






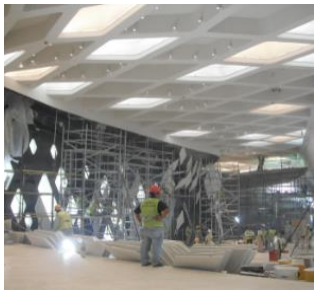

STRABAG | ZÜBLIN – ABU DHABI | DUBAI
INTEGRATED MANAGEMENT SYSTEM
SAFETY - TRAINING

IMS # **40-T006-000E**

Working at Height

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Working at Height
Learning Outcomes

By the end of this session you will understand:

1. What is Working at Height;
2. Hazards of Working at Height;
3. Fall prevention and Fall protection;
4. Use and Inspection of Full Body Harness;
5. 100% Tie off;
6. Roles and Responsibilities.

During this training please ask questions…

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Understanding Working at Height :

Introduction:

- Falls are the leading cause of deaths in the construction industry.
- Most fatalities occur when employees fall from open-sided floors and through floor openings.
- Falls from as little as 4 to 6 feet can cause serious injuries and sometimes death.

Note: All work above 1.8 m is considered as Working at Height

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Understanding Working at Height:

Definition:

Work at height means working in a place (except a staircase in a permanent workplace) where a person could be injured by falling from it, even if it is at or below ground level.

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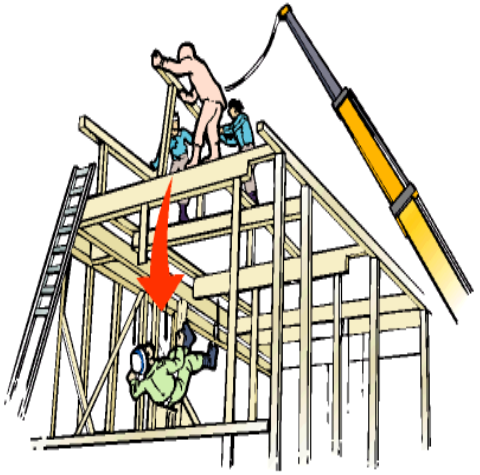
Working at Height :

MAIN HAZARD:

- Fall of Persons from Height;
- Fall of Material from Height;
- Poor Working platforms;
- Structural Collapse.



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Working at Height:

PRECAUTIONS:

- Use of Permit to Work System (as required);
- Dedicated Training;
- Close Supervision;
- Provision of Fall Protection (Guard rails etc.);
- Provision of Personal Fall protection / arrest systems;
- Follow “Three Point Contact” rule while climbing ladders;
- Do not overload working platforms.

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Working at Height:

Falling Objects:

Objects falling from height are capable of causing considerable injury to people and damage to equipment.

How can we prevent this?

- Housekeeping;
- Good storage practices;
- Cover all unprotected edges;
- Carry tools in a ‘hands free’ approved tool bag;
- Do not use buckets with wire handles for lifting tools or materials;
- Adequate barricades and warning signs.

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Working at Height:

Full Body Harness:

- Full Body Harness with double Lanyard with single shock absorber (Self locking/Double action snap hooks);
- Full Body Harness required for any work at or above 1.8m;
- When any worker risks a potential fall of 1.8 meters or greater;
- When it is obvious that a fall of less than 1.8 meters could cause injury.

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Working at Height:

Full Body Harness:

- The body harness has a 5 point strap system;
- Two lanyards and a single integrated shock absorber;
- Designed to distribute shock load / fall arrest force over the shoulders, thighs, pelvis, waist, and chest;
- The D-ring should be positioned on the upper back centrally between the shoulders;
- Lanyard is a fall arrest mechanism which must be capable to withstand a load of 5000 lbs.;
- Flexible line, about 1.8 m in length and at least 1.25 cm (2 inches) in width;
- One lanyard should always be connected before your body moves - 100% fall protection.

Note: Persons falling from height will almost end up in fatality.

A fall from 30meters = 70 kph Impact

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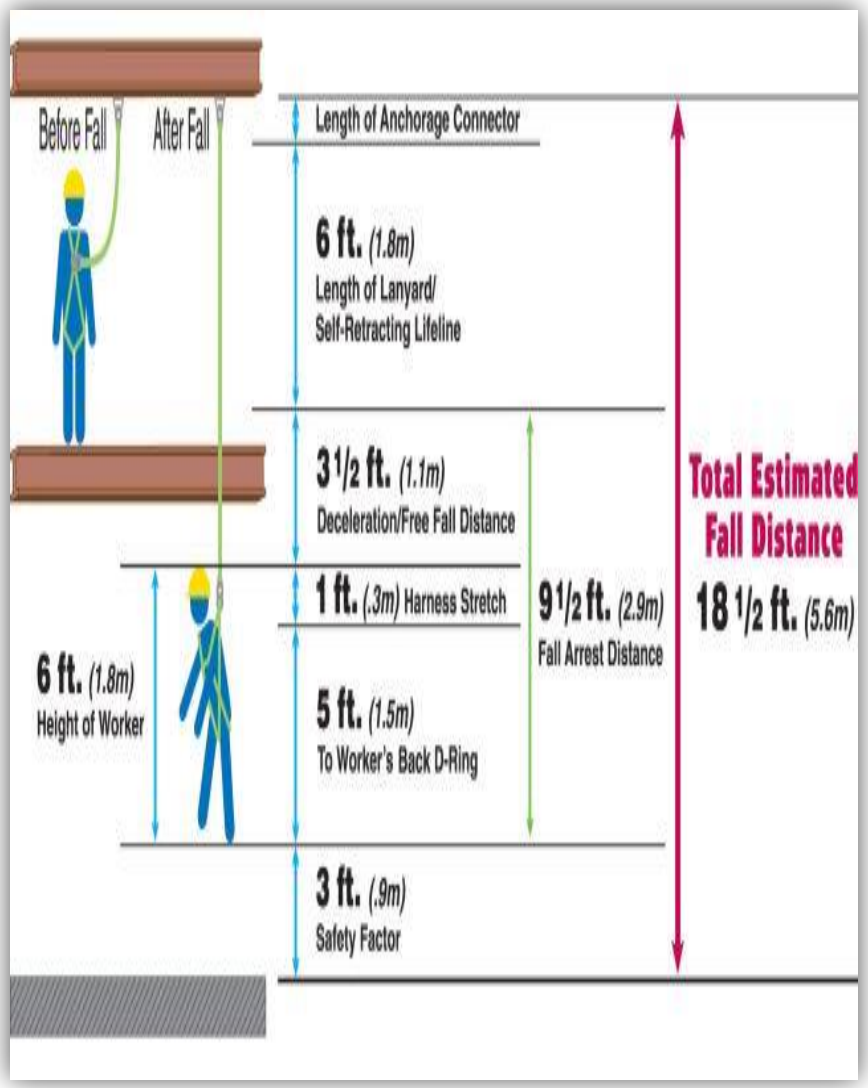
Working at Height:

Calculate the Fall Distance:

Lanyard:

- Length of Anchorage connector 1.8 m (6 ft.);
- Deceleration/Free Fall Distance (Shock absorber) 1.1 m (3 1/2 ft.);
- Worker Height Displacement and Stretch of Harness 1.8 m (6 ft.);
- Safety Factor of 0.9 m (3 ft.);

LL + DD + HH + C = 5.6 m Required fall clearance distance using typical 1.8 m lanyard.



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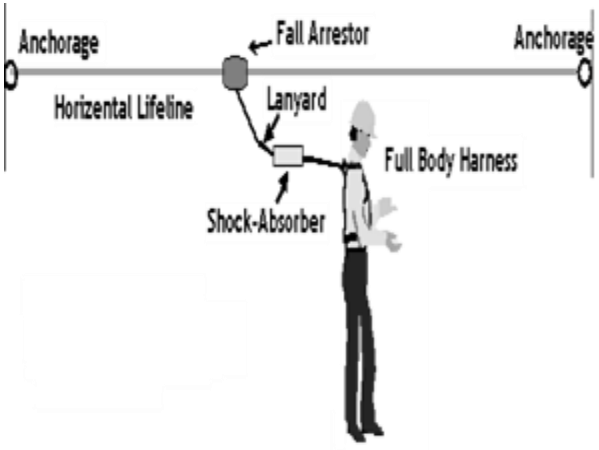
Working at Height:

Anchor Point:

- A secured point of attachment for lifelines, lanyards or deceleration (grabbing) devices;
- Anchor points for fall arrest must be capable of supporting 5000lbs (2200kg) or (22KN).

Independent Lifeline



Stable Structure

Scaffolding Structure

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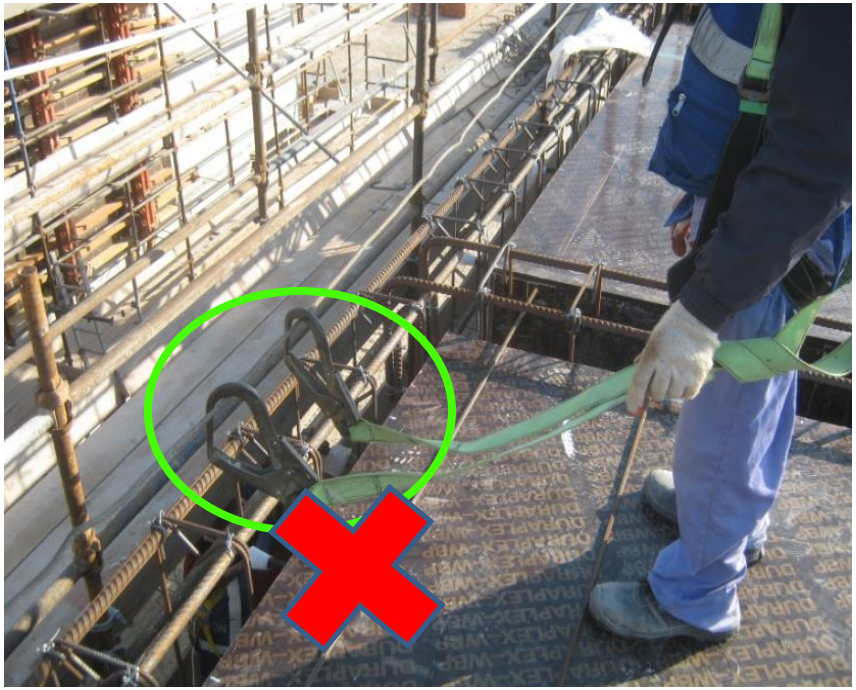
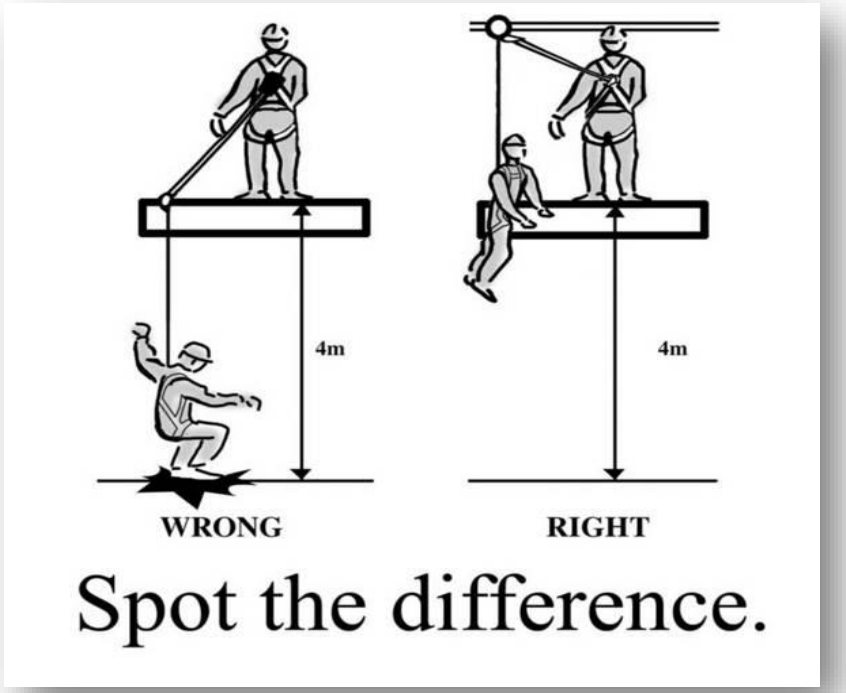
Working at Height:

Anchor Point:

- Ensure that your anchor point is always above your shoulder to reduce the impact when you fall.





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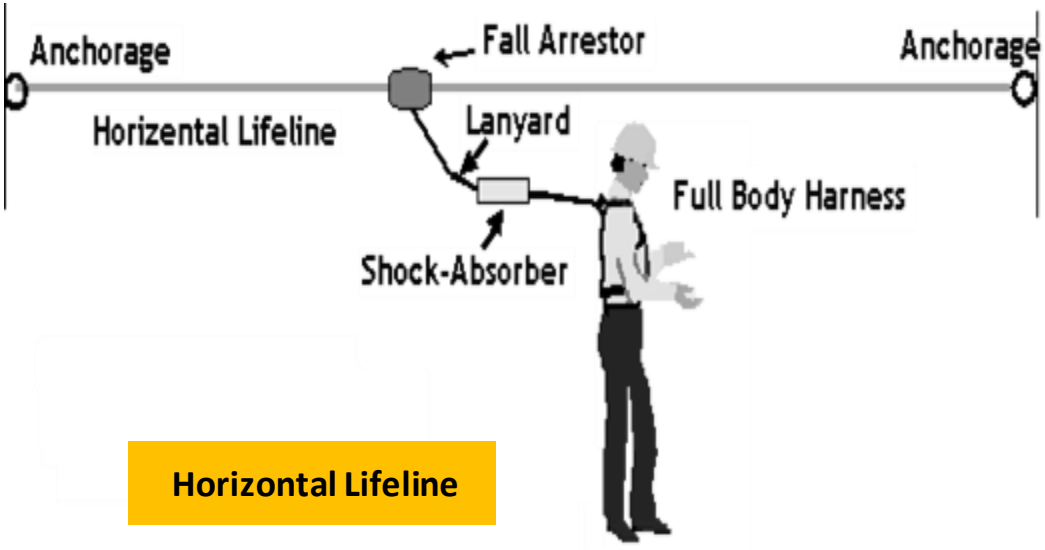
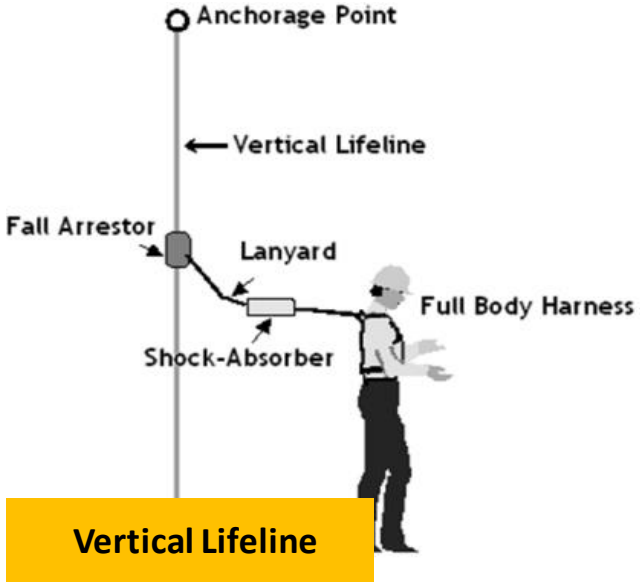
Working at Height:

Lifeline:

- An anchoring wire rope rigged between two fixed anchorage points;
- Facilitating the movement of person with their full body harness's or drop line anchored to it;
- The lifeline is used when a person has to move horizontally or vertically on a long length.



Horizontal Lifeline



Vertical Lifeline

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Working at Height:

Recognition of Potential Fall Hazards:

- Any area that has an exposure to fall and does not have primary fall protection devices in place.

The following areas require fall protection when employees are exposed to fall:

- Unprotected Sides and Edges;
- Scaffolds & Unsecured Platforms;
- Walkways and Ramps;
- Floor Openings & Wall Openings;
- Steep or Low slope roofs;
- Excavations, Sewers, Pit;
- Precast concrete and skeletal racks.

