



Government of **Western Australia**
Department of **Commerce**
EnergySafety

Electrical Incident Safety Report Western Australia 2012-13



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Preface

This report by EnergySafety summarises statistical information about electrical incidents in Western Australia during 2012-13 fiscal year. EnergySafety is the electricity regulator in Western Australia.

The report provides information on how safely the State's industry and general community are operating in the supply and use of electricity.

EnergySafety uses the information to make assessments about:

- The effectiveness of safety education and regulatory measures (including mandatory technical requirements); and
- The changes that should be considered to improve industry and community electrical safety outcomes.

These assessments are the subject of continuing policy work by EnergySafety, which include extensive consultation with electrical contractors, unions, training organisations and the Electrical Licensing Board.

I am confident that the report will interest those involved in the State's electrical industry.



Director of Energy Safety

June 2014

1. Executive Summary

This report presents an analysis of electrical incidents reported to EnergySafety WA in the fiscal year 2012-13. The analysis has also been based on incidents reported over a 10 year period from 1 July 2003 to 30 June 2013.

The report examines three categories of incidents – fatality, accident and shock. Its aim is to provide a statistical basis for future recommendations to reduce the risks associated with electricity.

From 1 June 2003 to 30 June 2013, 28 electrical fatalities occurred in Western Australia, 18 within the Perth metropolitan area and 10 in regional areas. Although the rate of fatalities in the Perth metropolitan area remained relatively stable in previous years, the recent trend depicts a radical reduction. The trend is influenced by the reality of nil fatalities in the metro area over the past two years. Regional areas have shown a substantial increase again influenced by the two fatalities that occurred in regional WA in 2012-13.

Western Australia's Fatal Injury Frequency Rate (FIFR) in 2012-13 was 0.8 per million persons.

Approximately 46 percent of fatalities occurred in a workplace environment with electrical workers forming 47 percent of this category. Among non-workplace categories, the group most at risk is home-based members of the general public, including children, students and retired persons.

In the 10 year reporting period, fixed wiring has remained the primary contributor in 32 percent of reported electrical fatalities, followed by tools/appliances at 29 percent. Most fatalities occurred in the months of December, January and February.

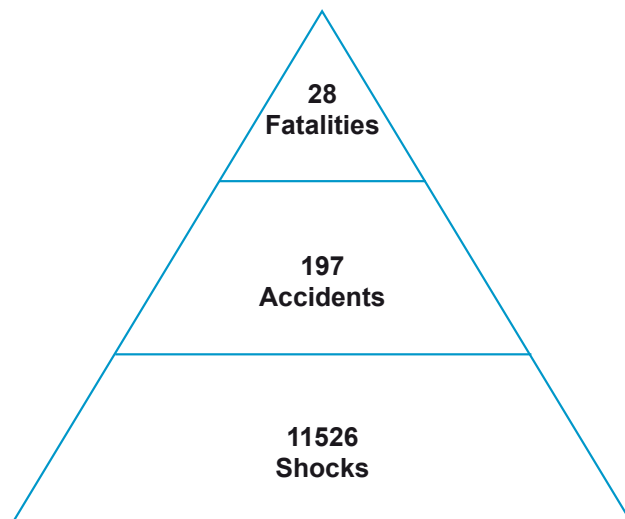
There were 195 serious electrical accidents and 11,526 shocks reported since July 2003. In comparison to the previous year there has been a reduction in reported electrical accidents. The reduction in the number of accidents may be attributed to improved work practices stemming from improvements in the electrical installation standards and other electrical guidelines issued by EnergySafety as well as successful safety campaigns.

2. Introduction

EnergySafety administers the Electricity (Licensing) Regulations 1991 and the Electricity (Supply Standards and System Safety) Regulations 2001. A common element to both pieces of legislation is the mandatory reporting of all electrical accidents causing or likely to cause, danger to life or property to the Director of Energy Safety and the relevant network operator. The incidents reported to the Director of Energy Safety are recorded and presented as a number of reported accidents per million population.

In the case where an electrical accident involves an employee it is acceptable for the incident to be reported to the employer in the first instance who in turn must report it to the respective network operator. It is the responsibility of the network operator to report the incident to the Director of Energy Safety.

This report focuses on the 10 year period from 1 July 2003 to 30 June 2013. It takes into account all reported incidents recorded into the EnergySafety database. The incidents have been categorised into fatalities, accidents and shocks. The 'Accident Triangle' below illustrates the proportion of reported incidents in each category in Western Australia for the reporting period.



The information compiled in this report has been retrieved from the EnergySafety database and the merging of data from other regulatory jurisdictions in Australia and New Zealand. The report provides a comparative analysis of electrical fatalities and their trends¹.

Although electrical accident and shock trends have been analysed in this report, they have not been compared with other jurisdictions.

EnergySafety thanks the regulatory jurisdictions of the States and Territories of Australia and New Zealand for their contribution to this report.

¹ Due to issues with data availability, interstate and national comparisons have been evaluated on the nine years from 2003-04 to 2011-12.

3. Definitions and Explanatory Notes

3.1 Fatalities, Accidents and Shocks

3.1.1 Electrical Fatality

An electrical fatality (electrocution) is defined as a death directly resulting from a sudden discharge of electricity, excluding a fatality deemed a result of wilful self-electrocution.

3.1.2 Serious Electrical Accident

A non-fatal incident resulting from a sudden discharge of electricity causing injury sufficient to require first-aid or medical attention as either an inpatient or outpatient, excluding attendance for a precautionary electrocardiograph (ECG).

3.1.3 Electric Shock

A non-fatal incident resulting from a sudden discharge of electricity, but not including static discharge, causing insufficient injury to require first aid or medical attention. Note: Where the only treatment required is attendance for a precautionary electrocardiograph (ECG), the incident is classified as an electric shock.

3.1.4 Electrical Incident

An electrical incident refers to an electrical fatality, serious electrical accident or electric shock.

3.1.5 FIFR (Fatal Injury Frequency Rate)

A measure of the number of electrical fatalities in a given period, expressed per million persons in a population.

3.2 Installation Types

3.2.1 Mining

The definition of mining operations used in this report is that appearing in the *Mines Safety and Inspection Act 1994*.

3.2.2 Commercial

For the purposes of this report, commercial installations are those in a business premise area accessible to customers and not involving industrial processing activities. Commercial sites include, but are not limited to, offices, retail premises, restaurant public areas, hospital patient areas, railway platforms and carriages, classrooms, ovals and parks. Storerooms, warehouses, commercial kitchens and fishing boats are also considered to be commercial sites.

3.2.3 Industrial

Industrial installations are considered to be those involving manufacturing processes or normally subject to restricted public access for safety reasons. Industrial sites include factory floors, workshops, commercial railway tracks and overhead lines and construction sites.

3.2.4 Rural

A rural installation comprises any aerial distribution system extending from the property 'point of supply' (usually a pole mounted transformer), the electrical installation within buildings on the property (excepting the primary residence which is domestic by definition) and other installations such as pumps, irrigation equipment and any other agricultural or horticultural equipment. Excluded is the network operator's transmission and/or distribution equipment (eg aerial conductors and poles).

3.2.5 Domestic

An installation in a private dwelling, apartment/flat or living unit utilised for residential purposes.

3.2.6 Network Operator

Network operator installation type refers to the transmission, distribution and service apparatus used to distribute electricity to consumers.

3.3 Occupations

3.3.1 Occupational Classifications

Occupational classifications used in this report are in line with the taxonomy used in the Australian Bureau of Statistics' Australian Standard Classification of Occupations (Second Edition). Note: Occupational classifications are distinct from occupational categories (see below).

3.3.2 Occupational Categories

Individuals have been allocated to one of four occupational categories depending on their activity at the time of the electrical incident. Those at work have been divided into supply worker (ie those employed by a network operator), other electrical worker and non-electrical worker, while general public or community refers to all those involved in an electrical incident which occurred outside the course of their paid employment.

3.3.3 Electrical Worker

For the purposes of this report, an electrical worker is defined as a person carrying out electrical work who, is licensed or authorised to do so under the Electricity (Licensing) Regulations 1991. This definition encompasses electricians and holders of restricted electrical licences, electrical apprentices, electrical fitters and electrical mechanics.

3.3.4 Electrician

An electrician is defined as a person holding an electrician's licence and those who prior to

1 July 2008, held an 'A' Grade electrical worker's licence endorsed as either an electrical fitter or electrical mechanic (or both) to perform electrical work in accordance with the Electricity (Licensing) Regulations 1991.

3.3.5 Restricted Electrical Worker

A restricted electrical worker is defined as a person (not including an electrician) licensed in accordance with the Electricity (Licensing) Regulations 1991 to carry out specific types of limited electrical work associated with, or for the purposes of, the licence holder's trade or calling.

3.3.6 Electrical Apprentice

An electrical apprentice is defined as a person holding an Electrician's Training Licence who, prior to 1 July 2008, held a 'C' Grade electrical worker's licence and was therefore licensed to perform electrical work under supervision in accordance with the Electricity (Licensing) Regulations 1991 as part of a registered industry training program.

3.4 Statistical Divisions

3.4.1 Population

Population statistics used in this report are obtained from the Australian Bureau of Statistics [ABS] (www.abs.gov.au/ausstats) and Statistics New Zealand [SNZ] (www.stats.govt.nz). Census statistics are used where available; otherwise all population figures are estimated resident populations as available on the ABS and SNZ websites on September 2010.

3.4.2 Metropolitan/Country

The boundaries of the metropolitan area used in this report are the Metropolitan Area (Scheme Boundary).

4. Electrical Fatalities

4.1 Recent Fatal Electrical Incidents in WA

In 2012-13 two fatalities were reported in Western Australia where electricity was found to be the cause.

- A portable generator was being used to charge a car battery. The victim mistakenly plugged in the 12 volt DC charging cord into the generator's 240 ac volt socket outlet and received a fatal electric shock when he contacted the DC charging connectors.
- A trade assistant was working in a roof space assisting an electrician to pull cables through a conduit into the roof space. The cables were live as they had not been isolated. The victim received a fatal electric shock when he made contact with the live ends of the cable.

In both cases, no residual current device (RCD) was fitted on the circuit, which could have prevented the fatality.

During the 2009-10 financial year EnergySafety implemented the compulsory fitting of RCD's in dwellings (house or unit) prior to their sale and within two years in the case of leased premises. A successful press advertising campaign was carried out to inform the public about the benefits of installing an RCD. EnergySafety continues to address responses to technical issues raised by electrical contractors, property owners and managers.

Another RCD campaign was held in latter half of the 2010-11 financial year. However, there is still a requirement to educate the public on the use of RCDs and need to regularly test that they work properly.

4.2 Historical Information

In the 10 years from 1 July 2003 to 30 June 2013 there were 28 electrical fatalities in Western Australia. Of these, 18 occurred within the Perth metropolitan area and a further 10 in regional areas (Chart 1).

