



Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Energy Safety

Electrical Incident Safety Report 2016-17

Table of contents

Contents

- Table of contents.....2
- Preface.....4
- 1 Executive summary.....5
- 2 Introduction.....6
 - 3.1 Fatalities, Electrical Accidents and Electric Shocks.....7
 - 3.2 Installation types8
 - 3.3 Occupations.....8
 - 3.4 Statistical divisions.....9
- 4 Electrical Incidents – 2016-17..... 10
 - 4.1 Electrical fatalities 10
 - 4.2 Electrical accidents 10
 - 4.2.1 Electrical accidents (hospitalisation) 10
 - 4.2.2 Electrical accidents (medical treatment)..... 10
 - 4.3 Electric shocks 10
- 5 Electrical Incidents 2007-08 to 2016-17 11
 - 5.1 Electrical Fatalities..... 12
 - 5.2 Electrical accidents 16
 - 5.3 Electric Shock..... 20
- 6 Conclusion 22

Preface

This report by *EnergySafety* summarises statistical information about electrical incidents in Western Australia during the 2016-17 fiscal year. *EnergySafety* is the electricity regulator in Western Australia.

EnergySafety uses the information to assess:

- 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.

Ken Bowron
Director of Energy Safety

November 2017

1 Executive summary

This report presents an analysis of electrical incidents reported to EnergySafety in the fiscal year 2016-17 with comparison to the preceding ten year period from 1 July 2007 to 30 June 2017.

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

From 1 June 2007 to 30 June 2017, 17 electrical fatalities occurred in Western Australia. Western Australia's Fatal Injury Frequency Rate (FIFR) in 2015-16 was 0.4 per million persons. As there were no fatalities reported in 2016-17, this has decreased to zero for 2016-17. The three year moving average has decreased from 0.52 in 2015-16 to 0.39 in 2016-17.

Over the reporting period, 41 per cent of fatalities occurred in the workplace when compared to those that occurred in the general community.

There were 135 electrical accidents which occurred over the 10 years. Electrical accidents have increased in 2016-17 compared to the previous year. The trends for the last 10 years indicate an overall reduction.

There were 14,654 electric shocks reported since July 2007. The trend for electric shocks over the reporting period shows an increase. The number of reported electric shocks has decreased by 0.3 per cent compared to the previous year.

Please note: All statistical information is correct as of October 2017.

2 Introduction

EnergySafety administers the Electricity (Licensing) Regulations 1991 and the Electricity (Network Safety) Regulations 2015. A common element to both pieces of legislation is the mandatory reporting to the Director of Energy Safety and the relevant network operator of certain electrical accidents causing or likely to cause, danger to life or property. The incidents reported to the Director of Energy Safety are recorded and presented as a number of reported accidents per million persons in a 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 2007 to 30 June 2017. It takes into account all reported incidents recorded into the EnergySafety database. The incidents have been categorised into fatalities, electrical accidents and electric shocks.

A new compliance management system has been developed to record incidents. The transition to the new system is ongoing. The information compiled in this report has been retrieved from the database in November 2017.

3 Definitions and explanatory notes

3.1 Fatalities, electrical accidents and electric shocks

Electricity: The generation and supply of electric current for heating, lighting or powering appliances or apparatus, excluding where used for the propulsion system of a motor vehicle.

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

Electrical accident: Are non-fatal incidents which include electrical accident (hospitalisation) and electrical accident (medical treatment).

Electrical accident (hospitalisation): A non-fatal incident resulting from a sudden discharge of electricity causing injury sufficient to admission as an inpatient in a hospital, excluding attendance for a precautionary electrocardiograph (ECG).

Electrical accident (medical treatment): A non-fatal incident resulting from a sudden discharge of electricity causing injury sufficient to require first-aid or medical attention but not as an inpatient in a hospital, excluding attendance for a precautionary ECG.

Electric shock: A non-fatal incident resulting from a sudden discharge of electricity (excluding static discharge), causing insufficient injury to require first aid or medical attention. Note: Where the only treatment required is attendance for a precautionary ECG, the incident is classified as an electric shock.

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

Property damage (reportable): Reportable damage that has occurred as a result of a sudden discharge of electricity or in some way has an electrical origin that has not been contained within an item of equipment and results in a fire or damage to property. It also includes damage to equipment that occurs as a result of voltage or frequency variations exceeding prescribed limits.

FIFR (fatal injury frequency rate): A measure of the number of electrical fatalities in a given period, expressed per million persons in a population. This is derived by the formula:

$$\text{FIFR} = \frac{\text{Fatalities}}{\text{Population}} \times 1,000,000$$

Wilful: Intentional; deliberate.

Workplace: A place where people work, such as an office, factory or work site.

3.2 Installation types

Network operator: A supply authority and any other person lawfully operating transmission or distribution works.

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

Mining installation: Installations in mining operations as appearing in the *Mines Safety and Inspection Act 1994*.

