Practical Guide to Working at Height:
Ensuring Safe Work Practices
Disclaimer

It is the responsibility of duty holders to ensure site safety. The provisions of this Practical Guide (the Guide) should not be regarded as exhaustive in respect of matters covered by relevant safety legislation. Compliance with the following provisions does not relieve persons of any of their statutory responsibilities or confer any immunity from their legal obligations.

Site management should formulate relevant safe working procedures and management systems according to the actual environment and operations on their own construction sites. They should also provide training to and supervision of their workers in order to ensure that the whole team understands and follows necessary safety measures to prevent accidents.

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Safety is not an act but a habit

Introduction

Working at height in construction and maintenance works or activities involving temporary or transient working environments entail inherent hazards can always be made safer with necessary safety measures. Safety experts agree that with proper planning and design of safe methods together with effective control, communication and supervision, it is possible to effectively reduce, and in many cases, eliminate such work hazards. Adoption of ‘safe system of work’ has to be done with a ‘caring’ approach in order to instill a ‘safety’ mindset.

Safety First, Zero Incident

As a proactive and caring public sector developer, the Hong Kong Housing Authority (HA) has always striven to promote occupational safety and health throughout the supply chain. ‘Safety First’ has always been an integral part of our work and we emphasise ‘ZERO incident’ as a performance goal to provoke vigilance on all fronts.
Aspirations

With the expert advice from the core members of the Housing Department Site Safety Sub-committee (HDSSSC), we have compiled the Practical Guide to Working at Height: Ensuring Safe Work Practices (the Guide) to reinforce critical safety messages and promote best practices. We suggest readers should use the Guide as a handy reference and a ‘safety companion' in their daily work.

We sincerely hope that this Guide will call forth considerate and smart practices among industry practitioners during operations at heights. Looking ahead, we will continue to engage practitioners including contractors, service providers, staff members and other stakeholders with a view to promoting safety awareness, fostering safe practices and spreading 'Safety DNA'.

HDSSSC wishes you a safe future...

Housing Department Site Safety Sub-committee
December 2011
This Guide is a synergistic product of the HDSSSC Task Group. First and foremost, our utmost gratitude must go to the Occupational Safety and Health Council for their initial draft, and the Labour Department and the Development Bureau for their invaluable advice on the compilation of the Guide. Their tenacity made this Guide a reality.

We are also much indebted to the support from the HDSSSC organisations on the development and production of this Guide, which has been an illuminating process –

**Bureau / departments / statutory bodies**

- Occupational Safety and Health Council
- Labour Department
- Development Bureau
- Buildings Department
- Construction Industry Council
- Vocational Training Council

**Contractors / service provider associations**

- Hong Kong Construction Association Limited
- The Hong Kong Federation of Electrical and Mechanical Contractors Limited
- Hong Kong Construction Sub-contractors Association
- The Association of Hong Kong Property Services Agents
- Hong Kong Cleaning Association
- The Hong Kong Chamber of Cleansing Contractors Limited

**Trade unions**

- Hong Kong Construction Industry Employees General Union
- Hong Kong and Kowloon Electrical Engineering and Appliances Trade Workers Union
- Construction Site Workers General Union
Last but not least, a huge thanks to colleagues in the Development & Construction Division and the Estate Management Division for their efforts and patience rendered in information searches and administrative support that helped make everything happen.

Please feel free to send any comments and suggestions to the Safety and Health Unit, Development and Construction Division, Housing Department:

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Background

- More than half of fatal accidents on construction sites in Hong Kong involve persons or materials falling from heights.
- Many of such falls are attributed to unsafe workplaces, unsafe means of access to workplaces and / or a lack of planning, coordination, monitoring and control.

Safe systems of work

- A safe system of work is a formal procedure which systematically examines work tasks to identify all potential hazards and then delineates safe working methods that ensure hazards are eliminated and risks minimised.
- A safe system of work is needed when hazards cannot be physically eliminated and certain elements of risk remain.

Those responsible for implementing a safe system of work should define safe methods by:

- Considering work preparation and authorisation required at the start of any job.
- Ensuring clear planning of job sequences.
- Specifying safe work methods and necessary safety measures.
- Including a safe means of access and escape, where relevant.
- Considering tasks such as dismantling and disposal of building materials at the end of each job.
In cases where a ‘permit to work’ is required, these work permits should:

- Define the work to be done.
- State clearly how to make the work area safe.
- Identify any remaining hazards and precautions to be taken.
- Describe checks to be carried out before normal work can be carried out.
- Name the person responsible for controlling / supervising the job.

**Hierarchy of controls**

- The hierarchy of controls – relating to the risks associated with people falling from heights – should be in order as follows:
  
  (i) The provision, use and maintenance of proper working platforms; and / or proper guard-rails, barriers, toe-boards and fences; and / or coverings for openings; and / or proper gangways and runs.
  
  (ii) If complying with (i) is not reasonably practicable, the provision and the proper use of other forms of physical restraints that are capable of arresting the fall of a person from a height as a last resort after proper risk assessment is done.
Guiding Principles

Two-metre Rule

It is often mistakenly believed that no further action is needed if a person faces a fall of less than 2m. This belief is wrong.

Mistakenly believed that a fall less than 2 metres is safe

• Occasionally, people suffer accidental falls in occupations associated with working at heights such as painters, plasterers, glaziers, plumbers, lift mechanics / workers and cleaners.

• Even those who normally carry out duties below 2m, such as fit-out workers, may sometimes need to be deployed at heights above 2m.

• It needs to be emphasised that there is no ‘safe height’ and those working at any distance from the ground could be at risk of falling.

Even those who normally carry out duties below 2m, such as fit-out workers, may sometimes need to be deployed at heights above 2m.
Typical height hazards

- Typical hazards, when working at height, exist on unfenced working platforms, unsuitable scaffolds, ladders, roofs, canopies, open steelwork, lift shafts, slope work, ground excavation works and any area where work is being done in proximity to fragile materials, openings, holes and floor edges etc.
Guiding Principles

Equipment for work at height

It is tempting to use a ladder for a wide variety of jobs, but workers should primarily use working platforms for most jobs, and reserve ladders purely as a means of access and egress to such platforms.

When deciding what equipment to use, think about exactly what the job entails:

**Working environment**

- Slopes, uneven / soft ground, obstructions and traffic may all determine the choice of work equipment for a job.
- For example, elevated / elevating working platforms can be used to reach over poor ground / obstructions as long as their stability is not compromised, and may be preferable to a tower scaffold in such circumstances.
Height to be negotiated for access and egress

- Ladders are not suitable for access to high work areas.
- In such cases, it is preferable to provide access by fixed staircases or towers with integral stairs and suitable guard-rails and toe-boards.

Distance and consequences of falls

- A fall arrest lanyard is unacceptable if it is designed or anchored such that the possible resultant falling distance is greater than two metres or if the user may hit the floor or other objects.
- Safety nets also become less reliable, in terms of preventing injuries, the higher the fall.
- In such circumstances, alternative safety measures – namely fall prevention measures – should be deployed.

If there is a risk that users may strike obstructions in the event of a fall, alternative safety measures other than fall arrest system should be selected in such circumstances, i.e. fall prevention measures – working platform and guard-rails.
**Guiding Principles**

### Duration and frequency of use

- Use of ladder for work at height for long duration or high frequency is not suitable.

- Serious or even fatal accidents involving the fall of persons from ladders occurred from time to time. This is usually attributed to the use of ladder for work of complicated nature or long duration, unsafe practices on ladders, or without appropriate safety precautions.

  - Straddling across a step ladder and moving it from one location to another with the feet is unsafe.

- As a safety conscious contractor or service provider, adequate safety precautions should be taken to ensure the safe use of ladders by workers, including:

  - Avoiding the use of ladder for work at height and use working platforms in lieu of ladders whenever practicable.

  - Ensuring the ladder is placed on firm and level ground.

  - Fastening the ladder in position or assigning another worker to hold it to ensure its stability.

  - Avoiding carrying or lifting objects when using ladders.

  - Workers get down from the ladder before moving it to a new location.

  - Conditions of the ladders should be checked regularly to ensure they are safe for use.

*Fastening the ladder in position or assigning another worker to hold it to ensure its stability*

*Over-reaching from the ladder is unsafe*

*Avoiding the use of ladder for work at height*

*Straddling across a step ladder and moving it from one location to another with the feet is unsafe.*
Evacuation and rescue

- If evacuation from a deployed fall arrest system is in any way likely to be difficult, alternative safety equipment should be selected such as elevating working platforms.

Select alternative safety equipment, such as elevating working platform

Hazard of objects falling from heights

- It is important to consider the risks associated with objects falling from heights.

- The Construction Sites (Safety) Regulations detail specific risk control measures for controlling the risks associated with objects falling from heights.

- The Regulations stipulate that necessary precautions and steps shall be taken:
  - To prevent scaffolding materials, tools or other objects and materials from being thrown, tipped or shot down from a height where they are liable to cause injury to persons on or near a site.
  - To prevent workmen from being struck by falling materials or objects.

To ensure that scaffolding materials, tools or other objects and materials are properly lowered in a safe manner by means of a lifting appliance or lifting gear

Preventive control measures

Objects falling from height

Toe board to prevent falling object
Safe working cycles

- A safe working cycle integrates safety practices into a systematic framework by placing emphasis on leadership and promoting participation in all safety issues on site.

- It comprises scheduled activities to heighten safety awareness and help prevent accidents or injuries and is an effective means to help implementation of safety management systems on daily, weekly and monthly cycles.

- Non-compliance items are identified and rectification action to eradicate malpractice is required.

### Daily Safe Working Cycle
- Morning safety meeting
- Hazard identification activity
- Prior-to-work inspection
- Guidance and supervision at work
- Safety inspections
- Process safety discussion
- Tidy up
- Final check

### Weekly Safe Working Cycle
- Weekly inspection
- Weekly check
- Process safety discussion
- Weekly tidy up

### Monthly Safe Working Cycle
- Monthly safety meeting
- Monthly inspection
- Monthly safety training
- Monthly safety committee meeting
Legislative requirements and guidance materials

- This Guide has used the existing legislative framework as a basis for providing practical advice on how to plan for safe work at height and how to establish control measures to prevent injury to persons working at heights as part of a safe system of work.

- The general principles for the prevention of falls in workplaces can be found in the following safety codes of practice and guidance materials:
  
  - Safe System of Work
  - Code of Practice for Bamboo Scaffolding Safety
  
  - Code of Practice for Metal Scaffolding Safety
  - Safety Guide for Bamboo Scaffolding Work
Guiding Principles

- Guidance Notes on Safe Use of Power-operated Elevating Work Platforms
- Safety Hints on Operation of Suspended Working Platforms
- Safety Hints on Renovation Work
- Beware of Fall at Work
- Guidance Notes on Classification and Use of Safety Belts and their Anchorage System
- Guidance Notes to Renovation Safety
- Occupational Safety and Health Management in Renovation and Maintenance Works for the Property Management Industry
- Guidelines on Safety of Lift Shaft Works – Volume 1
- Guidelines on Safety of Lift Shaft Works – Volume 2
- Construction Safety – Working at Height
- Construction Sites (Safety) Regulations
- Statutory General Duties Requirements under Factories and Industrial Undertakings Ordinance – Section 6 (e.g. Safe Systems of Work)
Guiding Principles

Key safety points to remember

- Carry out risk assessments for work at height activities to ensure all ‘work at height’ and ‘prevention of objects falling from height’ are planned, organised and carried out by competent persons and trained workers.

  Ensure all ‘work at height’ and ‘prevention of objects falling from height’ are planned, organised and carried out by competent persons and trained workers.

- Follow the hierarchy of controls (as stated on pages 2 and 3) for managing risks from work at height.

- Take steps to prevent persons and materials falling by providing suitable barriers, fences, guard-rails and working platforms, as far as practicable. As a last resort, use fall arrest systems to reduce risks of falling.

  Avoid risks + Prevent risks + Reduce risks = Manage and Control

- Select appropriate work equipment and deploy collective risk control measures necessary for a safe workplace to prevent falls whenever practicable.

- Barriers, fences, guard-rails and working platforms should be used as primary safety measures.

Barriers, fences, guard rails and working platforms are primary safety measures.
• Other mitigating measures, which may only reduce the distance and consequences of falls, such as safety nets and safety harnesses, and measures that only provide personal protection from a fall, should then be used as secondary safety measures.

For working at heights, safety regulations require employers to adopt basic safety precautions including provision of suitable working platforms, safe access and egress to workplaces and the erection of suitable barriers, fences, guard-rails at hazardous locations.

If these basic safety precautions to prevent the falls of persons are not feasible, safety harness should be used as a last resort after proper risk assessment is done.

Provide suitable guard-rails

Suitable working platforms to prevent persons from falls

Proper use of safety harnesses as a "last resort" after proper risk assessment is done.
Risk assessment approach to working at height

- When considering working at height, a risk assessment must be undertaken in order to identify what the hazard is and the degree of risk present.

- A risk assessment is a careful examination of what could cause harm to people as a result of a work activity, and it allows the necessary precautions to be taken to prevent accidents and / or injury.

