

Electrical Safety Office

# Safety Switches Save Lives

*Proposals for mandatory fitting of safety switches on all residential electrical installations in Queensland*

Discussion Paper

November 2009

# Safety Switches Save Lives

## *Proposals for mandatory fitting of safety switches on all residential electrical installations in Queensland*

### **Purpose**

The purpose of this discussion paper is to propose the extension of the existing mandatory safety switch requirements to include temporary residential accommodation places, such as short-term holiday accommodation, hostels, boarding houses, hotels, motels, on-site temporary and semi-permanent accommodation provided by caravan and holiday parks, as well as for all Queensland domestic residences. This will ensure all Queensland residents and visitors are afforded the same level of protection from electrical injury and death regardless of their accommodation choice.

Stakeholder and public comment are sought on the proposal to enable a more comprehensive consideration of any move for regulatory change. Any such proposal for change will be subject to Regulatory Impact Statement which will be published for wide public consultation and comment prior to proceeding.

### **Background**

The *Electrical Safety Plan for Queensland 2009-2014*<sup>1</sup> (the Plan) was developed by the Electrical Safety Board (the Board), in consultation with key stakeholders, and outlines the high-level vision, priority areas and strategies to support improvements in electrical safety in Queensland over the next five years. The Plan sets as its five-year goal, “the elimination of all preventable electrical deaths”.

In line with the Plan’s vision, the Electrical Safety Office’s (ESO) policy objectives aim to prevent persons from being killed or seriously injured, and property from being destroyed or damaged, by electricity. Each year people are killed and injured while using electrical equipment that is either unsafe or not being used safely. In many cases, these incidents can be prevented or the adverse effects minimised by safety switches.

The ESO performed an analysis of electrical fatalities for the five year period from 2003/04 to 2007/08. This indicates safety switches could have prevented 12 of the total 25 fatalities, representing 48% of these lives being saved. Extending the scope of legislation requiring the mandatory installation of safety switches would provide greater protection to all Queenslanders against electric shock.

The three main causes for electrical fatalities during the reviewed five year period were: powerlines, electrical installations and electrical equipment. Although the seven powerline electrocutions cannot be impacted by safety switches, 9 of 15 fatalities involving electrical installations and all of the three fatalities involving electrical appliances could have been prevented had a safety switch been installed.

Safety switches also provide a primary method for obligation holders to discharge their electrical safety obligations under the *Electrical Safety Act 2002* (the Act) in relation to the use of electrical equipment in places that provide accommodation to the public. Employers and the self-employed owners of rental or other accommodation places have an obligation under Section 30 of the Act to ensure that their business or undertaking is conducted in a way that is electrically safe. The installation of a safety switch is a primary method of meeting this obligation.

### **What are safety switches?**

A ‘safety switch’, also known as a Residual Current Device (RCD), is an electrical device that monitors electrical current flowing in the active and neutral conductors of a circuit. The safety switch’s earth leakage sensor responds to any imbalance detected in the circuit and cuts the power in less than 40 milliseconds (under 1/25<sup>th</sup> of a second).

For example, when an appliance has a broken or exposed wire, and electricity passes through this wire to earth, either through the metal body of the appliance that has an earth wire attached to it or because a person acts as the contact to earth, the safety switch recognises this fault and operates instantaneously.

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<sup>1</sup> <http://www.deir.qld.gov.au/electricalsafety/publications/policy/safetyplan2009/index.htm>

In the case of a double-insulated appliance where there is no metal body or exposed metal (and no earth wire), electricity that escapes may pass to earth through a person, e.g. as a result of an exposed wire from a damaged appliance. A safety switch will also operate in such circumstances.

Thus, safety switches protect people from earth leakage, regardless of whether or not an earth wire is attached.

Section 77 of the *Electrical Safety Regulation 2002* (the Regulation<sup>2</sup>) defines an approved safety switch as a RCD that has a Queensland or external approval and a rated residual current of not more than 30mA.

### **Why install safety switches?**

In the past several years, a number of people have died in Queensland in domestic situations from electric shocks and other related injuries. A safety switch can help guard against such electrical tragedies. A review of cases of death by electrocution in Queensland in the five years to 30 June 2008 reveals that safety switches could have prevented around half of the 25 electrical fatalities recorded. Of this number, seven resulted from contact with overhead or underground powerlines and safety switches would not have prevented the deaths. Of the remaining 18 deaths resulting from electrical installations and electrical equipment, 12 of these could have been prevented had a safety switch been installed. Safety switches can have a significant impact in reducing electrical fatalities.