Commercial Installation: Installations 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, carriages, classrooms, ovals and parks, storerooms, warehouses, commercial kitchens and fishing boats.

Industrial installation: Installations 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.

Rural installation: Comprises any 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. This excludes the network operator installation components (e.g. aerial conductors and poles).

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

3.3 Occupations

Electrical worker: A person carrying out electrical work who is licensed or authorised to do so under the Electricity (Licensing) Regulations 1991 and encompasses electricians, holders of restricted electrical licences and electrical apprentices.

Electrician: An electrical worker 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.

Electrical contractor: A person who carries on a business as an electrician but does not include an electrician when in a capacity of an employee for an electrical contractor.

Restricted electrical worker: An electrical worker (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.

Electrical apprentice: An electrical worker 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.

Inspector (electricity): An inspector as defined in the *Energy Coordination Act 1994* section 3(1) who is classified as an Inspector (Electricity) under section 12 of that Act.

Supply worker: A person employed by a network operator.

3.4 Statistical divisions

Population: Estimated residents in Western Australia. Population statistics used in this report are obtained from the Australian Bureau of Statistics (ABS) at www.abs.gov.au/ausstats.

Census statistics are used where available; or estimated resident populations as available on the ABS website and extrapolated for years where the data is not available.

4 Electrical incidents - 2016-17

There were 1,656 electrical incidents reported to EnergySafety in 2016-17. The table below outlines the number of incidents reported in each category.

Incident type	Number of incidents reported
Electrical fatality	0
Electrical accident	17
Electric shock	1,639
Total electrical incidents	1,656

4.1 Electrical fatalities

In 2016-17 there were no fatalities reported in Western Australia where electricity was found to be the cause.

4.2 Electrical accidents

Electrical accidents are non-fatal incidents which include:

4.2.1 Electrical accidents (hospitalisation)

These are non-fatal incidents resulting from a sudden discharge of electricity causing injury sufficient to require admission as an inpatient in a hospital, excluding attendance for a precautionary electrocardiograph (ECG). There were six electrical accidents in this category during 2016-17.

4.2.2 Electrical accidents (medical treatment)

This category includes non-fatal incidents resulting from a sudden discharge of electricity causing injury sufficient to require first-aid or medical attention but not as an inpatient in a hospital, excluding attendance for a precautionary ECG. There were 11 accidents in this category during 2016-17.

4.3 Electric shocks

Electric shocks are non-fatal incidents resulting from a sudden discharge of electricity (excluding static discharge), causing insufficient injury to require first aid or medical attention, but precautionary medical treatment may have been sought (including an ECG).

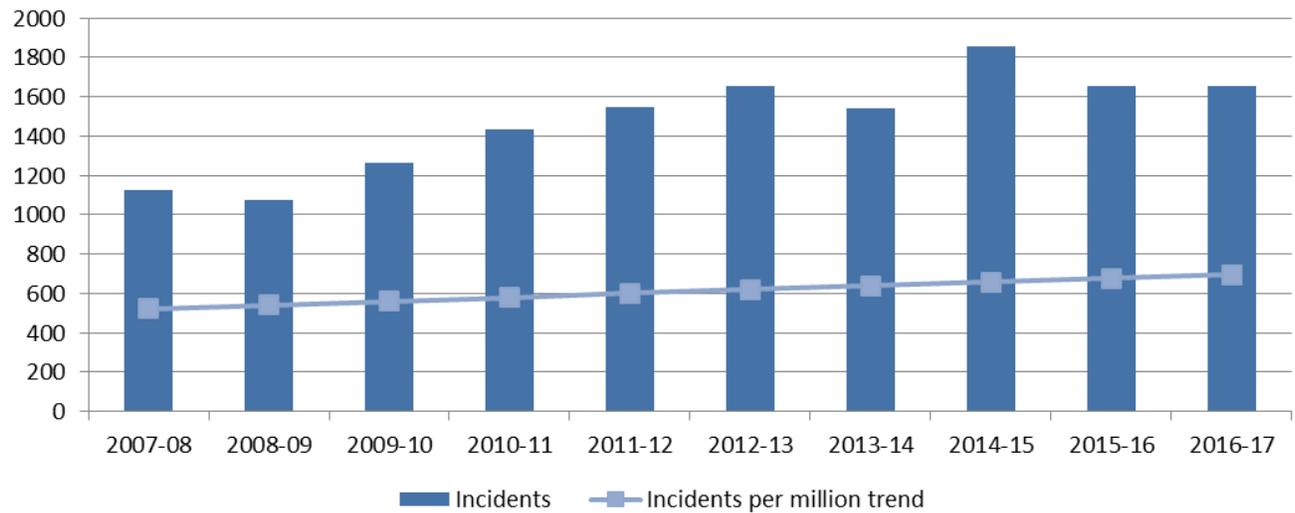
There has been a significant increase in the number of reported shocks over recent years. This may be due to an increased awareness about the requirement to report such incidents.

