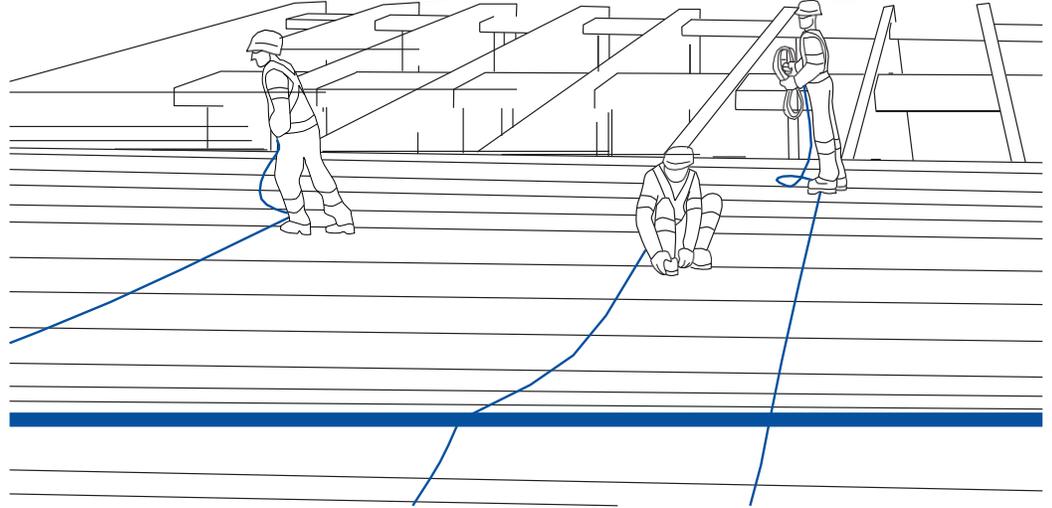


INSTITUTE FOR WORK AT HEIGHT



Roofing & Working at Height



Concern:

A fall from height is the most serious hazard associated with roof work. Preventing falls from roofs is a priority and it is expected from principals, employers, and contractors with staff working on roofs to actively manage any potential for falls.

Investigations into falls while working at height show:

- more than 50 percent of falls are from less than three metres
- most of these falls are from ladders and roofs

More injuries happen on residential building sites than any other workplace in the construction sector, and of falls experienced by roofers:

- 20 percent were over three metres in height.
- 40 percent were from permanent structures such as roofs.

These guidelines give all who are involved with working on roofs a clear direction on how to manage the work in a way that will bring down the death and injury toll.

The Best Practice Guidelines for Working on Roofs provides practical guidance to employers, contractors, employees, designers, principals, persons who control a place of work, and architects who are engaged in work associated with roofing.

Workers who need to access roofs and to whom these guidelines will apply include:

- roofers
- builders

Good Practice Note

2019

Good Practice notes inform the industry on how to embrace best practice and how to deal with issues that may arise. They are aligned with, but do not replace regulation as well as endorse industry standards

- plumbers
- heating and ventilation installers
- air conditioning installers
- painters
- installers of telecommunications equipment
- demolition contractors
- home or property owners or inspectors
- chimney sweeps, etc.



Legal References:

What are the legal aspects and requirements for working on roofing?

Various legal references contained in the OHS act with specific reference to:

- Section 8 (Duties of Employers)
- Regulations 9 (Risk Assessments)
- Regulations 10 (Fall protection plans)
- General Safety and Administrative regulations

As for all companies the Occupational Health and Safety Act takes relevance when working on roofs. As per Section 8 of the OHS Act –

- 1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health and safety of his employees.
- 2) Without derogating from the generality of an employer's duties under sub-section (1), the matters to which those duties refer include in particular –
 - a) a provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health,
 - b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety of employees, before resorting to personal protective equipment;

- c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;
- d) establishing, as far as is reasonably practicable, what hazards to the health and safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall as far as is reasonably practicable, further establish what precautionary measures should be taken
- e) with respect to such work, article, substance, plant and machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;
- f) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;
- g) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;
- h) taking all necessary measures to ensure that the requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;
- i) enforcing such measures as may be necessary in the interest of health and safety;
- j) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and
- k) causing all employees to be informed regarding the scope of their authority as contemplated in section 37(1)(b).

