



GUIDE TO SAFE SOLAR PANEL INSTALLATION

SAFework NSW

FEBRUARY 2021



LET'S TALK SAFETY

Disclaimer

This publication may contain information about the regulation and enforcement of work health and safety legislation in NSW. It may include some of your obligations under some of the legislation that SafeWork NSW administers. To ensure you comply with your legal obligations you must refer to the appropriate legislation.

Information on the latest laws can be checked by visiting the NSW legislation website www.legislation.nsw.gov.au

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SafeWork NSW, 92-100 Donnison Street, Gosford, NSW 2250

Locked Bag 2906, Lisarow, NSW 2252 | Customer Experience 13 10 50

Website www.safework.nsw.gov.au

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1. INTRODUCTION

This guide has been developed by SafeWork NSW to provide the solar industry clear direction on controlling risk. The guide should be read in conjunction with the *Work Health and Safety Act 2011* & *Work Health and Safety Regulation 2017* and relevant Codes of Practice.

Installing solar photovoltaic systems (PV) exposes workers to risks of serious injury or death. Installers must manage the risks to maintain a safe place of work.

SafeWork NSW is the State's work health and safety regulator. We promote compliance with work health and safety (WHS) legislation by providing information, education and assistance on WHS matters to improve industry outcomes and ensure a fair and level playing field.

2. REQUIREMENTS FOR BUSINESSES IN THE SOLAR INDUSTRY

The solar installation industry includes system designers, manufacturers, solar retailers, installation contractors and clients. Under the work health and safety legislation these are known as a person conducting a business or undertaking (PCBU). A person conducting solar installations may hold multiple duty's under the legislation, for example the solar retailer may also be the installer.

System Designers

Solar photovoltaic (PV) system designers must consider the risks to worker health and safety for the installation and maintenance of the system. Where reasonably practicable systems should be installed a safe distance from fall and electrical hazards and allow for a safe means of access.

System Manufacturers

Solar PV system manufacturers must ensure that the system is manufactured to be without risk to health and safety of persons. For example, they must ensure adequate testing of the components, and that adequate information is provided to those installing the system as well as the users of the system.

Solar Retailers

Solar retailers market and sell solar PV systems. This may include advice on the system that best meets the customer needs. Solar retailers may allocate installation work 'in-house' or subcontract the work to contractors. If the sale of solar panels includes installation, the business must have systems in place to ensure the salesperson has sufficient knowledge to identify the safety controls that will be required to be costed in the quotation and incorporated into the installer's safe work method statement. Installation contractors must have sufficient knowledge, qualifications, equipment, skills and procedures to comply with safety practices. Solar retailers must have an adequate system and site audit to confirm that installation contractors are undertaking work safely.

Solar Installers

Installation staff or contractors are involved in the direct installation of solar PV systems. Installers must have sufficient knowledge, qualifications, equipment, skills and safe systems of work to comply with the work health and safety legislation. Installers must implement adequate supervision to ensure that workers are undertaking work safely.

Solar installation includes the installation of the solar components themselves, such as the panels and mounting rails. It also includes the installation of electrical equipment and wiring.

3. PLANNING FOR THE INSTALLATION

You must ensure that you have inspected the site prior to installation. This should be completed before providing a quotation, which will ensure that the quote includes the cost of required safety control measures such as temporary edge protection, scaffolding, EWPs, exclusion zones, access to the roof or mechanical lifting aids such as panel lifters.

By inspecting the site, you can then develop a site-specific safe work method statement which is also a legal requirement.

Some common hazards and risks are listed below:

- Working at heights:
 - access (both people and equipment)
 - falls from heights
 - falling objects
 - slippery glazed tiles or tiles with algae or moss deposits
 - roof pitch/slope
 - damaged roofing/fragile roofs/brittle roofing/skylights.
- Electrical:
 - discharge from uninstalled panels
 - electrical wiring, electrical fittings and electrical equipment
 - contact with overhead power lines or electrical cables, e.g. those located in the ceiling space under the roof.
- Asbestos:
 - inhalation of asbestos fibres
 - fragile/brittle roofing.
- Weather conditions:
 - time of installation
 - wet, cold, icy, windy or hot days.
- Hazardous manual tasks:
 - handling/moving panels
 - handling solar panel mounting kits.



4. SAFE WORK METHOD STATEMENTS

The installation of solar PV systems requires businesses to undertake high-risk construction work as it usually involves the risk of a person falling more than 2 metres and work near live electrical installations. You must ensure that the safe work method statement (SWMS) prepared for high-risk construction work includes the specific hazards, risks and control measures for the site you are working on. The SWMS should be developed in consultation with workers.

When working out the suitable control measures, consideration must be given to the hierarchy of controls. This ensures the highest level of protection is provided to protect the health and safety of workers and the public who may be affected by the work. You can access a sample SWMS template from the SafeWork NSW website (www.safework.nsw.gov.au) by typing 'safe work method statement' in the search bar.

5. HIERARCHY OF CONTROL

The most important step in managing risks involves eliminating the hazard, or if that is not reasonably practicable, minimising the risks so far as is reasonably practicable. When selecting controls you must consider various options and choose a control that most effectively eliminates the hazard or minimise the risks. This may involve a single control measure or a combination of different controls put together to provide the highest level of protection.

The ways of controlling risks are ranked from the highest level of protection and reliability to the lowest as shown in figure 1. This is known as the hierarchy of control and a business must work through this hierarchy when managing certain risks, for example falls from heights, electrical and manual handling risks.