EnergySafety conducted a safety awareness campaign during the 2003-04, 2005-06, 2007-08, 2009-10 and 2011-12 fiscal years. Chart 1 demonstrates that there have been fewer fatalities during these years, supporting the theory that advertising about electrical safety contributes to a reduction in the number of electricity-related fatalities.

Retrofitting RCDs into older installations in other states has proven to be effective. It was introduced as a condition of sale and leasing of residential properties in Western Australia in 2009-10. The requirement for at least two RCDs to be installed in rented residential dwellings constructed post 1992 came into force on 9 August 2009 in Western Australia.

CHART 1: ELECTRICAL FATALITIES IN WA - 2003-04 to 2012-13

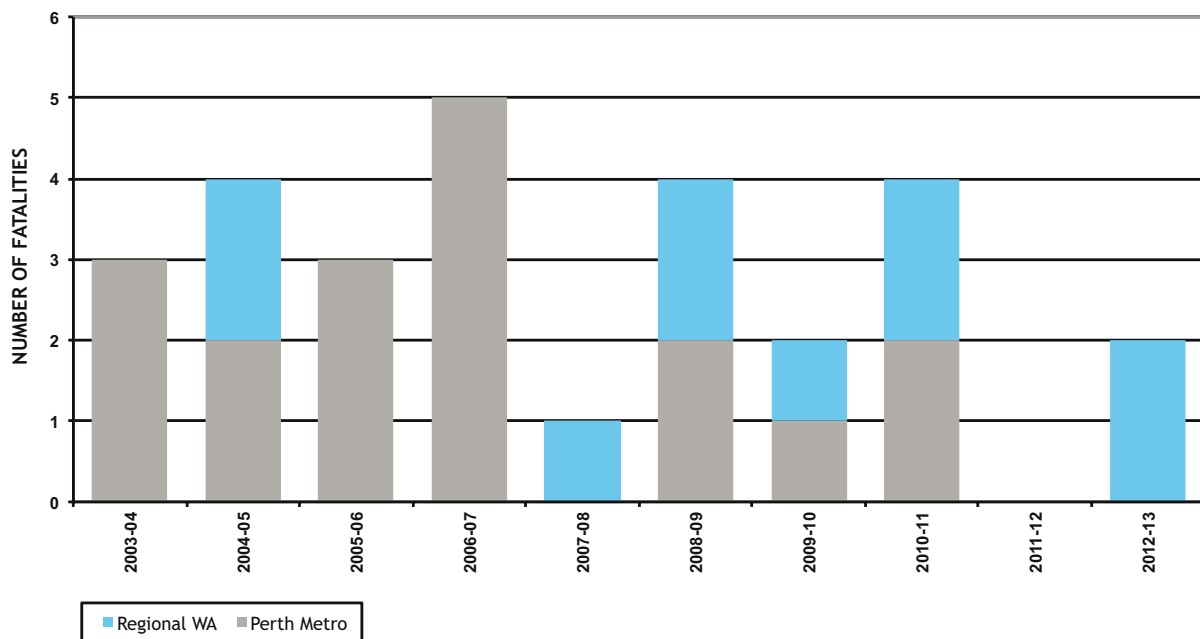
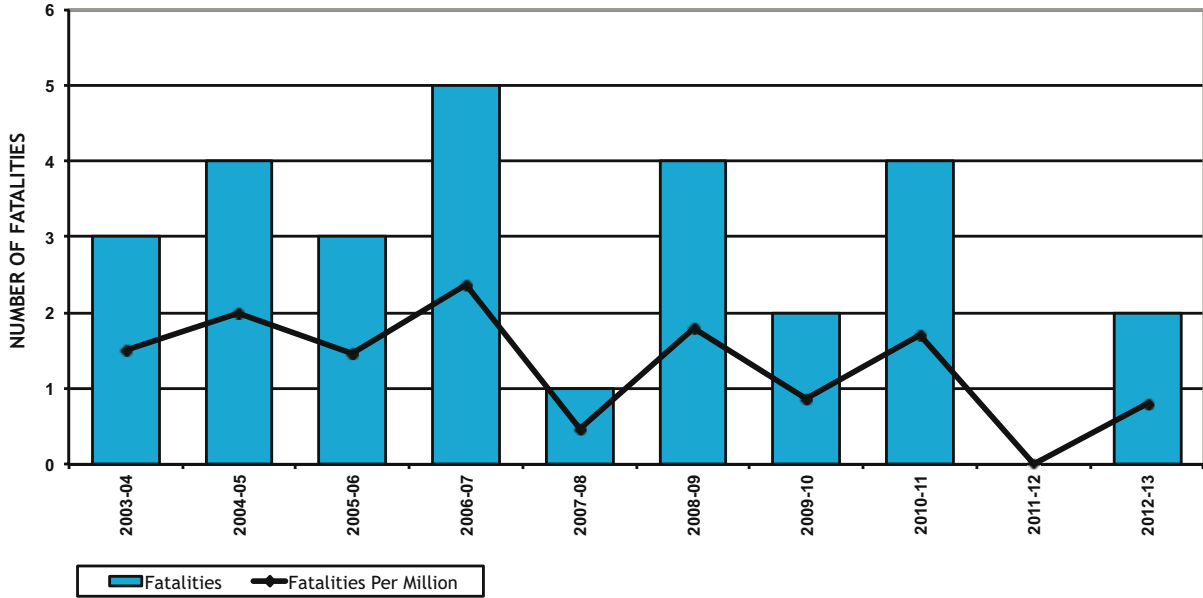


CHART 2: WA ELECTRICAL FATALITIES PER MILLION POPULATION



Fatalities per million population for Western Australia vary between two and four persons per million with the exception of 2007-08 and 2011-12 where there were fewer fatalities (Chart 2). Over the last five years fatalities averaged 2.4 per million population. The trend for fatalities has been on the decline over this period (Chart 3).

CHART 3: WA ELECTRICAL FATALITIES AND FATAL INCIDENT TRENDS

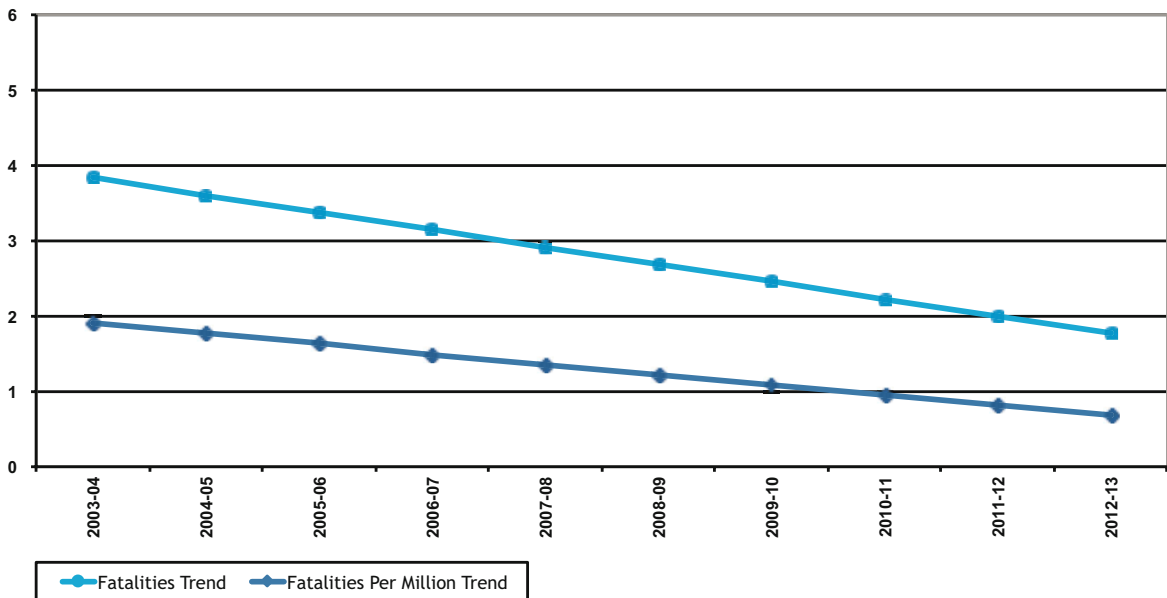


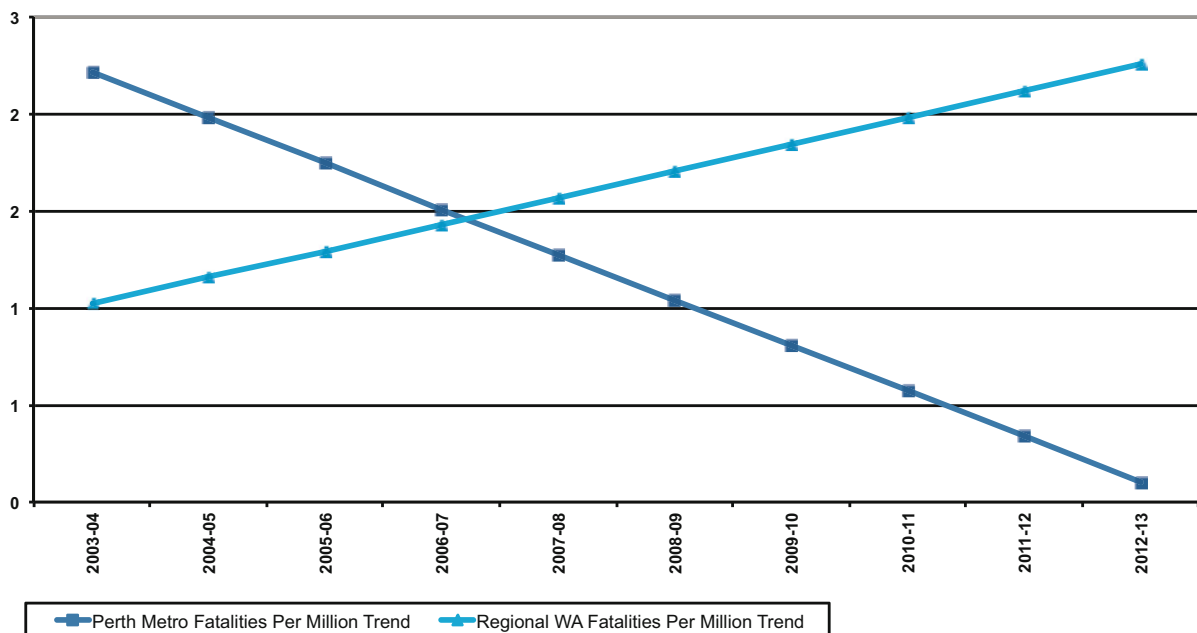
Chart 3 indicates a positive outcome for electrical safety in Western Australia, with fatalities in each year and the rate per million people decreasing. While Western Australia's population increased by 27 percent from 1,982,637 people in July 2003 to 2,517,232 in June 2013, fatalities per million have fallen.