- Below are also some key actions that should be taken to prevent falling of objects or materials:

  1. Secure loose / light materials stored on roofs, open floors or platforms to prevent them falling from height / being blown away by the wind.

  2. Keep materials at a reasonably safe distance – at least 2m – from openings of floor and roof, edges, excavations and / or trenches.

  ![Keep materials at a reasonably safe distance – at least 2m – from floor and roof openings, edges, excavations and / or trenches](image)

  3. Adequate protection, such as suitable nylon nets and / or catch-fans, should be provided to guard against falling objects. Regular inspection to these nets and / or protective fans should be carried out to ensure that they are functioning properly and that they contain no gaps, holes or accumulated debris.

  ![Catch-fans](image)
4. Contractors should prevent hand tools and other materials from falling from height by using safety measures such as providing workers with tool straps or tool vests.

**Risk assessment**

- All risk assessments should be conducted by a competent person and endorsed by a management staff with sufficient safety knowledge – preferably a safety officer or engineer.

- In view of the risks of working at height, a work permit or a checklist should be introduced to ensure all proper safety measures have been implemented prior to commencement of any work.

Risk assessments should be conducted by a competent person and endorsed by a management staff

Risk assessment needs to:

1. Look for potential hazards.
2. Identify who might be harmed and how.
3. Evaluate the risks as to whether the existing precautions are adequate and whether additional safety precautions are required.
4. Record the findings where necessary.
5. Review the assessment.
Risk control measures
Risk control measures for work at height

- **Collective risk control measures** should always take priority over personal control measures.

- **Collective risk control measures** protect more than one person at any one time, such as working platform, and are usually passive – requiring no action by users in order to work effectively.

- **Personal control measures** rely upon personal protective equipment (PPE) and only protect individual users, such as fall-arrest harnesses.

  - These are usually active measures and require the user to take specific actions in order for them to work effectively e.g. clipping PPE lanyards onto an anchorage point.

  - As the effective use of PPE relies very much on human factors, the use of PPE is only the last resort (after proper risk assessment is done) under the hierarchy of hazard controls.
Working at height – risk assessment flowchart

1. IDENTIFY HAZARDOUS ACTIVITIES OF WORK AT HEIGHT

2. RISK ASSESSMENT (Risk = Probability x Consequences)
   - NO: No further action
   - YES: Is there a risk of a person falling a distance liable to cause personal injury?

3. CONTROL RISKS Hierarchy of controls
   - NO: Can work at height be avoided? i.e. eliminate the need of working at height
   - YES: No further action

4. AVOIDANCE

5. WORKING PLATFORM
Can falls be prevented by appropriate railings, or other form of working platforms?

Yes

Go to 8

No

6.1.1 Work Restraint PPE

6.1 Personal Protective Equipment (PPE)

6.1.1 Work Restraint PPE

6.1.2 Fall Arrest PPE

6. WHERE THE RISK OF PERSONS FALLING STILL REMAINS, TAKE STEPS TO MINIMISE THE SEVERITY AND CONSEQUENCES OF A FALL.

Personal Fall Protection
7. RESCUE PLAN
Establish a rescue plan in the event that a fall should occur.

8. WORKING AT HEIGHT SAFE SYSTEM
OF WORK
- Risk assessment
- Procedures and method statement for working at height endorsement by management staff
- Work permit / checklist
- Selection and procurement of work equipment for working at height
- Inspection and maintenance of work equipment
- Inspection of workplace and conditions (including inclement weather)
- Effective communication, information and instructions to all relevant personnel
- Proper record keeping
- Rescue plans
- Workers’ training, competence & supervision

6.1.2 Fall Arrest PPE
* If safety harnesses are to be used, there must be continuous anchorage for attachment of the harness throughout the entire duration of the work at height.
Workplace access

- Ladders are not suitable for access to higher work areas.
- In such cases, it is preferable to provide access by fixed staircases or towers with integral stairs and suitable guard – rails and toe – boards.

Fixed Stairways

Guard rails

- Workers should be provided with protection, such as robust handrails, against falling from either side of stairs.
  - Every staircase with two or more rises should have a continuous handrail to provide guidance and support to those using it.
  - They should also be fitted with a guard rail on sides where falls are possible – particularly on high-traffic staircases, where simultaneous two-way traffic is likely.

Landings, steps and toe boards

- The open edges of stairways require guard rails with mid-rail protection.
- Landings shall be constructed to divide long stairs into separate flights of approximately equal rises.
Any landing shall have a minimum width and depth equal to the width of the steps.

Treads and rises on any stairway must be of uniform dimensions.

- The exact rise of each tread and the going (depth / tread) will be governed by available space but should comply with the following criteria:
  - The height of the rise and depth of the going of each step should observe the formula: \((2 \times \text{rise}) + (\text{the going} / \text{tread}) = 600\text{mm}\).
  - For example, with a rise of 160mm and a going of 280mm, this would be calculated as follows: 
    \[(2 \times 160) + (280) = 600\text{mm}\]

- Guard rails shall be provided on the open side of all stairs.

- Handrails must be provided on at least one side of all closed stairs.

- Stairways wider than 1m shall have hand or guard rails installed on both sides.

A toe board shall also be fitted anywhere there is a danger of tools / materials falling over an edge.

The maximum number of steps between stair landings should be 16, with no more than two flights (max. 32 risers) before a change of direction.
Service stairs around plant, machinery and similar equipment may, in some cases, not be able to meet these criteria – they should instead be built to the dimensions and pitch of a step or tread ladder.

Spiral stairways should be avoided, whenever possible.

Fixed Stairs – important points to remember

- Stairways must be not less than 600mm wide.
- Stairs of angles of 30° and less than 50° are considered as safe access.
- Stairs of angles of 50° and less than 60° are considered an ‘unsafe zone’ and should not be used for access.
  - Workers may make use of tower scaffolds or mobile working platforms to provide safer access.
- Stairs of angles of 60° and less than 75° fixed-step type ladders may be used, but due care should be exercised because of the inherent danger of sliding down when persons descend, facing forwards, on such ladders.
- Stairs of angles of 75° or more require cage guards (safety loops) or guided – type fall arrester on rigid anchorage line.

Fixed access ladders

- The use of fixed access ladders to access workplaces carries a number of inherent risks and should, wherever possible, be avoided.

- With reference to the guidebook *Construction Safety – Working at Height* (available with Chinese version only) issued by Occupational Safety Health Council, the following points should also be noted:
  - Suitable safety hoops or cage guards should be installed where required.
- The spacing of safety hoops should not exceed 900mm.
- The lowest safety hoop should be installed not more than 2.5m above the ground.
- The highest safety hoop should be installed 1m above the upper end of access and egress.
  * If there is a working platform, the hoop should be connected to the guardrail of the platform.
- There should be a suitable landing place or rest platform, at intervals of not more than 6m, along fixed access ladders.
  * These should be fitted with suitable guardrails of adequate strength.
  * Top and intermediate guard rails should be fixed at a height of 900 – 1150mm and 450 – 600mm from the platform, respectively.
  * Toe boards, at least 200mm high, should also be installed.

- Additional administrative controls may be required to further mitigate risks.
  - For example, a simple sign at eye level or, where the ladder incorporates a retractable bottom section, adjacent to the hinge point stating “CAUTION: FIXED LADDER”.
  - Easily accessible permanently-fixed access ladders should be blocked off when access is not required using lockable plates to cover the lower rungs or having removable / retractable lower rung sections.
3 Safe Working Methods

- Where installing cage guards or safety hoops is not possible, and the use of fixed access ladders is required with angles exceeding 75° to the horizontal, these must be fitted with a temporary / permanent guided-type fall arresters on rigid anchorage lines.
  - To facilitate this, a corrosion-resistant anchor cable or rail, generally stainless steel, can be attached to the ladder or access.
  - Climbers need to wear a harness attached to a Type 1 fall arrest device (inertia lock) which is free to slide up and down this cable or rail.
  - Refer to: Guidance Notes on Classification and use of Safety Belts and their Anchorage System from the Labour Department.

Fixed access ladders is required with angles exceeding 75° to the horizontal

Ladders and stepladders

Use of ladders

- Ladders are used to gain access to areas above or below the ground, however, it is important to appreciate the safe limits for their use – especially for portable ladders.
  - Most accidents involving ladders occur because these limits are exceeded and ladders should only be used to gain access to work areas.

- If tools are required to be brought while using a ladder, they should be restricted to light hand tools that can be carried in a tool belt, holster or pouch at all times.

Carry handheld tools using tool vest
During ascent, work and descent on ladders, workers must be capable of retaining three points of contact with the ladder at all times.

- Users should avoid moving the ladder while still on it, and avoid overreaching while working from the ladder, as these are the most common causes of falls – even for experienced workers.

Limitations for use of ladders / stepladders

- As a general guide, ladders and stepladders should only be deployed:
  - Where a handhold is available on the ladder / stepladder.
  - Where a worker can maintain three points of contact, via hands and feet, in their working position.
  - On any ladder where a worker cannot maintain at least one handhold, except for a very brief period of time, other measures should be taken to prevent a fall.
Ladder safety checklist

- Prior to use, establish whether any ladder / stepladder is in a safe condition. Only use ladders / stepladders that:
  - Have pre-use checks conducted each working day including a detailed visual inspection in accordance with the manufacturer’s instructions.

- Comply with one of the following international safety standards:
  * Timber BS1129: 1990 Kite Marked Class 1 Industrial
  * Aluminium BS2037: 1994 Kite Marked Class 1 Industrial
  * Glass Fibre BSEN131: 1993 Kite Marked Industrial
  * Step stools BS7377: 1994

- Have been properly maintained and stored in accordance with the manufacturer’s instructions.
Ladders / stepladders – important points to remember

- Only use ladders for access and egress.
- Only when working platforms or scaffolding are not reasonably practicable after proper risk assessment done, consider using portable ladder as a last resort. Such use of ladders should be limited to light works of simple nature and short duration conducted at a height of less than 2m.
- Comply with international safety standard and of sound construction.
- Ladders must be inspected for damage before each use. The feet of ladders are particularly susceptible to damage which can significantly reduce their grip – making them more prone to movement – increasing the potential for falls.
- Ladders / stepladders should only be erected on solid level and day surface.
- Vertical ladders should only be used when no other type of ladder is practicable.
- Vertical ladders should extend at least 1m above the landing place.
- Vertical ladders should be placed at a safe angle of approximately 75° to the horizontal i.e. ~1m out at the base for every 4m in height. Fix the position of the ladder with a string or by a co-worker.

Stepladders should be used on a level surface, spread to their fullest extent and spreaders securely locked in position

Wooden / fibre-glass ladders should be used for electrical work
Safe Working Methods

- If using a stepladder in a doorway, make sure the door is firmly wedged open.
- Stepladders must have slip-resistant treads not less than 100mm deep.
- Store ladders / stepladders in sheltered place.
- Remove damaged ladders from use and ensure they are properly repaired or destroyed.
- Workers should avoid carrying any tools / materials in their hand while climbing ladders.
- Tools requiring the use of two hands should not be used.
- The safest way to climb a ladder is to use the stiles as a hand grip.
  - This method allows the hands to slide up and down the stiles and maintain good hand contact at all times.
  - User should clean footwear before using ladders and face the ladder whenever climbing or descending.

Stepladders must have slip-resistant treads not less than 100mm deep

Remove damaged ladders from use and ensure they are properly repaired or destroyed

Tools requiring the use of two hands should not be used
Openings, corners, breaks, edges and canopies

In relation to work at height in any areas where there are openings, corners, breaks, edges and / or canopies involved, guard rails barriers, fences must be provided. Where the aforesaid measures for prevention of falls are not reasonably practicable, fall arrest systems, must be provided as a last resort after proper risk assessment is done.

Guard rails

- Top guard rails should be fixed at a height of 900 – 1150mm and intermediate guard rails positioned so that any gap does not exceed 600mm.
- Guard rails must not be installed more than 300mm away from any edge.
- Toe boards, 200mm in height, should be installed.

Floor Opening

- All floor openings must be guarded off or securely covered.
  - Make opening covers stand out with bright paint and include a warning sign stating, “DANGER! OPENING – DO NOT REMOVE! DO NOT LOAD!”. 
  - Fasten covers securely to the floor to prevent workers from removing them and falling through the opening.
Edge Protection

- Edge protection should be rigid enough to sustain, without failure or undue deflection, a force at any point of 0.69kN (70kg) vertically and 0.44kN (45kg) horizontally to prevent a person and/or load from falling down.
  - Note: chains are not rigid enough to provide adequate edge protection.
- Where guard rails have to be temporarily removed for the passage of materials or people, open edges should be fenced off and marked with warning signs.
  - Workers in such areas must use work restraint system to prevent falls from heights, including rails, guarding, and as a last resort, fall-arresting system including anchor points, fixed length lines and harnesses.
  - The removed guard rails must be reinstalled as soon as possible.

Fall arrest systems

- To provide safe access to workplaces such as canopies and the tops of covered walkways, plans should always make provision for, as soon as practicable, access via:
  - Permanent staircases.
  - Temporary working platforms with internal stairs.
  - Walkways/passageways complete with suitable guard rails.

