

Electrical Practices for Construction Work

1. Purpose

The purpose of this Code is to provide practical guidance and set minimum safety requirements for electrical practices on all construction sites in NSW.

2. Definitions

In this Code of Practice :-

"Inspector" means an inspector appointed under the Occupational Health and Safety Act 1983 or associated legislation.

"Construction work" means construction work as defined in the Construction Safety Act 1912 (*see appendix*).

"Constructor" means constructor as defined in the Construction Safety Act 1912 (*see appendix*).

"Building work" means building work as defined in the Construction Safety Act 1912 (*see appendix*).

"Construction wiring" means a system of wiring which is installed to provide electrical supply for construction work and is not intended to form part of the permanent wiring.

"Permanent wiring" means a system of wiring in which the installation of cables is a permanent part of a completed building and meets the requirements for fixed wiring as defined in the Australian Standard 3000 SAA Wiring Rules, 1986 as amended.

"Festoon lighting" means a system of lighting in which lampholders are supported by the supply cable.

"Licensed electrician" means a person who is the holder of a Qualified Supervisor Certificate/Electrician as defined under the Building Services Corporation Act 1989.

"Single-Unit Dwelling House" means

- (i) in relation to a proposed building, a building that is designed, or designed principally, as a separate residence for one family or person, and
- (ii) in relation to an existing building, a building that is designed and used, or designed and used principally, as a separate residence for one family or person.

3. Constructor

The constructor is responsible for the application of this Code during any construction work.

4. SAA Wiring Rules

All electrical wiring installations and equipment used in construction work must be safe for use. Where a more specific provision is not made in this Code of Practice they must conform to the provisions of the Australian Standard AS 3000, Wiring Rules 1986, as amended, and the local Supply Authority Service and Installation Rules.

5. Construction wiring

Notify the local electricity supply authority after installation or alteration of any construction wiring.

Remove construction wiring only under the supervision of a licensed electrician.

Use the construction wiring only for the approved purpose. If the wiring is used in an unsafe way then it will be disconnected without notice by a licensed electrician authorised by an inspector or an officer from an electrical supply authority.

6. Core Balance Earth Leakage Devices (also known as Residual Current Devices) and Tests

Current operated core balance earth leakage devices must comply with AS 3190 1983 as amended for Current Operated (core balance) Earth Leakage Device Approval and Test Specification.

Protect every single phase final sub-circuit and final sub-circuits supplying hand held or portable equipment with a core balance earth leakage device with a rated tripping current not exceeding 30mA

Ensure this device:

- (i) is fitted at the switchboard where the final sub-circuit originates;
- (ii) protects individual circuits or a group of circuits.

Protect single phase final sub-circuits connected by construction wiring and supplying lighting with a core balance earth leakage device with a rated tripping current not exceeding 30mA.

Where construction work supply can only be obtained from a permanent wiring power outlet connect the core balance earth leakage device at the power outlet.

Ensure that every core balance earth leakage device on the worksite is:

- (i) trip tested monthly from the time of installation by a Licensed Electrician or other competent person authorised by the constructor;
- (ii) subject to a calibration test conducted by a licensed electrician every 3 months from the time of installation.

Record the results of the tests in a book kept on site listing:-

- (i) the plant number of the core balance earth leakage device;
- (ii) the result of the test;
- (iii) the date of the test;
- (iv) the name and signature of the person performing the test.

7. Switchboards

Ensure that construction supply switchboards are of robust weatherproof construction and:-

- (a) have a locking device;
- (b) the protective doors or lids are attached in a way that will not damage flexible extension cords connected to the board.
- (c) holes provided for cord access are bushed to prevent damage to the cords.

Attach switchboards securely to a permanent wall or a temporary structure which has been specifically designed for the purpose and meets the requirements of the local electrical supply authority. Attach pole or post mounted switchboards securely with coach screws or bolts or fix with suitable clamps.

Do not locate switchboards outside the construction work site.

Ensure that all switchboards, other than the main switchboard, have an isolating switch that removes power from all outgoing circuits when it is in the "open" position.

NOTE: Do not use the core balance earth leakage device as the isolating switch.

Lock the main switchboard at the end of work on each day. This can be done by the constructor or the constructor's nominee. Do not lock switchboards during working hours.

8. Sub Mains

Protect all sub-mains with circuit breakers, or HRC (high rupturing capacity) fuses.

Circuit breakers on sub-mains must be able to be locked in the "open" position and tagged. This is to ensure that it cannot be accidentally closed if isolated by an inspector or a licensed electrician.

9. Sub-Circuits

Protect final sub-circuits with an overcurrent circuit breaker labelled by a licensed electrician to identify the outlets or equipment they supply.

Isolate all power final sub-circuits, other than those supplying portable equipment, at the completion of work each day except for sub-circuits for amenities and equipment which operate outside normal working hours.

Distinguish final sub-circuit wiring from permanent wiring by using cable of a different colour or by attaching iridescent yellow tape printed with the words "Construction Wiring". Space the tape at intervals of not more than 5 metres.

10. Power Outlets

Ensure that every 240 volt three pin plug general outlet is:-

- (a) rated at 10 amperes minimum;
- (b) controlled by a double pole switch which operates in both the active and neutral conductors.

Use power outlets within site sheds only to supply power to plant and lighting within or immediately adjacent to the shed. Protect these outlets with a core balance earth leakage device. Do not use them to supply power to any other part of the building, structure or construction work site.

11. Multiple Outlets

Do not use double adaptors, 3 pin plug ("piggy back") adaptors and similar fittings on construction work.

If portable outlet devices are connected to permanent wiring with a flexible cord and 3 pin plug, ensure that they:

- (a) comply with AS 3105, 1987 as amended, Approval and Test Specification for Electrical Portable Outlet Devices;
- (b) have 240V socket outlets;
- (c) have overcurrent protection;
- (d) incorporate earth leakage protection;
- (e) are of robust construction and a design that has been accepted for use by the WorkCover Authority of New South Wales.

Ensure that power supplied from a permanent wiring outlet has core balance earth leakage device protection.

12. Cables

Support cables run in places where they may be disturbed in a way that eliminates excessive sag.

If cables are run in places where they may be damaged, enclose them in a way that protects them from damage as defined in AS 3000 1986 as amended.

13. Extension Cords and Fittings

Ensure that 3 pin plugs and cord extension sockets used on flexible extension cords and portable power tools are either a non-rewirable (moulded) type or a transparent type.

Fit three pin plugs to flexible extension cords in the way described in AS 3000, Wiring Rules 1986 as amended.

Do not use cables normally used for fixed wiring as flexible extension cords.

Do not locate flexible extension cords with plug socket connections in wet places or places where they are subject to damage by liquids.

Locate flexible extension cords above any work area or passageway so that clear access is provided, beneath them.

Ensure that fittings for flexible conductors and flexible extension cords are wired identically and that the identity of actives, neutral and earth connections are preserved in a like manner.

Confine flexible extension cords used in multi-storey construction to the same floor as the power source. Obtain power for use in stairwells from the floor above or the floor below the work area. This clause need not apply to:

- (i) falsework;
- (ii) lift or service shafts (see *Clause 17*).

Ensure that 240 volt flexible extension cords are heavy duty sheathed types which comply with AS 3199, 1982 as amended Approval and Test Specification, Cord Extension sets. The maximum length of a 240V cord extension set is shown in Table 1.

MAXIMUM LENGTHS OF FLEXIBLE CORD

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<i>Cord extension set rating A</i>	<i>Conductor area sq. mm</i>	<i>Maximum length of flexible cord (m)</i>
10	1.0	25
	1.5	32
15	1.5	25
	2.5	40
20	2.5	32
	4.0	40

MAXIMUM LENGTHS OF FLEXIBLE CORD

Do not extend 240 volt flexible extension cords of the maximum length by more than 5 metres by the attachment of electrical equipment.

Where non-portable electrical plant of fixed loading is installed, determine the length of the flexible cord used in line to solely supply power in accordance with the loading of the plant.

14. Electrical Plant

14.1

Ensure that all flexible extension cords, portable tools and electrical plant supplied at a voltage above 32 volts (extra low voltage) are inspected, tested and tagged as per Clause 14.7 and 14.8 by a licensed electrician at regular monthly intervals or at regular 3 monthly intervals for single unit dwelling house sites. Record details of the inspections and tests in a book kept on site or at the owner's premises.

14.2

Ensure that all electrical appliances in amenities sheds/site offices are inspected and tagged upon arrival or relocation on site and then at least three monthly intervals thereafter by a licensed electrician. At the date of the inspection use a current colour coded tag as specified in 14.7 and 14.8. That tag will be valid for at least 3 months. Record details of inspections and tests in a book kept on site or at the owner's premises.

14.3

Ensure that all electrical plant hired for construction work, is inspected, tested, tagged and recorded at the supplier's premises prior to issue. It is then the responsibility of the hirer to meet the conditions of Clauses 14.1 and 14.2

14.4

Show the record book of inspections to an inspector or the constructor within 24 hours of a request being made.

14.5

Ensure that the tags specified in Clause 14.1 and 14.2 show:-

- (a) the date of the inspection;
- (b) the plant number or inspection number of the item inspected;
- (c) the name of the testing company.

14.6

Ensure that details in the record book specified in Clauses 14.1 and 14.2 show:-

- (a) the date of the inspection;
- (b) the plant number or inspection number of the item inspected;
- (c) the results of the tests and inspections and details of any repair work;
- (d) the licence number and signature of the electrician.

14.7

Use a different colour tag for each month as follows:

- January - Red
- February - Blue
- March - Orange
- April - Green
- May - White
- June - Yellow
- July - Blue
- August - Green
- September - Red
- October - Yellow
- November - Orange
- December - White

14.8

Ensure that all tags:

- (i) are durable;
- (ii) are non metallic;
- (iii) are self-adhesive or positively secured;
- (iv) are incapable of re-use;
- (v) have a bright, distinctive surface.

15. Plant Inspections and Tests

When Inspecting electrical plant, ensure that:-

- (a) the outer sheath of electrical cords is not damaged to an extent that reveals the insulation of the inner conductor;
- (b) the sheath of all electrical cords is secured at the ends;
- (c) rewirable plugs and extension sockets are satisfactorily connected and are serviceable.

When testing electrical plant, ensure that:-

- (a) all electrical plant, extension cords and portable power tools are subjected to an insulation resistance test conducted at 500 volts D.C. with a minimum acceptable level of insulation resistance as follows;

- (i) for single insulated equipment, 1 Megohm measured between each live conductor and the earth conductor of the supply cord; and
 - (ii) for double insulated equipment, 10 Megohm measured between each live conductor of the supply cord and the accessible metal parts of the equipment.
- (b) all electrical plant, extension cords and portable power tools, except for double insulated tools, have a continuous and safe level of electrical conductivity for the earthing system not exceeding 2 ohms.

NOTE: Exercise due care when testing electronically controlled hand tools. Do NOT perform insulation resistance tests between active and neutral conductors.

16. Lighting

(a) Install adequate artificial lighting to illuminate the work area if there is not sufficient natural lighting. Protect the lighting by wire guards or proprietary manufactured diffusers.

Luminaires installed as part of the permanent electrical installation in site accommodation need no further mechanical protection.

Note: A lampholder is not regarded as a luminaire.

(b) Install sufficient battery powered lighting in stairways and passageways to allow safe access to and from the area if there is not sufficient natural lighting. Ensure that battery powered lighting has sufficient capacity to operate for a minimum of one hour if there is a loss of supply to the normal lighting in the area.

Use festoon lighting systems only for underground shafts, wells and tunnels, at 32 volts (extra low voltage) with lampholder fittings of the non-removable type moulded to the cable.

17. Lift and Service Shafts

Supply construction wiring for lift and service shafts from a separate final sub-circuit protected by a core balance earth leakage device. Use this supply only for installing lift and service shaft equipment.

Lift and service shaft lighting can have either construction wiring or permanent wiring. Use fluorescent lighting. Locate the lights on the floor above or below the work area. Ensure that the lighting has sufficient battery capacity to operate for a minimum of one hour if there is a loss of supply to the normal lighting in the area.

18. Transportable Construction Buildings

Ensure that electrical installations to transportable construction buildings comply with the following requirements:

- (a) If supply is by means of a flexible cord, do not take it from one transportable building to another transportable building.
- (b) Do not use flexible cords longer than 15 metres to supply a transportable building.
- (c) Connect each amenities building supplied by flexible cord to a final sub-circuit protected by a core balance earth leakage device with a rated tripping current not exceeding 30mA.
- (d) Protect flexible cords from mechanical damage.

19. Portable Generators

Ensure that all portable generators comply with AS 2790, 1989 as amended Electricity Generating Sets - Transportable (up to 25 KW).

Ensure that the power supply for all construction wiring emanating from a portable generating set complies with this Code of Practice including protection by a core balance earth leakage device with a rated tripping current not exceeding 30mA.

20. Personnel and Material Hoists

Unless written permission to do otherwise is obtained from the WorkCover Authority of New South Wales:

- (a) supply construction wiring for hoists from a separate final sub-circuit originating from the main switch board.
- (b) suitably identify this supply as being for the operation of the hoist or hoists.

Appendix - Definitions from the Construction Safety Act 1912

Construction Work means:

- (a) building work, excavation work, compressed air work and diving
- (b) work in or in connection with the construction or maintenance of roads, airfields or airstrips, or of the permanent way of a railway or a tramway
- (c) dredging or salvaging work
- (d) the laying, lining or maintenance of pipes or cables
- (e) earthmoving carried out with equipment for or in connection with the operation of which power other than manual power is used
- (f) land clearing in preparation for any work referred to in paragraph (a), (b), (d), or (e)
- (g) any work in which explosives are used; and
- (h) any other prescribed work.

Constructor, in relation to any construction work means: the person who by himself (otherwise than as a servant or agent of the person carrying out that work) or by his servants or agents carries out that work.

Building work means: work in constructing, erecting, installing, adding to, altering, repairing, equipping, finishing, painting, cleaning, signwriting, sheathing, spraying, dismantling or demolishing or any other prescribed operation that-

- (a) is done in relation to a building or structure, at or adjacent to the site thereof; or
- (b) is done in relation to a vessel on or adjacent to the vessel while it is at a wharf, in dock or on slips; and
- (c) work in lining any shaft, well or tunnel