Safety Switches save lives!

Federal Budget Submission

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MASTER ELECTRICIANS AUSTRALIA

1.0 Background

In 2008, at the start of the global economic downturn, the Australian Government implemented a range of measures designed to stimulate the domestic economy and help avoid a recession. One of these measures was the Home Insulation Program (HIP). The fiscal result of these measures is well known – Australia continues its decades-long run without recession. However, the human result of the HIP is also well known, with three young insulation installers electrocuted while performing work under the scheme.

Those tragic deaths set Master Electricians Australia on a journey that continues 11 years later, to ensure such avoidable electrical deaths can – to the greatest degree possible - be prevented in future. That journey has included the tragic but unavoidable conclusion that those three deaths would almost certainly not have occurred had those homes been fitted with safety switches on the affected circuits. The result of this realisation has been *Project Safety Switch*, a movement that aims to have a safety switch installed on every circuit of every Australian home.

And so, as Australia once again confronts the threat of economic downturn, Master Electricians Australia offers an idea for the Federal Budget that may not only contribute to the economic stimulus needed to save the economy from recession, but which would in fact save lives. We seek the Federal Government's financial support for *Project Safety Switch*,

2.0 About Master Electricians Australia

Master Electricians Australia (MEA) is a training and accreditation organisation dedicated to lifting the standards of electrical safety. For over 80 years our organisation has been representing electrical contractors and advocating the issues affecting the industry to policy makers at all levels of government.

MEA currently represents several thousand small, medium and large electrical contractors right across Australia, lifting the standards, skills and safety of the industry to globally best practice. MEA fought to protect the safety of their members and consumers through many notable cases including the terrible 'pink batts' saga which resulted in the loss of life of four young Australians, and the recalls of dangerous imported products that failed to meet Australian standards including Infinity Cables, ECables and Avanco solar isolators.

Our commitment to excellence has resulted in a strong public reputation and we stand ready to work with and government or organisation committed improving safety in the electrical industry.

3.0 What is a safety switch?

Safety switches – also known as residual current circuit breakers (RCCBs) or residual current devices (RCDs) – have been in common use in Australia for several decades. However, feedback that MEA has received over the years indicates that there is high level of confusion among home owners as to what safety switches do, how they work and if their home even has them fitted.

3.1 How do Safety Switches work?

On a healthy electrical power circuit supplying energy to a normal appliance, the current entering the circuit through the active wire equals the current returning through the neutral wire. If a failure of insulation occurs, it can result in current leaking to earth through the appliance or any person in contact with it. In this case, not all the current being delivered through the active wire finds its way back through the neutral.[i] Instead, it flows to earth through the body of the person in contact with the circuit.

The impact of this electrical flow on the human body will be influenced by a range of factors, including the path of current flow, the area of contact with the source of current, body size, skin condition and the voltage applied across the body.[ii] It can result in muscle spasms, including ventricular fibrillation or disruption of the heart muscles. Standards Australia provides the following explanation of how electricity impacts on the human body:

Ventricular fibrillation occurs if an electrical current of sufficient magnitude excites the heart fibres while they are in an inhomogeneous state of excitability known as the vulnerable period. This period corresponds to the first part of the 'T-wave' of the electrocardiogram, which is approximately 10 per cent to 20 per cent of the cardiac cycle. When the heart is in the condition of ventricular fibrillation it is unable to pump the vital blood supply to various parts of the body. Loss of blood supply for more than a few minutes can cause irreversible brain damage and of course can ultimately lead to death. [iii] *It is important therefore that body currents of a magnitude that can cause ventricular fibrillation should be disconnected very quickly.*[iv]Other effects of ventricular fibrillation may include paralysis of respiratory muscles, damage to the neural activation pathways for these muscles, and damage to the respiratory control mechanism within the brainstem. If not interrupted, these effects will cause death. Prolonged contact (more than a few seconds) may lead to "deep-seated burns and other internal injuries".[v]

A safety switch will detect the leakage to earth of current from a circuit, described above, and will trip the circuit within as little as 30 milliseconds, and in no more than 300 milliseconds.[vi] This stops the flow of electricity through the body of the person in contact with the electrical circuit, and prevents the muscle paralysis and associated symptoms. Importantly, this response time is faster than the critical section of the cardiac cycle, and therefore significantly reduces the risk of death or serious injury.[vii]

A safety switch should always be considered a secondary safety response; it is not a substitute for rigorous electrical safety procedures – both in the home and the workplace – and old-fashioned common sense around electricity. A person who receives an electric shock from a circuit protected by a safety switch may still feel the current for an instant. This may be associated with a degree of pain as a result of the shock. It is, however, very unlikely to kill them and in this sense represents an infinitely superior option to an unprotected circuit.