Full-height temporary protective barriers are required to wall openings as protection against fall of persons and/or falling objects during the course of construction.
General

- Fall arrest and/or work restraint systems are designed to support and hold a person in the event of a fall. But such systems should only be used as a **last resort** in situations where other safety measures such as temporary working platforms or guard rails are not practicable, with proper risk assessment done.

- A fall arrest system comprises an independent lifeline, a fall arrester and a full-body harness.

- If fall arrest systems are required, the following points should be noted:
  
  - Fall arrest systems should be used in accordance with the manufacturer’s instructions, and when mixing components – check for compatibility before use.

- Fall arrest systems must be designed to provide ‘continuous protection’ to workers allowing them to attach and detach safety belts/harnesses to a continuous anchorage system\(^1\) in a safe position before and after working at height.

\(^1\) A properly designed fall arrest system
Safe Working Methods

Safety Harnesses

- Safety harnesses should be attached continuously to an anchorage system throughout the entire period of working at height, to ensure continuous fall protection.

  1. Shoulder strap
  2. Auxiliary strap
  3. Site strap
  4. Thigh strap
  5. Back support
  6. Adjuster
  7. D-ring
  8. Buckle
  9. Print

- Lanyards or anchor lines must be attached to the top dorsal position, at chest height.

Training of workers on proper use of fall arrest system

- Workers should be provided with training on the correct use of fall arrest systems and given periodic updates.
  - Proper records must be kept of such training.

Anchorage for fall arrest system

- Manufacturer’s specifications should be observed regarding the minimum distances required for specific fall arrest systems to be effectively activated.
  - For anchor points fixed above workers, a minimum clear distance of **at least 5m** is usually required **below the anchor point for the fall arrest system to properly activate**.
It is therefore essential that **sufficient activation distance** is provided above the ground / other surface and that there are no obstructions within this fall zone.

- Anchorages for lanyards should be fixed as high as is practicable, but within easy reach.
- An anchorage at foot level will allow a person to fall the length of the lanyard plus the distance between the worker's feet and harness fixing point.
- The maximum allowable fall factor\(^2\) is 1.

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**Work retraction system**

- Fall arrest equipment such as harnesses and lanyards can be used as work restraint systems.
  - By preventing workers from leaving safe areas into unsafe areas with fall risks.
  - An example would be a harness and lanyard / rope system adjusted so that it can physically prevent users from reaching the edge of a roof or canopy.
- Local environmental factors should also be taken into account to avoid, for example, high temperatures or smoke affecting the performance of any of the components of the system.

\(^2\) The fall factor is the ratio of the distance a worker falls before his rope begins to stretch and the rope length available to absorb the energy of the fall.
Pendulum effect

- The ‘pendulum effect’ is a potential hazard associated with the use of fall arrest systems.

- To reduce and / or eliminate the pendulum effect:
  
  - Equipment must be adjusted to reduce the restrained fall to the absolute minimum.
  
  - A secondary anchorage point and lanyard / lifeline should be used.
  
  - The anchorage point should be positioned more or less perpendicular to the position of the lifeline.
  
  - Guard rails can be used to help prevent any falls beyond the perimeter.

Safety nets

- Where workers are required to work at height and it is impracticable to provide a safe place of work via working platforms and / or the fencing off of dangerous places by barriers, fences, guard-rails – the use of safety nets can be considered a last resort after proper risk assessment is done.

- Erection of safety nets should only be considered where all other safety measures are impracticable to protect workers from injury due to fall hazards.
- Refer to: *Guidance Notes on Classification and use of Safety Belts and their Anchorage System* of the Labour Department.

- When using safety nets ensure they are:
  - Erected as close as possible to the working level.
  - The size and location of safety nets is critical – the further a person may fall, the larger the safety net needs to be.
  - The maximum recommended distance a person is allowed to fall before reaching a safety net is 6m.

- Compliance with accepted international standards.

- Rigged by a competent person who can demonstrate specialised training in this field.

- Correct in size: for a fall of one metre (H), safety nets must have a horizontal projection (d) beyond the outermost working point of 2.2m \( (d = 2 + \frac{1}{5}H) \).

---

**Safety net - Correct size**

\[
H = \text{Vertical distance in metres between net and uppermost working level above net}
\]

\[
L = \text{Length of shortest side of net (≤3.2m)}
\]

\[
d = \text{Horizontal projection from outmost working point in metres}
\]
• Inspected daily for signs of wear or damage and rejected if any are found.
• Stored in dry shaded areas with good air circulation.
• Protected from combustible materials, chemicals, welding slag or any damage.
• Not used as a substitute for the effective prevention of falls, but rather as a last form of defence after proper risk assessment done to save lives and prevent injury.

Safety nets – Important points to remember

• Systems, such as perimeter screens, fencing, handrails and other physical barriers used as edge protection to prevent persons / objects falling from elevated work areas should be properly designed by a competent person, rather than improvised.

• Personal fall protection systems including work restraints, fall arrest systems and work positioning equipment should only be used if other types of safety equipment are not reasonably practicable after proper risk assessment is done.

• Even when safety nets are installed, every effort must still be made to provide a safe working platform above the safety net.

• Apertures of safety net meshes should be around 100mm, and the length of net should not be less than 3.2m.

• Pre-work tests for the safety nets installed prior to usage and regular testing of such safety nets after putting into use by competent person, should be conducted.
Roof work
Safe access and fall prevention

Provide safe means of access by access stairs to roof.

- Existing places of work i.e. existing buildings or structures, including its means of access and egress, from which there is no risk of a fall occurring are deemed safe and no work equipment is required to prevent a fall.
  - For example, flat roofs with a parapet or permanent guard rail of adequate height to prevent falls over the edge.

- If an existing place of work cannot be utilised, then equipment including, but not limited to, temporary guardrails, working platform and elevating working platforms is required to prevent a fall.

Edge protection

- Edge protection is necessary for all roofs where there is the possibility of a fall of not less than 2m from the edge of the roof.

Fall prevention – flat roofs with a parapet or permanent guard rail of adequate height to prevent falls over the edge

Edge protection should take the form of barriers, fences or guard rails high and strong enough to stop people rolling / sliding down the roof

Unless roof battens are of adequate strength themselves, adequate handholds and footholds, climbing ladders or crawling boards should also be provided
Work on / near fragile roofs and surfaces

Risk of collapse

- A fragile surface is a surface liable to fail if a reasonable load is to be applied to it.
  - Contractors should identify all fragile surfaces in the workplace such as asbestos cement sheets, plastic sheets, corroded metal sheets, glass, wood, wool slabs and skylights, and fix appropriate warning notices at the access points to all such areas.

Planning for work on / near fragile roofs and surfaces

- Where possible any work on, from or near fragile surfaces should be avoided by using elevating working platforms, tower scaffolds or other safe means to access the work areas from underneath.
  - Where this is not reasonably practicable, falls should be prevented with equipment such as guard rails, barriers, fences, working platforms and coverings.
  - Where the risk of a fall still remains, additional fall-mitigation measures should be taken such as the use of safety nets and / or personal fall arrest systems.
  - For any re-roofing / roof repair work, consideration should be given to using non-fragile replacement materials whenever possible.
Roofs work – important points to remember

• Only when working platforms or scaffoldings are not reasonably practicable after proper risk assessment done, consider using fall-arresting system as a last resort for fall protection for working on roofs / fragile surfaces.

• Prior to working on roofs / fragile surface should clearly identify exactly which sections are made of fragile material.

• Where a risk of falls still remains, fall arrest equipment is also required.

If work requires regular / occasional access to areas that include fragile surfaces, permanent barriers, fences, guard-rails or other measures to prevent falls should be installed.

Workers should not be allowed to work on any roof without adequate edge protection.

Workers should never step onto a fragile roof.

Tree lopping and trunk / branch removal

General

• Tree lopping and / or related trunk / branch removal work is a high-risk work duty and all persons undertaking such work need to eliminate or at least control the various associated risks.

• Those responsible for tree lopping and associated debris removal must ensure:
  – Safe work procedures are developed in consultation with staff for hazardous operations.

Setting up and maintenance of safe work zones and escape routes.
A site-specific risk assessment is undertaken prior to the commencement of any work, which should include:

* The safe use of plant including chainsaws and general equipment for working at heights.
* The safe use of access equipment such as mobile elevating work platforms and other fall-prevention measures appropriate fall arrest system should be used as a last resort for the work.

Where it is not reasonably practicable to do so and after proper risk assessment is done, then appropriate fall arrest systems should be used.

Tree lopping and trunk / branch removal – important points to remember

- When a ladder is used for access to a tree, a safety harness system should be used and the ladder should be steadied by a ground worker.
- Workers are never connected directly, via harnesses / other means to any crane.
- Instead, appropriate plant / equipment specifically designed for safe access – such as elevating work platforms or suitable scaffolds, should be used.
- Refer to more information on the safe use of ladders in this chapter.
Scaffolds and working platforms
Metal and bamboo scaffolding

- Scaffolding is a temporary structure specifically erected to support work and access platforms.
  - The erection and dismantling of such scaffolding must be carried out in compliance with the Construction Sites (Safety) Regulations and Codes of Practice for Bamboo and Metal Scaffolding Safety of the Labour Department.
- Scaffolding should be secured to the building or structure at sufficient points to prevent collapse.
- Scaffolding should be erected with double guard rails and toe boards. Additional measure such as nylon net is also required to prevent materials from falling.

Working platforms should be fully boarded and the boards arranged properly
A bamboo scaffold of height greater than 15m, it should be designed and approved by professional engineer
Erection, alteration and dismantling of bamboo scaffolding must be conducted by trained workmen under the immediate supervision of a competent person.

- Trained workmen must have satisfactorily completed formal training in, and possess at least 3 years of experience of, bamboo scaffolding work.

- A competent person should inspect the scaffolding regularly and the results of these inspections properly recorded.

A scaffold platform placed below a working area is not a control measure – as it does not eliminate the risk of falling.

**Bamboo scaffolding**

- Ensure each cross-brace bamboo has a span not exceeding 9m and is erected at 60° or more from the horizontal.

- Securely tie any scaffolding erected higher than 7m to the building.
  - These ties should be spaced apart not more than 7m horizontally and 4m vertically.

- Ensure the scaffolding is not overloaded.

- Check the effective diameter of bamboo members is not less than 40mm for a ledger and 75mm for a standard.

- Ensure a safe means of access and egress is provided in the bamboo scaffold.
• Ensure a minimum dimension of 1.5 – 2m for standards and 2m for ledgers and bracing / rackers when overlapping any two bamboo members.

• Ensure scaffolding is still safe before dismantling it, and start the dismantling work from upper levels to lower levels and from the exterior to interior.

• Avoid using any bamboo poles that show signs of rotting or insect infestation.

• Examine all nylon ties for early signs of decay.

**Double-row bamboo scaffold with recommended erection standards**

**Standard**
(with effective diameter equal to or greater than 75mm)

**Ledger**
(with effective diameter equal to or greater than 40mm)

Ledger on the first lift with effective diameter equal to or greater than 75mm

Less than or equal to 0.75m

Less than or equal to 1.3m

Transom (effective diameter equal to or greater than 40mm)

Less than or equal to 1.2m

Height of each boarded lift should be between 1.9m and 2m

Building

**Note:**
For all standards and the ledgers on the first lift of the scaffold, the wall thickness of these bamboo members should not be less than 10mm.

distance between 2 fastenings should not be greater than 300mm

for connection between 2 bamboo members, the length of overlap should be:

a) 1.5m to 2m for standards

b) at least 2m for ledgers and bracings/rakers

(the ‘tail’ of one bamboo member should be connected to the ‘head’ of the other)
Truss-out scaffold

- The metal supporting framework should be designed by professional structural engineer.
- The size of drill holes in the wall should match the diameter of the 3 of each supporting bracket bolts so that they can penetrate into the supporting wall for adequate depth.
- Inspect the Truss-out scaffold to ensure safe working condition before work commencement.
- In case no anchor point is available, use mobile fall arresting system for anchorage of independent lifelines.

Metal scaffolding

- Ensure boards forming scaffolding work platforms are at least 25mm thick.
- Ensure scaffolding is braced vertically, horizontally and diagonally for stability.
  - Check that all such bracing extends from the base to the top of any scaffolding.
- Provide proper access and egress for scaffolders and subsequent users of scaffolding.
- Provide safety nets and safety belts (full-body safety harnesses) for the protection of scaffolders for erection / alteration / dismantling of bamboo / metal scaffoldings.

