ProBE

Programme-Based Engagement

Technical Advisory for **Working at Height**

WSHCOUNCIL

Contents

1. Introduction

Falls from height (FFH) is the largest cause of death at workplaces in Singapore in recent years. Simply put, one out of three deaths in the workplace were the result of persons falling from height. Many more are injured in this manner every year. Therefore, it is essential that measures are taken to protect workers.

The role of the management is crucial in ensuring the success of any safety programme. A committed management leading by example to promote safety at the workplace will drive the rest of the organisation to behave similarly. Over time, the safety culture in the workplace will evolve so that every person takes it as his responsibility to ensure a safe and healthy workplace.

It is also very important for persons who are working at height to be competently trained in the work to be done, aware of the risks involved and follow the required safe work procedures which include the use of proper personal protective equipment.

This technical advisory will give guidance on measures that can be implemented to help eliminate or reduce the risk of falling from height.

2. Tips to Reduce the Risk of Falling from Height

Discourage unsafe practices

Unsafe practices among workers should never be condoned by the management. Should the management decide to disregard unsafe practices such as not wearing the individual fall arrest system when required; workers may be led to believe that it is acceptable to engage in such practices. Over time, these unsafe practices may be unofficially incorporated into the work procedures, making it a norm. This will increase the risk faced by workers working at height.

Supervision of work

The supervision of work is important and should be carried out by an appointed and qualified supervisor. Without proper supervision, workers may violate rules and regulations or adopt unsafe practices and put themselves at risk.

Supervisors should ensure that workers adhere to all the safety requirements such as using their individual fall arrest system correctly. They should also be trained to spot and identify any unsafe work practices among workers.

A buddy system should be encouraged in your company so that workers can help to remind and encourage each other on the safe work practices even in the absence of a supervisor.

Wear the fall arrest system safely and correctly

Workers should use safety equipment properly despite the discomfort and inconvenience that may arise from the use of the safety equipment (most commonly the individual fall arrest system). One common reason for misuse is that by anchoring their individual fall arrest system, it may hinder them from doing their work due to restricted movement. Hence, for convenience, they may choose not to anchor. Such undesired practices can also be due to the lack of knowledge on the danger of their work and the importance of the individual fall arrest system.

Proper use of equipment

Some incidents were caused by workers using uncertified equipment or equipment that had yet to be approved. One common example was the use of scaffolds that have not been certified safe. Scaffolds that are safe for use carry a green tag.

Attention should also be given to ensure that the equipment is not being misused such as using a safety barricade as a ladder to gain access to higher areas. Misusing equipment poses a significant risk as they are not designed to carry out the intended functions.

1 Scaffolds have to be certified and tagged as safe before use.

Safe route of access

One common unsafe practice noticed was the frequent use of unauthorised and often unsafe routes of access in order to hasten work. Such shortcuts should not be allowed and workers should be reminded to use the identified safe means of access.

1 The absence of safe routes of access may result in workers being forced to take unsafe routes, increasing the risk of falling from height.

Case Study 1
Construction industry

A worker fell 8m to his death through an uncovered gap in a formwork while erecting the formwork on the second storey.

Findings

- The gap in the formwork was not covered.
- Insufficient anchorage points were provided.
- Rain had caused the working surface to be wet and slippery.
- The safety supervisor had not been invited to safety committee meetings.

Lapses

- No risk assessment was carried out prior to the commencement of work.
- No Safe Work Procedure was in place.
- The workplace was not made safe for workers.

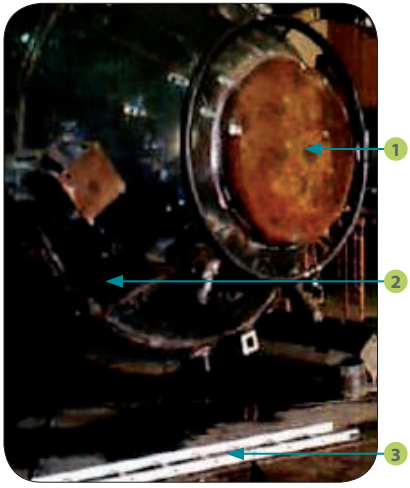
1 The worker had fallen through the uncovered gap in the formwork, here.
2 A piece of plywood that landed on top of the deceased.
3 The worker landed here.

Case Study 2
Resident contractor

A proprietor fell 3m off a ladder while gaining access to a tank under construction. He died from a fractured skull four days after the incident.

