Electricity Engineers' Association

Project 30

SM-EI

SAFETY MANUAL ELECTRICITY INDUSTRY

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HEALTH + SAFETY
ASSET MANAGEMENT
PROF DEVELOPMENT
NCLW + LIVE WORK

FOR INDUSTRY CONSULTATION

Contents

1 INTRODUCTION TO SAFETY MANUAL – ELECTRICTY INDUSTRY (SM-EI)

1.1 Disclaimer and Copyright

This guide has been prepared by representatives of the electricity supply industry to provide guidance on safety practices for use by the industry.

This guide is recommended as good practice by electricity supply industry representatives, but it is not a substitute for legislative or other regulatory requirements. If there is uncertainty on what guidelines or legislative requirements should apply in any particular situation, specialist advice, including legal advice, should be sought.

The Electricity Engineers' Association of New Zealand (Inc.) and the electricity supply industry representatives involved in preparing this guide accept no liability or responsibility for an error or omission contained in this guide, or any injury, loss, damage (including indirect or consequential loss or damage), or any other claim from any reliance on, or failure to rely on, the contents of this guide.

This guide has been prepared on the basis that the user will be appropriately trained, qualified and authorised.

Examples, including sample processes, or case studies in this guide are included to assist with consideration on the application of the guidelines for auditing. The examples or case studies are not a comprehensive statement of matters to be considered, nor steps to be taken, to comply with any statutory obligations pertaining to the subject matter of this guide.

1.2 Acknowledgements

The EEA is indebted to members of the working group and the many industry people and companies who provided comments and contributed to the development of this document.

1.3 About this Publication

The Electricity Engineers' Association (EEA) is pleased to provide you with a digital and printed version of your Safety Manual - Electricity Industry (SM–EI).

This publication is the cumulative result of decades of electricity supply industry expertise, with technical expertise to enable the conversion to this combined digital and printed format.

This SM–EI replaces the 2020 digitised version of the SM–EI and moves away from individualised rule numbers.

Contribution by industry employees is a key part of the process of improving safety. We can only do this with your help.

SM–EI content is supported by the Safety Standards and Procedures Group (SSPG). They are your industry experts when it comes to embedding safety into work every day.

The electricity supply industry has general and specific safety responsibilities. General responsibilities are placed on it by health and safety legislation, and specific responsibilities arise from energy sector legislation.

The technology required to generate and deliver electricity safely is diverse and crosses over into many other industries. Standards, codes of practice and industry guides are developed and maintained by a variety of organisations to support safe practices, the latest versions of these should always be referenced.

Legislation, standards, codes of practice and industry guides all have a common purpose to maximise the safety of assets, workers, customers, and the public. SM–EI

The purpose of the SM–EI is to provide guidance to those who contribute to the safe operation of electricity industry assets in such a way that it can be read and applied in daily practice.

1.4 What the SM–EI Contains

The foundations of the SM–EI are the principles from which the rules emerge. The Rules themselves create a framework for resources that provide further information. A Glossary is included for common terms.

The rules and resources are concerned with safe practices to reduce risk in the New Zealand electricity supply industry. This includes any activity carried out on or near generation, transmission, or distribution assets.

SM–EI is your safety manual. The information it conveys is guided by you, as an industry employee, and shared for the benefit of your industry peers. It is designed to evolve as the needs of industry change.

1.5 What the SM–EI Does Not Contain

SM–EI is a consensus publication. The rules are developed by consensus, and they should be applied by consensus, and considered in the context of other resources.
Please note the following important exclusions.
The SM–EI rules:

- Do not directly apply to the design of electricity supply industry equipment;
- Do not claim to represent an exhaustive compilation of safety requirements;
- Do not replace the need to refer to standards, codes of practice, and industry guides;
- Do not claim to be a substitute for legislative or other regulatory requirements; and
- Do not replace the need for local instructions to be developed and followed.

1.6 Hierarchy of Safety Requirements and Guidance

In applying the SM–EI, the following hierarchy shall apply:

1. Legislative Requirements (Acts, Regulations)
2. Approved Codes of Practice and Regulatory Guidance (e.g. New Zealand Electrical Codes of Practice, WorkSafe guidance)
3. Recognised Standards and Codes other that Approved Coded of Practice (e.g. ASNZS standards)
4. SM–EI Rules and Requirements (electricity industry specific)
5. EEA Guides and Industry Procedures
6. Asset Owner requirements and local instructions

Where there is any inconsistency, the high order requirement shall prevail. SM–EI shall be interpreted as supplementing, not replacing, higher order requirements

1.7 Back to Basics (Fundamentals)

The following requirements are a direct result of key learnings from serious accidents within the Electricity Supply Industry. These requirements must be followed when they apply to the work being performed.

1. TEST for safety
2. ISOLATE, prove de-energised and earth / bond equipment prior to work
3. IMPLEMENT live work procedures for all live work
4. ENSURE protection from voltage difference
5. DETERMINE poles or pole structures are safe to climb
6. ENSURE fall arrest or restraint

1.8 Clarifications and Interpretations

The EEA welcomes suggestions for clarifying the rules and enquiries for interpretation of the rules.

2 GLOSSARY

The glossary provides definitions for common terms, including those used across industry (all sectors)

ACCESS PERMIT (AP)
A form of contractual agreement between an Issuer and a Recipient for access to and work on, or within the relevant minimum approach distance of, equipment that has been isolated for work other than under a Test Permit. Under an Access Permit, the Recipient and their work party have temporary access for work activities to specific isolated equipment, which is in a defined state. (Relevant minimum approach distance is that which would apply if the equipment was live).

APPROVED
Having an asset owner's or employer's endorsement for a specified function or purpose.

ASSET OWNER (AO)
A participant in the electricity supply industry who owns assets used for generating or conveying electricity.

ASSURANCE
A form of contractual agreement between a sender and a receiver. The assurance confirms that safety measures have been applied to assets controlled by the sender. This allows the receiver to issue a permit for work on assets controlled by the receiver. The safety measures applied by the sender of the assurance are not changed until the assurance is returned by the receiver.

COMPETENT
An employee is competent when they can demonstrate to their employer, at any time, that they have the necessary knowledge, skills and experience to carry out the work safely and to the standards used by the employer.

CONDUCTOR
Material used for the conveyance of electricity. Examples include overhead lines, underground cables, busbars and electrical connections. Bare conductors include conductors that are not insulated to full working voltage.

DECOMMISSIONED

A status that is applied to a piece of equipment which has had all connections removed whereby it is impossible for that equipment to be energised by an operating procedure, and where that equipment has been recorded as decommissioned by the asset owner.

DE-ENERGISED

Not connected to any source of electrical supply but not necessarily at zero voltage, e.g. may have an induced voltage.

DROP ZONE

A specific type of exclusion zone located directly beneath or adjacent to a work area where there is a risk of dropped objects or materials. A drop zone is established to protect workers and others from injury due to dropped tools, equipment, or materials and must remain clear for the duration of the overhead work.

DOCUMENTED

Information that is recorded and maintained in a form that is retrievable and verifiable, including both written (hardcopy) and electronic formats.

EARTHED

Effectively connected to the general mass of earth.

EARTHING DEVICE

An approved device used for temporary earthing of isolated conductors. Examples include portable earths, earth switches, integral earthing and earthing trucks.

ELECTRICAL INSTALLATION

All fittings, beyond any point of supply, that form part of a system that is used to convey electricity to a point of consumption or used to generate or store electricity (with some exclusions as provided in the Electricity Act 1992).

ENERGISED

Connected to or containing a source of energy, e.g. electrical, steam, compressed air, hydraulic.

EQUIPOTENTIAL ZONE (EPZ)

A zone at a working position within which the voltage differences between conductive parts (including those deemed to be conductive), which can be contacted by an

employee, remain below hazardous levels in the event of the inadvertent livening of any part of the equipment.

EXCLUSION ZONE

A clearly defined area established to restrict access in order to reduce the risk of harm to workers, the public, or property from a specific hazard. An exclusion zone is typically established around activities such as work at height, lifting operations, live electrical work, or areas where dropped objects or hazardous energy may be present, and must be controlled so unauthorised entry is prevented.

HAZARD

Anything that can cause harm, including a person's behaviour where that behaviour has the potential to cause death, injury, or illness to a person.

HAZARDOUS SUBSTANCES

Any product or chemical that has explosive, flammable, oxidising, toxic, corrosive or ecotoxic properties.

HIGH VOLTAGE (HV)

Any voltage exceeding 1000 V a.c. or 1500 V ripple free d.c.

INDUSTRY PROCEDURES

Procedures that are recognised by the electricity supply industry generally, or by a particular sector of the industry, including contractors working for the industry, as being the recommended method of achieving the required outcome in a way that minimises the risk of harm to workers and to other persons. Some of the publications produced by the EEA are examples of industry procedures.

INTEGRAL EARTH

An earthing device which is incorporated within switchgear arrangement.

ISOLATED

Deliberately disconnected from network sources of harm, e.g. energy (electrical or mechanical) or asphyxiating, toxic or flammable gas, and rendered incapable of being reconnected without predetermined deliberate action.

ISSUER

A competent worker who issues, modifies, receives back, transfers, or cancels Access Permits and Test Permits. The Issuer also sends and receives Assurances.

ISSUER APPLIED SAFETY MEASURES (IASM)

Safety measures applied by, or on behalf of the Issuer before and Access Permit or Test Permit is issued and removed once an Access Permit or Test Permit has been cancelled.

LIVE

Connected to a source of electrical supply or subject to hazardous induced or capacitive voltage.

LIVE WORK

Work performed under industry procedures inside the minimum approach distance of equipment that is not isolated and not earthed or bonded. Live Work excludes the following (as these activities are covered under a Minor Works Management System):

a) The operation of fuses and the changing of the fuse elements;
b) The operation of isolators and switches;
c) The taking of electrical measurements;
d) The application or removal of HV earths or LV bonds;
e) The measurement of distances;
f) The phasing of conductors and fittings;
g) The checking and testing of insulator strings;
h) The removal of impediments on lines;
i) The greasing of fittings;
j) Traction live line work under 2,000 volts d.c.

LIVE WORK PERMIT (LWP) / LIVE LINE PERMIT LLP)

Authorisation to carry out work within the minimum approach distances of equipment that is live.

LOCAL INSTRUCTION

An approved document that identifies the means by which a safety rule or other management directive is applied to the local site or situation.

LOW VOLTAGE (LV)

Any voltage exceeding 50 V a.c. or 120 V ripple free d.c. but not exceeding 1000 V a.c. or 1500 V ripple free d.c.

LV BONDING

The deliberate act of interconnecting de-energised LV conductors together to bring conductors to the same potential.

LV BONDS

An approved device used to electrically interconnect all de-energised LV conductors.

LV TASK SPECIFIC PROCEDURE

A procedure that outlines the controls and safety measures to be applied to de-energised LV work where it has been deemed to "not to be reasonably practical" to apply LV bonds.

MINIMUM APPROACH DISTANCES (MAD)

The minimum approach distances when approaching live conductors not insulated to full working voltage that applies to workers, and conductive material carried by them, vehicles, and mobile plant.

MINOR WORKS MANAGEMENT SYSTEM (MWMS)

A system used to manage work on or near assets where a Live Work Permit, Access Permit, or Test Permit is not applied, and the Supervisor manages the control measures. Often a Work Authority is used in this context.

MOBILE PLANT

Any equipment fitted with a jib or boom, any equipment or device capable of raising or lowering a load, and any equipment or device capable of projecting a tool bit, including cranes, elevating work platforms, excavators, tip trucks, boring machines or similar plant. Mobile plant can be considered as a vehicle only when in the normal travelling mode and not in the working mode when determining minimum approach distances.

MUST

Indicates a mandatory requirement. The requirement is compulsory and is to be complied with in all cases where it applies.

NZECP 34

NZECP 34:2001, New Zealand Electrical Code of Practice for Electrical Safe Distances.

NZECP 46

NZECP 46:2003, New Zealand Electrical Code for High Voltage Live Line Work.

OPERATIONAL CONTROL

The exercising of authority, whether direct or delegated to control equipment required for the operation of the asset and or the management of access to the asset.

OPERATIONAL PLAN

A documented plan developed as part of work planning that details how the work is to be safely carried out under the selected work management system.

An operational plan may include, as applicable:

- the scope of work and work methods to be applied
- isolation, switching, and tagging requirements
- safety measures to be applied and maintained
- identification and management of stored energy
- requirements for systems that must remain operational
- roles, responsibilities, and interfaces between parties

An operational plan supports, but does not replace, permits, worksite safety plans, switching instructions, or local instructions.

PERMIT AREA

A defined area where there is equipment under an Access Permit or Test Permit, the boundary of which is identifiable by continuous markers. The equipment within the area may be in any state (e.g. live, de-energised or isolated).

PERSON CONDUCTING A BUSINESS OR UNDERTAKING (PCBU)

A broad concept used to describe all types of modern working arrangements commonly refer to as businesses. Most New Zealand businesses, whether large corporates, sole traders, or self-employed persons, are classed as PCBUs. The meaning of PCBU is defined in the Health and Safety at Work Act 2015.

PORTABLE EARTH

An approved portable earthing device for temporarily earthing isolated equipment.

PRESSURE VESSEL

An unfired vessel, the purpose of which is to hold, process, store, transport, or use gases or liquids exceeding pressures of 50 kPa gauge.

REASONABLY PRACTICABLE

As provided for in the Health & Safety at Work Act 2015, unless the context otherwise requires, reasonably practicable, in relation to a duty of a PCBU, means that which is, or was, at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters, including;

a. the likelihood of the hazard or the risk concerned occurring; and
b. the degree of harm that might result from the hazard or risk; and
c. what the person concerned knows, or ought reasonably to know, about—
    i. the hazard or risk; and
    ii. ways of eliminating or minimising the risk; and
d. the availability and suitability of ways to eliminate or minimise the risk; and
e. after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

RECEIVER

The person receiving an assurance that safety measures have been applied to assets under the control of the sender. This enables the receiver of the assurance to then issue a permit for work on assets they control but are also connected to assets where some safety measures are under the control of the sender.

RECIPIENT

A competent worker who receives, holds, may request transfer of, and returns, an access or Test Permit.

RECIPIENT APPLIED SAFETY MEASURES (RASM)

Additional safety measures applied by the work party after the Access Permit or Test Permit has been accepted.

RESPONSIBLE EMPLOYEES (SAFETY)

Employees who plan, organise, schedule, allocate and/or manage work, and who have the ability to influence the safe outcome of work by their actions or inactions. In some instances, only one employee will be a Responsible Employee (Safety) for a particular job.

An area or enclosure containing equipment that could cause serious harm (e.g. a switchyard). The area or enclosure will be subject to an entry control system determined by the asset owner.

Risks to health and safety arise from people being exposed to hazards (anything that can cause harm). Risk has two components – the likelihood that it will occur and the consequences (degree of harm) if it happens.

