defective vehicles. If a driver / operator does not adhere to the site rules and regulations, his appointment must be withdrawn, and he must not be permitted to continue with his or her duties. If necessary, site access will be denied (either temporarily or permanently) to any driver / operator who is deemed not adhering to site requirements.

No person may drive / operate a vehicle if he or she suffers from a medical condition that places both him or her and those around at risk of injury. Supervisors must regularly check on the physical condition of drivers / operators during the course of a shift. A system must be in place to manage driver fatigue.

All occupants of a vehicle (i.e. the driver and all passengers) must wear their seat belts at all times. No eating or drinking is permitted while driving / operating a vehicle. A cellular phone, whether hands-free or not, may not be used by the driver / operator of a vehicle while the vehicle is being driven / operated.



Speed limits and traffic rules must be reviewed regularly and must be rigorously enforced. Local traffic rules must be complied with at all times. Rules must be in place to ensure that:

- No vehicle approaches within 50 (fifty) metres of any heavy mobile machinery without first making positive contact with the operator of that equipment;
- The interaction between heavy and light vehicles is controlled;
- If overtaking is permitted in an area, no vehicle overtakes a haul truck, water truck, etc. before making positive contact with the driver;
- All vehicles give way to emergency vehicles; and
- No vehicle tows equipment unless it is engineered to do so.

The driver / operator of a vehicle must stop the vehicle and sound the horn before proceeding at blind corners, where his/her view of the path or intended path is obstructed, and when entering or leaving a building.

Whenever a vehicle is stopped or parked, the handbrake must be applied. All parked vehicles must be chocked with the handbrake engaged.

- No vehicle may be left unattended with the engine running or with a key in the ignition.
- No vehicle may be parked so as to cause an obstruction to any roadway, passage or access way.
- No vehicle may be parked within 50 (fifty) metres of a loading or off-loading point.
- Vehicles must be loaded safely.
- All loads must be secured and must be within the load limit of the vehicle.
- A load must be properly secured before the vehicle is set in motion.
- Adequate precautions must be taken for any overhanging load.
- No unauthorised vehicle may enter a restricted area or building.

A site-specific review of pedestrian interaction, road design and layouts (including entrance and exit points, intersections and other potential points of interaction between light vehicles and other mobile equipment) must be conducted and must be updated when changes to layouts are required. Where possible, traffic segregation should be used to separate pedestrians, light vehicles and other mobile equipment. A risk based traffic plan must be carried out prior to any changes being made to traffic movements or road systems.

Designated walkways (both indoors and outdoors) must be provided for pedestrians, and pedestrians must make use of these walkways. Wherever possible, rigid barricading must be used to separate pedestrians from moving vehicles / mobile equipment. Pedestrians must give way to vehicles / mobile equipment except at pedestrian crossings. Pedestrians and light vehicle drivers must be made aware of the blind spots associated with mobile equipment. High visibility clothing must be worn by all persons at all times whilst on the project site. No pedestrians are permitted on haul roads (or as far as this can reasonably be achieved in situations where a haul road runs through an area occupied by a local community). All personnel must be transported on site must be dropped off at a designated area. Controls must be in place to ensure the safety of people working on roads, including those working on broken-down vehicles.

### **16.5.2 Light Vehicles**

All light vehicles must have the following minimum safety features:

- Fixed seats and suitable seat (safety) belts for all occupants (i.e. driver and all passengers) unless a risk assessment specifies otherwise;
- Cargo barriers and load restraints for all vehicles designed for carrying loads (other than passengers), or that are unable to have cargo separated from the occupant-carrying space of the vehicle; and

- An air bag on the driver's side, and where available as a manufacturer fitted item, a passenger's air bag.

Seat belts must be used in all cases, by all occupants.

Only the driver and one passenger are permitted in the cab (front) of a light delivery vehicle.

No personnel may be transported in the load bin of a light delivery vehicle, even if the vehicle is fitted with a canopy. Only tools and equipment may be transported in the load bin. Furthermore, no personnel may be transported in a trailer behind a vehicle.

Personnel may only be transported in vehicles equipped with manufacturer fitted / approved seats and seat belts.

A pre-operation vehicle safety check and familiarisation system must be in place and used by the driver. An approved checklist must be used. All vehicle faults that are recorded must be attended to immediately.

Systems must be in place to ensure that risks associated with vehicle journeys are managed and controlled. The systems must include, but not be limited to:

- Formulation of route management plans prior to the commencement of new or changed travel activities;
- Identification and monitoring of the risks associated with the various routes, intersections, etc. in order to minimize the overall exposure;
- Assessment and communication of changed road conditions at the time of travel;
- Outlining of actions required in the event of an emergency (e.g. collision or breakdown); and
- Provision to manage driver fatigue.

Light vehicle running lights (low-beam headlamps) must be switched on at all times when the vehicle is in operation.

A mobile phone, whether hands-free or not, may only be used by the driver of a vehicle when the vehicle is stationary and in a safe location.

A site-specific traffic management plan must be compiled and submitted to the nominated project management representative for approval. The plan must include, but not be limited to, the following:

- Setting of appropriate speed limits for vehicle types, road surfaces and environmental conditions;
- Overtaking protocols;
- Procedures for light vehicles entering hazardous or restricted areas;
- Clear communication protocols;
- Standards for safe following distances based on operational circumstances, environmental conditions and near sight (blind spot) limitations of other mobile equipment;
- Installation and maintenance of road traffic control signs as appropriate to the work site; and

- Parking procedures (e.g. safe parking distances, safe parking locations, requirements for reverse parking, etc.) and required barriers from heavy mobile equipment and pedestrians.

A system must be in place to ensure that drivers receive adequate training to ensure that the vehicle intended to be operated or driven can be operated or driven safely. As a minimum, training must include:

- Vehicle familiarization, taking into account the handling dynamics of the vehicle, maximum number of passengers, load limits and various features;
- Loading and restraining principles where the vehicle to be operated is designed for carrying cargo loads;
- Education and awareness concerning driving and travel risks that may be encountered within the environment where the vehicle may be operated or driven, and the requirements pertaining to traffic rules and speed limits;
- Securing (locking) equipment to prevent unauthorized use;
- Emergency crash and breakdown procedures; and
- Basic mechanical principles, including how to change a tyre and perform an adequate pre-operation check.

A system must be in place to ensure that persons operating any equipment associated with a light vehicle (e.g. vehicle-mounted cranes and winches) are suitably trained and competent.

Behaviour-based observations and coaching must include the operation of light vehicles.

### **16.5.3 Mobile Equipment**

In addition to the requirements stipulated above, all mobile equipment must have the following minimum safety specifications:

- Adequate lighting (e.g. headlights, tail, turn, brake, and flashing lights);
- An identified isolation and lockout point;
- Adequate walkways, railings, steps / grab handle combinations, and boarding facilities including an alternative path for disembarking in the event of an emergency; and
- Effective guarding on accessible moving parts.

Mobile equipment must have the following minimum safety specifications, unless a risk assessment stipulates otherwise:

- Two-way radio or another form of communication;
- Fall-on protection (a protective structure over the operator cab to protect the operator from dropped objects and prevent the operator from falling out of the cab should the equipment overturn); and
- A means of moving supplies and personal items into and out of the operator cabin that enables drivers to continuously maintain three points of contact while boarding and disembarking the equipment / vehicle (e.g. a backpack or shoulder strap bag).

When purchasing or hiring equipment, the ergonomics of the cabin must be considered, specifically with regard to the seating, operator controls and retrofitted devices.

Fleet and control consistency must be considered in order to minimize the possibility of operator error when changing machines.

For all new (to site) and modified mobile equipment, a formal risk-based selection and acceptance process must be followed prior to the equipment being used on site.

Selection of equipment, and any modification, must be subject to a rigorous change management process.

A maintenance and inspection programme must be in place for all mobile equipment.

A procedure and checklist system must be in place for pre-operation inspection by the operator. Logbooks must be maintained and audited and must be kept on the machine.

Procedures must be in place to ensure that mobile equipment only operates on sufficiently stable surfaces and on gradients that are within the limits of safe operation.

Seat belts must be used in all cases, by all occupants. Apart from the driver / operator, only an appointed flagman may be transported in mobile equipment and **only if** the vehicle is equipped with a passenger seat. No passengers are permitted on a lift and carry crane (or mobi-lift), mobile crane, forklift, mobile elevating work platform (e.g. a cherry picker), tractor, bulldozer, dump truck, grader, excavator, front-end loader, back actor, drill rig, or similar.

A mobile phone, whether hands-free or not, may only be used by a mobile equipment operator when the equipment is stationary and in a safe location.

Risk assessments must be carried out as part of the planning process for mobile equipment operations and activities, and must consider the following:

- Maintenance activities;
- Risks to personnel from remote-controlled mobile equipment;
- Risks from loading, unloading, towing and recovering mobile equipment; and
- Risk of fire in mobile equipment.

Procedures must be in place for the safe isolation and lockout of mobile equipment.

A site-specific traffic management plan (which can be incorporated into the plan developed for light vehicles) must be compiled and submitted to the nominated project management representative for approval. The plan must include, but not be limited to, the following:

- Segregation of pedestrians, light vehicles, and mobile equipment where possible;
- Setting of appropriate speed limits, and installation and maintenance of road signage;
- Right-of-way rules (including overtaking restrictions);
- Access planning in areas identified as hazardous and having significant associated risk;
- Systems to control the movement of mobile equipment in areas accessible to pedestrians, the movement of mobile equipment into and out of workshops, and pedestrian and light vehicle movement around mobile equipment;
- The minimum safe distance to be maintained between light vehicles and mobile equipment (i.e. 50 meters unless positive contact is made);
- Designated parking areas for heavy vehicles and light vehicles, including parking around maintenance areas;
- Systems to control approaching, refueling, parking, boarding and disembarking mobile equipment (a driver / operator must exit the cabin and must disembark the vehicle entirely when his direct involvement with maintenance or servicing is not required);
- Clear communication procedures for vehicle interactions;

- Truck loading / unloading procedures – to avoid material or objects falling from the vehicle;
- Guidelines for wide or abnormal loads including offsite transport; and
- Systems to control equipment use in the vicinity of overhead power lines.

Where two or more vehicles / items of mobile equipment must be operated in proximity to each other, or where a vehicle / item of mobile equipment must be operated in proximity to employees on foot, a risk assessment involving all of the employees that will be working in the area must be conducted prior to the work commencing. The risk assessment must be approved by the nominated project management representative. In such a work area:

- No vehicle / item of mobile equipment may be driven to within 5 meters of another vehicle / item of mobile equipment without the driver / operator first making eye contact with, and signaling his intentions to, the other driver / operator who must acknowledge that he understands and that it is safe to proceed.
- No person on foot may work or be positioned within 5 meters of an item of mobile equipment that is in operation. Before approaching mobile equipment on foot, a person must make eye contact with, and clearly signal his intentions to, the operator of the equipment. The operator must cease to operate the equipment and must indicate that he understands and that it is safe to approach.

A heavy mobile vehicle may only move and operate with a dedicated flagman:

- Where flagmen are used, the contractor must ensure that the flagmen, vehicle operators, and all other personnel working in the vicinity of the vehicle, receive suitable training with regard to signals and signaling to ensure effective communication. The training must be formal and recorded, and competency must be tested.
- The flagman and vehicle operator must maintain eye contact at all times. The flagman must never position himself where the operator cannot see him.
- Should a vehicle operator lose sight of his flagman, he must stop his activities immediately until contact has been re-established.

A tyre management system must be in place to address issues including fire, heating, explosion, electrical contact, separations, maintenance, tyre changes, etc. (see Section 16.4.5).

Behaviour-based observations and coaching must include the operation of mobile equipment.

#### **16.5.4 Training and Licensing**

No person may drive / operate a vehicle unless he is trained, competent, tested and licensed to operate that specific vehicle. The training must address hazards and risks assessed for:

- That vehicle; and
- The tasks for which it is to be used.

Each person required to drive / operate a vehicle at a particular site must have a site licence / appointment to operate that vehicle. A state or civil driving licence is an approved alternative, except where:

- There is a need for a specific set of site rules / procedures (for example, in a pit area where a pit license or permit is required); or
- The state or civil license does not apply to the class of vehicle being driven.

A system must be in place to ensure that the renewal of licenses is based on an assessment of competency to drive and / or operate the equipment. The frequency of assessment must either be annual or derived from a risk assessment for each vehicle type.

No training of drivers / operators may be carried out on site unless authorized by a nominated project management representative.

#### **16.5.5 Tyre and Rim Safety**

These requirements apply to tyres / rims with a rim diameter of 60cm (24 inches) or greater.

A Tyre Management Plan must be established and reviewed every twelve months.

Safe Work Procedures must be in place for all tyre maintenance and servicing activities and for tyre fire emergency response.

All employees who will be carrying out tyre maintenance and servicing work and / or responding (potentially) to tyre fire emergencies on site must be certified against the requirements of job-specific competency standards for the project, which will address job-specific safe work procedures. Re-certification must take place every three years.

No person may approach a vehicle within 24 hours of:

- The vehicle being struck by lightning;
- The vehicle making contact with high voltage electricity; or
- A tyre fire.

In the event of a tyre fire, an exclusion zone of 300 metres must be established and may only be accessed by emergency services personnel who are shielded while fighting the fire.

Restricted Work Zones (RWZ) and exclusions zones must be established for tyre installation, removal and handling processes.

All tyre and rim handling equipment must have fall back prevention in place prior to anyone entering the RWZ.

Tyres with split rims must be deflated to zero and other tyres to a nominal pressure no greater than 5psi prior to removal of any retaining devices. In a dual assembly both tyres must be deflated.

Tyre inflation is subject to the following requirements:

- All tyre inflation must be carried out remotely;
- Where the risk of ejection of components exists, barricading must be in place;
- A tyre must not be left unattended during inflation; and
- Tyres that have run at less than 80% cold inflation pressure must not be re-inflated. Both tyres in a dual assembly must be dismantled and inspected.

No welding, cutting or application of heat sources to a rim or wheel may be done while the rim or wheel is fitted with a tyre – whether inflated or deflated.

A periodic testing and / or inspection regime must be in place for tyres, rims / wheels and assemblies.

All tyres and rims / wheels must be made unserviceable when deemed unfit for service or before being sent off site for disposal.

## 16.6 Barricading

Barricading must be erected to:

- Prevent personnel from making contact with an identified hazard;
- Provide warning of the existence of a hazard;
- Prevent unauthorised access (by people or vehicles / mobile equipment) into an area where a hazard exists or where a hazardous activity is being carried out;
- Define the boundaries of a hazardous location and / or restricted area.

Although not limited to these situations, barricading must be erected / installed:

- Around excavations (trenches, pits, etc.);
- To protect openings and edges (to prevent persons from falling);
- All openings and edges associated with floors, stairs and the open sides of buildings / structures during the course of building or erection;
- Construction areas must be protected by sturdy, rigid barriers capable of withstanding a force of at least 100 kilograms applied in any direction at any point;
- To prevent access into areas where overhead work is in progress;
- To route vehicles safely through (or around) construction areas; and
- To protect members of the public who may be in the vicinity of a work / construction site.

In all cases, the erection of barricading must be a temporary measure. It must only remain in place until the hazards are eliminated or the potentially dangerous situation is rectified.

A barricade must present a sturdy physical barrier to prevent entering an area. Therefore, plastic cones, post and chain systems, "danger tape" and "snow netting" will not always be accepted as barricading and may only be used for the purposes of low risk demarcation. For example, snow netting may be used for the demarcation of lay down areas. Acceptable forms of barricading include:

- Hoarding panels (no less than 900 mm in height) that can be securely fastened together to form a fence line may be used. Hoarding panels may be constructed from a variety of materials (e.g. wooden board, steel sheeting, wire mesh on a steel frame, etc.);
- Wire mesh fencing (no less than 900 mm in height with sturdy posts spaced at intervals of no more than 3 metres) may be used in certain circumstances, e.g. around excavations;
- Sturdy, rigid, and securely fixed (i.e. bolted, welded, clamped, etc.) metal guard rails may be used, particularly for protecting openings, holes and edges associated with floors, platforms, walkways, etc. The top rail must be positioned at a height of between 900 mm and 1,100 mm above the working surface, and a mid-rail must be provided;
- Concrete Jersey barriers can be used for the routing of traffic and when work is being conducted in or alongside a roadway. Regardless of the type of barricade used, the following requirements must be met:
  - The installation, alteration and removal of barricades must be supervised by a competent person;
  - The barricading must be uniformly and perceptively configured and be stable, conspicuous and effective;
  - The barricading must completely surround the work area / hazardous area;

- General access requirements around the work area / hazardous area (such as pedestrian walkways, operational access, or general thoroughfares) must be taken into consideration when erecting a barricade;
- The extent of the area that is barricaded must be kept to a minimum so as not to unnecessarily restrict access to other areas. If access routes to other areas are blocked by the barricade, alternative routes must be identified and signposted;
- All barricaded areas must have properly designated points of entry / exit for personnel and / or vehicles.
- Additional signage providing warning of specific hazards (e.g. falling objects, electricity, etc.) including, "NO UNAUTHORISED ENTRY", must be attached to all points of entry and, where required, to the barricading itself. The signage must be visible from all angles and must be large enough to be read from a distance of 10 metres;
- All barricades must be properly maintained and repaired as required;
- When the work has been completed and the hazard has been eliminated, all barricading must be removed without delay. A barricade may not be left in place if no hazard exists;
- Before a barricade is removed (allowing general access), the area must be inspected by the person responsible for the work that was carried out, to ensure that the area is once again safe. If applicable, the person accepting the area back for general use shall do so on completion of his own safety inspection;
- Authorisation to remove (or modify) a barricade may only be granted by the person responsible for the erection of the barricade.

