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electrical focus

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Office of Energy

Death of Electrical Worker Highlights the Need to Shroud Live Parts

On 26 April 2001, an electrician was tragically electrocuted whilst working in a switchboard at a Perth quarry.

The electrician was in the process of installing a new sub mains circuit breaker at a 415 volt main switchboard. He isolated the electrical equipment in the main switchboard by removing the three incoming phase-links at the bottom of the switchboard cubicle. There was no insulation placed over the line side ("live") terminals of the phase-links.

It appears that, as the electrician was working in the switchboard, he leant forward and his forehead inadvertently made contact with two of the "live" phase-links' terminals.

An electrician was tragically electrocuted whilst working in this switchboard

The Office of Energy's Technical & Safety Division, the Department of Minerals & Energy and the Police (on behalf of the Coroner) are investigating the accident.

In the past, there have also been other similar accidents where workers have received electric shocks and/or flash burns when working on or near live equipment in switchboard cubicles.

Working on or in close proximity to live electrical equipment should always be avoided. Every effort should be made to isolate all circuits and equipment from the electricity supply.

However, where the equipment cannot be isolated and it is necessary to work in the vicinity of live parts, the following safety measures must be taken to reduce the possibility of an accident happening:

- An assessment must be made of the associated risks prior to commencing any work on or in close proximity to any live electrical equipment. Action must then be taken to eliminate the risks.
- Appropriate and suitable protective clothing and accessories suitable for the task must be worn.
- Insulated barriers/mats/covers must be positioned over all live equipment/ parts to effectively prevent contact with live parts. This insulation will also prevent flashovers from taking place in the event that conducting tools or parts fall onto live equipment.
- Tools and equipment must be appropriate for the work to be carried out.

The Technical & Safety Division's Code of Practice "Safe Electrical Work on Low Voltage Electrical Installations" provides detailed information and instructions/procedures relating to work carried out on or in close proximity to live electrical equipment and the appropriate safety apparel to be worn. This publication can be downloaded free from the Office of Energy's web site. The publication is also available at a cost of $5.00 from our West Leederville Office.

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Electrical Fatality when Boat Mast Touches Overhead Lines

A recent tragic incident in which the mast of a yacht made contact with a Western Power overhead high voltage power line has highlighted the need for electricity supply authorities to ensure that all power lines which cross navigable waterways do not present an unacceptable level of risk for people sailing yachts. The fundamental questions to be asked are whether it is necessary for the power line to cross over the waterway and, if so, is the clearance above the high water mark appropriate for the circumstances.

Furthermore, electricity supply authorities should ensure that overhead lines crossing navigable waterways are clearly visible through the use of obvious markers fitted to the overhead wires. Where possible, the conductors should be insulated and clearly visible with easily readable warning signs placed on river banks in the vicinity of the overhead line crossing point such that they can be seen by yachtsmen from the water. Similar signs should also be placed at any boat access point to the waterway, such as a boat launching ramp or river mouth. There may be cases where it is also appropriate to erect earthed and marked guard wires adjacent to the live conductors in order to prevent mechanical contact or a close approach to the live conductors by a yacht mast.

Where a power line across a navigable waterway doesn't satisfy these safeguards, it should be reported to the relevant electricity supply authority so that the situation can be investigated and remedial action taken as appropriate.

Electric Shocks From Television Antennae

Recently, concern has been expressed about the possibility of receiving an electric shock from either a television receiver antenna or the antenna socket on the television receiver or video recorder.

Readers may remember that in 1997 a teenager was electrocuted when he contacted a live television set antenna. The circuitry inside this particular television set had been modified by removing the safety impedance and a dangerous voltage (and current source) was present at the antenna socket on the television.

Modern television set power supply systems use a switch mode power supply which enables the manufacturer to reduce the size and weight of the transformer.

Unfortunately this system produces other problems as the television sets' antennae sockets can have a voltage of up to 240 volts present. This voltage is regarded as safe provided that the current is limited (inside the television set) to a safe level.

AS/NZS 3250: 1995 "Mains operated electronic and related equipment for household and similar general use" recognises this fact and requires manufacturers of such equipment to ensure that antenna sockets are not live. To be considered "not live", the socket is tested to ensure that the maximum current from the external antenna socket will not exceed 2 mA dc or 0.7 mA ac peak to peak when measured through a non-inductive 2000 ohm resistor connected from the socket terminals to the supply active and neutral conductors.

To achieve this isolation, the manufacturer inserts a "safety impedance" between the antenna socket and the TV tuner assembly. Antennae should also be installed in accordance with the relevant Australian Standard and manufacturers' instructions.

This should provide a safe installation. However, should a shock occur, it needs to be taken as a serious warning and reported. Under Regulation 63 of the *Electricity (Licensing) Regulations 1991,* all instances of electric shocks must be reported immediately to the relevant electricity supply authority and the Director of Energy Safety of the Office of Energy (telephone Freecall 1800 678 198).

In such instances, the investigating electrical inspector will check to determine if the television set is safe and that the safety impedance is not faulty.

Disciplinary Action Taken by the Electrical Licensing Board

1 January 2001 to 31 July 2001

Summary

The Board conducted 28 interviews, six formal proceedings and six summary proceedings. A summary of the actions taken is:

- One operative had his electrical contractor's licence and electrical worker's licence cancelled
- Five operatives had their licences suspended
- Eight operatives were issued with a censure
- Eleven operatives were required to undertake and successfully complete a competency assessment
- Six operatives were required to undertake further training
- One operative was required to have his work supervised.

Paul Swarts (EW 120943), Safety 1st Electrical (EC 005887) – Electrical Worker's Licence was suspended for six months from 28 February 2001; Electrical Contractor's Licence no longer valid as Paul Swarts was the only nominee.

Mr Swarts failed to adequately check and test an installation in Brookdale. He also failed to detect a missing MEN connection. As a consequence, a young boy received a fatal electric shock two years later when he touched "live" taps in a bathroom. The taps became live as a result of a fault in an extension cord and no MEN connection at the main switchboard. The electrical contractor's licence has been re-instated as another nominee has been registered with the Board.

Bradley Wade Quinn (EW 117531), QuinnElect Pty Ltd (EC 004367) – Electrical Worker's Licence was suspended for three months from 4 April 2001 because he failed a competency assessment.

Mr Quinn had left an unsafe installation in Coodanup. Faults included transposed neutral and earth conductors and an insulation resistance of zero ohms on a lighting circuit. The Board also reviewed his contractor's licence. A condition was added requiring Mr Quinn to successfully complete the Electrical Contractor's Training Programme (ECTP). Mr Quinn has since demonstrated his competence as an electrical worker, completed the ECTP, and his licences have been re-issued.

Antonio Zampogna (EW 105057), A & A Zampogna (EC 001583) – Electrical Worker's Licence was suspended on 3 May 2001 because he failed to attend a competency assessment.

Mr Zampogna originally failed to ensure an apprentice held an appropriate licence and allowed the apprentice to work unlicensed. After interviewing Mr Zampogna, the Board was not satisfied with his ability to work in a safe and satisfactory manner. He was therefore required to complete a competency assessment, which he failed to attend.

Brett Michael Travers (EW 117053) – Electrical Worker's Licence was suspended for three months from 25 May 2001 because he failed a competency assessment.

Mr Travers created an unsafe situation in Camballin by failing to install an MEN connection. After interviewing Mr Travers, the Board was not satisfied that he had the ability to work in a safe and satisfactory manner. He was therefore required to complete a competency assessment, which he failed. To regain his electrical worker's licence, he has to demonstrate his competence as an electrical worker.

Bruce Nigel Hemmings (EW 101364), Karratha Electrical Company (EC 000162) – Electrical Worker's Licence was suspended for three months from 5 June 2001 because he failed a competency assessment.

Mr Hemmings failed to ensure his apprentice held an appropriate licence and that his Electrical Contractor's Licence was current. The Board required Mr Hemmings to complete a competency assessment after interviewing him, as there were concerns about his ability to work in a safe and satisfactory manner. He failed the assessment. To regain his electrical worker's licence, Mr Hemmings must demonstrate that he is competent.

Matthew Whyte (EW 102651), GCC Electrics (EC 004147) – Both licences cancelled on 22 June 2001 at a formal Inquiry.

Mr Whyte failed to leave premises in Martin in a safe and satisfactory condition. The connection between the aerial service and the underground cable was not enclosed, was taped only and taped to a fence. The Inquiry was held in Mr Whyte's absence (as he failed to attend). To regain his electrical worker's licence, Mr Whyte must undertake and satisfactorily complete the Electrical Trade Licensing Course. To obtain an electrical contractors licence, he will need to meet the Board criteria when he applies.

Australian Standards Activities

Joint Australian/New Zealand Standards are periodically reviewed to ensure they reflect current practices and technology and address user requirements.

Standards Australia has provided the following information regarding proposed new Standards and amendments to existing Standards.

Safe Electrical Camping

As part of the plan that yielded the revised AS/NZS 3000:2000 Wiring Rules, the companion Standards to that document have been undergoing revision.