RESTRICTED AREA

An area or enclosure containing equipment that could cause serious harm. e.g. a switchyard

RISK

The possibility or likelihood that harm (injury or illness) might occur when people are exposed to a hazard, along with the potential consequences of that harm

SAFETY MEASURES

Control measures applied, or actions taken, to ensure work can be safely undertaken under a work management system. Examples include isolation, tagging, locking, earthing, and LV

A worker assigned the sole duty of observing and warning against actions or situations that may breach specific hazard control methods including unsafe approach to live equipment, and controlled space entry. Where necessary, the worker may operate and monitor equipment for the safety of other employees, and initiate emergency response.

SAFETY OBSERVER

A competent worker assigned the sole duty of continuously observing specified work activities or situations in order to identify unsafe actions, warn workers of potential harm, and stop the work where necessary.

SECOND POINT OF CONTACT

Electrical conductors and fittings operating at a different voltage to a primary point of contact, including earthed components and structures

SHOULD

Imposes a good practice or recommendation

SENDER

The person sending an assurance that safety measures have been applied to assets under the control of the sender. This enables the receiver of the assurance to then issue a permit for work on assets which are connected to assets where some safety measures are under the control of the sender.

STATION

A general term to cover substations, power stations switching stations including switchyards. The term does not apply to ground mounted distribution substations, pole mounted substations, reclosers, disconnectors and sites of a similar nature.

STORED ENERGY SYSTEM

Any system or equipment containing energy that could be released unexpectedly, including electrical, gas, pressure, spring, mechanical, gravitational, thermal or chemical energy.

SUPERVISION

Control and direction by a competent worker that ensures workers or persons being supervised observe all safety requirements, do not cause harm to themselves or others, and carry out the work to appropriate standards.

SUPERVISOR

The worker who is present at the worksite and has the greatest level of control (worker in charge) of the work at the worksite. The worker may not necessarily be occupationally designated as a supervisor to perform the role of a supervisor.

SWITCHYARD

A restricted area, enclosed by a security fence or other secure boundary, containing normally live conductors and/or other exposed live equipment.

TAG

A control measure to identify equipment in a defined state.

TAGGED

To label, mark or identify something

TEST PERMIT (TP)

The permit for work on equipment that has been isolated for work where the modification of safety measures may be necessary and where procedures are required to control

hazards created by the introduction of energy sources for the work, e.g. testing. Under a Test Permit, the Recipient and their work party have temporary access for work activities to specific isolated equipment, which is in a defined state.

WORK AT HEIGHT

Work carried out in a place where a person could be injured if they fell from one level to another, which can be above or below ground level. Work at height does not include slipping, tripping or falling at the same level.

WORK MANAGEMENT SYSTEM

A documented system for control of risks at the worksite. Examples include Access Permit and Test Permit, Minor Works Management System, and Live Work Permit.

WORKER

An individual who carries out work in any capacity for a PCBU, unless the context otherwise requires. Meaning is aligned to the Health and Safety at Work Act 2015.

WORKING POSITION

The location within a worksite at which a worker(s) carries out a work activity (tasks). There may be several working positions within a worksite.

WORKS

Any fittings that are used, or designed or intended for use, in or in connection with the generation, conversion, transformation, or conveyance of electricity, but does not include any part of an electrical installation.

WORKSITE SAFETY PLAN

A documented plan that includes prestart discussions that review known risks and the controls associated with the management of these risks.

3 GENERAL HEALTH AND SAFETY

This section sets out a summary of health and safety requirements under New Zealand's Health and Safety at Work Act 2015 (HSWA) and industry best practices.

All Persons Conducting a Business or Undertaking (PCBUs) are required to establish and maintain robust health and safety management systems that proactively protect workers, the public, and property. This includes comprehensive planning, hazard identification, risk management, effective communication, and continuous monitoring throughout the lifecycle of work. PCBUs must ensure workers are competent, well-trained, and adequately supervised, while fostering a culture of safety through engagement, incident reporting, and emergency preparedness.

Under the HSWA, PCBUs, officers, and workers each have clear and active duties to protect health and safety. PCBUs must, so far as is reasonably practicable, provide and maintain safe work environments, safe plant and systems of work, adequate welfare facilities, training, supervision, and monitoring. Officers must exercise due diligence to ensure these duties are understood, resourced, implemented, and verified. Workers, while at work, must take reasonable care for their own safety and the safety of others, follow reasonable instructions, and cooperate with notified health and safety policies and procedures.

3.1 Planning and Risk Management

3.1.1 Work Planning

All work must be planned to eliminate or minimise risks to workers, the public, and property.

- Planning must include:
- Identification of known and potential hazards;
- Assessment of risks from nearby equipment or environmental conditions;
- Selection of appropriate tools, equipment, PPE, and procedures; and
- Allocation of competent workers or adequate supervision.

3.1.2 Hazard identification and Risk Assessment

Hazard identification and risk assessment must occur:

- During planning;
- Upon arrival at the worksite;
- Throughout the duration of work; and
- Whenever work scope or method changes.
- All work party members must participate in hazard identification and risk assessment.
- Risks outside the control of the work party must be managed as they arise.

3.1.3 Worksite Safety Plan

A worksite safety plan is used to document the hazards and risks at the worksite(s), and the controls that must be implemented to eliminate or minimise those risks before and during the work and includes the emergency procedures relevant to the worksite. A Worksite safety plan must:

- document all known and potential risks and associated controls;
- be updated as required;
- be used to manage safety throughout the job; and
- workers must formally acknowledge understanding of risks, controls, and emergency procedures before starting work.

3.1.4 Work Environment Risks and Management

Work undertaken in outdoor or exposed environments must account for environmental conditions that may create additional risks to workers.

If there is any indication of lightning risk, all work must stop immediately, and workers at height should descend and move to a safe distance until the danger has passed.

For tasks in hot or cold conditions, Workers and Supervisors must be trained to recognise early signs of heat or cold stress and understand the appropriate actions to prevent harm. Supervisors are responsible for managing exposure duration when heat or cold stress risks are present. Protection methods should follow established safety guidelines. Cold stress prevention must align with the Mountain Safety Hypothermia First Aid Guide and WorkSafe's guidance for extreme temperatures.

Ultraviolet radiation protection should comply with WorkSafe recommendations for solar UV exposure.

When working in outdoor fire risk areas, any fire restrictions imposed by any Regional or Local Authority must be observed, in addition when vehicles are being used in outdoor fire risk areas, hot exhausts must be kept clear of combustible material (e.g. long grass).

3.1.5 Working in Private Property

Before commencing work in private property, the owner or tenant must be consulted to identify any existing hazards. Information provided should be incorporated into the risk assessment and used to develop appropriate controls within the worksite safety plan.

When setting up for work, any entry requirements specified by the owner or tenant must be followed. This applies to all private properties, including farms and residential premises.

3.2 Communication

Scope of work, systems, procedures, tools, and PPE must be communicated to all workers.

- Emergency responses must be clearly communicated and understood.
- Job briefings must ensure all workers (including those working alone) are informed and prepared.

3.3 Incident Management

PCBUs must have internal incident management processes that ensure accidents, near misses, hazardous conditions, unsafe work practices, serious incidents, and notifiable events are promptly reported, responded to, recorded, investigated, and notified. There are obligations to notify the relevant regulator where required under the HSWA and associated regulations, e.g. section 56 of the HSWA requires a PCBU to notify WorkSafe of a notifiable event.

3.4 Equipment and PPE

PCBUs must ensure PPE is provided, maintained, and used correctly.

Workers must:

- Use the PPE provided;
- Use only safe, certified tools and equipment;
- Not modify certified equipment; and
- Tag and remove defective items from service.
- Visitors must wear appropriate PPE.

3.5 Training and Competency

3.5.1 Training Requirements

Workers must receive:

- safety training before starting new work;
- additional training as deemed necessary; and
- workers must not perform tasks or use equipment without proper training.

3.5.2 Competency Records

Must include:

- personal identification (photo if required);
- competency levels and endorsements;
- dates of last assessment and renewal; and
- records must be retrievable and reviewed during work planning.

3.5.3 Electrical Workers

Registered electrical workers must receive refresher training not exceeding two years (in accordance with EWRB requirements).

- Electrical workers should undertake refresher training in electrical safety, testing, first aid and emergency procedures annually. The frequency of this refresher training could be extended if a work type risk assessment results in low risk.

3.6 Worker Wellbeing and Supervision

Workers must:

- Be physically and mentally fit for work;
- not be impaired by drugs or alcohol;
- assess their readiness and raise concerns with Supervisors;
- Supervisors must monitor for fatigue and stress; and
- PCBUs must rotate workers if extended hours compromise safety.

3.7 Supervision and Monitoring

- Each work party must have at least one Supervisor.
- Supervision levels must reflect worker competency/experience (e.g., trainee, competent, authorised).
- Supervisors must ensure emergency procedures are in place and documented in the worksite safety plan.

Levels of control must be appropriate to the risk posed by:

- the work;
- the working environment; and
- the method used.

3.8 Working Alone

When work is being planned for a worker to work alone in a remote area or in situations where other persons will not be expected to be present or visit, a risk assessment of the work must be undertaken to ensure that the risk of harm is minimised.

Workers must not work alone where the task requires more than one person to perform it safely.

If working alone:

- A monitoring system or designated monitoring person must be in place; or
- communication must occur at agreed intervals;
- action must be taken if check-ins are missed; and
- workers must request assistance if safety cannot be assured.

3.9 Personal Safety

Workers must ensure:

- Jewellery or watches do not pose risks to safety; and
- long hair and loose clothing are restrained.

4 ROLES AND RESPONSIBILITIES

4.1 Roles and Responsibilities, Overarching Requirements

Supervision levels should be guided by the EEA Supervision for Health and Safety Guide and reviewed at the worksite, with adjustments made as necessary based on the environment.

Roles and responsibilities must be assigned and clearly understood by all members of the work party, including those working alone, before commencement of any work. For worksites involving multiple members, one person must be designated as the Supervisor. If work is being conducted at several sites simultaneously, a supervisor must be allocated for each site.

In situations where a single worker is present at a worksite, that individual assumes the Supervisor role and should be monitored remotely through technology or regular check-ins. When working alone or in remote locations, a site-based risk assessment is essential to reduce the risk of harm, and regular safety confirmations should be undertaken.

Work preparation should empower workers to request additional assistance whenever needed to maintain safety. All workers must exercise reasonable care to ensure their actions do not compromise the safety of others.

4.2 Relationship of Roles for Work Control

The table below identifies each role's primary work-control relationship. These relationships support safe control of equipment and work activities but do not replace employer, PCBU, asset owner, or organisational reporting responsibilities.

A person may be appointed to more than one role but must only act in one role at a time.

Role	Responsibility to	Primary relationship in work control
Responsible Employee (Safety)	Plans and organises the work but is not normally part of the permit control chain unless separately appointed to another role	
Sender	Receiver	Applies and maintains safety measures under an Assurance for connected or cross-boundary assets
Receiver	Issuer	Relies on the Assurance to support safe issue of a permit
Issuer	Recipient	Issues and controls permits and retains responsibility for Issuer-applied safety measures
Recipient	Supervisor	Accepts permit control and ensures work remains within permit scope and conditions
Supervisor	Workers and Safety Observers	Directs and controls execution of the work at the worksite
Workers	Work tasks under the defined controls	Carry out the work in accordance with the work management system, permit conditions, and worksite controls
Safety Observer	Observed workers	Monitors specified work activities and warns or stops work where required

4.3 Responsible Employee (Safety)

A Responsible Employee (Safety) is a worker who plans, organises, schedules, allocates, or manages work and has the ability to influence the safe outcome of that work. This role supports safe work planning and interfaces with the Supervisor, but is not normally part of the permit control chain unless separately appointed to another role. The Responsible Employee (Safety) must:

- ensure the work is clearly identified, planned, and scheduled before it begins;
- select and provide the appropriate work management system and safe work method for the job;
- document the work management system to be applied for each job;

- identify known and potential hazards associated with the work;
- communicate known and potential hazards to the designated Supervisor;
- ensure the Supervisor has access to relevant industry procedures, local instructions, operating manuals, supplier information, and other required resources;
- verify that any design provided for implementation complies with safety in design requirements;
- ensure safety in design requirements are addressed before equipment becomes operational;
- ensure emergency and fault procedures are available and understood where relevant;
- support effective planning interfaces between work planning, operational control, permits, Supervisors, and workers;
- work collaboratively with the Supervisor to ensure safety responsibilities for workers and others at the worksite are clearly understood and managed; and
- ensure planning decisions do not compromise the safe execution of the work.

4.4 Senders

A Sender is a competent worker authorised to apply and maintain safety measures to equipment under their control and to provide an Assurance to another party where those safety measures are required to remain in place. The Sender acts on behalf of the asset owner or controlling PCBU to enable safe work on interconnected or cross-boundary assets.

The Sender must:

- apply and maintain safety measures to equipment under their control;
- provide an Assurance to another party where work relies on those safety measures remaining in place;
- send Assurances that confirm the safety measures applied to equipment under their control;
- ensure the Assurance provides a reliable basis for the Receiver to issue a permit for work on equipment they control;
- ensure the safety measures stated in the Assurance are adequate, accurate, and effective;

- ensure safety measures applied under the Assurance remain in place for the full duration of the Assurance;
- ensure Assurances are documented and managed so the status of equipment under their control is known at all times;
- maintain oversight of Assurances affecting the same equipment so one activity does not compromise another;
- ensure any application, modification, or cancellation of an Assurance does not compromise the safety of any work;
- not remove or alter safety measures applied under an Assurance until the Assurance has been formally returned and cancelled;
- when an Assurance is returned, confirm control of the equipment can be safely restored; and
- confirm any related permits and Assurances affecting the equipment have been appropriately cancelled before the equipment is returned to its normal operating state.

4.5 Receivers

A Receiver is a competent worker authorised to receive and rely on an Assurance from a Sender where safety measures have been applied to equipment controlled by another asset owner or controlling PCBU. The Receiver uses the Assurance to support the safe issue of a permit for work on equipment under their control where safety depends on safety measures controlled by another party.

The Receiver must:

- receive and accept Assurances only where competent and authorised to do so;
- confirm the Assurance has been provided by an authorised Sender;
- understand the scope of the Assurance, the equipment covered, the safety measures applied, and any conditions attached to the Assurance;
- not rely on an Assurance unless satisfied it provides an adequate basis for the safe issue of a permit;
- ensure any permit issued in reliance on the Assurance remains within the scope and conditions of that Assurance;
- ensure the Issuer understands any safety measures, conditions, or limitations arising from the Assurance before issuing a permit;

- maintain oversight of permits issued in reliance on the Assurance so one activity does not compromise another;
- manage any change affecting the Assurance in coordination with the Sender and relevant Issuer;
- ensure changes to permits, safety measures, or work scope do not compromise the Assurance or the safety of any work;
- ensure an Assurance remains in place while any permit or work activity still relies on it;
- before returning an Assurance, confirm whether any other permits or work activities remain reliant on it; and
- return the Assurance for cancellation only when it is no longer required to support any permit or work activity.