There were 1,639 shocks reported in 2016-17, which is a minor decrease of 0.3 per cent in comparison to the previous year.

5 Electrical incidents 2007-08 to 2016-17

The total incidents for the 10 year period from 2007-08 to 2016-17 is 14,806. This is an average of approximately 1,481 incidents a year. Analysis of the different types of incidents provides a better understanding of the trends of electrical incidents.

Chart 1: Electrical incidents in WA – 2007-08 to 2016-17



5.1 Electrical fatalities

There were 17 fatalities over the 10 year reporting period averaging at two per year. There were no fatalities in 2011-12 and in 2016-17. The trend for fatalities has been declining over the reporting period.

Chart 2: Electrical fatalities in WA – 2007-08 to 2016-17

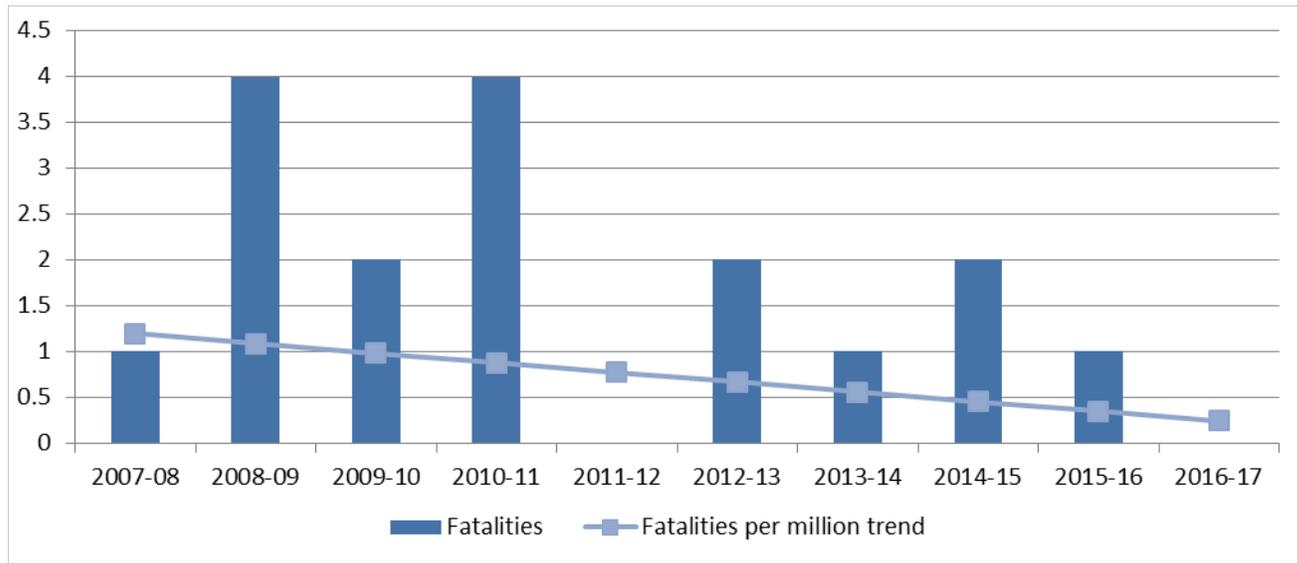
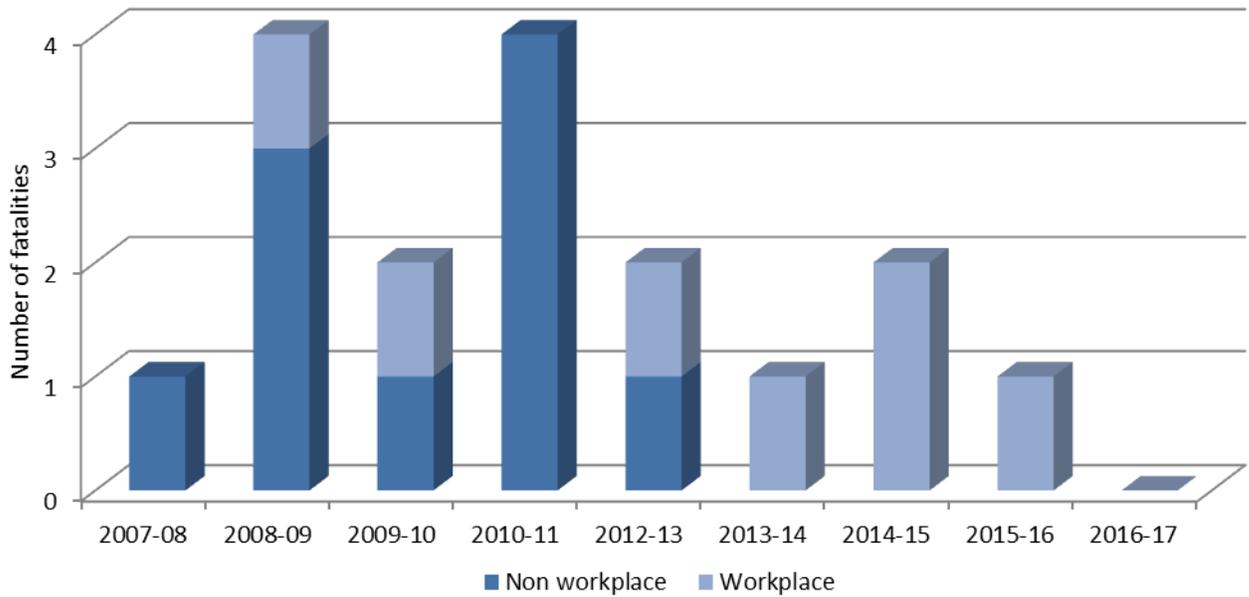