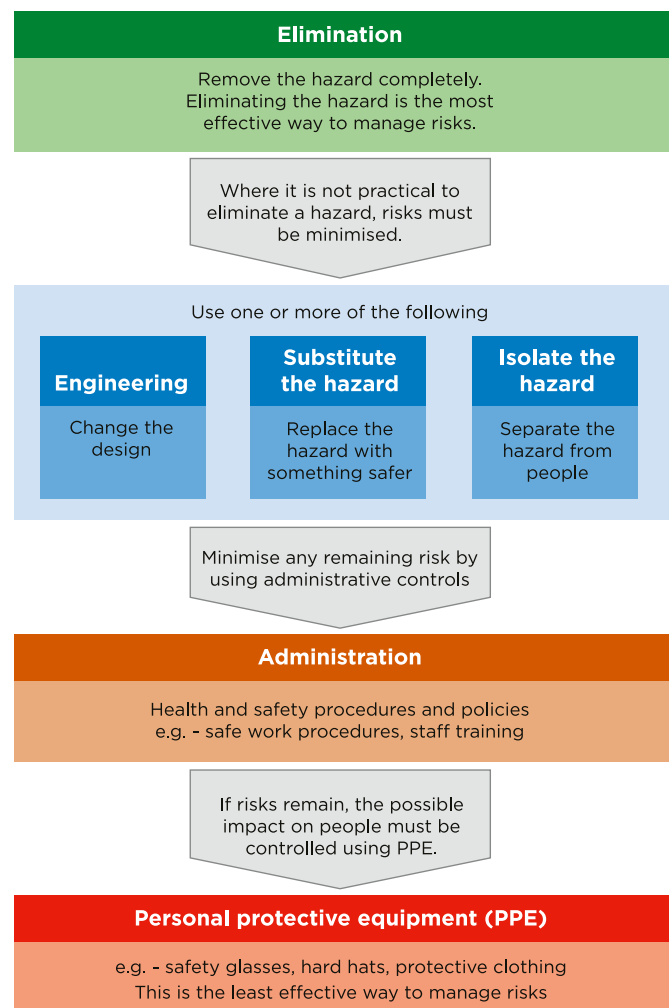


Figure 1: Safety hierarchy of control

6. SAFE INSTALLATION OF THE SOLAR PV SYSTEM

When conducting solar installations there are specific requirements that must be complied with during the installation.

The solar PV system installation must be carried out by a licenced electrician experienced in the specific work.

While installing the solar panels:

- use the identified control measures for eliminating or minimising the risk of falls from heights, and other hazards like asbestos
- follow the safe work procedures for installing the solar panels and supporting structures including following the manufacturer instructions
- ensure manufacturer requirements are followed when installing mounting points for the solar panels framing, considering the highest wind speeds for the region (refer to AS/NZS1170.2:2002 Structural design actions – Wind actions)
- ensure that external wiring is protected from UV rays
- ensure that mechanical protection of cables is provided in accordance with AS/NZS 3000 Australian/New Zealand Wiring Rules and AS/NZS 3008.1.1:2017 Electrical installations – Selection of cables
- ensure that risks associated with manual handling are controlled.

It is the electrician's responsibility to ensure a copy of the Certificate of Compliance – Electrical Work (CCEW) is provided:

- for any electrical work to the person (customer) for whom the work is carried out
- to the customer, distributor and Fair Trading for new electrical installations
- to the customer, distributor and Fair Trading for any alterations or additions to an existing electrical installation that will require additional work to be done in relation to the network connection for the installation
- to the customer, distributor and Fair Trading for work on a switchboard or associated equipment
- to the customer and Fair Trading for electrical installation work for an installation using a stand-alone power system
- to the customer and Fair Trading for installation, alteration or replacement of an electricity meter.

7. SITE SET-UP

An essential step in the risk management process is to ensure that risks associated with the worksite set-up are controlled for example:

1. Define the work area
2. Ensure materials delivery points are
 - a. reasonably level and suitable for unloading, and
 - b. where using a vehicle loading crane or elevated work platform, loading areas should be
 - i. reasonably level,
 - ii. able to support the use of the plant, and
 - iii. clear from overhead power and service lines.
3. Establish an exclusion zone to prevent unauthorised persons from accessing the work area. A way of achieving this is by erecting barrier tape attached to bollards and signage.
4. Work vehicles are parked in areas that minimise worker exposure to the risks of vehicular traffic.

8. ACCESSING THE ROOF

Safe access and egress to the roof must be established. You will need to consider the space available, the height, the size and shape of the panels and how they will be lifted, and how many persons need access.

For large installations, temporary scaffold stairways or a mobile scaffold are an efficient, cost-effective and safe option as a means of access. A competent person should install scaffold stairs in line with the manufacturer specifications and, if the scaffold is over 4 meters in height, a person who holds a scaffolding high risk work licence must install the scaffold.