4.6 Issuers

An Issuer is a competent worker authorised to control access to equipment through the issue and management of work management systems. The Issuer acts on behalf of the asset owner or controlling PCBU to enable work to proceed safely under an approved system of control.

The Issuer must:

- issue, modify, transfer, receive back, and cancel Access Permits, Test Permits and Live Work Permits;
- send or receive Assurances where safety measures are applied to equipment controlled by another asset owner;
- issue permits only to a nominated Recipient;
- confirm that the Recipient understands the permit scope, equipment covered, equipment state, and permit conditions before acceptance;
- ensure all required Issuer-applied safety measures are in place before issuing a permit;
- retain responsibility for Issuer-applied safety measures that cannot be independently verified by the Recipient;
- ensure permits and Assurances are documented and managed so the status of equipment is known at all times;

- maintain oversight of permits and Assurances affecting the same equipment so one activity does not compromise another;
- communicate clearly with the Recipient about permit status, conditions, and safety measures;
- confirm all related permits and Assurances have been returned and cancelled before equipment is returned to service; and
- understand that direct supervision of the work party remains with the Recipient or Supervisor, not the Issuer.

4.7 Recipients

A Recipient is a competent worker authorised to receive and hold an Access Permit, Test Permit or Live Work Permit for defined equipment. The Recipient accepts control of the equipment within the scope of the permit and is responsible for ensuring the work is carried out in accordance with the permit conditions and applicable work management system.

The Recipient must:

- receive and hold an Access Permit, Test Permit or Live Work Permit only where competent and authorised to do so;
- accept control of the equipment only within the defined scope of the permit;
- confirm with the Issuer that they understand the permit scope, equipment covered, equipment state, work to be undertaken, permit boundaries, conditions, and any remaining risks before accepting the permit;
- not accept a permit unless satisfied that the permit conditions allow the work to be carried out safely;
- ensure work remains within the scope and conditions of the permit for the duration of the work;
- ensure appropriate levels of supervision are provided for all workers operating under the permit;
- ensure workers understand the equipment covered, permit boundaries, equipment state, safety measures, and conditions under which the work may proceed;
- manage any Recipient-applied safety measures and ensure they do not compromise Issuer-applied safety measures or the safety of other work;

- consult with Supervisors and the Issuer before accepting any changes to permit conditions or safety measures;
- ensure the permit is returned when work is complete, suspended, or can no longer be carried out safely;
- before returning the permit, confirm all workers have signed off, no longer have access to the equipment, and are clear of the equipment; and
- confirm the equipment can be safely returned to the Issuer's control.

4.8 Supervisors

A Supervisor is a competent worker authorised by the employer or asset owner to supervise work activities at a worksite under an approved work management system. Where work is carried out under a permit, the Supervisor operates under the authority of the Recipient and is responsible for the direct supervision and control of workers performing the work.

The Supervisor must:

- supervise the execution of work at the worksite within the scope of the applicable permit or Minor Works Management System;
- exercise control and direction over workers to ensure work is carried out in accordance with the defined scope, conditions, and safety measures;
- ensure work remains within the scope and conditions established by the Issuer and accepted by the Recipient;
- provide supervision appropriate to the nature of the work, the work environment, and the competency of the workers involved;
- maintain situational awareness of work activities and ensure supervision remains effective for the duration of the work;
- ensure worksite safety, hazard management, and worker compliance are managed in accordance with the applicable work management system, industry procedures, asset owner requirements, and employer instructions;
- ensure workers understand the work scope, permit boundaries, safety measures, and safety requirements relevant to their tasks;
- not alter Issuer-applied or Recipient-applied safety measures unless expressly authorised and in accordance with the applicable work management system;

- understand that authority to issue, modify, transfer, or cancel permits remains with the Issuer or Recipient, not the Supervisor;
- provide effective leadership at the worksite, including introducing themselves to the work party, assigning roles, and confirming workers are fit and ready for the tasks being undertaken;
- maintain effective communication with the Recipient, workers, Safety Observers, and other relevant parties;
- delegate supervisory tasks only where appropriate, while retaining overall responsibility for effective supervision and control of the work; and
- stop or pause work where conditions change, controls are ineffective, workers are unclear on requirements, or the work can no longer be carried out safely.

4.9 Workers

A Worker is any person carrying out work under the direction of a PCBU, employer, Supervisor, Recipient, or applicable work management system. Workers are responsible for following safety requirements, complying with site controls, and ensuring their actions or inactions do not create risk to themselves, other workers, the public, or the worksite.

The Worker must:

- comply with all health and safety signs, notices, instructions, and site controls;
- understand and follow applicable safety rules, standards, guides, procedures, and documented work instructions;
- operate equipment only in accordance with approved instructions, training, and authorisation;
- take reasonable care for their own health and safety;
- take reasonable care that their actions or omissions do not adversely affect the health and safety of others;
- follow the directions of the Supervisor, Recipient, Safety Observer, and applicable work management system;
- participate in worksite risk management activities, including hazard identification, risk assessment, pre-start briefings, and updates to the worksite safety plan;
- use required PPE, tools, and equipment correctly and report any unsafe, defective, or unsuitable items;

- stay within the scope of the work, permit conditions, safety measures, and worksite controls;
- stop or raise concerns if they are unclear about the work, controls, hazards, permit boundaries, or safety requirements;
- report hazards, unsafe conditions, incidents, near misses, or changes in worksite conditions to the Supervisor;
- ensure their work does not compromise the safety of other workers or other work activities;
- if arriving after work has started, report to the Supervisor before entering the work area;
- receive a briefing on the worksite hazards, controls, work scope, permit conditions, and emergency arrangements before starting work;
- sign onto the worksite safety plan and any required permits before commencing work; and
- sign off when leaving the worksite or when they no longer require access to equipment controlled by a permit.

4.10 Safety Observers

A Safety Observer is a competent worker assigned the sole duty of continuously observing specified work activities, actions, or situations to identify unsafe actions, warn workers of potential harm, and stop work where necessary. The Safety Observer operates under the direction of the Supervisor and must remain focused on the workers, mobile plant, equipment movements, or hazards they have been assigned to observe.

The Safety Observer must:

- be competent in the work activity, action, situation, or hazard being observed;
- understand the risks being controlled and the specific controls that must be maintained;
- be clearly identified and known to the workers they are observing;
- have no other duties while acting as a Safety Observer;
- continuously monitor the assigned workers, mobile plant, equipment, or activity for the duration of the task;
- maintain a position that allows effective observation and communication;

- have an agreed method for warning workers and stopping work that all affected workers understand;
- warn workers immediately where an unsafe action, unsafe movement, or loss of control may occur;
- stop work where continued work could result in harm or where controls are not being maintained;
- confirm that workers' actions or movements, including movements of mobile plant, will not result in harm before allowing the activity to proceed;
- receive clear instructions from the Supervisor on the role, responsibilities, hazards, controls, and work activity to be observed;
- confirm with the Supervisor that the Safety Observer role and stopping authority are understood before work begins;
- ensure workers inform the Safety Observer of intended actions or mobile plant movements before making them;
- require workers to wait for confirmation that it is safe to proceed before undertaking the intended action or movement;
- ensure workers immediately obey any direction given by the Safety Observer, including any instruction to stop work; and
- advise the Supervisor if there is insufficient observer capacity, unclear instructions, ineffective communication, or changing conditions that may affect safety.

5 WORKS MANAGEMENT (PERMITS – ACCESS, TEST, LIVE WORKMINOR WORKS MANAGEMENT SYSTEMS, ASSURANCES)

5.1 Works Management Systems Overarching Requirements

Work management systems are essential for any task that presents a risk of serious harm at the worksite, including depots and workshops. They must be used for work involving electrical, mechanical, or hydraulic assets, as well as tasks performed in confined spaces, areas with gas hazards, at height, or in excavations.

Specific requirements apply when working on equipment that is in service, in-situ backup, being installed or commissioned, or undergoing de-commissioning or dismantling. Prior to work on or within the minimum approach distance of equipment being installed, commissioned, or re-commissioned, a permit must be planned and issued. This permit acts as a control for hazards originating outside the equipment and not managed by the working party.

In cases where equipment is completely isolated meaning all external energy sources and control signals are removed and the equipment is out of its operational / in service position, a work management system other than an Access or Test Permit may be suitable. Work planning must identify the appropriate system based on the specific risks assessed during the planning stage.

Issuing Access Permits, Test Permits, or Live Work Permits must never compromise the safety of workers operating under any other permit. At any point in time, equipment must be under the control of only one work management system. An Access Permit and a Test Permit must not be held concurrently on the same item of equipment. Where a change in work method requires transition between an Access Permit and a Test Permit, control of the equipment must be formally relinquished in accordance with permit return or suspension requirements before the alternate permit is issued. Control of equipment must not be shared.

Every work plan must include the selection of safe work methods, such as determining whether live or de-energised procedures are necessary, in accordance with the chosen work management system. Some tasks may require more than one method to ensure comprehensive safety controls.

Requests for permits must clearly specify all safety requirements, including the need for protective actions such as the strategic placement of earths or low-voltage bonds. The permit process should facilitate clear communication of responsibilities between Issuers and Recipients, ensuring that isolation points, scope of work, and equipment identification are fully described.

All work management systems implemented at the site must be thoroughly documented. This includes recording the controls used to manage risks, such as equipment isolation and application of safety measures. Detailed switching instructions should be maintained to verify the application and position of isolations or tags, temporary earths, and other critical safety elements.

Permits must capture the status of any stored energy systems present in the equipment and document all safety measures applied for each permit. Maintaining accessible and clear documentation is fundamental to upholding safety and accountability throughout the duration of the work.

In the instance of work being undertaken in stations the Recipient of a permit must always be onsite.

5.2 Work Planning Requirements

Work planning must involve selecting a suitable work method, such as live or de-energised, that aligns with the chosen work management system. Certain tasks may require more than one method for proper safety and execution. When making requests for Access or Test Permits, Issuers need to specify all safety requirements for workers, including any particular protective actions such as positioning of earths or LV bonds appropriately.

Operational plans must detail requirements for rendering isolation equipment inoperative and tagged, isolating and tagging of related control circuits as needed, and ensuring any remote-control signals capable of operating the equipment are rendered inoperative. Permit requests must clearly state isolation requirements, describe the scope of work, identify the equipment involved, and specify the extent and isolation points where known.

During the preparation and issuance of Access or Test Permits, the Issuer and Recipient must establish their respective safety responsibilities. If the work requires certain systems to remain operational for the duration of the permit such as seal oil or hydraulic oil systems these must be identified and recorded in the operational plan, along with necessary actions to ensure their continued service.

Where equipment is to be livened for the first time or re-livened after an extended period of being de-energised or de-commissioned, the Supervisor must:

- identify any potential risks associated with the change in state; and
- install markers or a notice indicating the change in state.

5.3 Documentation Requirements

Documentation is a crucial aspect of work management systems, ensuring that all safety measures and procedures are clearly recorded and accessible. This documentation helps maintain a high level of safety and accountability at the worksite.

All work management systems applied to specific jobs must be documented. This includes documenting controls applied to manage risks, such as equipment isolations, and making this information available at the worksite. Documented switching instructions should be used to operate, apply, and check the positions of isolations, as well as when applying tags, temporary earths, and other safety devices.

Permits, such as Access Permits and Test Permits, must be formally documented. This includes:

- the status of any known stored energy systems in the equipment stated on the permit;
- safety measures applied for permits individually identified and documented;
- permits being accessible at the worksite for the duration of the work and until the permit is cancelled; and
- records for permits being either a signed hardcopy or an electronic unalterable record.

Before issuing a permit, the Issuer must ensure that the Recipient is aware of any known special procedures required for certain types of equipment. The Issuer must log the details of all permits issued and ensure that Issuer-applied safety measures have been recorded on the permit.

5.4 Communication

Effective communication is essential for ensuring safety and clarity in work processes, especially when dealing with permits and Assurances. Clear and real-time communication helps prevent misunderstandings and ensures that all parties are aware of the current status and requirements.

Key points include:

Real-Time Communication: When a permit (or assurance) is issued (sent), accepted (received), relayed, transferred, modified, or returned by telephone or radio, the communication must be in real-time. Voice messages and text messages must not be used. Workers must clearly identify themselves, convey all relevant information, and log all statements. Each statement must be repeated back by the Recipient or Receiver to confirm accuracy.

Clear and direct communication: Communication must be clear, direct and confirmed between the Issuer and Recipient, as well as between the Recipient and Supervisor(s). This ensures that all parties have a clear understanding of the permit and assurance details and any potential risks.

Confirmation and Logging: All statements related to the issue, cancellation, or alteration of a permit or sending and receiving an assurance must be repeated back by each party for confirmation. If direct communication is not possible, the statements may be relayed by a third party. The Issuer or Sender must log all statements, and the Recipient or Receiver must record them.

Effective communication ensures that all safety measures are documented and that work is carried out under controlled conditions, with clear responsibilities assigned to the Issuer, Recipient, and Supervisor.

5.5 Permit Types

5.5.1 Access Permits

Access Permits are essential for managing safety and ensuring that work on equipment is conducted under controlled conditions. These permits are required when isolation points are not under the control of the work party.

Key points include:

Multiple Access Permits: More than one Access Permit can be issued for a single item of equipment, ensuring that safety measures remain in place until all permits are cancelled.

Limited Testing: Testing under an Access Permit is allowed only after a hazard identification and risk assessment confirm that the testing has insufficient capacity to cause harm. Before any testing all workers that could be affected by the testing must be informed and agree testing may proceed. Testing that introduces potential risks or requires the removal of Issuer-applied safety measures must not be carried out under an Access Permit.

Access Permits ensure that all safety measures are documented and that the work is carried out under controlled conditions, with clear responsibilities assigned to the Issuer and Recipient.

5.5.2 Test Permits

Test Permits are essential for managing risks associated with testing on isolated equipment. A Test Permit is required when defined Issuer-applied safety measures are to be removed for testing and is used to manage both external and deliberately introduced hazards. These permits ensure that the work is conducted under controlled conditions. Before starting work under a Test Permit, the Recipient must ensure that the equipment covered by the Test Permit is in a suitable condition to be tested, and that any hazards introduced by the testing activity are understood and controlled in accordance with the permit conditions.

Key points include:

Issuance and Management: An Access Permit is not a prerequisite for a Test Permit, and only one Test Permit can be applied to a single item of equipment at a time. The Recipient of a Test Permit is authorised to alter defined safety measures, energise isolated equipment for testing, run, operate, and/or energise defined equipment. The Recipient must be a member of the work party for all Test Permits, and a Test Permit must have a single work party

Specific Tests: A Test Permit should be issued for tests on in-position HV equipment, including Power Factor (Doble) testing, Hi-pot testing, Core flux testing, Impedance testing, VT calibration, VLF testing, Corona testing other than by use of a camera, Rotor pole volt-drop testing, and Rotation of plant.

Test connections should be applied and removed only while safety measures are in place.