A contributing factor to the reduction may be the mandatory installation of residual current devices (RCDs, known also as safety switches) since 1992 in new or modified electrical installations.

Additionally, the 9 August 2009 amendment places the onus on the owner of the property to ensure that two RCDs are fitted prior to transfer of the property title and, in the case of rented property, prior to entering into a new tenancy agreement. Since its implementation the change has and will continue to provide safety to electrical installations in residential premises.

In analysing the electrical fatalities for Western Australia, it is of interest to note the comparative trends between the Perth metropolitan area and Western Australia's regional and rural areas (Chart 4). Previous statistical analyses of the rate of fatalities in the Perth metropolitan area reflected a stable trend. The recent trend indicates a significant reduction, due to zero fatalities in the metropolitan area over the past two years. Regional areas have shown an increase, with two fatalities occurring in regional WA in 2012-13.

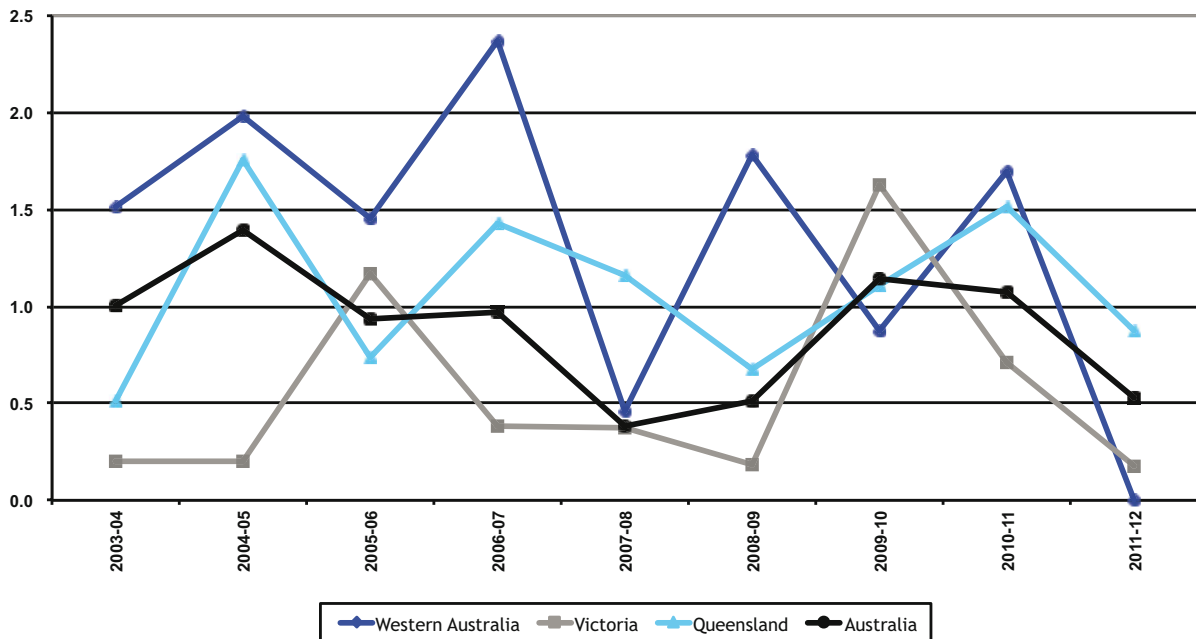
CHART 4: WA ELECTRICAL FATALITIES TRENDS BY METRO & REGIONAL AREAS



4.3 Interstate and National Comparisons

Historically, Western Australia has been compared with Victoria and Queensland when analysing the electrical safety performance² (Chart 5).

CHART 5: ELECTRICAL FATALITIES PER MILLION POPULATION



Queensland has a climate similar to Western Australia, with the exception of the southwest region, and therefore provides opportunities for comparison. The trend for Queensland in the period 2003-04 to 2011-12 indicates a slight increase in the number of fatalities during this period.

Victoria has a history of strong media promotion of electrical safety awareness. The State has maintained a low fatality rate over the last ten years, except for noticeable increase 2005-06 and 2009-10.

The fatality trend in Western Australia has followed a cyclical trend in comparison to Victoria and Queensland, and a decrease in the number of fatalities is evident despite an increase in population over the reporting period.

As electricity usage profiles in Australia and New Zealand are very similar, the data collated from each country, state and territory have been used as a basis for analysing trends in this report³.

² Due to issues with data availability, interstate and national comparisons have been evaluated on the nine years from 2003-04 to 2011-12.

³ All jurisdictions referred to in this section record electrical fatalities differently potentially impacting the accuracy of the analysis.

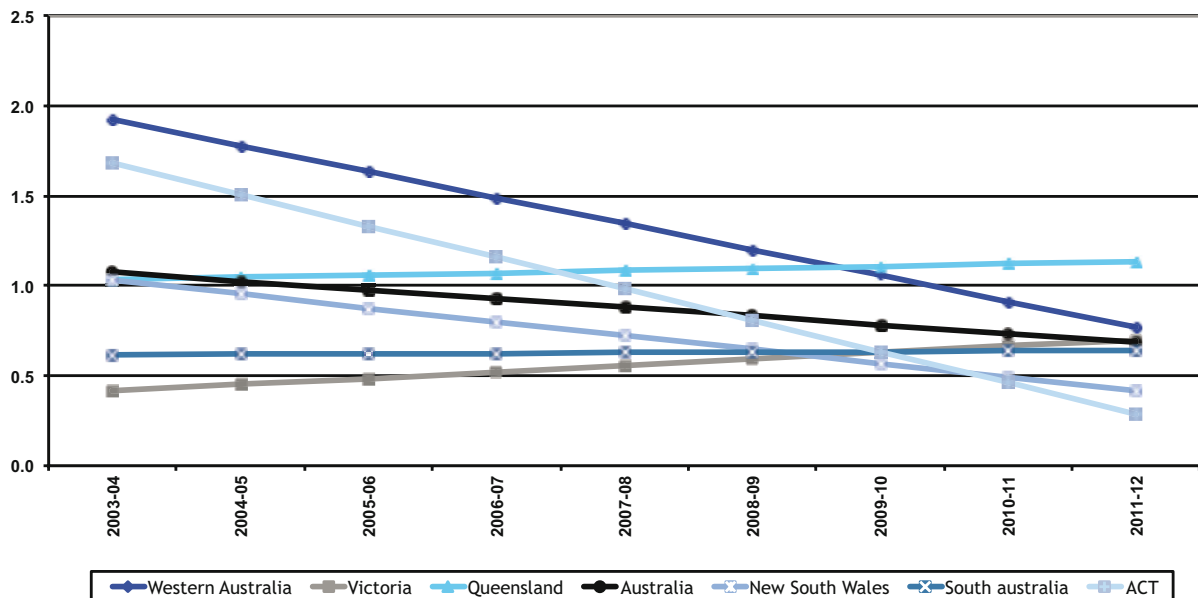
The measure known as the Fatal Injury Frequency Rate (FIFR) has been used to compare the data. This is derived by the formula:

$$\text{FIFR} = \frac{\text{Fatalities}}{\text{Population}} \times 1000,000$$

Western Australia has shown a gradual decrease in the rate of fatalities per million persons over the reporting period (Chart 6).

Similarly, the national rate of fatalities per million persons declined steadily over the period from 1 July 2003 to 30 June 2012, with Victoria, South Australia and New South Wales remaining well below the national average.

CHART 6: ELECTRICAL FATALITIES PER MILLION POPULATION TREND



The trend for Queensland and Victoria show increases over the reporting period. While Western Australia currently has almost twice the national rate of fatalities, the trend for Western Australia continues to show an encouraging decrease.

For comparison and benchmarking, the Fatal Injury Frequency Rate (FIFR) has been utilised. The FIFR is a measure of the number of electrical fatalities in a given period, expressed per million population.

The FIFR for Australia and New Zealand of 0.6 has been established as the benchmark for this report. While there may be other methods of comparison, this benchmark allows for a fair comparison between populations, while taking into consideration the fact that electricity usage is fairly universal in both countries. The table below indicates the FIFR for each state and territory of Australia and New Zealand. It also illustrates that the fatality rate for Western Australia is higher than the benchmark.

FIFR Comparison 2011-12⁴

State / Country	FIFR - 2011-2012
Benchmark	0.6
Tasmania	0.0
ACT	2.7
Western Australia	0
New Zealand	0.9
New South Wales	0.7
Queensland	0.9
Australia	0.5
South Australia	0.6
Victoria	0.2
Northern Territory	0

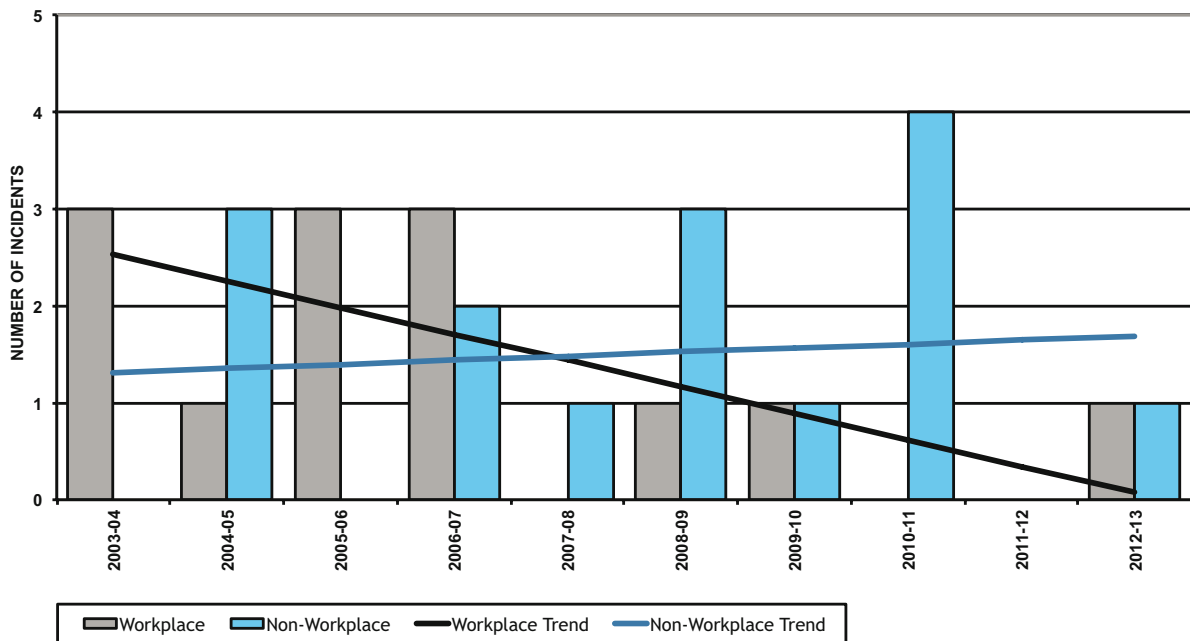
For the 2011-12 fiscal year, the FIFR for Western Australia was zero as there were no fatalities. However, in 2012-13 the FIFR rose to 0.8. In comparison to previous years, the FIFR trend for Western Australia has shown a significant improvement.