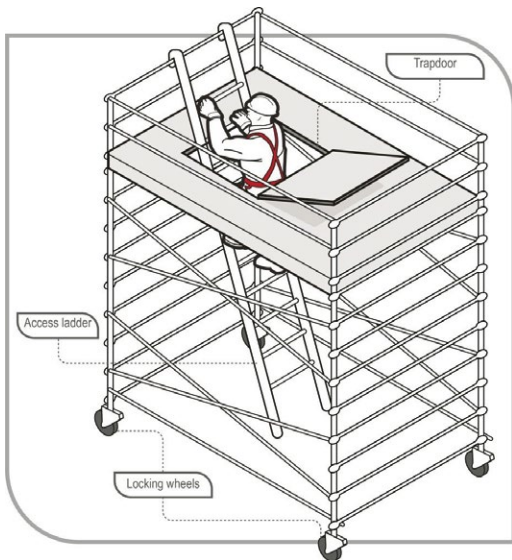


Figure 2: Mobile scaffold with access ladder and trapdoor

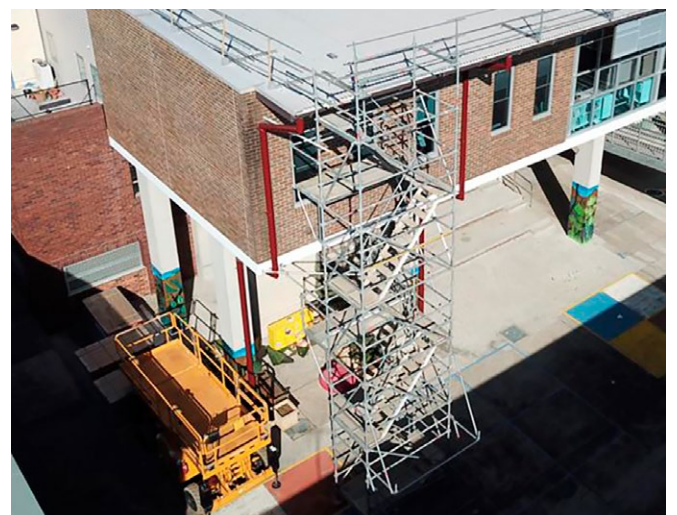


Image 1: An example of scaffold stairs

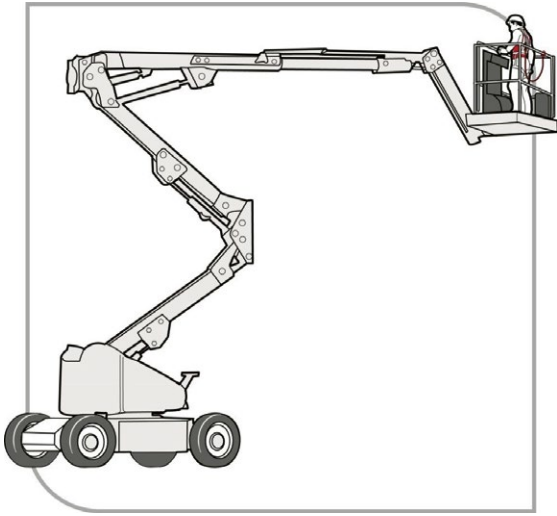


Figure 3: Boom-type elevating work platform

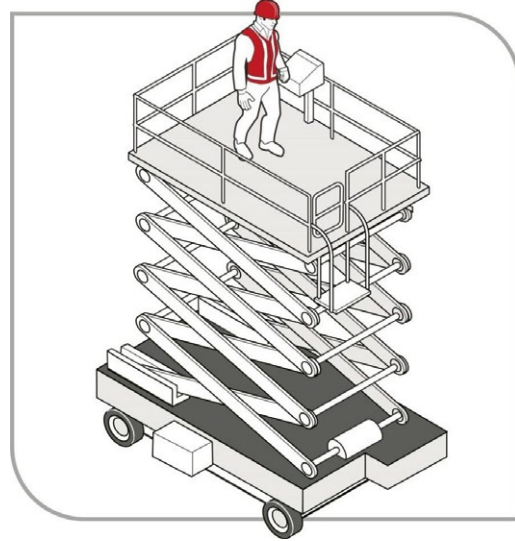


Figure 4: Scissor-lift elevating work platform

An elevating work platform (EWP) may also be a suitable means of access. When considering the use of an EWP as a means of access, you must ensure systems of work are in place to allow safe access from the EWP basket onto the roof surface, for example:

- roof surface can bear the weight of a person(s), loads and material to be used
- workers are not exposed to unprotected roof edges or voids when exiting or entering the platform. The step height from the EWP basket onto the roof should be no greater than 300mm.

For smaller works where temporary scaffolds or EWPs are not suitable, a mobile scaffold or ladder can be considered. When using a ladder, it can only be used for access/egress to the roof, not for transferring equipment or material such as panels and mounting equipment onto the roof. You must ensure that:

- the ladder meets Australian standards and the load requirements of the job
- the ladder has been inspected for damage before each use
- any workers using the ladder are physically capable of doing so
- the ladder is always set up on a flat, stable surface. If this isn't possible, then use a ladder that includes ladder safety devices like leg levellers, anti-slip gutter guards and stabilisers
- always maintain three points of contact when climbing or descending the ladder. This means two hands and one foot, or two feet and one hand
- the ladder extends 1 metre past the landing surface
- ladders must only be used for access/egress. The carrying of tools must be in a tool belt to enable the worker to keep both hands free when climbing or descending
- users never lean or reach away from the ladder while using it
- the combined weight of the person using the ladder and any items or tools should never exceed the working load limit on the ladder
- if you are using an extension ladder, ensure it is secured at the top, bottom or both. If this isn't possible, then have someone hold the ladder in place while in use
- extension ladders should be angled at a ratio of 1:4. That is, position the base of the ladder 1 metre away from the structure for every 4 metres of height
- do not climb or work past the second-last rung of a ladder and never straddle the top of an A-frame ladder
- when climbing down, remain facing the ladder and climb to the bottom rung before stepping off.

You should also consider installing a static line to minimise the risks of workers falling from the ladder.

Further information: video safety alert concerning [Ladders](#).

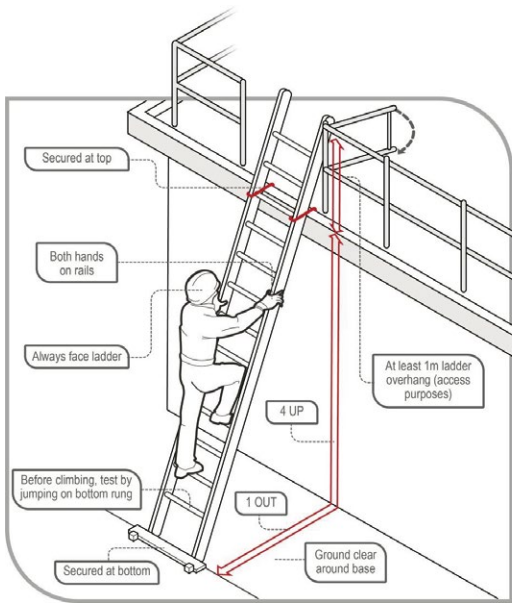


Figure 5: Example of acceptable ladder use

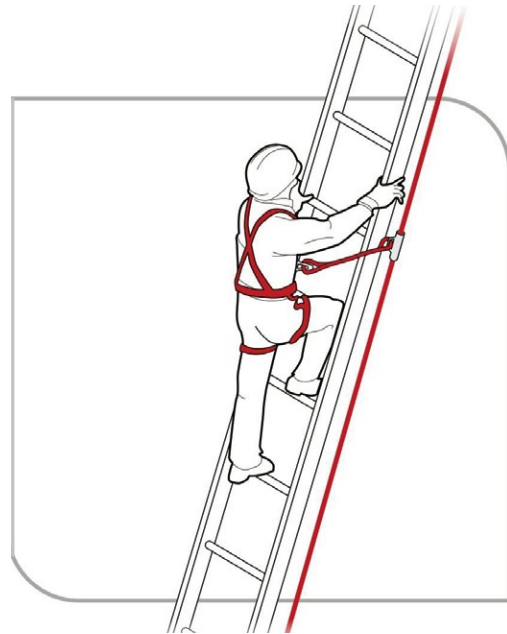


Figure 6: Anchorage line system for ladder use

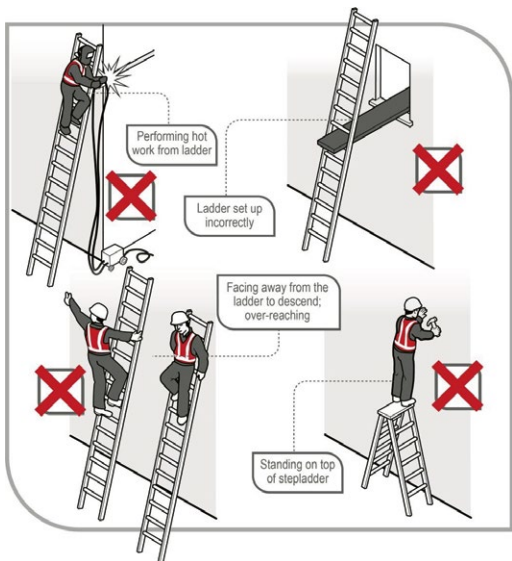


Figure 7: Examples of unsafe ladder use



Image 2: Base of ladder secured on lower level roof

8.1 INSTALLING FALL PREVENTION

Both falls from the edge of a roof and through a roof, such as fragile or brittle materials or skylights, must be considered.

Note: Skylights, or alsynate sheeting, are extremely hazardous falls risks for solar installers and have resulted in death.

Hierarchy of Control

Falls from roof edges must be controlled, and as a business you must ensure the hierarchy of control is applied when managing the risks of falls so far as is reasonably practicable. This means in the first instance you must consider the highest level of protection to keep your workers safe before using a lower order control. You can find further information on what reasonably practicable means on the SafeWork NSW website.

Controlling the risk of falls	Examples
In the first instance, a fall prevention device must be used. Only where it is not reasonably practicable to use a fall prevention device you can then consider...	A fall prevention device such as a scaffold, temporary edge protection or an elevating work platform (EWP)
↓	
...a work positioning system and if this is not reasonably practicable you can then consider...	A total restraint system
↓	
...a fall arrest system	Static lines, adjustable restraint lines, catch nets

Table 1: Controlling the risk of falls hierarchy with examples of fall protections

8.2 FALL PREVENTION DEVICES

Temporary edge protection is reasonably practicable and the most effective means of preventing falls from roof edges. This control can increase site productivity whilst also reducing risk to your workers, as opposed to using a harness.

Consideration should be given to edge protection systems installed from the ground where practicable.

Where edge protection is used it should comply with AS/NZS 4994.1:2009 Temporary edge protection – General requirements and should be erected in accordance with AS/NZS 4994.2:2009 Temporary edge protection – Roof edge protection – Installation and dismantling.

Where scaffold is used it should comply with AS/NZS 1576 Scaffolding general requirements and if there is risk of persons or an object falling more than 4 metres, it must be erected by a person who holds a scaffolding high risk work licence.