Test equipment used under a Test Permit must be under the control of the Recipient. The Recipient must ensure that test equipment is connected only to the equipment and assets explicitly covered by the Test Permit and is not connected to, or capable of energising, any other equipment.

Test Permits ensure that all safety measures are documented and that the work is carried out under controlled conditions, with clear responsibilities assigned to the Issuer and Recipient.

5.5.3 Testing Not Requiring a Test Permit

Testing that does not require an Access Permit or Test Permit must only be carried out in accordance with procedures approved or provided by the asset owner. This includes, but is not limited to, commissioning testing that requires test-livening from the power system, where energisation is performed solely for the purpose of functional verification. All testing that does not require a permit must be planned to ensure risks to workers, the public, and the worksite are minimised.

Planning must include:

- Identification of hazards associated with test livening or energisation activities;
- specification of controls, including the placement of suitable signs, barriers, perimeter markings, and exclusion zones to prevent inadvertent access;
- verification that all persons at or near the worksite understand the testing activity and associated risks;

- testing must not proceed unless the worker in charge confirms that all controls specified in the test plan are in place and remain effective for the duration of the activity;
- where test livening is required, the equipment must be treated as live at all times until isolation has been re-established and proven, and all affected personnel must be advised of the change in equipment state; and
- any abnormal condition, unexpected energisation outcome, or failure of control measures during non-permit testing must result in the immediate cessation of testing and notification to the Supervisor and asset owner.

5.5.4 Live Work Permits

Live Work Permits are essential for ensuring safety when working on energised equipment. These permits are required for specific tasks and must be managed carefully to prevent any harm to workers.

Key points include:

Live Work Permit Requirement: Live work requires a Live Work Permit. It is required for any work on energised equipment. A Live Work Permit is not required for testing or operating.

Live Work Procedures: Must be developed for work on energised equipment. These procedures must ensure that all control measures are in place and that the work is conducted under controlled conditions.

5.5.5 Minor Works Management Systems

Minor Works Management Systems (MWMS) are essential for managing work on or near assets where a Live Work Permit, Access Permit, or Test Permit is not applied. These systems ensure that safety measures are in place and that work is conducted under controlled conditions.

Each MWMS developed should:

- define the equipment and work practice to which the system is to be applied;
- include requirements for the isolation of electrical or mechanical energy as necessary;
- advise on any other safety measures and/or control measures to be applied;

- include requirements for the levels of competency required by workers utilising the system; and
- include requirements for records to be produced and supplied during the course of work under the system.

MWMS should be developed at the industry level but can also be developed locally where such systems do not already exist. These systems are crucial for ensuring that all safety measures are documented and that the work is carried out under controlled conditions, with clear responsibilities assigned to the Issuer and Recipient.

5.5.6 Assurances

Assurances are critical for ensuring safety when work requires safety measures to be applied to equipment owned and controlled by a separate asset owner. These measures must remain in place until the assurance is formally returned and cancelled.

Key points include:

Requesting Assurances: When work requires safety measures on equipment owned by another asset owner, an Assurance must be requested. This is necessary for cross-boundary connections or when isolation points are not under the control of the Issuer.

Documentation and Responsibility: The sender of an Assurance must document the application of safety measures, record the assurance details, and ensure the measures remain in place until the Assurance is returned and cancelled. The sender is responsible for the adequacy and accuracy of these safety measures.

Operational Plans: Plans must ensure that any safety measures applied under an Assurance remain in place until the Assurance is formally cancelled. The Issuer must obtain an Assurance before issuing an Access Permit if not all isolation points are under their control.

Training and Competency: Workers providing Assurances must be trained, assessed, and recorded as competent. The requesting, sending, receiving and recording of Assurances should follow the EEA Assurances Guide.

Assurances ensure that safety measures are properly documented and maintained, providing a clear framework for managing risks associated with work on equipment owned by different asset owners.

5.6 Permit Management

5.6.1 Issuance and Acceptance

Permit management is crucial for ensuring safety and clarity in work processes. It involves a series of responsibilities and procedures that must be followed by Issuers, Recipients, and Supervisors to maintain a safe working environment.

Key points include:

Chain of Relationships: There must be a continuous chain of relationships from the operator to the Issuer, Recipient, Supervisor, and work parties. This ensures clear communication and responsibility at each stage.

Control of equipment; At any point in time, equipment must be under the control of only one party, either

- the worker exercising operational control; or
- the Recipient of an Access Permit or Test Permit.
- Control must not be shared or exercised concurrently between operational control and permit control.

Responsibilities: The Issuer and Recipient have both mutual and defined responsibilities, while the Recipient and Supervisor(s) also have defined responsibilities. The Issuer does not have direct responsibility to the Supervisor(s).

Permit Issuance: Permits are issued only by an Issuer to a Recipient. The Issuer must be aware of the status of all permits and Assurances and ensure that the issuing of a permit does not affect other permits. Prior to issuing a permit, the Issuer must confirm that actions have been taken to allow safe access to the equipment, that any permit areas have been clearly defined, and that all required Issuer-applied safety measures have been implemented, including those applied under an assurance.

Permit Acceptance: Before accepting a permit, the Recipient must understand the extent of the equipment covered, the state of the equipment, the location of isolation points, the location of Issuer-applied safety measures, and any remaining known risks. The Recipient must confirm this understanding back to the Issuer.

Work Party Acknowledgement: The Recipient or the Supervisor must instruct all work party members on the equipment covered by the permit, the state of the equipment, and the safety measures applied. The members of the work party must acknowledge that they understand the extent of the permit and supervision being provided and sign on to the permit.

The Recipient must maintain effective oversight of work carried out under the permit, either by visiting the worksite or by regular liaison with the Supervisor, to ensure work remains within permit scope and requirements.

5.6.2 Returning Permits

Returning permits is a critical process to ensure that equipment is safely transitioned back to service, only the Recipient of the permit can return the permit to the Issuer. This process involves several steps and responsibilities for both the Recipient and the Issuer. Key points include:

Notification and Confirmation: Before returning a permit, the Recipient must notify the Supervisor(s) and receive confirmation that all workers understand the permit is about to be returned and they no longer have access to the equipment. Workers must sign off and keep clear of the equipment.

Safety Measures: When equipment under an Access Permit is ready for returning to service, any Recipient-applied safety measures must be removed and recorded. For Test Permits, all Recipient applied safety measures must be removed unless otherwise agreed, and Issuer applied safety measures must be restored to "as found" or "as agreed" condition.

Readiness for Service: The Recipient must state to the Issuer that all tools, equipment, and safety measures have been removed or restored as agreed, and that the equipment is ready for returning to service. Any changes made that affect the operation of the equipment must be communicated.

Documentation: Before the cancellation of an Access Permit where the equipment is de-commissioned, a documented undertaking must be obtained from the asset owner that the points at which the equipment was energised are secured until the work is complete or a new Access Permit is required.

Issuer Responsibilities: After cancelling a permit and before returning equipment to service, the Issuer must confirm that the equipment is ready for service, remove Issuer-applied safety measures, return any related Assurances, and log the appropriate details. The Issuer must ensure that all permits and Assurances covering the equipment have been returned and cancelled.

Exceptional Circumstances: If the Recipient is unable to return a permit due to exceptional circumstances, the person to whom the Recipient is responsible must be informed and ensure the permit is returned or arrange for the return of the permit.

5.6.3 Transferring Permits

Transferring permits is a critical process to ensure that work can continue safely and efficiently when the original Recipient is no longer available. This process involves several steps and responsibilities for both the existing and new Recipients, as well as the Issuer.

Key points include:

Recipient Responsibilities: If the Recipient in control of an Access Permit, Test Permit or Live Work Permit needs to transfer the permit they must arrange to transfer the permit to another competent worker via the Issuer.

Before transferring any permit, the existing Recipient must ensure the new Recipient understands the extent of the permit, the identity and locations of Supervisors and workers, the location of Recipient-applied safety measures, and the extent of work already completed.

The transferring Recipient must consult with the Supervisor(s) and obtain their agreement, inform the Issuer of the new Recipient's name and contact details, and inform all workers signed on to the permit of the change.

Issuer Responsibilities: The Issuer must confirm the new Recipient is competent, repeat the permit details to the new Recipient, and ensure the new Recipient understands the extent of the permit, including Issuer-applied safety measures and any potential risks in the vicinity of the equipment being worked on.

5.6.4 Permit Modification

Permit modification is a controlled activity used to manage changes to an issued permit without returning and re-issuing the permit.

Where a permit is modified, the Issuer and Recipient must ensure that the modification does not compromise safety and that the permit remains valid for the work being undertaken.

The Recipient and Supervisor must ensure that all workers working under the permit are informed of the modification and understand any changes.

5.7 Operating / Switching

Switching Instructions and associated communications should be guided by the EEA Technical Guide: Switching Instructions and Communications.

Isolation of conductors may be achieved by opening disconnectors or switchgear, removing fuses or links, or by another appropriate method that provides a physical disconnection. All disconnectors, switchgear, and other equipment forming isolation points must be tagged in the isolated position and locked where locking facilities are available. Where isolation is provided by a disconnector or switchgear without a visible break, the Issuer must notify the Recipient of this condition.

Where there is a risk of arc-flash, a remote operation facility should be used in preference to a local operation facility, following instructions provided by the asset owner.

Before work on any switching mechanism containing stored energy (springs) that could cause movement, the energy must be dissipated and secured to ensure it cannot cause harm.

Where isolation is provided by a circuit breaker or any automatic or remotely operated device, that device must be rendered inoperative as part of the isolation procedure. A circuit breaker may only be used for isolation when no other means are available, and the asset owner has approved this usage.

When a circuit breaker is withdrawn from a cubicle to allow worker access to spouts, shutters on spouts that do not require access must be closed, locked and tagged, where a locking facility is available. Additionally, when working on switchgear, care must be taken to prevent any item from falling into the fuse chamber.

5.8 Safety Measures

Electrical equipment must be regarded as live until isolated, earthed, if multi-phase, short-circuited and in the case of low voltage (LV) isolated and bonded.

Before any work begins under an Access or Test Permit, the effectiveness of safety measures must be verified this includes confirming equipment is de-energised and, where applicable, that energy has been dissipated. Additional safety measures such as earthing or LV bonds, flushing or purging for mechanical equipment may also be applied as required.

Basic isolations for permits should include both a primary and a backup method, such as double valve isolation, double block and bleed, isolate and earth, or the application of LV bonds.

Any isolation points and Issuer-applied safety measures for Access or Test Permits should be clearly marked with distinctive tags. These tags serve to prevent accidental changes to the state of isolations, earthing, or LV bonding points, or to ensure the continued safe operation of essential systems (such as seal oil pumps for hydrogen-filled machines).

Before a permit is issued, the Issuer must confirm that all necessary safety measures have been implemented, including those covered by Assurances. If requested, the Issuer should demonstrate the location and explain the purpose of these safety measures to the Recipient.

When safety measures cannot be verified by the Recipient such as those applied for Assurances, complex equipment, or specific circuits the Issuer retains responsibility for their adequacy and accuracy. The Issuer must consult with all affected Recipients and secure their agreement before modifying any permits or related safety measures. For Test Permits, any safety measures that may be modified by the Recipient must be clearly identified by the Issuer.

After accepting a permit, the Recipient must ensure that any Recipient-applied safety measures are applied as required, managed in accordance with the work management system, and recorded.

The Recipient must also consult with Supervisors and obtain their agreement prior to accepting any changes to Issuer-applied safety measures. Recipients of Test Permits may adjust such measures, provided they have the Issuer's consent. Both Access and Test Permit Recipients are required to make sure equipment is de-energised and stored energy is dissipated (unless retaining energy is part of the plan) and inform the Supervisor accordingly.

Supervisors may only alter Recipient-applied safety measures if they have the explicit permission of the Recipient.

5.8.1 Earthing and LV Bonding

This section outlines the essential procedures and safety requirements for earthing and LV bonding in electrical work environments. It details the responsibilities of competent personnel, the correct selection and use of approved devices, and the critical steps for isolating and proving conductors de-energised before work begins. The guidelines emphasise risk minimisation, proper application and removal of earths and bonds, and adherence to documented plans to ensure the safety of workers and the integrity of electrical systems. By following these procedures, organisations can effectively manage hazards associated with inadvertent energisation, equipment faults, and other operational risks.

Earthing of distribution overhead lines must be guided by the EEA Guide for Work on De-energised Overhead Lines.

LV bonding of LV overhead conductors must be guided by the EEA guides; Guide for Work on De-energised Overhead Lines and LV Works Management.

Earthing and LV bonding of underground cables must be guided by the EEA Guide to Safe Work with Cables.

Plans for work on conductors under Access Permit or Test Permit must include all requirements for earthing or LV bonding and identify which party (Issuer or Recipient) is responsible for the application of earthing or LV bonding devices.

5.8.2 Purpose of Isolation, Earthing, and Bonding

Isolation, earthing, and LV bonding procedures must be implemented to minimise the risk of harm from:

- voltage differences;
- inadvertent connection to supply;
- interconnection with other parts of the power system or other systems (e.g., via transformer secondary circuits);
- stored charge in capacitors, power cables, and bushings;
- induction from adjacent circuits, atmospheric conditions, or lightning strikes; and
- backfeed from secondary circuits, including embedded generation.

Earthing or LV bonding must be carried out in accordance with documented plans created and agreed during the planning stages. These plans must include requirements for isolating conductors and proving them de-energised before work begins. For high voltage (HV) systems, conductors must be earthed and, if multi-phase, short-circuited. For LV systems, bonds must be applied or a task-specific procedure followed.

Conductors must remain earthed and short-circuited (or bonded for LV) at all times while work is being carried out under an Access Permit. Where an LV Access Permit includes a task-specific procedure, the requirements of that procedure must remain in place for the duration of the permit.

Temporary earths, bonding leads, or LV bonds must:

For HV: minimise duration of inadvertent livening by enabling rapid operation of protection devices and prevent induction from live equipment; and

For LV: control introduced voltage at the worksite.

Sufficient sets of earths or LV bonds must be applied between isolated equipment and points of isolation to ensure continued protection during disconnection or dismantling. Earthing through high impedance equipment (e.g., transformers, resistors, capacitors, fuses) is not sufficient; additional precautions must be agreed upon and approved by the asset owner.

Before removing any isolations, all earths or LV bonds must be removed from conductors.

5.8.3 Proving / Testing of Isolations

Only voltage detectors approved by the asset owner or employer must be used to verify that equipment is de-energised.

Voltage detectors must be tested immediately before and after use to confirm they are in proper working order.

Before applying earths or LV bonds:

- All Conductors must be isolated from supply and proven de-energised.
- Electrical equipment must be proven de-energised before applying portable earths or LV bonds.

Earthing or LV bonding must occur immediately after proving de-energised and at the same location where testing was performed.

5.8.4 Application of Earthing

Where isolation is provided by a disconnector or switchgear without a visible break, earthing must be applied using:

- An integral earth of the disconnector or switchgear, or
- An earth connected to the same earthing system as the switchgear.