Ensure metal scaffolding is not overloaded

Workers should wear safety harnesses securely attached to anchor points and independent lifelines

Secure safety nets and attach safety belts to a secure anchorage point / independent lifeline rather than to any scaffolding member
Metal and bamboo scaffoldings – important points to remember

- Inspect and ensure the safe condition of scaffolding before work commencement.
- Provide suitable working platform, guard-rails, toe board and safe means of access and egress to scaffolding.
- A handheld tools and materials should be properly placed to avoid falling objects.
- It is always safer to use suitable scaffolding than a ladder, whenever work cannot be done safely from the ground.
- Ensure scaffolding is securely anchored to the building and only used for the purpose for which it was intended.
- Scaffolding boards making up a working platform should rest squarely and evenly on transoms to reduce any risk of tripping.
- Top guard rails and intermediate guard rails should be installed 900 – 1150mm and 450 – 600mm above work platforms, respectively.
- Toe boards must rise at least 200mm above the working platform to prevent material being knocked over the edge.
  - If materials need to be stored above this height, then additional boards / wire mesh should be added to extend the toe board coverage.

Inspection Form 5 is duly signed and valid.

Don’t alter or dismantle the scaffolding without approval so as not to affect the structural safety of the scaffolding.
• Ensure that timber used in scaffolding is not painted / treated so that any wood defects are not hidden.

• The vertical clearance above platforms must not be less than 2m.

**Tower scaffolds**

• Tower scaffolds consist of a platform resting on horizontal ledgers connected to four uprights.

• The whole structure is supported on base plates – if static, or on castor wheels – if mobile.

• The erection and dismantling of tower scaffolds must be carried out in compliance with the Construction Sites (Safety) Regulations, *Code of Practice for Metal Scaffolding Safety* and the manufacturer’s instructions.

**Risk of toppling**

• Serious accidents can occur if scaffold towers topple over – such instability can arise for a number of reasons:
  
  – The ratio of the height of the tower to the least width of the base is excessive.
– The top of the working platform is overloaded.

– A ladder is placed on the top platform to extend the height of the tower.

– Work involving percussion tools produces destabilising horizontal / lateral forces at the top of the tower.

– The mobile tower is moved, while persons / materials are still on top of the platform.

– The tower is erected on sloping / uneven ground.

– Access to the platform is provided via the outside of the tower itself.

– The tower is not tied off to a building / structure where required.

**Tower scaffold stability**

• The first precaution when using tower scaffolds is to achieve and maintain tower stability, which requires several key considerations:

  – Towers should only be constructed up to the maximum safe height (as defined by the height: least-base dimension ratio).

  Ratio of height to least base width should not exceed 4:1 for static towers used indoors, 3.5:1 for static towers used outdoors, 3:1 for mobile towers used outdoors, unless otherwise guyed and / or stabilised with outriggers.

  Towers of greater height must be guyed and / or stabilised with outriggers at each corner, with an additional set of ties being added for every 6m increase in height.
Outriggers and/or guy wires must be available for use, where necessary.

* All users should ensure they do not apply any undue horizontal force to the working deck.

* Hauling heavy ropes/cables, lifting significant loads up the outside of towers, and the use of gin wheels on cantilever tubes should only be carried out on scaffold towers specifically designed for these purposes.

- The working platform of tower scaffolds should be equipped with a secure cover for the ladder access opening which can be fixed with a latch in both open and closed positions.

- A suitable handhold should also be fitted near the access opening to provide support for users climbing through the opening.
**Inspection and maintenance**

- The physical condition of tower scaffolds is very important to ensure worker safety and regular inspection and maintenance must be scheduled for all tower scaffolds.

- These inspections should cover the:
  - structural integrity of bracings and uprights.
  - condition of brakes, castors, outriggers, work platforms, ladders and rails.

**Tower scaffolds – important points to remember**

- Tie the tower onto an adjacent structure wherever possible.

  Use the wheel locks whenever the tower scaffold is in use

  Never climb a mobile tower scaffold unless all the wheels are on level ground and locked

- Keep towers scaffold away from overhead electrical supply lines and check that mobile towers are free of overhead obstructions before moving them.

- Avoid using a tower scaffold in windy or severe weather conditions.

- Move the tower scaffold by manually pushing / pulling the tower base – never use powered vehicles to shunt towers.

- Never use a tower scaffold as a support for ladders, trestles or other access equipment.

- Use tower scaffolds provided with suitable guard-rails, toe boards and ladder access.
Safe Working Methods

- The tower scaffold should have been inspected by a competent person before use.
- The ratio of the height to the least width of the base should not exceed 4 for an indoor stationary tower scaffold (the ratio is 3.5 and 3 for an outdoor stationary and mobile tower scaffolds respectively).
- Stabilise tower scaffolds with outriggers fully resting on solid ground.

Never move a tower with persons or materials still on the working platform

Trestles

- Trestles are self-supporting metal or timber stands including horizontal members designed to support one end of a light-duty work platform.
- They may be folding or telescopic. When using trestles ensure:
  - They are safely erected and dismantled by competent persons in accordance with the manufacturer's/supplier's instructions.

Steel working stool provided for high level works

Trestle
They have bracing installed, in accordance with the manufacturer’s instructions.

Appropriate safety measures such as provision of toe boards and guard rails have been properly implemented to prevent users falling from the platform where the falling distance is 2m or more.

They are stable and erected on a hard surface in the fully opened position using soleplates, unless on a very rigid surface such as a concrete slab.

* The immediate foundations must also be adequate to carry and distribute the required loads.

Measures are in place to control instability and prevent possible toppling including tying trestles to a permanent structure or using outriggers.

Prior to the use of trestles, proper risk assessment should be conducted by a competent person to see if safer alternatives such as working platforms, step platform ladder, etc. can be utilised.

**Trestles – important points to remember**

- Establish a horizontal work platform on sloping / uneven ground, use frame trestles that incorporate height adjusters.

- Do not use bricks / blocks as soleplates for trestles.

- Platforms must be at least two boards wide (width at least 430mm).

- Prevent slips and trips by ensuring all users wear appropriate footwear, keeping working platforms clear of debris, installing sufficient lighting and avoiding workers overreaching.
Safe Working Methods

- Users to sit down to work whenever possible.
- Where jobs are done at a height of 2m or more, working platforms with top guard rail, mid-rail and toe-board should be used.

Do not exceed specified trestle load limits (total load will include the weight of all persons, tools and materials). The duty rating must be clearly stated on each trestle.

Use working platform for work at a height of 2m or more.

Mobile working platforms

Suspended working platforms (SWPs)

General

- SWPs are most frequently used for work on tall buildings / structures where it is not feasible / economic to build scaffolding from the ground.

- All installation, maintenance and dismantling of suspended working platforms should meet the Factories and Industrial Undertakings (Suspended Working Platforms) Regulation.

4 suspension wire ropes
Eyebolts for safety harness
• Typical accidents on SWPs occur because of:
  – Difficulty of getting in and out of the SWP.
  – Failure of suspension ropes.
  – Collapse due to overloading.
  – SWPs inadequately attached to suspension ropes.
  – Damage – by exposure to chemicals / corrosive materials – to motors, platforms or wire ropes to which the stage is suspended.
  – Poor maintenance.
  – Failure of SWP supporting structures.

**Suspended working platforms – important points to remember**

• Guard rails, of adequate strength, should be provided on all sides of SWPs.
  – The top guard rail and intermediate guard rail should be fixed 900 – 1150mm and 450 – 600mm above the platform, respectively.
  – Toe-board around the edge of the platform.

• Safe access and egress should be provided at all times to SWPs.

• Bilingual notices, in English and Chinese, should be displayed prominently on SWPs stating, “Every person riding on a suspended working platform shall wear a safety belt properly attached to an independent lifeline or an appropriate anchorage.”

Provided with Form 2 in the immediate preceding 6 months, Form 3 in the immediate preceding 12 months and Form 1 in the immediate proceeding 7 days before its use.
• Safe working load, the maximum number of persons that may be carried at any one time and an appropriate mark to distinguish the SWP from others must be clearly and legibly marked on each SWP.

• Operator or persons working on the suspended working platform should be at least 18 years old and have a recognised training certificate.

• Approximate safety measures are required for different work nature, e.g. fire extinguisher of approximate type is required if worker on suspended working platform would use inflammable substances.

Not to be used under adverse weather conditions

The area underneath suspended working platform must be cordoned off to avoid risk of falling objects

Mobile elevating working platforms (MEWPs)

General

• MEWPs are increasingly being used as temporary working platforms to provide a safe place of work at height.
  – In relation to fall protection hierarchy, they are considered to be work equipment that prevents a fall.
• If MEWPs are used to directly install materials, it is essential to know the weight and dimension of material.

• Boom-type elevating working platforms generally have smaller baskets and lower lifting capacities than scissor-type models and their platforms may ‘bounce’ at height due to the boom structure flexing.

  One of the biggest risks in using boom-type platforms is being thrown out of the basket if the boom swings, jolts or tilts away from the machine’s centre of gravity.

• Boom – type MEWPs are not suitable for installing long/ heavy materials, or bulky materials that may obstruct the function controls.

**MEWP safety features**

• To maximise worker safety, MEWPs should feature:

  A top guard rail and a mid rail round the edge of the basket to prevent users falling out.

  A slip-resistant floor.

  Toe-boards round the edge of the platform.

  Deadman controls – clearly marked to show their method of operation.

  Stability devices such as outriggers to make the entire unit stable.

  These should ideally be interlocked such that the MEWP will not operate unless all outriggers are fully extended.

• Locking-out controls, aside from those in the basket, to prevent inadvertent operation.
Safe Working Methods

- Access gates that open inwards, upwards or sideways and return automatically to a closed position.
  - It is also strongly recommended that a device is provided to lock the gate automatically and ensure it cannot be opened once the platform is raised.
  - If such a device is not fitted, then the gate should be self-locking in the closed position.

Avoiding operator overreach
- It is not safe for users to stand on any MEWP guard rails.
  - If users have to lean out of the platform to carry out work at height, then they must wear safety harnesses and lanyards securely attached and linked to the platform’s harness anchorage points to prevent them from falling from the platform.

Mobile elevating working platforms – important points to remember
- All workers must wear safety harnesses with lanyards securely attached to platform’s anchorage points when working on MEWPs.
- Designed and examined by registered engineer.
- Should not be overloaded.
- Used by operator in accordance with manufacturer’s instruction.
- Provided with 900mm – 1150mm top rail, 450mm – 600mm mid rail and minimum 200mm high toe board.
- Erection, dismantling or modification of MEWPs shall be under the supervision of competent person. Care must be taken when elevating the platform to avoid contact with any overhead obstructions.
- Clear and detailed instructions should be given to MEWP users covering safety and emergency procedures including evacuation procedures e.g. should the power fail.
Preventing objects falling from height

• To minimise the risk of objects falling from height, several critical safety considerations should be borne in mind:
  
  − Provide a safe means of raising and lowering plant, materials and debris in the place of work.

• Where it is not possible to provide barriers, take sufficient measures to arrest the fall of such objects including: scaffolding platforms, roof edge protection systems, toe boards and appropriate guard rail infill panels.

• These should also be inspected regularly to ensure they are functioning properly and contain no gaps, holes or accumulated debris.

• Workers should be provided with tool straps and reminded to make every effort to prevent materials and hand tools falling from height.

• Personal protective equipment, such as safety helmets, must be worn by all workers at all times on site to minimise the risks associated with falling objects.

• Contractors should ensure that all their workers should always wear chin straps attached to their safety helmet when working at height.

Provide secure physical barriers to prevent objects falling freely from buildings / structures in, or in the vicinity of, the workplace

Provide workers with tool straps

Provide adequate protection such as nylon meshes and catch-fans of adequate strength to guard against falling objects

Secure loose and / or light materials stored on roofs, keep materials at least 2m – away from roof openings
Guard rail height

✓ Top guard rails should be fixed at a height between 900mm and 1150mm from the working platform.

✓ Intermediate guard rails should be fixed at a height between 450mm and 600mm from the working platform.

Bamboo scaffold

✓ On bamboo-scaffold working platforms, protection by not less than two horizontal bamboo members (spaced at intervals between 750 – 900mm can eliminate the need for additional top and intermediate guard rails).

Working platform

✓ Have all boards / planks forming the working platform firmly secured to prevent movement.

✓ Have spacing between boards / planks not exceeding 25mm.

✓ Have toe boards installed to at least a height of 200mm above the working platform.
Boarding of gangways and runs

✓ Be of sound construction, adequate strength and free from defects.

✓ At least 200mm wide and 25mm thick, or at least 150mm wide for boards/planks with a thickness of 50mm or more.

✓ Rest securely and evenly on at least 3 supports and not protrude beyond end supports by more than 150mm.

✓ Include protection in the form of exterior curtain netting to prevent materials falling.

Removal of temporary works

✓ Plan the procedure of removing temporary works on external works by means of temporary working platform.

✓ The removal of pipe sleeves embedded in external concrete wall should be carried out from outside to inside so as to avoid pipe sleeves falling from height.

Catch fan

✓ Regularly maintained including removal of debris etc.

✓ Adequately supported.

✓ Fully covered with a layer of galvanised metal sheeting.

✓ Constructed with a 450 x 450mm channel at their base.

Project horizontally a minimum of 1500mm beyond the face of the building.
Good Working Practices

Safety net

✓ Installed by a competent person.
✓ Maintained, checked and tested periodically according to manufacturer’s instructions and this work is properly recorded.
✓ Have sufficient tension and ground clearance to prevent any person falling into them from coming into contact with surfaces / structures below the net.
✓ Installed with exits at their edges.
✓ Free from chemical and physical damage.
✓ Not used for storage of any items.
✓ Not subject to excessive heat such as from blow torches / welding equipment.
✓ No debris deliberately thrown into them.

