SAPREF Business Management System		HSSE Procedure Level 2	
Originator:	Denise Luteijn MS6	**Document ID:**	HSSE.PR.0122
Document Controller:	Melanie Francis	**Effective date:**	31/01/2017
		Revision:	2

Working at Height Procedure

Table of content

1. Purpose, scope and target group [back to TOC]

1.1 Purpose

This procedure describes the safety requirements for ALL personnel, Service Providers and Staff employees, while working at height. The phrase "working at height" means any and all situations for which a person must work and a potential of a fall risk exists or from structures where a person can fall into an area below grade.

1.2 Scope

Such situations include, but are not limited to the following:

- Any areas/structures above grade which are not protected by standard handrails, mid rails, and toe boards including temporary storage containers, rail cars, fire trucks and bulk loading tankers.
- Any situation where a person can fall through an opening to an area below (including excavations, building roof tops without protected sides or edges or can be weak to support a human body)
- During situations whilst using fixed and portable ladders.
- When operating/working from personnel lifting devices.

1.3 Target Group

- ALL personnel - Service Providers and Staff employees

DEFINITIONS

100% tie-off

Means that an individual is securely anchored via a tie-off device and full body harness (double lanyard) when working at height.

Tie off point

A secure point of attachment for lifelines, lanyards, or deceleration devices, and which is independent of the means of supporting or suspending a person.

Backbiter Lanyard

A lanyard with special snap hooks that are designed to support either a standard vertical pull or the lateral pull that results when a lanyard is looped around an anchor point and snap hooked back to itself. The old style lanyard, allowed previously, is designed only for a vertical pull and may fail if looped back to it, as this creates a lateral pull for which it was not designed.

Competent Person

"Is a person that 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"
Someone who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Controlled Access Zone

An area outside of a warning line system toward the leading edge where certain work may take place without the use of guardrail systems, personal fall arrest systems, or safety nets. This system must use a Safety Monitoring system.

Cross Arm Strap

A variable length strap with a smaller and larger D ring on each end. Its purpose is to allow the user to tie off to a larger anchor such as a large diameter pipe, without restricting the mobility offered by the 1.8m lanyard. It is designed so that the strap can be looped around an anchor point and the smaller D ring pulled through the larger such that the smaller D ring provides the attachment point for the lanyard snap hook.

Elevated Area (or Working from Heights)

Any area 1.8m or more above the ground, 1.8m or more above a working platform, or any situation where a risk of falling 1.8m or more is present.

Fall Arrest Devices

The most aggressive form of fall protection and bears the greatest risk of injury. Keeping arresting forces on the body at a minimum is critical as is the availability of a rescue plan. Fall arrest devices generally use shock-absorbing lanyards to slow the rate of descent in a fall.

Fall Prevention Device

A passive device used to prevent a person from falling from an elevated area such as a guardrail system. Spring loaded or counter-balanced ramp accesses on loading racks are also considered fall prevention devices. Generally, those working from

these elevated structures would not have to wear personal fall protection like a harness and lanyard.

Fall Protection

The generic description used to include all phases of fall protection including fall prevention, fall restraint, and fall arrest.

Fall Restraint Devices

Personal protective equipment used for the purposes of fall restraint (e.g., anchor points with fixed length lanyards, use of retractable reels or horizontal lifelines with fixed length lanyards).

Full Body Harness

A harness system designed to spread shock load over the shoulder, thighs and seat area. When this term is used within this Order, it is implied that the full body harness meets the requirements of a nationally or internationally recognized organization

Horizontal Lifeline

Horizontal Lifelines provide a tie-off point where one does not exist. They shall be designed, installed and approved by a "qualified person." The connecting device may be a yo-yo or lanyard connected directly to the D-ring on the back of a full body harness.

A flexible line that secures the wearer of a full body harness to a vertical or horizontal lifeline or a fixed anchorage.

ATTACHMENT 1 Lanyard

DEFINITIONS

Positioning Device

May be a self-retracting lifeline, webbing, rope or wire rope that restricts the user from falling more than 0.6m. A Positioning Device System can be anchored to an engineered lifeline or appropriate anchor point. The anchor point shall be able to support 1360kg. The connecting device shall be connected directly to the D ring on the back of a full body harness.

A positioning device that prohibits the user from falling may use an anchor point that is capable of holding 454kg.

Qualified Person

Someone who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, work, or the project.

