MASTER ELECTRICIANS AUSTRALIA

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EXTENDING THE PROHIBITION ON CERTAIN MODELS OF RCBOs

[redacted] / May 2020

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Introduction

Master Electricians Australia (MEA) is the trade association representing electrical contractors recognised by industry, government and the community as the electrical industry's leading business partner, knowledge source and advocate. Our website is www.masterelectricians.com.au

Electrical Safety is paramount in the industry and electrical deaths such as the those referred to in the RIS should not occur. Safe Work Method Statements (SWMS) and industry standards such as not working live, supervising apprentices appropriately and testing for dead and the installation of RCBO's on all sub circuits are there for the protection of workers and consumer.

History of the RCBO prohibition

A tragic but preventable incident occurred in which an unsupervised 3rd year apprentice was killed while working and had not deenergise the circuit on which he was working. After the ESV investigation, ESV through Worksafe Victoria, is reported as having said the following

WorkSafe Victoria provided a number of tips for electricians to work safely:

- *Always de-energise and lock-out the switchboard or circuit to be worked on.*
- *Always test for live to ensure all parts are de-energised before starting or restarting work.*
- *If working on or near an energised installation, ensure a Safe Work Method Statement is developed and adhered to.*
- *Ensure apprentices are effectively supervised.*
- *If the power cannot be turned off, reschedule the work to a time when the power can be isolated.* Source (aihs news article)

During this investigation according to the regulatory impact statement (RIS) states the following

> *While fully compliant with Australian standards,[3] ESV identified that some types of RCBOs had a design vulnerability that made them prone to failure under certain circumstances – namely:*
>
> *• if the RCBO is wired in an orientation opposite to the supplier's instructions (line to load, and load to line) – in other words, the RCBO is installed upside down; and/or*

• the active conductors from two different circuits are connected to the RCBO. This could occur due to defective wiring by the electrician or from external influences (such as overheating of the wiring, mechanical damage, rodent damage, etc).

This design vulnerability is not currently covered by the relevant Australian or international standards for RCBOs.

The ESV investigation report found that there are RCBOs available in the market that continue to operate effectively no matter which way they are installed, and if there are faults within the installation of the electrical wiring in a home.

ESV's findings were forwarded to the Coroners Court of Victoria which, at the time of preparing this RIS, has yet to release the findings of its investigation.

The ESV RIS continues to detail the following points

> *The ESV report recommended that the relevant Australian electrical standard for RCBOs and safety switches be reviewed, and additional tests implemented to verify that the devices would continue to provide their primary safety function even if the noted faults are simulated. To protect the safety of electrical workers and members of the public, the ESV report further recommended that a prohibition be placed on the supply of RCBOs that failed to meet the additional testing requirements specified by ESV.*

> *The Electrical Accessories technical committee of Standards Australia[4] did not support ESV's proposed testing to be added to the standard. The sub-committee resolved that the issue instead be referred to the International Electrotechnical Commission (IEC) for further consideration. The IEC did not support the proposed changes.*

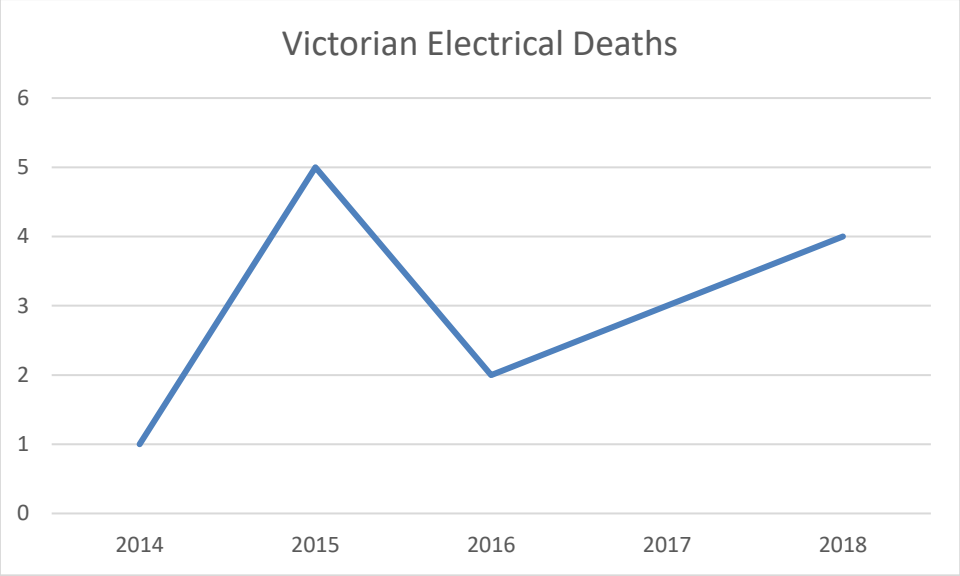
Master Electricians draws attention to three important features of the above extracts