## 16.7

### Excavation

All excavation must be properly planned. Site-specific conditions and hazards must be considered, including traffic, overhead and buried utilities, proximity to nearby structures, soil properties, presence of surface and / or ground water, position of the water table, and weather conditions.

Excavation work may only be carried out under the supervision of a competent Excavation Supervisor who has been appointed in writing.

Before commencing with excavation works, the principal contractor will verify that:

- A detailed Risk Assessment has been conducted for the work to be performed;
- A Safe Work Procedure is in place; and
- No buried services are present in the area where the excavation works are to be carried out. As a minimum, the Risk Assessment must consider hazards / risks associated with:
  - A person being trapped or buried as a result of an excavation collapsing;
  - A person being struck by an object falling into an excavation;
  - A person falling into an excavation;
  - A person being exposed to a hazardous atmosphere within an excavation (i.e. an oxygen deficiency, explosive or flammable gases, and / or harmful concentrations of a contaminant); and
  - Contact with belowground services.

On a plan (drawing) of the work area, the contractor together with the client must accurately indicate the position and dimensions of each intended excavation in order for it to be determined whether or not buried services would (or may) be encountered, such as electrical cabling, communications cabling, gas, fuel, potable water, fire water, effluent, sewage, or storm water pipelines. In addition to a desk top review of existing drawings, a field survey must be carried out to verify the presence or absence of buried services.



The positioning of all known belowground services must be accurately demarcated in the field before any excavation work commences. Should there be any uncertainty, a pipe / cable locator must be used to determine if buried services are present, and if so, the positioning of the services. If buried services are identified (or are suspected to be present) then the excavation plan must be altered if necessary, to avoid these services. If the excavation plan cannot be altered, then safe work methods (e.g. careful excavation by hand) must be specified and measures must be put in place to minimise risk to personnel and prevent damage to the service(s).

Machinery may not be used to excavate material lying within one metre of any belowground service (i.e. cable or pipe). All controls, precautions and restrictions identified in the Risk Assessment must be strictly observed / fully implemented.

The Excavation Supervisor must discuss these controls, precautions and restrictions with all personnel who will be carrying out the work.

All personnel working in or near any excavation must wear high visibility protective clothing / overalls with reflective taping. Unexpected structures (e.g. tanks, brick work, concrete work, etc.) or services (e.g. cables, pipelines, etc.) as well as unusual conditions (e.g. inconsistent materials, voids, historic artefacts, etc.) that are encountered during excavation work must be reported immediately.

All work must cease until the nominated project management representative provides authorisation to continue. If an excavation is more than 1.2 metres deep and people have to enter it, then the sides of the excavation must be suitably battered, benched, or shored, unless a registered professional engineer confirms in writing that there is no risk of the excavation collapsing (i.e. that the sides of the excavation are stable without battering, benching or shoring). If the sides of an excavation are battered (sloped), then this must be done at an angle that is suitable for the given soil conditions (as determined by the geo-tech report). When it is not possible to batter (or bench) the sides of an excavation to a safe angle, then the sides of the excavation must be suitably shored. The shoring must be installed and removed using a predetermined safe method. Only approved shoring systems and equipment may be used. Shoring requirements must always be determined and designed by a competent person for the specific conditions encountered at the excavation site.

All material removed from an excavation (spoil) must be placed no closer than three times the depth of the excavation away from the edges of the excavation. The profile of this spoil must be flattened out to prevent the material from being washed back into the excavation by rainwater. Scaling must be carried out on the sides of all excavations to remove loose material. Protective shields / barriers must be erected (when required) between the sides of an excavation and the work area in order to protect employees from falling, rolling or slumping rock, soil, or materials.

Employees may not work on the faces (sides) of battered (sloped) or benched excavations at levels above other employees unless the employees at the lower levels are provided with adequate protection from falling, rolling, or sliding material or equipment. Tools, equipment and materials may not be placed within two metres of the edges of an excavation. Alternatively, a suitable retaining device may be used to prevent tools, equipment and materials from falling, rolling or sliding into an excavation.

No vehicle or item of mobile equipment is permitted near an edge of an excavation. Mobile equipment may not operate in or near an excavation whilst personnel are working within the excavation. To ensure that adjacent structures (such as buildings, walls, or sidewalks) remain stable during excavation work, support systems such as shoring, bracing, or underpinning must be provided if required. Excavation below the base or footing of any foundation or retaining wall is prohibited unless: A support system is provided such as underpinning; the excavation is in

stable rock; or a registered professional engineer determines that the structure is far enough away from the excavation that no hazard exists.

To prevent persons and / or mobile equipment from accidentally falling into an excavation and to prevent unauthorised entry into an excavation, rigid barricading must be erected around every excavation that is deeper than 500 mm. Warning signage must be prominently displayed and, if necessary, flashing warning lights must be used at night. The barricading must remain in place for as long as the hazard (i.e. the excavation) exists. Sections of barricading around an excavation may only be removed (and then only temporarily) to enable excavation work to continue. For each excavation more than 1.2 metres deep, safe means of access and egress (e.g. ladders, steps or ramps) must be provided for employees working in the excavation. Safe entry / exit points must be located every 15 metres along the side(s) of an excavation (i.e. an exit point must not be more than 7.5 metres away from any employee working in the excavation).

Before any person enters an excavation more than 1.2 metres deep, the air within the excavation must be tested by a competent person (i.e. an appointed Excavation Supervisor) to confirm that it is safe to enter.

If a hazardous atmosphere exists within any excavation (i.e. an oxygen deficiency, the presence of explosive or flammable gases, and / or harmful concentrations of a contaminant) or if there is a possibility that a hazardous atmosphere may develop, then the excavation must be declared a confined space. Furthermore, an excavation must be considered a confined space if any risk of entrapment or engulfment exists. If an excavation is declared a confined space, then all precautions and requirements pertaining to confined spaces must be implemented / complied with.

Any water and / or sludge present within an excavation must be removed completely before any work commences in the excavation. Using ditches, dykes, sumps and pumps, or other suitable means, surface water must be prevented from entering an excavation and areas lying adjacent to an excavation must be adequately drained. If equipment is used to prevent water from entering an excavation or to prevent water accumulation within an excavation, then the equipment must be monitored by a competent person to ensure that it remains operational and effective.

Suitable lighting must be provided in and around any excavation in which work must be carried out at night. A high standard of housekeeping must be maintained in and around all excavations. Tools that are not in use, and materials that are no longer required, must be removed from an excavation to prevent these items from causing injury or being lost (buried). A register of all excavations must be compiled and maintained. A competent person (i.e. an appointed Excavation Supervisor) must inspect each excavation:

- At the start of each day (or shift) before work commences within the excavation;
- After any alteration is made to the excavation or shoring;
- After rainfall;
- After any blasting activity carried out in the vicinity of the excavation; and
- After any event that may have affected the strength or stability of the excavation or the shoring.

An excavation must be inspected for collapses, signs of instability, failures or signs of overloading of protective systems and equipment, hazardous atmospheres, water accumulation, and any other hazardous condition that may arise. The sides of an excavation as well as the surface of the ground around the excavation must be carefully inspected for signs of instability including fissures (cracks), slumping, and bulging. Shoring must be carefully inspected for signs of overloading (e.g. distortion). If a hazardous condition is identified, no person may enter the excavation until suitable corrective actions have been taken / suitable controls have been put in place to either eliminate the hazard or reduce the risks to acceptable levels. A record of each

inspection (including date, time, findings, and signature of the Excavation Supervisor who carried out the inspection) must be captured in the excavations register. Each inspection record must include a declaration as to whether the excavation is safe to work in or not.

All excavations must be monitored closely throughout each workday (or shift) by the Excavation Supervisor. Furthermore, an employee acting as a safety observer (who will be able to initiate emergency response procedures if required and identify the location of any trapped / buried persons in the event of a collapse) must be stationed at ground level outside of each excavation in which work is being carried out. If a hazardous condition is identified while work is being carried out in an excavation, then all personnel in the excavation must be evacuated to safety without delay. Under no circumstances may a person work alone in an excavation. Excavations must be backfilled as soon as possible, and the material used (usually the original material) must be properly compacted. Where belowground services are present, the material used to backfill an excavation must be such that the services will not be damaged. A 200 mm layer of a material that is dissimilar to the general backfill material must be placed immediately above any buried service. An excavated area must be restored to its original condition if at all possible.

## 16.8 Trenches

The Principal Contractor must implement and comply with **Construction Regulation 13**.

The Principal Contractor must ensure that all excavation (trenching) work is carried out under the supervision of a competent person who has been appointed in writing.

A risk assessment must be conducted for any excavation (trenching) works.

A Permit to Work must be established before commencing any excavation work

Barricading is provided around all holes or openings to prevent any person being injured as a result of a fall.

Where it is impracticable to provide fixed guard railing, effective removable barriers are provided at all unguarded openings in guard railing or floors and is maintained in position at all times until the hazard no longer applies.

Personnel must immediately report any unusual conditions that may be found, such as underground power cables, pipelines, sewers or inconsistent materials. to the Client representative and, if risk to personnel safety is involved all work is to be stopped until approval to continue is granted by the Client representative.

Safe access and egress is to be provided and sides battered or shored to the satisfaction of the Client representative.

All excavations must be on register and inspected daily before work commences and after inclement weather by the Principal Contractor appointed competent person and declared safe and his findings noted in the said register.

Note: No loose material is allowed within 1m of the cable trench edges.

## 16.9 Cranes and lifting equipment

### 16.9.1 *Design, Manufacturing and Safety Features*

Before any crane / hoist is operated on the project premises (i.e., new to site), it must be formally accepted (authorised) by the nominated project management representative. The acceptance process must be based on an inspection and must take the crane's / hoist's safety features and cabin ergonomics (if applicable) into account. The same process must be followed before any crane / hoist is returned to service following any modification or repair. Note: An equipment profile (dossier) must be compiled for each crane.

The Safe Working Load (SWL) must be clearly indicated on each crane, hoist, and item of lifting equipment. If the safe working load (rated capacity) of a crane varies with the conditions of use (i.e. varies with the angle of the boom and the boom length) then the manufacturer's load chart(s) indicating the crane's rated capacity at various boom lengths and angles must be available in the crane cabin. If the crane has a single load chart, it must be displayed in a position visible to the crane operator. If the crane has numerous load charts, they must be easily accessible to the operator.

Each crane, hoist, the manufacturer's operating manual must be available to the operator. The load chart(s) and operating manual for a crane / hoist must be in a language understood by the operator.

All lifting hooks must be fitted with a safety latch to prevent the load from accidentally detaching, unless otherwise specified in a risk assessment.

Each crane / hoist must be fitted with a load cell (with the mass of the load displayed in the visual range of the operator) and a load limiting device to prevent the crane / hoist from being operated outside of its safe working limits.

Where practicable, each crane must be equipped with an upper hoist limit switch (or anti two block device) to prevent the hook block from colliding with the drum, and a lower hoist limit switch to prevent the rope on the drum from unwinding completely. These systems must provide both a visual and an audible alarm to the operator. Under no circumstances may any limit switch or warning device be bypassed, disconnected, or adjusted in order to lift a load higher, or lower a load lower, than the respective switches allow.

Limit switches MAY NOT be adjusted to stop the hoist at a particular height under normal operating conditions – these are safety devices, and as such, should not be used as operating tools. Under no circumstances may a load limiting device be bypassed or disconnected in order to lift a load that exceeds the rated capacity of the crane.

Load limiting devices MAY NOT be used to "measure" or "test" the mass of a load – these are safety devices, and as such, should not be used as operating tools. Each overhead travelling crane (including cranes operated using a manual chain drive) must be fitted with an audible travel alarm or an equivalent warning device.

Only items of lifting equipment (tackle) that have been designed and manufactured with adequate factors of safety may be used on site. The following minimum factors of safety (with respect to the Safe Working Load) must be met: Ten (10) for natural-fibre ropes; Six (6) for synthetic-fibre ropes or woven webbing; Six (6) for steel-wire ropes; Five (5) for steel chains; and Four (4) for high-tensile or alloy steel chains.

#### **16.9.2      *Planning and risk assessment***

For each critical lift that must be carried out on site, a documented and detailed lift plan and risk assessment must be prepared to address all associated hazards. Only suitable qualified, competent and experienced persons (lift planners) may evaluate critical lifts and prepare lift plans. No Lifting over the R573 may be done while traffic movement is allowed. A stop go must be in place to prevent any traffic movement during ant rigging activities over the road.

The lifting supervisor, crane operators, riggers and spotters responsible for carrying out a critical lift must have input into the lift plan and risk assessment and must be consulted before these documents are finalised. All lift planners, lifting supervisors, crane operators, and riggers must be appointed in writing.

No road closures may be affected without approval from the managing consultants Resident Engineer responsible for the road construction as well as the SANRAL project manager

No critical lift may commence until the lift plan and risk assessment have been authorised by the nominated project management representative. Critical lifts include: All multiple (including dual) crane lifts; Lifts where the operational arcs of two or more cranes can overlap; Lifts over operating facilities where this may endanger personnel; Lifts over or adjacent to power lines; Any lift carried out in close proximity to equipment or a vessel containing a flammable or toxic substance; Lifts where the centre of gravity of the load could change; Any lift where the total weight on the hook exceeds 50 tonnes; Lifts near the rated capacity of the crane (i.e. exceeding 85% of the rated capacity at the working radius); Any lift when the wind speed (including gusting) exceeds 32 kilometres per hour; Lifts involving a man basket / safety cage; Lifts to and from water; Lifts requiring specialised equipment or involving complicated lifting / rigging configurations; Lifts requiring non-standard rigging / slinging techniques; Lifts involving the simultaneous use of more than one hoist on the same crane; and Any other lift deemed to be critical by a nominated project management representative, or assessed as critical during a risk assessment.

The lift plan for a critical lift must include:

- General Information – crane manufacturer, crane model, items to be lifted, and reason for lift;
- Lift Data – load weight, lifting block and hook weight, hoist rope weight, rigging weight, total weight, height of lift, radius of lift, surface area of load, and centre of gravity of load;
- Rigging Data – sling material (chain, wire rope, or synthetic), sling diameter, sling length, sling configuration, sling capacity, hook type, shackle size and capacity;
- Soil / ground competency – the ability of the ground
- Lift Computation – boom length, jib length, radius of lift, crane capacity as configured, size of outrigger footplates, and wind speed;
- Proximity to Power Lines – mobile cranes working in proximity to energised power lines must operate under a Permit to Work, which must define exclusion zones and spotter duties; and
- Local Hazards and Controls – including the route for the crane, ground stability, proximity of people or equipment, and agreed communication method.

Lifts that are not subject to detailed lift plans (i.e. lifts that are not considered critical) must nevertheless be risk assessed, be properly planned and executed. The use of a crane-suspended man basket (safety cage) may only be considered when all other avenues to safely perform the work (e.g. ladder, scaffolding, mobile elevating work platform, etc.) have been exhausted.

If a crane must be operated in proximity to energised overhead power lines (or any other exposed electrical conductors) then minimum clearance distances (specified by the electrical power utility, Municipality or ESKOM) must be observed. Whenever possible, power lines must be de-energised and isolated while lifting operations are carried out.

### **16.9.3 Operation**

At the start of every day / shift, the operator of a crane / hoist must carry out a pre-operation safety check using a prescribed checklist. The specific requirements of the pre-operation safety check (and associated checklist) must be based on: Risk that addresses all aspects of safe operation of the crane / hoist; and the inspection recommendations of the manufacturer.

As a minimum, the pre-operation safety check must include: A thorough visual inspection of all wire ropes, chains, hooks and safety latches, hook blocks, sheaves, hydraulic hoses, electrical

cables, and the general condition of the crane / hoist; Checks to confirm the serviceability of the operating controls; Tests to confirm the correct operation of all limit switches, emergency shutdowns, load indicators, alarms and other safety devices; and A thorough visual inspection of all lifting equipment (tackle) to be used.

The operator must:

- Check for any loose or missing parts;
- Make sure that the wire rope (or chain) of the hoist is properly seated in its drum and sheave grooves without any slack or overlapping;
- Operate each control to make sure it functions properly, releases immediately, and does not stick.
- Each control must be labelled to indicate its function;
- Listen for any unusual mechanical noises and look for any jerky movements while operating the crane and / or hoist several feet in each direction that it travels;
- Check the functionality of the upper and lower hoist limit switches (if applicable) by slowly raising and then lowering the block to trip the respective switches;
- Check all hooks. Hooks must not be cracked, stretched, bent or twisted. Each hook must have a safety latch that automatically closes the throat of the hook. If the latch is bent, has a broken spring, or is otherwise damaged, it must be repaired before use. Hooks must rotate freely in the block assembly without any "grinding" felt or heard;
- Check the wire rope by lowering the block to its lowest level and looking for the following signs of damage: Reduced rope diameter. This may indicate that the rope has been stretched, has lost its inner core support, or has worn outside wires; Broken wire strands (any number); Kinked, crushed, cut, or "bird caged" wiring, or wiring with heat damage;
- Check all chains for damage including wear at contact points, cracks, or distorted links (bent, twisted or stretched). All mechanical coupling links must be inspected to ensure that the linking pins are secure and in good condition. The capacity rating of each chain must be adequate for the load and the attachment method;
- Check the condition and capacity of wire rope and nylon / synthetic web slings. Capacity ratings must be legible on the manufacturer's label. The capacity of the sling being used must be adequate for the load and the attachment method. A sling must be replaced immediately if it is excessively worn.

