

Fall From Height Workplace Fatal Injuries in 2H2023

All work-at-height activities must be carefully managed as falling from heights will typically lead to fatal or major injuries even if the height is less than three metres.

In 2023, there were eight fatal falls from height, of which three occurred in the second half of 2023. The WSH Council would like to remind companies to carry out risk assessments for all work at height activities to protect our workers.

Worker fell while checking air condensing unit

On 27 August 2023, an aircon technician climbed out the fourth-storey window of a residential apartment and was checking an air condensing unit mounted on the exterior of the building when he fell about 11 metres to the ground. The technician was sent to the hospital where he died the same day.

The brackets supporting the air condensing unit were found to have given way, and the technician was not equipped with any personal fall-protection device at the time of the accident.

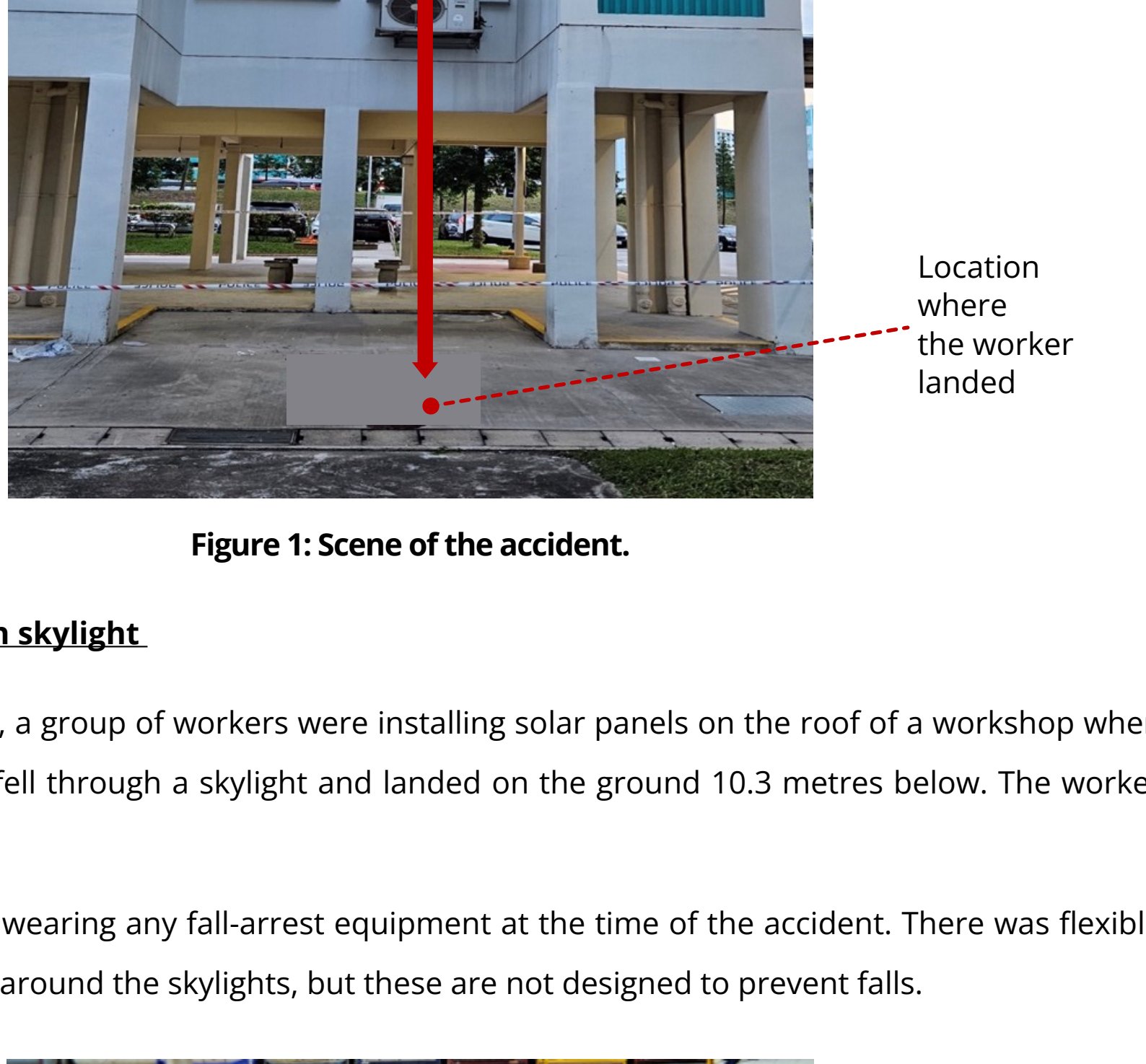


Figure 1: Scene of the accident.

