



Government of Western Australia
Department of Mines, Industry Regulation and Safety
WorkSafe



Guidance note

Working in roof spaces

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commission
for occupational
safety and health

Foreword

This guidance note is issued by the Commission for Occupational Safety and Health (the Commission) under the *Occupational Safety and Health Act 1984* (the OSH Act).

The OSH Act establishes the tripartite Commission, which consists of representatives of employers, unions and government, as well as experts. The Commission has the function of developing occupational safety and health legislation and supporting guidance material, and making recommendations to the Minister for Commerce and Industrial Relations for their implementation. To fulfil its functions, the Commission is empowered to establish advisory committees, hold public inquiries, and publish and disseminate information.

The Commission's objective is to promote comprehensive and practical preventive strategies that improve the working environment of Western Australians. This guidance note has been developed through a tripartite consultative process, and the views of employers and unions along with those of government and experts, have been considered.

The following information is provided as background to understanding this guidance note.

Legislative framework for occupational safety and health

The Occupational Safety and Health Act 1984

The OSH Act provides for the promotion, co-ordination, administration and enforcement of occupational safety and health in Western Australia. It applies to all industries with the exception of mining and petroleum.

With the objective of preventing occupational injuries and diseases, the OSH Act places certain duties on employers, employees, self-employed people, manufacturers, designers, importers and suppliers.

The broad duties established by the OSH Act are supported by a further tier of statute, commonly referred to as regulations, together with lower tiers of non-statutory codes of practice and guidance notes.

Occupational Safety and Health Regulations 1996

The Occupational Safety and Health Regulations 1996 (OSH Regulations) have the effect of spelling out specific requirements of the legislation. They may prescribe minimum standards and have a general application, or define specific requirements related to a particular hazard or type of work. They may also allow licensing or granting of approvals and certificates.

Guidance notes published by the Commission

A guidance note is an explanatory document issued by the Commission providing detailed information on the requirements of legislation, regulations, standards, codes of practice or matters relating to occupational safety and health.

Authority

This Guidance Note has been issued by the Commission under section 14 of the OSH Act.

It applies to all employers of workers and workers performing work for reward in the roof space of buildings constructed or used as residential premises. This Guidance Note applies to all type of work requiring access to the roof space such as carpentry, plumbing, pest control, installation of ceiling insulation, solar panels, air-conditioning systems, security systems and builders in general. It also applies to electrical work.

Disclaimer

Information in this publication is provided to assist you in meeting your occupational safety and health obligations. While information is correct at the time of publication, readers should check and verify any legislation referenced in this publication to ensure it is current at the time of use.

Changes in law after this document is published may impact on the accuracy of information. The Commission provides this information as a service to the community. It is made available in good faith and is derived from sources believed to be reliable and accurate at the time of publication.

Definitions

“building” means a Class 1, Class 2 or Class 10a building as classified under the Building Regulations 2012.

“competent person”, in relation to the doing of anything, means a person who has acquired through training, qualification or experience, or a combination of those things, the knowledge and skills required to do that thing competently.

“roof space, of a building” (a) means the space in the building that is (i) immediately underneath the roof; or (ii) if there is a ceiling under the roof, or a part of the roof, the space between the roof, or that part of the roof, and the ceiling. Roof space does not include an attic in the roof space.

“service apparatus” has the meaning given in the *Electricity Act 1945* section 5(1).

“consumer’s mains cable” includes the electrical equipment (such as cables, fuses, and electrical meters) that connect a consumer’s electrical installation to a nearby electricity distribution network, at the main switch(es) of the installation.

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1. Introduction

Between 2013 and 2016, two electrical workers died in roof spaces of domestic dwellings in Western Australia.

The hazards of working in roof spaces have also been highlighted in the Report of the Royal Commission into the Home Insulation Program (HIP). Three of the four fatalities of workers involved in the installation of insulation under the HIP were caused by electrocution, which would have been prevented if the main switch had been turned off prior to entry to the roof space. None of these workers were conducting “electrical work”.