⁴ The jurisdictions with an FIFR of '0' indicates that no fatalities occurred in those areas in 2011-12. Due to issues with data availability, interstate and national comparisons have been evaluated on the nine years from 2003-04 to 2011-12.

4.4 Workplace and Non-Workplace Fatalities

Western Australian incidents have occurred primarily in the wider community (54 percent) with fewer in the workplace (46 percent). Since 1 July 2003, 15 deaths involved the general public and a further 13 in work places. The trend shows a significant decline in the number of workplace fatalities during the 10 year period (Chart 7).

CHART 7: WA FATALITIES - WORKPLACE AND NON-WORKPLACE

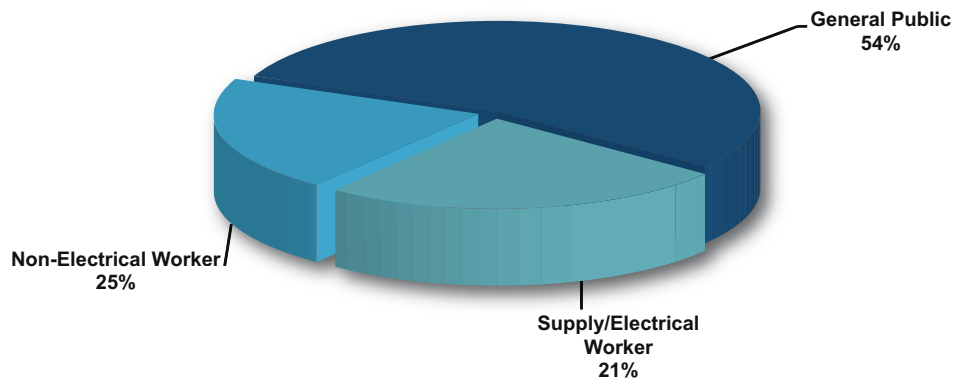


While the trend for workplace fatalities has decreased at a reasonable rate, the rate of non-workplace fatalities has marginally increased. The legislated installation of RCD's in new homes and in established premises being sold or leased (additions/alterations of existing homes) is expected to aid in the reduction of fatalities. It is anticipated that the rate of fatalities in non-workplace environments should begin to show a greater improvement during the next few years.

EnergySafety's advertising campaigns have focussed on discouraging people from performing their own electrical work. Further advertising campaigns will remind members of the general public about the dangers of electricity.

Chart 8 identifies fatalities in Western Australia by occupational categories. Given their working environment, electrical workers, as a population, are at greatest risk of being involved in electrical incidents. Electrical and supply workers account for 21 percent of all WA fatalities (Chart 8). Electricians comprise 4 of the 6 fatalities in this category. The general population accounted for 54 percent of fatalities in the reporting period.

**CHART 8: WA FATALITIES - OCCUPATIONAL CATEGORIES
2003-04 to 2012-13**

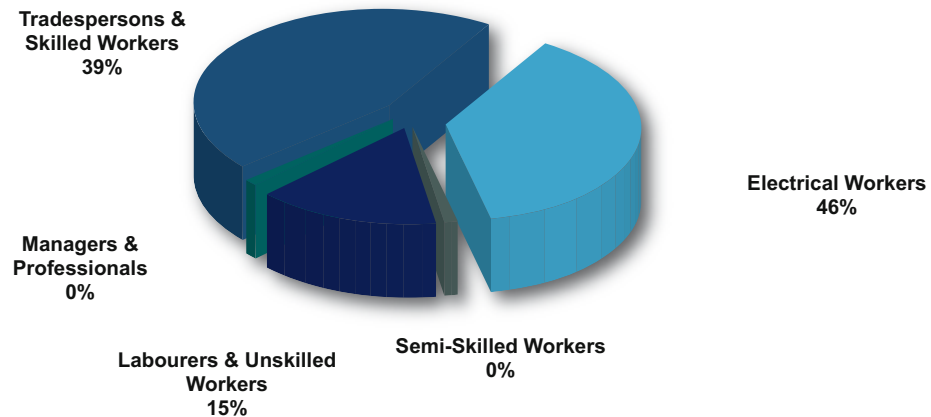


Working on or near energised electrical equipment is the leading cause of electrical fatalities and serious accidents for electricians. In view of this, the Director of EnergySafety issued a new 'Code of Practice - Safe LV Work Practices by Electricians' in the 2008 fiscal year. The Code significantly restricts work on or near live parts of a consumer's electrical installation. In most circumstances, electrical contractors and electricians are no longer permitted to perform electrical work on energised equipment operating at normal mains voltage.

No fatalities involving electrical apprentices were reported in the entire 10 year period. Apprentices are not allowed to perform live work and must be supervised by a licensed electrician.

Trade and industry workers are at much greater risk of electrocution than managers, professionals, clerical and service workers. In the ten years to 30 June 2013, there were no workplace fatalities in the clerical or service sectors, with fatalities almost wholly concentrated within the skilled trade areas (Chart 9).

CHART 9: WA WORKPLACE FATALITIES BY OCCUPATIONAL CLASSIFICATION



The number of skilled tradespersons, other than electrical workers, involved in fatal incidents is of concern. Some victims attempted electrical work for which they were neither qualified nor licensed. Other causes included inadvertent contact with overhead powerlines, contact with exposed live wires while working in roof spaces or electricity tracking as a result of moisture.

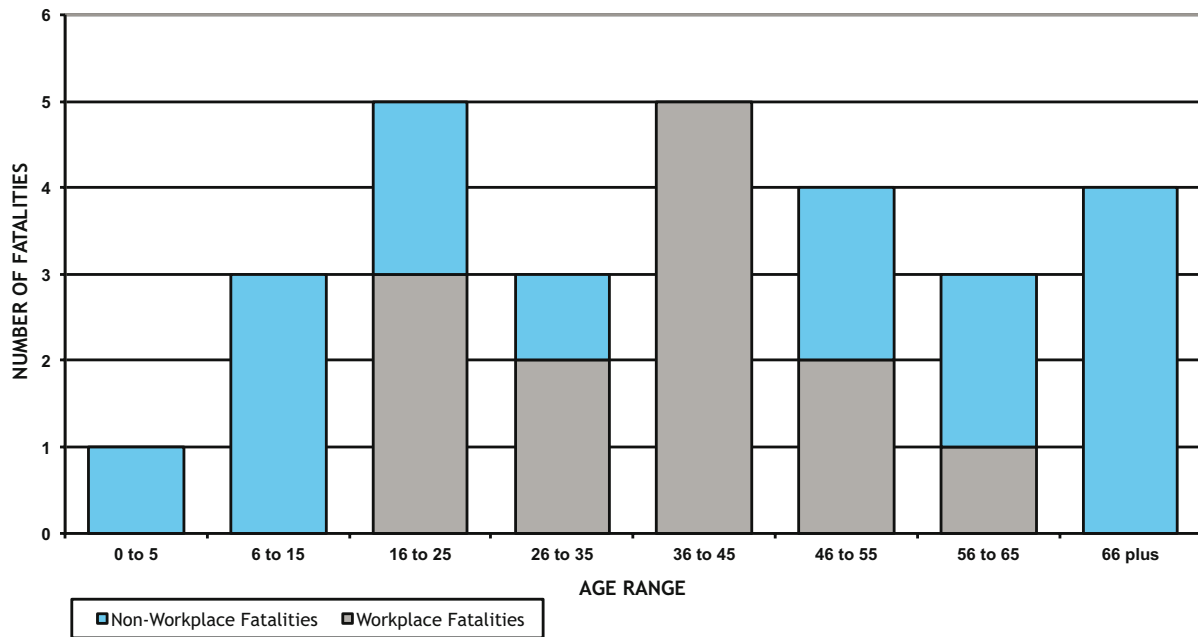
By contrast, the non-workplace group at most risk are home-based members of the general public, including students and retired persons. There were nine fatalities involving children and youth during the period 1 July 2003 to 30 June 2013, which accounts for 60 percent of incidents in this category.

Other fatalities occurring outside the workplace resulted from handyman-type work. The most common cases are where the victim had been attempting electrical work for which they were not qualified or licensed.

4.5 Age of Deceased

In a community setting, adults and retired people aged 46 and above are the most affected victims followed by young adults aged under 25 (Chart 10).

CHART 10: WA ELECTRICAL FATALITIES BY AGE



The above graph shows the 36 to 45 age group to be most at risk in the workplace environment, due mainly to the prevalence of workers within that age group in the industry. In previous years, concerns have been raised about risks to younger workers, particularly apprentices. There are three workplace fatalities in the 16 to 25 year age group over the reporting period, in which one involved a trade's assistant. The restriction on conducting live work affords the apprentices the protection they need while undergoing training.

Examination of the data for non-fatal electrical accidents and shocks will enable a more comprehensive analysis of the true risk to young persons, both at work and in the community.

4.6 Primary Electrical Contributors

While the specific circumstances relating to each fatality may differ, the common element underlying an incident is known as the primary electric shock source. EnergySafety has identified the following as primary sources.

- Overhead power lines;
- Substation equipment;
- Underground supply;
- Discharge from fixed wiring;
- Faulty flexible leads; and
- Faulty tools/appliances.

Table 1 – Workplace Fatalities

Type	Fatalities	%
Fixed Wiring	6	46%
Power lines	3	23%
Tools/appliances	2	15%
Flexi Cord	2	15%
Supply Other	0	0%
Substations	0	0%
TOTAL	13	100%

Table 1 demonstrates the primary electric shock sources for workplace environments where fixed wiring is to a large degree the main electrical source. Power lines and tools/appliances follow as the next main contributors.

Table 2 – Non – Workplace Fatalities

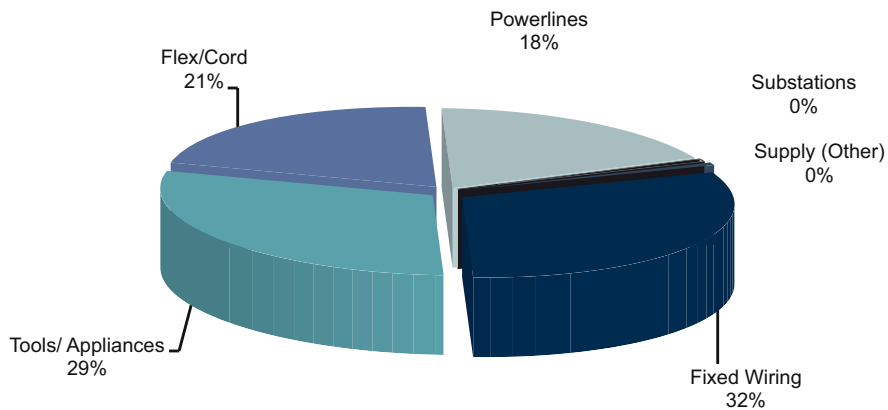
Type	Fatalities	%
Tools/appliances	6	40%
Flexi Cord	4	27%
Fixed Wiring	3	20%
Power lines	2	13%
Supply Other	0	0%
Substations	0	0%
TOTAL	15	100%

For the non-workplace environment tools and appliances, flexible cords and fixed wiring are the main sources. A factor in this pattern is the requirement for periodic inspection and tagging of tools/appliances in the workplace environment, a requirement that does not exist within the domestic environment.

Of particular concern for the non-workplace environment is the flexible cord component. This is an area where continued education and community awareness would reap significant safety benefits. The promotion of periodical testing of electrical equipment would also be of benefit.

The introduction of RCDs in older established premises is likely to have a positive effect upon figures for the non-workplace environment.

CHART 11: WA FATALITIES BY PRIMARY ELECTRICAL CONTRIBUTOR



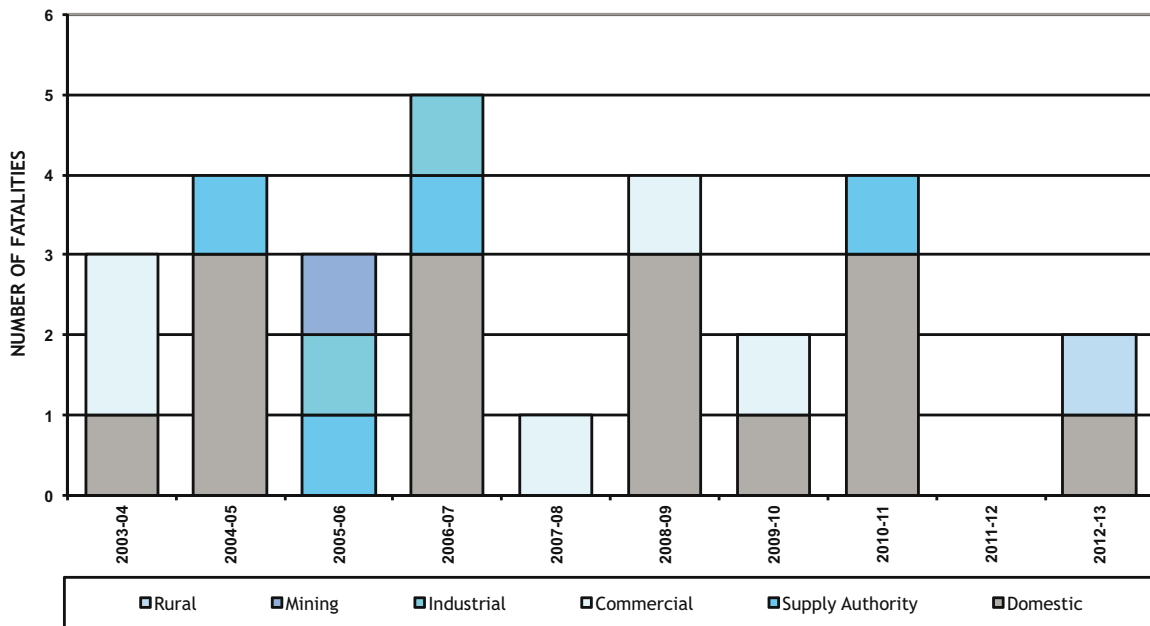
In averaging the results, fixed wiring is still found to be the main contributor, accounting for 32 percent of fatalities, followed by tools/appliances at 29 percent and incidents caused by flexible cords at 21 percent. Fatalities relating to fixed wiring, tools/appliances and flexible cords together account for almost 82 percent of incidents. Strong advertising in these areas would help to raise awareness levels in the general public.

Even though power lines form a significant category, there were only two incidents involving the general public since 2003-04. In 2007-08 a young girl climbed a steel pole to retrieve a football jumper and in 2010-11 an 18 year old female walked into a fallen street lighting switchwire at night.

4.7 Installation Type and Location

Domestic, commercial and supply authority installations account for 86 percent of fatalities. Incidents involving domestic installations are the most common, accounting for 54 percent of incidents. Educational programs would probably be of benefit to help reduce fatalities in this area.

CHART 12: WA ELECTRICAL FATALITIES BY INSTALLATION TYPE



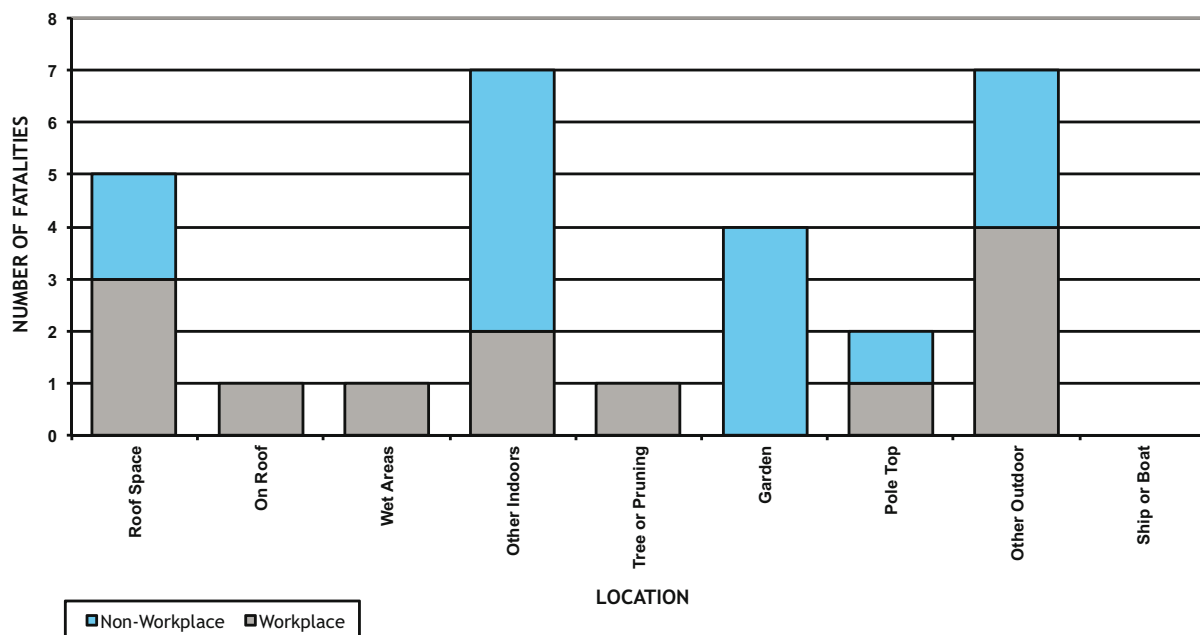
Mining, industrial and rural installations have the least number of fatalities, with a combined total of 4 over the reporting period.

As members of the general public are most likely to be affected by domestic installations, these require an increased focus on safety. In view of this, EnergySafety has been promoting the use of RCDs in domestic installations. Since 2000, fitting of at least two RCDs has been compulsory for all new domestic electrical installations.

It is now also compulsory for at least two safety switches to be installed in all rental properties and pre-2000 residential properties when sold.

The outdoor environment has proven to be the more significant location for workplace fatalities, with contact with power lines being the primary power source in these incidents. In a community setting general indoor areas accounted for the most fatalities (Chart 13).

CHART 13: WA ELECTRICAL FATALITIES BY LOCATION



Evidence suggests that activities within the roof space or on the roof of a premises present considerable risk. Data analysis further suggests the following risk factors are the most significant:

- failure to correctly isolate the electricity supply before commencing work within the roof space;
- presence of damaged or otherwise exposed energised wiring not anticipated by the victim; and
- absence of RCD protection.

Internal wet areas, such as bathrooms and laundries, continue to be of concern, along with external wet areas such as gardens. Other indoor incidents involve unqualified persons attempting to repair electrical appliances.

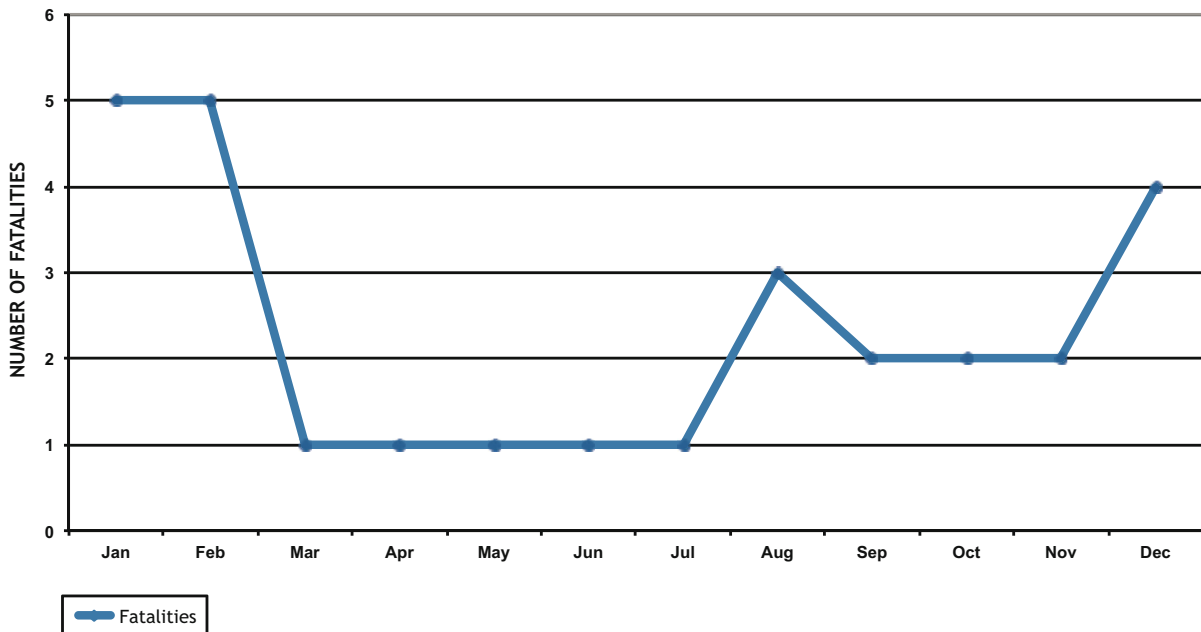
As indicated earlier, tree pruning – whether by professionals or members of the public – was formerly a factor in a number of fatalities. Safety campaigns have proven successful in reducing injuries in this area with only one fatality occurring in this category during the reporting period. The incident occurred in 2007 and involved a vegetation control worker.

4.8 Time of Year/Climate

Anecdotal evidence suggests that cooler temperatures may possibly contribute to lower rates of electrical fatalities, possibly due to potential victims being in a position to utilise additional clothing and protective equipment. The knowledge that exposure to water significantly increases the risk of electrocution is also seen as a deterrent to working in high-risk environments.

Western Australia generally experiences cool, wet winters and hot, dry summers across much of the State. Most electrical fatalities over the period 1 July 2003 to 30 June 2013 occurred during December, January, and February, traditionally some of Western Australia's warmest months (Chart 14).

CHART 14: WA ELECTRICAL FATALITIES BY MONTH OF INCIDENT

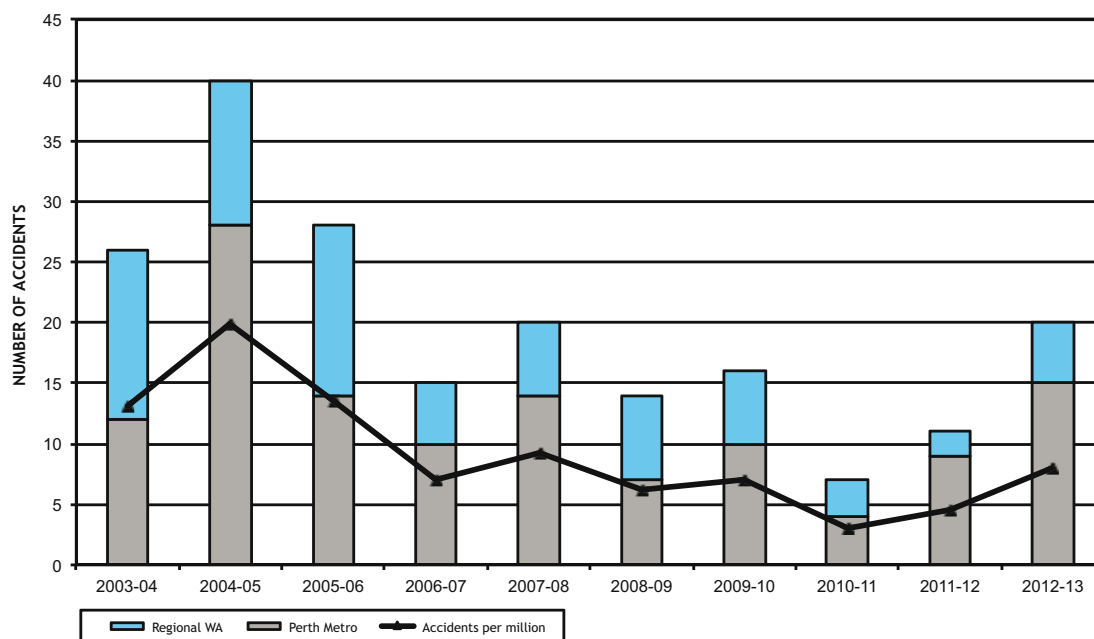


5. Electrical Accidents

5.1 Historical Information

There were 197 serious non-fatal electrical accidents reported in Western Australia during the period from 1 July 2003 to 30 June 2013. Approximately 62 percent took place within the Perth metropolitan area and 38 percent in regional areas. The results show a gradual decrease in the trend line over the reporting period (Chart 15).

CHART 15: ELECTRICAL ACCIDENTS IN WA - 2003-04 TO 2012-13

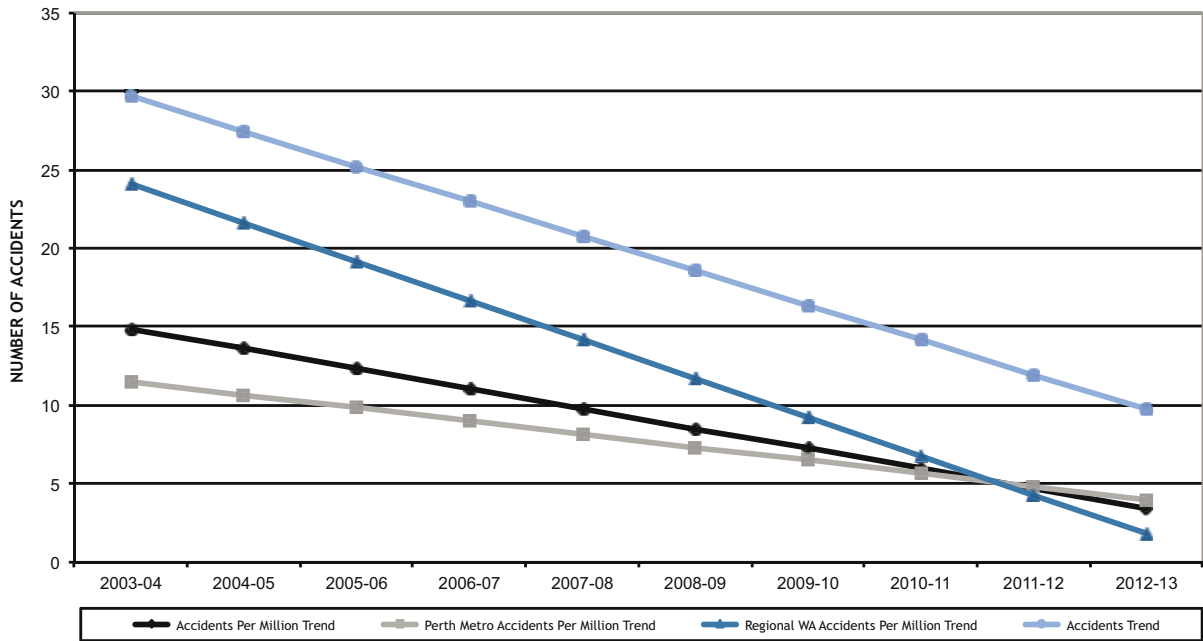


Serious non-fatal accidents are regarded as those which require the assistance or treatment by a health professional. Where a precautionary electrograph assessment is taken and treatment is not required, the incident is considered to be a shock rather than a serious accident.

Chart 15 above shows relatively high numbers during the early part of the reporting period with a spike occurring in 2004-05. Since 2005-06 a sustained decrease is evident, with the levels for 2010-11 being the lowest.

Despite the high number of accidents reported in 2004-05, the rate of serious electrical accidents per million population has improved considerably over the reporting period (Chart 16). The decreasing trend could be attributed to the change in standards restricting work on live circuits.

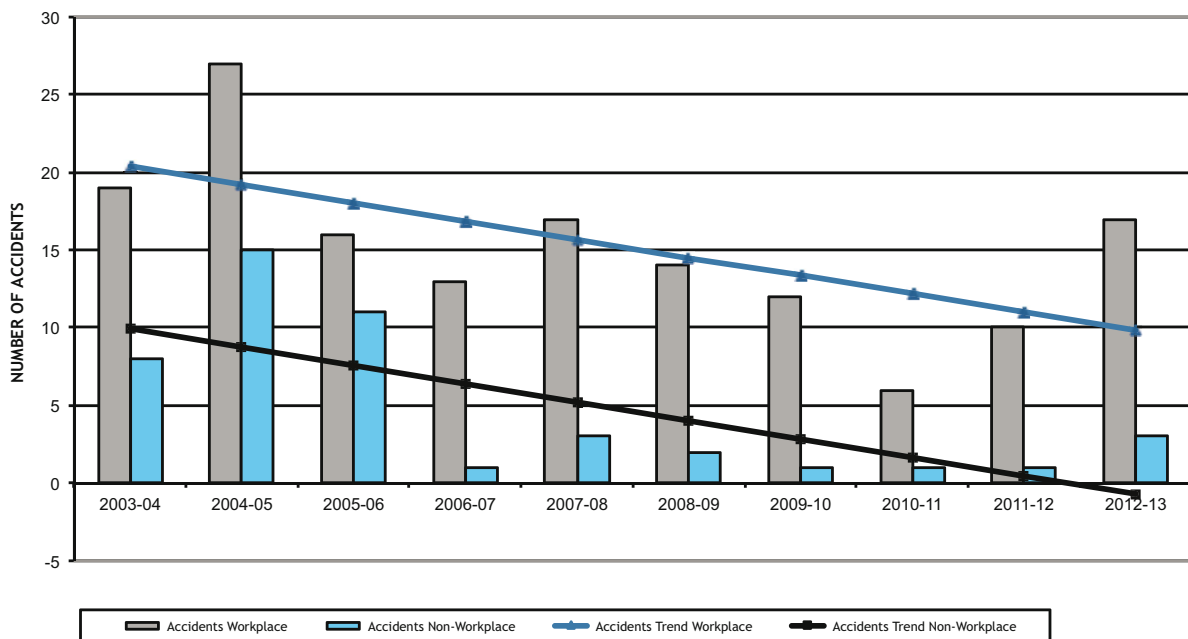
CHART 16: WA ELECTRICAL ACCIDENT TRENDS



5.2 Workplace and Non-Workplace Accidents

Analysis of the data for Western Australia indicates that approximately 77 percent of serious electrical accidents occur in the workplace. In the ten years to 30 June 2013, there were 46 reported non-workplace and 151 workplace electrical accidents respectively (Chart 17).

CHART 17: WORKPLACE v/s NON WORKPLACE ACCIDENTS IN WA



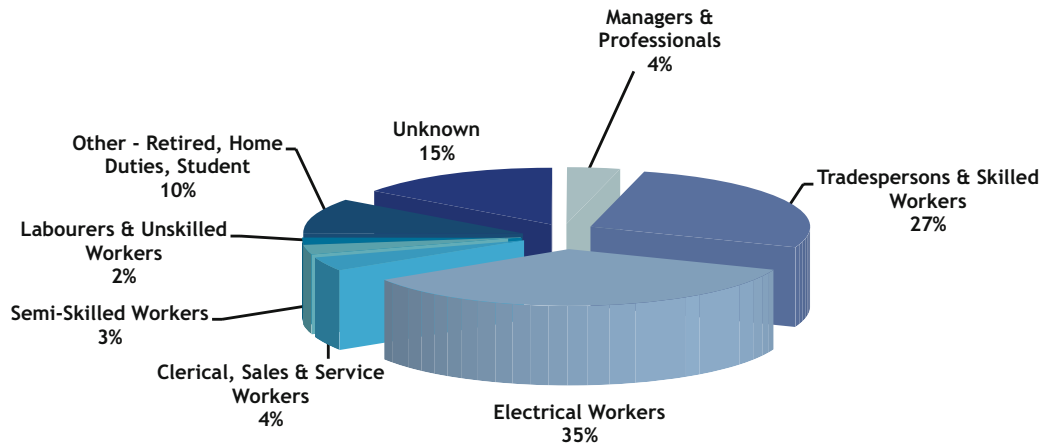
While serious electrical accidents are three times more likely to occur in a workplace environment, the fatality trend has been moving in a steady downward direction over the reporting period. The trend for community-based accidents also indicates a decrease in the number of accidents.

The decrease could be attributed to television and radio advertising campaigns held in 2008-09 which focussed on discouraging people from doing their own electrical work.

In 2010-11 an EnergySafety campaign advertised the importance of RCDs. It comprised television, press, online and radio advertisements. The main objective of the campaign was to urge home-owners of properties built prior to 2000 to have two RCDs fitted to their premises voluntarily. Results gauging the effectiveness of the campaign were encouraging, with 79 percent of 560 homeowners interviewed agreeing that the advertisements would make them want to install RCDs. In 2012-13 an advertising campaign by EnergySafety focussed on encouraging people to use a licensed electrical contractor for electrical work.

Electrical workers are involved in 35 percent of accidents followed by tradespersons at 27 percent (Chart 18).

**CHART 18: WA ACCIDENTS BY OCCUPATIONAL CLASSIFICATION
(2003-04 TO 2012-13)**



In a workplace environment, electrical workers are involved in 46 percent of accidents. This is due to the nature of their work; however this could be the area of focus to reduce the number of accidents.

Apart from workplaces, the family home remains the highest risk environment at 41 percent of total reported non-workplace incidents. Overall, when considering all incidents reported inclusive of both workplace and non-workplace incidents, the family home accounts for 10 percent of accidents.

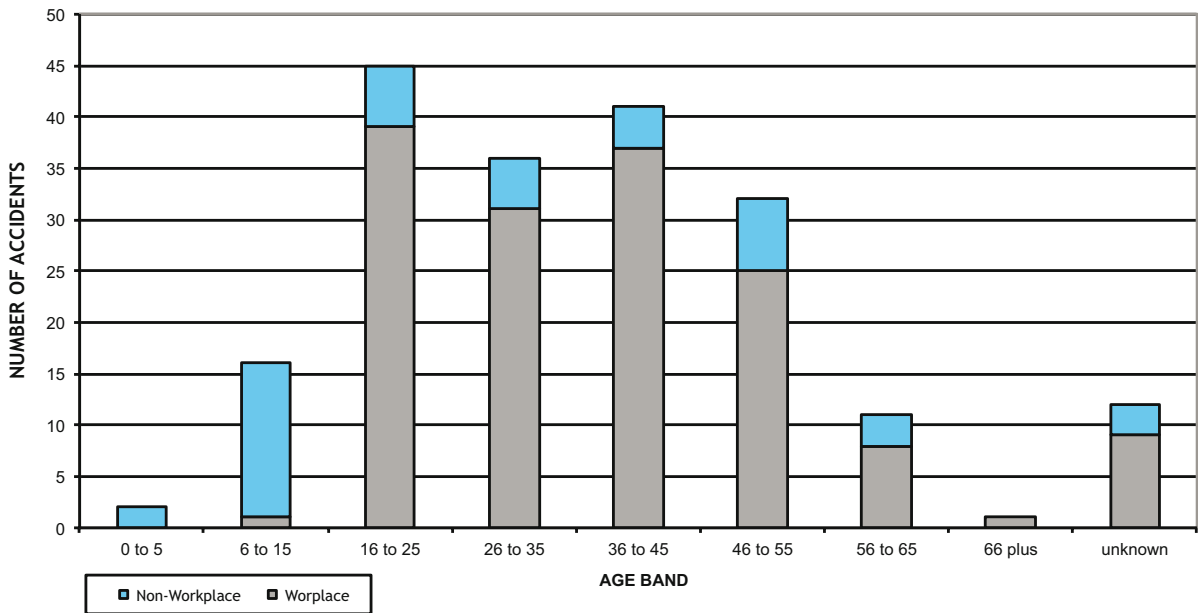
15 percent of accidents were categorised as unknown as the information provided was not sufficient to make an accurate determination.

Electrical workers will continue to be exposed to risk levels greater than that of other trades. Within this subset, apprentices accounted for only 17 percent of accidents. Again, this reflects the requirement that apprentices must not work on live circuits and must work under supervision.

5.3 Age of Victims

Children and young people are at greater risk of electrical accidents within the non-workplace environment; while workers aged 16 to 45 appear to be at greater risk of a workplace electrical accident (Chart 19). This may be attributed to the tendency for more mature workers to take on supervisory roles, thereby reducing the amount of time they spend on tools. As a result risks are incurred mainly by the younger members of the industry.

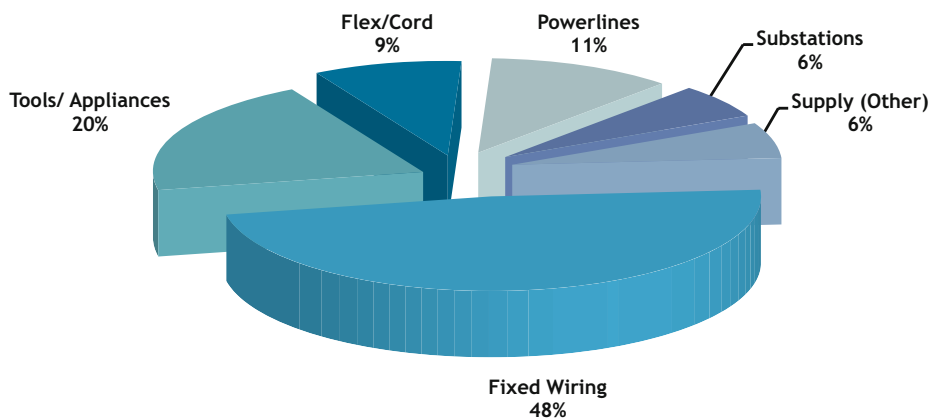
CHART 19: WA ELECTRICAL ACCIDENTS BY AGE OF VICTIM



5.4 Primary Electrical Contributors

Fixed wiring is the primary source of accidents at 48 percent followed by tools and appliances at 20 percent and power lines at 11 percent (Chart 20).

CHART 20: WA ACCIDENTS BY PRIMARY ELECTRICAL CONTRIBUTOR



In workplaces, fixed wiring is the highest electrical contributor. This can be partly attributed to the high percentage of accidents involving electrical tradespersons, undertaking work such as testing of switchboards or control panels. Installing or replacing lighting and socket outlet circuits also plays a part in fixed wiring related accidents.

Tools/appliances and fixed wiring are the most common electrical accident sources among members of the general public. This is followed by flexible cords. This reflects situations where people attempt to do their own electrical work for which they are neither qualified nor licenced.

Education on the importance of electrical work being done by licenced workers seems to be an area that can help to improve safety in this area.

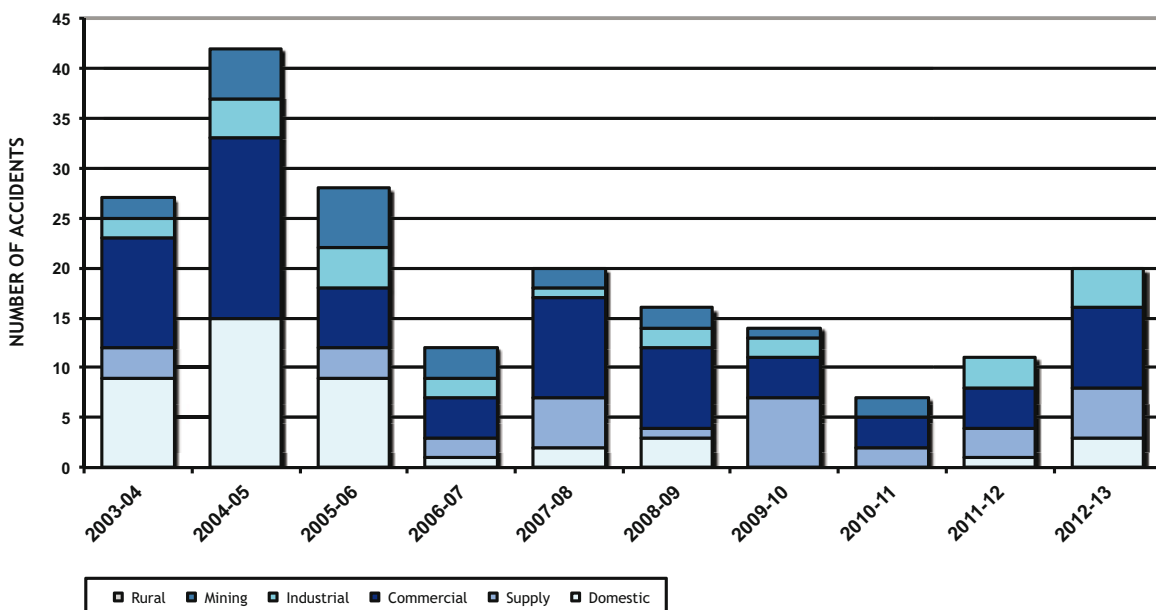
5.5 Installation Type and Location

Electrical accidents occurring in commercial and domestic installations are the most frequent with 37 percent in commercial and 21 percent in domestic installations over the reporting period. A further 15 percent of accidents occurred in the 'supply' category (network operators). The majority of incidents in this category reflect accidents involving supply workers.

There have been no electrical accidents reported in rural installations.

Over the reporting period almost 50 percent of workplace accidents occurred outdoors

CHART 21: WA ELECTRICAL ACCIDENTS BY INSTALLATION TYPE



compared with 49 percent indoors. In 2009-10, four of the six workplace accidents occurred outdoors.

Activities in the garden, on patios or near property boundaries account for approximately 19 percent of all domestic accidents, while wet areas such as kitchens, laundries and bathrooms are involved in a further 9 percent. These areas all constitute locations where the probability of coming into contact with electricity is high.

5.6 Time of Year/Climate

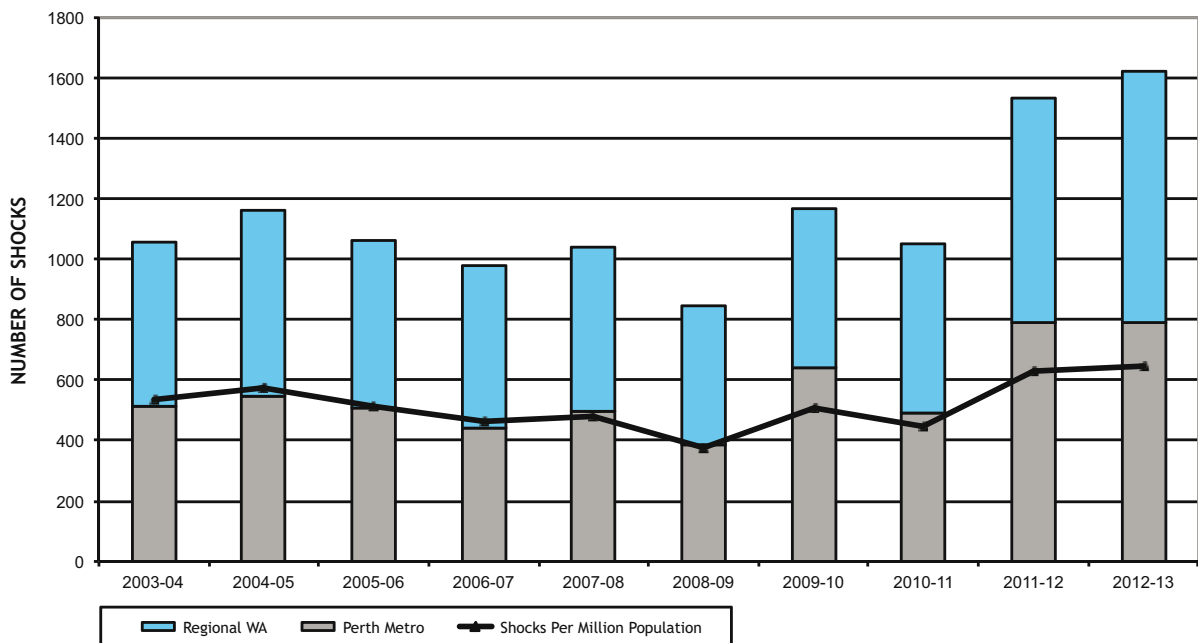
In contrast to the analysis of fatalities, analysis of both electrical accident and shock data did not indicate a strong correlation between the time of year/climate and occurrence.

6. Electrical Shocks

6.1 Historical Information

During 1 July 2003 to 30 June 2013, there were 11,526 reported electrical shocks in Western Australia. Approximately 51 percent were recorded as occurring in regional and rural areas, with the Perth metropolitan area accounting for the balance (Chart 22). The reason for a greater number of shocks reported in regional and rural areas may be due to the presence of mining companies, which must comply with reporting requirements for electrical shocks.

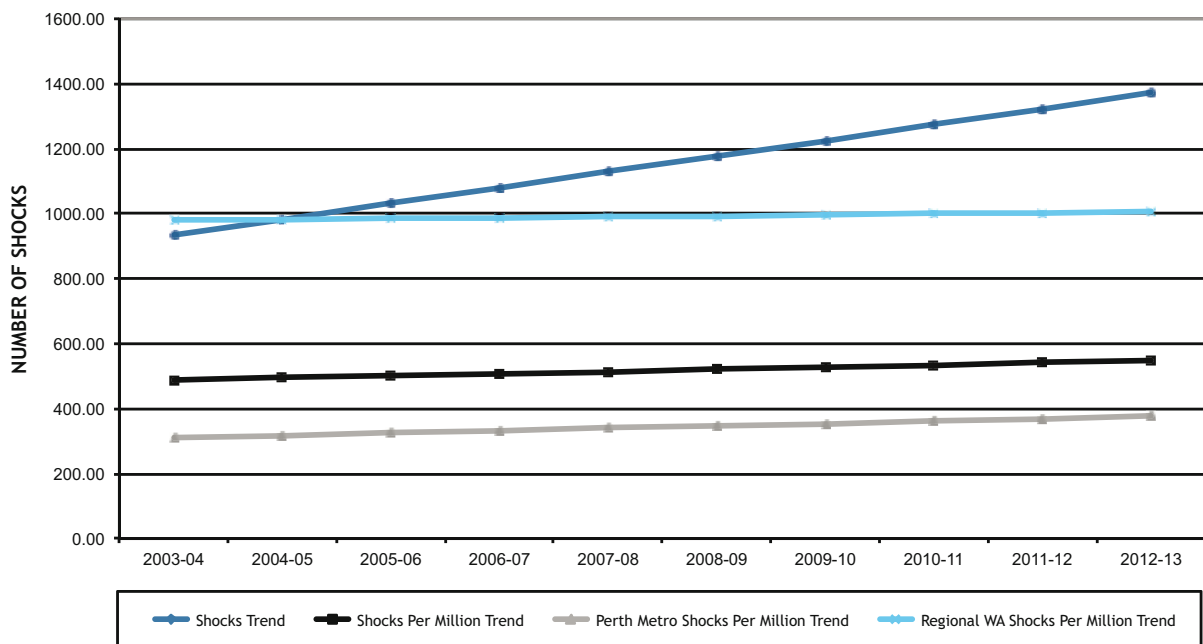
CHART 22: ELECTRICAL SHOCKS IN WA



A steady increase is apparent in the number of reported electrical shocks each year. This increase can be attributed to a greater awareness of reporting requirements. This awareness is reinforced by continual education and public awareness campaigns.

While it may not be apparent in Chart 22, Chart 23 indicates a modest rise in shocks reported over the reporting period. However the trend for the number of shocks per million population remains fairly steady for both metropolitan and regional areas. This could indicate that the shocks reported over the reporting period are a result of greater awareness of reporting requirements. Despite an increase in population over the reporting period, there has not been an increase in the number of shocks.

CHART 23: WA ELECTRICAL SHOCK TRENDS



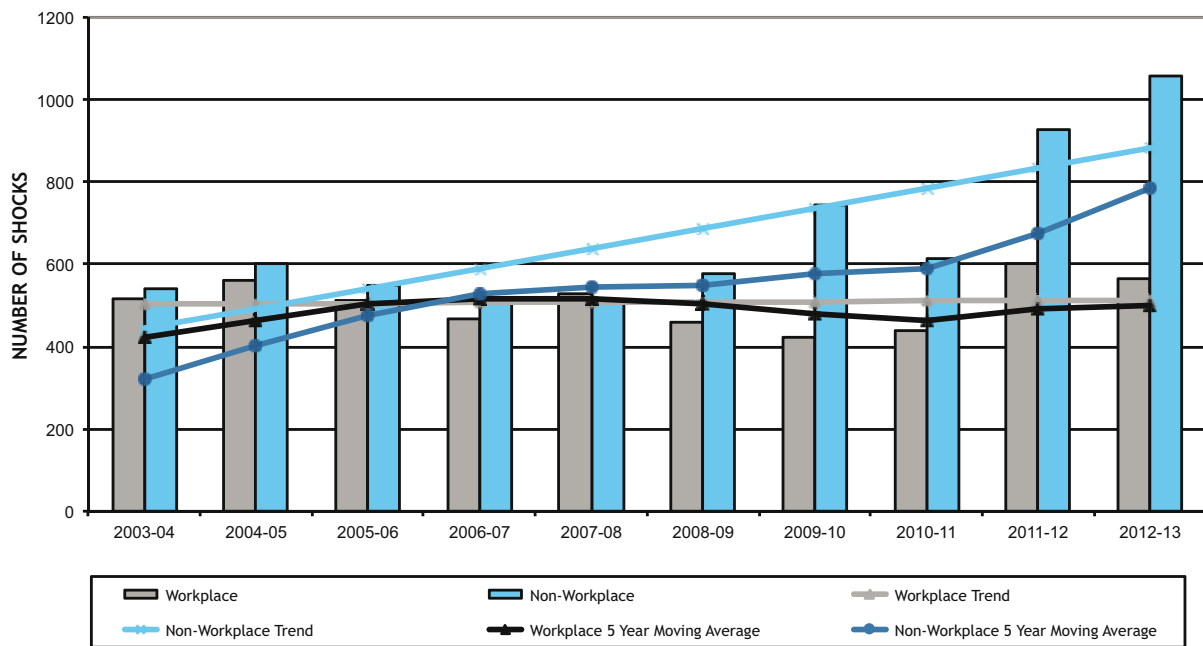
6.2 Workplace and Non-Workplace Incidents

As electrical shock is defined as an incident not requiring medical or first-aid treatment, there is some uncertainty as to the accuracy of reporting levels, particularly from sectors of business and industry which do not have formal reporting procedures in place.

An analysis of incidents prior to the ten year period has indicated the probability of under-reporting of electrical shocks by the general public, who, were unlikely to report an incident unless a significant injury had incurred.

There has been a substantial increase in the reporting of electrical shocks occurring in the workplace and those in the wider community since the beginning of the reporting period (Chart 24). This suggests that the electrical proactive inspection program has been an effective tool in promoting awareness of electrical safety in industry and the general public.

CHART 24: WORKPLACE v/s NON WORKPLACE ELECTRICAL SHOCKS IN WA



While reporting of workplace shocks rose at a steady rate during the early part of the reporting period, it has shown a slight decrease in the latter half of the decade. The five year moving average is beginning to demonstrate a slight decrease in the number of shocks.

Reporting of non-workplace shocks, on the other hand has increased markedly since 2007-08 (Chart 24).

Since 2003-04, with the exception of 2007-08, there have been more non-workplace than workplace shocks reported each year. This suggests there has been increased awareness among the general public about the need to report electric shocks.

It is unlikely that such a substantial increase is a result of an actual increase in the incidence of electrical shocks. The rise is more likely due to higher levels of electrical safety awareness. Members of the general public are reporting more shock incidents, as are the electrical providers and mine sites. This reporting pattern is not unique to the reporting of electrical incidents but a reflection on the integration of Occupational Health and Safety within the workplace. It is logical that the increased focus within the workplace carries over to an increase in awareness within the domestic environment as well. Despite the improved reporting rate it must be noted that the percentage of unreported incidents is still unknown, a fact that may alter the interpretation of results in the future.

Trend analysis over the past ten years can prove misleading, as it may well identify improved rates of reporting, rather than changes in actual incidence of electrical shock or nature of occurrence.

Given the added uncertainty about the reliability of workplace reporting of electrical shocks, further analysis has not been conducted.

7. Conclusion

While the trend for fatalities has been declining, Western Australia's electrical fatality rate is at 0.8. Safety advertising campaigns affect the number of fatalities, which tend to show a reduction in the same year as the campaign.

Electrical workers are at most risk of being involved in electrical incidents but, there were no fatalities involving apprentices. This may be a result of restrictions preventing live work by this group and the supervision required under the regulations.

Children and retired persons are the group most involved in non-workplace incidents. Increased electrical safety at home, especially the installation of RCDs will be a significant benefit to this group. Encouraging homeowners to use the services of a licensed electrical contractor for electrical work will help to prevent incidents arising due to faulty electrical work.

Fixed wiring was found to be a major electrical shock source for both electrical fatalities and accidents. This is another reason why RCDs will be beneficial. It is likely that we will see changes in the incident profiles once RCDs become more established in older housing.

Electric shock trends have been increasing over the reporting period; reflecting greater awareness of reporting requirements. It is possible the increasing trend will plateau as increased rates of reporting are balanced by the increased installation of RCDs in dwellings.

The analysis conducted in this report highlights the need to remind people of the dangers involved when working with electricity. This is especially true of those who conduct their own work without having had the necessary training. The need is also evident to reinforce the message to be careful when conducting pruning of trees near power lines and working in roof spaces.

Notes

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