Worker fell through skylight

On 22 October 2023, a group of workers were installing solar panels on the roof of a workshop when one of the workers fell through a skylight and landed on the ground 10.3 metres below. The worker died at the hospital.

The worker was not wearing any fall-arrest equipment at the time of the accident. There was flexible mesh netting set up around the skylights, but these are not designed to prevent falls.

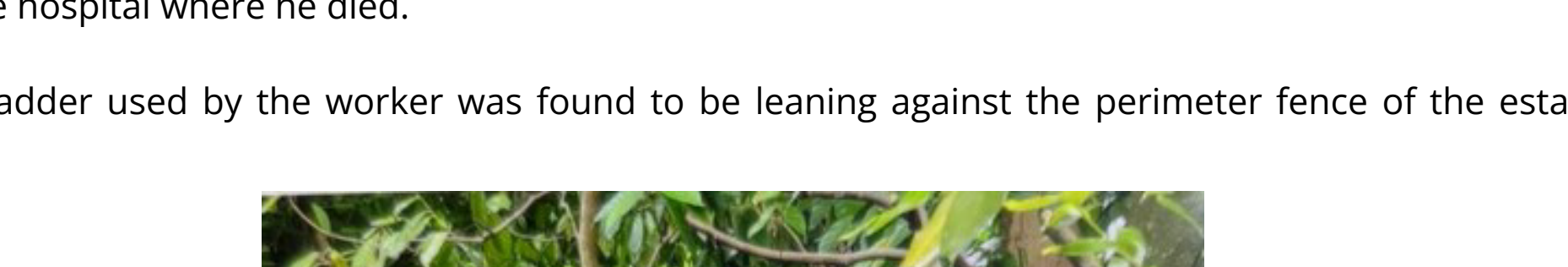


Figure 2: Scene of the accident.

Worker fell from ladder

On 31 October 2023, a worker was standing on a ladder and trimming tree branches within a private residential estate when he fell about three metres and struck his head against the ground. He was sent to the hospital where he died.

The ladder used by the worker was found to be leaning against the perimeter fence of the estate.