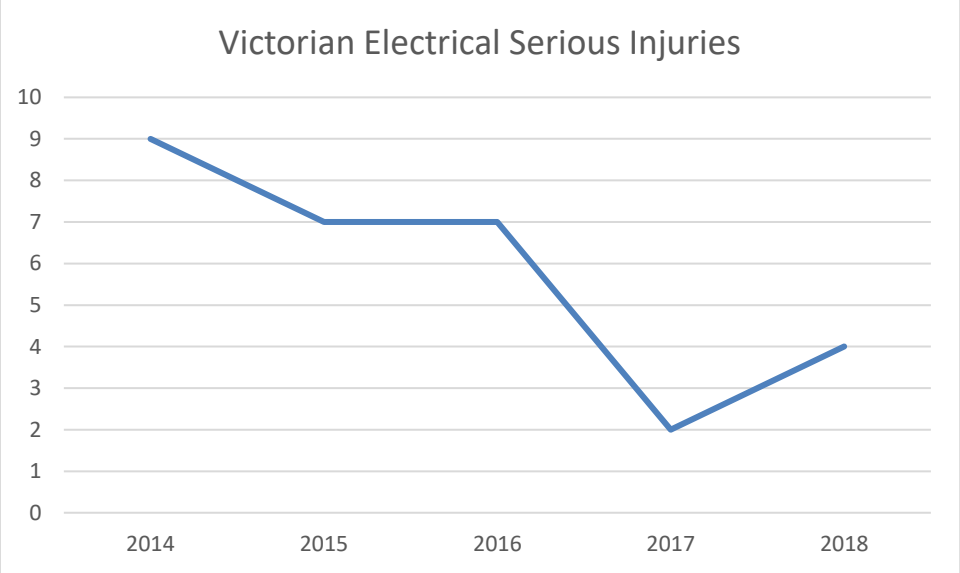
- The Victorian Coroners report into this tragic event has not been concluded and as such findings and recommendations have not been delivered.
- Importantly, based on ESV report and submissions to Standards Australia Technical Committee and referral to the IEC, the ESV position is not supported by industry experts both here and abroad.
- That ESV own finding have shown that the main cause of failure in this situation was due to either not following manufacturer's instructions or poor installation of wiring by electricians.

Nature and Extent of Problem

The RIS discusses and makes particular point regarding the number of electrical deaths in Victoria over almost a 20 year period. 45 deaths and 1217 serious injuries since 2001-2. Upon closer inspection the statistics reveal 33% of deaths have occurred in just the last 5 years. This demonstrates that electrical deaths are trending upwards. Alternatively, serious injuries over the same period is showing a significant decrease. (see graph 1 and 2 page 3)

The RIS provide no analysis as to these 2 trends and makes no attempt to explain the impact of the change in RCBO requirements that may have or may not have contributed to these results. It may be appropriate to say that the prohibition has not been in long enough to impact on these statistics however without analysis as to the root cause of those deaths and injuries we may also say that the change would have no effect on the death or injury rate. The RIS also compares state data over the same approximate 20 year period but again with no analysis as to the root cause of the deaths and injuries that would support the case for extending the prohibition. We would say based on the evidence presented in the RIS the data is at best inconclusive and at worst inappropriate in relation to extending the prohibition notice.





The number of electrical fires

MEA will not labour the point about using data to justify an extension of the prohibition but our concerns regarding the use of electrical fire data without examination of the actual cause is whether a RCBO would have prevented such a fire. Particularly in Country areas where electrical fires can be significantly caused by damage to and encroachment of supply infrastructure, heating equipment etc.

The Role of RCBO in ensuring electricity safety

ESV as a regulator is out of step with all other regulators in the country. ESV has not, and continues not to recognise Part 1 of AS/NZS 3000/2018 (wiring rules) or its predecessor 2007. Master Electricians raises this as the regulator has unfortunately by its action failed, up until 2018, to have a mandatory part of AS/NZS 3000 recognised and thus not educated the industry in Victoria. As can be seen in the following extracts from the wiring rules it is incorrect to say that the role of an RCBO is to ensure electricity safety. In actual fact it is the last line of defence for personal protection and by the RIS own admission complying and non-complying RCBO's fail. An RCBO may also as a side benefit provide some protection to property its certainly is not its main or primary purpose.

