Office of Energy

Office of ENERGY WA

Electrical FOCUS

## Electrical Installations in Marinas - Maximum Demand

Regulation 49(1) of the *Electricity (Licensing) Regulations 1991* requires electrical installations in marinas to be carried out in accordance with AS 3004-1993 Electrical installations - Marinas and pleasure craft at low voltage.

Clause 2.2.1.1 of AS 3004-1993 requires that the maximum demand for mains and sub-mains be determined by the current rating of a fixed setting circuit breaker or by one of the methods specified in AS 3000.

Recent surveys of marinas have shown that the determination of maximum demand for mains and sub-mains by calculation (provided as a guide at Clause 2.2.1.2 of AS 3004-1993) is conservative and can lead to over-design in many cases.

Other methods such as "assessment" and "measurement or limitation" set out at Clauses 2.7 and 2.8 of AS 3000-1991 are acceptable. One of these methods may be more appropriate for particular marinas.

The Office of Energy is also considering reducing the minimum rating of final subcircuits from 15 amps per outlet to 10 amps per outlet and to allow for load diversity in some practical way. This would be a variation to AS 3004, to allow for more economical designs of recreational marinas. Comments are invited on this proposal.

We also strongly recommend that supplementary protection by RCD's is provided to protect all socket outlets at marinas. Note that this does not apply where craft are connected through an isolation transformer, as stated at Clause 2.1.1 of AS 3004 -1993.

## Electrical Industry Presentations

Following on from the success of the Electrical Industry Presentations in 1997, and in response to industry demand, further Presentations are planned to be held during 1998 as follows:

| | | |
|---|---|---|
| ♦ Broome | 12 May | The Mangrove Hotel |
| ♦ Kununurra | 13 May | Mercure Kununurra Hotel |
| ♦ Northam | 28 May | C Y O'Connor College |

However, these Presentations are contingent upon there being sufficient persons nominating to attend.

Further details will be direct mailed to industry personnel whose business address is within these areas. In the meantime, persons who are interested in attending one of the Presentations may RSVP by telephoning 08 9422 5200.

## Connection of Smoke Alarms in Domestic Installations

Single point smoke alarms are not considered to be essential equipment for the purposes of compliance with AS 3000 SAA Wiring Rules. Therefore, electricity supply to these types of smoke alarms need not emanate from the line (supply) side of the installation main switch or switches.

Refer to Ruling No 5 of AS 3000-1991 SAA Wiring Rules, Clause 2.19.2.1 for details.
Recently there were two changes to membership of the Electrical Licensing Board.

## *Earthing Systems in Substations*

The following information is provided to assist persons designing and installing earthing systems in sub-stations.

Section 4.4 of WA Electrical Requirements requires that earthing systems in sub-stations be established in accordance with Clause 8.12 of AS 3000-1991 and Clause 5.6 and Appendices B&C of AS 2067-1984.

**Combined Earthing System**

Clause 8.12.2 of AS 3000-1991 states that the earthing system of a sub-station **shall** be the combined earthing system. Figure 8.1 of the Standard provides a guide to the application of the combined earthing system.

The requirements of the combined earthing system (eg. a maximum resistance of 1 ohm to earth) ensure that in the event of a fault:

- no dangerous step and touch potentials appear in the consumers' LV installation; and
- the magnitude of the stress voltage of the LV equipment in consumers' installations does not exceed their rated values as a consequence of a potential rise of the LV neutral point.

Clause 8.12.4.2 of AS 3000-1991 states that a combined earthing system resistance to earth greater than 1 ohm may be approved where, for example, step and touch potentials are satisfactory.

Guidance and recommendations for the design of earthing systems are set out at Clause 5.6 Appendix C of AS 2067-1984. Methods to calculate the maximum allowable touch and step voltages are detailed. Appendix B makes recommendations for the jointing of busbars and connections.

***Only when the requirements of the combined earthing system cannot be met, can separate HV and LV earthing systems be installed.***

**Separate Earthing Systems**

Where separate HV and LV earthing systems are installed, safety clearances must be achieved by separation as detailed at Clause 8.12.5.5 of AS 3000-1991. Additional protective devices may also be installed to automatically isolate the supply should a fault occur on the LV section of the transformer and/or unprotected consumers' mains.

## *High Fault Currents*

**Do you know that you could be working on an unexploded switchboard??**

Without suitably rated fault current limiters, and if sufficient energy is available from the power transformer, a switchboard could simply explode, the instant a short-circuit occurs within. This is due to both the enormous release of heat and electromagnetic forces on the busbars.