Relief Step

A safety device used to reduce or eliminate suspension trauma when suspended in a full body harness.

Safety Monitoring System

A Safety Monitoring System can be used on low pitched or flat roofs that are 1.3m or less in width with or without a Warning Line System. A person acting as a "Fall Protection Watch" will be designated as a competent person that can recognize fall hazards. Their job is to warn the employee when it appears the employee is unaware of a fall hazard or is acting in an unsafe manner. The Fall Protection Watch will be on the same level as the person (s) being monitored, within visual sight of the persons being monitored, be close enough to communicate orally with the monitored individuals and have no other job duties.

The Fall Protection Watch may monitor up to 5 people. If the work crew has more than 5 people additional Fall Protection Watcher must be used to monitor the additional workers. The ratio of 1:5 shall be maintained.

The Safety Monitor may also be used to monitor the people installing other fall protection systems.

Swing Fall Hazard

A hazard generally found when using self-retracting lifelines. When a person wearing a self-retracting lifeline moves horizontally, and then falls, the anchorage point may become the swivel point of a "swinging pendulum" thereby allowing the worker to strike objects on a lower level.

Type 1A Ladder

Ladder having a load capacity of 136kg.

Type 1AA Ladder

Ladder having a load capacity of 170kg.

Unprotected Side or Edge

Any side or edge of a walking or working surface where there is no wall or guardrail system at least 1.0m high.

Wall Opening

An opening at least 0.8m high and 0.5m wide, in any wall or partition, through which persons may fall.

Self retractable lifeline

A self-retracting line that is designed to lock up within 0.6m when an excessive rate of deployment is experience. They may also be known as a personal fall limiter, self retracting lifeline (SRL) or inertia reel.

2. Description [back to TOC]

2.1 Step 1 Apply Hierarchy of Controls for Work at Height

2.1.1 Eliminate the work at height.
2.1.2 Work from a permanent work platform with guardrails and toe boards.
2.1.3 Work from a temporary work platform (scaffold) or movable work platform with guardrails.
2.1.4 Use fall restraint systems and personal fall protection equipment.

2.2 Erection and dismantling of scaffolding – follow ASSET.WI.0032

2.3 Mobile elevated working structures ASSET.PR.0091

2.4 Ladders HSSE.WI.0059 and checklist HSSE.CL.0013

2.5 Working at height – requirements for specific situations

2.5.1 Overhead Hazards

Working where overhead hazards exist should be avoided. When this cannot be avoided, safeguards must be implemented for the potential hazards of falling materials or tools.

- Use of fish buckets or fire blankets to be placed on platform grating.
- Use of chin straps on helmets to avoid falling objects is mandatory at height.
- The area below and around the work area (drop zone) is barricaded with signage.

2.5.2 Moving material to or from elevated work locations

Material may not be thrown or dropped from elevated locations without a safe work plan in place (e.g. by means of chutes, conveyer systems and approved canvas bags).

2.5.3 Structures with unprotected sides and edges

Structures having an unprotected side and/or edge present a significant fall hazard to workers. Examples of such structures are:

- Buildings
- Fixed & Floating roof tanks
- Temporary storage containers

When working from these structures, one or more of the below listed fall protection controls must be used to protect employees. Some of these controls can include:

- Portable guardrail systems
- Team Leader/Foreman as safety watcher in addition to other controls
- Self-retracting lifeline systems
- Positioning device (retractable life line)

Personal fall protection (safety harness with double lanyard) and/or fall restraints shall be used when working on buildings and fixed roof tanks.

2.5.4 Buildings

When working on the roof of a building, the access point to the roof, whether by fixed exterior ladder or roof hole opening, must be protected.

When a building has no parapets (*is a barrier which is an extension of the wall at the edge of a roof, balcony, walkway or other structure)* or has a parapet lower than 1m, one or more of the above mentioned fall protection controls must be used.

When it is necessary for personnel to enter/work in an attic area, then a temporary working platform should be erected and used to minimize the risks, whenever possible. In cases when it is impractical to erect and use a temporary work platform, only beams or other structural members shall be used as walking surfaces in conjunction with personal fall protection.
NOTE: Walking on transit roofs or other brittle material is considered unsafe and is not permitted except by special permit authorized by a competent responsible person. When access is required to such roofs, a detailed risk assessment must be completed along with written procedures addressing the specific risks and controls.