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Working at Height Unsafe Practices:

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Working at Height Unsafe Practices:

Lanyard is missing

No fall protection & substandard access ladder

Standing on a sub standard working platform

Working without proper scaffolding platform

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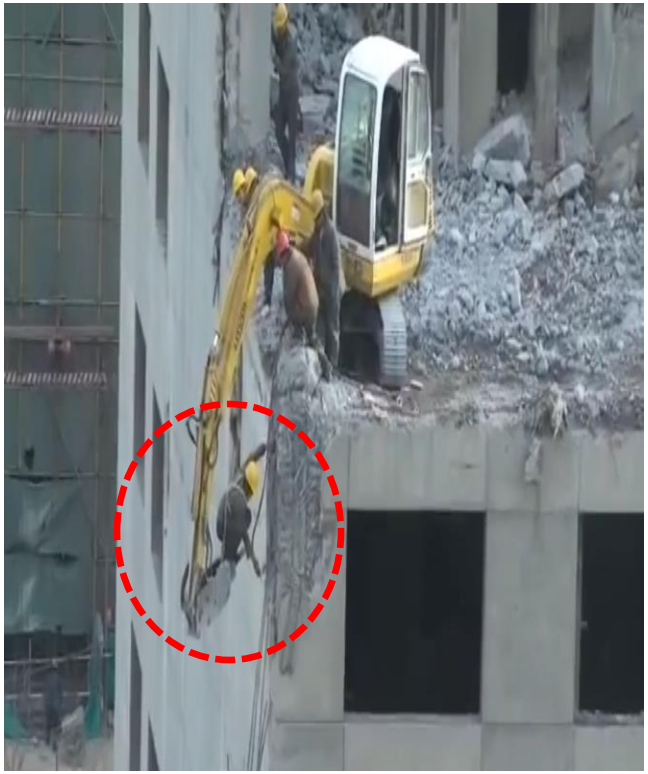
Working at Height Unsafe Practices:



Do you know anyone who has fallen from height?
Share your personal experiences.

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Control Measure:

Training and Competency:

- All work at height working personnel should receive training prior to start work;
- Competency is to be checked prior to the task.

Supervision:

- Supervisor should always be present at the time of work;
- Supervisor should make sure all personnel involved are trained and competent;
- Conduct STARRT briefing;
- Ensure valid PTW is in place.

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Control Measure:

Fall Protection:

- Ensure working platform or edge are protected from fall;
- Provide hand rail, mid rail, and toe board.

Control Measure:

Hole Protection:

- Cover all openings by steel plates or hard ply and keep hard barrier around the opening to ensure protection of personnel, tools or materials;
- Holes or gaps more than 2 square Inch is to be protected to prevent fall of materials or tools.

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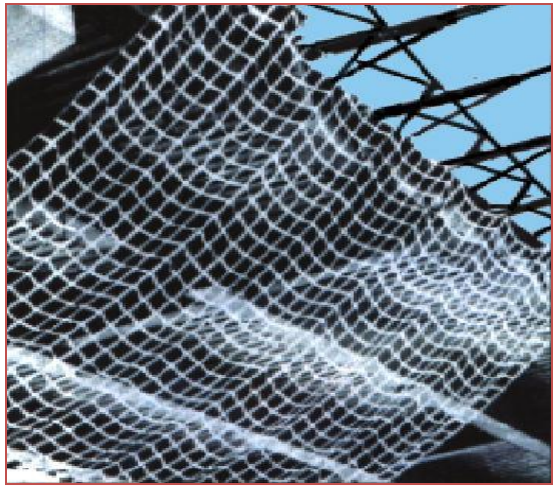
Control Measure:

Safety Net:

- Personnel Nets;
- Material or Debris protection nets.



Control Measure:

Tools and Material Fall Protection:

- Tie all tools while working at height to prevent its fall;
- Keep tools in bag or box;
- Materials shall be kept in a secured place.

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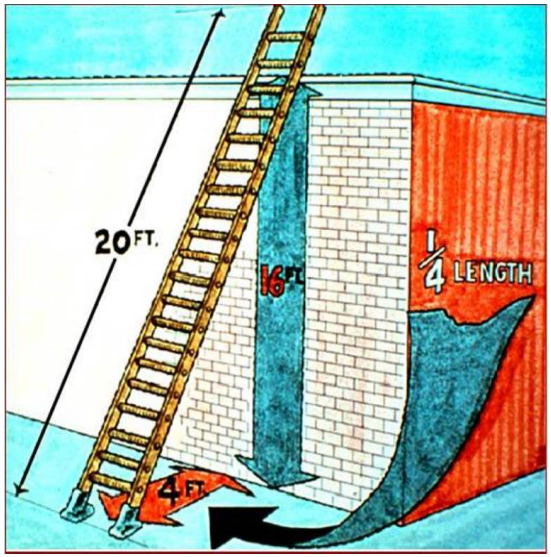
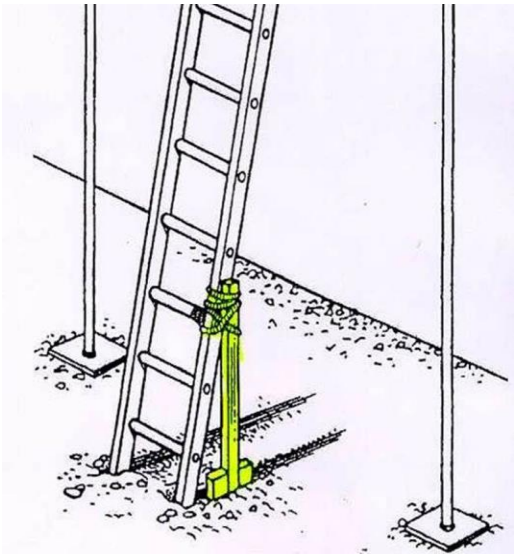
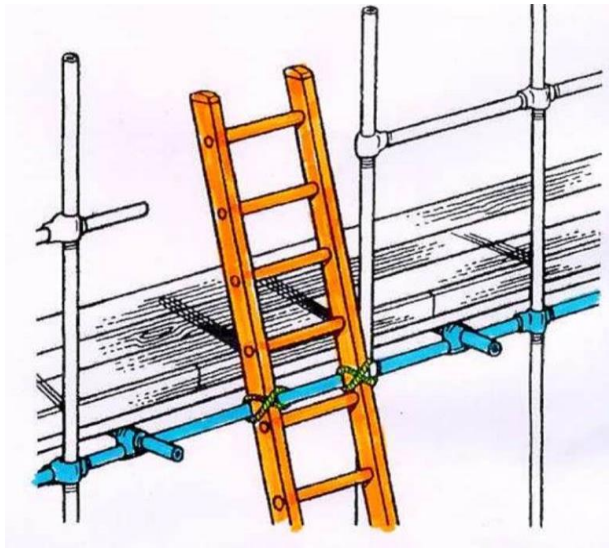
Control Measure:

Ladder Safety:

- All ladders should be free from damage, inspected and tagged;
- All straight ladders shall be correctly installed, footed or tied;
- Install ladders at angle of 75^{o} (Ratio of 1:4).







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Control Measure:

Ladder Safety:

DO

- Keep ladders in a safe condition;
- Keep the area around ladders clear;
- Ensure rungs, cleats, and steps are level and free from damage;
- Keep ladders free of slipping hazards;
- ONLY use ladders for their designed purpose.

DON'T

- Tie ladders together to make longer sections, unless designed for such use;
- Use A frame ladders as straight ladders;
- Use ladders as a working platform.

Control Measure:

Scaffolding – General:

- **ONLY** Certified Scaffolders can Erect, Dismantle or Modify scaffolding;
- Scaffolds shall be erected on firm and level ground;
- All scaffolds shall have full boarded platforms;
- All scaffolds shall have double guard rails and toe boards;
- During the erection, area around the scaffolding should be barricaded and Warning signs should be placed;
- Scaffolds shall be inspected by Certified Inspector before use - Scafftag system shall be used.

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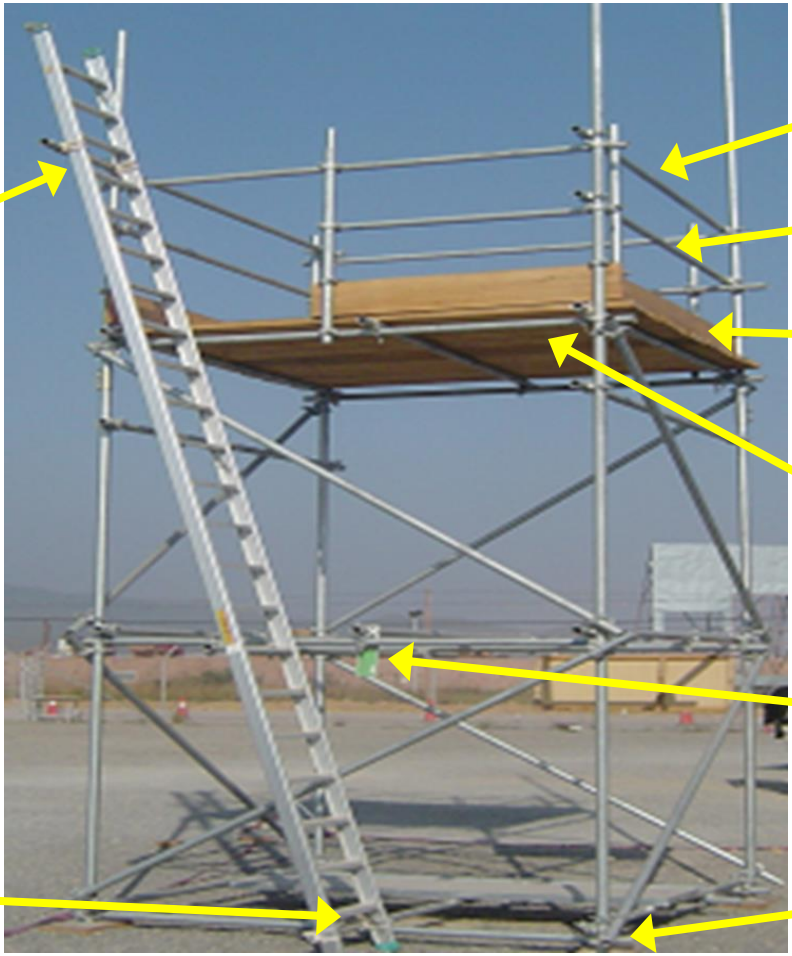
Control Measure- Safe Scaffolding:



Ladder secured by means of a metal clamp/rope

Top rail

Mid rail

Toe board

Full Platform

Green Scafftag

Access to scaffold

Base plates

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Control Measure:

- Scaffolds shall be inspected by Certified Inspector before use.
- Scafftag system shall be used.