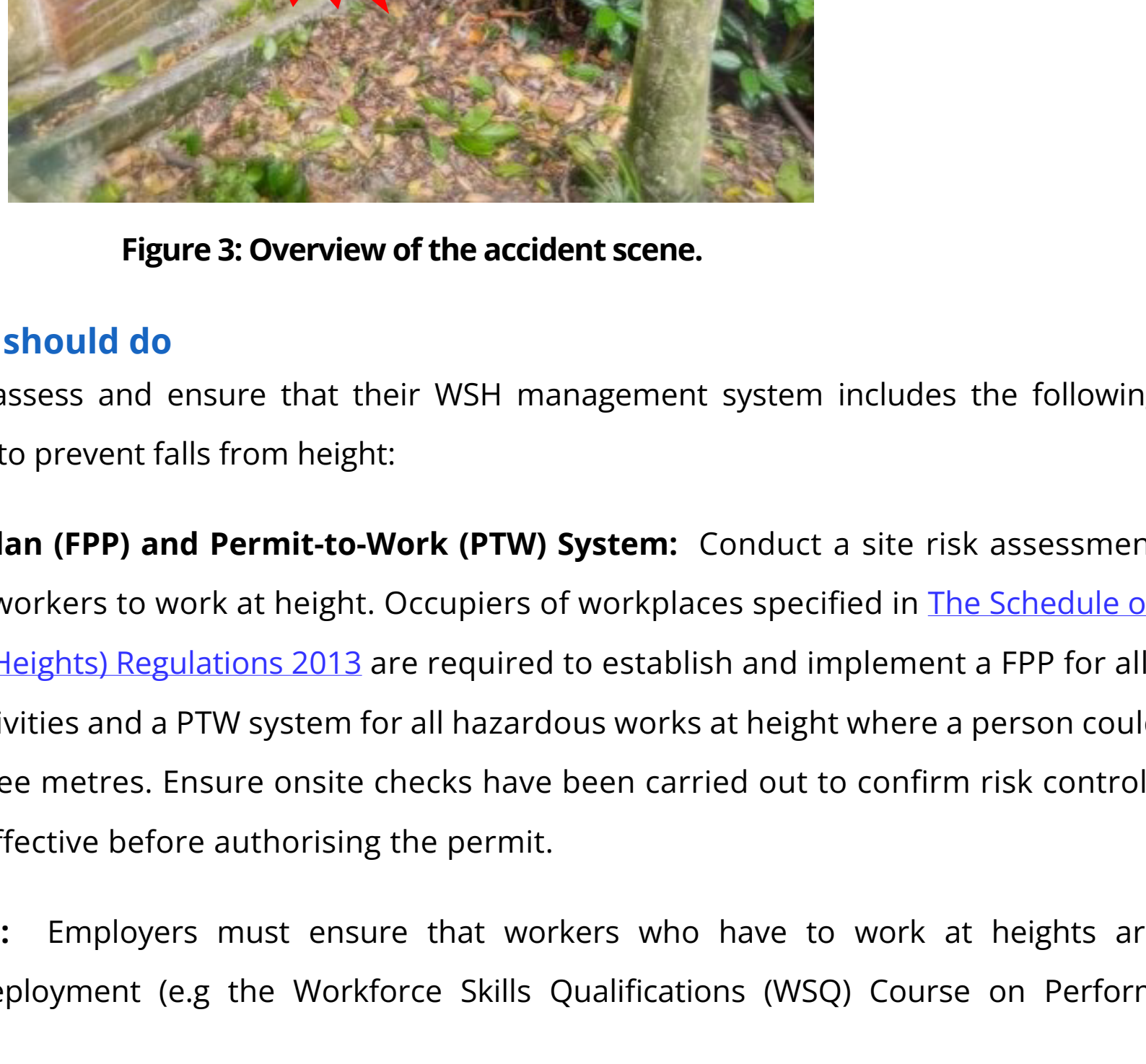


Figure 3: Overview of the accident scene.

What companies should do

Companies should assess and ensure that their WSH management system includes the following measures or checks to prevent falls from height:

- **Fall Prevention Plan (FPP) and Permit-to-Work (PTW) System:** Conduct a site risk assessment before deploying workers to work at height. Occupiers of workplaces specified in [The Schedule of the WSH \(Work at Heights\) Regulations 2013](#) are required to establish and implement a FPP for all work-at-height activities and a PTW system for all hazardous works at height where a person could fall more than three metres. Ensure onsite checks have been carried out to confirm risk controls are in place and effective before authorising the permit.
- **Trained workers:** Employers must ensure that workers who have to work at heights are trained before deployment (e.g. the Workforce Skills Qualifications (WSQ) Course on Perform Work-at-Heights).
- **Personal Fall-Arrest System (PFAS):** In work areas where there are fall-from-height risks (e.g. due to the presence of open sides), provide workers with a PFAS comprising a full-body harness, suitable connector (e.g. a lanyard) and secured anchor point(s) or lifelines. Employers and supervisors must ensure each worker is hooked up with 100% tie-off. Anchor points and lifelines should only be removed when works are completed. Use a lanyard with a shock absorber only if there is sufficient fall clearance distance, otherwise use an immediate arrest self-retracting lifeline.
- **Health survey:** Conduct a pre-work health survey at the start of each work shift to verify each worker's fitness for the task. Workers who are feeling unwell or on medication that can cause drowsiness should not be deployed to works at height.

Additional recommendations for aircon installation/maintenance

- **Competent aircon worker:** For installations or replacements of support brackets located on the exterior of a building, deploy air-conditioning unit installers who have completed the Installation of Structural Supports for Aircon Condensing Units course conducted by BCA Academy.
- **Safe Work Procedure (SWP):** Develop a SWP specifically for the installation, maintenance/servicing or dismantling of externally mounted air condensing units, based on site-specific conditions and risks. Familiarise workers with the SWP and ensure it is strictly followed. The SWP should include conducting a visual inspection of the aircon support brackets for signs of damage and/or corrosion before starting work. Engage a trained aircon installer to replace the bracket if it has deteriorated.
- **Safe access to building exterior:** For work on the lower floors of a building, consider providing a safe means of access and proper work platform (e.g. by using a vertical personnel lift or erecting a tower scaffold) for aircon works.
- **Secure anchor point:** Air-con technicians often have to work at height outside the window as the condenser units are installed on brackets outside the building. The technicians will need an anchor point to secure their safety harnesses. Window grills are not designed to be load-bearing and therefore must not be used as an anchor point. The WSH Council recommends the following:
 - **Permanent anchor point:** Where feasible, consider installing a new permanent anchor bolt especially in situations where future access is expected. In some commercial or industrial buildings, an anchor sling or webbing may be used by wrapping around a structural element such as a building column.
 - **Temporary anchor point:** Where a permanent anchor point is unavailable, use a window/door jamb anchor (Figure 4) or a parapet wall anchor (Figure 5). Remember to follow the manufacturer's instructions when using such equipment.