As roof work falls within the definition of the construction site, the Construction Regulation, 2014 as per the requirements needs to be considered when working on roofs including the following sections when working at heights –

CR 10 – Fall Protection

(1) A contractor must-

- (a) designate a competent person to be responsible for the preparation of a fall protection plan;
- (b) ensure that the fall protection plan contemplated in paragraph (a) is implemented, amended where and when necessary and maintained as required; and
- (c) take steps to ensure continued adherence to the fall protection plan

(2) A fall protection plan contemplated in subregulation (1), must include- a risk assessment of all work carried out from a fall risk position and the

- (a) procedures and methods used to address all the risks identified per location;
- (b) the processes for the evaluation of the employees' medical fitness necessary to work at a fall risk position and the records thereof;
- (c) a programme for the training of employees working from a fall risk position and the records thereof;

- (d) the procedure addressing the inspection, testing and maintenance of all fall protection equipment; and
 - (e) a rescue plan detailing the necessary procedure, personnel and suitable equipment required to affect a rescue of a person in the event of a fall incident to ensure that the rescue procedure is implemented immediately following the incident.
- (4) A contractor must ensure that-
- a) all unprotected openings in floors, edges, slabs, hatchways and stairways are adequately guarded, fenced or barricaded or that similar means are used to safeguard any person from falling through such openings;
 - b) no person is required to work in a fall risk position, unless such work is performed safely as contemplated in subregulation (2);
 - c) fall prevention and fall arrest equipment are-
 - i. approved as suitable and of sufficient strength for the purpose for which they are being used, having regard to the work being carried out and the load, including any person, they are intended to bear; and
 - ii. securely attached to a structure or plant, and the structure or plant and the means of attachment thereto are suitable and of sufficient strength and stability for the purpose of safely supporting the equipment and any person who could fall; and
 - d) fall arrest equipment is used only where it is not reasonably practicable to use fall prevention equipment.

Also taking into account –

- (5) Where roof work is being performed on a construction site, the contractor must ensure that, in addition to the requirements set out in subregulations (2) and (4), it is indicated in the fall protection plan that-
- a) the roof work has been properly planned
 - b) the roof erectors are competent to carry out the work;
 - c) no employee is permitted to work on roofs during inclement weather conditions or if any conditions are hazardous to the health and safety of the employee;
 - d) all covers to openings and fragile material are of sufficient strength to withstand any imposed loads;
 - e) suitable and sufficient platforms, coverings or other similar means of support have been provided to be used in such a way that the weight of any person passing across or working on or from fragile material is supported; and
 - f) suitable and sufficient guard-rails, barriers and toe-boards or other similar means of protection prevent, as far as is reasonably practicable, the fall of any person, material or equipment.

Recommendation:

What are the common challenges the developer's team faces when installing a roof and when working at heights such as scaffolding and rope access (i.e. painting or cladding or specialist operations like waterproofing)? Some new buildings can be 3 or 4 storeys tall, and redevelopments in the inner cities can be as tall as 10 storeys.

Any building has a few generic challenges that the developers / construction personnel face when either constructing, renovating or refurbishing a building with rooftops including:

The availability and suitability of structural or certified anchor points. Structural anchor points in a roofing environment is normally wooden trusses and they are not of sufficient strength to withstand a shock load of 15kn in case of a fall. This includes during all phases of construction

Sheeting is normally a huge challenge as well as it does not allow for lifelines (either permanent or temporary) to be installed due to various reasons including:

- Constant movement during installation (as sheeting is being placed on the wooden trusses). This is also applicable to steel trusses as you install sheeting over the anchor point.
- Anchor points at feet level increasing the fall distance
- Competency of personnel on site to competently assess the rooftops and place appropriate systems in place on site
- Time that is available for the installation of systems for safety is just not available and thus the “shortest route” possible is used and that does not include certified or competently installed systems.

Competency of personnel working on rooftops (both US229998 and US229995) to allow for all scenarios to be covered including rescue situations from a rooftop.

Access and egress that is normally done via scaffolding and when looking at higher than 6m, the certification of those structures is build according to which might link to the total safety management system and the competency thereof on site.

Roof Access

Roofing material deteriorates with age and does not perform as it did when it was installed. Before commencing work on an existing roof, inspect it thoroughly to determine its strength. This should, when possible, include inspection from inside the building as well as externally.

A mobile elevating work platform from inside the building can provide a close inspection of the condition of the timber or steel structure noting any deterioration that has occurred. If the building has a ceiling, then safe access must be provided into the roof cavity.

Where it is not possible to gain access from below the roof due to the presence of existing machinery, plant or the roof structure, ceiling or bracing elements, a safe work system for working from on top of the roof should be established, and this system should be documented.

Whether the work is undertaken from above or below the roof will be determined by the hazards associated with working at height. This includes the manner in which the hazards are controlled including the risk of falling through the roof. The preferred method of controlling height hazards while removing roofing material may be to use elevating work platforms or other temporary work platforms to gain access from below the roof.

Where there is no permanent access to roof areas, provide temporary access that is properly constructed. Scaffolding constructed work platforms or mobile elevating work platforms (MEWPs) are the preferred means of temporary access. Where this is not practicable, portable industrial-grade ladders with a load rating of at least 120 kg secured against movement, pitched at about 75 degrees (4:1) and extending at least one metre above the stepping-off point are a suitable means of temporary access. For major roofing

work, provide a scaffold stairway access tower. Never allow workers to use barrow hoists to gain access to the roof.

Falling materials

Isolate the area below roof work wherever there is any danger of people being struck by falling material, debris, tools, and/or material from adjacent cranes or structures.