Where isolation is provided by a disconnector or switchgear with a visible break, earthing must be applied:

- At an established HV equipment earth where practicable, or
- By a driven earth electrode to a recommended minimum depth of 600 mm if no permanent earth is available.

If an earth switch is provided, it must be used as the first earth applied. Earth switches must be locked in the earthed position and tagged.

5.8.5 Portable Earths and LV Bonds

Temporary earthing must connect to dedicated earthing systems where available. Portable earth tails must connect to a permanently established earthing point such as a steel tower, station earthing grid, or installed earth. If unavailable, an earth electrode (spike) may be used, driven to a recommended minimum depth of 600 mm after confirming no buried utilities are in the vicinity.

Earthing and bonding equipment must be checked immediately before use to ensure it is free of defects and within specified test dates.

Portable earths or bonds that have been in place for extended periods of time must be inspected before work begins, if deterioration is likely, replace portable earths with fault-rated bolted connections as soon as practicable. Portable earths must be applied before bolted connections are made or removed.

5.8.6 Connection Sequence

Earthing devices must be appropriately rated and approved by the asset owner or employer. Workers must verify ratings before use. Connection Sequence

When applying portable earths:

- Earths must be interconnected and connected to a common earth before connection to equipment.
- When removing portable earths:
- Remove from equipment before disconnecting from earth.
- When applying and removing LV bonds:
- Connect to the neutral conductor before phase conductors.
- Remove from phase conductors before disconnecting from neutral.

5.8.7 Removal and Reapplication of Earths and LV Bonds for Test Permits or Limited Testing under an Access Permit

Issuer applied Earths or LV bonds that are removed under a Test Permit must only be removed for the duration of the test(s).

When earths or LV bonds applied by the Recipient are removed or repositioned for testing under an Access Permit, they must be removed only for the minimum time necessary. The Recipient or Supervisor must ensure these are reapplied before any other work continues.

5.8.8 Earthing Requirements for Switchgear

Plans for work on withdrawable switchgear, including busbars and circuit terminations, must include the following requirements:

- **Earthing and Short-Circuiting**: Ensure all necessary earthing and short-circuiting measures are in place.
- **Integral Earth Switches**: Earth switches used to provide an earth and short-circuit must be closed, locked in position, and tagged.
- **Circuit Breakers for Earthing:** Circuit breakers used to provide an earth and short-circuit must be racked into the appropriate position, closed, locked, and tagged. Any remote tripping mechanism must be rendered inoperative and tagged.
- **Circuit Breakers for Isolation:** Circuit breakers used for isolation must be locked if possible and tagged or withdrawn and tagged. Any remote operating mechanism must be rendered inoperative and tagged.
- **Access Control:** Access to live spouts that are accessible from the work position must be locked and tagged.
- Identification: The switchgear being worked on must be clearly identified from both the front, back and different levels where appropriate.

Before applying earths, withdrawable switchgear busbar spouts and/or circuit spouts must be proven de-energised. Earthing must be achieved either by applying portable earths directly to the spouts or by using a circuit breaker that has been converted immediately prior to use with appropriate earthing attachments (e.g., plug attachments and earthing leads).

When a circuit breaker is closed to provide earthing continuity, its tripping mechanism must be rendered inoperative. Additionally, the racking facility (where provided) must be locked or otherwise made inoperative to prevent accidental movement.

If access to spouts requires the removal of spout earths, these earths must remain in place until immediately before work commences.

For work on transmission and distribution circuits where earth switches are installed at the terminals, those earths must be used as Issuer applied safety measures. Integral fault rated earth switches are an acceptable method for earthing circuits and busbars.

5.8.9 Earthing Requirements in Stations

For continuous conductors within stations that are not disconnected or dismantled as part of the work, a single set of earths is sufficient, even if multiple points of isolation exist (e.g., bus section isolation or transmission circuit isolation). All earths applied to conductors of equipment in a station must be electrically connected to the same earthing system as the equipment's permanent earthing.

Approved devices must be used to apply earths and short-circuits to busbar or feeder spouts of withdrawable switchgear. This ensures safe and reliable earthing during maintenance or isolation procedures.

The secondary circuit of a current transformer must never be left open while the primary side is live. Before performing any work on the secondary circuit, the secondary terminals must be short-circuited, and the presence of a secondary circuit earth confirmed.

5.8.10 Overhead Earthing / Bonding Requirements

General requirements:

- One set of earths or bonds must always be visible from the working position;
- Earths or LV bonds should be applied on each side of the working position unless impractical (e.g., at the end of a line);
- At least one set of earths or LV bonds must be placed as close as reasonably practicable to the working position and moved closer as conditions allow;
- Where earth connection uses multiple driven spikes, these spikes must be bonded together before connecting the tail clamp(s);
- Before breaking a conductor or where a break or open point exists, earths must be applied close to and on both sides of the break so tails can be connected. If simultaneous personal contact with both sides is possible, a bond must be applied across the break or open point;
- Where LV bonds are used, and if reasonably practicable, these should be bonded across any break or open point where simultaneous personal contact with both sides is possible; and
- Additional earths required to minimise harm from causes other than inadvertent livening may be applied only to the phase(s) being worked on.

Bonding of LV overhead conductors is required in the following situations:

- When LV conductors are being installed, removed, or worked on from poles carrying live LV or HV conductors.
- When work is carried out near in-service circuits where accidental contact with a live conductor could occur.
- When conductors may become live due to hazardous induced or capacitive voltages.
- When conductors may be energised from a backfeed source.

5.8.11 Protection Against Voltage Differences

When planning work on conductors that may be inadvertently energised, the plan must include measures to minimise the risk of voltage differences between conductive parts and between those parts and earth. Protection against voltage differences must be established at the working position and provided both at ground level and when working at height.

Steel towers, steel poles, poles with downleads, and concrete poles with integral earths must be connected to the temporary earthing system. Conductors may be earthed and short-circuited through these structures. Before work begins, the location of any driven earth spikes must be identified, and workers, as well as members of the public, must be kept clear of these spikes to avoid step and touch potential hazards should the associated conductor become inadvertently live.

Protection must also be provided against step potential and combined step-and-touch potential that can occur if a temporary earth becomes energised. Before transferring to or from the working position whether at ground level or at height controls must be in place to maintain protection against voltage differences.

Workers should avoid contact with earthed metal wherever possible. If this cannot be avoided, the earthed metal must be treated as a secondary point of contact operating at a different voltage from the primary point of contact, and appropriate protective measures must be applied.

5.8.12 Discharging and Earthing of Capacitors

All individual capacitors, as well as any groups of parallel-connected capacitors that could be contacted during work, must be discharged and earthed prior to commencing any tasks. While some capacitors include internal discharge circuits, these should never be relied upon. For safety purposes, treat all capacitors as if no internal discharge circuit exists.

Before discharging and earthing individual capacitors, ensure that any part of the capacitor bank support structure that may be live is properly earthed. This step is critical to prevent accidental contact with energised components.

Before issuing an Access Permit or Test Permit for work, the main supply connections of capacitors must be earthed and short-circuited. This ensures that the system is fully de-energised and safe for personnel to proceed.

5.9 Mechanical Isolations – Special Requirements

Preparations before issuing Access or Test Permits in areas such as hydraulic waterways, large pipes, storage hoppers, sealed spaces (including storage tanks and furnaces), as well as normally pressurised pipes and vessels (like boiler pressure parts), should address the following requirements:

- ensure all supply valves, gates, passages, conveyors, and similar mechanisms leading to the relevant area are properly opened, closed, or stopped as required. Operating mechanisms must be rendered inoperative, locked where practicable, and tagged;
- drain or remove contents unless explicitly required to remain. For pressurised pipes and vessels, release pressure or hydraulic head to atmospheric pressure, and provide necessary venting, purging or flushing before any work begins;
- install stop logs or coffer dams as appropriate for isolation;
- remove or block open access covers, ensuring atmospheric pressure is confirmed before removal or opening. Secure covers in the open position if necessary;
- provide adequate ventilation, especially in spaces where hazardous gases or fumes may be present. If gas pressure (toxic or otherwise) has been released, follow with purging to prevent risks of explosion, poisoning, or asphyxiation;

- ensure valves are positioned as required (open or closed), then locked and tagged to prevent re-pressurisation from any source, including backfeed or heating. Where configuration allows, double block and bleed must be used; and
- for work external to a pressurised pipe or vessel, stored energy may be retained only if it does not pose a risk to the work party.

6 WORK PROCEDURES

6.1 Overarching

Work planning must include assigning and scheduling competent workers for the tasks. Trainees may participate if the ratio of competent workers to trainees is appropriate and adequate supervision is provided. Supervision is required at every worksite, and the level of control and direction must match the degree of risk posed by worker competency. If higher competency levels are unavailable, additional control measures should be implemented.

- Arrangements for issuing Access Permits, Test Permits, and other permits requiring asset owner approval must be made during the planning stage. Plans for work should include:
- Opening disconnectors and isolation points.
- Closing appropriate earth switches.
- Locking and tagging disconnectors, equipment, and earth switches.
- Isolating and tagging all associated drive motors.
- Ensuring equipment is adequately earthed and short-circuited.
- Providing protection against voltage differences at the work position.

A risk assessment must be conducted at the worksite to ensure agreed minimum approach distances are maintained at all times. When working near live equipment, Supervisors must:

- Identify all live equipment that could pose harm.
- Inform workers of control measures to be adopted.
- The risk assessment should consider:
- Movement and positioning of mobile plant and vehicles.
- Potential changes in position during work.
- Radio aerial adjustments.
- Lifting or hoisting of materials nearby.
- Worker movement on mobile plant.
- Sudden wind gusts affecting conductor movement.
- Load changes impacting conductor movement.
- Ground stability.

- Asset owner baseline requirements.
- Operator competency and its effect on risk reduction.

Before working on earth grids or equipment permanent earth connections, a bond must be applied across any proposed connection or disconnection before the connection or disconnection is made (to minimise any risk of harm from possible differences in voltage).

Before testing or fault-finding, hazard identification and risk assessment must ensure all actions are controlled to avoid harm. Where multiple work methods are required, checks must confirm that no method introduces additional risks when combined with others.

If equipment is known or suspected to pose an immediate risk:

- Workers must leave the vicinity immediately.
- Report the condition promptly.
- Prevent others from approaching the faulty equipment.

Equipment suspected of being in distress must not be operated if failure during operation could result in harm.

6.2 Restricted Areas and Public Safety

Anyone entering a restricted area must:

- Hold the required authority level per asset owner requirements, or
- Be under direct supervision of an authorised worker.
- Worksites must be set up to eliminate or minimise risks to visitors, the public, and non-work party members as far as reasonably practicable.

6.3 Minimum Approach Distances (MADs)

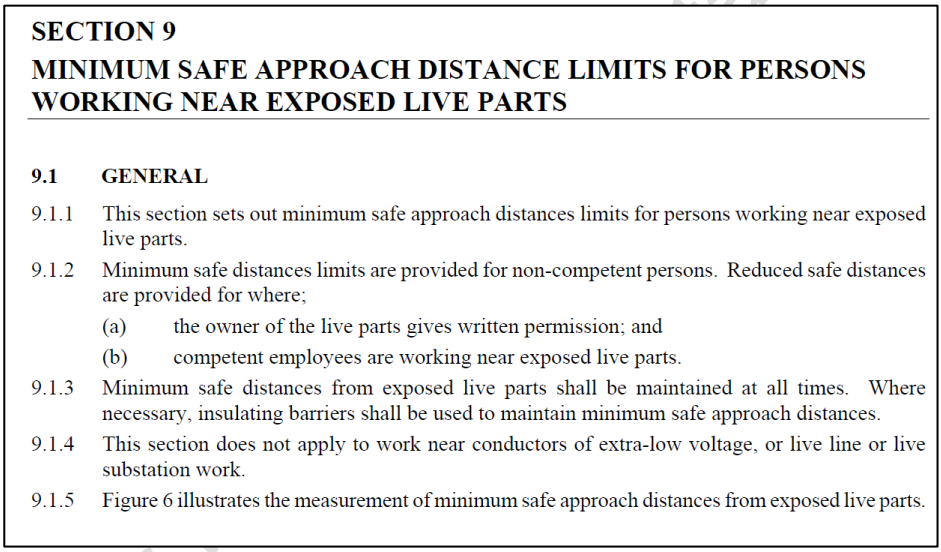
Unless approved live work methods and tools are used in accordance with live work requirements, workers must maintain at least the minimum approach distances (MADs) from live bare conductors or conductors not insulated for full working voltage. These distances apply to any part of the worker's body, clothing, and any conductive items in contact with the worker, including tools, ladders, scaffolds, or mobile plant, particularly where inadvertent movement is possible.

Work near live conductors must not proceed until all workers understand the required approach distances, and electrical work must be planned to minimise risks arising from potential voltage differences between conductive parts, including inadvertent livening

MADs do not apply between fixed conductors or when approved live work methods are used. All MADs for competent and non-competent workers and for mobile plant must comply with NZECP 34 and NZECP 46.

Note – Use of NZECP 34 extracts

The following figures are extracted from **NZECP 34:2001, New Zealand Electrical Code of Practice for Electrical Safe Distances**, and are included to support understanding of the minimum approach distance requirements in this section. These figures are not a substitute for NZECP 34. The full Code must be read, understood, and applied wherever work is planned or carried out near live electrical conductors or equipment.



SECTION 9

MINIMUM SAFE APPROACH DISTANCE LIMITS FOR PERSONS WORKING NEAR EXPOSED LIVE PARTS

9.1 GENERAL

9.1.1 This section sets out minimum safe approach distances limits for persons working near exposed live parts.

9.1.2 Minimum safe distances limits are provided for non-competent persons. Reduced safe distances are provided for where;

(a) the owner of the live parts gives written permission; and

(b) competent employees are working near exposed live parts.

9.1.3 Minimum safe distances from exposed live parts shall be maintained at all times. Where necessary, insulating barriers shall be used to maintain minimum safe approach distances.

9.1.4 This section does not apply to work near conductors of extra-low voltage, or live line or live substation work.

9.1.5 Figure 6 illustrates the measurement of minimum safe approach distances from exposed live parts.

Figure 1 Minimum safe approach distances limits for Persons Working Near Exposed live parts – From NZECP 34 Electricity Authority

9.3 MINIMUM SAFE APPROACH DISTANCE LIMITS FOR COMPETENT EMPLOYEES FROM EXPOSED LIVE PARTS

9.3.1 The minimum safe approach distance limits for competent employees carrying out electrical or telecommunications work near exposed live parts shall not be less than those set out in Table 10.

9.3.2 The minimum safe approach distance for competent employees shall be maintained by keeping all parts of the body, clothing and any hand held tools (except those tools designed for contact with live parts) beyond the safe distances set out in Table 10.

TABLE 10 MINIMUM SAFE APPROACH DISTANCE LIMITS FOR COMPETENT EMPLOYEES FROM EXPOSED LIVE PARTS

Nominal Voltage	Distance Limits (m)
Not exceeding 1 kV a.c. or d.c.	0.15
Exceeding 1 kV but not exceeding 6.6 kV a.c. or d.c.	0.25
Exceeding 6.6 kV but not exceeding 11 kV a.c. or d.c.	0.3
Exceeding 11 kV but not exceeding 22 kV a.c. or d.c.	0.45
Exceeding 22 kV but not exceeding 33 kV a.c. or d.c.	0.6
Exceeding 33 kV but not exceeding 50 kV a.c. or d.c.	0.75
Exceeding 50 kV but not exceeding 66 kV a.c. or d.c.	1
Exceeding 66 kV but not exceeding 110 kV a.c. or d.c.	1.5
Exceeding 110 kV but not exceeding 220 kV a.c. or d.c.	2.2
Exceeding 220 kV d.c. but not exceeding 270 kV d.c.	2.3
Exceeding 270 kV d.c. but not exceeding 350 kV d.c.	2.8
Exceeding 220 kV a.c or 350 kV d.c.	4

FIGURE 6 MEASUREMENT OF MINIMUM SAFE APPROACH DISTANCES

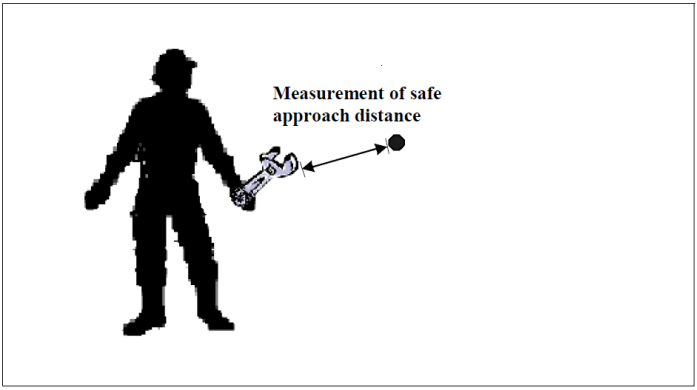


Figure 2 Minimum safe approach distances limits for competent employees from exposed live parts - from NZECP 34 Electricity Authority

For mobile plant, cranes, vehicles, and other plant operating near live conductors, refer also to Section 7.1 Mobile Plant. NZECP 34 requirements for mobile plant apply in addition to the general MAD requirements in this section.

6.4 Work within the Minimum Approach Distances (MADs) or in Proximity to Electrical Equipment

When operating, working on, or near live electrical equipment, workers must consider the possibility of equipment failure that could result in an arc-flash event and implement appropriate protective measures, including personal protective equipment and safe work practices.

Due consideration must be given to the appointment of safety observers for work within the MADs.

Where a conductor or other conductive material is being installed or dismantled and may be affected by contact with or induction from other conductors, and where live conductors are on the same supports, the following requirements must be complied with:

- live conductors must be adequately shielded to prevent any possibility of contact;
- adequately insulated either directly or by using interrupter bypass cables so that if inadvertent contact occurs, there is no possibility of harm to employees, allowing for the mechanical effects of any contact;
- or isolated, proven de-energised, and for HV systems, earthed and short-circuited, and for LV systems, bonded before work commences.

LV work methods should align with the procedures outlined in the EEA Guide to Low Voltage Live Line Model Procedures and the EEA Guide to Live LV Electrical Work.

Line work must follow the EEA Line Mechanic and Cable Jointers Handbook.

6.4.1 Work in Stations

When carrying equipment in switchyards, it must be kept below shoulder level. Workers must not climb or descend from any switchyard structure supporting live equipment unless a second worker has checked the route to ensure MADs can be maintained. Controls must always be in place to maintain these distances when using materials, tools, ladders, or portable earths near live conductors.

Work directly above exposed live conductors or other exposed live metal must only occur when it is necessary, can be done safely, and has the asset owner’s approval.

There must be procedures developed for this work, and they must be understood by assigned workers before work begins. In addition, Safety Observers must be appointed for this work.

Safety Observers are also required when workers carry or use materials, tools, ladders, or portable earths near live conductors, if deemed necessary by the Supervisor.

Only specific ladder types are permitted in live switchyards:

- fiberglass ladders (with fiberglass or metal rungs); and
- wooden ladders without wire reinforcing (with metal or wooden rungs).

Scaffolds and work platforms in live switchyards must be erected following documented procedures and under the supervision of a Safety Observer. Metal scaffolds and work platforms must be bonded to the switchyard earthing system. When using scaffolds or platforms, MADs must be observed at all times.

A Safety Observer must be present whenever scaffolding is erected, moved, or dismantled near live conductors, such as in a live switchyard.

When working near or passing close to live equipment, suitable temporary barriers and/or warning signs must be placed between live equipment and walkways where reasonably practicable. Barriers and signs must be constructed of insulating material or earthed metal and securely fixed. For work aloft in live switchyard structures, markers and barriers of insulating material should be installed unless conductive material is approved by the asset owner.

Work on circuit breaker spouts requires an Access Permit or Test Permit.

The EEA Permit Area Guide relates to the setting up and monitoring of work areas within Switchyards and Stations to provide defined boundaries inside of which work on equipment may be carried out. Where boundaries marked under an Access Permit are changed for a Test Permit, signs must be updated accordingly.

6.4.2 Distribution Transformers

Before working (excluding testing) on transformer windings or terminals (bushings) with a secondary voltage less than 1,000 V, the transformer:

HV side:

- Must be isolated, short-circuited, and earthed, and

LV terminals (bushings):

- Must be isolated and, where possible, bonded.

Beyond LV terminals (bushings):

- Any work requires a LV work method selection to be undertaken.

When working on a transformer in service:

- The neutral-to-earth connection must not be broken.
- If repair of this connection is necessary while the transformer is in service, treat the connection as a live conductor.

Important Note: Energising an LV connection of a transformer can cause full line voltage to appear on the HV side.

6.4.3 Overhead

Plans for work on overhead conductors should follow the EEA guides, an example of these;

- HV Live work must be guided by NZECP 46
- Guide for Work on De-energised Distribution Overhead Lines
- Guide for Live LV Electrical Work
- LV Works Management Guide for Distribution (Network) Infrastructure Assets
- Guide for Work on Poles and Pole Structures
- Line Mechanics and Cable Jointers Handbook

Before climbing or working on any pole marked as defective or not proven structurally sound, and where alternative access is unavailable, the pole must be supported to prevent failure. All poles, pole structures, and associated equipment must be assessed to ensure they remain safe for the duration of the work. Wood poles or wood structures should be assumed structurally unsound until positively assessed as sound or made safe for work.

The pre-climb assessment of poles and pole structures must consider:

- Structural defects
- Additional weight from climbing
- Displacement or addition of conductor load
- Changes to hardware or equipment
- Application of temporary supports
- Any other activity that increases load

When installing new asset components, the minimum approach distance must account for additional risks such as conductor sag. For installation or dismantling work where contact with or induction from other conductors could occur:

- Documented safety procedures and precautions must be available
- All procedures and precautions must be agreed upon by all parties involved

Procedures for installing, dismantling, and transferring conductors must be provided and understood by assigned workers before work begins. Uninsulated conductors or conductive materials being installed or dismantled must be earthed before work starts and remain earthed until completion. Where contact with a live conductor is possible, earth connections must be adequate for any potential fault current.

Poles, pole structures, and associated equipment that could be inadvertently energised from any source must be treated as conductive unless proven otherwise. In multi-circuit line structures, the circuit to be worked on must be correctly identified before work commences under permit.

All conductive communication circuits and catenaries installed on the same poles as live conductors must be regarded as hazardous. Appropriate safety precautions must be taken before working on structures supporting communication circuits and installations.

6.4.4 Underground

Plans for work on underground conductors should follow the EEA guides, an example of these;

- Guide for Live LV Electrical Work
- LV Works Management Guide for Distribution (Network) Infrastructure Assets
- Safe Work with Cables Guide
- Line Mechanics and Cable Jointers handbook

Plans for work on de-energised cables must include:

- Correct identification of cables
- Isolation of cables and tagging of isolation points
- Verification that cables are de-energised
- For HV cables: earthing and, if multi-phase, short-circuiting
- For LV cables: application of bonds or use of a task-specific procedure

Before commencing work, the cable must be positively identified beyond doubt at the point of work. If the cable cannot be confirmed as isolated at the work location, it must be spiked (other than pressurised cables) or cut remotely before de-energised work begins.

When working under an Access Permit, the Recipient must ensure the Issuer has applied safety measures to the correct cable. If there is any doubt, the cable should be spiked or the asset owner's procedures followed. Additionally, any capacitive charge stored in the cable must be discharged before work begins and after any application of test voltage.

Precautions should also be taken to prevent voltage differences between conductive parts that workers may contact. These measures may include short-circuiting and bonding of conductors or using appropriate covers.

When work is performed near live cables, suitable precautions and protective measures must be applied to prevent damage. For oil-filled or gas-pressure cables, the pressure must be reduced to a safe level before work begins.

Excavations must be covered or fenced off when the site is unattended to prevent hazards, such as water accumulation. Where excavations are accessible to the public, they must be guarded to minimise risk. Adequate protection may include a 1-meter-high fence or a combination of signs, barriers, lights, markers, flags, or sentries in accordance with WorkSafe Excavation Safety Good Practice Guidelines.

6.4.5 Live Work

A live works justification must be completed prior to any live work commencing and a live works management system must be applied whenever equipment is regarded as live and live work methods are used to ensure safety. Live work procedures for HV and LV must be developed preferably at industry level, but locally where no standard exists and approved by the employer.

HV live work must comply with NZECP 46 and follow guidance from the EEA ECP 46 Live Line Practice Notes, the EEA Live Line Restart Guide, the HV Live Work Model Procedures. LV live work must follow the EEA Guide for Live LV Electrical Work and should align with the EEA Guide to Low Voltage Live Work Model Procedures

Workers near live equipment must plan movements carefully, use only non-conducting devices (such as measuring tapes) near live conductors, and employ insulated tools for LV work.

Live LV work procedures must ensure protection from secondary points of contact, prevent bridging of conductive fittings at different voltages, and treat all LV and HV conductors, including cables and neutrals, as live. Exposed conductor ends must be restrained to avoid accidental contact, and conductors to be connected tested for same potential and phase.

Equipment with stored energy must be treated as live until discharged.

Before connecting a conductor to another conductor, a test must be performed to ensure it is safe to do so.

For LV overhead conductors or isolated conductors liable to become live, all secondary points of contact must be covered with insulating material except the part being worked on. When two workers are within reach of each other on live LV, they must not work on different phases or pass tools while in contact with a live conductor.

For work on live LV cables, two forms of insulation must be used at all times, e.g. insulating gloves and one other form of insulation.

6.5 Working at Height

Work at height must always follow WorkSafe best practice guidelines for working at height and applicable AS/NZS Standards. When using mobile elevating work platforms (MEWPs), both the WorkSafe Best Practice Guidelines to MEWPs and the EEA Guide for Electricity Supply Industry Use of Mobile Plant should be consulted. The use of

scaffolding, including its setup and dismantling in live switchyards, must adhere to the WorkSafe Good Practice Guidelines for Scaffolding in New Zealand and NZECP 34.

WorkSafe must be notified of any work where there is a risk of a person falling five meters or more, except for work on overhead telecommunications or power lines, or work carried out from a ladder.

Work at height must be planned so workers are attached at all times while at the working position, including when moving or changing position. This requirement does not apply while a worker is climbing a ladder, unless the ladder is fitted with an integrated fall protection or attachment system that allows the worker to remain attached while climbing. The selected equipment and method must prevent a fall wherever reasonably practicable. Where fall prevention, an enclosed work environment, or total restraint is not reasonably practicable, a suitable PFAS must be used to minimise the risk of harm from a fall. Where a work positioning system is intended to support the user's weight, additional control measures must also be implemented to protect the worker if the work positioning system fails.

Working alone at height is permitted only where the worker is in an enclosed work environment, using total restraint, or using a PFAS arrangement that prevents free fall. Where there is any risk of free fall, at least one other worker must be present and able to provide immediate assistance, and a secure safety helmet must be worn.

6.5.1 Mobile Elevated Work Platform (MEWP)

Before using a MEWP, it must be inspected and confirmed to be in safe working condition. Workers operating in the bucket or on the platform of a MEWP, or in a crane-lifted work platform or bucket, must use a PFAS consisting of a full-body harness with an appropriate lanyard. The PFAS must be attached via a lanyard assembly to an approved attachment point on the bucket, arm, platform, or crane hook. Workers must not attach themselves to adjacent poles, structures, or other equipment unless transferring to another working position.

6.5.1.1 Transferring From a MEWP to a Structure

If work requires transferring between a MEWP and another position aloft, the operator and all workers involved must be briefed on the transfer plan and fully understand their roles before the transfer takes place.

When transferring between an elevated MEWP and another working position aloft:

- Complete a risk assessment and develop a transfer plan before starting the work.
- Ensure fall protection is in place and use a double lanyard during the transfer.
- The MEWP must remain at the working position with an operator in control throughout the transfer.
- Confirm the proposed transfer point is well within the vertical and horizontal reach of the MEWP bucket or platform.
- Verify that the external working position has a secure surface or footing capable of bearing the necessary load.
- Ensure the MEWP is stable for the transfer and account for any potential boom deflection.

6.5.2 Crane Platform

Work using crane lifted work platforms should adhere to the WorkSafe Code of Practice for Cranes and follow guidance from the Crane Association. Crane lifted work platforms must be designed and certified by a Chartered Professional Engineer and inspected at least every 12 months by a competent person, with inspection results recorded. These platforms should only be used if fitted with sides or guardrails, mid rails, and toe boards, and the safe working load must be clearly displayed. Platforms with shackles on the rigging gear must be moused (closed off with a lashing) or otherwise positively secured against opening and have a hook with an operational safety latch. For truck loader or fixed or pendulum type platforms, a fixed boom connection between the crane and the work platform, including the yoke, is required. Vehicles with crane-mounted work platforms must not travel while the platform is occupied.

Workers using a crane-lifted work platform must wear a PFAS attached to an approved / rated point that is independent of the platform and its attachments.

Before moving loads with a crane that has a work platform attached, the crane operator must ensure:

- No occupants are working from the platform
- Any materials on the platform are secured and cannot fall; and
- The platform can be moved safely without interfering with the crane's operation.

When the work platform is occupied:

- The operator must remain at the controls at all times.
- The platform must only be moved under power and under the instruction of the employee on the platform; and
- The established communication system from worksite setup must be used to position or reposition the platform.

6.5.3 Ladders

The use of ladders should adhere to WorkSafe guidelines for working at height, the AS/NZS 1892.1: standard relating to portable ladders, and the EEA Guide to Portable Equipment for Work on or Near Conductors.

Ladder inspection should follow guidance in the EEA Guide to Portable Equipment for Work on or Near Conductors. Ladders and their associated ropes and securing arrangements must be thoroughly inspected periodically by a competent person, and the inspection records should be kept and made available to ladder users.

When work at height is required, the most appropriate ladder must be chosen for the task.