Images 3-6: Examples of temporary edge protection

Edge protection may be omitted (based on a risk assessment) only on roofs below 7-degree pitch where a 3 metre exclusion zone can be maintained. The exclusion zone must be a minimum of 3 metres from the roof edge or void and be delineated with a barricade. Safe access must be provided to the exclusion zone, for example elevated work platform, mobile scaffold or delineated walkway with secure ladder.



Image 7: Example of delineated exclusion zone

8.3 PREVENTING FALLS THROUGH BRITTLE/FRAGILE ROOF MATERIAL INCLUDING SKYLIGHTS

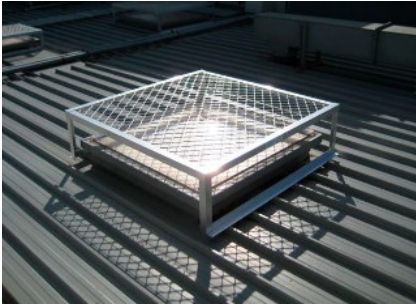
Prior to work commencing an assessment must be made by a competent person regarding the roof material and whether the roof can bear the weight of persons, materials and equipment used as part of the solar installation. You must assume that the roof is fragile unless confirmed otherwise by the competent person.

Consideration needs to be given to the following:

- the location of polycarbonate or plastic commonly used in skylights
- roof lights, particularly those in the roof plane that can be difficult to see in certain light conditions or when hidden by paint
- fibre cement sheets
- alsynite or similar
- glass, including wired glass
- slate
- corroded fasteners
- rotted timbers
- significant deformation of the roof.

If there is a risk of falling through a roof surface, additional protection must be provided. This may include:

- an elevating work platform so workers can avoid standing on the roof itself
- physical barriers such as guard rails
- covers that are secured and labelled with a warning, e.g. formply with a warning sign or fixed steel mesh
- barricaded exclusion zones at least 3 meters from the void
- walkways or crawl boards of a suitable size and strength
- staging on the roof surface to spread the load(s)
- safety mesh (refer to AS/NZS 4389:2015 Roof safety mesh).



Images 8-10: Examples of physical barriers to manage risks of falling through skylights and brittle roof material.

8.4 WORK POSITIONING SYSTEMS

If it is not reasonably practicable to provide physical edge protection, a work positioning (harness) system may be used. A work positioning system requires correct design and reliance on user behaviour to ensure its effectiveness.

Total restraint technique always physically prevents a fall hazard from being reached. The system cannot be incorrectly adjusted, disconnected during use or have parts interchanged; for example, the user connects a device to a static line at the point of entry, the device cannot be removed from the static line until the user either reaches the endpoint or moves back to the entry point, the lanyard is a fixed length and cannot be adjusted.

8.5 FALL ARREST SYSTEMS

Only if it is not reasonably practicable to provide physical edge protection or to use a work positioning system may a fall arrest system be considered.

In most single storey residential homes the roof height will not provide enough clearance to the ground to enable a fall arrest system to activate appropriately and, therefore, a fall arrest system cannot be safely used.

When using a fall arrest system, you must develop an emergency plan including rescue procedures in relation to fall arrest. These procedures must be tested to ensure they are effective, and you must provide adequate information, training and instruction to workers in relation to the rescue procedures.

Restraint technique uses a fall arrest system with an adjustable lanyard. The system design and setup must prevent a user from reaching a fall hazard. The system usually requires multiple anchors to cover the working area and requires the user to install and connect to the anchors as they traverse the entire work area, keeping their lanyard adjusted to prevent them from reaching a fall hazard. These systems rely heavily on worker behaviour to ensure effectiveness and often fail due to incorrect setup or application.

When implementing a restraint technique, the system of work should include the following:

A documented plan which shows:

- the system layout
- access points including method, i.e. scaffold stairs, ladder
- all fall hazards such as edges, skylights, polycarbonate roof sheets
- anchor point locations and the number of anchors required
- the radius of travel from the anchor in relation to the fall hazards.

Documented equipment registers which show:

- equipment type, serial number, date of last inspection and date of withdrawal
- evidence that the equipment being used is rated for fall arrest
- the type and length of lanyard being used that is attached to rope grab and rear dorsal of the harness
- anchor types, the fall arrest rating per anchor and the number of screws and type required to secure the anchor to the roof in accordance with manufacturers specifications.

A business must be able to demonstrate this information when a SafeWork NSW Inspector attends the site. This information will assist with determining compliance in relation to the work positioning system being used. Workers must be provided information training and instruction in relation to the use of these systems.

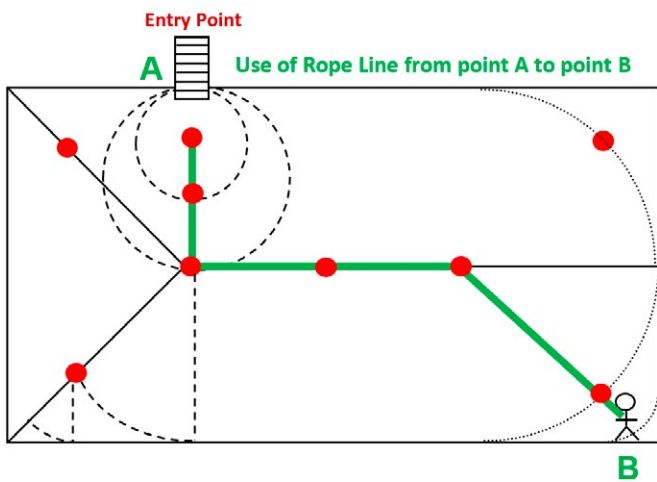


Figure 8: Example of an anchor plan

9. ELECTRICAL RISKS

The installation of solar PV systems exposes workers to serious risks of electric shock or electrocution. It is important to ensure electrical work is conducted by someone holding an electrical contractor licence, or an electrical qualified supervisor certificate or under the supervision of a person who holds an electrical qualified supervisor certificate issued by NSW Fair Trading. Further information can be found by visiting the [NSW Fair Trading website](#).