Fixed Roof Tank Tops
Walking/working on a fixed roof tank presents a significant risk of falling. When the need arises to leave the top stair landing and walk/work on the roof, one or a combination of the following fall protection systems are required:

- Ensure integrity of the walking surface (Inspection)
- Do Risk assessment
- Guardrail systems (ensure sound integrity)
- Safety Monitoring system
- Warning line systems
- Self-retracting lifeline systems
- Positioning device

2.5.5 Floor Holes/Excavation

Fall prevention/protection and trip protection methods such as guardrails, covers, safety nets, or safety harnesses are required for all holes in walking/working surfaces.

Each employee at the edge of a well, pit, shaft, and similar excavation shall be protected from falling by guardrail systems, fences, barricades, or covers.

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole. When they are used around holes that are used for the passage of materials, the hole shall have no more than two sides provided with **removable guardrail sections** to allow the passage of materials.

When guardrail systems are used around holes that are used as points of access (e.g. ladder-ways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

NOTE: Covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, etc., that could be imposed on them at any one time. They shall also be secured to prevent accidental displacement and shall be either color-coded or marked with the word "Hole" or "Cover" to provide warning of the hazard. These requirements do not apply to manhole covers, steel grates, or other permanent fixtures.

2.5.6 Openings e.g. Walls, Vessels, Columns, Ducting etc

Employees shall be protected in situations where they could fall upon entering a structure, e.g. Entering a vessel or column from a grating platform where as the floor in the vessel has a drop at a point of entry (man way etc.), a fall risk is present.

2.5.7 Ramps and Runways

Guardrail systems (where there is a risk of falling), when required on ramps and runways, shall be erected along each unprotected side or edge.

2.5.8 Working on Top of Tank Trucks and Railcars

All permanent loading facilities and repair racks shall have a permanent fall protection system.

2.5.9 Pipe rack Tie Offs

Planned work on the top level of pipe racks where overhead tie-off points do not exist requires the use of engineered horizontal fall arrest systems. These systems may be permanent or temporary, but must be sufficiently engineered to provide protection for all workers on the rack and designed by a Qualified Person.

NOTE: Pipe racks often contain cable trays. These cable trays are not designed as walking/working surfaces or tie off points and should not be used as such.

2.5.10 Emergency Access/Egress Points in Pipe racks Emergency access/egress is required in pipe racks (often between units and/or departments) so that pipe rack travel to the access/egress point does not exceed 30m. These emergency access/egress points may be permanent or temporary and must be signed off by a Qualified Person. Temporary access/egress points can be in the form of scaffolds or ladders that extend at least 0.9m above the rack level.

Access to and short term work in the pipe rack (such as unplanned or emergency operating a valve) where an overhead tie off point is not available should be avoided and risk assessed such that a means of tie-off is provided.

Tie-off points should be above your head height (to minimize fall factor). In the event that this is not practical, then consideration should be given to the use of a mobile elevated working platform (MEWP) e.g. cherry picker or Man lift device. See Chapter 8 of General HSSE Specifications Regulations (Booklet No. 1).

If there is an emergency reason that necessitates access to an area where the only tie-off point is below the head height, employees should be aware of the danger of contact with the next lower level and fall factor, then they should and use an appropriate tie-off device. This must be included in the Risk Assessment.

2.5.11 Temporary Access to a Job or Task Site

Where temporary access is required, follow these work practices:

- Use a temporary work platform, if practical. Examples of acceptable temporary work platforms are personnel lifts, scaffolding, rolling/mobile scaffolds and ladders.
- Use of personal fall protection is required on personnel lifts and modified scaffolding. Follow ASSET.WI.0032 on scaffold colour coding tags.
- If it is not practical to use or install a temporary platform, use personal fall protection attached to a suitable anchor point. TRA to be conducted for this activity.

2.5.12 Requirements for Working above Dangerous Equipment

When working above dangerous equipment such as open augers or unguarded rotating equipment, fall prevention equipment such as guardrails, safety net systems or scaffold platforms is required.

2.5.13 Access to Elevated Equipment Less Than 1.8m Above Grade

Sometimes access to elevated equipment requires an employee to work or travel less than 1.8m above grade. In such a case, do not use equipment that is not designed for work access for climbing or as a work platform (e.g. climbing on a pump case to access and operate a valve). Use stepladders, platform ladders, scaffolding, jig lifts, and any other devices that are specifically designed to provide safe access.