Safety switches provide increased protection from electrical shock when a fault causes a current to flow to earth. Potentially fatal electric shocks occur when current flows through a person to earth. Safety switches are designed to cut the supply of electricity in a fraction of a second when a harmful level of electricity is detected leaking to earth. If a safety switch senses an imbalance in the active and neutral conductors in a circuit, it quickly cuts off the power. This applies equally to appliances that have their own earth wire as well as double-insulated appliances or circuits that do not have an earth wire. Once installed, the safety switch does not consume any electricity, as it is purely a protective device.

Although safety switches are a proven method of preventing most serious electrical shocks, they are not a substitute for proper electrical maintenance and safe practices. For that reason, householders and other users are encouraged to check appliances and power supply cords prior to use to ensure they are in good condition and showing no signs of damage.

To ensure effective operation, safety switches need to be checked regularly, preferably every three months, by pressing the 'test' button to ensure the switch turns off. If the switch doesn't turn off the power, then it may not be protecting the circuits and a licensed electrical contractor should be contacted to investigate and repair or replace it.

As their operation is dependent upon the individual circumstances of an event, safety switches cannot provide a guarantee of protection from injury or death in all cases, so should not be viewed as a panacea for all electrical incidents. As a secondary means of protection, however, they provide significant assurance against many avoidable injuries and deaths from electricity.

### **The Wiring Rules**

Australian/New Zealand Wiring Rules (the Wiring Rules<sup>3</sup>) otherwise known as AS/NZS/3000 is the Australian and New Zealand standard which prescribes the wiring requirements for all electrical installations. This standard is called up in the Regulation as the applicable mandatory electrical safety wiring standard in Queensland.

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<sup>2</sup> <http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/E/ElectricalSR02.pdf>

<sup>3</sup> <http://www.wiringrules.standards.org.au/>

## Legislative requirements

Safety switches were first required to be installed on power circuits in new domestic residences in 1992 under an amendment to the *Electricity Regulation 1977*. The Queensland *Electricity Regulation 1994*<sup>4</sup> was then amended to introduce, from 1 September 2002, the mandatory retrofitting of safety switches on power circuits in domestic residences constructed prior to 1992 after sale and within three months of their transfer of title. This followed stakeholder endorsement of a Regulatory Impact Statement (RIS) proposing their retrospective installation. This requirement was carried forward into the current Queensland *Electrical Safety Regulation 2002*<sup>5</sup> (the Regulation).

From 1 March 2006, the Regulation was further amended to require the installation of safety switches on power circuits in rental properties within six months of any new residential tenancy agreement, with all rental properties covered by a residential tenancy agreement to have a complying safety switch from 1 March 2008. This change was again supported by a RIS published in 2006.

A summary of all requirements impacting the installation of safety switches follows:

- Safety switches were required to be installed on power circuits in new domestic residences for the first time in 1992 under the *Electricity Regulation 1977*.
- The 2000 Wiring Rules added the requirement to also protect lighting sub-circuits on new installations. (No versions of the Wiring Rules require retrofitting of safety switches for either power or lighting circuits.)
- The *Electricity Regulation 1994* was amended in 2002 to introduce, from 1 September 2002, the mandatory retrofitting of safety switches to domestic residence constructed prior to 1992 within three months of their transfer of title. Temporary accommodation was excluded from the definition of “domestic residence” by this amendment. The safety switch requirement was carried forward into the *Electrical Safety Regulation 2002*.
- The Wiring Rules standard is mandated by section 66 of the Regulation.
- Section 81 of the Regulation requires a safety switch to be fitted on an electrical installation on which a licensed electrical contractor or licensed electrical worker has performed electrical installation work.
- The Regulation was amended in 2006 to require owners of pre-1992 leased domestic residences to have a safety switch installed on power circuits within six months of entering into a new residential tenancy agreement.
- As of 1 March 2008 all pre-1992 leased domestic residences under an existing residential tenancy agreement are required to have a safety switch installed on power circuits.

In summary, the Regulation currently requires safety switches on both power and lighting circuits in all new residences and all new residential electrical installations, by the mandated application of the Wiring Rules. In addition, retrospective fitting of a safety switch on power circuits to post-1992 domestic residences is required on their sale, or rental where a residential tenancy agreement applies.