4.0 Why fund a national safety switch program?

Safety switches save lives. In fact they are one of the most reliable and cost-effective life-saving devices. Sadly though, around 15 Australians are killed and around 300 hospitalised every year due to electrical accidents in the home that could have been prevented by a safety switch. The causes of these deaths may include a child inserting an implement into a toaster, a handyman drilling into a live cable inside a wall, or stormwater ingress into lights and appliances. Around 93 per cent of the people killed in electrical accidents are male, and the majority of them are aged between 25 and 64. Those aged 15 to 24 are the next most likely to be killed, followed by the over 65 group, then children.

A safety switch is designed to cut the power to an electrical circuit in as little as 0.03 of a second in the event of an electric shock. The technology is widely available, relatively cheap in the context of a home, and would almost certainly have saved the lives of the three insulation installers killed in the HIP. Safety switches have been commonplace in Australian homes for around 30 years, and in that time they have contributed to a significant reduction in electrical fatalities.

However, around 40 per cent of Australian homes remain completely unprotected by safety switches. Approximately 30 per cent of homes have coverage of their power outlet circuits only, and a further 30 per cent have the light circuits covered as well. However despite the fact that only 60 per cent of homes have safety switches fitted, independent research commissioned for this report indicates that more than 80 per cent of home owners believe they are well protected or very well protected from electrical injury in their own homes. This statistic betrays a fundamental disconnect in the Australian community between perception and reality.

This disconnect may be caused by confusion among home owners as to what a safety switch does, and the difference between a safety switch (which protects people) and a circuit breaker (which only protects electrical cables and appliances). It may also be caused by the wide variations in the regulatory requirements relating to safety switches in the different states and territories. While all jurisdictions have mandated safety switches on power outlet circuits of new homes since around 1991, and on the lighting circuits of new homes since 2001, there has been no other uniform action in this area.

Queensland and Western Australia have some additional requirements, and the most recent iteration of the national wiring standards requires safety switches to be added to all new and extended circuits. But until safety switches are installed on every circuit of every Australian home, people will still be vulnerable to electrocution or electrical injury.

Independent research commissioned by Master Electricians Australia indicates 82 per cent of people believe safety switches should be made compulsory in all homes. Around 76 per cent of people said they were more likely to support this view if there was a government subsidy for safety switches.

Master Electricians Australia believes there is an opportunity for the Federal Government to use the Budget to increase the safety of Australians in their own homes, but funding a program of retrofitting safety switches. We believe this would stimulate the economy through increased business activity, as well as removing those costs associated with injuries and fatalities.

5.0 Unfinished business

The Federal Coalition Government established a Commission of Inquiry into the deaths under the Home Insulation Program. In its report, delivered in August 2014, the Commission recommended that State and Federal Governments work together "to urge homeowners—either through statutory instruments or activities such as public awareness campaigns—to install RCDs in dwellings predating the 2009 amendment to the Wiring Rules". This recommendation reflected a similar finding contained in the report of the Queensland Coronial Inquest into the three deatgs.

Although more than five years have now passed, this key recommendation has not been pursued in any meaningful way by the Federal Government.

There has also been little action on another key finding of a Federal Government investigation, specifically the spot audits of homes which had been fitted with metal foil insulation under the HIP. The initial results of this inspection program, released in February 2010, indicated around eight per cent of installations had created at electrical danger . More alarmingly, however, the audits also found pre-existing electrical faults in around 20 per cent of the homes tested.

This figure suggesting faults in 20 per cent of homes is also reflected in anecdotal feedback to Master Electricians Australia from accredited contractors conducting the government audits. Master Electricians report a fault rate of around one in every five homes – once again, entirely unconnected with the HIP. The vast majority of these faults are associated with unlicensed, do-it-yourself electrical work, although a small number are due to the deterioration of cables and electrical fittings, particularly in older homes.

We believe the opportunity now exists for the Government to address the findings of these three key investigations – the HIP Commission of Inquiry, the Queensland Coronial Inquest and the HIP home audits – by accelerating the installation of safety switches through a program of subsidies.