Green Tag – Safe to Use

Red Tag- Do Not Use

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Scaffolding – General (Unsafe Practices):

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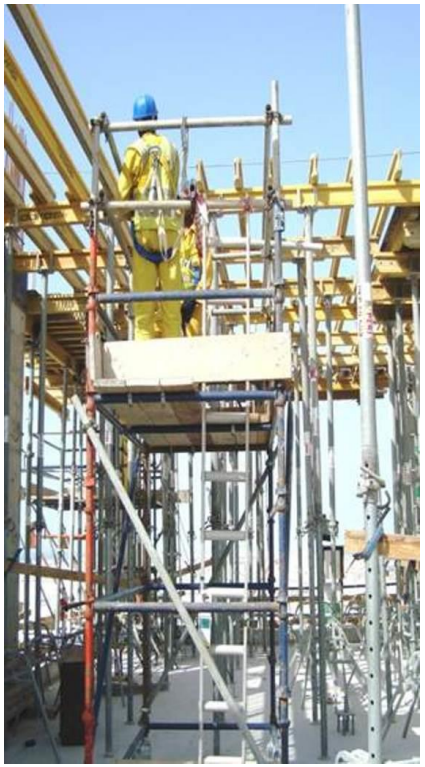
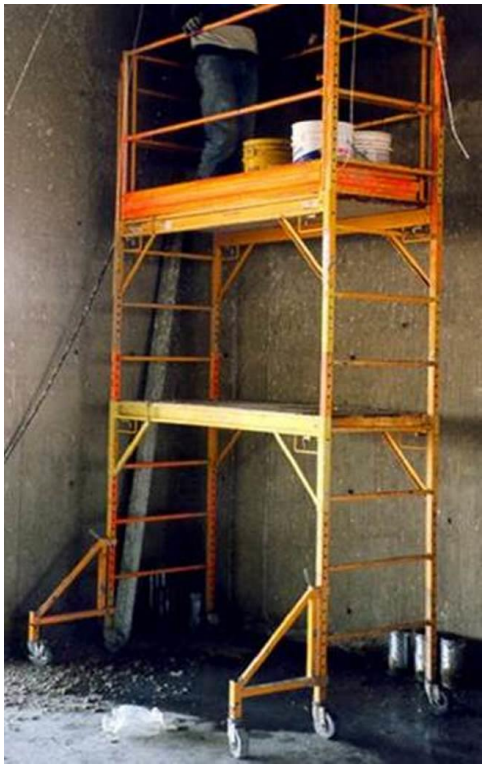
Control Measure - Mobile Scaffold:

Employees cannot work on mobile scaffolds unless:

- Erected by trained Scaffolders;
- Supporting ground is firm and level;
- Height to base ratio is less than 3 to 1;
- Outriggers are installed on both sides of scaffolds;
- Green Scafftag;
- Wheels locked.





No mobile tower can be moved whilst persons are on them.

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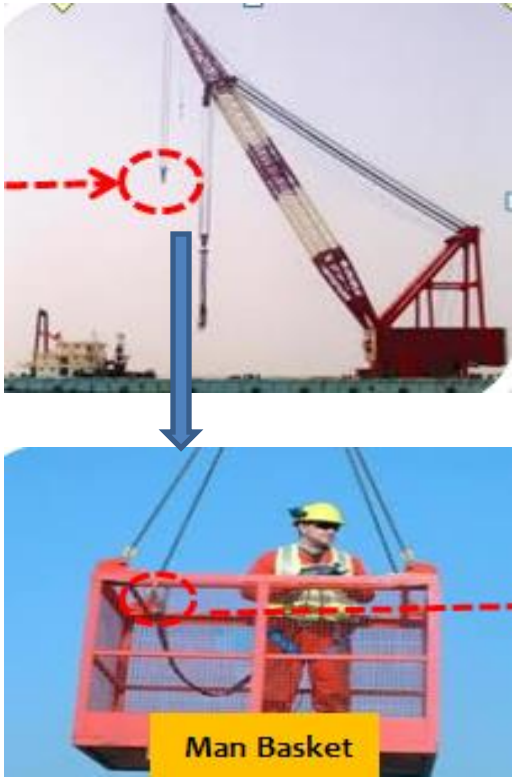
Control Measure:

Mobile Elevated working Platform (MEWP'S):

- Do Not operate any machine if you are not authorized, licensed / certified to operate that type of machine;
- All operators shall conduct an inspection prior to starting their machine DAILY;
- Do Not leave machines running when you exit cab;
- Keep away from "LINE OF FIRE" of mobile plant;
- Keep out of exclusion zone created around works;
- All equipment shall be subject to routine maintenance;
- All operators shall use full PPE when outside of cab;
- Moving plant shall be escorted by a trained banksman.

Control Measure:

Mobile Elevated working Platform (MEWP'S):



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Control Measure:

Signs and Barriers:

- Suitable signs and barrier to be provided to prevent unauthorized entry.

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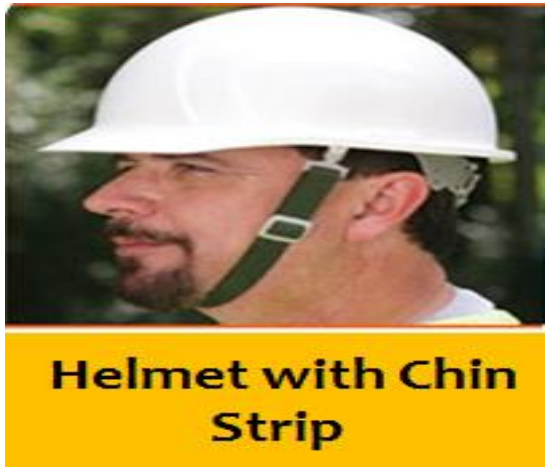
Control Measure:

Personnel Protective Equipment (PPE):

- Hemet with Chin Strip;
- Full Body Harness with Double Lanyard;
- High Visibility Vest;
- Hand Gloves;
- Safety Shoes;
- Safety Goggle;
- Ear Plug if required;
- Face Shield if required.