Before starting any solar installation work, you must ensure that you turn off and isolate all electricity being supplied to the property at the main switch board. You should also take steps to prevent the electricity from being turned back on while work is in progress, known as lock-out/tag-out (LOTO).

Once electricity is isolated you must determine that the electrical equipment is de-energised, also known as testing for dead. By switching off the power at the meter box, the electricity supply from the street to the meter box will remain live. This includes overhead service lines and the consumer mains from the point of connection to the property into the switch board. Steps must be in place to prevent workers from coming in contact with these services.

Before entering any ceiling space:

- identify and confirm all sources of electricity to the property. There may be more than one source or multiple properties powered from the same meter box
- identify any hazards that may be introduced as a result of isolating the power to the affected property
- switch OFF all power at the electricity meter box and place a lock on the MAIN SWITCH or on the meter box itself. This will prevent inadvertent re-energisation. If it is not reasonably practicable to use a lock, use a recognisable lock-out tag
- for workers entering the ceiling space, always “test for ‘dead’ before you touch” – before undertaking any electrical work.

When using electrical equipment, ensure that:

- workers are trained in its safe operation as per the manufacturer instructions
- workers are provided with the appropriate personal protective equipment (PPE) such as eye protectors/face shields and safety footwear.

Consideration should be given to the use of cordless power tools during the install. Ensure all portable electrical equipment is:

- inspected, tested and maintained regularly
- used in conjunction with a 30mA Residual Current Device (RCD or safety switch)
- visually inspected for damage before use
- not located in wet places
- not dragged over sharp edges on metal sheeting.



Image 11: Example of main electrical switch with lock



Image 12: Testing before you touch



Image 13: Testing for dead

10. OTHER RISKS

10.1 WORKING IN CEILING VOIDS

When workers are required to access the ceiling voids, consideration needs to be given regarding the risks associated with this space. For example:

- heat stress
- electric shock
- electrocution
- falling through the ceiling
- inhalation of roof insulation fibers.

The following controls can be implemented to manage the risks:

To avoid electrocution:

- switch off the electricity supply to the whole area before you touch, move or physically disturb any electrical wiring, cable or junction box connection
- always seek the services of a competent, such as an electrician
- only attempt electrical work or tasks where you have the required skills or qualifications.

To avoid heat-related illness:

- determine entry time - for example, early morning or by assessing the temperature before entering the space
- ensure sufficient cool drinking water is available to ensure workers remain hydrated
- ensure all workers are trained in heat-risk awareness and how to recognise heat stress symptoms in themselves and their workmates.

Other safety considerations include:

- using crawl boards to walk across the ceiling space
- ensuring your entry and exit points are easily accessible
- stabilising and securing ladders to avoid slipping when being used
- using appropriate personal protective equipment (PPE).

10.2 HANDLING

The handling of solar panels and the components that form the solar PV system is a hazardous manual task, as the task can expose workers to a musculoskeletal disorder.

The handling of solar panels and associated installation materials can also create falls risks where handling processes are insufficient. The carrying of panels by workers up ladders is not a safe system of work and must not be conducted.

To minimise the risks of workers sustaining a musculoskeletal disorder, consideration should be given to the hierarchy of control for example:

- using a panel lifter
- using a mobile crane
- using a scissor lift
- using a winch and davit arm from a scaffold.



Image 14: Example of a panel lifter

10.3 ASBESTOS

UNDER NO CIRCUMSTANCE CAN HIGH PRESSURE WATER SPRAY OR COMPRESSED AIR BE USED ON ASBESTOS CONTAINING MATERIAL

Asbestos containing material may be located in a number of work locations where solar installations may occur, this includes:

- roof and wall sheeting, ridges, barge capping, gutters, eaves and downpipes
- electrical backing boards and some fuses and conduits in switchboards
- ceiling spaces (insulation, pipe lagging, delamination of roof).

It is recommended that asbestos containing material that is likely to be disturbed be removed and replaced with non-asbestos materials prior to installation of the solar system.

Asbestos containing roof sheets can be brittle, slippery and in poor condition.

The use of power tools or any equipment that causes the release of airborne asbestos into the atmosphere is not permitted unless the equipment is controlled.

The installation of solar panels requires the fixing of multiple screws that require drilling through the corrugated asbestos sheeting. The use of power tools or other equipment can cause breakage and contaminate the ceiling space.

The use of local exhaust ventilation or shadow vacuuming with a low speed drill and H Class HEPA vacuum may not be reasonably practicable. The roof sheeting is corrugated and local exhaust ventilation may not be effective. Shadow vacuuming may not capture dust and debris falling into the ceiling space.