As an employer, your duty is not just to provide the workers with a safety harness, you are also required to ensure that there is an anchor point for them to secure their lanyard to.



Figure 4: Example of a window/door jamb anchor with secure anchor point.

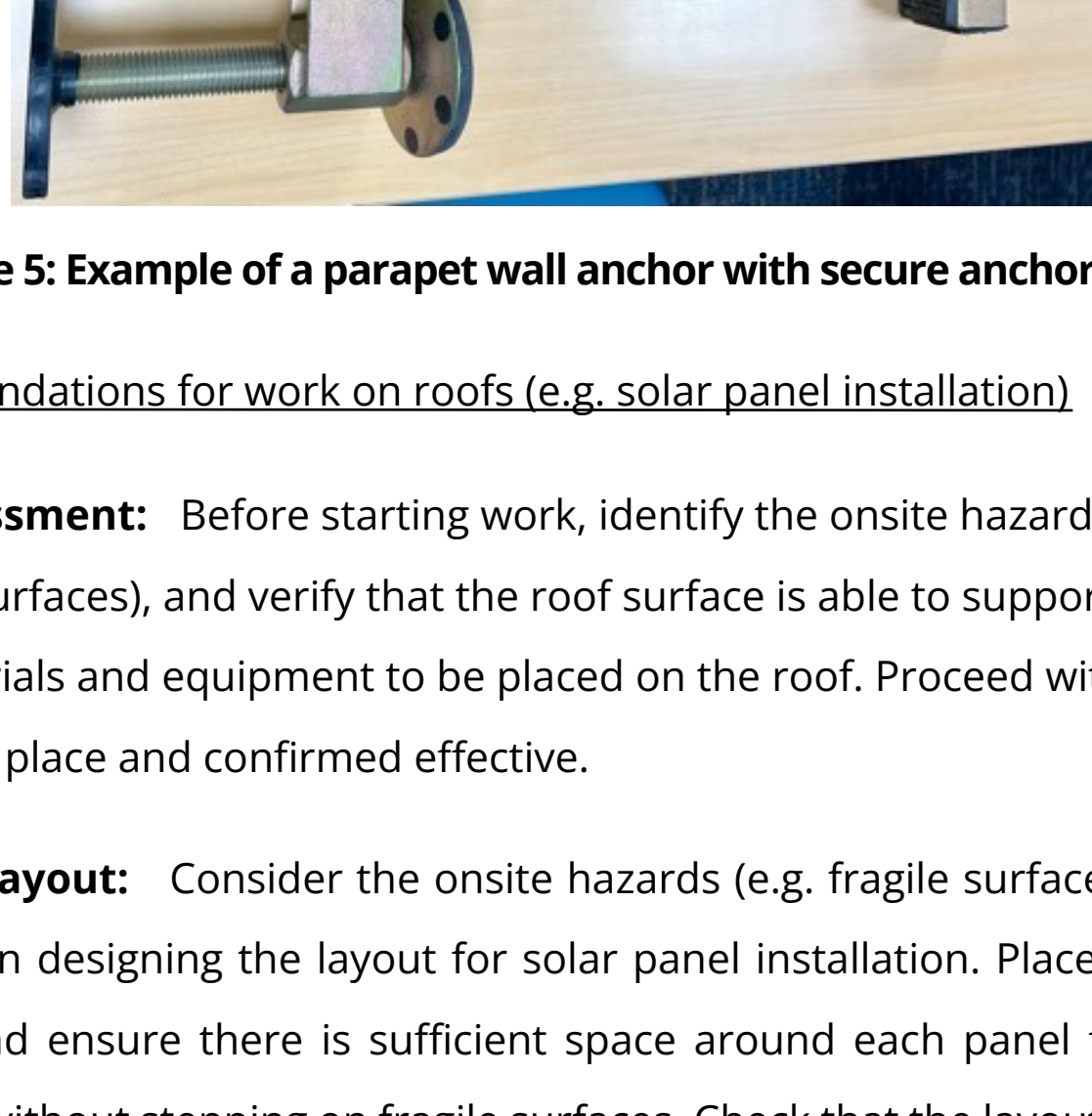


Figure 5: Example of a parapet wall anchor with secure anchor point.

Additional recommendations for work on roofs (e.g. solar panel installation)

- **Roof hazard assessment:** Before starting work, identify the onsite hazards (e.g. open sides, roof openings, fragile surfaces), and verify that the roof surface is able to support the weight of workers as well as all materials and equipment to be placed on the roof. Proceed with roof works only after risk controls are in place and confirmed effective.
- **Safe solar panel layout:** Consider the onsite hazards (e.g. fragile surfaces) and risk controls (e.g. guard railing) when designing the layout for solar panel installation. Place solar panels away from fragile surfaces and ensure there is sufficient space around each panel for workers to carry out installation works without stepping on fragile surfaces. Check that the layout of solar panels does not hinder the effectiveness of risk controls.
- **Physical protection from fragile surfaces:** Ensure workers do not step directly on fragile surfaces by:
 - Installing guard-rails around the fragile surface;
 - Installing a fall protection screen/safety cover (comprising a strong mesh panel placed over the fragile surface); or
 - Installing work platforms (e.g. crawler boards, walkways) over the fragile surface.
- **Hazard communication:** Identify and mark all fragile surfaces to alert workers of the existence of a fall-through hazard. Display warning signs at entry points to the work area. Install additional warning signs at specific location(s) where fragile surfaces are found. Instruct workers never to step directly on fragile surfaces.
- **Safety net:** As a last resort, safety nets may be deployed to catch any worker that falls through a fragile surface.

Additional recommendations for use of ladders

- **Use safer means of access:** Consider using a step platform ladder or suitable work platform especially if the worker has to use both hands (i.e. unable to maintain three-point contacts) to carry out the work at height. This is because the platform ladder or work platform provides more stability as compared to an A-frame or a leaning ladder.
- **Securing the ladder:** Instruct workers to place ladders only on firm, level and stable ground. A-frame ladders must be fully opened with its spreaders locked before use. A leaning ladder should be properly secured at the top and base of the ladder to prevent slippage.
- **Safe use of ladder:** Workers must be familiar with the hazards of working on ladders and are able to demonstrate the three-point-contact method when going up or down a ladder. Consider the safe handling of tools to be used while working at height on the ladder. The use of the tools should not compromise the stability of the worker such as over-stretching.

For more information, refer to the following:

Relevant Legislation

- Part IVA of the Building Control Regulations 2003
- WSH (Work at Heights) Regulations 2013

Ministry of Manpower Circulars

[WSH Circular: Safe Work at Heights at Completed Buildings](#)
[Circular on Safe Installation of Photovoltaic \(PV\) System](#)

Singapore Standards

- SS EN 131 Ladders

WSH Council Resources

- [Code of Practice for Working at Heights](#)
- [WSH Guidelines on Anchorage, Lifelines and Temporary Edge Protection Systems](#)
- [WSH Guidelines on Personal Protective Equipment for Work at Heights](#)
- [WSH Guidelines for Working Safely on Roofs](#)
- [Addressing WSH Risks for Safe Installation of Solar Photovoltaic Systems](#)
- [6 Basic WSH Rules for Working Safely on Roofs](#)
- [Ladder Safety Pack](#)
- [6 Basic WSH Rules for Safe Use of Ladders](#)
- [Activity Based Checklist on Safe Use of Ladders](#)

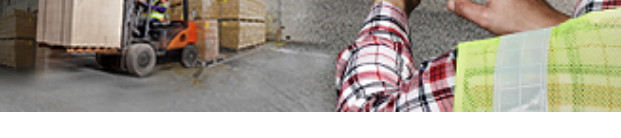


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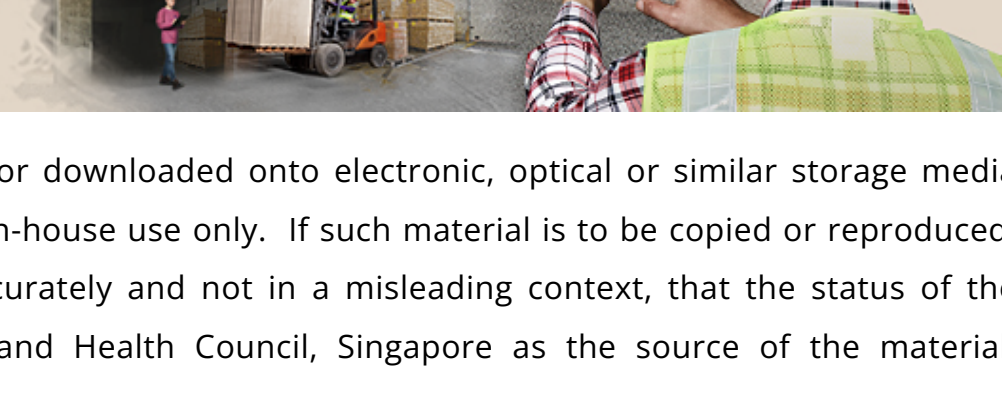
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