Findings

- There were no eye witnesses, the deceased had been working alone, and his workers had gone for lunch.
- The occupier and proprietor were aware of the hazards of using ladders at heights.
- Safe Work Procedure was in place.
- Proprietor had on previous occasions instructed his workers on safe practices associated with working on ladders. However, he had accessed the ladder alone without assistance, despite knowing the risks involved.
- No legal action was taken against the occupier, as the deceased had violated safe work practice, despite knowing the hazards and the safe practices.



1 The deceased had presumably placed the ladder here to gain access to the tank to remove the wire rope that had been used for rigging.
2 The deceased was probably struck against this supporting leg as he fell.
3 The deceased was found unconscious next to the collapsed aluminium ladder.

Lapses

- Failure to adhere to Safe Work Procedure.
- The deceased had been working alone with no supervision.

Case Study 3

Construction industry

A worker installing lifelines on a roof, fell after he stepped on a roof tile which broke under his weight. He died in hospital on the same day.

Findings

- Insufficient anchorage points were provided.
- The worker had stepped onto the midsection of the roof tiles, where there was no support structure.

Lapses

- No risk assessment was carried out prior to the commencement of work.
- No Safe Work Procedure was in place.
- No supervision was provided.

1 The worker had fallen through the roof, as it could not support his weight due to the absence of a support structure.

2 The worker landed here. after a fall of 4.8m.

Case Study 4

Construction industry

A subcontractor worker fell to his death after taking an unsafe shortcut, across a metal decking to cross from the edge of one building to another building (3m). The metal decking buckled under his weight and collapsed.

Findings

- The worker had squeezed past a safety barricade to access the unsafe shortcut.
- The worker had pushed the metal decking to create the shortcut.
- The worker was seen to hit a metal scaffold, which was located at ground level, as he fell.
- A safe, longer route (50m) was available for the worker to reach his destination safely to do his work.

A re-enactment of the worker squeezing past the safety barricade.

Lapses

- Failure to adhere to Safe Work Procedure.
- Failure to take responsible care for own safety.
- Bypassing safety barricades and failing to use a safe means of access.

1 The worker was seen pushing the metal decking here to create his shortcut, before his fall.

2 The external terrace

3. Risk Assessment

Risk assessment allows for the improvement of work conditions by identifying the hazards at the workplace and implementing effective risk control measures before they escalate into accidents and injuries. Under the Workplace Safety and Health (Risk Management) Regulations, every workplace, including worksites, should conduct risk assessments for all routine and non-routine work undertaken.

Prior to conducting risk assessment, adequate preparation must be done. A risk assessment team should be formed, preferably consisting of personnel from the various levels of participation in the work activity.

Relevant information should also be collated to facilitate better understanding of the work process.

What must be known?	Where to find such information?
• Where is the work carried out? • Who is doing the work? • What equipment is used? • What steps are involved? • What are the existing control measures? • What do existing regulations and codes of practices stipulate?	• Plant layout plan • Processes flowchart • List of work activities/trades • List of chemicals, machinery and tools used • Records of past incidents and accidents • Relevant legislations, codes of practice or specifications • Observations and interviews • Inspection records • Details of existing risk controls • Health and safety audit reports • Feedback from staff, clients, suppliers or other stakeholders • Safe work procedures and copies of previous risk assessments

Having completed the preparation work, workplace risks can then be assessed in 3 sequential steps:

1 Hazard Identification	2 Risk Evaluation	3 Risk Control
• Identify the hazards. • Identify potential accidents or incidents.	• Estimate the risk levels of the workplace hazards identified. • Prioritise the hazards to be controlled.	• Formulate the control measures according to the Hierarchy of Controls. • Analyse and evaluate the residual risks.

Step 1: Identify the hazards

Determine the work activities that are being planned to be carried out. Identify and analyse the hazards associated with each work activity that involves persons working at height.

Step 2: Assess and evaluate all hazards identified

Determine the possibility of someone falling or getting injured while working at height. Assess the risk levels for each of the hazards based on their likelihood and severity, taking into account the existing risk control measures. Risk level can be determined once the severity and likelihood have been established. This can be achieved by using a 3 by 3 matrix given below. The size of the matrix can be varied according to the complexity of the work conditions.

The following chart illustrates how severity and likelihood come together to help determine the risk level.

The unguarded open side and staircase are both potential falling hazards. Risk assessment will help identify such hazards in the workplace and control measures that can be used to reduce the risk of falling.

Practice good housekeeping, tripping or slipping at height may lead to workers falling from height.