Toe boards should be fixed to temporary edge protection as a way of containing all materials, including debris and loose tools.

Work areas must be declared a 'No Go' area for all persons except those directly involved in the roof work. Signage should be prominent at the entry points to the site. The immediate working site must be isolated, and no other persons must enter the area when work is being carried out above

Weather conditions

Check the suitability of weather conditions. Hazards resulting from adverse weather conditions should be anticipated and suitable precautions taken. Considerations relating to weather conditions include:

- condition of the roof surface
- moisture conditions (for example, rain, ice, frost, snow)
- wind speed
- UV radiation and sun glare

What are the common things that go wrong on site? So many things can go wrong.

- Personnel can fall from heights
- They can be exposed to a leading edge that, coupled with a fall from height, can lead to equipment failure during a fall from height
- Not sufficiently trained and competent personnel on site to work (safely and with appropriate fall protection controls) on site
- Lack of site-specific fall protection plans addressing all roof work challenges
- Anchor point failure
- Uncertified installations (e.g. cable systems, etc.) failure
- Lack of understanding of the risks when working at heights leading to unsafe practices
- Cost vs benefit discussions always lead to cheaper systems that is uncertified and not suitable for the task at hand

What are the best practices to be followed by all teams involved, and what protocol needs to be followed when incidents occur?

Proper and detailed task specific risk assessments that brings about:

- Detailed equipment procurement
- Training in line with the assessed risk and equipment provided
- Detailed safe working procedures
- Detailed rescue procedures
- Competency training of all personnel exposed to working at heights
- Adherence to all of the above must be non-negotiable

In the event of an incident:

- Rescue / fall arrest plan contained in the site-specific fall protection plan must kick in immediately and thus allow for a quick rescue (if needed from height)
- Section 24 of the OHS Act with appropriate WCL 1 and 2 documents

- Detailed investigation into the causes of the accident for compliance (as there is too many sites that knows the legal and best practice requirements) but still see the need to not follow that
- Appointments to be in place with responsibilities well informed for each and every person to allow for a smooth process

Eliminating falls through design

Design the roof with the purlins and battens spaced to prevent workers falling through the gaps between them. Purlins can be placed 450 mm apart, rather than the standard 900 mm. However, this could still result in an injury being sustained by the impact of a person falling onto the rafters and being wedged between them, or through striking a limb or other part of their body against the rafters.

Use sarking that is strong enough to support the weight of a person when falling on to it from the roof (that is, the same level). The sarking is not to be considered a work platform, and workers should be discouraged from walking on it. Where it is intended to be used as fall prevention sarking, it should be compatible with the roof and meet the manufacturer's installation and design specifications.

Plant requiring maintenance could be installed at lower levels of a building reducing the need to access the roof area.

Selecting the right equipment for working on roofs

Part of the hazard assessment process is selecting a control or a combination of controls to prevent falls from roofs. Outlined below are a number of options linked to the hierarchy of controls for managing hazards. Each control will have benefits and deficits depending on the nature of the work. Sometimes a number of controls will need to be used to ensure the hazards are adequately managed.

The first priority is always to eliminate the potential of a fall. Ways to do this include designing out the hazard, or working on the ground, or working from a solid construction. Minimization controls should only be implemented as the primary means of controlling the hazard when neither elimination controls nor isolation controls are possible.

Group controls versus personal controls

As well as the hierarchy of controls, consider how controls can protect multiple people from falling. These are called group controls. The best work methods are those that don't require any active judgement by the workers to keep themselves safe, such as edge protection, scaffolding, and elevating work platforms.

Personal controls only look after individuals and rely on active judgement by the user for them to work safely (for example, fall restraint harness and fall arrest). Training, inspection, and equipment maintenance are critical for these personal control measures to be effective.

Competency

A competent person is defined by the Construction Regulation 2014, as 'a person who –

- (a) has in respect of the work or task to be performed to 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 Qualifications Framework Act 2000 (Act No. 67 of 2000), those qualifications and training must be regarded as the required qualifications and training; and

(b) is familiar with the Act and the applicable regulations made under the Act;'

There are various standards applicable for the different access methods (MEWP's, Scaffolding, Fall Arrest, Rope Access). The Institute for work at heights issue licenses to operate for employees found competent for work at height training according to the designation trained against by an approved training provider.

The minimum training required:

What training of staff is required (on or off site) and who ensures compliance on sites?"

Site induction:

- Risk assessments including controls
- Toolbox talks
- Various focus areas including working at height / ISM / rescue / lifelines, etc

Accredited and certified fall arrest training:

- US229998 – general workers
- US229995 – supervisors
- US229994 – fall protection planners / risk managers / site agents / etc.

First aid

Incident investigation

Risk Assessment

Note:

The fall protection plan for roofing sites needs to be site specific, clarifying methods, equipment, training and rescue methods as well as risk assessments for the work methods to be used.

**WORK AT HEIGHT CAN BE
CONDUCTED SAFELY**



A Special Thanks To:

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