All ladders, except step ladders and special purpose ladders, must be fitted with a headrope of adequate length, good quality, a diameter of not less than 8 mm, and a breaking load of not less than 8 kN, or an approved alternative ladder top securing arrangement.

For ladders other than step ladders, the first user is responsible for securely fastening the ladder top to the pole or other safe support, where possible, after securing their pole strap. Such ladders should be positioned at an angle so that the horizontal distance from the top support to the foot of the ladder is one quarter of the ladder's working length. (4:1)

When using any ladder, loads must not be carried that would prevent both hands from gripping the rungs. Workers must avoid over-reaching to the extent that their waist passes beyond the sides of the ladder. Only one person should use the ladder at a time unless the ladder is specifically designed for multiple users, or if an emergency situation requires otherwise to prevent greater harm.

Access to ladders, whether temporary or permanent, must be restricted when they are not needed for reaching a working position. Unattended ladders that allow access to areas near live conductors must either be removed or secured to prevent unauthorised climbing, except for ladders in switchyards where this requirement does not apply.

6.5.4 Drop Zones

When working at height, special precautions must be taken to protect workers below. This includes clearly defining and marking out exclusion zones to warn of potential hazards from falling objects.

In these situations, it is essential to secure all loose tools and materials to prevent them from falling. When raising or lowering items using a hand line, the items should be placed in a suitable container or securely attached to the line to minimise the risk of accidental drops.

For those working or walking beneath others, a safety helmet must always be worn. Additionally, the area directly below the working position should be avoided whenever possible to reduce the risk of injury from falling objects.

Where there is a risk of serious harm to workers due to possible failure of attachment methods, or when an exclusion zone cannot be established and there is a danger to other workers or the public, safety nets must be prescribed to provide additional protection.

6.6 Protection of Openings in Floors, Roofs and Working Platforms

All accessible openings in the ground, roof, floor, or working platforms must be effectively fenced, covered, or otherwise guarded to prevent falls. Guards or fencing must be installed before any grating, cover plate, or similar component is lifted, and may be removed only temporarily to allow immediate access or controlled movement of materials. Openings must not be left unattended while unprotected and covers when used must be secured against accidental displacement.

Where work is carried out on a surface above areas accessible to workers or the public, suitable protective measures must be implemented. This includes placing secure coverings over gratings or tubes or establishing a clearly barricaded exclusion zone beneath the work area. Where required, warning lights and signage must be installed to alert others to overhead hazards and ensure the area below remains clear.

6.7 Manual Handling

All manual handling activities must follow the controls and principles outlined in the WorkSafe New Zealand Guidance on Safe Manual Handling. Workers and Supervisors must ensure that the selection of lifting methods, body positioning, load weight, and task duration comply with this guidance.

6.8 Work Near Radio Transmitters and Cell Towers

All work near radio frequency (RF) transmitters must comply with the NZS 2772.1 standard for maximum exposure levels to radiofrequency fields. These standards ensure that safety requirements are met and exposure remains within acceptable limits When work is planned near RF transmitters, a site-based risk assessment must be conducted. This assessment should identify and locate all RF transmitters, determine allowable exposure levels, and outline measures to keep exposure within safe limits throughout the work.

Before starting work, the transmitter owner must provide detailed information, including transmitter power, operating frequency, antenna type, exact location, and antenna orientation. This information is essential for accurately assessing exposure risks.

6.9 Loading and Unloading of Poles

When loading or unloading poles during worksite setup, they must be stacked and wedged to prevent movement. Workers should always operate in a manner that allows them maximum control and ensures they can move clear in case of sudden movement, ideally working from the ends of the pole stack. Slings used for lifting must securely hold the poles and be choked appropriately. Single leg slings that are choked or reeved are unsuitable for long loads like poles, as these may tilt or not be effectively balanced. If a two-leg sling is choked or reeved to lift a pole, the combined rated working load limit of both slings should be at least two and a half times the pole’s weight, with the angle between slings not exceeding 120 degrees.

Where poles have dedicated lifting points fitted, these should be used for loading and unloading to ensure safety and effective handling.

6.10 Diving and Drowning Risks

When working in areas with a drowning risk, life jackets and/or safety harnesses with lifelines must be worn.

Diving work must follow the WorkSafe Construction Industry Guidelines and the WorkSafe Occupational Diving, Snorkelling, and Free-Diving Industry Guide, comply with Part 1 of the AS/NZS 2299.1 Standard for Occupational Diving Operations, and be notified to WorkSafe.

6.11 Safe Operation of Aircraft

The use of helicopters must be guided by the EEA Guide to Using Helicopters in Power Company Work.

Helicopter operation must comply with part 135 and part 133 of the Civil Aviation Authority rules.

The use of unmanned aircraft must comply with part 101 and part 102 of the Civil Aviation Authority rules.

6.12 Safe Operation of ATVs

All-terrain vehicle (ATV) operation must be guided by the WorkSafe Guide to Safe Use of Quad Bikes.

6.13 Worksite Security

Restricted areas must be secured against unauthorised entry at all times, and if doors or gates need to remain open or unlocked, precautions must be taken to prevent unauthorised access.

When a worksite is vacated before completion, such as overnight, it must be secured to minimise the risk of harm and prevent people from gaining access. Temporary fencing or barriers should be installed where necessary to protect workers and others from hazards, and warning signs or flags by day, along with reflective signs or lamps at night, must be used if required.

Temporary security fencing, barriers, or markings near live conductors must be non-conductive, strong enough, and properly supported to prevent contact with live conductors.

Permit area boundary markers must not be used for non-permit areas.

6.14 Confined Space

Confined space work must comply with AS 2865 Confined Space standard and be guided by the WorkSafe Guide Planning Entry and Working Safely in a Confined Space. Workers required to enter confined spaces must be suitably trained in confined space procedures, including rescue techniques.

6.15 Excavations

When planning and managing excavation work, a thorough risk assessment must be conducted to address potential hazards such as collapse, flooding, gas accumulation, underground service strikes, and contamination of soil or groundwater. All work should comply with relevant WorkSafe Guide Keeping Healthy and Safe while Working on the Road or Roadside and the New Zealand Utilities Advisory Groups Code of Practice for Utility Operators Access to Transport Corridors.

It is essential to determine whether the excavation work is notifiable to WorkSafe during the planning stage. Prior to entry each day and after events like heavy rain or earthquakes excavations must be inspected, and any exposed sloped soil should be covered to maintain safety.

Before any digging or use of excavation equipment, including trenchless methods such as thrusting, impact moling, pipe bursting, or directional boring, underground services must be identified by referencing plans, and using suitable cable and pipe location devices. Taking these precautions helps ensure the safety of workers and the integrity of existing infrastructure.

6.16 Mechanical Equipment

6.16.1 Guarding and Isolation Requirements

Guarding of conveyors must follow the guidance provided by WorkSafe. Before any work on or near mechanical equipment where movement may cause harm, the equipment must be isolated and rendered inoperative to prevent movement. The device used for isolation or rendering inoperative must be locked (if locking is available) and tagged. Motorised operating mechanisms must also be made inoperative before work begins.

6.16.2 Work on Mechanical Equipment

Plans for work on mechanical equipment such as large internal combustion engines, turbines (gas, hydraulic, steam, wind), elevator hoist equipment or elevator shaft spaces, conveyors, large fans, and overhead cranes must include requirements for:

- Disconnecting or rendering inoperative any starting or drive motor (e.g., by removing a coupling, disengaging a clutch, opening switches, or removing fuses).
- Locking and tagging the device used for disconnection or rendering inoperative (where available).
- Isolating steam, fuel, water, and starting air supply, and locking and tagging the isolation mechanism.
- Mechanically locking or restraining any mechanism that may cause harm when it moves (e.g., when brakes are released or couplings are disconnected).

6.16.3 Rotating Equipment and Barring Gear

Plans for work near rotating equipment must ensure that the equipment is stationary. The exception is when equipment is rotated by barring gear; in such cases, the Access or Test Permit must state that rotation using installed barring gear is allowed. Where barring gear is required to remain in service, this must:

- Be agreed upon between the Issuer, Recipient, and Supervisor during planning.
- Occur for the minimum time necessary.
- Prevent access to any rotating parts during this time.

6.16.4 Control of Supply Mechanisms

Before work on or near mechanical equipment designed to control any supply of steam, fuel, water, or starting air:

- The supply mechanism must be isolated.
- The means of isolation must be locked (if locking is available) and tagged.

6.16.5 Managing Stored Energy

Plans for work involving stored energy must require its dissipation unless the equipment is normally handed over with stored energy (e.g., circuit breakers with pressurised air receivers or charged mechanisms), a specific request is made for it to remain, or isolation or other measures have been applied to prevent operation (e.g., isolating a governor high-pressure oil system or locking a swing ring near wicket gates). Before work on or near equipment containing stored energy that could cause movement, the energy must be dissipated and secured to ensure it cannot cause harm.

6.17 Work in Hazardous Areas

Before work in waterways, large pipes, storage hoppers, and normally sealed areas such as storage tanks and furnaces:

- All supply pipe valves, gates, passages, and conveyors leading to the area must be opened, closed, or stopped as appropriate.
- All operating mechanisms must be rendered inoperative, locked (if locking is available), and tagged.
- Contents must be drained, purged, flushed or removed unless otherwise stated in plans.
- Stop logs or coffer dams must be installed as appropriate.
- Access covers must be removed or secured in the open position, and atmospheric pressure must be proven before removal.

6.18 Specialist Work Areas

Abrasive blasting must comply with the Abrasive Blasting Regulations 1958.

Work with asbestos or asbestos-containing materials must comply with the Health and Safety at Work (Asbestos) Regulations 2016 and the WorkSafe Approved Code of Practice for management and Removal of Asbestos.

For work near high-temperature pipework and equipment, industrial workwear (including overalls) must fully cover the body, including arms, torso, and legs.

When working with loose but enclosed materials (e.g., coal hoppers), the selected method must prevent the risk of workers being trapped or engulfed.

The safe use of pressure vessels must follow the WorkSafe Code of Practice and the guide to regulations relating to pressure equipment, cranes, and passenger ropeways.

6.19 Tree Work

Felling, trimming, maintaining, or removing trees including cutting scrub near power lines must comply with:

- WorkSafe Approved Codes of Practice (ACoP).
- Maintenance of Trees around Powerlines,
- Safe Practice for Forestry and Harvesting Operations and
- Safety and Health in Arboriculture Forest Operations

Workers must maintain the MADs for both personnel and mobile plant.

7 PLANT AND EQUIPMENT

Mobile plant and tools provided for workers must:

- Be suitable for the required work.
- Be appropriately maintained and tested.

Workers are responsible for:

- Using tools and equipment only for their intended purpose.
- Inspecting all tools and equipment before use to ensure they are suitable, free of defects, not due for period certification, and within the test date where appropriate.
- Ensuring all Instruments used for testing are checked before use to ensure they are appropriate for the work and functioning correctly.

Supervisors must ensure that mobile plant, tools, and other equipment necessary for performing the work are used safely and correctly.

7.1 Mobile Plant

The safe use of mobile plant and vehicles close to live conductors must adhere to the EEA guides for Mobile Plant Operation.

Mobile plant operating near live equipment must be earthed, especially when work occurs within 4 metres of live equipment or if there is any risk of accidental contact or flashover with live parts, including buried cables. Special precautions, thorough hazard management, competent operation, and effective supervision are essential for safety in such environments. Only workers deemed competent may operate mobile plant at reduced minimum approach distances, and safety observers must be appointed where required.

Worksite safety plans for mobile plant near live bare conductors must specify agreed minimum approach distances in accordance with NZECP 34, and any special precautions, such as the use of safety observers, to maintain these distances. Before starting work, Supervisors are responsible for ensuring the site is set up and all movements are planned to keep clear of live conductors at all times, including during the positioning of mobile plant.

Physical controls, such as restraints and barriers, should be used where practical to prevent any part of the mobile plant or vehicle from entering minimum approach zones. Barriers should be erected, and the public must be warned to keep clear of the work area.

When operating in or near a switchyard or using winching or hauling equipment near live conductors, asset owner earthing requirements and minimum approach distances must be strictly followed, with assigned Safety Observers ensuring compliance.

All workers are responsible for maintaining safe distances from live conductors, whether operating mobile plant or working from platforms or buckets. Risks associated with step and touch potential must be managed by keeping clear of mobile plant and its attachments, using bonding, or ensuring insulation from the plant.

If mobile plant contacts a live or potentially live conductor, the operator should remain in the cab, avoid stepping down, warn others to stay clear, and only attempt to clear the conductor if it can be done safely. If it becomes necessary to exit the plant due to imminent danger, the operator should switch off the engine, remove loose clothing, jump well clear with feet together, and shuffle away to safety. All other workers must keep clear until the plant is deemed safe by a competent person and ensure others do the same. Any such incident must be recorded, and the asset owner notified by the Supervisor.

Note – Use of NZECP 34 extracts

The following figures are extracted from **NZECP 34:2001, New Zealand Electrical Code of Practice for Electrical Safe Distances**, and are included to support understanding of the minimum approach distance requirements in this section. These figures are not a substitute for NZECP 34. The full Code must be read, understood, and applied wherever work is planned or carried out near live electrical conductors or equipment.

The following NZECP 34 extracts relate specifically to mobile plant operating near overhead electric lines. These extracts are provided for clarity only and must be read together with Section 6.3 Minimum Approach Distances and the full requirements of NZECP 34.

SECTION 5
SAFE DISTANCES FOR THE OPERATION OF MOBILE PLANT NEAR CONDUCTORS

5.1 GENERAL

5.1.1 This section does not apply to live line work or to any conductor forming part of the mobile plant or any collector wire, insulated cable, or flexible cord used for the purpose of supplying electricity to the mobile plant.

5.1.2 Mobile plant working near an electric overhead electric lines can damage the line and be hazardous for the plant operator, the mobile plant and people in the vicinity.

5.1.3 Conductors can be displaced from their normal position by wind or temperature change. This requires special consideration by mobile plant operators.

5.1.4 This section does not apply while mobile plant is in transit on a road and the relevant requirements of the Traffic Regulations 1976 are observed.

5.2 MINIMUM APPROACH DISTANCE

5.2.1 The distance between any live overhead electric line and any part of any mobile plant or load carried shall be **"AT LEAST 4.0 METRES"**, unless the operator has received written consent from the overhead electric line owner allowing a reduced distance.

5.2.2 When an approval has been obtained pursuant to clause 5.2.1, and subject to clause 5.5.1, the minimum approach distance between a conductor and any mobile plant shall not be less than specified in Table 6.

5.2.3 Figure 5 provides a quick reference guide to the minimum safe distances for use of mobile plant near conductors of overhead electric lines.

5.3 WORKING ABOVE OVERHEAD ELECTRIC LINES

5.3.1 Mobile plant or any load carried shall not operate above the conductors of any overhead electric line unless the operator has received written consent from the overhead electric line owner to work above the overhead electric line.

