

STANDARD OPERATING PROCEDURE - ELECTRICAL



1. Purpose

This Standard Operating Procedure (SOP) sets out the mandatory health and safety standards to be applied on all Perkins project sites in order to control significant hazardous task, thing or circumstance. SOPS do not replace any Regulatory requirements, Codes of Practice or Australian Standards and are to be used in conjunction with the documents referenced in Section 3. This SOP shall be read in conjunction with the Perkins Builders Electrical Safety – Safety Practice (90.02.05).

2. Mandatory Requirements

- Photocopies of electrical qualifications and licences for those carrying out work on electrical equipment or installations are to be uploaded to Hammertech with the employee's site induction.
- Prior to Perkins allowing the use of any energised electrical installation a Certificate of Compliance (State Specific) stating the electrical services have been installed, inspected tested and commissioned in accordance with the local electrical safety requirements and **AS 3012 Electrical Installations-Construction and Demolition Sites**, is to be obtained from the relevant electrical services installer for the installed electrical services and equipment including but not limited to:
 - Installation of main switchboard (including the use of existing);
 - Installation of temporary distribution boards;
 - Supplying power to any site office, lunch/change room, ablution blocks, containers or storage areas;
 - Installation of temporary lighting, including any emergency battery back-up lighting;
 - Supplying power to any hoist (personnel and/or personnel & materials);
 - Supplying power for a tower crane.
- All electrical equipment is to be recorded on an electrical equipment register

Temporary Electrical Supply

- Temporary electrical supply cables, boards, leads etc., including any subsequent relocation, must be located so as not to present tripping hazards or physical damage by vehicles, water, etc. (refer figure 1).
- Electrical supply panels must be sufficient in number, located in close proximity to work areas to minimise trailing cables, secured to prevent unauthorised access.
- All electrical circuits, including mobile generator sources, must be protected by an Earth Leakage Circuit Breaker (ELCB), Residual Current Device (RCD) or a Ground Fault Circuit Interrupter (GFCI), fitted at the source.

Leads and cables are to meet the following requirements:

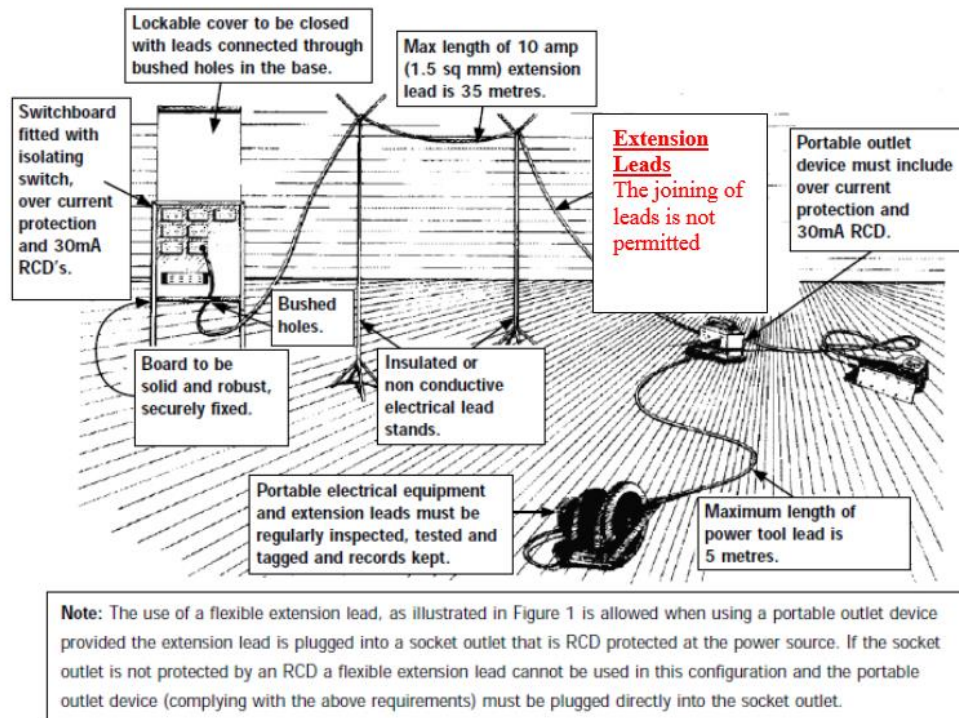
- Heavy duty with lipped see through or molded plugs- no green

Current rating (A)	Conductor size (mm ²)	Maximum length (metres)
10	1.0	25
	1.5	35
15	1.5	25
	2.5	40
20	2.5	30
	4.0	50

- Typical temporary electrical installations are to meet the requirements as depicted below:

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Figure 1: Guide to electrical practices on site