## Residential premises already protected by safety switches

The effect of these requirements means that the following domestic situations are now required to be protected by safety switches on power circuits in Queensland subject to the following:

- **All new homes built after 1992 and before 2000**  
Safety switches have been compulsory on all new power circuits in Queensland homes since 1992, so many Queenslanders already have a safety switch in their homes.
- **All homes extended after 1992**  
The requirement for fitting of safety switches to all new power circuits also applies to homes extended from 1992 as such electrical installation extensions are subject to the Wiring Rules standard applying at the time the work is undertaken. Homes built prior to 2000 which have had the electrical installation extended to include additional lighting and power circuits after 2000 will have safety switch protection on both lighting and power circuits

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<sup>4</sup> <http://www.legislation.qld.gov.au/LEGISLTN/SLS/1994/94SL468.pdf>

<sup>5</sup> <http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/E/ElectricalSR02.pdf>

- **All new homes built from 2000**

Safety switches have been compulsory on all new power and lighting circuits in Queensland homes built since 2000 following the change in Wiring Rules, so some Queenslanders have safety switch protection on both power outlets and lights in their homes.

- **Homes sold or transferred after 1 September 2002**

For homes sold or transferred after 1 September 2002 that do not have a safety switch installed on power circuits, licensed electricians may only perform electrical installation work on the home if a safety switch is installed as part of the work, or if it is an emergency.

Sellers must declare on the sales contract (REIQ contract for houses and land) whether the home has a safety switch, as well as when completing the Department of Natural Resources' Form 24<sup>6</sup> (Property Transfer Information). If there is no safety switch on the premises, the buyer must have one installed on the power circuit within three months of the date of legal possession, with a maximum penalty exceeding \$1,000 if this requirement is not fulfilled. This law applies to any home transfer including estate, Family Law and mortgage transfers.

- **All rental properties covered by residential tenancy agreements**

From 1 March 2006, legislation was introduced for the installation of safety switches on power circuits in rental properties within six months of any new residential tenancy agreement, with all rental properties covered by a residential tenancy agreement to have an approved safety switch on power circuits from 1 March 2008. This regulatory change was supported by a further Regulatory Impact Statement (RIS) published in 2006.

As of 1 March 2008, it has been compulsory for owners of leased domestic residences subject to a residential tenancy agreement to have safety switches installed for all power points. If the residence does not have safety switch protection for all power points, the owner needs to arrange installation by a licensed electrician. If this is not done, the maximum penalty exceeds \$1,000.

Data collected in conjunction with Energex and Ergon meter readings indicates that, as at December 2008, 63% of homes surveyed had safety switches fitted at least on power circuits, 7% did not have them fitted, and it was not known whether a safety switch was installed in the remaining 30% surveyed. Of this 30%, it is more than likely many of these dwellings are already fitted with safety switches, though in circumstances where the switchboard is remote from the meter position or in an area inaccessible to meter readers. There is no data available to indicate if both power and lighting circuits are protected by safety switches.

## **Residential premises not protected by safety switches**

Safety switches are not yet mandatory for:

- temporary accommodation e.g. short-term holiday accommodation, hostels, boarding houses, hotels, motels, on-site temporary and semi-permanent accommodation provided by caravan and holiday parks. This includes leased moveable dwellings<sup>7</sup> (including caravans and mobile homes), which are covered by short (up to 42 days) or long-term moveable dwelling tenancy agreements, or
- owner-occupied domestic residences built before 1992 which have not been sold or transferred since 1 September 2002.

### **Temporary accommodation**

Currently, temporary and holiday accommodation is excluded from the definition of "domestic residence" under section 77 of the Regulation and, therefore, the requirement to install a safety switch on power circuits only applies to new installations in these residences. Retrofitting has not yet been mandated for this segment as was done for rental accommodation, although this proposal was canvassed in the 2006 RIS.

Though generally supported for inclusion when the Regulation was drafted, this sector was not included at that time due to concerns at the capacity of the electrical industry to resource all rental accommodation installations at the same time as owner-occupied domestic dwellings, and probable high levels of voluntary compliance due to the capacity of owners to recoup the associated cost as a business expense.

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<sup>6</sup> [http://www.nrw.qld.gov.au/property/titles/pdf/form\\_24\\_version4.pdf](http://www.nrw.qld.gov.au/property/titles/pdf/form_24_version4.pdf)

<sup>7</sup> [http://www.rta.qld.gov.au/moveable\\_dwellings.cfm](http://www.rta.qld.gov.au/moveable_dwellings.cfm)

This means Queenslanders using these kinds of accommodation may not be universally protected by safety switches, leaving them more exposed to an electrical shock or death. Notably, a 1997 fatality at a caravan park could have been prevented by a safety switch, which resulted in coronial recommendations concerning the wider use of safety switches.

Although it is difficult to obtain exact current data on the numbers of all temporary accommodation establishments in Queensland, as of December 2008, there were 276 licensed hotels, 763 motels and guest houses, and 505 serviced apartments (all with five rooms or more)<sup>8</sup> in Queensland.

The Australian Bureau of Statistics (ABS) report *Tourist Accommodation Australia*<sup>9</sup> indicates, as of December 2008, there were 324 caravan park establishments in Queensland. These premises comprised 3,398 on-site vans, 6712 cabins, flats, units and villas, with a total capacity of 39,597 persons. The Office of Fair Trading estimates there are approximately 200 residential parks in Queensland providing manufactured home sites to accommodate around 15,000 Queenslanders<sup>10</sup>.

This indicates a significant number of people are using these forms of accommodation and shows the potential positive impact of improved electrical safety if safety switches were installed in all of these establishments.

### ***Owner-occupied domestic residences built pre-1992 which have not been sold or transferred since 1 September 2002***

It is timely that people living in domestic dwellings built pre-1992 are afforded the same protection from electric shock as is now the case for most other domestic dwelling types. Some homes built pre-1992 may not yet have safety switches fitted if they have not been sold or transferred since 2002.

In a 2008 ABS report, the majority (57%) of Australian homes were reported by their occupants as being 20 or more years old<sup>11</sup> and, due to the popularity of the Queensland-style heritage home, the number of pre-1992 homes in Queensland is high. However, population movement trends into Queensland over the past decade mean many older houses have likely been bought, sold, or redeveloped since 1992 when the first phase of regulatory requirements for safety switches were implemented.

Based on 2006 census data, it is estimated that there are approximately 1,750,000 private dwellings in Queensland currently. In 1991 there were 1,118,113 private dwellings in Queensland. Therefore private dwellings built since 1991 number 631,887, all of which will have safety switches fitted on at least power circuits.

Dwellings built from June 2000 are required to have safety switches installed on both lighting and power circuits. Consequently 128,920 of the 631,887 will not be affected by the proposed legislation.

As discussed previously, it is currently unknown whether safety switches have been installed in 30% of Queensland households, but for reasons already outlined it is believed that a high proportion of these households already had safety switches fitted on at least the power circuits. The Australian Bureau of Statistics has estimated that up to 90% of Queensland households having been fitted with safety switches. Using a more conservative estimate of 80%, the remainder of homes not yet protected by a safety switch is expected to be in the vicinity of 350,000.

There is no data available on which to base a calculation of the number of pre-1992 homes with safety switches installed on lighting circuits.

### **The Proposal**

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<sup>8</sup> Australian Bureau of Statistics (2008). "Tourist Accommodation Australia". Time Series Spreadsheet: Table 13 - Summary of accommodation establishments with 5 or more rooms, Queensland. December.

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8635.0Dec%202008?OpenDocument>

<sup>9</sup> Australian Bureau of Statistics (2008). "Tourist Accommodation, Australia". December. [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/8A1E4661C09A2CF3CA257584000F55B7/\\$File/86350\\_Dec\\_2008\\_\(Reissue\).pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/8A1E4661C09A2CF3CA257584000F55B7/$File/86350_Dec_2008_(Reissue).pdf)

<sup>10</sup> Department of Employment, Economic Development and Innovation (2009).

<sup>11</sup> Australian Bureau of Statistics (1999). "Australian Housing Survey: housing characteristics, costs and conditions". Overview.

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DSSbyCollectionid/949017CAABBD0B6ECA256BD00027B1CB?opendocument>

Following the establishment of the Board in 2002 as a statutory advisory body to the Minister, it has guided implementation of electrical safety initiatives in Queensland through the development of successive five-year electrical safety plans. The *Electrical Safety Plan 2009-2014* has as its five-year goal 'The elimination of all preventable electrical deaths'.

In support of this goal, the Board has recently proposed the extension of the requirement for compulsory fitting of safety switches to all forms of residential and domestic accommodation. The implementation of this proposal will result in the extension of the protection afforded by safety switches to all residents regardless of their residential status or accommodation choices.

In support of this goal, the Electrical Safety Office has developed a staged proposal to meet the objective of safety switch protection for all users of domestic and 'quasi-domestic' electrical installations. In doing so the current economic climate has been considered with a proposed roll-out period over two years for business-related temporary accommodation and five years for all other domestic premises.

### **Phased implementation**

**Phase 1:** Introduction of a requirement as soon as is practicable for the mandatory fitting of safety switches on power and lighting circuits within three months of the sale or transfer of:

- properties used, or designed to be used, for temporary accommodation places e.g. short-term holiday accommodation, hostels, boarding houses, hotels, motels, on-site temporary and semi-permanent accommodation provided by caravan and holiday parks;
- all properties subject of a Residential Tenancies Agreement.
- all other domestic residential properties including pre-1992 residences and employer supplied accommodation.

**Phase 2:** Extension of the mandatory requirement for retrospective fitting of safety switches on power circuits to include all lighting circuits:

- in all properties subject of a Residential Tenancies Agreement, within 6 months of the signing of the lease or commencement of the proposed provision; or before the expiry of a period of two years following that date; and
- application of the same mandatory requirements for all properties used, or designed to be used, as temporary accommodation places e.g. short-term holiday accommodation, hostels, boarding houses, hotels, motels, on-site temporary and semi-permanent accommodation provided by caravan and holiday parks to have safety switches fitted on all power and lighting circuits at the expiration of a period ending two years from the date of commencement of the provision.

**Phase 3:** Introduction of a requirement for the mandatory fitting of safety switches on power and lighting circuits before the expiry of a period ending five years following the date of introduction of the provision:

- in all other domestic residential properties, including pre-1992 residences and employer supplied accommodation.

### **Costs**

The cost of installation of a safety switch on a typical domestic switchboard is estimated by industry sources as between \$200 to \$250 inclusive of materials, call-out and fitting charges. Where multiple safety switches are installed in a single installation, this cost reduces for additional units through reduced time and call-out cost components. There are also various devices available which enable safety switches to be fitted into, or near, most older-style switchboards, keeping costs to a minimum.

Although retrofitting requirements for pre-1992 dwellings have not been mandated to date, there has already been significant penetration of safety switches. Generally, the range, type and quantity of electrical appliances and equipment found in households today are far greater than they were in 1992. Due to this increase in usage of electrical appliances, it is very likely that many older pre-1992 switchboards would have required upgrading to prevent overloading, and so would have had a safety switch fitted in accordance with the Regulation and prevailing Wiring Rules.

In the case of temporary accommodation establishments associated with a business operation, many of these forms of temporary accommodation may already have safety switches installed; particularly if

the property has a new installation, or some kind of renovation or modification since 2000. Additionally, some owners may have voluntarily had safety switches installed.

In the case of large establishments such as hotels, hostels and motels, as well as caravan and holiday parks etc, the owners may have voluntarily fitted safety switches in these premises as a way of discharging their electrical safety obligation, and to avoid future civil liability. The cost of safety switch installation can be recouped as a business expense, and is therefore tax deductible.

The provision of an extended uptake period of up to five years for the non-commercial residential sector will enable the estimated cost of up to \$250 per safety switch installation to be amortised over the period. In this timeframe, it is likely many home owners will require the services of an electrical contractor for general maintenance purposes. In these cases, the safety switch/es can be fitted as part of other work, avoiding the additional labour call-out component.

### **Comments and feedback**

The ESO is proposing the three stage approach as detailed for the introduction of compulsory requirements for the fitting of safety switches throughout all Queensland residences and temporary accommodation establishments. It is anticipated this will provide significantly improved electrical safety protection for all Queenslanders and visitors, while imposing minimal impact on electrical contractor supply and demand, and having regard to spreading the costs over a reasonable period in the current and emerging economic climate.

Accordingly, stakeholder and public comment and feedback are invited on the proposal. As stated previously, any resulting proposal for legislative change will be subject to Regulatory Impact Statement which will be published for wide public consultation and comment.

Please provide any comments or feedback by no later than 5pm on 26 February 2010 via email to [ESO.Policy@justice.qld.gov.au](mailto:ESO.Policy@justice.qld.gov.au) or by mail to:

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