5.3.2 The use of helicopters above overhead electric lines is governed by the Civil Aviation Rules.

5.4 CONSENT FOR REDUCED MINIMUM APPROACH DISTANCES

5.4.1 The application for written consent from the overhead electric line owner shall be made with reasonable notice.

5.4.2 The overhead electric line owner's written consent shall advise:

(a) The voltage of the overhead electric line and the minimum approach distance to be observed, which shall not be less than the requirements of Table 6; and

(b) Any other reasonable conditions to be observed while working in proximity to, or above, the overhead electric line.

(c) The section of line to which the consent applies.

Figure 3 Safe distances for the operation of mobile plant near conductors - from NZECP 34 Electricity Authority

TABLE 6 REDUCED MINIMUM APPROACH DISTANCES
(where written consent has been obtained)

Circuit voltage	Minimum approach distance (m)
Not exceeding 1 kV – insulated conductor	0.15
Not exceeding 1 kV – conductor not insulated	1.0
Exceeding 1 kV but not exceeding 66 kV	1.0
Exceeding 66 kV but not exceeding 110 kV a.c. or d.c.	1.5
Exceeding 110 kV but not exceeding 220 kV a.c. or d.c.	2.2
Exceeding 220 kV d.c. but not exceeding 270 kV d.c.	2.3
Exceeding 270 kV d.c. but not exceeding 350 kV d.c.	2.8
Exceeding 350 kV d.c. or 220 kV a.c.	4

5.5 REDUCED MINIMUM APPROACH DISTANCES FOR COMPETENT EMPLOYEES

5.5.1 Where the operator of any mobile plant is a competent employee working on, or in the proximity of, an overhead electric line, the approach distances may be reduced in accordance with the safety practices determined by the overhead electric line owner.

5.5.2 Direct contact of insulated elevating work platform with live conductors shall be acceptable only under approved live working procedures. Whenever a special reduced minimum approach distance is applied, the maximum practicable clearance from conductors shall be maintained.

5.6 OTHER REQUIREMENTS

5.6.1 Where any mobile plant is likely to be used at any time in the proximity of overhead electric lines, the owner or operator of such device shall affix an approved warning notice in a conspicuous place as near as practicable to the operator's position. The notice shall be maintained in a legible condition and shall state:

"WARNING, KEEP CLEAR OF POWER LINES".

5.6.2 Any mechanically operated hedge cutter used under or in close proximity to any overhead electric line shall be operated to prevent hedge clippings or other material being thrown into contact with the conductors or creating any other hazard.

Figure 4 Table 6 Reduced Minimum approach distances - from NZECP 34 Electricity Authority

7.2 Cranes

The design, manufacture, supply, safe operation, maintenance, and inspection of cranes should follow the WorkSafe Approved Code of Practice for Cranes. The use of cranes must comply with the Health and Safety in Employment (Pressure Equipment, Cranes and Passenger Ropeways) Regulations 1999. The use of cranes and rigging gear should be guided by the Crane Safety Manual for Crane Operators and Dogmen, and the EEA Line Mechanics and Cable Jointers Handbook.

7.2.1 Slings and Lifting Equipment

The use of slings, cranes, and rigging gear should comply with the relevant WorkSafe codes of practice for cranes and load lifting rigging and the Crane Association of New Zealand (CANZ) Crane Safety Manual for Crane Operators and Dogmen.

7.3 Mobile Elevated Work Platforms (MEWPs)

MEWPs must be equipped with operator controls in the bucket, a compliance plate indicating the safe working load, maximum wind speed, and maximum operating gradient, suitably rated and marked fall-arrest anchorage points, and a designated temporary earthing point if required. These platforms must have current safety inspection certification, including six-monthly and major inspections, carried out by either an authorised inspector with a Certification Board for Inspection Personnel Competence Certificate for MEWPs or an inspector accredited by the manufacturer. The setup of MEWPs should follow the WorkSafe Best Practice Guide to MEWPs. When used within the minimum approach distance of live conductors, MEWPs must be electrically insulated and certified accordingly. Insulation and maintenance of MEWPs must comply with the requirements of NZECP 46.

7.4 Fork Hoist

The use of forklifts must comply with the WorkSafe code of practice relating to powered industrial lift trucks, and follow guidance provided in the EEA Guide for ESI Use of Mobile Plant.

7.5 Winching

Winching and hauling practice must comply with the WorkSafe code of practice relating to safety and health in forest operations.

7.6 Other Working at Height Equipment

All temporary work platforms, excluding pole boards, used for work at height must have a guardrail in place.

Scaffolding must meet the requirements of Regulation 22 of the Health and Safety in Employment Regulations 1995.

7.7 General Equipment

The provision of portable equipment for work on or near conductors must be guided by the relating EEA guide.

7.8 Electrical Insulating Equipment

Electrical insulating equipment must be inspected and tested for safety before first use and at intervals required by industry procedures to confirm effective insulation at the intended voltage.

Any equipment used for insulating purposes must be of suitable rating and design for the conditions of use. This suitability may be proven by type testing, and the gear must be of a type provided by the asset owner or employer and/or endorsed for use by the electricity industry or relevant sector. Portable equipment used for work on, or within the MADs of, conductors must be supplied by the employer or asset owner and inspected immediately prior to use to confirm it is in good condition and not due for re-inspection. Additionally, all such equipment must undergo thorough inspection by a competent person at intervals specified by industry guidelines.

Electrical insulating equipment must be checked immediately before use to ensure it is free of defects.

Insulating equipment must be suitably stored to prevent damage or deterioration. Tools or equipment must not be placed in those containers or compartments in which insulating gloves or boots are stored.

Workers must take care to prevent damage during use by avoiding contact with rough surfaces or sharp objects (including watches or jewellery), exposure to heat or strong sunlight, and contact with oil, grease, turpentine, motor spirit, strong acids, or other corrosive substances.

7.9 Chainsaws

Further detailed resources, refer to the WorkSafe and NZ Forestry Guidelines.

7.10 Powder Actuated Tools

Powder-actuated tools must be loaded only where it is intended to be used and immediately before use.

If a powder-actuated tool has been loaded but not put to immediate use, the charge and the fastener must both be removed.

7.11 Handheld Appliances

Hand-held electrical appliances must comply with Regulation 89 of the Electricity (Safety) Regulations 2010 and be inspected to ensure they are in good condition before use. Appliances must be tested in accordance with relevant AS/NZS standards and the EEA Guide Use Inspection and Testing of Portable Equipment. When used indoors in damp conditions, outdoors, or in buildings under construction, appliances must be protected by one of the following: a residual current device (RCD), an isolating transformer not exceeding 230 volts, or double insulation. Safeguards must be connected directly to the power source, and only one appliance may be connected to each isolating transformer. In environments where workers are immersed in or surrounded by conductive substances, these measures are insufficient; alternative protections prescribed by the Electricity (Safety) Regulations 2010 must be applied.

8 PERSONAL PROTECTION EQUIPMENT (PPE)

8.1 Personal Protective Equipment (PPE), Overarching Requirements

Employers must develop standards for industrial workwear that suit the variety of work required of their employees and ensure that workwear is provided to meet these standards. These standards should incorporate the requirements of any upstream PCBUs. PPE must be provided to workers and should be:

- A reasonably comfortable fit
- Appropriately maintained and tested
- Suitable for the nature of work and any associated risks
- In accordance with the requirements of the asset owner and the employer

Workers must use suitable PPE and protective clothing where required. PPE should be inspected before use and worn in accordance with supplier information, employer requirements, and asset owner requirements. It must only be used if it is clean and free of defects. Supervisors must ensure that workers use the required PPE and protective clothing. Workers must receive training on how to select, wear, and use the PPE they are required to use. Additionally, any industrial workwear requirements issued by the employer or asset owner as a control for arc flash must be complied with in the prescribed circumstances.

8.2 Industrial Workwear

Industrial workwear must be selected based on a job-based risk assessment. If the standard issue of industrial workwear provided by an employer or asset owner is inadequate, this must be identified before work commences, and additional personal protection equipment or controls must be used. Workers are required to wear industrial workwear, including overalls, that comply with standards set by their employer or asset owner, as well as the requirements of any upstream PCBUs.

High visibility garments must meet the requirements of AS/NZS 1906.4:2023 standard for retroreflective materials and devices for road traffic control purposes.

For work on or near live conductors, including high-capacity battery banks, industrial workwear must:

- Fully cover the body, including arms, torso, and legs
- Have no metal fittings unless protected by a layer of the same material as the garment on both the top and undersides
- Be flame retardant or arc-flash rated
- Have a minimum arc rating of 8 cal/cm² for work on live conductors
- Have a minimum arc rating of 4 cal/cm² for work in the vicinity of live conductors
- Be worn over natural fibre or material that is flame retardant or arc flash rated to prevent flammability with melting/dripping properties when exposed to heat or flame

Industrial workwear for HV live line work must meet the requirements of NZECP 46.

8.3 Safety Helmets

Only non-conducting safety helmets must be worn, and they must comply with a recognised standard and be appropriate for the intended use. Methods for head protection should be guided by the AS/NZS standards for occupational protective helmets and the ANSI/ISEA standard for industrial head protection.

Safety helmets used with a PFAS, where there is a risk of free-fall that may result in a head injury, must be fitted with a head and chin harness to ensure the helmet does not dislodge during a free-fall. The chin strap strength must be at least 150 N.

When preparing for work on or near conductors that are live or that may be capable of becoming live a safety helmet must be worn.

A safety helmet must be worn for all overhead work.

When working with tractors and earthmoving vehicles, safety helmets must be worn to protect against falling, flying, or moving objects. Safety helmets should be worn in all designated areas and any other area where there is a risk of head injury from falling or moving objects, such as switchyards and construction sites.

8.4 Insulating Gloves, Boots, Mats and Sleeves

Insulating gloves, screens, mats, boots, and protective covers must be provided. These items must be marked with the standard, class, and size, be within the valid test date, the next due test date should be recorded or labelled on the container, glove, sleeve, or boot.

Gloves and sleeves should be examined for cuts and weak spots, and gloves rolled from the cuff end to verify air tightness. Workers must take care to prevent damage during use by avoiding contact with rough surfaces or sharp objects (including watches or jewellery), exposure to heat or strong sunlight, and contact with oil, grease, turpentine, motor spirit, strong acids, or other corrosive substances

Maintenance of insulating gloves and sleeves must meet the ASTM International specification for in-service care. Additionally, insulating gloves should be used with over gloves for mechanical protection where reasonably practicable.

Workers must check that electrical insulating gloves are appropriately rated for the use before using them.

Insulating gloves must be worn when:

- applying or removing portable earths, temporary bonding connections, or LV bonds
- using fuse pullers, fuse sticks, operating sticks, measuring sticks, or universal sticks on live equipment or conductors, unless the device is fully insulated to the working voltage
- operating switches, circuit breakers, or reclosers manually, unless touch voltages are within safe limits and an equipotential zone has been established
- there is a risk that the conductor or fitting being worked on could contact other live metal, unless the conductor is adequately earthed to keep any resulting voltage rise within safe limits
- working on or near live conductors, or conductors that may become live
- undertaking overhead work prior to leaving the ground
- installing or removing conductors on poles carrying live conductors, irrespective of the insulation on the conductor

8.5 Personal Fall Arrest Systems (PFAS)

PFAS equipment must be selected, used, inspected, and maintained in accordance with AS/NZS 1891.4, WorkSafe good practice guidance, and applicable EEA guidance.

PFAS equipment must be:

- formally inspected, maintained, and removed from service by competent persons in accordance with AS/NZS 1891.4, manufacturer instructions, and employer or asset owner requirements
- suitable for the task, work position, fall exposure, fall clearance, anchor or attachment arrangement, and electrical environment
- inspected before use and not used unless free of defects, within inspection and test requirements, and suitable for the intended use
- configured so that pole straps or work positioning systems create no possibility of free fall and are attached to a secure point from which they cannot slip
- checked before weight is placed on the harness, pole strap, or work positioning system, including all fastenings, snap hooks, and attachment points
- adjusted to minimise possible free-fall distance and keep arrest forces within equipment ratings and AS/NZS 1891.4 limits
- used with an energy absorber where required by the system design, possible free-fall distance, or manufacturer's instructions
- supported by additional controls where a work positioning system is intended to support the worker's weight

8.6 Safety Glasses

Appropriate eye protection must be worn in designated eye protection areas and any other areas or activities where there is a risk of eye injury, including from an arc flash. Methods for eye protection should be guided by the associated WorkSafe guide and AS/NZS 1337.1 standard related to eye and face protection.

8.7 Safety Footwear

Safety footwear must be worn by all personnel when undertaking work, unless otherwise specified by an approved risk assessment. Footwear must be appropriate to the task, work environment, and identified hazards.

Safety footwear must provide protection against impact, penetration, crushing, slips, and uneven ground. Footwear must be maintained in a serviceable condition and must not be worn if damaged, excessively worn, modified, or otherwise unfit for purpose.

Where work involves actual or potential exposure to electrical hazards, including proximity to live conductors, energised equipment, or step and touch potential, a risk assessment should be undertaken to determine the type of safety footwear to be used. The risk assessment should consider whether appropriate dielectric (electrically insulating) or static-dissipative (SD) footwear is required and ensure it is worn in accordance with the task risk controls. Dielectric or Electrical Hazard rated footwear must not be relied upon as the sole means of electrical protection and must be used in conjunction with other specified electrical safety controls.

All safety footwear worn for work covered by this SM–EI must comply with the requirements of AS/NZS 2210.3 Occupational Protective Footwear, including applicable construction, performance, testing, and marking requirements.

8.8 Hearing Protection

Hearing protection should be worn in all designated areas and where the noise level exceeds a daily average of 85 dBA (over no more than 8 hours per day) or a peak of 140 dBA. Hearing protection provided to employees must be the correct class for the environment and work being undertaken.

The required class of hearing protection (classes 1 to 5) depends on the noise level and the duration of exposure. Noise control must comply with Regulation 11 of the Health and Safety Employment Regulations 1995.

Methods for hearing protection should be guided by the WorkSafe Code of Practice for Managing Noise in the Workplace and the AS/NZS 1270 Acoustic Hearing Protectors Standard.

Worksite noise levels must comply with the WorkSafe Code of Practice for Managing Noise and the Factsheet on Noise in Construction.

8.9 Breathing Apparatus

Respiratory protective equipment must be selected in accordance with the respirator selection tool provided by WorkSafe, and AS/NZS 1715 Selection, use and Maintenance of Respiratory Protective Equipment standard.

9 HAZARDOUS MATERIALS

The use and handling of various hazardous materials, including Polychlorinated Biphenyls, cleaning solvents, pulverised fuel, radioactive materials, Synthetic Mineral Fibres, and lead-based paints, must adhere to specific guidelines and regulations.

It is important to note that the EEA is not the authoritative body on environmental issues. For detailed information pertaining to chemicals, please refer to the relevant Safety Data Sheets.

10 INDEX

Note: This index is intended as a practical navigation aid. Section references are provided instead of page references to support both printed and digital use of the SM–EI and to allow for future updates without requiring re-pagination.

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