Workers in roof spaces can be inadvertently exposed to energised electrical installations whether they are carrying out electrical work or not.

The legislation now requires that all workers performing work for reward at “domestic-type” premises, turn off all sources of electricity by opening the main electricity switch(es) at the main switchboard before entering the premise roof space.

1.1 What does the legislation say?

All workers, including persons who undertake electrical work and persons who do not undertake electrical work, **shall not enter** in a roof space of a Class 1, Class 2 or Class 10a building, unless the building’s electrical installation, other than any service apparatus, is de-energised and isolated.

This applies to all work undertaken in the space in the building that is:

- (i) immediately underneath the roof; or
- (ii) if there is a ceiling under the roof, or a part of the roof, the space between the roof, or that part of the roof, and the ceiling.

It does not include work undertaken in a habitable part of a roof space, such as an attic.

This is prescribed in r. 3.59B of the OSH Regulations.

OSH Regulations - r. 3.59B (2)

A person who, at a workplace, is an employer, the main contractor, a self-employed person, a person having control of the workplace or a person having control of access to the workplace must ensure that, before work is done in a roof space of a building at the workplace, the building’s electrical installation, other than any service apparatus, is de-energised and isolated by a competent person.

OSH Regulations - r. 3.59B (3)

An employee must not do work in a roof space of a building at a workplace unless the building’s electrical installation, other than any service apparatus, is de-energised and isolated by a competent person.

OSH Regulations - r. 3.59B (4)

If the roof space of a building to which sub-regulation (2) or (3) applies is divided into separate parts, such that a person cannot move from one part of the roof space to another without first exiting the roof space, and each part relates to a separate dwelling, the requirement to de-energise and isolate only applies to the part of the dwelling that relates to the part of the roof space in which the work is to be done.

1.2 Applicable buildings

The legislation applies to work undertaken in the roof spaces of Class 1, Class 2 or Class 10a building as classified under the Building Regulations 2012. The applicable buildings are:

- Class 1a - A single dwelling being a detached house, or one or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit.
- Class 1b - A boarding house, guest house, hostel or the like with a total area of all floors not exceeding 300m², and where not more than 12 reside, and is not located above or below another dwelling or another Class of building other than a private garage.
- Class 2 - A building containing 2 or more sole-occupancy units each being a separate dwelling.

- Class 10a - A private garage, carport, shed or the like

Buildings that were constructed as Class 1, Class 2, or Class 10a buildings and have been repurposed for other uses (such as a medical practice or retail outlet) are also covered under these regulations.

Commercial buildings, shopping centres and other building specifically designed for such purposes are not included.

1.3 Attics and roof spaces

Electrical installation in the roof space of domestic-type dwellings pose a greater hazard than installations elsewhere as they have greater exposure to the environment, are more likely to intersect with metal fittings such as pipes, are subject to greater wear and tear, and may have been modified in unanticipated ways. The prohibition in the new legislation is intended to remove the risks posed by aged, damaged or improperly installed installations.

What is a roof space?

Most roof spaces in residential premises constitute the space between the ceiling of the top floor and the roof. Even where there is only sufficient space to reach in to conduct the work (particularly for shallow eaves) there is a risk of shock, and the electrical installation should be de-energised to remove the hazard.

There may be some circumstances (e.g. renovations) where all or part of the roof is to be removed. The hazard of an energised, and potentially damaged electrical installation, still exists in these circumstances. In these circumstances, the exposed areas should continue to be considered a roof space for the purpose of these regulations.

Renovations may also constitute construction work which is covered by other requirements in the OSH Regulations.

What is an attic?

Attics are rooms in a roof space suitable for human habitation or storage. A properly constructed attic will have floors and walls that provide suitable barriers between the electrical installation and any potential occupants and are not considered part of the roof space.

2. Carrying out work in the roof space

Employers must ensure they provide the necessary tools and equipment (including adequate lighting, power tools etc.) to their employees to facilitate working in roof spaces with the main switch(es) off.

Considerations to be made when carrying out work in roof spaces include:

- ensuring someone is aware of where you are and contact with them is maintained until work is completed;
- being aware that heat and humidity may cause heat stress, so making sure fluid intake is sufficient to ensure you do not become dehydrated;
- taking additional lighting (e.g. torch) with you as the lighting is generally poor in roof spaces;
- taking care accessing and traversing the work area, avoiding tripping over debris, material and the ceiling trusses;
- stepping carefully on joists or other beams – not the ceiling material (i.e. Gyprock sheeting and steel ceiling battens) – to avoid risk of falling or injury;
- using/providing appropriate tools – preferably manual or battery operated tools;
- being aware of the location of electrical cables, fittings and equipment and avoiding contact with them;
- ensuring that, if fixing points are required (e.g. saddling TV aerial cable in place), fixings are well clear of all electrical cables and equipment;
- making sure you do not damage any electrical cables or electrical equipment. If any electrical cable or equipment is damaged, consult with the owner and engage a licensed electrical contractor to inspect the installation;
- wearing appropriate, well maintained and correctly-fitted personal protective equipment when working in dusty roof spaces, including: a half-face (class P1 or P2) disposable particulate respirator, in accordance with AS/NZS 1715:2009 *Selection, use and maintenance of respiratory protective equipment*, a head covering and eye protection;
- being aware of the possible presence of asbestos fibres in older buildings;
- wearing long-sleeved, loose-fitting clothing and gloves, to minimise skin contact with insulation material;
- wearing appropriate fully enclosed footwear;
- keeping your work areas clean and clear of fibres and dust and placing waste in bags capable of containing the dust; and
- being aware of the hazards posed by other services (such as plumbing).

2.1 Electrical hazards in roof spaces

Electrical hazards include:

- Exposed live electrical conductor/wiring.
- Unenclosed joints in conductors (i.e. no connection boxes).
- Electrical connections where the condition of wiring has deteriorated (often associated with older buildings).
- Unused wiring left in the roof space that could be still connected to the switchboard (i.e. not disconnected).
- Past electrical work not performed by a competent person which could be sub-standard and unsafe.
- Solar Array DC and Service AC Cabling - Cabling carrying significant DC voltage from solar arrays to inverters may travel through roof spaces in a way that does not comply with the Wiring Rules and other regulations requiring that they be clearly marked, appropriately fastened and protected by conduit to avoid contact. Many of these existing arrays cannot be isolated at the source and DC cabling remains live to the switchboard during daylight hours. Roof spaces may also contain AC cables running to the switchboard which remain live (e.g. consumer's mains cable not installed in conduit).

- Cables, where insulation may have been damaged (e.g. chewed by rats or other rodents) also presents a hazard if cables are energised. Some older established dwellings/buildings may still have electrical wiring with vulcanised Indian rubber (VIR) or tough rubber sheathed (TRS) insulation. These types of insulation can severely degrade over time and might be at the end of their serviceable life, presenting an electric shock hazard to persons using appliances or when entering the roof space. This represents a serious defect in the electrical installation. The remedial action requires replacement of all the VIR or TRS insulated wiring.
- Metallised foil insulation which may have been energised due to poor installation practices. If not properly installed, foil insulation can cause areas of the roof space to become energised. This is a danger to workers installing the insulation and individuals entering into the roof space. In some cases, gutters and fixtures around the home may also be energised.

2.2 Managing the risks

The only certain way to ensure a worker is not inadvertently electrocuted in a roof space is to ensure that no electricity is flowing through the installation while the work is being conducted. With the advent of battery-operated hand-held tools and powerful battery-operated LED lights, there is no reason why the main switch and all known sources of electricity running through the roof space cannot be isolated prior to work being commenced.

Turning off electricity to the property at the main switchboard does not turn off the electricity supply from the street to the switchboard via the consumer's supply cable.

The legislation does not require switching off any supply cables upstream of the meter. This means the incoming overhead service lines and the cables supplying the switchboard will still be energised. Extreme care must be taken to avoid touching any of these energised overhead electrical lines or supply cables.

Before commencing work in the roof space:

- Inform the owner of the installation that you will need to switch off all supplies to the building.
- Conduct a Risk Assessment. The Risk Assessment must ensure that control measures are undertaken to avoid contact with any energised service apparatus or overhead electrical lines or supply cables or consumer mains. Advice and templates to assist you in conducting a risk assessment can be found in the OHSE Subbypack available on WorkSafe's website.
- Switch off and isolate each main switch at the main switchboard (there might be more than one).
- Identify and isolate any other sources of electricity which run through the roof space [e.g. from solar photovoltaic panels (PV systems) or batteries].

Alternative sources of electricity supply

The Wiring Rules require the provision of an isolating device to isolate every source of electricity including inverters and battery banks.

The device must generally be installed adjacent to the electricity generating system.

If workers cannot isolate all sources of electricity and they have any concerns about the condition of the electrical installation, they should not proceed with the work.

They should advise the occupant and their employer(s) about their concerns.

It is strongly recommended that workers are trained on the shut down procedures to shut down alternative sources of supply, including batteries.

Where solar PV systems are installed, supply cables from the solar cells on the roof to the inverter unit will be live when the solar cells are generating electricity. For this reason, care must be taken when working near these cables.

Remember: Supply cables from solar power systems, wind turbines or batteries will be on.

On some solar systems, the supply cable from the solar panels to the inverter can be isolated using the isolation switch at the panels.

If workers are not trained and competent to shut down alternative sources of supply, they must not attempt to do so. Treat the supply cable from the source (solar panels) to the inverter as energised.

An exclusion zone must be maintained, at all times, near energised service apparatus, consumer mains and all energised cables and equipment running through the roof space. Other hazards such as working at heights must also be managed.

2.3 Lock out

It is important that an electrical installation is not re-energised while the work is in progress (for example, by a resident or worker who is unaware the work is ongoing).

The main switch should be turned off and steps taken to ensure that it cannot be inadvertently turned on again by another person. Lock out kits are a practicable means of ensuring an electrical installation remains de-energised, and should be suitable for most domestic installations.

3. Exemptions from OSH Regulations r. 3.59B (2) and (3)

3.1 Electrical work in roof spaces

Electrical work should never be conducted on an energised electrical installation, at residential premises, unless there is no reasonable alternative. Careful planning should ensure that, in most circumstances, there is no reason for the installation to be energised. For example, life support equipment provided for home care can be supplied with power from a battery or generator.

In exceptional circumstances, where there is no reasonable alternative to leaving the building's electrical installation energised while doing electrical work in the roof space, the legislation does provide exceptions.

In all cases, a methodical approach, including the development of a risk assessment by a competent person, and the preparation of a safe work method statement, is required prior to commencing the work.

Any exceptional circumstances, justifying work on energised installations, must comply with r. 55 of the Electricity (Licensing) Regulations 1991.

OSH Regulations - r. 3.59B (5)

(5) Sub-regulations (2) and (3) do not apply in relation to electrical work carried out under the Electricity (Licensing) Regulations 1991 regulation 55(4).

Electricity (Licensing) Regulations 1991 – r. 55 (4)

A person may carry out electrical work, or cause electrical work to be carried out, on or near an energised part of an electrical installation if:

- (a) a risk assessment has been undertaken by a competent person who is familiar with the type of work to be carried out; and
- (b) the competent person is satisfied that-
 - (i) there is no reasonable alternative to carrying out the work while the part of the electrical installation is energised; and
 - (ii) the risks identified by the risk assessment are or can be reduced to as low as reasonably practicable; and
 - (iii) the work can be carried out safely; and
- (c) where the Occupational Safety and Health Regulations 1996 regulation 3.143 does not apply to the work, a safe work method statement (SWMS) for the work has been prepared in accordance with regulation 3.143(4) of those regulations (as if the work were high-risk construction work and the place where the work is to be carried out were a construction site); and
- (d) suitable personal protective equipment and safety equipment is used by the person carrying out the work.

If degraded electrical wiring or unenclosed joints are identified in any installation, the risk assessment should identify that the risks are too high. The work should not proceed and the situation reported to the owner/occupant.

3.2 Testing, servicing or commissioning appliances or other equipment

The OSH Regulations r. 3.59B (2) and (3) require the building's electrical installation to be de-energised and isolated by a competent person before work is undertaken in a roof space of a Class 1, Class 2 or Class 10a building.

The legislation does provide an exemption when competent persons are testing, servicing or commissioning an appliance or other equipment in or accessible via the roof space. Typical appliances in roof spaces are gas appliances, air conditioners or antennas.

The exemption only applies at the time of testing, servicing or commissioning. It does not apply at the time work is being done on the appliance or equipment.

Only the circuit supplying the appliance and equipment can be energised under this exemption.

The exemption only applies if:

- (a) it is necessary to energise the appliance or equipment for the purpose of testing, servicing or commissioning it; and
- (b) a risk assessment has been undertaken in accordance with regulation 3.1 by a competent person who is familiar with the type of work to be carried out ; and

The risk assessment must:

- identify the electrical and other hazards to which a person doing the work is likely to be exposed and assess the risk of injury or harm;
- be designed to check compliance with the legislative requirements;
- be in written form; and
- determine the risk level and include appropriate risk control measures to be implemented.

A copy of the Risk Assessment must be kept for a period of two years after all the work to which it relates is completed.

The following documents provide further guidance on how to prepare a risk assessment:

- The Commission for Occupational Safety and Health's *Guidance note: General duty of care in Western Australian workplaces*;
 - AS/NZS ISO 31000:2009 *Risk management – Principles and guidelines*; and
 - SA/SNZ HB 205:2017: *Managing health-and-safety-related risk*.
- (c) the competent person referred to in paragraph (b) is satisfied that –
 - (i) the risks identified by the risk assessment are or can be reduced to as low as reasonably practicable; and
 - (ii) the work can be carried out safely; and
 - (d) an SWMS for the work has been prepared in accordance with regulation 3.143(4).

The SWMS document provides a process for identifying and controlling health and safety hazards and risks. It may also incorporate a risk assessment.

The SWMS must:

- be developed in consultation with relevant workers - if the workers are represented by a health and safety representative, the consultation must involve that representative;
- identify the electrical work;
- specify the hazards associated with that electrical work and risks associated with those hazards;
- describe the measures to be implemented to control the risks;
- describe how the risk control measures are to be implemented, monitored and reviewed, and may include the risk assessment prepared for the relevant work;
- be in writing and be written in a way that makes it readily understandable by the workers who are to use it;
- be kept up to date;
- be revised if a decision is made to change relevant safe work procedures at the workplace;
- be readily accessible to any worker who is to carry out the electrical work covered by the statement; and
- be kept for a period of two years after all the work to which it relates is completed.

Advice and templates to assist you in preparing a safe work method statement can be found in the *OHSE Subbypack* available from WorkSafe's website.

4. Completion of work in the roof space of a building

To the extent practicable, the occupants of the residential premises and any other workers must be advised before the main switch is turned back on and the electrical installation energised. This is to ensure no other hazards are inadvertently caused by energising the building's electrical installation after completion of the work.

Judgment should be used if the residence will be unattended when the work is complete. If there is any doubt about the potential for additional hazards from reenergising the electrical installation, the default approach should be to leave the power off. This possibility should be discussed with the resident prior to commencing the work.

Department of Mines, Industry Regulation and Safety

WorkSafe

Advice Line 1300 307 877

(for the cost of a local call statewide)

Level 1 Mason Bird Building
303 Sevenoaks Street (entrance Grose Avenue)
Cannington Western Australia 6107
Website: www.dmir.wa.gov.au
Email: safety@dmir.wa.gov.au

Regional offices

Great Southern	(08) 9842 8366
Mid-West	(08) 9920 9800
South-West	(08) 9722 2888

National Relay Service: 13 36 77

Quality of service feedback line: 1800 304 059

Translating and Interpreting Service (TIS) 13 14 50

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