Types of accidents/ incidents	Persons-at-risk
• Person falling from height	• Persons directly involved in the operation
• Object falling from height	• Persons not directly involved in the operation
• Collapse of structure	• Visitors to the workplace
• Slipping or tripping	• Members of the public
• Struck by or against objects	
• Unsafe ground conditions	
• Poor lighting conditions	
• Equipment not maintained properly	
• Insecure structures	

Risk evaluation map

Determine Severity		Determine Likelihood	
Minor	No injury, injury or ill-health requiring first aid treatment only (includes minor cuts and bruises, irritation, ill-health with temporary discomfort)	Remote	Not likely to occur
Moderate	Injury requiring medical treatment or ill-health leading to disability (includes lacerations, burns, sprains, minor fractures, dermatitis, deafness)	Occasional	Possible or known to occur
Major	Fatal, serious injury or life-threatening occupational disease (includes amputations, major fractures, multiple injuries, occupational cancer, acute poisoning and fatal diseases)	Frequent	Common or repeating occurrence

Determine Risk Level			
Likelihood/ Severity	Remote	Occasional	Frequent
Minor	Low Risk	Low Risk	Medium Risk
Moderate	Low Risk	Medium Risk	High Risk
Moderate	High Risk	High Risk	High Risk

If the consequence of a hazard is identified to have moderate severity and occasional likelihood, the risk level may be determined to be medium.

If there is a risk that a fall may still occur, additional safety measures need to be put in place to control the risk. The primary duty is to eliminate the risk at source where possible. If elimination is not practicable, the risk must be reduced so far as is reasonably practicable following the hierarchy of controls outlined in Step 3 in the following page.

Step 3: Control the risk

Based on the risk level determined in Step 2, risk controls should be selected to reduce or confine the risk level to an acceptable level. The following table suggests the acceptability of risk for different risk levels.

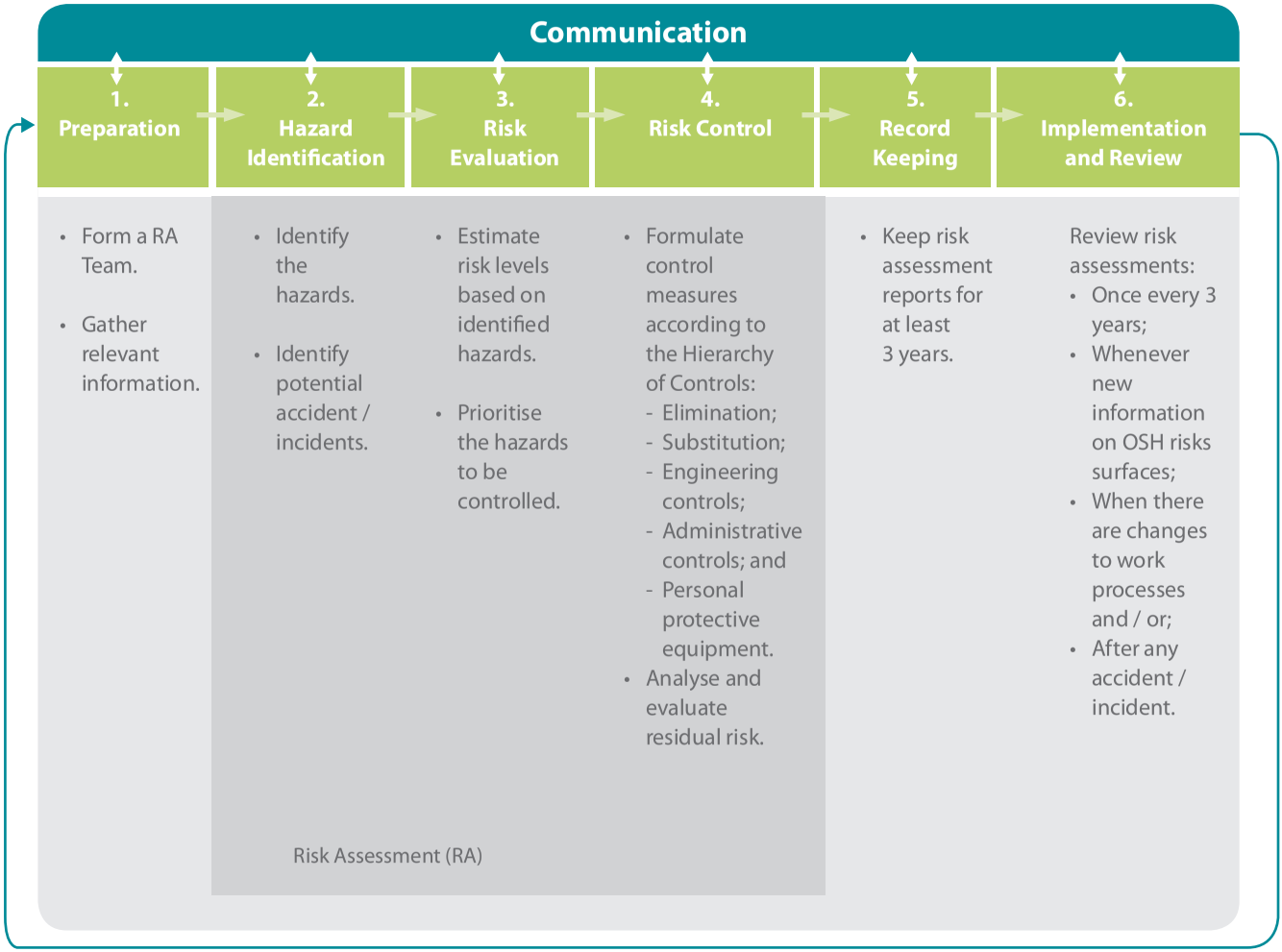
Risk Level	Acceptability of Risk	Recommended Actions
Low	Acceptable	No additional risk control needed. Conduct periodic review to ensure that the assigned risk level is accurate and does not increase over time.
Medium	Moderately Acceptable	Evaluate hazards carefully to ensure that risk is reduced to as low as reasonably practicable within a defined time period. Interim risk control measures, such as administrative controls may be implemented. Attention by management is required.
High	Not Acceptable	Risk level must be reduced to at least medium risk before work commences. Interim risk control measures should not be used. Risk control should not overly rely on personal protective equipment. If possible, the hazard should be eliminated before work begins. Immediate involvement by the management is required before work commences.