Chart 3 is a representation of the number of fatalities segregated by workplace and non-workplace categories. Over the reporting period, 41 per cent of fatalities occurred in the workplace when compared to those that occurred in the general community.

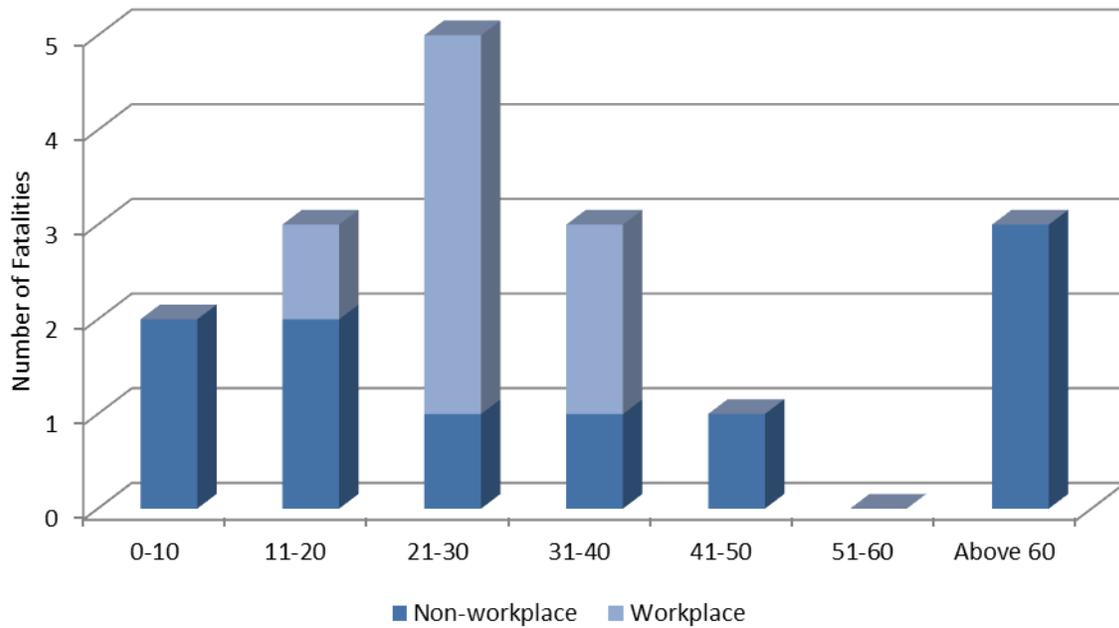
Chart 3: Workplace and non-workplace electrical fatalities



All fatalities recorded from 2013-14 onwards were workplace fatalities, while the opposite is true for 2007-08 and 2010-11 which primarily involved members of the general public.

Chart 4 provides a representation of electrical fatalities by age. The occurrence of fatalities among the general public in the age groups 21 to 60 is much lower compared to those aged below 20 and above 60.