Overhead Power Transmission Lines:

- The area surrounding every power line is referred to as “the absolute limit of approach”.
- It is strictly forbidden to move any crane boom or load line into this area, unless the line has been de-energised, insulated or isolated.
- The “Absolute limit of approach” varies according to the power line voltage:

  - For Up to 25,000 Volts = Min 30 Feet / 9 M;

  - For over 25,000 Volts = Min 50 Feet / 15M.
- Once the voltage has been identified, then height restricting facilities (Goal Posts) shall be erected at both sides of the overhead lines, to indicate the safe working distance.

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Working at Height Safe Practices:

Always face on the ladder and implement 3 points of contact

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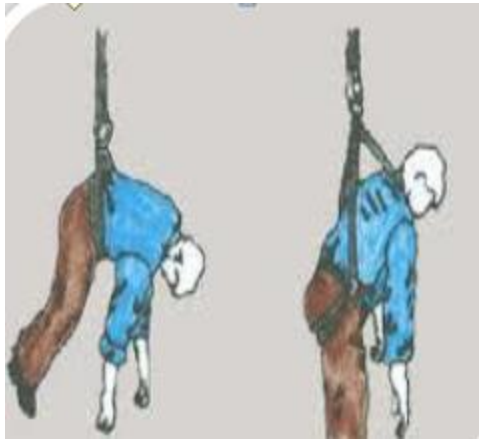
Suspension Trauma:

- Suspension Trauma also known as harness hang syndrome (HHS), or orthostatic intolerance, is an effect which occurs when the human body is held upright without any movement for a period of time.

- If the person is trapped into a harness or tied to an upright object they will eventually suffer the central ischaemic response (commonly known as fainting). If one faints but remains vertical, the brain will not get required oxygen eventually leading to death.



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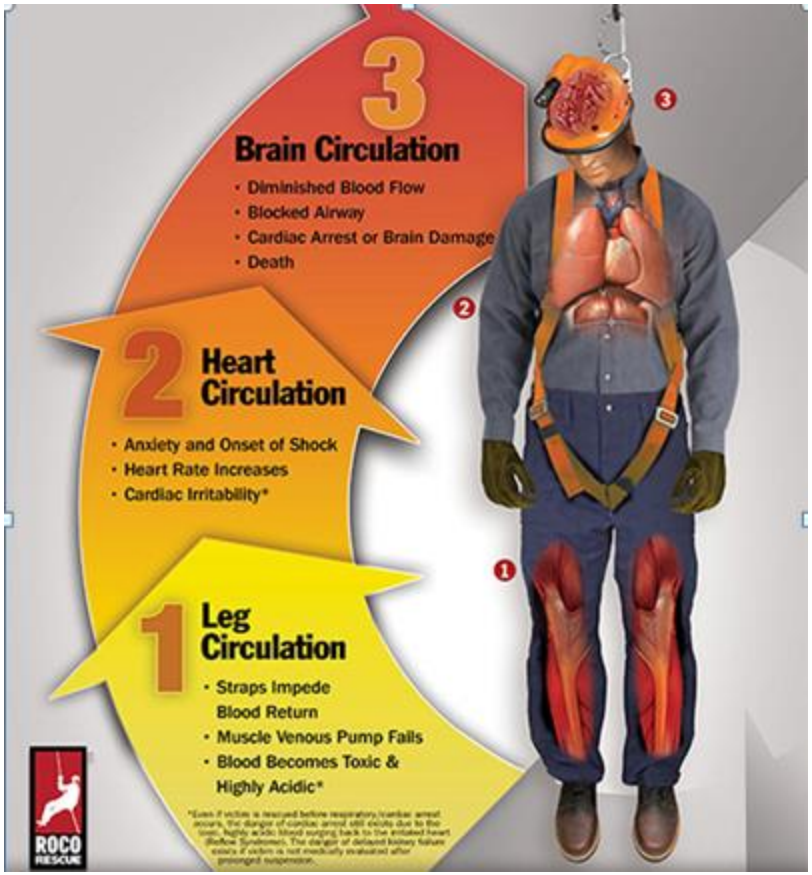
Suspension Trauma:

- Onset of symptoms may be just after a few minutes, but usually occurs after at least 20 minutes of free hanging.
- Typical symptoms are pallor, sweating, shortness of breath, blurred vision, dizziness, nausea, hypotension and numbness of the legs.
- Eventually it leads to fainting, which may result in death due to oxygen deprivation of the brain.



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Suspension Trauma:

If you fall accidentally and are suspended:

- Avoid moving your legs;
- Lift your knees into a sitting position;
- Relax as much as possible, panic makes things worse;
- If you can, every few minutes swing yourself to get reach on possible structure;
- If you're trapped and cannot move, Strain your leg muscles as hard as you can every 5 seconds, Breathe slowly and deeply and you're most urgently needing rescue!
- Buddy system is required (2 persons).

Note: Remember although suspension trauma is rare, it can happen to anyone, if you are at work, the employer needs to manage the risks.

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Fall Arresting System:

What to do if the fall arrest system has been used once to arrest a fall?

- If a fall arresting system and devices have been used once to arrest a fall, all items must be tagged and withdrawn from service;
- Should be re-Inspected by an authorised person, before using the second time.