ESV has also in our view underestimated the importance of workmanship and importantly two other key factors in ensuring electrical installations are safe and fit for purpose those being

- Installation to manufacturers' instructions and
- Testing of installations and RCBO upon installation

The wiring rules outlined below show the importance of these and this has also been seen to be supported by the Standard Australia Technical Committee and the IEC ruling that was referred to earlier in the RIS.

Part 1 of AS/NZS 3000 / 2018 appears as follows

> ***AS/NZS 3000:2018*** *(also unchanged in 2007 version)*
> ***1.5.6 Additional protection by the use of RCDs***
> *1.5.6.1 Basic protection*
> *RCDs are not recognized as a sole means of basic protection (in normal service) but may be used to augment one of the means set out in Clause 1.5.4.2.*
>
> ***1.5.4 Basic protection***
> *1.5.4.2 Methods of protection*
> *Basic protection shall be provided by one or any combination of the following methods:*
> *(a) Insulation, in accordance with Clause 1.5.4.3.*

(b) Barriers or enclosures, in accordance with Clause 1.5.4.4.
(c) Obstacles, in accordance with Clause 1.5.4.5.
(d) Placing out of reach, in accordance with Clause 1.5.4.6.
RCDs are not recognized as a sole means of basic protection against contact with live parts but may be used to augment one of the above methods.

1.7 SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT
1.7.1 General
Electrical equipment forming part of an electrical installation shall be—
(a) selected and installed to operate in a safe and reliable manner in the course of normal operating conditions;
(b) selected and installed so as not to cause a danger from electric shock, fire, high temperature or physical injury in the event of reasonably expected conditions of abnormal operation, overload, fault or external influences that may apply in the electrical installation; and
(c) electrical equipment shall be installed in accordance with the requirements of this Standard and the additional requirements as specified in the manufacturer's instructions.

Part 2 of the wiring rules raises the following clauses

2.6 ADDITIONAL PROTECTION BY RESIDUAL CURRENT DEVICES
2.6.1 General
The use of fixed setting RCDs with a rated operating residual current not exceeding 30 mA is recognized
as providing additional protection in areas where excessive earth leakage current in the event of failure of other measures
of protection or carelessness by users could present a significant risk of electric shock.
NOTE: The use of RCDs is intended only to augment other measures of basic protection.
RCDs do not provide protection against faults between live conductors,
nor do they provide protection against voltages imported into the electrical installation earthing system
through the supply system neutral conductor.
The use of such devices is not recognized as a sole means of protection and does not obviate the need to apply the protective measures specified in Clause 2.4.

2.1 GENERAL
2.1.1 Application
This Section specifies the minimum requirements for the selection and installation of switchgear and controlgear that shall be achieved to satisfy Part 1 of this Standard.
2.1.2 Selection and installation Switchgear and controlgear shall be selected and installed to perform the following functions or have the following features:
(f) Installed in accordance with the requirements of this Section, and the additional requirements as specified in the manufacturer's instructions.

8.3.7 Polarity
8.3.7.1 General
Polarity testing shall be carried out to ensure that no shock hazard arises from the incorrect connection of active, neutral and earthing conductors.

This testing is to prevent—

(a) the transposition of active and neutral conductors of the consumer mains, or submains supplying an outbuilding having an MEN connection,
resulting in the electrical installation earthing system becoming energized;

(b) combinations of incorrect active, neutral and earthing conductor connections resulting in the exposed conductive parts of the electrical installation becoming energized;

(c) the connection of switches or protective devices in neutral conductors, resulting in parts of appliances, such as heating elements and lampholders,
remaining energized when the switches are in the 'OFF' position; and
(d) multiphase equipment, such as multiphase motors, and semiconductor-controlled equipment operating in an unpredictable manner.

These passages would in our view indicate that the prohibition does not address the core issue of installation procedures and practices of tradesman. We believe that the Coroners report may shed more light on this and we say that the prohibition extension should be delayed until such time as the corner has handed down his findings.

The RIS also states 8 examples of deaths in which an RCBO may have assisted. We agree that RCBO's would have saved many of these people. We are seriously concerned however after examining these extracts to find the following protections have also not been followed.