In order to prioritise the risk controls adequately, the formulation of such risk controls may take into consideration the relative risk levels of the different hazards and the cost and benefit of the controls. The residual risk after the implementation of the controls should also be evaluated.

Reasonably practicable measures must be taken to maintain the risk level within the acceptable range. It is essential for risks to be eliminated or reduced 'at source'. If the risk level is high, work cannot commence until the risk level is reduced to the medium level or below.

These risk controls must be effective and practicable. To control hazards and reduce risks, follow the hierarchy of control methods. It may be necessary to use more than one of these measures to reduce a risk to its lowest possible level when no single measure is sufficient on its own. Only where it is not reasonably practicable to use a higher order control, should a control at a lower level be used.

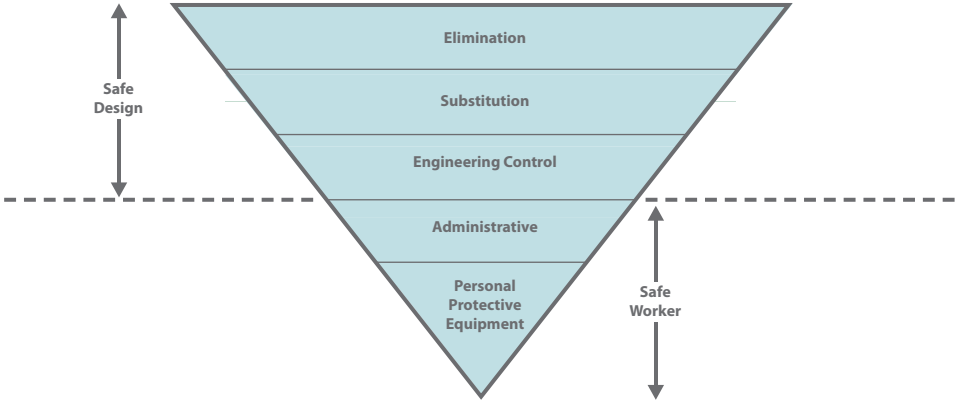
Follow the hierarchy of control: Provide and use correctly other suitable equipment such as safety harnesses or safety belts, only if barricades cannot be provided.



Main Phases of a Typical Risk Assessment Process.

4. Hierarchy of Risk Controls for Work at Height

A hierarchy of risk controls for working at height should be applied as detailed below:



Level 1: Elimination

Removing the need to work at height.

The most effective way to make sure that persons do not fall from height is to eliminate the need to work at height. One obvious way to do so is by relocating the task required to ground level, where it is reasonably practicable to do so.

Examples of elimination include:

- Prefabrication of roofs at ground level.
- Using pre-cast or tilt-up concrete construction instead of concrete walls constructed in situ.
- Using paint rollers with extendable handles.
- Using remote released shackles for crane lifted loads positioned at height.

If eliminating the hazard is not reasonably practicable, then measures that reduce the hazard should be considered and implemented, where reasonably practicable to do so.

Level 2: Substitution

Undertaking the work using a fall prevention system.

Fall prevention systems are 'materials or equipment', or a combination of both, that are designed and intended to prevent a person from falling. When using fall prevention systems, it is important to ensure that after the initial installation, no adjustments, alterations or unauthorised operations are performed by any person, except for performing regular checks or maintenance. This is to ensure that the performance integrity of the device is ensured. Some examples of fall prevention systems are scaffolds, mast climbing work platform and aerial work platforms.

It is important to ensure that boards used for scaffolding are secured. Unsecured boards or planks may shift or even tip over when stepped on.

Scaffolds

Scaffolds are a common means of providing a safe work platform for working at height, however, certain guidelines still have to be followed to make working on scaffolds safe. For information on the safe use of scaffolds, please refer to the Technical Advisory for Scaffolds (See Section 6, Useful References).

A mast climbing work platform must be installed and used in accordance to its approved design.

Mast climbing work platform

Mast climbing work platforms can be set up in either a single mast or multi-mast configuration. The erection and dismantling of it must be carried out by competent persons. It should be installed, used and maintained according to the manufacturers' manuals.

Mobile elevated work platforms

Mobile elevated work platforms (MEWPs) such as scissor lifts and boom lifts are types of elevated work platforms used to position workers, materials or equipment at height. The persons working on MEWPs are protected by physical barricades to prevent falls. Ensure that platforms are fitted with a safety interlock system to prevent accidental toppling. Workers working on the MEWP should wear safety harnesses with a short lanyard and anchor it properly. All MEWPs should only be used on a solid level surface and within the load limit. It should not be used in high wind conditions or on uneven ground.

When using mobile elevated work platforms, workers should use safety harnesses with suitable anchorage points.

Level 3: Engineering Controls

The use of engineering controls such as barriers or guardrails can also improve safety while working at height by providing a barrier to workers against falling.

Barricades/Guardrail

Guardrails may be used to provide effective fall protection at:

- The perimeters of buildings or other structures;
- The perimeters of skylights or other fragile materials;
- The openings in floor or roof structures; and
- The edges of shafts or other excavations.

Provide and maintain a guardrail with a lower rail or other effective means to guard open sides of staircases.

Workers are needlessly exposed to falling risks/hazards if guardrails are not provided on staircases.

Provide an effective barrier for every open side or opening to prevent falls.

Barriers should be marked to increase visibility.

Guardrails should meet the following requirements:

- Be at least 1m above the working level;
- Incorporate intermediate guardrails between the platform and the topmost rail (also known as mid-rails); the distance between two adjacent guardrails or any work platform, workplace and the guardrail immediately above must not exceed 600mm; and
- Be designed and constructed to withstand its intended load.

Barriers at the edges of mezzanine floors to prevent falls.

Fencing to barricade an open lift shaft.

Proper access and egress

Should there be a risk of falling from height, proper means of access must be provided for workers to reach their working areas safely. Due consideration should be given to the tools and equipment that need to be moved to and from the work areas.

Proper means of access and egress have to be provided for workers to arrive at their areas of work safely.

Workers are endangered when they attempt to access areas where no safe passage is provided.

Level 4: Administrative Controls

An administrative control reduces or eliminates exposure to a hazard by adherence to procedures or instruction.

Administrative control - Fall hazards

Administrative controls are systems of work or work procedures that help to reduce the exposure of employees to fall hazards.

One such work procedure is the 'permit-to-work' system which is used to control potentially hazardous work. It is an effective way of managing entry into or work on scaffolds.

It provides a systematic framework to ensure that hazardous work is allowed to commence only after the work environment and condition have been assessed by competent persons to be safe and approved by the project manager, who would have knowledge and overall control of the worksite. With such a system in place, checks will be introduced at different stages of work, and the person responsible for endorsing the permit will be held accountable.

Safe Work Procedure

Safe Work Procedure (SWP) are a set of systematic instructions on how work can be carried out safely. Arising from the risk assessment, a set of SWP should be written for various jobs on site.

The SWP provides a step by step account of how jobs are to be executed, who is in charge of these jobs, what safety precautions must be taken (based on the risk assessment made earlier) and what kind of training is necessary for the workers doing these jobs. The permit-to-work system has to be integrated with the Safe Work Procedure so that the supervisors are made aware of the safety requirements and checks.

The SWP must be communicated to everyone involved in the job so that each is aware of the role they play in it. The SWP must also be communicated to those who will be affected by the job.

Approved access points should be tagged after inspection by a competent person to show that they are safe for use.

Provide stairs and ladders to enable access from one level of a scaffold to another.

Level 5: Personal Protective Equipment

Personal protective equipment (PPE) should only be used as the final option where workplace safety and health is concerned. It is neither effective nor recommended to use PPE on its own for fall protection. However, when used in conjunction with other control measures, PPE can provide an additional degree of safety.

A work positioning system is equipment that enables a person to be positioned and safely supported at a work location for the duration of the task being undertaken at height, e.g. a travel restraint system.

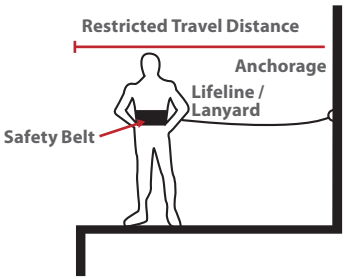
Work positioning systems require a higher level of worker competency and supervision than other control measures which are higher on the hierarchy of control.

Travel restraint systems

The purpose of a travel restraint system is to restrict the user's movement and to prevent him from approaching an unprotected edge on a building or structure.

Generally, the system consists of a safety belt or harness that is connected by a lanyard to a suitable anchorage point or a static line.

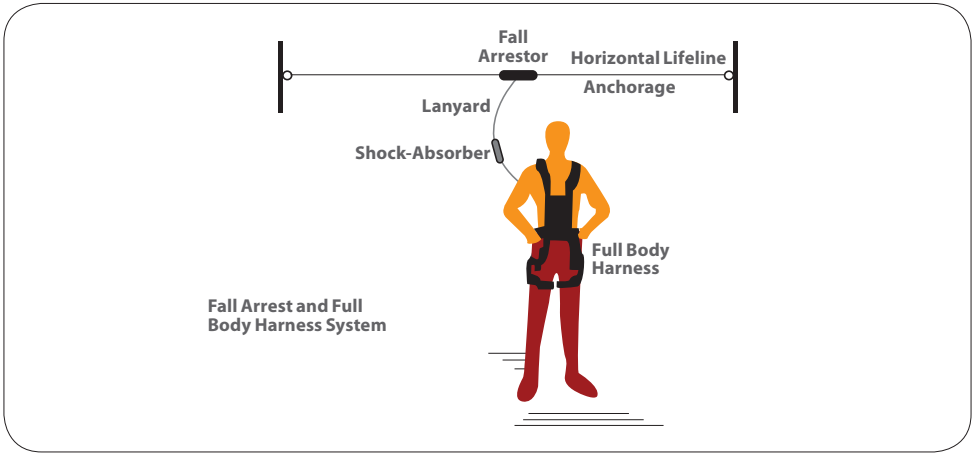
The system must be set up to prevent the wearer from reaching the edge.



Individual fall arrest system

Individual fall arrest systems function to safely stop a worker falling an uncontrolled distance and to reduce the impact of the fall.

Individual fall arrest systems consist of an assembly of interconnected components comprising a harness connected to an anchorage point or anchorage system either directly or by means of a lanyard. They can be used where workers are required to carry out their work near an unprotected edge.



Other personal protective equipment (PPE)

In addition to the abovementioned specific PPE for persons working at heights, the following could be considered:

- Suitable footwear to prevent slips;
- Gloves to provide protection against abrasive materials and chemicals;
- Eye protection such as sunglasses to ensure that a worker at height is not at risk due to glare or reflection; and
- Safety helmets that will remain in place in the event of a fall.

Monitoring of risk controls

The implementation of all risk control measures, including Levels 1, 2 and 3, should be monitored continuously by the immediate work supervisors so as to ensure that all such measures are being implemented effectively at all times.

5. An Example of Risk Assessment

RISK ASSESSMENT FORM

Company:	**ABC Company**	**Conducted by: Names, designations) (Date)**	**Tan Ah Lee, Supervisor, Ong Huat Ling, Worker Tan Ai Ling, Worker, 1 Aug 2007**
Process / Location:	**Painting / 1st Floor of House, exterior**		
Approved by: (Name, designation)	**Salim Bin Samat, Manager 5 Aug 2007**	**Last Review Date: 5 Aug 2007**	**Next Review Date: 5 Aug 2010**

No	Work Activity	Hazard	Possible Accidents / Ill Health & Persons-at-Risk	Existing Risk Control (if any)	Severity	Likelihood	Risk Level	Additional Risk Controls	Action Officer, Designation (Date)
1	Accessing and exiting work area using a ladder	Fall from height	Injury or death	• Ladder is checked every 6 months for defects by a competent person. • Ladder is visually checked before usage. • Training provided to worker to ensure that 3 point contact to be maintained by worker while climbing the ladder. • Tools are not to be carried by hand, a belt pouch had been provided for this purpose.	High	Occasional	Medium	Ladder is secured at the top using rope or footed at the bottom before usage. An alternative is that another worker can be assigned to hold the ladder firmly in place during climbing.	Tan Ah Lee Supervisor (Jan 2008)
2	Other work activities	… … …	… … …	… … …	… … …	… … …	… … …	… … …	… … …

A Risk Assessment form is available on the MOM website at:
www.mom.gov.sg/wsh/risk_management

Occupational Safety and Health Risk Compendiums can also be found at the same link.

Residual risks

Residual risks are the remaining risks after implementation of risk controls. The risk assessment team should ensure that residual risks are acceptable and manageable; and highlight the residual risks of each of the controls.

For example, if the risk control involves the use of safety harnesses and lanyards (a type of PPE), one of the residual risks is that the workers may not anchor the lanyards to protect themselves. In this case, the risk assessment team can highlight training (administrative control) as a further measure to ensure that residual risks are further minimised.

Once all the risk controls are selected and their residual risks highlighted, the risk assessment team needs to identify the officers for action and follow-up dates. In this way, the specific officers to implement the controls can be clearly identified, and the follow-up dates help to ensure timeliness in implementation.

Emergency response procedures

A written emergency response plan must be established and it should cover the procedures for handling emergencies relating to falls from height.

In the event of a fall, it may be necessary to retrieve the injured worker from the site of the fall. Therefore, equipment needed to perform a rescue must be made readily available and workers need to be trained to perform a rescue. It is important that a worker who is suspended in a full body harness be rescued promptly. Studies have shown that unconsciousness from suspension trauma can occur in around 5 minutes; death can follow shortly, within a few minutes. Emergency response procedures must be put in place when work has to be performed at height.

While developing these procedures, consider the different types of emergency and rescue scenarios that may arise. Use information obtained during the risk assessments to facilitate this task.

Effective emergency response procedures may require one or more of the following:

- Workers using safety harnesses should not work alone;
- A person trained in rescue techniques is allocated to each site; and
- Rescue equipment is readily available for use.

The emergency response procedures must also cover the provision of first aid, they should:

- Specify how many workers will be trained in first aid, the competencies and the necessary first aid equipment required;
- Identify the nearest hospital and medical treatment rooms; and
- Establish means of contacting the emergency services promptly.

Training in the Prevention of Falls

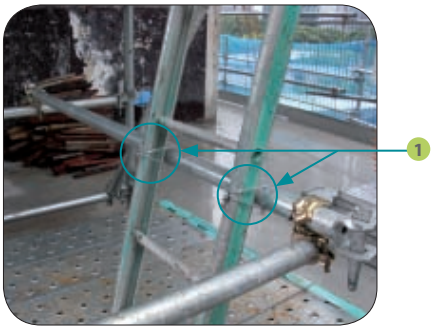
Information, instruction and training should be given to provide your employees with the skills and knowledge they need to perform work at height safely. It should help them to understand:

- The fall hazards to which they are exposed;
- The risk of injury associated with the task;
- Why control measures are needed and how to use them properly; and
- What actions to take if there is an incident.

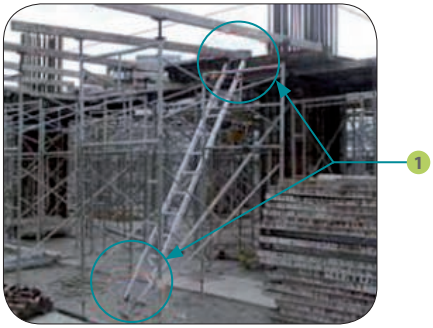
Working at height requires the operator to be properly trained to use the systems employed to prevent falls. The training depends on the level of operator skill required to operate or use the control measure.

Tasks involving complex work procedures or risk control measures require a comprehensive training process. Whatever level of control is used, a high level of competency must be achieved.

Where guardrails are being used, employees need to know why the guardrail system is needed and the limitations of the system. They should, for example, be instructed not to stand on, climb over, or remove any part of the guardrail system.



1 Workers should be trained in the safe use of ladders. Ladders should be securely fixed so that it can neither move from its top nor bottom points of rest.



1 An unsecured ladder may slip during usage. If it is not possible to fix the ladder, it should be held securely in place by a person during any climbing, to prevent the ladder from slipping.

For example, an individual fall arrest system requires a high level of competency on the part of the user to ensure its proper usage. Employees who use these systems should be trained in the correct fitting, anchorage, use and maintenance of the individual fall arrest system, including the nature of the fall hazard and the risks of injury associated with the tasks that they undertake when using the individual fall arrest system. This training should cover the risks of injury associated with an arrested fall.