Persons undertaking work with asbestos must have the following:

- asbestos awareness training (minimum) that includes identification, safe handling and suitable control measures in particular to the installation of solar panels and with asbestos containing backing electrical boards
- asbestos PPE (minimum half-face P2 respirators, disposable type 5 category 3 coveralls, gloves and appropriate footwear that prevents slips (double bagged after use for any future asbestos use)
- appropriate tools and equipment (low speed drill fitted with local exhaust ventilation, Class H HEPA vacuum, 200micron plastic bags and drop sheets)

- health monitoring for all workers who carry out ongoing asbestos-related work
- safe work method statement which includes all high-risk activities involved (asbestos, heights, gas, electrical, confined spaces, mobile plant).

Any removal of over 10 sq metres of non-friable asbestos material or any amount of friable material MUST be undertaken by a licensed asbestos removalist. A class A licensed removalist can remove any amount of friable and non-friable asbestos material whilst a Class B licensed removalist can only remove non-friable asbestos material.

A clearance certificate should be obtained by the solar panel installer prior to commencing work if licensed asbestos removal has occurred.

10.4 INFORMATION, TRAINING, INSTRUCTION AND SUPERVISION

A business must ensure workers are provided with adequate information, training and instruction regarding the work activities they are required to undertake.

When providing information, training and instruction consideration must be given to the:

- nature of the work carried out by the worker. For example, whether the task is of a high-risk nature such as working at heights or electrical work
- risks associated with the tasks such as falls, electric shock or asbestos exposure
- control measures implemented, such as scaffold, roof rail, isolation and testing for dead, and/or removal of asbestos containing material before workers commence work.

When providing training, the training must be provided by a competent person and in a way that the worker can readily understand. This could be conducted internally or through a registered training organisation. Examples of related training include RIIWHS204D – Work Safely at Heights and 10314NAT Course in asbestos awareness.

Training must be specific for the site, tasks and equipment being used.

You must also consider adequate supervision. This means that there is a person on site who has the required skills, knowledge, experience and training to ensure work is being conducted safely.

Supervising workers ensures that your safety process are correctly followed.

The level of supervision required depends on the:

- level of risk in the job – e.g. falls from heights, contact with electricity
- experience of the worker – e.g. apprentice or 10 years on the job
- skills of the worker – e.g. how often the person has conducted the task prior
- existing controls – e.g. higher order controls such as temporary edge protection, opposed to harness based systems.

High level supervision is necessary when:

- inexperienced or new workers are expected to follow new systems or carry out difficult and high-risk tasks
- using controls which rely on human behaviour, such as keeping a lanyard correctly adjusted and remaining clipped on when using a harness based system.

An effective supervisor may not always be the person who has the most experience or holds a certain qualification. Some examples of the skills and attributes required to be an effective supervisor are a person who:

- is an advocate for safety
- is intentional and purposeful in prompting safety
- leads by example.

11. FURTHER INFORMATION

SAFETY INFORMATION

- [Solar panel photovoltaic \(PV\) installations](#) – SafeWork NSW web page
- [Housing Industry Site Safety Pack](#) – residential construction guidance including templates to help you to meet your work health and safety responsibilities (e.g. SWMS, toolbox talk)
- Checklist – [Construction falls from heights principal contractor safety checklist](#)
- [Safe Work Method Statement template](#)
- [Ladders](#) – SafeWork NSW web page
- [Work near overhead powerlines – the basics](#)
- [Safety alerts](#) – SafeWork NSW website, including solar incidents

CODES OF PRACTICE

- [Managing the risk of falls in housing construction](#)
- [Managing the risk of falls at workplaces](#)
- [Managing electrical risks in the workplace](#)
- [Work near overhead powerlines](#)
- [Hazardous Manual Tasks](#)
- [How to Manage and Control Asbestos in the Workplace](#)
- [How to Safely Remove Asbestos](#)

AUSTRALIAN STANDARDS

- AS/NZS3000:2018 Electrical Installations (AUS/NZ Wiring Rules)
- AS/NZS 1170.2011(R2016) Structural Design Actions – Wind Actions
- AS/NZS 4994.1.2009 Temporary edge protection – General requirements
- AS/NZS 3760:2010 In-service safety inspection and testing of electrical equipment
- AS/NZS 1576.1.209 – Scaffolding – General requirements
- AS 4576:2020 – Guidelines for scaffolding

OTHER GOVERNMENT AND NOT-FOR-PROFIT ORGANISATIONS

- NSW Fair trading – government consumer rights and trader compliance regulator including for [installing solar panels](#) and [certificate of compliance for electrical work](#). Also see www.fairtrading.nsw.gov.au
- NSW Department of Planning, Industry and Environment. Also see www.planning.nsw.gov.au
- Clean Energy Council – Also see www.cleanenergycouncil.org.au

For further information about how to work safely when installing solar panels, see www.safework.nsw.gov.au or call 13 10 50.



APPENDIX 1: EXAMPLE OF THE SOLAR INSTALLERS SAFETY CHECKLIST



SOLAR INSTALLERS SAFETY CHECKLIST

Businesses that sell, design and install solar systems have duties to provide and maintain a working environment that is safe and without risk to health and safety, so far as is reasonably practicable.

This checklist can help you prepare and plan for the safe installation of photovoltaic solar systems.

This checklist is not exhaustive and should be used in conjunction with the *SafeWork NSW Guide to Safe Solar Panel Installation*, relevant codes of practice and the SafeWork NSW solar installers video safety alerts risks of falls and electrical risks.