✓ Regularly maintained including removal of debris, particles etc.
✓ Building exteriors should be covered with nylon safety nets.
✓ Nets should be securely fixed onto scaffolding and free of gaps / holes / accumulated debris.
✓ Safety nets should be made of fire retardant materials.
Fall arrest system

✓ Platforms must have sufficient, clearly designated safety-harness anchorage points designed to withstand the forces of a person falling from the platform.

✓ Workers’ safety harnesses must be attached securely to the fall arrest systems of independent lifelines.

✓ Fall arrest systems should comprise: a body support element (fall arrest full-body harness), a connecting element (fall arrest lanyard with built-in energy absorber), a connector (rope grab) and an anchorage (lifeline / anchor).

Anchor point of fall arrest system

✓ Be inspected by workers prior to use.

✓ Regularly inspected by a competent person to ensure their integrity – especially in outdoor environment where they are more prone to corrosion.

✓ Strong enough to stand with the required static and dynamic loads resulting from a fall, when used for fall arrest purposes.

✓ Checking by a Professional Engineer of the structural discipline in accordance with the Guidance Notes on Classification and Use of Safety Belt and their Anchorage System.

✓ Any testing, if necessary, should comply with manufacturer’s specification.
Rope grab
✓ Adjustable rope grabs facilitate an adjustable length connection between a user's body support and their anchor point.
✓ The metallic grab provides a constant grip on the rope and can be user-adjusted to any desired operating length.

Continuous anchorage of fall arrest system
✓ Fall arrest systems should be designed and installed to facilitate workers remaining in a safe place when attaching / detaching safety belts / harnesses to continuous independent lifelines / horizontal anchorage systems.
✓ To ensure continuous fall protection, the safety harness should be continuously attached to the anchorage system while working at height.
Retractable fall arrester (RFA)

There are two main types of RFAs: lightweight short-range auto-reel models (approx. 2m long) and long-range models. RFAs:

✔ Provide users with freedom of movement over large areas.

✔ Operate via inertia sensing in the event of any sudden jerk / free fall the device.

✔ Will immediately lock on to provide users with a cushioned movement arrest.

✔ It is essential that such fall-arresters be used in conjunction with full-body harnesses to provide adequate body support in the event of a fall.

✔ Harness attachment points must also be tested to ensure they are secure enough to handle fall arrests.

Safe access and egress

✔ Safe access to, or egress from, any work area, including roofs can be facilitated via stairs with permanent guard rails or edge protection such as parapet walls.

✔ Temporary work platforms, such as scaffolds, can also be deployed to facilitate safe access and egress.
Fixed access ladder

✓ Safety hoops to be provided for fixed access ladders of a height of 2.5m or more.

✓ Spacing of safety hoop not exceed 0.9m.

✓ Fixed access ladders without safety hoops or with angles exceeding $75^\circ$ to the horizontal should be fitted with a permanent / temporary fall-arrest system.

✓ Moreover, a specifically designed rescue procedure should also be developed for use in ladder cage emergencies.

✓ Training in this rescue procedure should also be conducted prior to use of any fixed access ladder.

Fall arrest system for fixed access ladder

✓ These fall arrest systems comprise a rail / steel wire line rigidly fixed to the ladder or tower.

✓ Users must attach their safety harness to a fall arrester carriage, which moves freely upwards and downwards on the rail / line without need for any manual adjustment – allowing users to keep both hands free for climbing.

✓ In the event of a fall, the fall arrester locks on the rail / line and provides immediate fall arrest for the user.
Climbing a ladder

✓ Those ascending / descending ladders should maintain three points of contact with a ladder, whenever possible i.e. two feet and one hand, or two hands and one or two feet.

✓ Tools and materials should not be carried by hand, but rather carried in a tool belt or side pouch.

Provision of permanent platform and staircase at roof

✓ Avoid high cat-ladder and replace by staircase as far as possible.

✓ Intermediate resting platform should be provided for cat ladder with excessive height.

✓ Working platform shall be provided for operation of the valves at high level.

✓ First step of cat ladder should not be too high from finished floor level.

✓ Cat ladder shall be provided with safety loops to protect workers from falling down.

Avoid placing cat-ladder near building edges to prevent accidental fall equipment to below

Access to cat ladder should be free from obstacles, such as water pipes, drain pipes
Good Working Practices

✓ Provide safe access to main and upper roof level for operation and maintenance of the services such as permanent platform and staircase. For limited space, provide suspended steel platform and cat ladder with adequate security measures from trespass.

Acess to work area at height

- Upper roof with safe access
- When unavoidable cat ladder provided and located away from edge of building
- Steel stair
- Suspended steel service platform
- Safe maintenance access for Twin Tank
- Maintenance platform with safe and easy access to valves and pipes
- Railing
- External stair from main roof to maintenance platform
- Upper roof with safe access to top of water tanks
- Cat ladder from maintenance platform to upper roof
Metal gate for lift shaft opening

- Locked at all times when access is not required to the lift shaft.
- Self-closing.
- Readily openable, at any time, from inside the lift shaft without the need of a key.
- Fully cover the lift shaft opening with 4-leaf gates. The 4-leaf design reduces weight of each leaf and the risk involved during erection.
- Maximum mesh aperture of does not exceed 5mm.

Coverings to floor opening

- Used to guard / cover all floor holes with apertures greater than 50mm.
- Made from suitable materials.
- Securely fixed in position.
- Clearly marked with bilingual signs stating, “Hole below”. 

Full-height temporary protective steel gates covering lift shaft openings, providing protection against fall of persons / objects

Safety coverings for floor openings to prevent the fall of persons / objects
Physical protective measures

✓ Provide structural anchors for the uses of a guided-SWP, a trimmed scaffold and independent lifelines and eye bolts for work at height inside lift shaft.

✓ All workers inside a lift shaft should wear reflective garment.

✓ Fix warning notices at prominent locations on or near lift shaft protection barriers to remind all site personnel to take all necessary safety precautions when entering a lift shaft.

Work arrangement

✓ No lift worker and other trade worker to work simultaneously inside a lift shaft during the hot work or electric arc process.

✓ No lift worker should work alone inside a lift shaft. If it is practically unavoidable, the worker should have communication devices such as motion sensor to generate alarm in addition to the provision of walkie talkie.

Supervision, inspection and maintenance

✓ Strict supervision on both routine works and hazardous trade processes with focus on the use of safety devices including personal protective equipment (PPE) and oversee the permit-to-work systems.
Use of guided-SWP or a platform lift

- Conduct bi-weekly inspection and maintains lift shaft platforms, scaffolds, safety nets, wall anchors, independent lifelines and gangways.
- Maintain the hinges and locks of lift shaft protection barriers to ensure that the cages could not be swung beyond the floor edges of a lift shaft.

If a guided-SWP or a platform lift is used for the lift installation works, adopt the following specific safety precautions:

- A competent person should check control switches, safety devices and/or pedal brakes of the appliance before each work shift.
- Display a notice of the maximum number of workers working on the platform on the appliance facing the lift shaft opening and do not overload the platform.
- No work while the appliance is moving.
- Disallow worker to enter the lift shaft when the appliance is operating.
- Worker(s) should immediately anchor safety harness(es) to the independent lifeline(s) before entering the platform.
- Place all portable tools in the tool box and bag when working on the platform.
Good Working Practices

- Stop the platform of the appliance at appropriate level above the lift pit and locked in an inoperative mode. The switch key should be kept by the worker working inside the lift shaft. Post a warning notice at the control of the platform before entering the lift pit for works.

- Carry out lift car and frame assembly works preferably at the lowest level.

- If the lift car and frame assembly works are carried out at the lowest level, stop the guided-SWP at appropriate level above the lift pit and lock it in an inoperative mode.

- If the lift car and frame assembly works are carried out at the highest level, stop the guided-SWP at one level below and lock it in an inoperative mode.

Access to and egress from lift pit

- For safe access to deep lift pit over 2.5 m deep, provide a separate permanent access point instead of cat ladder where practicable and to provide a working platform or reserve space for the working platform.

- Where a ladder and working platform inside a deep lift pit is unsuitable, provide a suitable anchorage or a tailor-made cross beam (BSEN 795) with a retractable device for a lift worker who wore a safety harness attached to the retractable device.
Lift shaft temporary working platform

✓ Lift shafts with unprotected void spaces can be made safer with the use of closely-packed board platforms to prevent fall of persons and materials.

Working Platform with guard rails and close boarding and gangway are provided to connect the edge of lift well and the scaffolding

Mobile elevating working platform (MEWP)

✓ Workers operating MEWP must be trained in the safe operating procedures specific to that particular brand / type.

✓ MEWP should only be used as working platforms and not as a means of access to, or egress from, work areas.

✓ Unless designed for rough terrain, MEWP should only be used on solid and level surfaces.

✓ Users working in boom-type MEWP must wear a safety harness and lanyard with a shock absorber anchored to the MEWP’s anchorage point as precaution against mechanical failure of the basket.

✓ Lanyards should be as short as possible and must be attached directly to the designated anchor point, and not attached to the handrail.

✓ Users must not climb into / out of the bucket when it is elevated.

✓ The bucket should be used purely as a working platform and not as a means of access to, or egress from, work areas.
Good Working Practices

Temporary working platform (TWP)

- Provided with top and intermediate guard rails fixed at heights between 900 – 1150mm and 450 – 600mm from the platform level, respectively.
- Toe boards should also be installed to a height of at least 200mm from the platform.
- Examined every three months by a competent person.
- Not used to support any materials or plant.

- Regular cleaning of temporary working platform to prevent falling objects.
- No person should be allowed on the formwork during any lifting operations.
- Safe access should be provided to TWPs which should be fully enclosed with netting to prevent fall of persons / materials.
- Reduce time spent working at heights by pre-fabricating modules on the ground prior to lifting.

- Ladder / tower-scaffold fall-arrest systems (temporary / permanent) should be installed to provide continuous fall protection for persons using ladders or climbing towers.

Mobile tower scaffold, access ladder with guard rails, trapdoor and toe boards altogether provide a safe working platform.
Safety platform for paths with services

✓ Demountable platform should be provided across and over utilities / pipes in narrow paths at roofs / canopies to ensure safe passage of workers.

✓ Workers may be tripped down or slip down from the water pipes when they step on it in particular when they are carrying heavy equipments and the water pipes are not designed for sustaining persons from stepping on.

Tree lopping

✓ Provide a scissor lift / mobile elevating working platform – where operators are given appropriate high-risk work training.

✓ Only when working platforms or scaffolding are not reasonably practicable after proper risk assessment done, consider using ladder as a last resort. Provide ladders that are well maintained and selected specifically for tree lopping for making access and egress – which are regularly inspected for faults such as broken rungs, rails and footings.

✓ Ground staff should be caution against the inherent risks from falling debris / equipment.
Good Working Practices

Safe access to fragile roofing material

- Workers must be informed of the location of all fragile / brittle roofing materials.
- Safe access to such work areas should be provided enabling workers to step directly onto a safe platform / area.
- Work should only be carried out from a suitably located safe working platform.
- Warning signs must be securely fixed in a prominent position clearly visible to persons accessing the working area.

Safe access to work areas

- Detailed assessment of wind and inclement weather conditions.
- Provide of proper and safe access. Only if it is not reasonably practicable, provide fall prevention equipment and personal protective equipment for worker to make access to the work area as the last resort.
- Issue of specific safety instructions to users.
- Provision of means of rescuing persons from safety harnesses following arrested falls.
- Provision of safe access to anchorage points – taking into account the possibility of falls before users connect to / after users disconnect from anchorage points.
Safe maintenance access to vertical greening

- Hoisting beam 1
- Steel scaffolding with working platform 2
- Concrete plinth for setting of the scaffolding 3
- Automatic Irrigation system 4

Safe maintenance access at roof top of covered walkway

- Provision of guard rails, barriers, toe-board or fences.
- Provision of fall arrest system if guard rails, barriers, toe-board or fences are impracticable.
- Maintenance path.
- Automatic irrigation system.
- Choice of plant material with low maintenance species, e.g. drought tolerant type.
Incomplete Guard Rail

- Guard rail systems fail to withstand a force of 0.55kN (equivalent to around 55kg) applied to any point of it.
- Mid-rail and toe-board infill mesh panels are not installed to prevent persons / objects from sliding off the floor edge.
- Where access points are required for equipment, they are not adequately protected with gates / safety chains / other means to prevent persons from falling.
- Where guard rail systems are to be used with steel mould structures, the guard rails and fixings are not attached to the panels prior to the structures being raised from the ground.
- Not all open edges of staircases, landings, platforms and shaft openings are provided with guard rail to prevent falls.
Deficient toe boards, screens or guard-rail systems to prevent objects from falling.

Entry to areas into which objects could fall is not prohibited.

Objects are placed within 2m away from floor edges, and are at risk of falling over the edge if displaced.