- Temporary electrical boards are to meet the following requirements:
 - Must comply with AS/NZS 3012
 - Installed in a manner and location so as to prevent tip-over or movement (e.g. secured to a wall, post or free-standing structure) and to be of IP23 Rating where affected by the weather or the ingress of water if installed in wet area locations;
 - Include a device to prevent strain or termination of cables and flexible cords (e.g. tie-bar);
 - Must not be moved unless a licenced electrician has isolated power to the temporary electrical board.
 - Protected from weather extremes;
 - Be designed to ensure all main switches are accessible at all times;
 - Clearly marked and capable of being locked in an open or closed position;
 - Have markings at least 6mm high, in a clear and legible manner, identifying all mains/isolating switches;
 - Sign on door stating: 'KEEP CLOSED, RUN LEADS THROUGH BOTTOM';
 - Area in front of switchboards are to be kept clear at all times (1.2m minimum clearance);
 - Identification of who to contact, contact number and where identification/location of where the board is fed from.

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Testing and Tagging of Electrical Equipment

Equipment Type	Test Frequency	Means of Identification
Leads	3 Monthly	December to February – RED March to May – GREEN June to August – BLUE September to November - YELLOW
Power Tools	3 Monthly	December to February – RED March to May – GREEN June to August – BLUE September to November - YELLOW
Temporary Switchboards Inclusive of RCD	3 Monthly	December to February – RED March to May – GREEN June to August – BLUE September to November - YELLOW
Electrical Equipment within Construction Site Offices	12 Monthly	Date Tagged
Portable RCD	3 Monthly and in addition Press button tested prior to use	December to February – RED March to May – GREEN June to August – BLUE September to November - YELLOW
Non-portable RCD (e.g. Site sheds, ablution blocks)	Yearly and in addition Press button tested upon installation and monthly thereafter prior to use	Date Tagged

Services Identification and Protection

- Live electrical services/equipment shall be permanently decommissioned or otherwise temporarily decommissioned by a licensed electrician where there is a risk to any worker coming into contact with live electrical equipment or services when performing their work. Where it is not reasonably practicable to permanently or temporarily decommission the services, appropriate safeguards are to be established to ensure those undertaking the work are protected and informed of the presence of live services.
- An Isolation Permit** is to be completed, in conjunction with the relevant electrical trade subcontractor to identify the status of services within any area where the risk to others from live electrical services has been identified (e.g. working in ceiling voids, demolition of walls, floors etc.) and where the status of services needs to be communicated to others.
- The status or change of status of electrical installation services is to be communicated to relevant workers through tool box talks or induction into the relevant SWMS (i.e. where their work involves working on or near live electrical services) which shall include reminding them of the need to continue to treat all cables as potentially live and not to cut these or remove them.

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- All ends to new and existing cables that are not connected to a junction box, fitting, appliance or equipment are to be folded over with the end of the cable taped with approved electrical tape so as to further minimise the risk of persons inadvertently coming into contact with a live electrical cable.
- All live cables shall be labelled every 5m where accessible

Work on Energised Electrical Systems

Works on electrical equipment and electrical installations must not be undertaken or allowed to be undertaken whilst the equipment is energised. However, where in exceptional circumstances it is necessary, in the interests of health and safety that the electrical work is carried out on the equipment while the equipment is energised (Example. It may be necessary in a hospital situation that life-saving equipment remain energised and operating while electrical work is carried out on the Equipment) There is deemed no reasonable alternative to carrying out the work while energised if one of the following applies

- A risk assessment must be carried out by a competent person, and they are satisfied that:
 - i. There is no reasonable alternative to carrying out live work
 - ii. The risks identified by the risk assessment are or can be reduced to as low as reasonably practicable.
 - iii. The work can be carried out safely.
- It is deemed No Reasonable Alternative to carrying out live work if one of the following applies-
 - a) For the work to be carried out effectively.
 - b) Carrying out the work by alternative means would put the health or safety of one or more persons in imminent danger.
 - c) In order to test, measure the performance of, or detect or locate faults or defects
- A SWMS must be completed and approved by the Site Manager
- Suitable safety equipment and PPE is used

Approval to work on energised installations is to be obtained from the Relevant Regulatory Authority, Perkins's General Manager and HSE Manager.