Results can be dramatic and similar to a large anti-personnel mine exploding. Flash fire can be accompanied with shrapnel in the form of molten metal and exploded switchgear components. Horrendous burns and other personnel injuries may result!

**The Hazard**

Electrical workers are placing themselves and others at risk because they do not always understand or recognise the hazards of prospective fault currents.

Prospective fault current is the current that may flow in a circuit during short circuit conditions.

A relatively simple cross-connection or incorrect selection of a multimeter can create a short circuit resulting in a potentially dangerous short circuit current.

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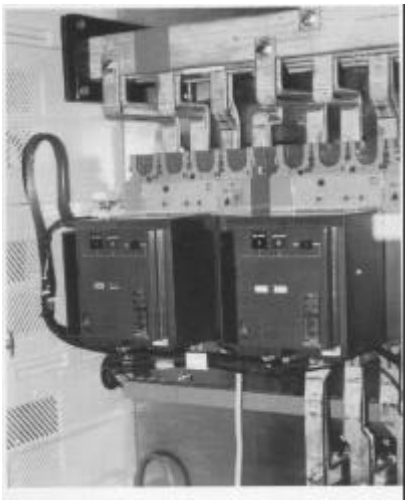

**Avoid the Risk**

- Before commencing work, disarm the "explosive device" by isolating the electricity supply and observe safe working procedures (refer to Office of Energy publication, "Safety Guidelines for Electrical workers").
- Ensure that correctly rated fault current limiters are installed (refer to Section 16.2 of WA Electrical Requirements).
- Where a number of circuits are connected close to the transformer terminals, both upstream and final sub-circuit protection must be coordinated to assure that a fault occurring at any point in the system is cleared.
- Check that additional transformer capacity, or larger cables have not been installed and connected to the original protection arrangement.

Check to ascertain that the current limiters have been well maintained and will provide protection as designed.

## *Installing and Testing of Residual Current Devices*

A number of electrical contractors have recently requested advice on the installing and testing of residual current devices (RCDs) fitted to protect general purpose outlet (GPO) circuits.

To ensure that the RCD is installed and operates correctly (after installation) it is recommended that the following procedure is carried out:

**Before Installation:**

- Ensure that the circuit breakers/fuses protecting the installations' power circuits are correctly identified at the main switchboard and that all that the relevant GPOs will be protected by the RCD.
- Check that the insulation resistance for all circuits requiring RCD protection is acceptable and will not cause nuisance tripping.

**After Installation:**

- Check the operation of the RCD to ensure that it operates correctly using an RCD tester. This tester will measure the RCD's tripping current and tripping time.
- Finally, ensure that the circuits protected by the RCD are clearly marked at the main switchboard.

## *Electrical Licensing Board: Disciplinary Actions*

Since Energy Bulletin No 9 was published, the Electrical Licensing Board has interviewed a number of licensed electrical workers and electrical contractors for disciplinary reasons.

The outcomes were that in most cases, proceedings will need to be conducted because of the seriousness of the breaches of regulations. The main area of concern continues to be the **failure of electrical workers and contractors to check and test electrical installing work.** The non detection of serious faults, such as phase to neutral cross connections, is a particular problem.

The Board conducted proceedings against John Piccolo, a licensed electrical worker, on 4 February 1998. Mr Piccolo had failed to detect that he had carried out substandard electrical work. Mr Piccolo must work under supervision for at least six months and then demonstrate his competence in checking and testing procedures, to the satisfaction of the Board. The conditions placed on his electrical worker's licence may then be lifted

Instances of electrical workers not checking and testing electrical installing work are viewed by the Board as serious breaches of regulations and are dealt with accordingly. They may also be prosecuted, as was the case with Mr Piccolo.

## *Resetting Protective Devices*

Office of Energy staff are frequently asked about the licensing requirements for employees resetting circuit breakers or replacing fuse cartridges (or elements).

The Electricity (Licensing) Regulations 1991 do not preclude an unlicensed person from resetting circuit breakers or replacing fuse cartridges.

However, if access to the protective device requires the person to be in the vicinity of exposed live parts, such as busbars in a switchboard, then the task should only be carried out by a person with the appropriate electrical worker's licence.

Where the protective device fails to reset a second time or the fuse ruptures again, the incident should then be referred to a licensed electrical worker to identify and rectify the problem.

A general duty of care also rests with employers to ensure that a person required to perform such a task has the knowledge and practical skills to be able to carry out the task in a safe and effective manner.