Openings in guard rail systems are not small enough to prevent objects falling down between them.

A canopy structure / debris net / catch platform not erected above workplace where workers might be hit by falling objects. Even if the structure is erected, the structure is not strong enough to withstand the impact of objects which may fall into it.

Panelling or screening extending from toe boards / platforms to the top of guard rails not installed to protect objects from falling onto workers below

**Missing barrier**

- No secure guard rails and toe boards.
- No safe means of raising and lowering plant, materials and debris into / out of work areas.
- Secure physical barrier is not provided to prevent objects falling from buildings / structures in or close to the workplace.
- Where it is not possible to provide physical barrier, measures are not taken to arrest the fall of such objects.
Measures such as platforms of scaffolds, edge-protection systems, and wire mesh infills between guard rails and toe boards are not provided.

Screens / overhead protective structures are not provided to catch any falling objects and / or use barriers to set up no-go zones where there is any possibility of being hit by falling debris or objects.

Unprotected floor opening without adequate fall protection or barriers to prevent materials / persons falling

No edge protection

Temporary guard rails are not installed to perimeter resulting in falling hazard for those working at heights before erection of permanent barrier or after removal of temporary fence.
The sequence of work to be performed at heights to minimise fall risks is not carefully worked out.

Nylon rope fencing at floor edge is unacceptable

Gaps in bamboo scaffolding

Excessive gaps between bamboo scaffolding working platforms and building facades mean that objects may still be able to fall down.

Substandard plastic carton board unacceptable for use as a toe board

Improper working platform

Not providing proper working platforms for workers.

Workers supporting themselves unsafely on narrow wooden planks
Loose boarding with void

× Working platforms are not inspected by a competent person at regular intervals of not exceeding 14 days and immediately preceding each use of scaffolding.

× To verify such inspections, Form 5 is not completed and duly signed by the competent person.

× Each platform do not rest securely and evenly on at least 3 support rests unless, taking into account the distance between the supports and the thickness of the boards / planks, the conditions are such as to prevent undue or unequal sagging.

× Working platform is not closely boarded with uneven planks and dangerous void space

× Working platforms are not closely boarded or planked.

× Plank / board is not of a thickness capable of affording adequate security having regard to the distance between their supports. The plank or board does not meet the requirement of at least 200mm wide and at least 25mm thick, or at least 150mm wide when boards / planks exceed 50mm in thickness.

× Working platforms protruding more than 150mm beyond their end supports may lead to tipping.
Substandard catch-fan

× Catch-fans is not made of materials capable of withstanding the forces of objects falling from height and covered with timber boarding and galvanized metal sheeting.

× If the wall of a building is accessible to the public pavement, catch-fan is not provided at not more than 15m vertical intervals.

× The catch-fans do not project 1500mm minimum horizontally beyond the face of the building.

Truss-out Scaffold Overloaded

× Excessive storage of bamboo members on the scaffold.

× Bamboo raker overloaded and buckled, leading to falling of bamboos from height.

× Only two single bamboo rakers are used to provided support. Collapse of one raker will lead to falling object from height.
Unsafe access or egress

✗ Permanent guard rails or edge protection such as parapet walls are not provided.

✗ Temporary work platforms such as scaffolds and elevating work platforms are not provided.

✗ All plant and equipment are not properly located, operated and serviced.

✗ Old plant and equipment, is not adopted when it comes to end of its serviceable life.

✗ When barrier or working platform is not practicable, no proper risk assessment is conducted and fall injury prevention system is not adopted as a last resort by providing suitably located temporary and permanent anchorage points and struts with safety line attachments that harnesses / lanyards can be hooked onto.

Malpractice in use of ladder

✗ The ratio of the distance between the ladder base and supporting structures at about 1m horizontally for every 4m of ladder height vertically is not followed.

✗ Ladders are not firmly secured / tied off or firmly held by another person.

✗ Securing ties are attached to the rungs of the ladder and not the stiles.

✗ Ladders do not extend at least 1m above the access level.
Wrong use of ladders

✗ Ladders are used as a working platform. (Ladder should only be used for access to, or egress from a working area and not as a working platform).

✗ Not following the manufacturer’s recommendations on safe use.

✗ For A-shaped ladders, persons sit / stand on the top two rungs while working.

✗ It is not appropriate type for the task.

✗ Not compliant with international safety standards.

✗ Non-conducive ladders are not used for electrical work.

Unsafe access

✗ The amount and timing of worker traffic flows through access points is not considered.

✗ No provision for the location and space required to temporarily store any plant, equipment or materials.

✗ Workers are not supervised to ensure they only access work areas by safe means.

✗ Not regularly inspect and maintain all means of safe access.
**Dangerous Working Practices**

**Unsuitable staircase**

- Work platforms, walkways and stairways are not properly installed.

- After adverse weather conditions including heavy rain and strong winds, become temporary work platforms slippery. Combined with insufficient hand grips, the risk of workers slipping and/or falling may increase.

**Excavation without safe access**

- No suitable barriers – at least 900mm to 1150mm high – to prevent falls.

- No measure is used to prevent falls and also catch material falling into excavation areas.

- No safe access to and egress from work areas – particularly important whenever there is a risk of flooding and/or situations where rapid escape is essential.

**Entering lift shaft without safety precaution**

- No anchorage of safety harness onto the wall anchor before entering lift shaft.

- No close supervision of work in lift shaft.
Improper fall arrest system

× Select fall-arrest system and method of installation without proper risk assessment done.

× The system does not conform with international safety standards.

× Suitable anchorage points are not provided to meet the need for lateral and vertical mobility whilst workers are connected to the system.

No continuous protection by fall arrest system

× Potential for different types of falls including both freefall and restrained falls is not assessed.

× Not enough fall distances and clearances – both vertically and laterally.

× No safe access to, and egress from, work areas (at all levels) for persons installing anchorage points.

× Anchorage points are not installed in locations where it will be possible to assist / rescue users in an emergency.

Dislocated Material Hoist

× No secure anchorage of material hoist to permanent structure.

× Too early removal of ties of material hoist from permanent structure during dismantling process.

× Material hoist wrapped with safety screen but without sufficient ties may collapse under strong wind.
Case Studies

Learning from mistakes  Avoiding tragedies

General

According to the lessons learnt from the case studies, contractors should invariably develop and implement a safe system of work for site operations, and periodically review it, to ensure safety at work and prevent accidents. This safe system of work should include and is not limited to:

- Assess the work processes involved.
- Identify hazards associated with the work processes and carry out risk assessment.
- Formulate safe working methods and procedures.
- Implement and monitor the system to ensure effectiveness in operation, provide sufficient information, instruction and training to site personnel to ensure the whole team understand and follow safe work procedures, deploy only trained personnel to take up site operations, implement necessary safety measures and assign competent / experienced persons for supervision.
- Review, and if necessary, modify the system with contingency plans to cope with difference / changes in work environments.

Case 1: working platform – fatal fall of bar-fixing worker from substandard working platform

- An unsafe working platform was erected on the lower level of a scaffold to provide a support for four bar-fixing workers.
- Wooden boards and timber battens were also placed on the upper level of the scaffolding – where steel bars, timber materials and tools were placed for use by the workers.
- To perform their duties, the bar-fixing crew had to fetch tools and materials from the upper level of the scaffold and transfer them to the lower level.
While one worker was taking a steel bar from the upper level of the scaffolding; he lost his balance and fell 6m to the ground through an unsafe opening on the upper-level working platform, sustaining serious injuries from the fall, and later died in hospital.

Lessons to learn

The principal contractor responsible for the site and the subcontractor responsible for the bar-fixing work should ensure that:

- Proper working platforms of safe construction are provided to prevent workers from falling from heights.
- Working platforms should be closely boarded and fitted with suitable guard rails and toe boards.
- Any openings on the working platform, through which a person is at risk of falling, are securely covered.
- Implement a safe system of work for bar-fixing work which should include the following:
  - Formulate safe working procedures regarding the erection, inspection and use of working platforms.
  - Appoint a competent person to inspect working platforms before use.
  - Provide adequate training and regular surveillance of all relevant supervisors and workers in regard to complying with safe working procedures.
Case Studies

Case 2: working platform – fatal fall from height while erecting truss-out working platform

- A contractor was awarded a contract to install 14 additional metal brackets to secure a 300mm-diameter metal water pipe on the external wall of an industrial building.

- A truss-out working platform was fabricated to facilitate the installation of water pipe brackets onto the external wall.
  - Two identical metal bracket supports, each with an inverted U-shape clamp, were clamped on the wall of window openings as supporting structures.
  - Two large wooden boards were then placed onto the metal bracket supports to form the working platform deck.
  - Metal tubes and wooden battens were also installed as guard rails and toe boards, respectively.

- On the day of the accident, installation of the additional water pipe brackets had been completed.
  - While erecting the working platform on the 16/F, however, one worker suffered a fatal fall of 82m through a window opening to the ground.

Lessons to learn

- Adequate steps must be taken to prevent workers falling from heights, including the provision, use and maintenance of working platforms suitable for the environment and work being undertaken. For example, a suspended working platform in this case.
Suitable fall-arrest equipment should be provided and used by workers at all times whenever exposed to fall risks.

- An effective monitoring system should be implemented to ensure that workers make full and proper use of such safety equipment.

Erection of the working platform should be carried out by competent workers with adequate training and experience.

Case 3: working platform – fatal fall of glass panel installation worker through canopy void space

- On a building construction site, a metal canopy with glass panels was to be constructed at the 1/F level of the building.

- The work team was divided into two groups: one responsible for lifting the glass panels to the top of the canopy, the other was positioned on the canopy and was responsible for receiving the glass panels and securing them onto the metal frame.

- While the team on the canopy were taking a break, one of the workers walked along the canopy metal frame and suddenly fell through a void to the ground and sustained fatal injuries.

Lesson to learn

- This safe system of work should include:

  - Assessment of the work process involved. Carry out risk assessment suitable and sufficient for the glass panel installation work, identifying all the potential hazards including the falling hazard, and assessing their risks arising from the actual working environment on the canopy, such as the danger of falling through the canopy void spaces during the work.

A worker falling through a canopy void

A safe system of work for glass panel installation work should be developed, implemented and periodically reviewed.
- Establish and implement well-defined safe working method and procedures for the glass panel installation work, including the provision of proper working platforms with safe means of access and egress, suitable guard-rails and toe-boards so as to avoid workers working over the canopy void spaces.

- Training workers about the hazards / risks of working on canopy, as well as the defined safe working method and procedures for the glass panel installation work.

- Monitoring the implementation of the defined safe method and procedures, including the supervision of the workers’ safety when carrying out work on the canopy.

- Reviewing and, if necessary, revising the safe method and procedures with contingency plan to cope with different / changeable work environments encountered when carrying out the work on the canopy.

Establish and implement well-defined safe working method and procedures for the glass panel installation work, including the provision of proper working platforms with safe means of access and egress.

Provide proper working platforms for workers working at height.
Case 4: ladder – cleaning worker suffers fatal fall to the ground while working on stepladder

- Aluminum folding stepladders were used by some workers to access high-level windows at a temple for cleaning.
- A worker on one of the ladders lost his balance and fell to the ground as the stepladder toppled over.
- The worker sustained serious head injuries and died the following day.

Lessons to learn

- Provide suitable working platforms for all those conducting cleaning duties at height.
- Stepladders should be of sound construction and properly maintained.

Case 5: ladder – fatal fall from wooden stepladder during electrical maintenance

- A team of workers were responsible for installing electrical conduits on the ceiling of the school chapel.
- The workers used a six-rung folding wooden stepladder to access the ceiling area.
- One worker lost his balance and fell to the ground as his ladder toppled over sustaining serious head injuries and died afterwards.

Lessons to learn

- When work cannot be safely conducted on the ground, suitable working platforms with guard rails and toe boards must be provided.
- Stepladders should be regularly inspected and properly maintained to ensure that it is in a safe working condition.
Case 6: access and egress – fatal fall from height

- A worker was appointed to replace a section of drainpipes in a building’s car park.

- After replacement of a drainpipe, the worker climbed up using a ladder to access a beam for cleaning work, however, he later fell from the beam and sustained fatal injuries.

**Lessons to learn**

The principal contractor responsible for the site and the employer of relevant workers should provide:

- Properly maintained scaffolding equipped with suitable working platforms that have a safe means of access to, and egress from that work platform for anyone working at height.

- Sufficient information, instruction, training and supervision to workers – as may be necessary – to ensure safety at work.

- As far as practicable, any work carried out at heights should be closely supervised by a competent person.
Case 7: suspended working platform – worker killed during gondola dismantlement after getting entangled and dragged by nylon rope

- Gondolas were suspended from the roofs to allow workers to clean exterior windows before handing four apartment buildings over to clients.
  - After the cleaning work had been finished, the gondolas were then dismantled and lowered to the ground floor.

- Gondola platforms were detached from their components – including four wire ropes, two nylon ropes and an electric cable – before being moved away from the building.
  - One batch of these components, including two wire ropes and an electric cable, was connected by shackles to a nylon rope.
  - The rope was then passed through an outrigger to drop the components to workers waiting to receive them at ground level.
  - The other end of the nylon rope laid on the ground would return to the roof as the other end with the materials came down.

- A worker on the ground would give a signal to the workers on the roof before they lowered the components to the ground.
  - One of the workers on the roof, incorrectly thought that his colleague on the ground had given him this signal, and so started lowering the components to the ground.
The left foot of the worker on the ground became entangled in the rope laid on the ground and was dragged upwards.

His head struck the ground, he sustained serious head injuries and died later in hospital.

**Lessons to learn**

- Cable reels or other suitable devices should be used for proper handling of cables; and drums / reels should be used for winding in detached ropes – to eliminate the risk of tripping and / or entangling operators.
- Provide a suitable communication system between workers on different floors or in different areas of a work site.
- The principal contractor and the gondola subcontractor must ensure that:
  - A safe system of work for the dismantlement of gondolas is developed and implemented before commencement of any work.
  - Provide suitable mechanical equipment for lowering gondola components to ensure that a steady lowering speed can be maintained.
  - Maintain good housekeeping on the ground.
  - Any areas with risks of falling objects or entanglement of workers should be fenced off.
Case 8: loading platform – wicket door of loading platform falls onto site office roof

- On a construction site, while a tower crane was lifting timber from a loading platform on the third floor, one of the timber collided with the wicket door of the loading platform.
- The door was subsequently unhooked from its hinges and fell from height onto the site office roof.
- Fortunately, nobody was injured in the incident.

Lessons to learn

The principle contractor responsible for the site and the employer of relevant workers should ensure that:

- Risk assessment is conducted and safe working methods are developed and implemented.
- Lifting route should not come across any building or pass over any person.
- The signeller should communicate clearly with the tower crane operator.
- Provide CCTV system for the tower crane operator to clearly monitor the lifting object during lifting operation.
- Install anti-detachment devices on wicket doors of loading platforms.

Case 9: working floor – bamboo falls onto police patrol car

- On a construction site, a piece of bamboo fell from a working floor of a domestic block, during erection of bamboo scaffolding, and hit a police patrol vehicle below.
- The windscreen of the vehicle was cracked but, fortunately, nobody was injured in the incident.
Lessons to learn

The principle contractor responsible for the site and the employer of relevant workers should ensure that:

- Scaffolders have proper communication with team members, wear anti-slip gloves and are not allowed to cut any bamboo poles during the erection of scaffolding.

- Loose materials are not placed too close to floor edges.

- Sufficient information, instruction, training and supervision is provided to workers to ensure that works are conducted in a safe manner.

Case 10: working floor – steel hammer falls from height

- On a construction site, a steel hammer fell from a working floor of a domestic block onto the ground during sleeve removal when dismantling metal formwork. Fortunately, nobody was injured in the incident.

Lessons to learn

The principle contractor responsible for the site and / or the employer of relevant workers should ensure that:

- Hand tools are carried / used with a supplementary hand strap during operations at height to prevent them falling if they slip out of a worker's hand.
Case 11: work near building edges – concrete debris falls onto ground level

- On a construction site, a concrete debris fell down from 10/F during the installation of a metal working platform on the external wall of a domestic block.
- Fortunately, nobody was injured in the incident.

Lessons to learn

The principle contractor responsible for the site and / or the employer of the relevant workers should ensure that:

- No loose material is inside metal working platform.
- Debris should be cleared before work commencement.
- The construction of canopy and catch fan should be completed as soon as possible.
- The area with work at height should be restricted and cordoned off with a warning notice.
- Only permitted persons are allowed to work within the restricted zone.
# Useful Information

**Knowledge brings safety  Look before you leap**

## Key terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
<th>Inspection and maintenance requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchorage</td>
<td>A secure attachment on a structure or plant to which a fall arrest device, or lanyard assembly or restraint line or lifeline can be attached.</td>
<td>Regular inspection by a competent person before their first use and then on a regular basis so that they are capable of supporting the design loads. In addition, the user should carry out a visual inspection before every use.</td>
</tr>
<tr>
<td>Collective fall protection equipment</td>
<td>Collective fall protection equipment is used to provide fall protection for more than one person. It includes guard rails and safety nets.</td>
<td>Regular inspection by a competent person.</td>
</tr>
</tbody>
</table>
| Fall arrest PPE               | Equipment used to protect an individual during a fall, by arresting the individual before reaching the ground within prescribed safe fall distances and arrest forces.  
A fall arrest system comprises a body support element (fall arrest full body harness only), shock absorbing element (energy absorber lanyard or another form of absorbance designed in the fall arrest system), independent lifeline and anchor point. | Regular inspection by a competent person.                                                                 |
<table>
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<tr>
<td>Fall protection PPE</td>
<td>Equipment used to protect an individual from falls, including work restraint, work positioning and fall arrest PPE.</td>
<td>Regular inspection by a competent person.</td>
</tr>
<tr>
<td>Guard rails</td>
<td>A rigid barrier used to restrict access to hazardous areas or to prevent falls from height.</td>
<td>Regular inspection by a competent person.</td>
</tr>
<tr>
<td>Ladders</td>
<td>Fixed ladders: ladders that are permanently attached to the structure to be accessed.</td>
<td>Regular inspection by a competent person.</td>
</tr>
<tr>
<td></td>
<td>Portable ladders: ladders that are not permanently attached to any structure. This includes stepladders, hanging ladders and extension ladders.</td>
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</tr>
<tr>
<td>Mobile elevating working platforms (MEWP)</td>
<td>MEWP s have many aliases including ‘cherry pickers’ or ‘aerial platforms’.</td>
<td>Pre-operation inspection by operator.</td>
</tr>
<tr>
<td></td>
<td>They can be vehicle-mounted, self-propelled, towed or manually moved.</td>
<td>Weekly inspection by a competent person.</td>
</tr>
<tr>
<td></td>
<td>They are used to move personnel, equipment or materials to and from work locations above the support surface.</td>
<td>Periodic servicing / inspection according to the manufacturer’s operation and maintenance manuals.</td>
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<td></td>
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<td>Examination and testing by a competent examiner.</td>
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<tr>
<td>Mobile scaffolds</td>
<td>An independent scaffold that is freestanding and mounted on castors.</td>
<td>Maintenance logbooks and records should be kept.</td>
</tr>
<tr>
<td>Restraint systems PPE</td>
<td>A system to prevent falls from heights. This can include rails, guarding, static lines, anchor points, fixed length lines and harnesses.</td>
<td>Inspection before first use and then at regular intervals not exceeding 14 days immediately preceding each use by a competent person. (Form 5)</td>
</tr>
<tr>
<td>Safety nets</td>
<td>A net used to restrain or catch a falling person.</td>
<td>Regular inspection by a competent person.</td>
</tr>
<tr>
<td>Scaffolding</td>
<td>Any temporary structure on or from which persons perform work.</td>
<td>Inspection before first use and then at regular intervals not exceeding 14 days immediately preceding each use by a competent person. Inspection by a competent person following any exposure to adverse weather conditions. (Form 5)</td>
</tr>
<tr>
<td></td>
<td>Any temporary structure which enables persons to obtain access to or which enables materials to be taken to a specific work area.</td>
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<tr>
<td></td>
<td>Scaffolding can also incorporate working platforms, gangways, runs, ladders and stepladders.</td>
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</tr>
<tr>
<td>Term</td>
<td>Description</td>
<td>Inspection and maintenance requirements</td>
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<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Suspended working platform</td>
<td>Working platforms suspended from a building or structure by means of lifting gear and capable of being raised and lowered by lifting appliances.</td>
<td>Inspection by a competent person, not more than seven days immediately preceding its use. (Form 1) Thorough examination by a competent examiner not more than 6 months immediately prior to it being put into use. (Form 2) Load testing and thorough examination by a competent examiner not more than 12 months prior to its use. (Form 3)</td>
</tr>
<tr>
<td>Working platforms</td>
<td>Platforms used to provide a place of work or as a means of access to and egress from another place of work. For example, mobile elevated working platforms, integrated elevating working platforms and scaffolding.</td>
<td>As per scaffolding.</td>
</tr>
</tbody>
</table>
### Performance checklist for working at height

<table>
<thead>
<tr>
<th>Item</th>
<th>Good</th>
<th>Needs Improvement</th>
<th>Needs Immediate Improvement</th>
<th>N/A</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Scaffolding</strong></td>
<td></td>
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<tr>
<td>1.1 Has the construction, addition and alteration works of the scaffold been conducted by trained and experienced workers under the direct supervision of a competent person?</td>
<td></td>
<td></td>
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<tr>
<td>1.2 Is the scaffolding secure from collapse by being effectively fastened vertically, horizontally and diagonally?</td>
<td></td>
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</tr>
<tr>
<td>1.3 Is the scaffolding standing on suitable ground surface or foundation?</td>
<td></td>
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</tr>
<tr>
<td>1.4 Is there safe access available to the scaffolding users?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1.5 Was the scaffolding inspected by a competent person before use and at least once every 14 days with the findings duly recorded in the statutory inspection form?</td>
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<tr>
<td>Item</td>
<td>Good</td>
<td>Needs Improvement</td>
<td>Needs Immediate Improvement</td>
<td>N/A</td>
<td>Remarks</td>
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</tr>
<tr>
<td>1.6 Was the scaffolding inspected again by a competent person after it had been extended or altered or exposed to adverse weather conditions with the findings duly recorded in the statutory inspection form?</td>
<td>**</td>
<td>**</td>
<td>**</td>
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</tr>
<tr>
<td>1.7 Does the ratio of the height of the tubular tower to its smallest base length meet the relevant safety requirements? (i.e. indoor: 3.5; outdoor: 3)</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>1.8 Are the base wheels of the mobile tubular tower equipped with an effective locking system?</td>
<td>**</td>
<td>**</td>
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<td>**</td>
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</tbody>
</table>
### 2. Working platforms

<table>
<thead>
<tr>
<th>Item</th>
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<th>Needs Immediate Improvement</th>
<th>N/A</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Are the wooden or plywood boards of the working platform structurally sound and of adequate thickness?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.2 Is the working platform tightly decked with wooden or plywood boards?</td>
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<td></td>
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<tr>
<td>2.3 Is the working platform suitably decked or fixed with wooden or plywood boards to avoid overturning?</td>
<td></td>
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<tr>
<td>2.4 Are materials evenly placed on the working platform and causing no overloading?</td>
<td></td>
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</tr>
<tr>
<td>2.5 Is the working platform operating at a height of not less than 2m equipped with a suitable guard rail and toe board on each side?</td>
<td></td>
<td></td>
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<tr>
<td>2.6 Is the working platform wide enough for people and materials to pass through?</td>
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<tr>
<td>Item</td>
<td>Good</td>
<td>Needs Improvement</td>
<td>Needs Immediate Improvement</td>
<td>N/A</td>
<td>Remarks</td>
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<tr>
<td>3. Floor edges, staircase edges, lift shafts and floor openings</td>
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</tr>
<tr>
<td>3.1 Are floor edges, staircase edges, lift shafts or other dangerous places, at a height of not less than 2m, equipped with suitable guard rails and toe boards?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3.2 Are the guard rails of adequate strength and fixed tightly on secure floor slabs to prevent people from falling off?</td>
<td></td>
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</tr>
<tr>
<td>3.3 Do all floor openings, holes in the ground and other dangerous places have coverings of a suitable structure which are fixed tightly at correct places?</td>
<td></td>
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<tr>
<td>3.4 Are the coverings marked with bold characters to clearly indicate their use?</td>
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</table>
## 4. Ladders

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<tr>
<th>Item</th>
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<th>Needs Immediate Improvement</th>
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<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Are ladders used for access and egress as a last resort only when access platforms, access towers or suitable scaffolding are not reasonably practicable after proper risk assessment done?</td>
<td></td>
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<td></td>
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<tr>
<td>4.2 Do ladders have all their parts such as side rails, rungs and anti-slip foot-pads in good condition?</td>
<td></td>
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<tr>
<td>4.3 Are ladders fastened up at the top or, if this is not practicable, fixed securely at the part near their bottom?</td>
<td></td>
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<tr>
<td>4.4 Are all ladders standing on level and firm bases?</td>
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<tr>
<td>4.5 Do all ladders extend at least 1m above the landing level?</td>
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## 5. Preventive measures against people from falling

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<tr>
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<th>Needs Improvement</th>
<th>Needs Immediate Improvement</th>
<th>N/A</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Where it is not reasonably practicable to provide a safe working platform, is there any provision of suitable safety nets, safety belts or similar</td>
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<tr>
<td>Item</td>
<td>Good</td>
<td>Needs Improvement</td>
<td>Needs Immediate Improvement</td>
<td>N/A</td>
<td>Remarks</td>
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<tr>
<td>equipment to prevent people from falling and getting injured after proper risk assessment done?</td>
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<tr>
<td>5.2 If safety harnesses are being used, is there any provision of proper anchor points such as independent lifelines and suitable equipment that are able to provide continuous protection against people falling from height?</td>
<td></td>
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<tr>
<td>5.3 Are all safety nets and safety belts kept under proper maintenance?</td>
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<tr>
<td>5.4 Are steps being taken to ensure that the safety net installation is close to the building?</td>
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<tr>
<td>5.5 Are safety nets installed in a manner that the nets are not overstretched and are allowed to sag slightly?</td>
<td></td>
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<tr>
<td>5.6 Are all independent lifelines and anchor points examined and accepted by a registered professional engineer?</td>
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</tbody>
</table>
### 6. Preventive measures against materials from falling