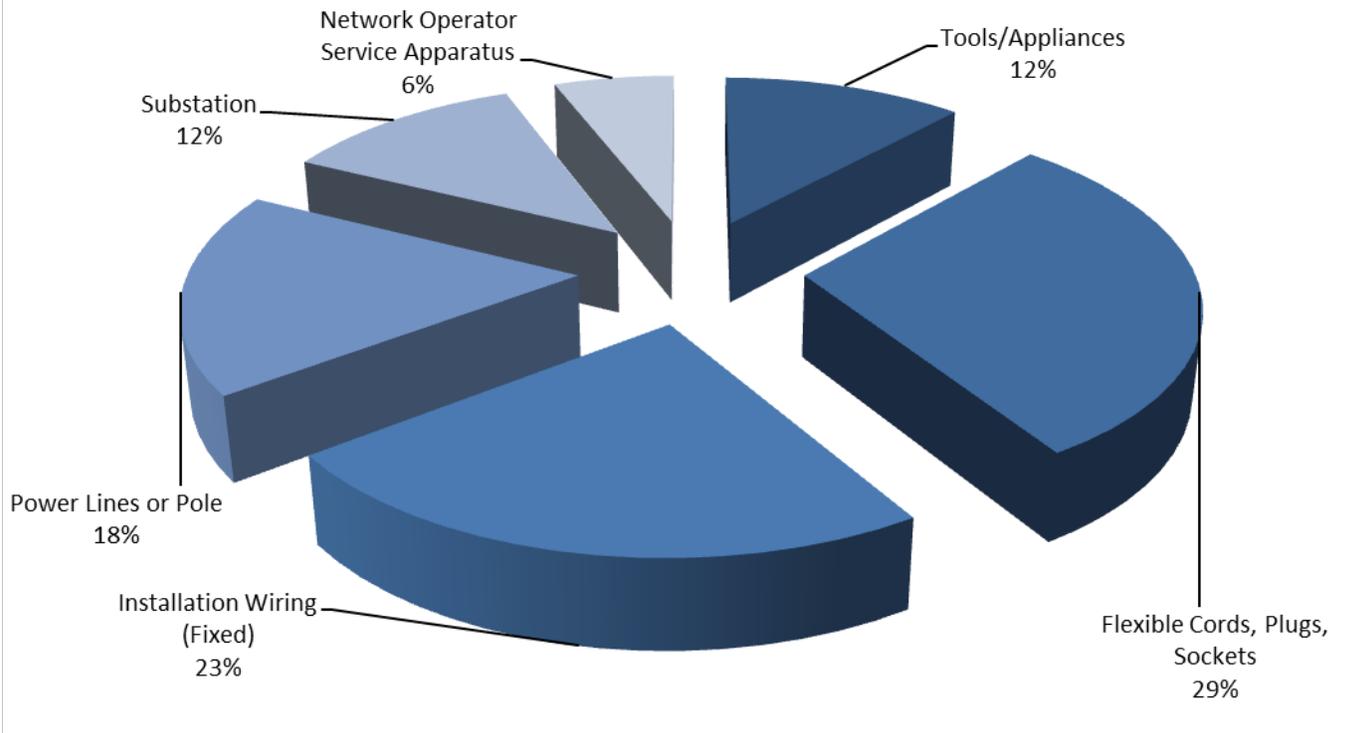
Chart 4: Electrical fatalities by age



Fatalities in the workplace seem to be significantly higher in the 21 to 50 age group which also largely consists of the working population.

Chart 5 below depicts the primary electrical source of electrical fatalities. Flexible cords and plugs accounted for 29 per cent of fatalities followed by fixed wiring installations with 23 per cent.

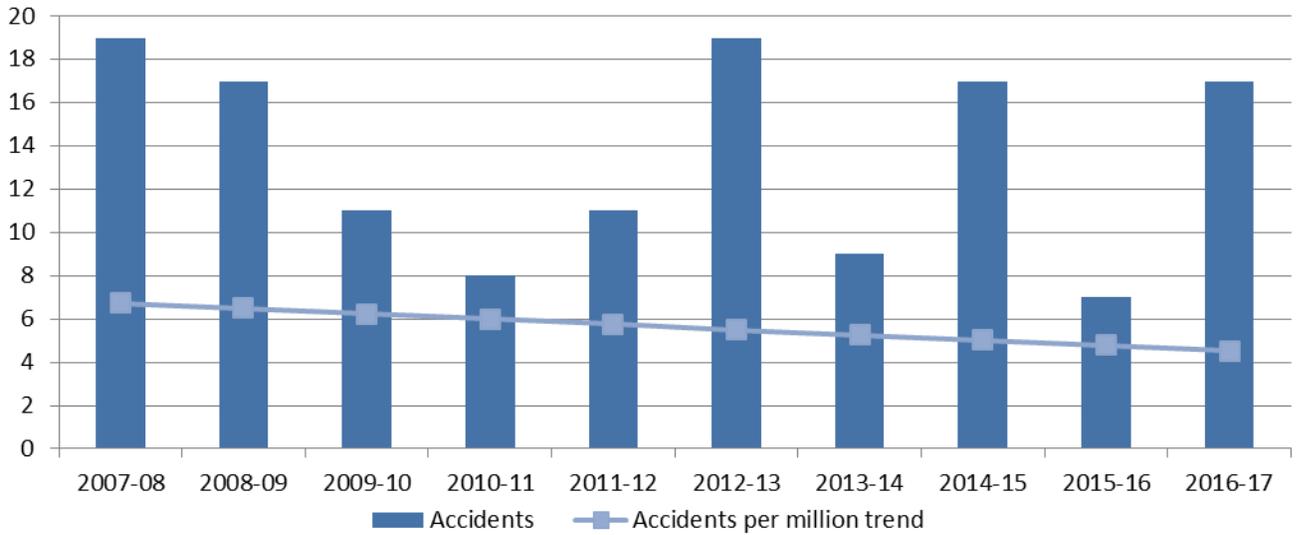
Chart 5: Fatalities – primary electrical source



5.2 Electrical accidents

There were 135 non-fatal electrical accidents over the reporting period. Chart 6 below shows a decreasing trend for non-fatal electrical accidents. The most number of electrical accidents reported over the ten year period were in 2007-08 and 2012-13.