The operator must report any fault, defect or damage to his supervisor immediately. A crane / hoist must not be operated if any safety device is out of order or defective, or if any rope, chain, hook or other component is worn or damaged. Completed checklists must be made available (on request) for inspection by the nominated project management representative. Wherever possible, these checklists must be kept with the crane / hoist.

All lifting operations must be supervised by suitably qualified, competent and experienced supervisors.

An effective method of communication between the crane operator and those assisting with the lift must be in place and suitable Safe Work Procedures for crane operations.

#### **16.9.4      *Inspection, testing and maintenance***

Any crane / hoist brought onto the project premises must have a current test certificate and record of inspection as well as a suitable checklist (derived from the crane / hoist manufacturer's inspection recommendations) for use by the operator(s) when carrying out pre-operational safety checks.

A register of all cranes / hoists and lifting equipment (tackle) brought onto the project premises must be compiled and maintained. Each crane / hoist and item of lifting equipment must have a unique identification code or number, which must be referenced in the register.

For each crane / hoist and item of lifting equipment, the following documentation must be kept on site and must be made available (on request) to the nominated project management representative for inspection: Test records and certificates; Inspection records; and Maintenance records.

All cranes / hoists and lifting equipment must be inspected, tested and confirmed fit for purpose / accepted safe for use: Before being operated or put into service; Before being returned to service following any repair or modification; and Periodically as follows (unless local regulations require examination more frequently):

- Each crane / hoist (including all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices that form an integral part of the crane / hoist) must be thoroughly examined by a competent, experienced and appointed person every 6 months;
- Each crane / hoist must be subjected to an annual performance test (i.e. a load test) by a competent, experienced registered authority; and
- All lifting equipment (tackle) must be thoroughly inspected by a competent, experienced and appointed person every 3 months.

The system of inspection and testing must provide verification that each crane / hoist is able to function to its design specifications, and must verify the integrity of: Mechanical and electrical components; Controls; Cables and all lifting attachments; Structural components including boom, hoist, brakes, wheels, hooks, baskets, out-riggers, hook-blocks and rails; and Load limiting devices, hoist limit switches, alarms / warning devices, and other safety devices and control systems (including independent fail-safe braking systems, devices to stop the crane / hoist such as a dead man's switch, and emergency shut-off switches).

A preventative maintenance system must be in place to ensure that all cranes / hoists are maintained in a safe and serviceable condition. For any crane / hoist, all inspections, testing, maintenance and repairs must, as a minimum, be carried out in compliance with the requirements and specifications of the manufacturer as well as all applicable regulatory requirements (in terms of both the frequency of inspection / testing / maintenance and the physical condition of the crane / hoist).

Repairs to a crane / hoist may only be carried out by competent persons. After repairs have been made, the crane / hoist must be tested and recertified fit for purpose (unless the repairs did not affect the integrity of the lifting mechanism).

Any modification to a crane / hoist must be subject to the approval of the original equipment manufacturer and a rigorous change management process.

Each item of lifting equipment (tackle) must be tagged following each quarterly (3-monthly) inspection. Details of these inspections must be recorded in the lifting equipment register which must be made available to the nominated project management representative on request.

The following colour coding system must be used for the tagging of all lifting equipment on the project:

**Table 3 - Lifting equipment colour coding**

Quarter	Tag Colour
January – March	Blue
April – June	White
July – September	Green
October – December	Yellow

The tag placed on an item of lifting equipment must be traceable to an entry in the lifting equipment register where the following information concerning the inspection of that item of equipment must be recorded: Item description; Unique item identification code or number; Item owner; Date of inspection; Name and signature of competent person who carried out the inspection; and any comments concerning the inspection.

Any item of lifting equipment that is found to be damaged or defective must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired and recertified (if possible) or destroyed to prevent further use. Similarly, any lifting equipment that is known (or is suspected) to have been overloaded must be removed from service immediately and destroyed to prevent further use. If an item of lifting equipment is removed from service or destroyed (scrapped), this must be indicated in the lifting equipment register. Any item of lifting equipment without a tag may not be used.

#### **16.9.5 Training and Competency**

Only suitably trained and competent persons who have been authorised in writing by the contractor's Construction/Project Manager are permitted to: Evaluate and plan critical lifts; Supervise lifting operations; Operate cranes / hoists; Use lifting equipment, and rig (sling) loads; Provide signals for controlling lifts; and Inspect, maintain or test cranes / hoists and lifting equipment.

Each operator must meet the competency requirements for the particular class / type of crane / hoist to be operated. Depending on the project location and applicable legislation, operators may need to hold a certificate of competency issued by a recognised training institution.

### **16.10 Scaffolding**

#### **16.10.1 Training, Competency and Supervision**

Scaffolding may only be erected, maintained, altered or dismantled under the strict personal supervision of a competent Scaffolding Supervisor (or Scaffolding Inspector) appointed in writing by the contractor.

Scaffolding can only be erected, maintained, altered or dismantled by competent and appointed Scaffolding Erectors (or Scaffolding Builders). It is the Scaffolding Supervisor's responsibility to ensure that all employees carrying out such work are suitably trained and experienced. A certificate of competency issued by a reputable (i.e. accredited and approved) training provider must be produced for each Scaffolding Supervisor and each Scaffolding Erector.

#### **16.10.2 Erection and Dismantling of Scaffolding**

Only approved scaffolding components may be used to erect a scaffold. Scaffolding must be erected, modified and used in accordance with the manufacturer's guidelines / recommendations, and in strict compliance with all applicable legislation and standards.

Base width to scaffold height ratios prescribed by regulation or by the manufacturer of the components must be adhered to.



If the scaffolding is to be load bearing (i.e. other than normal access and workplace storage) then full calculations and a design must be prepared and authorised in writing by an engineer. The load limits specified by the scaffolding manufacturer may not be exceeded under any circumstances. All temporary works for the bridge must be designed by a professional engineer taking into account the river bed and the opportunity for flooding.

Scaffolds must be plumb and level at all times. All scaffolding components must be in good condition (i.e. undamaged and free of corrosion). All scaffolding components must be properly connected / secured, and scaffolding must be effectively braced. Scaffolding must be secured to the structure every 6 metres vertically and every 10 metres horizontally (as a minimum).

Adequate underpinning, sills or footplates must be provided for scaffolds erected on filled or otherwise soft ground (including sand or gravel).

Each person erecting, maintaining, altering or dismantling scaffolding must use fall protection at all times (i.e. a full body safety harness with shock absorber and two lanyards fitted with scaffold hooks).

The work must be planned to enable every Scaffolding Erector to be securely anchored at all times. A suitable lanyard length (not exceeding 2 metres) must be selected taking the potential fall distance and height of attachment (height of anchorage point) into account. If the lanyard is too long or the anchorage point is too low, the person may hit the ground / a platform / objects below him before the lanyard is able to break his fall.

The area around the base of a scaffold must be barricaded to prevent unauthorised access into the work area. When scaffolding is erected / dismantled on a level / platform / floor lying above ground level and the potential exists for components to fall to levels below the level on which the scaffolding is positioned, then the area directly below the scaffolding on each of those levels must also be barricaded. Appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed.

Hoists, lifts and approved material baskets must be used (where available) to lift scaffolding components to elevated positions. Where components are passed from hand to hand during the erection / dismantling of a scaffold, each Scaffolding Erector must always stand on three boards and not directly above the person below him. During this process, each Scaffolding Erector must remain within the confines of the scaffold and must expose as little of his body as possible to minimise the risk of being struck by a falling component.

Good communication between team members must be maintained at all times. No scaffolding components, tools, or any other material may be dropped from height or thrown from one level to another. Components / tools / materials must be lowered or lifted in a controlled manner. Use may be made of a chute.

Each tool must be secured to the wrist, harness or structure by means of a lanyard. A tool bag (around the waist or over the shoulder) may be used for carrying tools up and down a scaffold structure. Tools or equipment may not be carried by hand up or down a structure, as both hands must be used for climbing. If necessary, a rope must be used for lifting or lowering tools or equipment.

While a scaffold is being erected or dismantled, no scaffolding components may be stacked on the scaffold structure unless it has been designed for that purpose. Any loading of a scaffold structure must be authorised in writing by an engineer. For special scaffolding, a design must be prepared by the appointed Scaffolding Supervisor and this design must be authorised in writing by an engineer before the scaffolding is erected. Scaffolding may not stand on steel grating unless the grating is adequately supported from below. Scaffolding must rather stand on the

structure that supports the grating. Empty drums, crates or bricks may not be used to prop up, support or anchor scaffolding.

Should the scaffolding require earthing, this must be done as soon as possible while the scaffolding is being erected. Scaffolding may not be erected if it is raining or in winds stronger than 35km/h.

A green tag (displaying the words, "Scaffold Safe to Use") or a red tag (displaying the words, "Scaffold Unsafe to Use") must be prominently displayed on each scaffold at all times. The tag must be positioned close to the base of the ladder / staircase provided for safe access. The wording on the tags must be in English and any other language commonly used on site. As a minimum, a green tag must display the Scaffolding Supervisor's name, the date that the scaffold was erected, and the date that the scaffold was last inspected. Only an appointed Scaffolding Supervisor may attach, change, update the information on, or remove these tags.

Scaffolding must not be: Left partially erected or partially dismantled except for normal work stoppages (for example, over weekends); Left in an unsafe condition (if scaffolding is unavoidably in an unsafe condition, barricading must be in place to prevent unauthorised access and the required red tags must be prominently displayed on the scaffold structure); or Moved or altered while work is in progress.

Mobile scaffolding must be fitted with brakes, which must be engaged at all times when the scaffolding is in use. A scaffold may not be moved if any person is on the structure.

#### **16.10.3 Safe Access**

Safe and convenient access must be provided to every scaffold platform by means of ladders or staircases. Climbing up or down a scaffold on the braces or ledgers is forbidden. All ladders used to access scaffolding must be securely attached to the scaffold structure. Hook-on and attachable ladders must be specifically designed for use with the type of scaffolding being used. If a ladder is used to access a scaffold platform at a height greater than 1.5 metres above the ground, then the ladder must be secured internally (i.e. within the scaffold structure) and there must be an opening (closed with a trap-door) in the platform at the top of the ladder. If the scaffold platform is at a height of less than 1.5 metres above the ground, then the ladder may be attached externally.

No person may climb over or through the guard rails to gain access to a platform. If a vertical ladder used on scaffolding is more than 5 metres in length it must be equipped with a ladder cage extending from a point 2 metres from the base of the ladder to a height of 1 metre above the platform (or the uppermost platform) that the ladder is providing access to. Circular ladder cages must have an internal diameter of no more than 700 mm.

Square ladder cages must have internal dimensions of no more than 700 mm by 700 mm. The requirement for a ladder cage may be waived if platforms are provided at height intervals not exceeding 4 metres, with the vertical ladder secured on the inside of the scaffolding framework and an opening (closed with a trap-door) in each platform.

Vertical ladders must be braced at three metre intervals (as a minimum) to prevent undue movement. All vertical ladders providing access to a platform must be left in place for as long as the scaffold remains in place and must be inspected as part of the scaffold structure. Any deviation from the requirements stipulated above must be subjected to a risk assessment and the nominated project management representative must authorise the deviation in writing.

#### **16.10.4 Scaffolding platforms**

Every work platform must be complete (i.e. from ledger to ledger and from transom to transom without any gaps) in order to prevent personnel, materials, tools, etc. from falling through the platform. Every work platform must be constructed from manufactured nonslip steel scaffold

boards. Timber boards are not permitted under any circumstances. Each steel scaffold board must be securely hooked (fastened) onto the ledgers / transoms that support it.

On all sides except the one facing the structure, every scaffold platform must be provided with: Sturdy guard rails positioned 500 mm above the platform floor (the mid rail) and 1000 mm above the platform floor (the top rail); and Steel toe boards that are at least 150 mm high and securely attached such that no gap exists between the toe boards and the platform floor.

Scaffold platforms must be as close to the structure as is practicable (but not closer than 75 mm) except where personnel need to sit on the edge of the platform while they work in which case the distance may be increased to no more than 300 mm.

Scaffold platforms must, at all times, be kept free of waste, protruding objects, and any other obstructions. Platforms must be cleaned if necessary, to ensure that they are maintained in a non-slip state.

#### **16.10.5     *Inspection of scaffolding***

Every scaffold structure must be inspected by a competent Scaffolding Supervisor: Prior to use after erection, and at least weekly thereafter; After inclement weather (heavy rain, strong winds, etc.); After any incident resulting in jarring, tilting or overloading; After any alteration is made; and Before being dismantled.

On completion of an inspection, the Scaffolding Supervisor must update the information on the scaffold tag. A record of each inspection (date and time of inspection, location of scaffolding, findings, etc.) must be captured in a register. The register(s) must be maintained by the Scaffolding Supervisor(s) carrying out the inspections.

#### **16.10.6     *Using scaffolding***

The user of a scaffold (i.e. the responsible supervisor) must inspect the erected structure prior to acceptance and must ensure, as far as is reasonably possible, that the scaffold is safe and fit for purpose before allowing his or her team to make use of the scaffold. In particular, the user must ensure that:

- The scaffold and the platforms have been constructed to meet the loading requirements of the work that is to be carried out (the Scaffolding Supervisor must be consulted in this regard);
- The Scaffolding Supervisor has checked that adequate ties and braces are in place;
- The work platforms are in the correct positions and are complete with toe boards and guard rails;
- Safe and convenient access has been provided (ladders and / or staircases); and
- A green ("Scaffold Safe to Use") tag has been attached to the scaffold by the Scaffolding Supervisor. Use of an incomplete / unsafe scaffold is prohibited. Unsteady or non-rigid scaffolds must not be used, and inadequacies must be reported to, and rectified by, the responsible Scaffolding Supervisor.

The user of a scaffold must ensure that every employee in his or her team is aware that no alterations to the scaffold may be made by the team during the course of their work, and that if any alterations are required, they must be made by competent Scaffolding Erectors under the supervision of an appointed Scaffolding Supervisor. A scaffold may not be used:

- If a red tag is displayed indicating that the scaffold is unsafe to use; or
- During inclement weather, defined as wind speeds greater than 40 km/h, thunderstorms, or heavy rain (in excess of 40 mm/h).

**Note:** With due consideration of possible educational limitations, the contractor must ensure that all employees understand what green and red tags mean.

The area around the base of a scaffold must be appropriately barricaded to prevent unauthorised access into the work area. Appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed. Loose tools and / or materials on scaffold platforms must be secured using lanyards, wire or fibre rope, or must be placed in secured containers. Where appropriate, "catch nets" deemed may be installed as an additional safety measure to prevent materials / tools from falling to the ground. The storage / placement of materials on scaffolding platforms must be kept to a minimum.

Debris as well as tools and materials that are no longer required must be removed from all working platforms at least once per day. Scaffolding platforms must be cleaned regularly.

A heavy load may not be placed on a scaffolding platform unless the scaffold has been designed and constructed specifically for that purpose. Any loading of a scaffold structure must be authorised in writing by an engineer. Scaffolds may not be used as hoisting towers or to support piping or equipment.

Each person working from scaffolding must wear fall protection (i.e. a full body safety harness with shock absorber and two lanyards fitted with scaffold hooks) and must be securely anchored at all times.

All work must be carried out from properly constructed work platforms. Standing on railings or braces in order to perform work is forbidden. Drums, boxes and other makeshift substitutes for scaffolding may not be used under any circumstances.

Where work on an electrical system has to be undertaken from a scaffold, an electrical engineer must determine whether or not the scaffolding structure requires bonding and earthing. The scaffolding may not be used until this has been determined, and if required, until the structure has been bonded / earthed.

#### **16.10.7     *Identification, storage and inspection of scaffolding components***

All scaffolding belonging to the contractor must be properly marked to enable positive identification. Prior to erecting a scaffold, all scaffolding components must be carefully inspected by a competent Scaffolding Supervisor.

Components found to be defective during an inspection must be conspicuously marked and removed to a suitably demarcated quarantine area for destruction, repair, refurbishment or removal from site. Deformed and bent wedges must be straightened and inspected for cracks before being put back into service.

All scaffolding components must be stored in a demarcated storage area in such a manner that they are not exposed to environmental extremes and will not cause injury to persons. Suitable barricading or fencing must be erected, and warning signage must be posted (e.g. No Unauthorised Entry).

Within a storage area, scaffolding components must be stacked such that pathways (750 mm in width) are maintained between the stacks. Each stack must be stable, and components must be neatly placed to ensure that no ends protrude into any pathway. The various components must be stacked separately. The weight of scaffolding components must be considered when stacking them in elevated positions. Any storage area for scaffolding components must be positioned such that it will not interfere with any onsite activity (including the operation of any plant or equipment), block any access way, or obstruct access to any plant or equipment. Before establishing a storage area, the location must be agreed with the nominated project management representative.

## 16.11 Working at height

Fall prevention or fall protection measures must be in place for all work carried out from a fall risk position.

### 16.11.1 Fall prevention

**Work Platforms:** Wherever practical, a safe working area must be provided by means of a work platform with fixed edge protection. This may include: A fixed work platform or walkway (i.e. a fixed steel structure); a fixed or mobile scaffold; or An Elevating Work Platform (EWP) such as a scissor lift, man lift, boom lift or cherry picker.

All work platforms and walkways elevated one metre, or more must have complete floors and edge protection must be in place in the form of toe boards and sturdy guard rails / barricades properly secured (i.e. bolted, welded, clamped, etc.) to prevent accidental displacement.

Safe access and egress must be provided. Guard rails must be capable of withstanding a force of at least 100 kilograms applied in any direction at any point. The top rail must be positioned at a height of between 900mm and 1100mm above the working surface, and a mid-rail must be provided.

**Stairways:** Each flight of stairs having four or more risers must be fitted with handrails. Handrails must be installed on both sides of every stairway. Riser height and tread width must be uniform throughout any flight of stairs, including any foundation structure used as one or more treads. Stairways must be free of hazardous projections, such as protruding nails. No materials, equipment or waste may be placed on or beneath any stairway.

### 16.11.2 Fall protection

Before carrying out any work where a risk of falling exists (or where a risk of falling onto dangerous equipment / machinery exists): A Fall Protection (and Rescue) Plan must be prepared by a competent person and submitted to the nominated project management representative for approval (the contractor must ensure that this plan is implemented); A detailed task-specific Risk Assessment must be carried out.

Fall protection must be used at all times whenever there is a risk of falling while working above the ground (or above a platform, floor or surface), and whenever there is a risk of falling onto dangerous equipment / machinery. An employee has fall protection if he is secured by means of an approved full body harness (well fitted) with shock absorber and two lanyards (where the potential to fall is greater than 4 metres) or two short restraining lanyards (where the potential to fall is less than 4 metres), and secure anchorage points (an employee's lanyard may be attached either directly to an anchorage point or indirectly through the use of a variety of systems that incorporate a lifeline). Note: When selecting fall protection equipment, care must be taken to ensure that the potential fall distance is greater than the height of the person plus the length of the lanyard with its shock absorber deployed (taking the height of attachment into account).

Anchorage points must, where practical, be above the head of the employee, and must ensure that in the event of a fall the employee will neither swing nor touch the ground. All permanent anchorage points must be designed and approved by a professional engineer. All anchorage points must be periodically inspected and tested by a competent person to ensure that they are secure and can support the required load.

A system must be in place to identify anchorage points as authorised for use. Temporary anchorage points (and lifeline systems) may only be used if a competent person has certified them safe to use.

If an elevating work platform is used, such equipment must be fitted with a fixed anchorage point for the attachment of fall protection equipment. The use of fall protection (fall arrest or fall

restraint) systems must be avoided wherever and whenever possible through design, the installation of physical barriers that protect employees from falling, and employing alternative methods of working. Only if physical barriers protecting against free falls cannot be installed must fall protection equipment be used.

Fall protection (fall arrest or fall restraint) systems are items of personal protective equipment and, if required, must be purchased, installed and provided to employees. Prior to commencing with any work at height, an assessment must be conducted to determine if the work requires the use of fall protection equipment, and if so, which fall protection system is the most appropriate for the work.

There must be a system for ensuring that fall protection equipment is: Tested and certified for use; Inspected by the user before use; and Destroyed following a fall or where inspection has shown evidence of excessive wear or mechanical malfunction.

All employees that are required to work at height (in order to carry out routine or non-routine tasks) must first be trained and certified competent to do so.

All employees required to use personal fall protection equipment must be trained and certified competent in the correct selection, use, maintenance and inspection of such equipment. All fall protection equipment must be thoroughly inspected on at least a quarterly basis by competent persons appointed in writing and each item of equipment must be tagged to show when it was last inspected. All inspections must be recorded in a register. On finding defective or damaged equipment, appropriate action must be taken by the competent person (i.e. the destruction of the equipment to prevent further use).

Employees making use of personal fall protection equipment must do so in strict accordance with the instructions or requirements specified by the manufacturer / supplier of the equipment or system. Specific pre-use inspection, maintenance and fitting protocols must be established in accordance with the manufacturer's requirements / guidelines and these protocols must be followed by all users of the fall protection equipment.

Solvents may not be used to clean fall protection equipment. Only manufacturer-approved cleaning solutions may be used. No employee required to use personal fall protection equipment may work in isolation (a minimum of two employees working together is required). Adequate supervision must be in place at all times for work being carried out at height.

There must be a system for preparing and testing emergency rescue procedures for fall victims. Note: Even though there is no risk of free fall, fall protection equipment may be required in situations where there is a risk of falling, slipping or sliding down a slope of more than 45 degrees. Note: The maximum service life of fall protection equipment manufactured of synthetic fibre shall be 5 years from the date of first use and / or manufacture unless otherwise specified by the manufacturer.

An employee may climb or descend a ladder without fall protection provided that he is able to use both hands and legs to do so, faces the ladder, and uses one step at a time. The ladder must be tied off or supported at its base.

Prior to any roof work being performed / prior to employees accessing a roof, an engineer must verify that the roof is of sound construction and that it is capable of supporting the weight of the employees as well as any equipment that may be required. Should the engineer's findings be to the contrary, alternative methods of performing the work must be found.

### **16.11.3 Risk assessment and planning**

The following documentation is required for any work where fall protection is required (i.e. where a risk of falling exists): A Fall Protection (and Rescue) Plan; and A Risk Assessment for the task to be performed.

As part of the Risk Assessment and planning processes, the following must be considered:

- Hazards relating to accessing the location at height; the nature of the work location;
- The nature of the work activities to be undertaken at height; Environmental / weather conditions;
- The presence of nearby persons who may be at risk due to falling objects (potentially) or who's activities may be affected by the work being performed at height;
- The selection of fall protection equipment and / or access equipment;
- The selection of anchorage points;
- The load ratings of access platforms, work areas, anchorage points, etc.
- The need for multiple employees and the means of communication;
- A rescue plan that addresses retrieval / rescue contingencies;
- The use of a mobile elevating work platform, man basket, suspended scaffold or boatswain's chair; and
- Any other conditions that may affect the safe execution of the task.

### **16.11.4 Mobile elevated work platforms**

Before hiring or purchasing an elevating work platform (e.g. a scissor lift, man lift, boom lift, cherry picker or similar equipment), the certification of the equipment (with regard to suitability of design and construction) must be verified.

Before using an elevating work platform, it must be verified that the equipment is in good working order and has been serviced regularly. The service record and instruction manual must be kept on site. A system must be in place to ensure that the equipment is maintained and inspected as required by the manufacturer / local regulations. Employees (operators) must be formally trained through an accredited training provider and certified competent in the operation of the equipment. Once an employee has been issued with the necessary licence / qualification as required under local regulations, he must be appointed in writing to operate the equipment. Before using an elevating work platform, the operator must inspect the equipment and a pre-use checklist must be completed.

The operator of an elevating work platform must be in the "basket" unless it can be demonstrated to the satisfaction of the nominated project management representative that this is not possible / practical.

Every employee in the "basket" must keep his feet on the floor at all times. Every employee in the "basket" must be secured at all times by means of personal fall protection equipment attached to an approved anchorage point, and systems must be in place to prevent tools and equipment from falling.

A mobile elevating work platform must not be driven unless the "basket" has been lowered and secured in a stable position.

Every elevating work platform that is used must be equipped with a dead man's switch or foot pedal at the operator controls. An elevating work platform must only be operated on a firm surface with the outriggers extended (where fitted).

An elevating work platform must not be operated on a grade or slope beyond the capability of the machine (every mobile elevating work platform that is used must be fitted with an

inclinometer which sounds an audible alarm before the maximum safe incline has been reached). The area beneath the "basket" and the boom must be barricaded.

#### **16.11.5 Man baskets**

The use of a man basket, may only be considered when all other avenues to safely perform the work (e.g. ladder, scaffolding, mobile elevating work platform, etc.) have been exhausted. Authorization to use a man basket must be obtained from the nominated project management representative. If permission is granted, the use of such equipment must be in strict compliance with all applicable legislation.

An employee working from a man basket must remain within the basket and must keep his feet on the floor at all times. Each employee working from a man basket must be in possession of a valid medical certificate of fitness and must be trained in the Safe Work Procedures pertaining to the use of the equipment, as well as the Fall Protection Plan.

Each employee working from within a man basket must wear personal fall protection equipment at all times (i.e. an approved full body harness connected by means of a shock absorbing lanyard to an anchorage point or lifeline that does not form part of the basket / chair).

If suspended using a crane, the man basket must be visible to the crane operator at all times. A suitable means of communication must be in place to ensure that the suspended employee(s) are able to communicate with the crane operator and personnel on the ground.

The crane operator must remain at the controls at all times while the man basket is occupied. Where feasible (and if it is safe to do so), tag lines must be used to stabilise the man basket.

Only an approved man basket may be used. Driven Machinery Regulation 18.8 require approval by an inspector prior to using a man basket. The manufacturer's procedures and conditions for use must be strictly complied with at all times.

Each man basket or suspended scaffold must be fitted with an information plate indicating the maximum weight and number of persons that may be lifted. Copies of the welding x-rays and engineering drawings must be kept on site. Any work involving the use of a man basket, must be carried out under the supervision of a competent person who has been appointed in writing.

A man basket must be thoroughly inspected (examined for damage) by a competent person prior to use (every time the equipment is used) and the results of each inspection must be recorded in a register.

The crane as well as all lifting equipment (tackle) that is used to suspend the man basket, must be tested and inspected.

#### **16.11.6 Falling objects**

In the process of planning work activities, the risks associated with falling objects (i.e. materials, tools or equipment) must be assessed and appropriate control measures must be identified, implemented, and monitored taking the following hierarchy of control into consideration: Preventing objects from falling – by using containment sheeting, toe boards, lanyards to secure tools (to the employee or to the structure), ropes or chains to secure equipment (to the structure), lift boxes, brick cages, etc. and by properly securing loads when lifted by crane or hoist; Protecting people from falling objects – by establishing barricaded exclusion zones, installing catch platforms or catch nets, displaying warning signage, and posting safety watchers / traffic controllers; and Personal Protective Equipment (particularly safety helmets and safety boots) – protective equipment is a last line of defence and must be worn. Where overhead work is being carried out, barricading must be erected around the work area (at the level at which the



work is taking place and at every level below including ground level) to prevent people from entering such an area and potentially being struck by falling objects. Wherever hazards related to falling objects exist, appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed.

No items are permitted to lie loose in elevated positions (e.g. nuts and bolts must be securely stored) and good housekeeping standards must be maintained at all times. No tools, equipment, material, debris, waste, etc. may be dropped from height. Objects must be lowered or chuted to ground level in a safe and controlled manner.

## **16.12 Ladders**

All ladders used on site must be of sound construction and adequate strength. Wooden or makeshift ladders is forbidden.

All ladders must be numbered, listed in a register, and inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register). Before using a ladder, the user must inspect it for damage. Ladders with missing, broken, cracked or loose rungs, split stiles, missing or broken spreaders (stepladders) or any other form of damage or defect may not be used.

A damaged ladder must be removed from service (and tagged, "Out of Service") without delay and must then either be repaired (if possible) or destroyed to prevent further use.

Employees must receive instruction in the correct use and proper care of ladders. Ladders may only be used as a means of access and egress. The use of ladders as working platforms is prohibited, except for inspection and carrying out minor tasks (i.e. light work and short duration).

Ladders may not be positioned horizontally and used as walkways / runways or as scaffolding. All portable ladders must be fitted with non-skid safety feet (or some other means to prevent the base of the ladder from slipping) and the feet must always be placed (stand) on a firm level surface. The use of bricks, stones, wood or any other material to level the stiles of a ladder is prohibited.

Ladders may not be placed on movable bases such as boxes, tables, trucks, etc. The base / foot of a ladder must always be secured to prevent it from slipping. The ladder must be held by an assistant if the base cannot be secured in any other way (e.g. tied off). A straight ladder must extend at least one metre above its support (or above the working platform that it is providing access to).

The top of the ladder must be tied off (or otherwise secured to its support) to prevent accidental movement. A straight ladder must be placed at a safe angle, i.e. tilted at a ratio of approximately 4:1, meaning that the base of the ladder must be one metre away from the wall (or other vertical surface) for every four metres of height to the point of support.

A stepladder may never be used as a straight ladder. A stepladder must be opened fully, and the spreaders must be locked securely. When using an extension ladder, at least four rungs must always overlap at the centre of the ladder. Ladders may not be joined together unless they have been specifically designed and manufactured for that purpose. A suspended ladder (i.e. not standing on a base) must be attached in a secure manner to prevent undue swinging or swaying, and to ensure that it cannot be displaced.

A ladder may not be placed against a window, glass or any other material that is unlikely to withstand the force exerted on it by the top of the ladder. A ladder may not be placed in front of

a door or window that opens towards the ladder unless the door or window has been locked or barricaded.

When a ladder is used near an entrance or exit, the base of the ladder must be barricaded. Materials / equipment may not be placed in close proximity to the base or landing of any ladder.

When ascending or descending a ladder, an employee must always face the ladder and use both hands (i.e. maintain three points of contact). Nothing may be carried up or down a ladder if it prevents the employee from holding on to the ladder with both hands. Tools must always be properly secured. This can be achieved by attaching them to the wrist using lanyards or placing them in a tool belt around the waist. Tools and materials may also be carried in a bag over the shoulder or hoisted to the landing using a tool bag and rope. Only one employee at a time may use (i.e. be positioned on) a ladder. No employee may stand / step above the third rung from the top of a straight ladder or above the second highest step of a stepladder.

Overreaching from a ladder is prohibited. If the target is not within comfortable reach, the employee must climb down and reposition the ladder.

No employee may run up or down a ladder, or jump from the lower rungs / steps to the ground. All ladders must be properly maintained and cared for. Ladders must be stored under cover and should be hung in a horizontal position from several brackets, secured and locked. No ladder may be left lying on the ground or be left exposed to the weather. A ladder left lying on the ground presents a tripping hazard and vehicles running over it may damage it.

No ladder may be left in such a position where it may fall over, be accidentally knocked over, or be blown over by the wind. Ladders may not be painted, as the paint may conceal damage, defects, labels or other markings. Ladders must be kept clean, as dirt may conceal damage / defects. Oil or grease accumulation on the rungs of a ladder may cause employees to slip. Before making use of a ladder, employees must make an effort to remove mud, oil, grease, etc. from their boots.

## **16.13 Isolation and lockout**

Isolation and lockout procedures that make it impossible to inadvertently energise any system or equipment so isolated, must be in place for all work where hazardous energy sources exist.

These procedures must be strictly enforced. The contractor must develop and submit for review the isolation and lockout system and procedure. All Isolation and Lockout Procedures must incorporate the following basic requirements:

- The issuing of a formal Isolation permit by the contractor to his supervisor for any work that requires the isolation of any system, plant or equipment;
- The use of defined Equipment, Personal Locks, and multiple lockout systems (i.e. Isolation Bars and lockout hasps);
- Clear identification of all isolation / lockout points ensuring there is no duplication;
- Isolation of the main energy source;
- The use of slip plates or the blanking off of pipelines or ducting, in addition to the chaining and locking of valves, as determined by a risk assessment;
- Suitable methods of preventing the movement of equipment; and
- Methods to test the effectiveness / completeness of the isolation.

Note: No work may commence on a system or equipment until an Isolation Permit has been issued by the Principal Contractor; and an Isolation Permit may only be issued by an Authorised Person once all required Clearance Certificates have been issued by appointed Isolation Officers.

The isolation and lockout system that is employed must incorporate the following basic procedures:

- In accordance with a system or equipment-specific Isolation and Lockout Procedure, an appointed Isolation Officer(s) must isolate all points that need to be isolated in order to render the system, plant or equipment safe to work on. An Equipment Lock must be attached to each isolation point;
- On completion of an isolation / lockout, the Isolation Officer must clear the area of personnel and must then carry out tests to ensure that the isolation is effective. Note: In the case of electrical isolation, a test for voltage must be carried out, after the switching device, to ensure the absence of voltage.
- The Isolation Officer must place the key to the Equipment Locks on an Isolation Bar (at a Lockout Station) and must then attach a Discipline Lock (to prevent the key from being removed) before issuing a Clearance Certificate;
- The Discipline Lock must remain in place when handing over to subsequent shifts. All Discipline Locks for a particular discipline (e.g. low voltage electricity) must be keyed-alike so that any Isolation Officer appointed for that discipline (and issued with a key) can open any of the Discipline Locks used for that discipline. This enables an Isolation Officer to de-isolate equipment that may have been isolated by another Isolation Officer during an earlier shift. Appointed Isolation Officers for a particular discipline are the only persons permitted to hold keys to the Discipline Locks used for that discipline. Note: Local isolations do not require the use of Equipment Locks (a Discipline Lock may be attached to the local isolation point by the Isolation Officer, followed by the necessary Personal Locks). Note: For local isolations, if the Isolation Officer is the only person who will be working on the isolated equipment, then he or she must attach a Personal Lock to the local isolation point;
- Once all required Discipline Locks are in place (i.e. attached to the Isolation Bar) and all Clearance Certificates have been issued, the Isolation permit may be issued by the Authorised Person;
- Each person that will be working on the isolated system or equipment must then attach his or her Personal Lock to the Isolation Bar before starting any work (including the Isolation Officer, if he intends to work on the isolated unit);
- The attachment of a Personal Lock to the Isolation Bar prevents the removal of the key to the Equipment Locks even if the Discipline Lock is removed;
- When called by an Authorised Person to de-isolate the system or equipment (on completion of the work under the Isolation permit), the Isolation Officer must ensure that all Personal Locks have been removed from the Isolation Bar before removing the Discipline Lock and the key to the Equipment Locks;
- Before removing the Equipment Locks and de-isolating the energy source, the Isolation Officer must inspect the system or equipment that was worked on to ensure that it is safe to perform the de-isolation. This includes guard inspections, housekeeping, ensuring that all doors and covers are in place, and most importantly, ensuring that no personnel are present;
- Once all Equipment Locks have been removed and the system, plant or equipment is safe for use, the Isolation Officer must cancel the Clearance Certificate and inform the Authorised Person that the unit has been de-isolated.