Employees shall avoid access to pipe racks. If the work requires access or travel in pipe rack, then appropriate scaffolding should be erected.

SPECIAL SYSTEMS

Special Tasks

When special tasks require the use of specific fall protection other than guardrails and safety harnesses (e.g., overhead lifelines or other special systems listed below), the responsible department or organization shall develop written procedures that must be approved by the Safety Manager, EMS Dept and the affected Department Manager.

Special tasks will require a fall protection plan. Some special tasks may include the following:

- Framework
- Reinforcing steel
- Overhead bricklaying
- Reaching more than 25cm below the level of the walking/working surface.
- Low slope roof
- Steep roofs
- Precast concrete erection
- Leading edge work
- Vessel entry

The affected personnel must be trained on the procedures and the training must be documented.

PORTABLE LADDERS

General Ladder Safety

The following general practices shall be implemented when using portable ladders (with the exception of scaffolding ladders): HSSE.WI.0059

1. All manufacturer requirements for use of that ladder (usually posted on the ladder) must be followed.
2. The ladder must be set in a stable position before use. It should be set on a flat, smooth, and level surface and, if possible, without obstructions at grade or in the upward pathway of the ladder.
3. Ladders over 3.0m tall shall be secured during use.

4. Ladders should only be used for tasks of short duration (typically less than an hour without a break).
5. Work should not be done where the task requires the midline of the body to be outside of the ladder rail.

6. Ladders should not be used for long duration high maintenance task (e.g., asbestos glove bag operation). The use of a JLG, scissor lift or scaffolding is recommended for long duration tasks. However, if fall restraints (e.g., retractable life line) are in place such that there is limited risk of a fall, the task may be done.
7. Portable ladders, other than stepladders, extended beyond 6.4m must be supported in the middle to reduce instability and flexing.
8. Climbing portable or scaffold ladders over 6.0m in height must include the use of a retractable life line or full body harness.
9. In addition to above general precaution, follow HSSE.WI.0059 Portable ladder work instruction.

Portable Industrial Ladders

Industrial ladders are constructed to meet a performance requirement known as a "Duty Rating." The ladder's duty rating tells you the maximum weight capacity for which the ladder is designed.

Ladders should not be used as a brace, skid, guy or gin pole, gangway, or for uses other than for which they were intended, unless specifically recommended for use by the manufacturer.

NOTE: Only fiberglass ladders shall be used near sources of electricity.

Setting Portable Ladders for Use

When a ladder is setup for use, the user shall:

- Look above for any overhead wires or obstructions.
- Clear any clutter from the area around the base of the ladder.
- Position the ladder carefully to prevent slipping.
- Not place ladders in front of doors opening toward the ladder unless the door is blocked, locked, or guarded.
- Ensure the ladder extends 1m above the access point if the ladder is used to access an area greater than 1.8m above grade.

Note: With the single exception of stepladders, all ladders must be securely tied at the top when the ladder is raised for use. While the ladder is being tied or untied, another person must secure the bottom of the ladder.

Climbing or Descending Ladders

When climbing or descending a ladder, the user must:

- Use both hands for climbing/descending
- Not carry tools or equipment in hand(s)
- Face the ladder and ensure there is secure foot placement with each step.

Pre-Use Ladder Inspection

All ladders shall be visually inspected by the user prior to use for safety defects such as:

- Dented or bent side rails or rungs.
- Loose or damaged rung to side rail connections.
- Damaged hardware connections such as sheared rivets.
- Cleanliness (if inspection reveals the presence of oil, grease, or slippery material that makes the ladder unsafe to use, the ladder must be clean of this material before it is used).
- Damaged ladder footings.

Ladders with safety defects other than cleanliness shall not be used and shall be tagged with **"Danger, Do Not Operate"**. Ladders so tagged shall be discarded immediately. Dirty ladders that are tagged can be used after cleaning.
Reference HSSE.CL.0013 for the ladder checklist.

A documented procedure for use of the ladders, specific to the situation, is required. The procedure must be approved by the EMS (fire department) and communicated to all affected personnel. The procedure must contain:

- The ladder design approved by the design engineer and to accommodate for the weight of the user plus extension.
- The rescue plan.
- The method by which the ladder to be inspected.

Portable Ladder Inspections

An annual inspection is required on each portable ladder (including step ladders, extension ladders and platform ladders, but does not include scaffold ladders). Each department is responsible for ensuring the following takes place.
Each department is responsible for:

- Ensuring, using a tracking system, its own ladders are inspected annually. This annual inspection does not replace the need for a user inspection each time the ladder is used.
- Ensuring a permanent label is attached to each ladder that uniquely identifies the ladder and the department to which it belongs.
- Create a list of all ladders in the responsible department requiring this inspection. Update the list as the inventory changes. Label and date new ladders prior to their use.

Central Maintenance Services does the annual inspections for all portable ladders. (See definition for competent person)

Upon successful completion of the annual inspection, the party inspecting shall initial and date the inspection tag.

Ladders shall be stored in a fixed site for facilitating inspection and access. These fixed site locations can be set up by department or by the operating or maintenance area.

Contractor Ladder Protection Inspections and Personal Fall

Service providers and SAPREF staff must meet the minimum annual inspection by a competent person(s) for both portable ladders and fall protection equipment as required by this procedure. However, their method for identification and documentation of inspections shall be their decision except that it must meet the minimum requirements of this procedure.

FIXED LADDERS/LANDINGS/PLATFORMS

Fixed Ladders without Cages

Fixed ladders without cages can be no more than 6m high, and must have a landing provided at the 6m level. However, some fixed ladders without cages having a height greater than 6m may exist, but those ladders can only be climbed with an installed cable or rail vertical fall arrest system and appropriate personal fall protection.

Areas with such equipment must train their employees on the required use of such fall arrest systems.

Fixed Ladders with Cages

Fixed ladders with cages may not extend more than 9m without a landing and must be enclosed with an appropriately designed ladder cage.

Ladder Cage Extensions to the Handrail

All above grade slanted ladders with cages having a handrail 1.2m or less from the center of the ladder rung to the handrail must be protected by appropriate cage extensions to the handrail. For vertical ladders the distance is 1.5m from the center of the ladder rung to the rail.

Ladder way Openings

Each above grade landing or platform accessible by a fixed ladder shall have the ladder way opening protected by a chain or swinging gate which does not require the climber's hand to operate the gate. The swinging gate must meet the same strength requirements as the standard rail.

Rope Ladders

Rope ladders should be used only after all other forms of access are reviewed. At a minimum:

- The ladder must reach and be anchored to the working surface.
- Personal fall protection is required.
- Only the HSSE manager can approve the use of rope ladders before use.

A documented procedure for use of the rope ladders, specific to the situation, is required. The procedure must be approved by the HSSE Manager and communicated to all affected personnel. The procedure must contain:

- The ladder design
- The rescue plan
- The method by which the ladder will be inspected
- Training requirements for employees on how to use the ladder
- All PPE requirements (gloves, fall protection)

Training Requirements

As required by OHS Act, all employees who might be subject to fall hazards shall be initially trained by a competent person to recognize the hazards of falling and to understand the procedures to be followed in order to minimize these hazards. This means any employee, or service provider, whose work activities could require them to work in the field above grade, must initially be classroom trained.

Initial and refresher training on this procedure is required for Operations/Maintenance staff.

Refresher training is required at least every three years.

Cone Roof Tanks

Cone Roof Tanks present a separate requirement for fall protection. Inspection Dept. will assess tank roofs for structural integrity per their guidelines.

- Long duration work (replacing roof panels, welding, painting, etc.) will require the use of temporary handrails or other method of fall protection.
- Short duration tasks (instrumentation work, conservation vent work, etc.) will require use of the Safety Monitoring System to install a Positioning Device System.

Tank dipping or other Operations work may be done within the confines of the permanent handrails (without personal or additional fall protection) as long as access past that protected area is not required.

3. References [back to TOC]

3.1 Records

ID No.	Title	Holder	Location	Working Duration	Archive Duration

3.2 External References

Document Reference	Title	Issued by	Revision / Date

3.3 Internal References

Doc. ID	Title

4. Keywords [back to TOC]

Working at height, scaffold, ladders, access

5. Definitions and abbreviations [back to TOC] Refer to SITE.RG.0001

Additions to this list must be sent via e-mail to the Bms Administrator.

6. Revision list [back to TOC]

Revision	Date	Description	Checked by	Approved by
0	31/01/17	First Issue	S. Zulu	M. Yokwe
1	08/01/2019	Added chin straps	Lloyd Gonde / David Radebe	M. Yokwe
2	04/02/2020	Portable ladder to design	David T. Radebe	M. Yokwe

7. Appendices [back to TOC]