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***PROSECUTIONS FOR BREACHES OF***
***THE ELECTRICITY (LICENSING) REGULATIONS 1991***
***1 November 1997 to 31 January 1998***

| *Breach* | *Name (and suburb of residence at time of offence)* | *Licence No.* | *Fine & Court Costs ($)* |
|---|---|---|---|
| *Unlicensed electrical work* | *B Hankinson (Riverton)* | *NLH* | *1150.00* |
| *Regulation 19(1)* | *G Lengkeek (Alexander Heights)* | *EW 126233* | *635.00* |
| *Carried on business as an electrical contractor without a licence* | *J Branch (Guilderton)* | *EW 101231* | * |
| *Regulation 33(1)* | *P Irving (Alexander Heights)* | *EW 123162* | *855.00* |
| *Advertising without displaying their electrical contractor licence number* | *All Weather Pty Ltd T/A Ian Banister Electrical (Narrogin)* | *EC 005687* | *830.00** |
| *Regulation 45(1)* | *All Weather Pty Ltd T/A Ian Banister Electrical (Narrogin)* | *EC 005687* | * |
| | *Electricity Corporation T/A Western Power Corporation (Kewdale)* | *EC 004931* | *358.00* |
| *Substandard electrical work* | *W Alexander (Ballajura)* | *EW 107248* | *850.00* |
| *Regulation 49(1)* | *J Branch (Guilderton)* | *EW 101231* | *850.00** |
| | *G Caputi (Spearwood)* | *EW 125891* | *1070.00* |
| | *C Cowell (Leda)* | *EW 114978* | *767.00* |
| | *S Khazaly (Landsdale)* | *EW 128073* | *545.00* |
| | *T Marshall (Connolly)* | *EW 107959* | *6014.00* |
| | *J Piccolo (Kingsley)* | *EW 106588* | *645.00* |
| | *J Rowe (Yangebup)* | *EW 114604* | *1100.00* |

**NLH** No Licence Held * Global conviction (fine and/or costs cover multiple charges).

**Note:** There were four other prosecutions finalised in this period. The details of these prosecutions are not printed above as they resulted in either a spent conviction order or a conditional release order being issued.

## *Standards Australia Seminars*

Standards Australia has announced three seminars to be held in Perth to introduce new electrical standards.

**Overhaul and Repair of Ex Equipment**

***AS/NZS 3800:1997, Electrical equipment for explosive atmospheres - Overhaul and repair*** is a new Standard prepared specifically to meet industry needs in this area. Its objective is to provide users and regulatory authorities with information to ensure safety and compliance with relevant existing Standards.

This half day seminar will outline the new requirements including certification and accreditation. The seminar will be of interest to engineers, plant managers, safety practitioners, electrical inspectors, technicians and equipment designers.

The half day seminar will be held at the Ibis Hotel, Perth from 8:30am on Thursday 30 April 1998.

**Classification of Hazardous Area**

***AS/NZS 2430.3:1997, Parts 1-9 Classification of hazardous areas - Examples of area classification*** is a set of Standards developed to make the controversial issue of classification of hazardous areas much clearer. These Standards are dedicated to examples of area classification for specific occupancies.

The half day seminar to be held in conjunction with the half day seminar "Overhaul and Repair of Ex Equipment", will provide detailed descriptions of the nine parts of the Standard, as well as an outline of upcoming changes for dust areas.

The half day seminar will be held at the Ibis Hotel, Perth from 12:30pm on Thursday 30 April 1998.

**Note:** Compliance with AS/NZS 2430.3:1997, Parts 1-9, which supersedes in part the previous AS 2430, is required from 1 June 1998.

**Selection of Cables and Review of Proposed New AS/NZS 3000 Wiring Rules**

***AS/NZS 3008.1.1:1998, Electrical installations - Selection of cables for alternating voltages up to and including 0.6/1 kV*** replaces AS 3008.1:1989. This seminar will explain the changes and show the relationships between this Standard and AS 3000 Wiring Rules. A session has also been allocated as a forum to discuss the major revision of AS 3000.

The half day seminar will be held at the Ibis Hotel, Perth from 12:00 noon on Wednesday, 20 May 1998.

**Note:** Compliance with AS/NZS 3008.1.1:1998, which replaces the previous AS 3008, is required from 5 August 1998.

We recommend that persons in the design, installation and maintenance of electrical installations attend these important seminars. The hazardous area seminars will be of particular benefit to those in the mining and heavy industry sector.

There is also an opportunity for those who are seeking more information on the new Wiring Rules (due for issue in 1999) to attend on 20 May 1998 and become involved at the forum. Drafts of the new Wiring Rules will shortly be available from Standards Australia, for your comments.

*For further information on these seminars, please contact: Standards Australia Seminar Services, telephone 02 9746 4784 or facsimile 02 9746 2950*