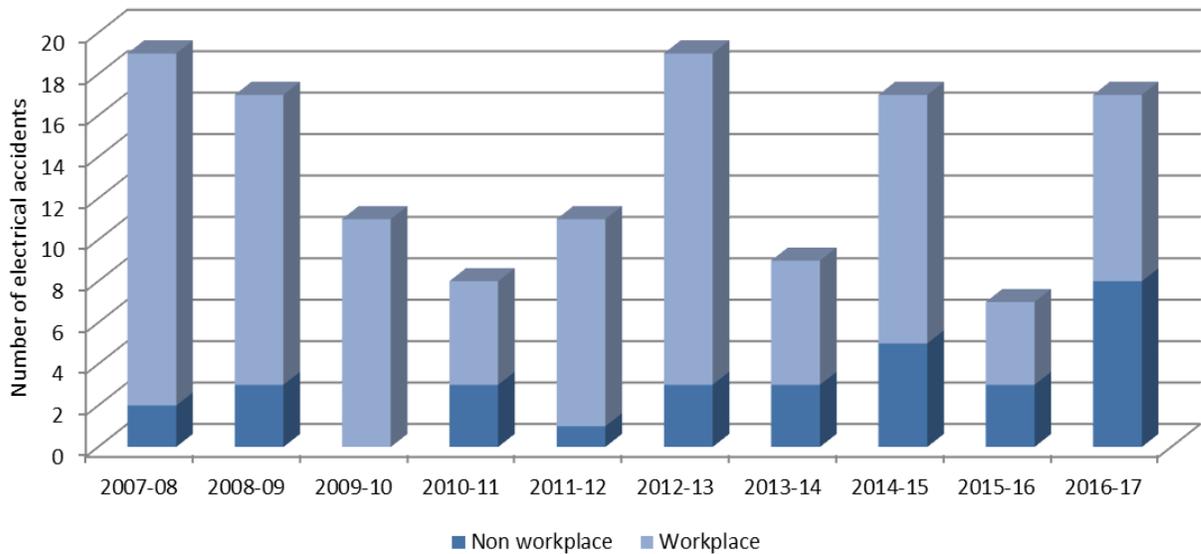
Chart 6: Electrical accidents



Analysis of electrical accidents indicates that 77 per cent occurred in the workplace (Chart 7). All reported electrical accidents in 2009-10 were workplace accidents.

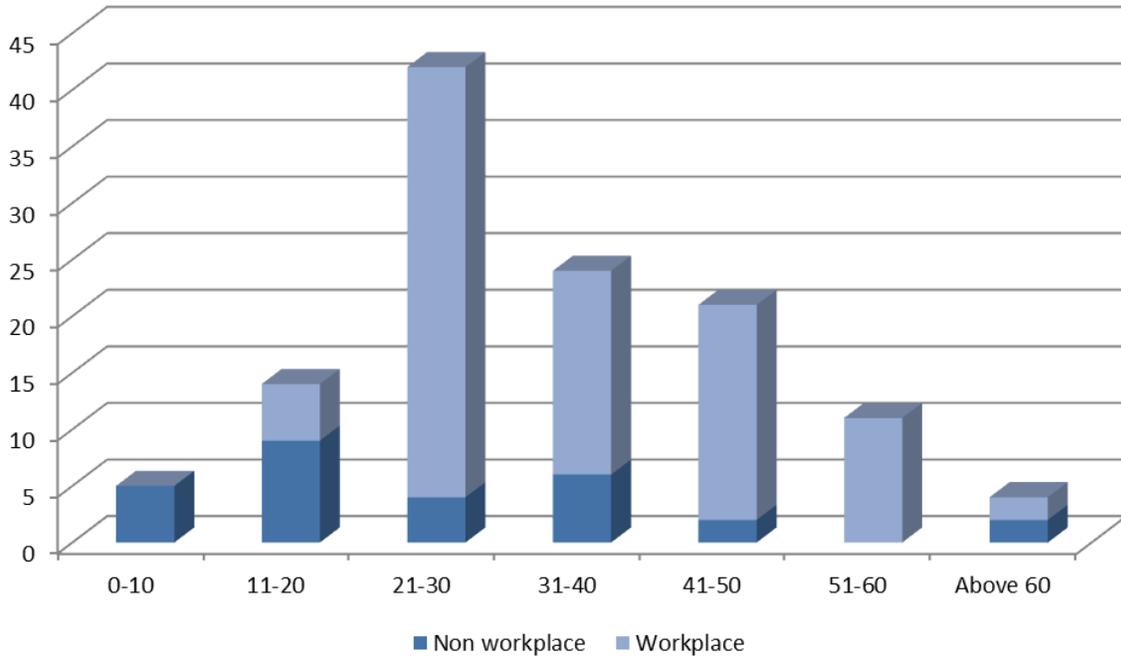
Working on or near energised electrical equipment is the leading cause of electrical accidents for workers.