These include:

- AS 3001–1990 Electrical Installations – Movable Premises (Including Caravans) and Their Site Installations; and
- AS 3005–1982 Electrical Installations of Tents and Similar Temporary Structures for Domestic Purposes;

which have been combined to form the following proposed new Joint Standard:

- AS/NZS 3001–Relocatable Premises (Including Caravans and Tents) and Their Site Installations.

Grid Connection of Energy Systems via Inverters

With the assistance of the electricity supply industry and regulators, Standards Australia is preparing a suite of Standards covering the connection of renewable energy devices (eg. solar cells) onto the electricity distribution network (electricity grid) using an inverter and a grid protection device. It is proposed that the set of Standards will consist of the following parts:

Part 1: Installation requirements

Part 2: Inverter requirements

Part 3: Grid protection requirements

Insulated Pins for Plugs

Electrical regulatory authorities, following the recommendations of Standards Australia's Committees EL-002, EL-004 and TE-001 and industry, and reflecting their own concerns for improving electrical safety, advise that it will be mandatory for all plugs to incorporate insulated live pins from 3 April 2005.

AS/NZS 3112:2000 Approval and Test Specification – Plugs and Socket-outlets introduced requirements and tests for the insulation of the live pins (active and neutral pins) of plugs.

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Insulated plug pins will enhance the safety improvements already afforded by recessed cord extension sockets and the optional recessing of fixed socket outlets. These were introduced in Australia in response to a number of incidents including fatalities involving plugs or plug-in devices partially removed from a socket outlet or cord extension socket.

Objects such as a metal blind slat or the edge of a sheet of roofing iron or jewellery have been known to touch the exposed live plug pin and cause a shock to the person in contact with the object.

To ensure rapid dispersion in the marketplace, electrical regulatory authorities require all electrical equipment to be supplied with insulated pin plugs, at all points of sale, by no later than 3 April 2005. Current approvals and those granted in the future for plugs without insulated pins will be withdrawn or expire, as appropriate on 3 April 2005. Plug manufacturers and equipment suppliers are urged to ensure they are supplied with and using insulated-pin plugs in time to meet this deadline.

PROSECUTIONS FOR BREACHES OF THE ELECTRICITY (LICENSING) REGULATIONS 1991

1 March 2001 to 30 June 2001

Breach	*Name (and suburb of residence at time of offence)*	*Licence No.*	*Fine & Court Cost ($)*
Unlicensed electrical work Regulation 19 E(L)R	*Barry Cappelluti (Yangebup)*	*NLH*	** 1 250.00*
	Brent Pye (Greenwood)	*NLH*	*657.70*
	Gary Spoors (Greenfields)	*NLH*	** 1 357.70*
Carried on business as an electrical contractor without a licence Regulation 33 E(L)R	*Barry Cappelluti (Yangebup)*	*NLH*	*
	Gary Hunter (Merriwa)	*EW 126652*	*1 207.70*
	Gary Spoors (Greenfields)	*NLH*	*
Carried out substandard electrical work Regulation 49 E(L)R	*Barry Cappelluti (Yangebup)*	*NLH*	*
	Anthony Alderslade (Redcliffe)	*EW 122310*	*1 387.70*
	Darryl D'Sena (Balga)	*EW 131338*	*750.20*
	Ken Barker (Swan View)	*EW 121 995*	*802.70*
	Michael Hannent (Greenwood)	*EW 102900*	*707.70*
	Vincent Harding (Ardross)	*EW 103751*	*702.70*
	Troy Innes (Sinagra)	*EW 130977*	*902.70*
	Carl Merlo (Marangaroo)	*EW 121358*	*907.70*
	Sean Nichols (Edgewater)	*EW 122473*	*1 180,00*
	Claude Poulter (Gingin)	*EW 120031*	*802.70*
	Kenneth Rockley (Broome)	*EW 133120*	*1 250.00*
	Vahid Salekian (Mt Hawthorn)	*EW 131820*	*797.70*
	Craig Smith (Gelorup)	*EW 132296*	*1 350.20*
	Bozidar Trumbich (Kardinya)	*EW 125530*	*857.70*
Submitted a Notice of Completion when the work was not complete Regulation 52 E(L)R	*Hammond Electrical (WA) P/L (Welshpool)*	*EC 001055*	*1 157.70*

Legend:
NLH No Licence Held
E(L)R Electricity (Licensing) Regulations 1991
* Global fine (more than one offence)

Note: There was one other prosecution finalised in this period. The details of this prosecution are not included above as it resulted in a spent conviction order being issued.