<table>
<thead>
<tr>
<th>Item</th>
<th>Good</th>
<th>Needs Improvement</th>
<th>Needs Immediate Improvement</th>
<th>N/A</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Are necessary precautions being taken to prevent workers from being struck by falling materials or objects?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6.2 Are steps being taken to prevent scaffolding materials, tools and other materials from being thrown, dumped or dropped from height?</td>
<td></td>
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<tr>
<td>6.3 Are lifting appliances or lifting gears being used for the safe and proper lowering of scaffolding materials, tools and other objects?</td>
<td></td>
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</table>

### 7. Suspended working platforms

<table>
<thead>
<tr>
<th>Item</th>
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<th>Needs Immediate Improvement</th>
<th>N/A</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Has the suspended working platform been designed, inspected and examined by a registered professional engineer to ascertain its safe working load?</td>
<td></td>
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<tr>
<td>7.2 Has the erection, alteration and dismantling of suspended working</td>
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<tr>
<td>Item</td>
<td>Good</td>
<td>Needs Improvement</td>
<td>Needs Immediate Improvement</td>
<td>N/A</td>
<td>Remarks</td>
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<tr>
<td>platform been executed by trained and experienced personnel under the supervision of competent person?</td>
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<tr>
<td>7.3 Are the operators or persons working on a suspended working platform at least 18 years old and do they possess a recognised training certificate and relevant working experience?</td>
<td></td>
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</tr>
<tr>
<td>7.4 Has the suspended working platform been inspected by a competent before commencement of daily work and in the 7 days immediately preceding its use? Have SWP Form 1, SWP Form 2 and SWP Form 3 been duly completed and signed by a registered professional engineer?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7.5 Has the suspended working platform been inspected by a competent person? Has the statutory form been completed following any alteration or exposure to adverse weather conditions?</td>
<td></td>
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</tbody>
</table>
Principal safety and health legislation

General duties provisions under Factories and Industrial Undertakings Ordinance (FIUO)

Sections 6A and 6B of the Ordinance impose general duties on proprietors and persons employed with regard to the health and safety at work in industrial undertakings. In a construction site, these provisions do not only bind the principal contractor of the site, subcontractors who are employers and who have management or control of construction activities within the site are also regarded as proprietors and are therefore bound by Section 6A. Besides, with regard to metal scaffolding works, workers using metal scaffolds and scaffolders, who are employed to work in the site, are also bound by Section 6B.

Subsection 6A (1)

The general duties imposed on the proprietor of an industrial undertaking are to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him at the industrial undertaking.

Subsection 6A (2)

These general duties extend to include five specific areas:

(a) The proprietor shall provide machinery, equipment, appliances and other plant that are, so far as is reasonably practicable, safe and without risks to health and must maintain them in that condition. He must also ensure that the systems of work are safe and without risks to health.

(b) The proprietor shall make adequate arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances.

(c) The proprietor shall provide such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him. The information to be provided should include information about the hazards in the workplace and the necessary precautions to be adopted.

(d) The proprietor shall ensure that, so far as is reasonably practicable, any place of work under his control is kept safe and without risks to health. This requirement covers not only buildings, but also includes, for example, open sites and temporary structures such as scaffolds. The proprietor shall also ensure, so far as is reasonably practicable, the
provision and maintenance of means of access to and egress from the workplace that are safe and without risks to health.

(e) The proprietor shall provide and maintain for all persons employed by him a working environment that is, so far as is reasonably practicable, safe and without risks to health.

**Subsection 6B (1)**

The general duties imposed on every person employed at an industrial undertaking while at work are as follows:

(a) The person employed shall take reasonable care for the safety and health of himself and of other persons who may be affected by his acts or omissions at work.

(b) Also, he shall co-operate with the proprietor or other persons so far as is necessary to enable them to perform or comply with the safety duties or requirements imposed on them by the Ordinance.

**Construction Sites (Safety) Regulations (CSSR)**

The CSSR are to protect workers in the construction industry. These regulations lay down legal requirements to ensure the safety, health and welfare of workers on construction sites. In respect of scaffolding safety, the contractors/workers are subject to the requirements of the following regulations:

**Regulation 38A**

This regulation specifies general provisions for safe place of work, safe means of access to and egress from workplace, and to ensure no person gains access to any unsafe place on site.

**Regulation 38B**

This regulation requires that adequate steps such as the provision, use and maintenance of working platforms, etc. shall be taken to prevent any person from falling from a height of 2 metres or more.

**Regulation 38C**

This regulation requires the provision of safe scaffolds, ladders, etc. and ensures their use where work cannot be safely done on or from ground or from part of a permanent structure.
Regulation 38D
This regulation requires that all the scaffolds, ladders, etc. shall be so
designed, constructed, maintained and every part thereof so securely
supported or suspended as to ensure that they are stable. Besides, all such
scaffolds, ladders, etc. shall be made of suitable and sound materials of
sufficient strength.

Regulation 38E
This regulation requires that only trained workers with adequate experience
and under the supervision of a competent person shall erect, alter or
dismantle scaffolds.

Regulation 38F
This regulation requires that a scaffold shall not be used unless it has been
inspected by a competent person:
(a) before being taken into use for the first time;
(b) at regular intervals not exceeding 14 days immediately preceding each
use of the scaffold;
(c) after any substantial addition, partial dismantling or other alteration,
exposure to weather conditions likely to have affected its strength or
stability or to have displaced any part, and a report has been made
by the person carrying out the inspection on Form 5, which includes a
statement to the effect that the scaffold is in safe working order.

Regulation 38H
This regulation requires the proper use of safety nets and safety belts when
it is impracticable to provide safe scaffolds.

Regulation 38I
This regulation requires that any worker who has been provided with
a safety belt shall wear the safety belt and keep it attached to a secure
anchorage.

Regulation 48
This regulation requires that suitable safety helmets shall be provided for
every worker; and all reasonable steps shall be taken to ensure that no
worker remains on site unless he is wearing a suitable safety helmet.
Regulation 49

This regulation requires that scaffolding materials and waste materials, tools and other objects, shall not be thrown, tipped or shot down from height. Where proper lowering by lifting appliances or gear is impracticable or demolition is being carried on, steps shall be taken to protect workers from being hit by falling debris.

Regulation 52

This regulation requires that all platforms, gangways, etc. shall be kept clear of any loose materials that are not required for immediate use.

Third Schedule to the CSSR

This schedule relates to the protection of any person from falling from a height of 2 metres or more.

Occupational Safety and Health Ordinance Issuance of improvement notice and suspension notice

Section 9

This section empowers the Commissioner to serve on an employer or an occupier of premises where a workplace is located an improvement notice requiring the rectification of contravention against safety legislation within a specified period.

Section 10

This section empowers the Commissioner to serve on an employer who is responsible for, or an occupier of, premises where a workplace is located a suspension notice requiring suspension of an activity or use of premises or of any plant or substance where there is an imminent risk of death or serious bodily injury.
Labour Department safety legislation, guidance materials and reference

- Beware of Fall at Work
- Code of Practice for Bamboo Scaffolding Safety
- Code of Practice for Metal Scaffolding Safety
- Guidance Notes on Classification and Use of Safety Belts and their Anchorage System
- Guidance Notes to Renovation Safety
- Guidance Notes on Safe Use of Powered-operated Elevating Work Platforms
- Occupational Safety and Health Management in Renovation and Maintenance Works for the Property Management Industry
- Safety Guide for Bamboo Scaffolding Work
- Safety Hints on Operation of Suspended Working Platforms
- Safety Hints on Renovation Work
- Safe Systems of Work
- Construction Sites (Safety) Regulations
- Construction Site Safety Handbook – Development Bureau
- Site Safety Handbook – Housing Authority
Safety belts and their anchorage systems

1. European Standard, EN 353-1 and EN 353-2: 2002
   Personal protective equipment against falls from a height: guided type fall arresters.
   Part 1: Guided type fall arresters including a rigid anchor line
   Part 2: Guided type fall arresters including a flexible anchor line

2. European Standard, EN 360: 2002
   Personal protective equipment against falls from a height – retractable type fall arresters.

3. European Standard, EN 361: 2002
   Personal protective equipment against falls from a height – full body harnesses.

   Protection against falls from a height – anchor devices – requirements and testing

5. British Standard, BS 1397: 1979
   Specification for industrial safety belts, harnesses and safety lanyards.
   (Note: this standard was superseded by EN 354, 355, 358, 359, 361, 362, 363, 364, 365)

   Permanent anchors for industrial safety belts and harnesses
   (Note: this standard was superseded by EN 795: 1997)

   Specification for manually operated positioning devices and associated anchorage lines for use with industrial safety belts and harnesses.

   Code of practice for Application and use of anchor devices conforming to EN 795

   Safety requirement for personal fall arrest systems, subsystems and components
   Construction and demolition operations – requirements for safety belts, harnesses, lanyards and lifelines for construction and demolition use

   Safety belts for miners

   Safety belts for line-men

13. Ministry of Labour Notification No. 67,
   Safety Belt Standard of Japan’s Ministry of Labour, September 1975.

   Industrial fall arrest system and device.
   Part I: Safety belt and harness

15. German Standard, DIN 7470
   Protective equipment against fall – safety belts, safety requirements, testing.


The list of references above has been extracted from: Guidance Notes on Classification and Use of Safety Belts and their Anchorage Systems, published by the Labour Department.

Mobile elevating work platforms


19. BS 8460: 2005 Safe use of MEWPs – Code of practice


The list of references above has been extracted from: Guidance Notes on Safe Use of Power-operated Elevating Work Platforms, published by the Labour Department.
Suspended working platforms

Safety requirements for powered platforms for building maintenance

22. Australian Standard (AS 1576.4-1991) Scaffolding
Part 4: Suspended scaffolding

Specification for suspended access equipment (suspended chairs, traditional seats, work cages, cradles and platforms) for use in the building, engineering construction, steeplejack and cleaning industries

Code of practice for temporarily installed suspended scaffolds and access equipment

Code of practice for permanently installed suspended access equipment

Safety Code for Suspended Elevating Platforms

27. European Standard (EN 1808: 1999)
Safety requirements on suspended access equipment – design calculations, stability criteria, construction – tests

28. Health and Safety Executive, UK (Guidance Note GS 15)
General access scaffolds

29. Health and Safety Executive, UK (Guidance Note PM 30)
Suspended access equipment

30. Ministry of Labour, Republic of Singapore
Code of practice for examination and test of suspended scaffolds for approved persons

31. National Association of Scaffolding Contractors, UK
Cradle riggers and users’ guide to safe suspended platforms

32. Singapore Standard (CP 20: 1999)
Code of practice for suspended scaffolds
Relevant International Standards

33. Suspended Access Equipment Manufacturers Association, UK
   Guide to permanent suspended access equipment, power or manually operated

34. Suspended Access Equipment Manufacturers Association, UK
   Users’ guide to temporary suspended access equipment

The list of references above has been extracted from: Guidance Notes on the Inspection, Thorough Examination and Testing of Suspended Working Platforms, published by the Labour Department.

Bamboo Scaffolding

35. Code of Practice for Bamboo Scaffolding Safety of the Labour Department.

Metal scaffolding

36. British Standard 1139 – Metal scaffolding

37. British Standard 2482 – Specification for timber scaffold boards

38. British Standard 5507 – Methods of test for falsework equipment


40. British Standard 5973 – Code of practice for access and working scaffolds and special scaffold structures in steel

41. British Standard 5975 – Code of practice for falsework

42. Singapore Standard CP 14 – Code of practice for scaffolds


The list of references above has been extracted from: Code of Practice for Metal Scaffolding Safety, published by the Labour Department.
Ladders

44. British Standard BS 4211: 1994
   Specification for ladders for permanent access to chimneys, other high
   structures, silos and bins.

   Stairs, ladders and walkways

   Stairs, ladders and walkways
   Part 2. Code of practice for the design of helical and spiral stairs.

47. British Standard BS 5395: Part 3: 1985
   Stairs, ladders and walkways
   Part 3. Code of practice for the design of industrial type stairs, permanent
   ladders and walkways.

   British standard specification for portable timber ladders, steps, trestles
   and lightweight stagings.

49. British Standard BS 2037: 1994
   Specification for portable aluminum ladders, steps, trestles and
   lightweight stagings.

Safety nets

50. British Standard BS EN 1263-1: 1997
   Safety nets
   Part 1. Safety requirements, test methods.

   Code of Practice for The use of safety nets, containment nets and sheets
   on constructional works

The list of references above has been extracted from: Code of Practice Safety and Health at
work (Land-based Construction Over Water – Prevention of Fall), published by the Labour Department.
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to
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