Chart 7: Workplace and non-workplace electrical accidents



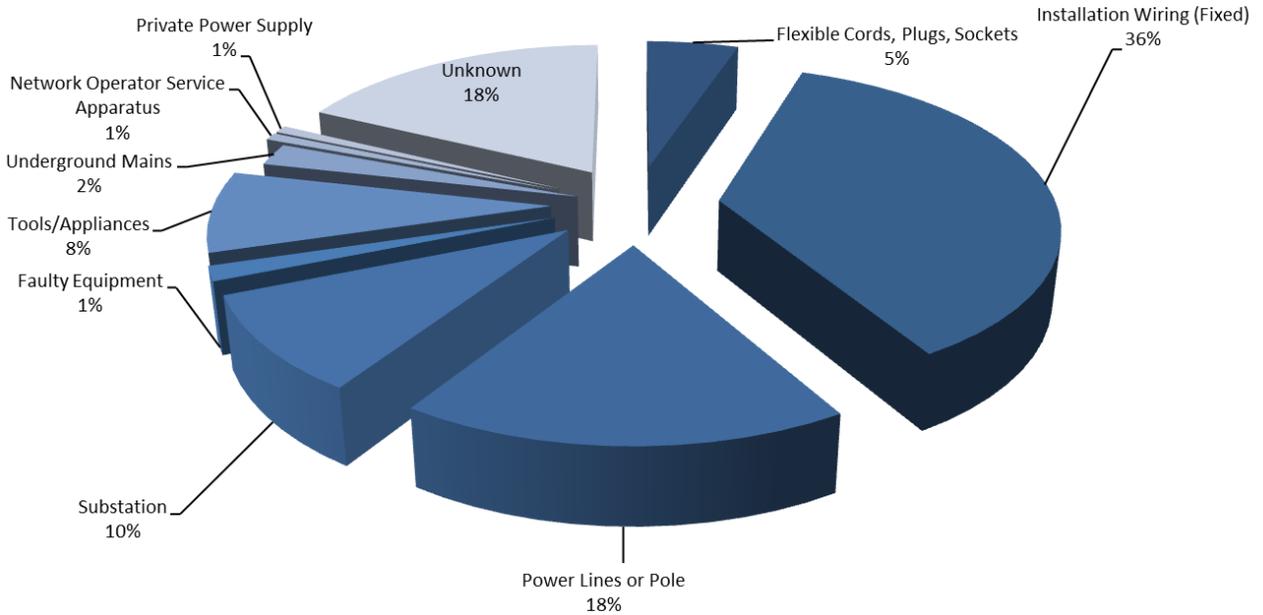
The age profile of electrical accidents (Chart 8) shows that most workplace accidents occurred between the age group of 21 and 60.

Chart 8: Workplace and non-workplace electrical accidents by age group



The primary source of electrical accidents is fixed wiring installations with 36 per cent of incidents in this category (Chart 9). Incidents related to power lines/power poles accounted for 18 per cent of serious electrical accidents.

Chart 9: Electrical accidents – primary electrical source



5.3 Electric shock

There were 14,654 electric shocks reported from 1 July 2007 to 30 June 2017. The reporting of electric shocks is encouraged. Across the reporting period there has been a steady increase in the trend for the number of reported electric shocks (Chart 10).