6.0 Managing risk

One of the key failings of the HIP was that it encouraged unskilled and poorly training workers into the industry to service the businesses that popped up to chase Federal Government money. This was also an outcome of the stimulus program that supported the rollout of roof-top solar panels. It would not be the case in relation to a safety switches program. Safety switches can only be installed by a licensed electrical contractor, so there is no opportunity for new businesses to suddenly emerge – or even for existing businesses to upscale disproportionately – in response to a new pool of government funding.

However, Australia's 50,000 existing electrical contracting businesses could move relatively quickly to provide services under a safety switch scheme. Most of those businesses are small, family businesses which would be likely to spend any additional income on either family expenses or reinvest it into their businesses in the form of new capital equipment, training or additional staff. The economic benefits would also flow through the supply chain. And, if contractors had a degree of certainty over the longevity of the program, it is likely that they could employ additional apprentices to help them meet the long-term demand.

7.0 How many safety switches does Australia need?

Based on the most recent (August 2016) Census data, Master Electricians Australia estimates there is a deficit of around 30 million safety switches in homes across Australia. This is calculated by considering the number of houses built under each era of wiring rules, and how many safety switches each is likely to have, and assuming (conservatively) that each home should have four safety switches to cover all its circuits.

Figure 7.1 Estimated safety switch shortfall based on age of housing stock

Housing era	**Number of houses**	**Safety switches needed per home for full protection**	**Total safety switches needed**
Pre 1991 homes (Safety switches not included in construction)	5,852,500[viii]	Four extra switches per home	23,410,000
1992-2001 homes (Safety switches on power circuits included in construction)	1,219,700[ix]	Three extra switches per home	3,659,100
2001-2016 homes (Safety switches on power and light circuits included in construction)	2,619,882[x]	Two extra switches per home	5,239,764
All homes (2016)	9,692,082	N/A	**32,308,864**

Some older homes will have received safety switches through renovations or money-making activities such as sale or rental. However, even if all existing homes had safety switches on power and light circuits, the national housing stock of 9.7 million would require an additional 19.4 million safety switches to achieve a full level of protection. This indicates a deficit of safety switches in the national housing stock of somewhere between 19.4 and 32.3 million.

8.0 How much to invest?

Master Electricians Australia believes a subsidy of $200 per new safety switch would be enough to create demand for the service. This would be through a combination of consumer awareness and response to the Budget measure, and the likelihood that licensed electrical contractors would tend to "upsell" their clients to have safety switches installed while they are on the premises. (Many Master Electricians Australia members already do this, but it would be a significantly different proposition if the safety switch were partially or fully subsidised.)

At this $200 price, fitting out the entire national housing stock would cost $6 billion – which we acknowledge is well beyond any common-sense Budget measure of this nature. However, an investment of $200 million over the forward estimates would allow for one million additional safety switches to be installed into Australian homes. And of course, if this were applied as a 50 per cent subsidy rather than a grant, it would result in two million additional safety switches being installed in that time. Two million additional safety switches would without doubt boost the safety of Australians in their own homes. Such a measure could also be means tested, to ensure it was taken up by those Australians who would otherwise find it difficult to improve the electrical safety in their own homes.

9.0 Conclusion

Action on the recommendations of the HIP Royal Commission and Coronial Inquest, the HIP Audit and the Coronial Inquest is long past due. We believe that funding Project Safety Switch could provide a slow and steady boost to economic activity. It would avoid the unseemly rush to the funding pool that occurred with previous stimulus schemes. It would improve safety for Australians in their homes. And without doubt, it would save lives.

10.0 Contacts

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[i] Standards Australia, *Residual Current Devices – What they do and how they do it*, 1998, p12
[ii] Standards Australia, *Residual Current Devices – What they do and how they do it*, 1998, p7
[iii] Standards Australia, *Residual Current Devices – What they do and how they do it*, 1998, p9
[iv] Standards Australia, *Residual Current Devices – What they do and how they do it*, 1998, p10
[v] Standards Australia and Standards New Zealand, *Effects of Current on Human Beings and Livestock*, p14
[vi] Standards Australia, *Residual Current Devices – What they do and how they do it*, 1998, p16
[vii] Office of the Technical Regulator, South Australia, *Safety Switches for the home,* p1
viii Ibid
ix Ibid
x Ibid