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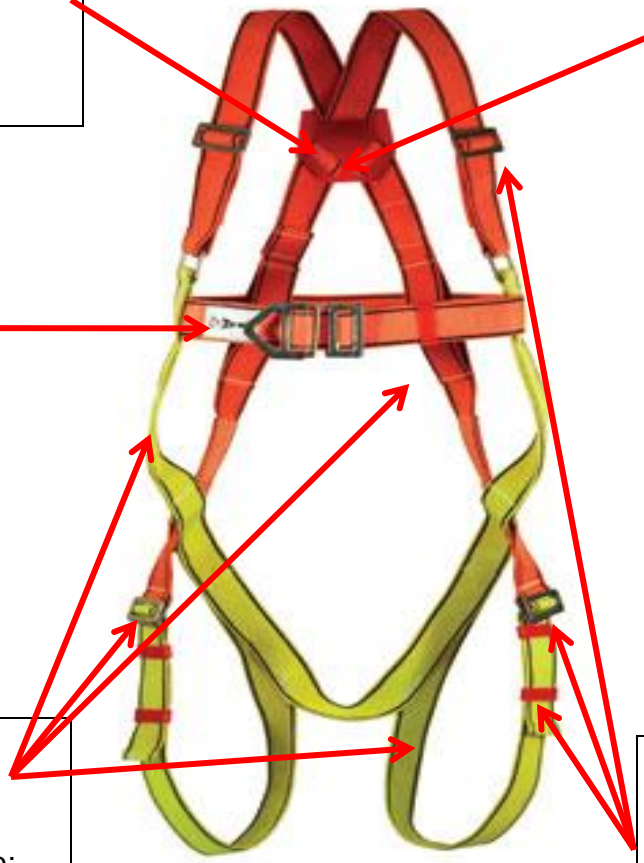
Inspection Guideline-Full Body Harness:

D-Ring:
-No Distortion;
-No Cracks;
-No Rough Edges.

D-Ring:
-No Damage;
-Must hold Ring in place.

Manufacturers Tag:
-Less than five years old;
-Harness ID Number.



Webbing:
-No Cuts;
-No Fraying;
-No Broken Stitching / Other Damage;
-No Chemical or Heat Damage;
-No Discoloration / Brittleness or Melted Webbing.

Clips and Keepers:
-No Distorted Metal Clips / Keepers;
-No Sharp Edges on Clips;
-All Plastic Keepers in place (two per strap).

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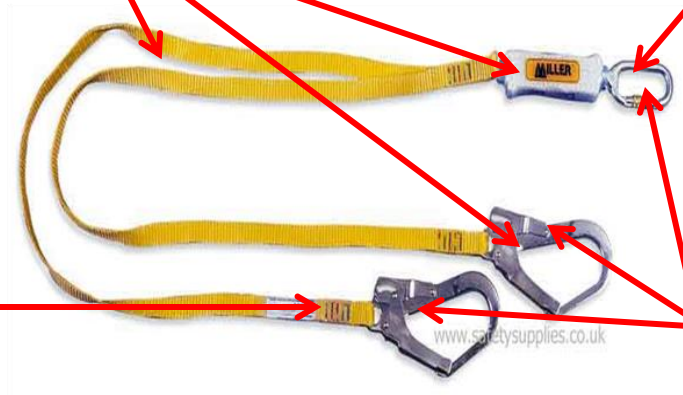
Inspection Guideline-Full Body Harness:

Webbing:
-No Cuts / Burns;
-No Fraying;
-No Broken Stitching / Other Damage;
-No Chemical or Heat Damage;
-No Discoloration / Brittleness or Melted Webbing.

Fall Arrest Pack:
- Stitching Undamaged;
- Pack Undamaged;
- No colour coding on absorbing component.



Manufacturers Tag:
- Label in place and legible;
- Less than 5 years old;
- Harness ID Number.

Clips and Karabiners:
- Double action (two movements required to operate);
- Free moving;
- No excessive rust.

Note:

1.Harness and Lanyards should not be re-used until proper repairs have been carried out by the Manufacturer; remove harness to a safe place and attach warning notice to prevent use;

2.Discarded harness and lanyards should be cut to prevent re-use.

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Working at Height:

Supervisors Roles and Responsibilities:

- Ensure Permit (Cold Work) is in place prior to start of the job;
- Conduct STARRT briefing;
- Conduct daily inspection of work area to recognise hazards;
- Proper working platform should be provided;
- Provide safe access/egress;
- Ensure all the workers have received training before start of work at height;
- Ensure safety harnesses are inspected and colour coded;
- Ensure the workers are using correct lanyard;
- Ensure safety harnesses are being correctly worn and tied off at a secure point;
- Hard barricading to be used around open shafts and holes;
- Adequate signage's.

Emergency Procedures:

Witness:

- Report immediately to Site Supervisor or Call 24 Hr. HSE Duty phone;
- Raise alarm & surface team call for First Aider / Nurse to attend scene.

First Aiders:

- Respond to assist of any causalities.

Supervisor:

- Call for Assistance;
- Stop all work, make area safe;
- Arrange first aiders to assist casualty;
- Send guide to meeting point;
- Ensure access is clear;
- Control the crowd;
- Identify and note witnesses;
- Make himself known to E.R.T.

Note: Permit cancelled until revalidated by HSE Dept.

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Emergency Procedures:

Emergency Response Team:

- Emergency Response Teams should report to Area Emergency Management Team Leader;
- ERTs try to control any emergency situation in their area;
- Arrange first aiders to assist casualty;
- In the event of an evacuation, order all personnel to evacuate and conduct a thorough search of personnel;
- Record the location of people that cannot, evacuate, and provide information to the Area Emergency Management Team Leader.

Working at Height - Learning Review:

1. What are the main hazards related to working at height?
2. What is the responsibility of the Supervisor during an emergency ?
3. What is the responsibility of the witness during an emergency ?
4. What should be the position of Anchor point?
5. What should be done if the fall arrest system has been used once to arrest a fall?

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Discussion…

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