Lock-out / Tag-out (LOTO)

- A Lock-out / tag-out (LOTO) procedure is to be obtained from the electrical contractor for the works and must be referenced in the relevant Safe Work Method Statement (SWMS);
- The procedure must reflect the need to ensure lock-out ('Engineering') control is used as the primary control, in conjunction with tag-out ('Administrative') controls, and is to include:
 - Isolated circuits to be locked out with personal danger tags
 - Personal danger tags to be installed and removed by the same worker only, do not remove other workers danger tags
 - Circuits are not to be isolated with zip ties, copper wire or similar tags that can be easily removed

Requirements for Residual Current Devices (RCD)

- Where temporary electrical supply for construction/demolition work is not provided (e.g. in the case of working in existing a partially occupied building or office space) and the electrical supply is to be taken from an existing wiring socket (e.g. the buildings existing power supply) an appropriately qualified electrician is to test the circuit and confirm in writing the power supply is RCD and Earth leakage protected and the cabling meets AS/NZS 3012 prior to use.
- Where the supply is not RCD and Earth leakage protected, or the cabling does not meet AS/NZS 3012, an RCD and Earth leakage protection shall be installed, so far as is reasonably practicable, to protect the circuit. On completion an appropriately qualified electrician is to confirm in writing the circuit is safe to use.
- Where the electrical supply for construction/demolition work supply can only be obtained from an existing permanent wiring socket outlet, and the outlet is not protected by an RCD, a portable RCD must be connected between the socket outlet and the equipment plugged into the socket outlet.

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- Sub-mains supplying site sheds shall incorporate an RCD having a rated tripping current not exceeding 100 mA;
- In the event of an RCD or circuit-breaker operating, the cause of any fault should be assessed by a licensed electrician before reset

Construction Wiring

- Construction wiring shall be readily distinguishable from permanent wiring by using cable of a different colour or by attaching iridescent yellow tape spaced at intervals appropriate for the work location and generally not exceeding 5 meters and stamped with the words '~~temporary~~ construction wiring'.
- Unarmoured cables shall not be installed on metallic roofs or similar structures unless suitably protected against mechanical damage.
- Overhead wiring shall be positioned to avoid crossing roadways or access ways where cranes, high loads, or heavy machinery may travel. Where it is not possible to avoid crossings and access ways an effective means shall be provided to minimise the risk of the vehicular contact with the aerial wiring system, e.g. by placing a flagged catenary wires at a lower level at a distance before the overhead wiring.
- Cables supported by means of a catenary shall be stranded or flexible cables affording double insulation or the equivalent of double insulation.
- Cabling shall be installed in a manner so as to avoid cables hanging down and thereby being prone to snagging or interference with workers and plant.
- Construction wiring and lighting shall not be roughed in as permanent wiring.

Extension Cords and Fittings

- 3 pin plugs and cord extension sockets used on flexible extension cords and portable power tools are to be either a non-rewirable (moulded) or transparent type.
- Cables that are normally used for fixed wiring are not be used as flexible extension cords.
- Flexible extension cords are to be elevated above any work area or passageway to ensure that clear access is provided beneath.
- Flexible extension cords must not exceed 30 meters and not be joined (piggy backed).
- Flexible extension cords used in multi- storey construction are to be confined to the same floor as the power source (this does not apply in the case of formwork; external staging; lift or service shafts and stairwells).

Lighting

- Adequate artificial lighting to illuminate the work area is to be installed if there is insufficient natural lighting.
- Lighting levels should be a minimum 40 Lux in Walkways 160 Lux in General Work areas
- Lamps in luminaires must be protected against mechanical damage.
- Sufficient battery powered lighting in stairways and passageways is to be provided to allow safe access and egress from the area if there is insufficient natural lighting and if there is a loss of supply so as to allow persons to exit work areas safely.
- Emergency lighting shall meet the requirements of AS 2293.
- Temporary wiring supplying lighting circuits shall be connected to the designated lighting circuits of the switchboard.

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Task Lighting

- Portable luminaires shall meet the requirements of AS/NZS 1939.
- A mechanical guard is to be fitted to task lighting in order to protect the lamp.
- Task lighting shall be of an adequate stability.

Portable Generators

- All portable generators shall comply with Australian Standard AS 2790, Electricity Generating Sets Transportable (up to 25 KW) or be fitted with core balance earth leakage protection having a rated tripping current not exceeding 30Ma.

Energisation/Commissioning

- Perkins Energisation Safety Practice 90.02.23 must be followed
- Energisation and commissioning procedures are to be provided to Perkins before energisation / commissioning are to include:
 - Requirements for developing a SWMS working in or around live services
 - Identification of circuits to be energised
 - Drawings/sketches reflecting services
 - Arrangements for communication to workers regarding circuits to be energised
 - Procedure for inspecting all outlets and circuits prior to energising/commissioning, ensuring that there are no open 'live ends'

3. References

- Work Health and Safety Act 2020
- Work Health and Safety (General) Regulations 2022
- Electricity (Licencing) Regulations 1991
- AS 3000 Electrical Installations (known as the Australian/Nex Zealand Wiring Rules)
- AS/NZS 3012 Electrical Installations-Construction and Demolition
- AS 3010 Electrical Installations - Generating Sets
- AS 2293 Emergency escape lighting and exit signs for buildings

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