Chart 10: Electric Shocks in WA – 2007-08 to 2016-17

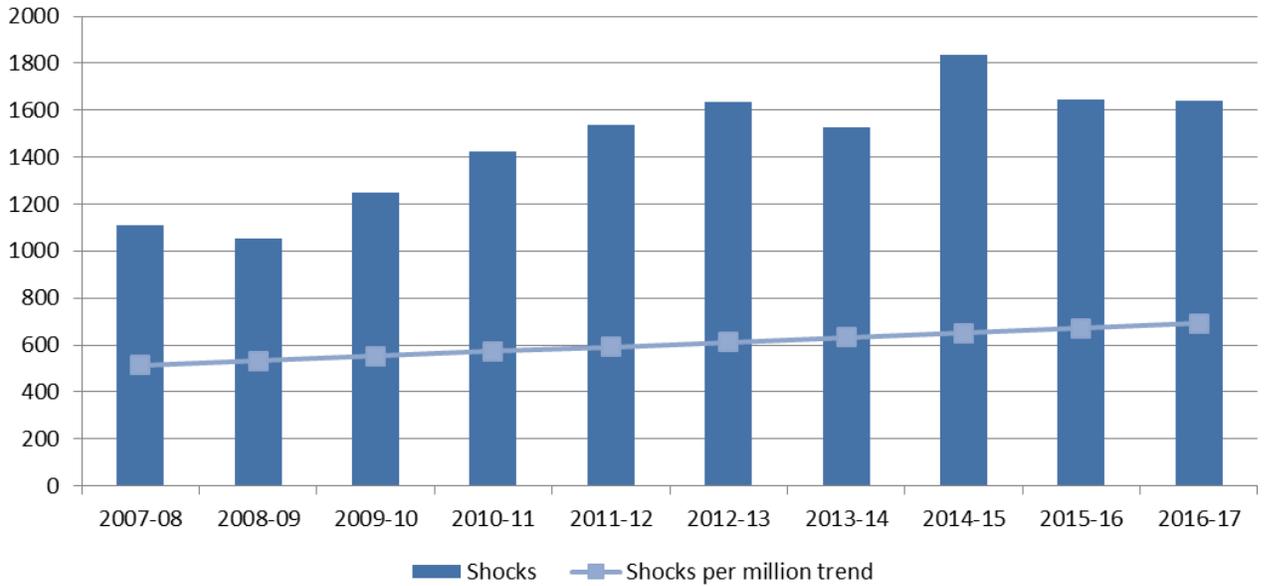
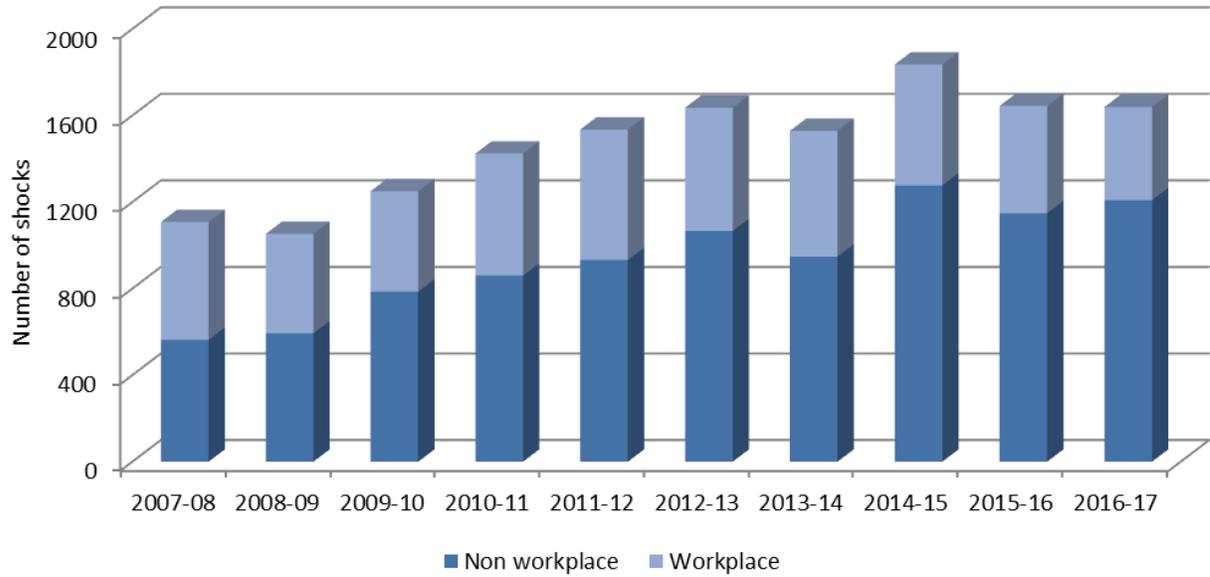


Chart 11: Electric shocks – workplace and non-workplace



Sixty-four per cent of electric shocks occurred in a non-workplace setting compared to 36 per cent in the workplace (Chart 11). It is encouraging that electric shocks occurring in the general community are being reported to *EnergySafety*. It shows that the awareness to report these incidents has increased.

6 Conclusion

The analysis of incidents reported to *EnergySafety* over the 10 year period from 1 July 2007 to 30 June 2017 indicates that 59 per cent of fatalities involved members of the general public. Historically, the trend showed that members of the general public appear to be more at risk in this category. There are significant risks for workers and specifically electrical workers, but these risks are mitigated by workplace safety guidelines and legislation.

The number of electrical accidents has shown a significant decrease over the reporting period. The declining trends in this category may be attributed to improved work practices as a result of improvements in the electrical installation standards and other electrical guidelines issued by *EnergySafety*. Online communications with electrical workers has improved with the use of the digital version of the *Energy Bulletin*.

The majority of electric shocks appear to occur in the general community. This substantiates the need for education and awareness programs or advertising that will help prevent serious incidents. While tailored advertising programs encouraging the safe use of electricity was previously utilised to educate the general public, current and future education in this area is primarily structured to run through online digital media.