#### **16.13.1    *Personal locks***

A Personal Lock must be such that it can only be unlocked by its owner. A Personal Lock must be issued to each employee that requires one, and the employee's details must be clearly and

permanently engraved directly onto his Personal Lock. Alternatively, a thick durable plastic identification tag may be used that clearly displays the company's name, the employee's name, the employee's company number, and a contact telephone number (the tag must be securely fastened to the Personal Lock).

Where the above is handwritten, it must be done using a permanent marker pen and it must be legible. A Personal Lock may NEVER be removed by anyone other than the person to whom it belongs, except if the removal (cutting) of the lock is authorised by the nominated project management representative (in the absence of this person, authorisation can only escalate upwards).

Furthermore, the removal of the lock must be done under the personal supervision of the nominated project management representative, and in accordance with a written procedure. The removal (cutting) of a Personal Lock may be required if the employee who applied the lock is unable or unavailable to remove it on completion of the work (e.g. lost his key, failed to remove his lock before going home, etc.).

## **16.14 Electrical Safety**

All electrical work must be carried out by competent personnel in accordance with the statutory requirements, codes, design criteria, safety standards and safe work procedures applicable to the project.

Each employee potentially exposed to electrical hazards must receive induction to electrical hazards at the commencement of his employment on site and thereafter on an annual basis. The training must address the equipment and conditions specific to the area where the individual will be working. The induction training records must be kept.

### **16.14.1 Electrical Installations**

Each electrical installation (temporary or permanent) installed or worked on by the contractor will be inspected by a nominated project management representative to ensure that the installation complies with all statutory requirements, codes, design criteria and safety standards applicable to the project.

A nominated project management representative must approve all electrical work before the installation is energised. Any installation deemed unsatisfactory by a nominated project management representative must be removed / repaired / modified by the contractor.

The contractor must ensure that a certificate of compliance is issued / is available for every permanent or temporary electrical installation. Single line diagrams (with supporting documentation) must be produced and maintained for all electrical installations. This information must include, equipment details, electrical protection discrimination curves, and cable ratings.

Work on electrical installations (new installations and modifications / repairs to existing installations) may only be carried out by qualified and authorised personnel (i.e. electricians) as specified in the applicable legislation and project safety standards. Electrical safety devices (specifically, earth leakage protection and overload protection) must be installed on all distribution circuits and the settings must be established by suitably qualified personnel. A suitable numbering / labelling system must be used so that each circuit breaker / earth leakage device can be clearly and readily matched with the outlet / equipment that it protects. To ensure the safety of the user, each distribution panel must be completely enclosed, must be of the dead-front type, and must be properly constructed and earthed.

All electrical cabling must be covered (e.g. in cable trenches) or elevated (in cable trays) to protect it from damage and to eliminate tripping hazards. All permanent and temporary

electrical installations (cabling, sockets, distribution panels, transformers, switchgear, etc.) must be inspected and tested by a competent and suitably qualified electrician on a monthly basis. The testing must include a grounding (earthing) continuity test and testing of the electrical safety devices. Details of these inspections and tests must be recorded in a register that must be made available to the nominated project management representative for inspection.

A rigorous Isolation, Lockout and Permit to Work system must be applied to all electrical work (i.e. work on electrical installations, machinery or equipment).

No electrical work may be performed live, regardless of the voltage.

Control centres, switchgear rooms, substations, generators, transformers, capacitor banks, and other similar electrical plant and equipment must be appropriately guarded and labelled and, with the exception of emergency shut-off mechanisms, must be made inaccessible to unauthorised personnel (i.e. plant or equipment of this nature must be positioned within rooms or fenced enclosures which must be kept locked).

Appropriate warning signage must be prominently displayed within, and at all entrances to, these rooms / enclosures. The signage must indicate that unauthorised persons are prohibited from entering, that unauthorised persons are prohibited from handling or interfering with any electrical plant / equipment, the procedure to be followed in the event of a fire, and the first aid procedure to be followed should a person suffer electric shock.

Suitable fire-fighting equipment must be provided in all such rooms or enclosures. All electrical panels must be kept locked (using keyed-alike padlocks). Keys may only be issued to authorised personnel. All un-insulated (bare) or partially insulated conductors must be enclosed and protected to prevent accidental contact therewith.

Measures must be taken to prevent unauthorised access and appropriate warning signage must be conspicuously displayed. Only authorised persons may enter rooms or enclosures housing electrical plant or equipment, and only authorised persons may access electrical panels / cabinets and cable ducts / trenches.

No connection to any electrical system may be made without prior approval and a valid Isolation Permit.

All permanent and temporary electrical cables, whether energised or not, must at all times be handled as if they are energised.

Any equipment or structure on which electric charges may accumulate (such as storage tanks) must be grounded (earthed). Lightning protection must be provided on all tall structures and buildings. Grounding (earthing) and lightning protection systems and devices must be designed / engineered / selected / installed based on site-specific requirements.

#### **16.14.2 High Voltage Power Lines**

Before any heavy equipment (such as cranes, bulldozers, backhoes, boom trucks and drill rigs) is mobilised to a work site, an assessment must be carried out (including a thorough inspection of the work site and the access route) in order to clearly identify any overhead or underground power lines.

A system must be in place to mitigate the risks associated with working in close proximity to power lines and suitable measures must be taken to prevent personnel or equipment from coming into contact with power lines. Extreme caution must be exercised.

Where possible, exclusion zones (based on minimum clearance distances specified by the electrical power utility or the nominated project management representative) must be created with rigid barriers and warning signs.

Only in exceptional circumstances, and then only after a detailed method statement and risk assessment has been approved, all necessary mitigation / control measures are in place (including the use of a spotter), and a Permit to Work has been issued by the nominated project management representative, may equipment be operated within one boom length of energised overhead power lines. Suitable protective insulating barriers may need to be provided by the contractor.

If possible, the power lines must be de-energised and isolated while the work is carried out.

All equipment operators and rigging personnel must be trained in the hazards and the applicable safe approach distances (exclusions zones) associated with overhead power lines.

A procedure must be in place for the evacuation of a vehicle / equipment in the event of accidental contact with power lines. All operators must be trained in this procedure and must follow it implicitly.

Scaffolding may not be erected within 5 metres of power lines.

#### **16.14.3     *Portable electrical equipment***

Prior to site establishment, the contractor must provide the nominated project management representative with a complete inventory of all portable electrical equipment that he or she and his or her sub-contractors intend to use on the site (including plant, machines, appliances, generators, hand tools, lighting, extension cords, etc.). The unique number for each item of equipment must be included.

All portable electrical equipment to be used by the contractor on the site must be supplied and maintained in a serviceable condition. Any electrical equipment that is in poor condition or is not in proper operating order may not be used. Any electrical equipment that a nominated project management representative deems to be unsafe or unsuitable must be removed from site.

Electrical repair work or diagnostic work on electrical equipment may only be performed by personnel that are competent and authorised to perform this work (i.e. qualified electricians). With the exception of double-insulated equipment, all electrical equipment must have equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system.

All electrical equipment and all electricity supply systems used (including generators) must be inspected and tested by a competent electrician to ensure that all equipment is properly grounded (earthed). All electrical equipment used on site must be supplied electricity through (i.e. must be protected by) an approved and tested residual current device (or earth leakage device / unit). If a socket outlet does not have a residual current device in the circuit, a portable residual current device must be used.

Outlets without residual current device protection must be labelled as such. Any electrical equipment that causes an earth leakage device to trip or deactivate the circuit may not be used again until an electrician has inspected and tested the equipment and deemed the equipment safe to use.

Interlocks may never be removed or modified, and fuse terminals may never be bypassed to keep current flowing in any circuit. All generators must be used in compliance with the manufacturer's requirements. Any proposed modification to a generator must be authorised in writing by the manufacturer prior to the modification being made.

All welding machines must be properly grounded (earthed). All portable electrical hand tools used on the site must be double-insulated or properly earthed. Electrical equipment must be disconnected / unplugged when not in use.

Portable lights must be stable, and each lamp / light bulb must be protected by a substantial guard. Temporary festoon lighting must be double-insulated and must be supported at least 2.5 metres above the floor, if possible. Handheld lights must be of the all-insulated type and must be extra low voltage (i.e. not exceeding 32V). 120V / 240V handheld lights are not permitted. Any lighting used in hazardous locations (i.e. potentially explosive atmospheres, confined spaces, and damp / wet areas) must be operated at a maximum of 32 volts, unless earthed and protected by earth leakage devices. Care must be taken to ensure that light bulbs / lamps inserted into a light fitting do not exceed the allotted voltage and power for that fitting. Each light bulb must fit firmly into its socket.

No person may wear a watch or any jewellery, or carry any metal objects such as a lighter or keys, while working on any electrical system or equipment. No person may work on or use electrical equipment if his clothing is wet or any part of his body is in contact with water. No person may handle electrical equipment, equipment cords or extension cords with wet hands or if the floor / ground surface is wet. Water may never be used to fight electrical equipment fires. If possible, the electrical equipment should be de-energised before fire-fighting activities commence.

When cleaning or performing maintenance work on an item of electrical equipment, the equipment must be unplugged. Equipment must be unplugged by grasping the plug and never by pulling on the electrical cord. Equipment may not be unplugged while that equipment is switched on. Nor may equipment be plugged into a receptacle (socket) with the equipment's switch turned on. Electrical equipment that has a defective plug or wiring may not be used. Repair work to defective / damaged electrical equipment may only be carried out by an electrician.

Extension cords may be used for temporary applications only. Permanent cabling must be installed for long-term needs. Extension cords may not be run through doors, windows, ceilings or holes in walls. Extension cords must only be as long as is necessary (i.e. an extension cord may not be substantially longer than is required for the application). An extension cord must be of sufficient current-carrying capacity to power the equipment that it is supplying electricity to. Cords must not be overloaded. The tripping of a circuit breaker, a receptacle that is warm to the touch, a cord that is warm, or the smell of burning electrical insulation are all indications that an extension cord may be overloaded. Extension cords must be unbroken and continuous (i.e. no joins or splices in the cord are permitted). Extension cords may not be daisy-chained (i.e. one extension cord plugged into another extension cord). Extension cords and equipment cords may not be modified to fit a receptacle (socket). An extension cord with a moulded multiple receptacle is acceptable if the total load does not exceed the current-carrying capacity of the cord. Detachable multi-plug adapters should be avoided.

Extension cords that are frayed have insulation tears, cracks or abrasions, have exposed conductors, or have bent, broken or "spread" plug prongs may not be used. All electrical equipment cords and extension cords must be covered or elevated to protect them from damage and to eliminate tripping hazards. The contractor is responsible for protecting his electrical equipment from the weather and from possible mechanical damage.

All portable electrical equipment (including generators) must be inspected, tested and tagged by an appointed competent electrician on a monthly basis. Details of these inspections and tests must be recorded in a register that must be made available to the nominated project

management representative for inspection. The inspection and testing must include a continuity test of the grounding (earthing) conductor (as applicable) and a complete examination of the equipment or system to assure safe use.

The following colour coding system must be used for the tagging of all electrical equipment:

**Table 4 - Electrical Equipment colour coding**

Month	Tag Color	Month	Tag Color
January	White	July	White
February	Blue	August	Blue
March	Orange	September	Orange
April	Green	October	Green
May	Yellow	November	Yellow
June	Purple	December	Purple

The tag placed on a piece of equipment must be traceable to an entry in a register where the following information concerning the inspection and testing of that piece of equipment must be recorded: Date of inspection and testing; Equipment description; Equipment owner; Name, signature of the electrician who carried out the inspection and testing; and Comments concerning the inspection and testing, and details of any repair work carried out / required.

Any item of electrical equipment that does not pass an inspection / test must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired (if possible) or removed from site.

Any item of electrical equipment without a tag or with an out-of-date inspection / test may not be used. Any item of electrical equipment found without a tag or with an out-of-date inspection / test must be / will be removed from service until it has been inspected and tested.

In addition to the formal monthly inspections and testing carried out by an electrician, electrical equipment (particularly extension cords, portable hand tools, welding machines, compressors and pumps) must be visually inspected by the user on a daily basis prior to use. Users must be trained to look for cracks in casings, loose casings, outer cord sheathing that is not being held firmly in position at the equipment, cuts / cracks in cord or cable insulation, exposed conductors, damaged plugs / sockets, and missing covers.

Damage / defects must be reported immediately. Employees must immediately stop using and report any electrical equipment or machinery that is shocking, sparking, overheating or smoking. Corroded outlets, switches and junction boxes must also be reported.

## **16.15 Arc welding**

All welding machines must be fitted with voltage reducers.

The supply cable to every welding machine must be correctly rated and fitted with an approved plug to be used only with an approved matching plug socket.

The electrical circuit to every plug socket must be protected by a correctly rated circuit breaker and a supply voltage rated earth leakage unit.



Welding cable terminals must either be covered with a properly designed, constructed and installed cover so that inadvertent human contact with the terminals is impossible, whether the cables are connected or not, or the welding cables must be fitted with insulated plugs so that inadvertent human contact with any live part is impossible when the cables are plugged into the machine. Also, the plug socket should be such that when the cables are not plugged in, inadvertent contact with a live part of the socket is impossible.

Earth cable clamps and electrode holders must be of an approved type. Earth clamps and electrode holders must be fixed to welding cables with eye terminals and bolts.

All welding machines and safety devices must be subjected to regular planned maintenance and a monthly electrical inspection. The inspection must include a test to ensure that the voltage reducer where necessary is functioning properly, by measuring and confirming that the open circuit output voltage is reduced.

Before using a welding machine, the welder must ensure that he is wearing all the required and approved protective clothing and equipment: Welding hood; Leather welding gloves; Safety boots with steel toe protection; Overalls; and any other clothing or equipment necessary to perform his or her work safely and efficiently. Persons assisting the welder must also wear all of the required personal protective equipment.

When changing electrodes or moving the earth clamp, the welder and his or her helpers must wear gloves to avoid possible skin contact with live electrical parts and to prevent burns. When attaching welding cables to the terminals of the welding machine, the welder and his or her helpers must wear gloves, or preferably, the machine should be switched off to avoid possible electric shock.

Helpers who may be holding the work piece being welded must wear gloves and protective goggles. Where practicable the welder should place protective screens around the area where he is welding, to prevent injury to the eyes of passers-by.

The welder must ensure that the earth cable follows the shortest practical route between the welding machine and the work piece. The earth connection must be directly between the welding machine and the work piece and no building or other structure must form part of the earth return path. As far as is practicable, the welder should avoid welding under wet or damp conditions.

When working inside metal vessels or under other conditions where parts of his or her body may come into contact with conducting surfaces, the welder must take precautions to insulate him or herself from such surfaces. When working in confined spaces, the welder must take steps to ventilate the area to prevent inhalation of fumes, which may endanger his health and the health of any assistants. Engine powered welding machines must not be used in any place that is not very well ventilated since the welder and his or her helpers may be overcome by carbon monoxide fumes.

The welder should take the necessary precautions when welding objects that may catch alight, explode or release poisonous fumes or gases.

## **16.16 Gas welding and burning**

Welding or cutting torches and hoses shall not be connected to cylinders when stored. When work is stopped and equipment is unattended, all valves at the gas and oxygen cylinders shall be closed. The hoses shall be bled, and a check shall be made for possible pressure build-up.

Torches shall be removed from the hoses prior to putting them into the toolbox. Smoking SHALL NOT be permitted during this stopping procedure.

Special care shall be taken during overhead cutting and welding operations to safeguard and prevent falling sparks from starting a fire. Warning signs shall be posted around and at each level below the area of each overhead welding or burning operation. Fire extinguishers shall be available and fire blankets shall be used for protection.

When welding or cutting, adequate ventilation must be ensured / provided. Hoses shall be kept clear from passageways, ladders and stairs. When hoses are subject to damage, they shall be properly protected. Hoses shall be inspected daily. Fire extinguishers shall be ready for instant use in locations where cutting is performed.

Flash-back arrestors must be fitted to all cutting torches at the torch and at the bottle (a total of four arrestors). Hoses may only be secured using approved hose clips, and not by wire, cable ties or any other means. Special care shall be taken when welding with respect to piping that has been painted, as toxic fumes may be emitted in some cases. The supervisor's advice should be sought prior welding operations being carried out.

## **16.17 Compressed gas cylinders**

The contractor must establish a suitable storage area for oxygen, acetylene, LPG and argon cylinders in compliance with the following requirements:

- The storage area must be located at least 10 metres away from any building, and must be well ventilated;
- The storage area must have a solid floor;
- The storage area must be enclosed using wire mesh fencing (as this will ensure adequate ventilation). Access into the storage area must be limited and controlled;
- A protective covering or roof must be fitted to the enclosure to provide shade;
- The enclosure may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials at all times;
- Appropriate warning signage (i.e. "No Smoking" and "No Naked Flames") must be prominently displayed on the enclosure;
- A 9 kg dry chemical powder fire extinguisher must be mounted near the entrance to the enclosure;
- If electrical lighting is required, it must be of an approved intrinsically safe type;
- Oxygen, acetylene, argon and LPG cylinders must be stored separately in the enclosure. Furthermore, full and empty cylinders must be separated. Separate storage sections must be clearly designated within the enclosure for the different gas types, and for full and empty cylinders, i.e. oxygen – full, oxygen – empty, acetylene – full, acetylene – empty, etc.
- When a cylinder is empty, the cylinder cap must be replaced to protect the valve. Empty cylinders must be clearly marked (there must be no need to open valves to check if cylinders are full or empty);
- All cylinders must be stored in an upright position and must be secured in this position by chaining, strapping or clamping them individually to a wall, a cylinder trolley, rack or carrier, or some other rigid structure;
- Cylinders must be stored in rows (when necessary due to the number of cylinders) with aisles between the rows to facilitate easy and rapid removal in the event of a fire;
- Oxygen cylinders may never be stored near highly combustible materials, particularly oil and grease, or near fuel gas cylinders. When in storage, oxygen cylinders must be separated from fuel gas (LPG and acetylene) cylinders;

- The total quantity of gases stored on site must be limited to a 3 week supply.

Compressed gas cylinders must always stand upright (i.e. when being used, stored or transported) and must be properly and individually secured to prevent them from falling over. Cylinders must be protected from flame, heat and from being struck by moving equipment and falling objects. When handling gas cylinders (whether full or empty), care must be taken to prevent sudden impacts.

Gas cylinders may not be carried, dragged, rolled or slid across a floor or surface. When gas cylinders are to be moved / used, they must be placed in a proper cylinder trolley. Gas cylinders may not, under any circumstances, be used as rollers or work supports. If transported by crane, hoist or derrick, compressed gas cylinders must be placed in a suitable cradle, net or skip box. Cylinders may NEVER be lifted using wire rope, fibre rope, a web sling or a chain sling.

Before moving / transporting a gas cylinder, the regulator must be removed, and the protective valve cap must be replaced. Gas cylinders may not be taken into a confined space. Gas hoses that are run into a confined space must be removed during breaks. Cylinder valve keys must be in place. Nothing but the manufacturer-supplied key may be used to open the valve.

A flashback arrestor and a check valve (non-return valve) must be installed between the regulator and the hose and between the hose and the torch on the oxygen line and on the fuel (acetylene) line. Connection fittings may not be forced, and safety devices associated with cylinder valves or regulators may not be altered / tampered with.

Gas hoses may not be joined. Only approved hose connectors of the crimp type are permitted. Wire and jubilee clamps are prohibited. Only high quality ancillary equipment may be used. This includes flashback arrestors, hoses, clamps, spindle keys, nozzles and torches.

Only competent personnel may operate gas welding / cutting equipment and appliances. When an employee opens the valve to a cylinder, he must stand to one side and open it slowly. Valves may never be left partly open – they must either be closed or be opened fully. Leaking cylinders must immediately be removed from service and the workplace (if it is safe to do so).

Suitable firefighting equipment must be at hand wherever gas cylinders containing oxygen and / or fuel gas are being used. Gas cylinders must be prevented from coming into contact with electrical circuits, e.g. welding leads. Never strike an arc on a cylinder. Oxygen may only be used for the purpose for which it is provided. Do not use oxygen in pneumatic tools or tyres, as an explosion may occur. Empty cylinders must immediately be marked as such and must be removed to the cylinder storage area at the end of each day / shift.

## **16.18 Electrically powered tools and equipment**

All powered hand tools, such as circular saws, drills, chainsaws, percussion tools, jigsaws etc., must be equipped with a constant pressure switch that will shut off the power when the pressure is released. (Exception: this requirement does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, and similar hand operated power tools). No powered nail drivers will be allowed on site.

All powered tools will have the correct OEM approved guarding in place at all times, failure to comply will be seen as a breach of the general rules of conduct.

Electrical power tools must be of the approved double-insulated type. The electric cord, pneumatic or hydraulic supply line of powered tools must not be used for hoisting or lowering of the tool.

Loose clothing, jewellery or gloves that could get caught in the tool must not be worn when operating powered tools. Operators of powered tools who have long hair must keep their hair tied up. The power source must be disconnected from the tool before making any repairs, servicing, adjustments, or replacing attachments such as drill bits.

#### **16.18.1 Angle grinders**

The following personal protective equipment must be worn when using angle grinders: Safety helmet; Gloves; Safety glasses (or safety goggles) and a full face shield (i.e. double eye protection); Overalls with long sleeves and long pants, avoid any form of loose clothing; Safety boots with steel toe protection; Hearing protection, Spats, Apron, Yoke, kneepads if kneeling down to perform work, welders gloves.

All angle grinders must have a dead man switch incorporated, with a pressure switch in the handle. All angle grinders must have a spindle lock to assist with changing the disc or grinding wheel. Angle grinders must be equipped and operated with disc guarding at all times. Before use and mounting of discs it is essential to check the safety codes and specifications printed on the upper side of the disc. Such specifications include the following:

- Revolutions per minute (RPM) – the allowable speed of the disc must be equal to or greater than the maximum achievable speed of the grinder;
- Physical dimensions of the disc must meet grinder specification; and
- The disc must be suitable for the material type to be cut / ground as indicated on the disk;
- Cutting discs must never be used for grinding and vice versa.

It is critical that the correct disc mounting procedure is followed:

- Check the machine spindle, backup washer and thread;
- Check the condition of spindle nut - ensure spanner drive holes are not elongated;
- Ensure spindle nut spanner is the tool recommended by machine manufacturers;
- Do not use a hammer, pipe or chisel to tighten the nut, or apply additional mechanical advantage to nut torque. A firm "nip" is sufficient to retain the disc;
- Ensure the spindle diameter is suited to disc bore. Excessive clearance will cause the machine to vibrate due to eccentricity;
- Check to see that the nut and backup washer do not "bottom out". This will result in the disc not being correctly clamped on the spindle;
- Ensure the spindle speed is marked on the grinder and that it is less than the allowable disc speed; and
- Fit the disc, with the metal ring or writing to the nut side.

#### **16.19 Pneumatically powered tools and equipment**

Pneumatic powered tools must only be driven by filtered compressed air with an in-line lubrication system, or be lubricated prior to use if there is no in-line lubrication system.

When using pneumatic powered tools, the designated tool pressure must be attained by the use of a regulator. Pneumatic powered tools must be disconnected when not in use. They must not be disconnected from the air supply until all the residual pressure has been released or contained by a shut-off device.

Hoses must not be kinked as a means of containment. Employees operating pneumatic powered tools, and any potentially affected employee in the vicinity of use, must wear suitable personal protective equipment.

All rotary compressed air tools (e.g. drills) must have the rated revolution per minute (RPM) permanently marked on the casing. Only attachments of compatible RPM must be used with

these machines. The actual RPM of the tool must be checked every three months to ensure that the speed is as rated to manufacture specifications.

Pneumatic powered tools must be secured to the air supply hose by an approved positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers must be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 kPa pressure at the tool, must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

Compressed air must not be used for cleaning purposes. Compressed air must not be pointed at any part of the body or used for cleaning clothing. Airless spray guns of the type which atomize paints and fluids at high pressures must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. A diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection must be provided in lieu of the above.

Abrasive cleaning nozzles must be equipped with an operating valve, which must be held open manually to enable operation. A support must be provided on which the nozzle may be mounted when it is not in use.

## **16.20 Fuel powered tools and equipment**

Fuel powered tools must be shut down and allowed to cool before being refuelled, serviced, or maintained. Fuel must be transported, handled, and stored in approved fuel containers. Where possible, diesel driven engines must be used in preference to petrol driven engines. All fuel powered tools must be included on the contractor's Equipment Register and the register must be submitted to the nominated project management representative prior to the relevant work commencing.

When fuel powered tools are used in enclosed spaces, the space must be ventilated, and the atmosphere monitored to measure toxic gas concentrations. Persons in the space must wear the necessary personal protective equipment. Confined Space Entry clearance may apply. This type of activity must only be undertaken in exceptional circumstances and requires the approval of the nominated project management representative.

## **16.21 Explosive Powered Tools (Explosive Actuated Fastening Device)**

All operators shall be trained by the contractor.

The contractor shall ascertain that the explosive charges to be used are of the correct strength for the purpose.

Projectiles from explosive powered tools shall NOT be driven into:

- Tile, terracotta, glazed brick, glass, marble, granite, thin slate or other brittle substances
- High tensile steel, cast iron or steel hardened by heat treatment; or
- Concrete that contains aggregate that will not pass wholly through 25 mm mesh screens.

Under no circumstances shall a tool be fired in such a manner as to cause the projectile to fly free.

Suitable safety glasses and hearing protection shall be worn by operators when firing an explosive powered tool.

At all times when a tool is being used, the operator shall display clearly legible signs at or near the place where the tool is in use. Sign should read: WARNING: EXPLOSIVE POWERED TOOL IN USE – KEEP CLEAR.

The operator shall warn all other employees in the vicinity of the area in which the tool is about to be used.

Tools shall never be stored in a loaded state. Cartridges and tools shall be stored separately in lockable containers.

A logbook must be kept of the number of cartridges used and returned.

## **16.22 Hand tools**

Employees required to use hand tools must receive training for the tools to be used.

Where necessary additional applicable personal protective equipment must be worn when using hand tools. Wrenches, including adjustable, pipe, end, and socket wrenches, must not be used when the jaws are sprung to a point where slippage occurs.

Impact tools such as drift pins, wedges and chisels, must be kept free of mushroomed heads.

The wooden handles of tools must be kept free of splinters or cracks. Adjustable wrenches must not be used in lieu of ring or open-end type spanners, unless a risk assessment has been conducted and the use of the adjustable wrench is approved by the nominated project management representative.

Wherever possible, ring spanners must be used in preference to open end spanners.

Correct hand tools for the activity must be used, e.g. screwdrivers must not be used as chisels, and pliers must not be used as hammers. All wedges and drifts that may spring, fly or fall to lower levels upon impact must be fitted with an attachment which attaches a safety "lanyard" to a solid structure to restrain the impact tool from becoming a projectile.

All hand tools used in elevated areas, that may be dropped or fall to lower levels must be fitted with safety lanyards and attached to solid structures or in the case of podges, scaffold keys etc., attached by wrist lanyard to the user.

Purpose built tools and equipment may not be used unless authorised by the nominated project management representative.

### **16.22.1 Stanley knives / Utility knives**

A utility knife must be used as a last resort, when it is the safest tool to use. Always consider alternatives that pose less of a risk to the operator. Only utility knives with retractable blades are to be used. The blade is to be retracted at all times when the knife is not in use or is being stored.

Before using the utility knife, ensure that the tool is in a good condition and the blade is secure in the holder (seated correctly and that there is no play). Ensure that the blade is always sharp and in good condition. This will prevent the use of excessive force.

Always wear cut resistant gloves and safety glasses when using a utility knife.

There is always a risk of the blade breaking under tension and becoming a projectile. Always ensure that you cut away from your body, and that no part of your body is in the firing line.

## 16.23

### Manual handling and vibration

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done. If more than one person is involved in a task a communication process must be agreed in advance. Lowering the load must be done in a controlled manner. Dropping a load is dangerous and must be avoided. As a guideline 25 kg is considered to be the limit of what a person can safely handle. Where there are loads exceeding 25 kg the risk of handling the load must be mitigated to assure minimal potential for any injury.

When mechanical lifting aids are provided, they should be used. Extra care should be taken when lifting awkwardly shaped objects. Position the feet correctly, feet should be placed hip-width apart to provide a large base. One foot should be put forward and to the side of the object, which gives better balance. Bend or 'unlock' the knees and crouch to the load. The weight will then be safely taken down the spine and the strong leg muscles will do the work. Get a firm grip. The roots of the fingers and the palm of the hand should grip the load. This keeps the load under control and permits it to be distributed more evenly.

The following should be considered with conducting Manual Handling and also take into consideration the task factors, physical demands and tools involved in the task: Load weight/frequency; Hand distance from lower back; Asymmetrical trunk/load;; Postural constraints; Grip on the load; Floor surface; Environmental factors; Carry distance; and Obstacles on route.

Team Manual Handling: Load weight; Hand distance from lower back; Vertical lift region; Trunk twisting/sideways bending; Postural constraints; Grip on the load; Floor surface; Environmental factors; and Communication, co-ordination and control.

As far as possible, exposure to vibration must be eliminated. However, if this is not possible, short-term solutions to decrease exposure include: Reducing the vibration levels; Removing the person from the vibrating equipment / tools; and Reducing the period of time that the person works with the vibrating equipment / tools (at least 40 minutes break after 20 minutes working with a machine that vibrates excessively).

In order to reduce exposure to vibration:

- Consider buying equipment that operates effectively at lower speeds;
- Buy equipment with built-in damping materials;
- Buy lighter tools if they are available - they require less of a grip;
- Maintain the equipment;
- Make sure equipment is balanced and there are no worn parts;
- Use remote controls when they are available;
- Reduce your grip on the equipment when it is safe.
- The less time you actually have your hands on the equipment the better. Relax your hands during these brief breaks;
- Take scheduled breaks; and
- Do other tasks that allow you to move away from vibrating tools and equipment.

The workplace must be assessed by a competent person for compliance with good design, layout and practice, to avoid or minimise adverse health consequences due to manual handling and vibration issues.

## 16.24 Working Near a Body of Water

Suitable flotation devices shall be available and correctly used. All users shall be trained in the effective use of floatation devices.

If entry or the need to work above the body of water or other body of liquid is necessary and acceptable as a result of risk assessment, then a safe and effective means of exiting from the body of water or other liquid shall be provided.

Persons performing tasks where there is a risk of drowning or entrapment as a result of a body of water or other liquid, the risk assessment shall specifically outline the method of rescue and the person/s shall be assisted by an attendant who is trained, able to raise an alarm and to initiate rescue procedures if so required.

## **16.25 Personal Protective Equipment**

As a minimum, the following Personal Protective Equipment (PPE) must be worn by all personnel (including visitors) at all times whilst on the project site:

- Safety footwear with steel toe protection, oil resistant, antistatic and anti-slip;
- Safety glasses;
- Safety helmet (hard hat);
- Two piece 100% cotton overalls;
- High visibility protective clothing / overalls with reflective taping (long trousers and long-sleeved shirts).

Additional PPE requirements must be determined through hazard identification and risk assessment. This hazard-specific PPE (such as hand protection, hearing protection and respiratory protection) must be worn as required (e.g. when in a certain area, when performing a certain task, or when working with a certain substance). The correct PPE must always be worn:

- In accordance with site requirements (as indicated at the entrances to the project site and at the entrances to buildings / areas on the premises);
- In zoned areas (e.g. noise zones and respirator zones); or
- As required by a Safe Work Procedure, a risk assessment, or a Safety Data Sheet (SDS).

The contractor must provide each of his employees with all required PPE (at no cost to the employee). The specific PPE that is provided to a particular employee must be based on the nature of that employee's work and the location in which the work is performed (i.e. must be based on the hazards to which the employee is exposed).

PPE requirements for a particular job or for a particular area must be determined through a risk assessment for that job or area.

Any employee who does not have all of the PPE that is required for him or her to perform their duties safely will not be permitted to work.

Each employee must care for his PPE, maintain it in good condition, and inspect it on a daily basis. If an item of PPE has worn out, has become damaged, or is found to be defective in any way, it must be replaced by the contractor.

PPE must be stored in accordance with the manufacturer's requirements / recommendations. Each employee must receive induction training in the use, maintenance and limitations of the PPE that is provided to him or her, and must be made aware of why the PPE is necessary as well as the consequences of not wearing it as instructed (i.e. the potential for injury and / or disciplinary action).

Any employee that refuses to wear PPE as required must be / will be removed from the site.



Symbolic signs indicating mandatory PPE requirements must be prominently displayed at the entrances to the project site and at the entrances to buildings / areas on the premises where additional PPE is required. These signs must comply with the applicable national standard (if one exists). An employee must be appointed to: Control the issuing and replacement of PPE; Keep an up-to-date register as proof that items of PPE have been issued to individuals (an employee must sign for the items that he receives); Ensure that there is an adequate supply of all required PPE (i.e. maintain PPE stock levels on site); and Carry out regular inspections to ensure that PPE is being used correctly, is being maintained in a good, serviceable and hygienic state, and is not being shared between employees.

## **16.26 Sun protection, heat and cold stress**

The contractor must ensure that all personnel are protected in sunlight through the use of long sleeve shirts, long trousers, brims to safety helmets and UV factored sunscreen (where applicable). Shade structures must also be made available to all employees.

The contractor must conduct training and awareness sessions with his employees, advising on the risks associated with working in the heat (including dehydration) and the precautions to be taken (e.g. ensuring adequate fluid intake).

The contractor will implement a procedure to manage heat and cold stress and this will be aligned with the guidelines as stipulated in the relevant legislation.

## **16.27 Fuel / Flammable liquid storage and refuelling**

No fuel (diesel, petrol, paraffin, etc.) or any other flammable liquid (paints, solvents, etc.) may be stored on site unless approved in writing by the nominated project management representative.

If the on-site storage of a fuel or a flammable liquid is approved, the contractor must ensure the following:

- The quantity of fuel / flammable liquid to be stored on site must be kept to the minimum that is required;
- The storage area must be located in a well ventilated area at least 10 metres away from any building, drain, boundary or any combustible material;
- If more than 200 litres of fuel / flammable liquid is to be stored, the tank must be installed / the containers must be positioned within a bund;
- If the fuel / flammable liquid are to be stored in bulk tanks / vessels, then the minimum capacity of the bund must be 110% of the volume of the largest tank / vessel. If many small containers (e.g. 210 litre drums) are to be stored, the bund must be able to contain 25% of the total volume of the stored products;
- The bund must be impermeable. It must have a solid concrete floor and the walls must be constructed out of brick and must be plastered on the inside;
- The bund must be fitted with a lockable drain valve (for draining away rainwater), which must remain locked in the closed position;
- The fuel / flammable liquid storage area may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials (including rubbish, brush and long grass) at all times;
- Access to the storage area must be controlled;
- Appropriate warning signage (i.e. "Flammable Liquid", "No Smoking" and "No Naked Flames") must be prominently displayed at the storage area. The contents and volume of each tank must be indicated;

- In order to contain spillages, the offloading / refuelling bay at the fuel / flammable liquid storage area must have a solid concrete base surrounded by bund walls, ramps or humps and / or spill trenches that lead into a sump;
- All fuel / flammable liquid storage tanks and dispensing equipment must be electrically bonded and properly earthed;
- All electrical installations and fittings must be of an approved intrinsically safe type;
- A 9 kg dry chemical powder fire extinguisher must be mounted in an easily accessible position near the entrance gate to the fuel / flammable liquid storage area. Depending on the size of the storage area, additional fire extinguishers may be required to ensure that an extinguisher is no further than 15 metres away from any point on the perimeter of the storage area;
- A fire extinguisher must be at hand wherever refuelling is carried out;
- Smoking or open flames within 15 metres of a fuel / flammable liquid storage / refuelling area is strictly prohibited;
- No petrol or diesel powered vehicle or equipment may be refuelled while the engine / motor is running;
- Cellular phones must be switched off in fuel / flammable liquid storage / refuelling areas;
- Spill clean-up kits (containing a suitable absorbent fibre product) must be provided;
- Any spillages must be cleaned up immediately and all contaminated cleaning materials must be disposed of in accordance with the applicable legislation as well as the Environmental Management Plan and Waste Management Plan;
- If a flammable liquid is spilt or is leaking from a container / vessel, the area must be cordoned off and appropriate warning signage must be displayed to keep unauthorised personnel away from the affected area. Every effort must be made to contain the spillage. All hot work in the vicinity must be stopped immediately. If the spilt product is volatile and the possibility exists that a vapour cloud may form, or if the leak or spillage cannot be contained or stopped, then appropriate emergency response procedures must be activated including the evacuation of all persons in the vicinity. Suitable firefighting equipment must be positioned ready for use should the spilt product ignite;
- Drip trays must be used wherever required;
- All tanks, drums, cans, etc. containing flammable liquids must be tightly closed and properly sealed except for when a container is being filled or when a product is being decanted;
- The transport or storage of corrosive or flammable liquids in open containers is strictly prohibited;
- Only small quantities of flammable liquids (paints, solvents, etc.) may be stored within a building. Each product must be kept either in its original container or in an approved container which must be properly sealed. Each container must be clearly labelled to indicate its contents. When not in use, all such containers must be stored in a well-ventilated steel cabinet which must be kept locked to prevent unauthorised access;
- Not even small quantities of flammable liquids may be stored or dispensed in buildings or places of public assembly, in general warehouses, or in buildings containing sources of ignition such as space heaters, cooking devices, open electric motors, motor vehicles, or where welding, cutting, or grinding activities are being carried out;
- Procedures must be compiled for the transportation (including delivery), offloading, storage, handling and use of any fuel / flammable liquid on site;
- All personnel that will be required to work with or may come into contact with a flammable liquid must be made aware of the hazards associated with the product.

**Fire protection and prevention**

The contractor must draft a Fire Protection and Prevention Plan this could be in the form of a plot plan for the work that will be carried out on site. The contractor must assess / survey his area of responsibility and identify locations where the risk of fire is high. Cognisance must be taken of the fact that certain locations may need to be designated as high risk due to the presence of large quantities of flammable or combustible materials / substances.

For all high risk areas, the contractor must ensure that additional precautions are taken to prevent fires and strict control is exercised over any hot work (i.e. welding, cutting, grinding, etc.) that is carried out.

The contractor must supply and maintain all required firefighting equipment.

The type, capacity, positioning, and number of firefighting appliances must be to the satisfaction of the nominated project management representative and must meet the requirements of the applicable legislation.

Fire mains, hydrants and hose reels will not be available on site, so use must primarily be made of portable fire extinguishers. Firefighting equipment must be strategically located with a view to being able to rapidly deploy the equipment in order to bring potentially dangerous and destructive fires under control while still in their infancy. All fire extinguishers (and any other firefighting equipment) placed on site must be:

- Conspicuously numbered;
- Recorded in a register;
- Visually inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register and the competent person must sign off on the entries made); and
- Inspected and serviced by an accredited service provider every twelve months (the nominated project management representative may require that this frequency be increased depending on the environmental conditions (e.g. high dust levels, water, heat, etc.) to which the fire extinguishers are exposed).

Any fire extinguisher that has a broken seal, has depressurised, or shows any sign of damage must be sent to an accredited service provider for repair and / or recharging. Details must be recorded in the register.

Firefighting equipment may not be used for any purpose other than fighting fires. Disciplinary action must be taken against any person who misuses or wilfully damages any firefighting equipment. Access to firefighting equipment must be kept unobstructed at all times. Approved signage must be in place to clearly indicate the location of each permanently mounted fire extinguisher.

The contractor must ensure that all persons working in / entering his area of responsibility are made aware of where all firefighting appliances and alarm points are located. The contractor must ensure that his employees (and those of any appointed sub-contractors) are trained in firefighting procedures and the use of firefighting equipment.

The contractor must develop and implement an emergency response procedure which details the actions that must be taken in the event of a fire or a fire / evacuation alarm. All personnel working within the contractor's area of responsibility must be trained, and all visitors must be instructed, on this procedure. Copies of the procedure must be prominently displayed in the workplace.

A person discovering a fire must extinguish the fire if he can do so safely, and then immediately report the incident to his supervisor. If the person cannot extinguish the fire, he must raise the nearest alarm and then report the fire as quickly as possible to his supervisor, the person responsible for the area, and / or Security.

On hearing a fire / evacuation alarm, all persons must make any operational plant or equipment safe, and then proceed to the nearest emergency assembly point and await instructions. All incidents of fire (including the use or misuse of any firefighting equipment) must be reported to the nominated project management representative immediately. Used fire extinguishers must be replaced by the contractor without delay.

Wherever hot work is being carried out, a fire extinguisher must be at hand. Supervisors must carry out workplace inspections regularly to ensure adherence to fire prevention measures and procedures. At the end of every working period (i.e. before each tea / lunch break and at the end of every shift / day), the workplace must be thoroughly inspected to ensure that no material is left smouldering and no condition / situation exists that could give rise to a fire.

The contractor must ensure that all supervisors and all employees carrying out or assisting with any hot work or any other activity that could give rise to a fire have been trained in firefighting procedures and the use of firefighting equipment.

Each vehicle used on site for work purposes and each item of mobile equipment with a diesel or petrol engine must be fitted with a permanently mounted fire extinguisher.

Smoking is only permitted in designated smoking areas. Cigarette ends / butts must be properly stubbed out in the ashtrays provided and never thrown into waste bins.

The contractor must ensure that good housekeeping practices are enforced, as this is crucial to the prevention of fires. All combustible waste materials must be removed from the workplace on a daily basis (at the end of each shift) and placed in waste receptacles. The accumulation of waste materials in out-of-the-way places is prohibited. Offices, desks, cabinets, etc. must always be kept tidy and uncluttered. Wastepaper bins must be emptied regularly.

The storage of combustible materials under stairways or in attics is prohibited. The storage of any materials against the exterior of a building or any other structure is prohibited. All walkways, passages and stairways must be kept clear (i.e. must be unobstructed) at all times, as they may need to be used as a means of escape. The areas around fire extinguishers must be kept clear (i.e. must be unobstructed) at all times.

"No Smoking" signs must be conspicuously displayed in and around all storage areas / rooms. Waste may not be burned under any circumstances. No flammable liquid (such as petrol, acetone, alcohol, benzene, etc.) may be used for starting fires or as a solvent for cleaning clothes, tools, equipment, etc. Only solvents approved by the nominated project management representative may be used for cleaning purposes. Whenever any work is carried out involving the use of a flammable substance / material, the area must be cordoned off and appropriate warning signage (i.e. "No Unauthorised Entry", "No Smoking" and "No Naked Flames") must be displayed.

## **16.29 Smoking**

The contractor must not permit smoking on site except within designated smoking areas selected in accordance with the applicable legislation. Such an area must be clearly demarcated, and the required signage must be displayed. Any person found smoking or discarding a cigarette butt outside of a designated smoking area may be removed (temporarily or permanently) from site.

In all designated smoking areas, adequate non-combustible commercial ashtrays and / or cigarette butt receptacles (butt cans) must be provided. Ashtrays and other receptacles provided for the disposal of smoking materials must not be emptied into rubbish bins or any other container holding combustible materials. "No Smoking" signs must be strictly observed.

### **16.30 Housekeeping**

The contractor must maintain all work areas in a tidy state, free of debris and rubbish.

In cases where an inadequate standard of housekeeping has developed and compromised safety and cleanliness, a nominated project management representative may instruct the contractor to cease work until the area has been tidied up and made safe.

The contractor must carry out housekeeping inspections on a daily, weekly basis to ensure maintenance of satisfactory standards. Furthermore, at the end of every shift, the contractor must ensure that all work areas are cleaned, all tools and equipment are properly stored, and construction rubble is removed. Where the contractor fails to maintain housekeeping standards, the nominated project management representative may instruct the contractor to appoint a dedicated housekeeping team for the duration of the project. Littering is prohibited on the project.

### **16.31 Waste management**

Waste may not be disposed of unless the disposal of that waste is authorised by law. The contractor must therefore ensure that all waste that is generated is handled, stored, transported and disposed of in accordance with the requirements of the applicable legislation / local authority. No waste may be removed from the project site to a waste storage or disposal facility unless that facility has been approved for use by the nominated project management representative. The specific landfill site and waste procedure has been specified in the Environmental Management Plan and the Waste Management Plan.

An adequate number of waste bins and skips must be provided by the contractor and suitable arrangements must be made to ensure that these bins and skips are emptied regularly. Hazardous wastes must be kept separate from general wastes.

### **16.32 Stacking and Storage**

All irregular shaped items will be stacked at floor / ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the commodities being stacked and stacked in such a manner that the items do not topple over or change position due to subsidence or weight transfer when being moved.

Where these commodities are stacked on shelves or racks, the shelves or racks must be designed to carry the weight of the commodity being stacked. All materials, commodities or articles, which could be damaged due to inclement weather, must be stored under cover.

The storage of material, small equipment, tools, files and general items in cupboards and on shelves must be neat and controlled at all times. No equipment, tools, files or documents may be stored or stacked on top of cupboards which are higher than 1.5 metres in height.

### **16.33 Facilities**

Sanitary conveniences must be provided and maintained at a rate of at least one toilet facility for every 30 workers, separate male and female changing facilities and sheltered eating areas.

Where chemical toilets are provided, one toilet for every twenty five employees must be allocated. All toilets must be cleaned daily, disinfected and provided with toilet paper. All

employees making use of these facilities have the responsibility to help keep the facilities neat, clean and hygienic.

Change rooms must be provided and must be kept clean and free from odours at all times.

No chemicals, except those normally used for domestic cleaning of these facilities, may be stored in the facilities. No equipment or items (other than those normally associated with hygiene facilities) may be stored in the facilities. All entrances must be constructed in a way to afford privacy to users.

Drinking water must be provided. A sheltered (covered) area must be set aside on site to be used as a dining facility (eating area). Adequate seating must be provided for the maximum number of employees.

The facility must be kept clean and tidy. A suitably sized, impervious receptacle (bin) must be provided for the disposal of waste food and other refuse generated at the dining facility. This bin must be emptied and cleaned regularly (i.e. promptly after mealtimes). Food may only be consumed in authorised sheltered areas.

#### **16.34 Occupational hygiene**

The contractor must ensure that the exposure or potential exposure of his employees to any of the following stressors is assessed and measured (a baseline survey must be carried out by an Approved Inspection Authority): Noise; Thermal stress (heat and cold); Particulates (dust); Silica (free crystalline silica); Gases or vapours; Lead; Chemicals; Ionising radiation; Non-ionising radiation; Vibration (hand / arm vibration and whole body vibration); Ergonomics; Illumination.

If it is determined that exposure levels for a particular stressor are unacceptable, then a monitoring and control plan must be implemented to manage any risk of overexposure.

For all dust creation and aerosol type spray creation activities the contractor will consult the SDS and implement the required PPE as specified in the SDS.

#### **16.35 Lighting**

For all work areas outside as well as inside building structures and access ways or stairs, if the natural lighting available is inadequate it must be supplemented by artificial lighting to meet the minimum levels required.

#### **16.36 Hearing conservation**

Hearing conservation must be implemented and protection against the effects of noise exposure must be provided when the noise exposures equal or exceed an 8-hour time weighted average sound level of 85 decibels measured on the A-weighted scale of a standard sound level meter at slow response. For the hearing conservation to be effective it must include as a minimum: Monitoring of the workplace to determine the representative exposure of employees to excessive noise levels; An audiometric testing program for employees, which must include: A baseline audiogram for all employees exposed to noise levels equal to or in excess of the standard; Annual audiograms for each overexposed employee; A training program for all employees exposed to noise; Provision of personal protective equipment to all affected employees when administrative or engineering controls fail to reduce sound levels to within the levels of the standards.

#### **16.37 Hazardous chemical agents**

No chemical substance may be brought onto site unless it appears on the contractors HCA register. Every HCA will have available a SDS with the following information: Trade name / product name of substance; Manufacturer / supplier of substance; Maximum inventory; Storage requirements and precautions; Inventory of special emergency items held for handling spillages,

fires, etc. (e.g. reagents to neutralise spillages, firefighting foam, etc.); and Approved disposal methods. SDS's will not be older than 5 years.

Any chemical substance brought onto site without adherence to the requirements stipulated above shall be removed from site immediately. The contractor must ensure a file, or files, containing all of the SDS's must be maintained and must be readily available to all personnel on site (particularly first aiders) as well as other potentially affected parties (e.g. emergency services personnel, persons from the local community, etc.). The SDS's must be in the language(s) commonly used on site. The contractor must appoint a Hazardous Chemical Agent Coordinator who understands and is able to evaluate the risks associated with a wide variety of substances.

This person shall be responsible for: Assessing the hazardous properties and risks associated with all chemical agents brought onto site by the contractor and appointed sub-contractors (using the SDS's); Determining precautions and safe practices for transportation, use, handling, storage and disposal (including PPE requirements) (using the SDS's); Determining first aid and emergency response requirements / procedures (using the SDS's); Maintaining the SDS file.

The risks associated with the transportation, use, handling, storage and disposal of all hazardous chemical agents brought onto site must be assessed and managed by the contractor through a process that incorporates risk reduction using the hierarchy of controls.

## 16.38 Radiation

The risks associated with ionising (from naturally occurring radioactive minerals (NORM), radon, and man-made sources), ultraviolet (UV) and electromagnetic field (EMF) radiation exposure must be assessed by a competent person.

There must be an inventory of all radiation sources that have the potential to cause adverse health effects. For each radiation source, the type of radiation (e.g. radioisotope, radon, x-ray, EMF, laser, etc.), the strength of the radiation, and the location must be recorded.

Where risk assessment indicates the need, a documented radiation management programme must be developed such that:

- All types of radiation sources are adequately characterised and described
- Exposures are eliminated or reduced to as low as reasonably practicable (ALARP)
- A clearly defined chain of responsibility (with duties) is provided; and
- Education is provided for employees regarding radiation safety, including the radiation management programme elements.

The ionising radiation management programme must meet all applicable regulatory requirements, and as a minimum must include the following elements (as applicable):

- Surveyed radiation areas and quantification of exposure sources / levels
- Exposure and medical monitoring programmes based on established investigation levels
- Transport of radioactive materials in compliance with international radiation transport regulations, when no local regulations are in place
- Waste monitoring and disposal programmes
- Feedstock and equipment checks for naturally-occurring ionising radiation
- Clearance and control procedures for all contaminated materials and equipment leaving or arriving at site (including scrap)
- Leak (wipe) tests on sealed radioactive containment equipment

- Lock-out procedures for vessels and equipment containing radioactive sources and radon decay product measurement prior to entry
- Emergency procedures
- Environmental impact risk assessment (air, water, waste, foods, etc.)
- Product / waste life cycle control; and
- Dose assessment for employees and critical exposure groups, according to documented methods and by a competent person.

Areas with ionising radiation with annual doses greater than 5 milli Sieverts (mSv) must be designated as restricted access or controlled areas. These areas must be identified and mapped, signposted or otherwise clearly communicated to employees working in the area.

Each person whose potential exposure exceeds 5 mSv per annum or who is a designated radiation worker must undergo periodic personal radiation monitoring and medical surveillance designed to show continued fitness for radiation work.

All sources of ionising radiation must be managed in use and when they are either disposed of or securely stored in accordance with local regulations. Each operation where individual worker's exposures could exceed 5 mSv per annum must have a trained radiation protection adviser or ready access to a trained protection consultant.

There must be documented procedures for the inspection, assessment and maintenance of the controls, and emergency procedures to deal with incidents involving ionising radiation sources (including fire and explosions). All controls must be reassessed annually to ensure their continued effectiveness and that operating practices are in accordance with written procedures.

### 16.39 Thermal Stress

Hot areas or activities where employees have experienced or could experience excessive fatigue, muscle cramp, dehydration, dizziness and other symptoms of heat stress must be identified and described.

Where a risk of thermal stress is determined, a competent person must conduct monitoring surveys on site, in consultation with workers.

For defined extreme thermal conditions and job activities, medical examinations must include information about the operator's physiological and biomedical aspects, and an assessment of fitness for the working conditions.

Cold areas or activities where employees have experienced or could experience pain or loss of feeling in extremities, frostbite, severe shivering, excessive fatigue and other symptoms of cold stress must be identified and described.

Workplace thermal stress levels (temperature, air movement, humidity, etc.), activities (work level, etc.) and conditions (clothing, health, etc.) that have the potential to exacerbate thermal stress effects must be adequately characterised and described. Workplace exposure assessment must be repeated according to regulatory requirements or whenever there is a change in production, work organisation, process or equipment which may impact thermal stress levels.

Detailed heat stress assessment of identified tasks or jobs must be tiered to:

- Commence with the use of a simple heat stress index as a screening tool; then, if necessary
- Use rational heat stress indices in an iterative manner to determine the 'best' control methods for alleviating potential heat stress; and



- Undertake physiological monitoring when exposure times are calculated to be less than 30 minutes, or where high level PPE that limits heat loss must be worn.

Detailed cold stress assessment of identified tasks or jobs must be conducted according to current appropriate guidelines that incorporate a cold stress index, to determine the 'best' control methods for alleviating potential cold stress.

When a risk of thermal stress is identified, the following exposure controls must be implemented:

- An acclimatization period for new workers and those returning from extended leave or sickness
- Training in the recognition of signs and symptoms of heat or cold stress, emergency procedures and preventative measures
- Protective observation (buddy system or supervision); and
- A requirement for self-paced working.

The following exposure controls must be considered by a competent person:

- Work / rest regimes and job rotation based on measurements conducted
- Suitable rest areas with a provision of cool drinking water and cool conditions for high temperatures, or provision of warm drinks and warm conditions for cold temperatures
- Selection of appropriate clothing or other PPE for extreme temperature conditions
- The use of engineering controls; and
- Undertake hot / cold tasks during a cooler / warmer time of the day.

Where thermal stress is assessed to be a risk, the operation must develop a suitable emergency response plan.

## **16.40 Fitness for work**

The contractor must develop and implement a programme to manage employee fitness for work. All employees working on site for whom the contractor is responsible (i.e. direct employees of the contractor as well as the employees of any appointed sub-contractors) must be subject to this programme.

All safety critical jobs (i.e. roles where fatigue or other causes of reduced fitness for work could lead to serious injury, illness or death to employees, significant equipment / plant damage, or significant environmental impact) must be identified and the risks associated with reduced fitness for work in these roles must be assessed. A programme to manage these risks must be implemented, and it must include: Mechanisms for managing fatigue, stress and lack of fitness; an alcohol and other (including prescription, pharmaceutical or illicit) drugs policy that includes testing; and Training and awareness programmes.

Each employee has an obligation to present himself fit for work at the start of the day / shift, and to remain fit for work throughout the work period. Reporting for work under the influence of alcohol or any other intoxicating substance will not be tolerated. Any transgression concerning the alcohol and other drugs policy applicable to the project may result in the offending employee's access to the project premises being temporarily or permanently withdrawn. Alcohol and drug testing on the project premises will be carried out randomly (as employees report for duty and during the course of the day / shift), following significant incidents (all persons involved), and whenever there is reasonable suspicion. Alcohol and drug testing may also be carried out as part of a Pre-Employment Medical Examination.

Sleep deprivation during shift work or from excessive working hours is a known cause of fatigue. Fatigued employees are at increased risk of accidents. Shift system design must consider: The effect on worker fatigue; The effects of activities carried out during scheduled and overtime hours; The impact on sleep cycles of activities such as commuting to and from site; and; The monitoring and control of working hours.

The contractor is responsible for the administration of the working hours of his employees as well as the employees of any appointed sub-contractors. The maximum working hours per day and the minimum rest times between shifts must be specified and must comply with all applicable legislation.

All employees must undergo fitness assessments (medical examinations) which must be carried out prior to the commencement of employment on the project and periodically based on an employee's individual risk profile, and on termination of employment on the project.

Proof of all medical examinations (i.e. certificates of fitness signed by an occupational medical practitioner) must be kept, in the correct form as prescribed by legislation on site and these records must be readily available for inspection by the nominated project management representative. An employee's certificates of fitness must be included in his Personal Profile (dossier).

Should any employee become unfit or temporally unfit for work, the Principal Contractor will establish a management plan to control and manage the exposure risk profile of the employee.

## **16.41 Management of change**

The contractor must develop and implement a procedure for identifying and managing change in the workplace (e.g. changes to scope, procedures, work methods, site conditions, designs, plans, plant and equipment, materials, processes, etc.) that may impact on health, safety or environmental performance. The procedure must describe the processes that must be followed to ensure that proposed changes do not give rise to unacceptable risk to the health or safety of people, the environment, the community, or equipment / assets. The management of change process must take into consideration that changes may be planned or unplanned, sudden or gradual, temporary or permanent. The process must aim to ensure that:

- Changes are identified and assessed before they are implemented;
- Careful consideration is given to managing the risks associated with any change;
- Due diligence can be shown to have taken place;
- There is a reduction in the number of unsatisfactory or unnecessary changes;
- The right people are involved in the change process; and;
- All statutory requirements are met.

## **16.42 Project Close Out**

The contractor must ensure that the complete Health and safety system is handed over to the client on completion of the project in electronic (PDF) format.

As per the legislative requirement the following documentation must be included as a minimum:

- All documents in the contractor's health and safety file.
- Records of all drawings, designs and materials used; including redline drawings, temporary works drawings with load bearing calculations for design and anticipated loads (or a reference to the drawings in the contractors document management system and the quality information for the materials used from the QC system if an integrated system is used)

- Other similar information relevant to health and safety concerning the completed structure and installation; this will include all documents relation to the compliance to OHSA section 10, including operating manuals, maintenance manuals and end-user training on the manuals by the supplier or installer (or a reference to the relevant information in the contractor's QC system if an integrated system is used.)

To facilitate this process the contractor will ensure that all documentation in relation to the safety management system as indicated above is scanned on a monthly basis and a copy thereof presented to the nominated project management representative as part of the monthly reporting on performance (see section [21](#)).

This is a contractual and legislated requirement for completion. No extension of time or costs will be granted due to non-management of this deliverable during the project

## **17. Emergency planning and response**

The Principal Contractor must develop, implement, test and maintain an Emergency Response Plan (incorporating an emergency evacuation procedure). The plan must be risk-based and documented, and it must detail the procedures that must be followed when responding to various emergency scenarios such as a medical emergency (including first aid response), a fire, Major incidents and accidents, a hazardous substance spill, flooding, rescue from height, rescue from a confined space, venomous snake bites, etc.

The Emergency Response Plan must satisfy / comply with all applicable legal requirements. The contractor must clearly define accountability for the plan and ensure that it is adequately resourced.

A copy of the plan must be provided to the Resident engineer for review and comment. The contractor must ensure that all persons (i.e. personnel and visitors) working within his area of responsibility leave their places of work in the event of an emergency (e.g. fire, explosion, etc.) and proceed to a safe location (i.e. an emergency assembly point).

The contractor must provide an evacuation alarm (siren). All persons working in an area where an evacuation alarm is sounded must respond to it immediately. The contractor must designate (and conspicuously signpost) emergency assembly points positioned in safe locations away from buildings, plant and equipment where all persons must assemble and be accounted for following an evacuation.

Where more than one contractor is present on site, the principal contractor Construction manager will coordinate activities related to the provision of evacuation alarms and the designation of emergency assembly points. The contractor must ensure that all personnel working within his or her area of responsibility receive awareness training on the applicable emergency response procedures, and all visitors entering the area are properly instructed in these procedures.

The contractor must ensure that the emergency response procedures are displayed on each Health and Safety Management Information Notice Board. Diagrams or plans indicating evacuation routes, emergency assembly point locations, and the positioning of emergency equipment (fire extinguishers, first aid boxes, etc.) must be prominently displayed.

The contractor must compile and maintain an up-to-date list of emergency telephone numbers. A copy of this list must be posted at each working area / site, in each office on site and on every notice board.

The contractor must conduct emergency response drills to test the effectiveness of the emergency procedures and equipment, and the knowledge and proficiency of the response personnel. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, and hazardous substance spills. The frequency with which these drills are carried out must be agreed with the nominated project management representative and must, as a minimum be done quarterly. The frequency may be increased if the site response to drills are not up to standard.

Each drill must be monitored and the outcomes (highlights and shortcomings) must be documented. Corrective actions must be identified and implemented to address the shortcomings, and the Emergency Response Plan must be amended as required.

## **17.1 First aid**

The contractor must ensure that First Aiders are trained and appointed. If the workplace is located less than 20 minutes surface travel time away from definitive medical care (i.e. a hospital) and less than 50 people will be working per shift, the contractor must ensure that a Level 2 First Aider and a Level 1 First Aider are in place (i.e. trained and appointed) per shift, and that a First Aid Kit are provided and maintained.

### **17.1.1 First Aid kits**

A suitable first aid kit must be readily available to each First Aider. All kits must be provided and maintained by the contractor. The contents of each first aid kit must be kept clean and dry. Each kit must be contained in either a portable weather-proof case / bag or a steel box mounted to a fixed structure. Access to first aid equipment / supplies must be limited to trained and competent First Aiders only.

Access to portable kit bags must be controlled and steel first aid boxes mounted in the workplace must be kept locked. Approved signage must be in place to indicate the locations of the first aid boxes / bags.

A record of each treatment administered must be kept in a suitable register.

The first aid kits must, as a minimum, contain the equipment and supplies as specified in the General Safety Regulations.

## **17.2 Weather Precautions**

The Principal Contractor's Emergency Response Manual must include procedures for adverse weather conditions (high winds, flooding, storm surge, lightning, etc.). In the event of impending adverse weather or other conditions the Principal Contractor, in consultation with the Resident Engineer, must decide whether to institute such precautionary measures in connection with the carrying out of the work.

## **18. Measuring and monitoring**

The contractor must develop and implement a process for regularly measuring and monitoring the key characteristics of its work activities that could have significant health or safety risks. Procedures for measuring and monitoring occupational health exposure must include: Detail of what must be measured and monitored, based on a risk analysis or identified legal and other requirements; the frequency of measurement and monitoring; Conformance against stated objectives and targets; and continual improvement opportunities.

## **19. Non-conformance, incident and action management**

The contractor must establish a procedure for the management of all incidents. The procedure must outline the methodologies and processes that will be followed for:

- Recording an incident;
- Investigating an incident;
- Analysing the impact(s) and the potential risk of future incidents;
- Communicating information concerning an incident to relevant persons / groups; and
- Managing corrective actions to prevent a reoccurrence.

This procedure must be communicated to all personnel through awareness training. Note: Arrangements must be in place to ensure that proper medical care is provided to any contractor (or sub-contractor) employee that suffers an occupational injury or illness. Proof of employment in the form of employment contract or payslip or certificate of service or a letter confirming employment in the letterhead of the employer needs to be available in the OHS site file for the entire project team and must accompany the injured with the relevant form (WCL 1 or WCL2) to the Hospital / Doctor.

The contractor must report each incident that occurs (including Near Misses) to the nominated project management representative without delay (i.e. immediately). Preliminary details must be recorded on the same workday / shift on which an incident occurs. The contractor must investigate each incident (including Near Misses) to a level of detail that is appropriate for the Maximum Reasonable Outcome of the incident investigation.

All significant incidents must be investigated using a recognised root cause methodology. For all other incidents other methodologies may be used to determine the root cause and to identify corrective and / or preventative actions.

Incident investigations must be facilitated by personnel who have been trained in the appropriate methodology. Investigations into significant incidents must involve the active participation of the contractor's Project / Construction Manager, Health and Safety Officer(s), and relevant Supervisors.

Nominated project management representatives may participate in the investigation. The contractor must document the results of each investigation and a report must be submitted to the nominated project management representative within five working days of the incident occurring.

As a minimum, each incident report must include: The date, time and location of the incident; A detailed description of the incident, including photographs; The names of any injured persons; Injury details (if applicable); A summary of the first aid / medical treatment provided (if applicable); The current status of any injured persons; The root causes of the incident; and Detailed corrective and preventative actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the nominated project management representative to assure completeness, accuracy and relevance before it is communicated to all employees.

The contractor must establish a process for identifying and recording corrective and preventative actions arising from:

- Incident investigations;
- Hazard identification and risk management;
- Measurement and monitoring;
- Improvement plans and suggestions;
- Managing change;

- Audits and inspections; and
- Safety observations and coaching (safety interactions).

The contractor must establish a procedure for managing actions that addresses:

- Identification, categorisation and prioritisation of actions;
- Formal evaluation and approval of actions;
- Assignment of responsibilities, resources and schedules for implementation;
- Implementation of actions;
- Tracking and reporting against implementation;
- Monitoring and verifying the effectiveness of the actions;
- Analysing trends and communicating performance with regard to closing actions; and
- Communication concerning the status of actions.

## **20. Data and records management**

The contractor must establish a procedure for the systematic control of health and safety records and related data, which defines controls for: Creation; Receipt; Retention; Approval and Use of records.

Records must be legible, identifiable and traceable and must contain the appropriate amount of data and information to demonstrate conformance to measuring and monitoring requirements.

The confidentiality and security of data and records must be maintained relative to their source and in accordance with any applicable external data / privacy protection legislation.

Personal information originating from medical surveillance and occupational hygiene monitoring must be reported in a form that respects the privacy of the individual, but enables management to fulfil their duty of care obligations to employees.

The names of individuals must not be disclosed without their written authorisation. Medical examination reports must be dated and signed by the examining physician, nurse or equivalent. They must be legible and include a printed name to assist with identification and authentication of the results (electronic signature is acceptable). Retention periods for all records must be established and documented.

## **21. Performance assessment and auditing**

The principal contractor must develop a process for measuring health and safety performance. Metrics must include leading and lagging indicators, and be based on qualitative and quantitative data.

The contractor must set project-specific objectives and targets concerning health and safety, which must be aligned with the objectives and targets set for the project as a whole.

Performance must be measured on a regular basis and this must include an evaluation of: The extent to which objectives are being met; Progress against targets; The effectiveness of controls; Proactive conformance measures; and Reactive or historical performance measures.

### **21.1 Reporting on performance**

Reports summarising the principal contractor's health and safety performance must be compiled on a weekly and a monthly basis (the same applies to each appointed contractor). These reports must be submitted to the nominated project management representative as follows: Every week on the day indicated by the nominated project management representative (weekly report); and on the last day of each month (monthly report). In the format as specified by the client.

The contractor must be prepared to discuss the content of these reports at scheduled health and safety meetings. The reports must contain the following information:

- Number of contractor employees on site;
- Number of sub-contractor employees on site;
- Number of contractor / sub-contractor employees demobilised from the project and the reasons for the demobilisation (e.g. resigned, disciplinary action, etc.);
- Total hours worked on site by all contractor employees and by all sub-contractor employees (per sub-contractor);
- Number of incidents by category (i.e. Near Miss, FAC, MTC and LTI);
- Lost Time Injury Frequency Rate (LTIFR) and All Injury Frequency Rate (AIFR) (project to date and 12-month rolling) – monthly only;
- Details of all new incidents for the reporting period and the corrective / preventive actions taken or to be taken;
- Feedback (progress updates) on all open incidents and outstanding corrective / preventive actions;
- Status and feedback on any employee that may have been injured and has not yet returned to work (weekly updates);
- Number of pre-employment and exit medicals performed;
- Details of health and safety training carried out;
- Details of all audits, inspections and site visits carried out during the reporting period, and the corrective actions taken (or to be taken) to address all non-conformances;
- Feedback (progress updates) on all open non-conformances and outstanding corrective action;
- Challenges faced with regard to health and safety for the coming week / month; and
- Any other health and safety related information specific to the project that may be required.

The contractor is expected to demonstrate a proactive approach towards acting on the health and safety information that is generated and reported on. Leading indicators (e.g. audit / inspection non-conformances, safety observations, etc.) must be analysed by the contractor and any negative trends identified with regard to unsafe behaviour or conditions must be appropriately addressed to prevent incidents.

Lagging indicators (e.g. injuries, illnesses, near misses, etc.) must be investigated in detail by the contractor to determine the root causes. Corrective and / or preventive actions must be identified, implemented and integrated into risk assessments to prevent recurrences.

## **21.2 Audits and inspections**

On a monthly basis, the Appointed Construction Health and Safety Agent will audit the activities of the contractor to measure compliance with the requirements of this specification as well as the principal contractor's Health and Safety Management Plan.

Any deviation from the requirements of these documents that places the health or safety of any person in immediate danger will result in a non-conformance being issued and subsequently be corrected.

For each non-conformance determined during any audit, the contractor must identify and implement appropriate corrective actions. For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified.

Progress on implementing corrective actions (i.e. closing non-conformances) must be monitored by the contractor and reported to the nominated project management representative on a weekly basis.

The implementation of corrective actions will be verified by the Appointed Construction Health and Safety Agent during the monthly audits.

On a monthly basis, the contractor must carry out sub-contractor audits to assess their compliance with the requirements of this specification as well as their own Health and Safety Management Plan.

Copies of these audit reports must be submitted to the nominated project management representative on a monthly basis. The contractor must allow a nominated project management representative to attend any such audit.

## **22. Management review**

A review of the contractor's Health and Safety Management System must be completed annually to ensure that the system is efficient and effective in managing health and safety performance and meeting project requirements. A procedure must be in place for this process. The review must evaluate if there is any need for change and must identify actions to improve the system.

The review must be led by the contractor's senior management and the following must be considered:

- The suitability of the policy;
- The impact of changing legislation;
- The management of risk registers;
- Health and safety objectives, targets and performance indicators;
- Changing expectations and requirements of relevant stakeholders;
- Changes in the services or activities of the organisation;
- Changes to the structure of the organisation;
- Communication and feedback (particularly from employees and client);
- The effectiveness of the management of change process;
- Workplace and medical monitoring;
- The status of corrective and preventative actions;
- Performance statistics, including an annual summary of safety statistics, and occupational hygiene and medical monitoring results;
- Findings of completed audits;
- Follow up on actions from previous management reviews; and
- Recommendations and opportunities for improving the effectiveness of the management system.

A record of each completed management review must be retained, and it must include all decisions and identified actions concerning alterations, modifications or improvements to the management system that demonstrate a commitment to continuous improvement