- lack of supervision, working live, and connecting equipment to supply when not licensed
- DIY work no electrician involved
- Working unsupervised, working live, no SWMS
- Rewireable fuse that did not blow in a non-residential setting rewireable fuse indicates an aged installation and may not have been upgraded due to lack of maintenance
- Commercial setting so not required x 2 examples
- Age of property incorrectly wired sockets
- Damaged consumer controlled electrical cord

The RIS in Section 5 definitively rules out retrofitting RCBO on all circuits however the RIS clearly demonstrates that this is required to save lives. The same cannot be said for the data to justify simply extending the prohibition.

There are approximate 2.2 million housing dwelling in Victoria according to the 2016 census. MEA has assumed 5 RCBO in each dwelling at $30 a unit and using the RIS own costs of $4 million saved per life we estimate that a proactive requirement to upgrade all circuits with RCBOS on all dwellings will return an investment in 20 years if current and recent fatality rates were to continue. That is the same amount of time that this current RIS has reviewed data. Effectively saving 82 peoples lives in that time.

Recommendation

MEA after reviewing this RIS and the options and data submitted would recommend

1. That the current RCBO Prohibition only be extended 12 month to allow for the Coroners Report to be delivered and that any recommendations be taken into account for a new RIS at that time.
2. That the Victorian Government review and engage with the electrical industry to implement a free 10 Point Domestic Switch Board Safety Check to encourage consumers to actively review and upgrade switch boards as required.
3. That the Victorian Government introduce measures to address safety risk in established dwellings and retrofitting RCBO's on all sub circuits either through a combination of industry engagement with consumers and upon transfer of ownership of properties.

[redacted]

[redacted]

Manager Advocacy and Policy

Note:

MEA has proactively provided their members customers with a free 10 point Domestic Switch Board Safety check. This is to provide a home owner a simple factual assessment of the current reliability of the most import part of the homes electrical system. Such a free inspection would easily identify where RCBO are incorrectly connected and subsequently rectified.

The cost to the government is negligible and possibly a greater safety outcome that the proposition is trying to create.

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10-Point Switchboard Safety Check

Master Electricians Australia is committed to helping home owners stay safe. **A free 10-point visual safety check** of your home's switchboard has been completed, providing peace of mind that everything is up to date or extra steps for your consideration.

Unsafe switchboards can lead to fire, electric shock and potentially death. Your Master Electrician will discuss with you any electrical safety issues requiring urgent attention and things you might like to consider for the future.

Property Address: _____

_____ **Date:** ____/____/_____

		Tick if action required
1	**Exposed live parts visible**	
2	**Vermin activity visible**	
3	**Asbestos visible**	
4	**Main earth not in sound condition**	
5	**Rewireable fuses visible**	
6	**Safety switches – power outlets**	
7	**Safety switches – lights**	
8	**Safety switches – other circuits**	
9	**Recalled cable products visible***	
10	**Switchboard does not appear structurally sound**	

*Recalled products may be installed but not seen by your Master Electrician

Urgent Action Required:

_____

Other Action Required:

_____

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10-Point Switchboard Safety Check

1. Exposed live parts are a serious threat to your safety and should be rectified immediately.
2. Vermin and geckos can be a fire risk. Your Master Electrician can advise on how to safely remove any nests or debris and seal access areas to stop further infestation.
3. Asbestos is a serious threat to your health. Do not disturb it. Your Master Electrician can advise on replacement and disposal of hazardous waste.
4. Your main earth protects you from electric shock in some circumstances. If it is damaged or missing, it should be replaced urgently.
5. Installing rewireable fuses is now illegal as they have been linked to a number of fires/safety incidents. They should be replaced with a combined circuit breaker and safety switch.
6. In the event of electric shock, a working safety switch cuts the power faster than a heartbeat, guarding against serious injury or death. These are mandatory for power points.
7. Safety switches on all lighting circuits for new homes are mandatory. Safety switches save lives. Consider adding them to your lighting circuits.
8. Safety switches are now mandatory on all final circuits in new homes. Safety switches save lives. Consider having them installed in your home.
9. There have been a number of product cable recalls in recent years. Please talk to your Master Electrician about whether you may be at risk.
10. Corrosion, signs of water ingress, loose hinges and door catches can all present a risk of fire or electric shock. Your Master Electrician can advise on the steps needed to make your switchboard safe.

Note: Your Master Electrician will advise if your State/Territory requirements differ to the above. e.g. rental/sale of property.

Your Local Master Electrician: