

APPENDIX D
RISK ASSESSMENT PRIOR TO WORK ON ANU LOW VOLTAGE
ELECTRICAL INSTALLATION

All electrical work conducted on the ANU low voltage electrical installation shall be in accordance with the University's *Electrical Safety* hazard management procedure and the guidelines of AS/NZS 4836 *Safe working on low-voltage electrical installations*. The objective of this Australian Standard is to provide electricians working on low voltage electrical installations or systems with -

- (a) the principles of safe working practices; and
- (b) recommended procedures for safe working practices.

A risk assessment shall be carried out at the work site to assess the hazards that might have the potential to cause harm or damage. All workers involved in the task shall participate in the hazard identification and risk assessment. The assessment should be done using the ANU *Low Voltage Electrical Installation Risk Assessment* form given below, taking due consideration to the Warnings and Notes attached at the end of the form.

ANU
LOW VOLTAGE ELECTRICAL INSTALLATION
RISK ASSESSMENT

Hazard Identification

In addition to the electrical hazard, look carefully to identify other hazards and document the control methods that will be used to control the risk from these hazards.

| 1. Site Hazards | <u>CONTROL METHOD</u> |
|--|---|
| Are exits clear? | YES / NO |
| Is it a registered Confined Space? | YES / NO (If Yes Confined Space Entry Permit required) |
| Are safe barriers in place? | YES / NO |
| Noise levels? | YES / NO |
| Is there danger from vehicle movement? | YES / NO |
| Have access ways been provided? | YES / NO |
| 2. Climate Hazards | |
| Wet weather? | YES / NO |
| Is lightning about? | YES / NO |
| Heating precautions | YES / NO |
| Cooling precautions | YES / NO |
| 3. Height Hazards | |
| Can you fall? | YES / NO (Consult Facilities and Services Height Safety Procedures) |
| 4. Mechanical Hazards | |
| Is there rotating equipment? | YES / NO |

Could something be crushed? YES / NO
Is cutting/stabbing possible? YES / NO
Are burns possible? YES / NO
Can something strike you? YES / NO
Can objects fall on you? YES / NO

5. Manual handling Hazards

Is excessive effort required? YES / NO
Heavy Lift? YES / NO
Is it an awkward lift? YES / NO
Is the task repetitive? YES / NO
Is mechanical assistance required? YES / NO

6. Chemical/Environmental Hazards

Are you using chemicals and have you read the appropriate
Material Safety Data Sheet (MSDS) YES / NO
Are you working on a Fume cupboard YES / NO Read, Fume cupboard Procedure

7. Public Hazards

Traffic control? YES / NO
Area below work? YES / NO

Are there any **Other Hazards or Risks** not yet considered? e.g. pests, radiation or RF hazards etc.

Risk Assessment for Electrical Hazard

Date: ___ / ___ / ___ Building: _____

Detail of work proposed: _____

Name: _____

Electrical licence No: _____ State licensed: _____

(If Applicable) Electrical Contractor:

Name: _____

Company details: _____

Electrical licence No: _____ State licensed: _____

Work on the electrical installation shall only be undertaken by an A- Grade licensed electrician (Category 1 competent person, ANU Electrical Safety hazard management procedure).

Wherever reasonably practicable, isolate the electrical installation prior to undertaking the electrical work.

1. De-energised (Isolated) Working Procedure

The risk assessment below documents the practices used to eliminate the risk of inadvertent contact with energized conductors.

Isolate the electrical installation and determine it is safe by:

- a) Positive identification of the electrical installation, all of its energy sources and their isolation points.
Confirm complete with control method to be used: _____

- b) Isolate and discharge where necessary the electrical installation from all sources of supply e.g. substation, main switchboard, distribution board, and isolation switches.

Confirm complete with control method used: _____

- c) Secure the isolation by locking off, where possible, switches used for isolation by using a device for securing the switch in the open position (e.g. by clip, screw, bolt, pin, padlock, that will prevent the switch from being operated. Also apply a personal danger tag to each isolation point.