Induction training should be provided for all new workers. It is a good idea to keep a record of training to enable ongoing programme evaluation and review. Information should be provided in a form that can be understood by all workers. This may include providing information in languages other than English.

Workers should be trained to identify damaged or faulty equipment and report such findings to their supervisors. They must not use such equipment nor carry out unauthorised repair.

Training must be provided for safety harnesses, belts or lifelines to ensure that they are used correctly. The PPE must be of good construction, without any indication of wear, damage or deterioration.

6. Useful References

- Workplace Safety and Health Act 2006
  www.mom.gov.sg/oshd
- Workplace Safety and Health (General Provisions) Regulations
  www.mom.gov.sg/oshd
- Workplace Safety and Health (Construction) Regulations 2007
  www.mom.gov.sg/oshd
- Workplace Safety and Health (Risk Management) Regulations
  www.mom.gov.sg/oshd
- Factories (Scaffolds) Regulations 2004
  www.mom.gov.sg/oshd
- SINGAPORE STANDARD CP 14 : 1996 – Code of Practice for Scaffolds
- SINGAPORE STANDARD CP 20 : 1999 – Code of Practice for Suspended Scaffolds
- SINGAPORE STANDARD CP 23 : 2000 – Code of Practice for Formwork
- SINGAPORE STANDARD CP 62 : 1995 – Code of Practice for Safe Use of Tower Cranes
- SINGAPORE STANDARD CP 63 : 1996 (2005) – Code of Practice for The Lifting of Persons in Work Platforms Suspended from Cranes
- SINGAPORE STANDARD CP 79 : 1999 – Code of Practice for Safety Management System for Construction Worksites
- SINGAPORE STANDARD SS 292 : 1984 – Specification for Safety Nets for Construction Sites
- SINGAPORE STANDARD SS 311 : 2005 – Specification for Steel Tubes and Fittings Used in Tubular Scaffolding
- SINGAPORE STANDARD SS 402 : Part 1 : 1997 – Specification for Industrial Safety Belts and Harnesses – Part 1 : General Requirements
- SINGAPORE STANDARD SS 402 : Part 2 : 1997 – Specification for Industrial Safety Belts and Harnesses – Part 2 : Permanent Anchors
- SINGAPORE STANDARD SS 528 : Part 1 : 2006 – Specification for Personal Fall Arrest Systems – Part 1 : Full-body Harnesses
- SINGAPORE STANDARD SS 528 : Part 2 : 2006 – Specification for Personal Fall Arrest Systems – Part 2 : Lanyards and Energy Absorbers
- SINGAPORE STANDARD SS 528 : Part 3 : 2006 – Specification for Personal Fall Arrest Systems – Part 3 : Self–retracting Lifelines
- SINGAPORE STANDARD SS 528 : Part 4 : 2006 – Specification for Personal Fall Arrest Systems – Part 4 : Vertical Rails and Vertical Lifelines Incorporating a Sliding-type Fall Arrester
- SINGAPORE STANDARD SS 528 : Part 5 : 2006 – Specification for Personal Fall Arrest Systems – Part 5 : Connectors with Self-closing and Self-locking Gates

- SINGAPORE STANDARD SS 528 : Part 6 : 2006 – Specification for Personal Fall Arrest Systems – Part 6 : System Performance Tests
- SINGAPORE STANDARD SS 536 : 2008 – Code of Practice for the Safe Use of Mobile Cranes (Formerly CP 37 : 2000)
- BS 7985:2002 Code of Practice for the Use of Rope Access Methods for Industrial Purposes
- Risk Assessment Compendiums, Developed by MOM at: www.mom.gov.sg/managing_workplace_hazards
- ProBE Technical Advisory for Scaffolds at: www.mom.gov.sg/wsh/probe/scaffold
- Suspension Trauma, its Effects, Prevention and Treatment Methods at: www.suspensiontrauma.info/

Singapore Standards

All listed Singapore Standards including Codes of Practice can be obtained from:
SNP Corporation (Legal) Ltd
Legal Publication Retail Outlet
1 Kim Seng Promenade #18-01/06
Great World City East Tower S(237994)
Tel: (65) 6826 9691
www.singaporestandardseshop.sg/Product/Home.aspx

7. Acknowledgements

The Workplace Safety and Health Council wishes to acknowledge the following organisations for the images used in this publication:
- Bovis Lend Lease Pte Ltd
- Singapore Contractors Association Limited

Published in November 2008 by the Workplace Safety and Health Council in collaboration with the Ministry of Manpower.