Solar installers face on-the-spot fines of up to \$720 for individuals and \$3,600 for businesses for not protecting workers from falls from heights and electrical risks.



Name: _____ Date: _____ Time: _____

Site Address: _____

Preparation and the working environment		
	Y	N
Workers have been consulted regarding site specific information/controls e.g. toolbox talk	<input type="checkbox"/>	<input type="checkbox"/>
An exclusion zone has been established around the work area, to prevent unauthorised persons, such as the homeowner, neighbours or children, accessing work areas	<input type="checkbox"/>	<input type="checkbox"/>
Electrical work is being undertaken or appropriately supervised by a licenced electrician i.e holds the correct Fair Trading licence	<input type="checkbox"/>	<input type="checkbox"/>
A site-specific <u>safe work method statement</u> has been prepared for high-risk construction work e.g. addressing falls and electrical risks	<input type="checkbox"/>	<input type="checkbox"/>
An <u>emergency plan</u> has been prepared for roof works and is site-specific	<input type="checkbox"/>	<input type="checkbox"/>
Workers have been trained in working at heights, applying SWMS, emergency response procedures and other skills, as required	<input type="checkbox"/>	<input type="checkbox"/>
Workers have been provided with <u>sun-safety</u> equipment e.g. hats, sunscreen, long sleeved shirts, sunglasses	<input type="checkbox"/>	<input type="checkbox"/>

Managing the risks of falls		
	Y	N
Safe access and egress is available to the roof e.g. <u>ladder</u> is fixed at the top along with anti-slip gutter guards and stabilisers and leg levellers as required, secured at the base and extends 1-metre past access point	<input type="checkbox"/>	<input type="checkbox"/>
A perimeter scaffold system has been installed as the highest order control for falls	<input type="checkbox"/>	<input type="checkbox"/>
A fall prevention device (e.g. scaffold or temporary edge protection such as roof rails) has been installed to control the risk of falls	<input type="checkbox"/>	<input type="checkbox"/>
Consideration has been given to a roof rail system that can be installed from the ground	<input type="checkbox"/>	<input type="checkbox"/>
If scaffold or roof rail has not been installed, the reasons why it is not practicable to do so have been recorded and able to be produced	<input type="checkbox"/>	<input type="checkbox"/>
Adequate processes and controls are in place to prevent a fall through brittle/fragile roof materials and identified in the site-specific SWMS e.g. skylight covers, roof mesh, physical barrier	<input type="checkbox"/>	<input type="checkbox"/>

Managing the risks of harness-based work		
Note: harness-based systems should only be considered if it is not reasonably practicable to install a fall prevention device e.g. scaffold or temporary edge protection such as roof rails.	Y	N
A plan/diagram has been drawn that shows the system layout e.g. access point, anchor point locations, location of fall hazards	<input type="checkbox"/>	<input type="checkbox"/>
The system design allows the worker to connect on to the system prior to stepping off the ladder	<input type="checkbox"/>	<input type="checkbox"/>
The system prevents the worker from reaching a falls hazard (edge or fragile roof surface) when correctly adjusted i.e. physically prevents worker reaching a position where they can fall	<input type="checkbox"/>	<input type="checkbox"/>
Proprietary anchor points are installed in accordance with manufacturer's instructions, including the number/type of fixings	<input type="checkbox"/>	<input type="checkbox"/>
Improvised anchor points (e.g. rafters, beams, trees) have been assessed by a competent person to ensure they are clearly structurally adequate i.e. 15kN single person, 21kN two person.	<input type="checkbox"/>	<input type="checkbox"/>
All fall arrest equipment is within service date and inspected prior to use	<input type="checkbox"/>	<input type="checkbox"/>
Users are installing multiple anchors to cover the working area and remain connected to the anchors as they traverse the work area	<input type="checkbox"/>	<input type="checkbox"/>
Workers are wearing the harness correctly e.g. leg loops attached, harness firm and orientated correctly	<input type="checkbox"/>	<input type="checkbox"/>

Managing electrical and installation risks		
	Y	N
Before workers enter a ceiling space or drill into walls, electricity to the property is switched OFF at the meter box	<input type="checkbox"/>	<input type="checkbox"/>
A lock has been placed on the main switch or the meter box itself i.e. lock-out/tag-out procedure 'LOTO'	<input type="checkbox"/>	<input type="checkbox"/>
Authorised electrical workers are testing for dead to ensure power is isolated prior to conducting electrical work (consider alternate power sources)	<input type="checkbox"/>	<input type="checkbox"/>
Prior to isolation all potential hazards that may be introduced after electrical isolation, such as loss of lighting, life support systems, have been identified	<input type="checkbox"/>	<input type="checkbox"/>
The risks of energised consumer mains prior to the meter box are adequately controlled i.e. cables in wall/roof/ceiling space need an exclusion zone established or isolated if required	<input type="checkbox"/>	<input type="checkbox"/>
The risks associated with overhead powerlines have been adequately controlled (as these will be live even after meter box isolation) e.g. maintain safe approach distances	<input type="checkbox"/>	<input type="checkbox"/>
Damaged or aged wiring and appliances within ceiling spaces/surrounds have been adequately controlled e.g. identified, isolated where possible and reported to owner	<input type="checkbox"/>	<input type="checkbox"/>
Solar panel isolators are terminated prior to panel installation	<input type="checkbox"/>	<input type="checkbox"/>
If the job has been completed the electrical certificate of compliance (CCEW) has been issued by the electrical installer	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