Confirm complete with control method used: _____

- d) Prove that the electrical installation and conductors have been adequately de-energized.

Confirm complete with control method used: _____

- e) Identify the safe area of work.

Confirm complete with control method used: _____

Note: Work on de-energized equipment shall proceed if the equipment is isolated and any other exposed conductors in the work area are either:

- a) De-energized and isolated; or
- b) Separated by barriers or by distance

If the above requirements are not satisfied, then work shall be done in accordance with the energized Section below.

2. Energized Working Procedure

It is to be expected that a Category 1 competent person will occasionally need to consider undertaking electrical work on or near the energized electrical installation. Such work should only be considered when all means of de-energizing the installation are deemed inappropriate, and then only after the risk assessment below has been completed.

The risk assessment below documents the practices used to eliminate the risk of inadvertent contact with energized conductors.

If the risk of working on the energised installation cannot be effectively controlled (ie, the risk of inadvertent contact cannot be eliminated) the work shall **NOT** be undertaken on the energized electrical installation.

When performing work on or near exposed energized conductors there is a risk of electric shock, arc, blast, flash burn injury. To control this risk, the following precautions shall be taken before work commences on or near exposed energized conductors.

- a) The above risk assessment (Hazard Identification and Risk Assessment for Electrical Hazard) has been completed
YES. / NO (If NO, work does not proceed until risk assessment completed)

Confirm Complete with hazards identified: _____

- b) A safety observer shall be used as an essential risk control element when working on any exposed energized conductors.

Indicate name, and electrical license No of observer:

- c) The electrician who plans to undertake electrical work on or near exposed energized conductors shall be competent in the work to be carried out. The work to be undertaken shall be authorised by Facilities and Services management, as relevant.

Date ___/___/___ **Authorised by F&S Manager** _____

- d) Precautions have been put in place to prevent the possibility of simultaneous contact with conductors at different voltages, while work is being carried out on or near exposed energized conductors?

- e) The following safety equipment, safety tools and personal protective equipment (see Notes) is to be supplied and used for the task, as relevant?

See details in Notes below.

- f) Where work on the exposed energized conductors is carried out on a work platform, the work platform must be stable. Has the structure been checked? YES /NO

- g) Do temporary protective earthing conductors need to be installed? For protection when removing electrical equipment from earthed metal?

YES / NO

If YES the temporary earthing conductors used, shall be appropriately rated to withstand and remove any charge from the prospective short-circuit/fault current of the primary protection without failure.

Warnings

1. NEUTRAL CONNECTIONS

Special care should be taken when removing neutral connections as tests may have indicated a de-energized situation. However, when these connections are removed, a voltage may be present between conductors or between conductors and earth.

2. SAFETY EQUIPMENT

Use of insulating barriers, covers or mats shall be used in the work area between conductors and between electrical workers and earth (including building materials such as concrete and steel that may be earthed) should be broken by one or more of the following methods

- Insulating barriers, covers or mats.
- Insulating tools.
- Insulating gloves

Please indicate which method of control is being used in this risk assessment below

3. FAULT FINDING OR TESTING EQUIPMENT

Is fault finding equipment being used YES / NO

If YES use only approved test equipment for the application and ensure that it is selected for the appropriate operating range.

Have you checked and confirmed the correct operation of the test equipment on a known supply prior to relying on exposed energized conductor? YES / NO

Whilst testing consider the effects at the worksite and remotely:

- bridging out safety and control interlocks
- inadvertent initiation of equipment operation
- inadvertent energization of equipment
- bridging of terminals
- forcing of contactors and interlocks or
- forcing of software interlocks, e.g. programmable logic controllers.

Note: Ensure that the equipment is returned to service in its original state or that changes made have been approved.

4. CUTTING CABLES OR WIRING ENCLOSURES

While carrying out work that involves cutting cables or wiring enclosures, the cables shall be treated as energized and the working procedure for working on or near exposed energized conductors followed until testing can prove the cable is de-energized.

Warning The use of testers that detect an electrical field surrounding an energized conductor may not be suitable for cables that are surrounded by a metallic screen, cables carrying direct current and in some other circumstances.

This also applies to out-of-service or decommissioned electrical equipment, the equipment and cables shall be isolated from all sources of supply and appropriate test made to ensure the equipment and cables are de-energized.

5. PRECAUTION WHEN LEAVING WORK UNFINISHED

All electrical workers have a responsibility to ensure that the work they are doing does not present a hazard to others at the workplace. This means leaving the worksite in a safe state for access by others. The following precautions should include:

- Termination of exposed conductors and, where necessary, provides mechanical protection.
- Physically securing cables
- Tagging and taping-off cables
- Where appropriate, inform relevant parties that the work is incomplete
- Take necessary precaution to ensure that equipment cannot become energized
- Ensure that switchboards are clearly and correctly labelled in relation to their status.

Notes

SAFETY EQUIPMENT AND TOOLS

All insulated equipment and tools used shall be of an approved type and be in good working order, regularly inspected, tested and maintained. If any doubt exists as to the insulating capabilities that the equipment or tools may provide, they should not be used.

AS 3527.2 contains specific requirements for insulated hand tools.

PORTABLE ELECTRIC TOOLS

Residual Current Device (RCD) should be provided as personal protection when using portable electric tools, during use an RCD should be integrated as close as practicable to the point of supply, e.g. at the outlet socket end of an extension lead.

LADDERS AND STEP LADDERS

Ladders used for working on installations shall comply with either AS/NZS 1892.2 or AS/NZS 1892.3.

Metal, wire-reinforced or otherwise conductive ladders shall not be used, where an electrical hazard might result from their use

The ladders shall also be rated for industrial use and have a load rating of at least 120 kg. Be of a correct size and length for the work, anti-slip feet where applicable be provided.

Ladders shall be located and positioned to provide the safest working medium. Non-self supporting ladders should be secured bottom and top, e.g. an assistant to foot the ladder or alternate measures employed to prevent the base of the ladder from moving.

INSULATING BARRIERS, COVERS AND MATS

Insulating barriers used shall be of a suitable material to effectively insulate and separate electrical workers from contacting energized equipment.

The barriers shall be visually inspected before and after each use.

Insulating mats for use on low voltage electrical installations and equipment shall comply with and be tested according to the requirements of AS/NZS 2978.

Insulating covers for use with low voltage electrical equipment shall comply with and be tested according to the requirements of AS 4202.

TESTING PLUG-IN EQUIPMENT

When testing for faults on electrical equipment which plugs into a socket outlet rated at up to and including 20 A, when energized an RCD shall be used complying with AS 3190.

PERSONAL PROTECTIVE EQUIPMENT

| | |
|----------------------------|---|
| Eye protection | Eye protection without metal frames and complying with AS/NZS 1337. |
| Footwear | Shoes or boots complying with AS/NZS 2210.2 and selected and maintained in Accordance with AS/NZS 2210.1. |
| Insulating gloves | Gloves complying with AS 2225 and insulated to the highest potential voltage expected for the work being undertaken. |
| Flame resistant gloves | Gloves complying with AS/NZS 2161.4 and protected against heat or fire to the highest level for work being undertaken and air tested each time prior to use. |
| Noise protection | Earplugs or muffs complying with AS 1270. |
| Clothing | Flame retardant clothing covering the full body (including arms and legs) and not made from conductive material or containing metal threads. |
| Safety belts and harnesses | Safety belts and harnesses complying with AS/NZS 1891.4 and that have been checked and inspected each time before use with particular attention being paid to buckles, rings, hooks, clips and webbing. |
| Safety helmets | Headwear complying with AS/NZS 1801 |