Electrical Safety in Ontario
2003 Report

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Executive Summary

The fatality rate of accidental contact with electricity in Ontario has been steadily decreasing in the past three decades. Year 2003 saw the total death by accidental electrical contact rose to ten. Contact with energized powerline continues to play a major part in electrical related fatalities, accounting for 60% of all electrocutions in the Province.

Women continue to be absent in workplace related death of electrical nature. From 1997 to 2003, there were 5 accidental deaths to females as opposed to 72 to males. Workplace fatalities were of a minority in electrocution cases prior to year 2000, where most deaths were non-work related. There is a definite shift in the predominance of occupational fatalities that occupational electrocution account for almost 80% of total electrical deaths in the province. Compared to the size of the labour force, the occupational death rate in Ontario has been on the decline.

Coroner’s report continues to affirm that human error was responsible for at least 80% of all electrocution fatalities in the province and that a high number of these fatalities demonstrated lack of job planning that included hazard awareness.

Aluminum ladders remain the most predominant tool in occupational electrocution. New this year is electrocution involving aerial work platforms. This type of fatality involved mostly workers with no formal background in electricity.

Ladders were also the most common tools involved in non-occupational electrical fatalities, accounting for 50% of all non-occupational electrical fatalities. Ontario has the highest number of non-occupational electrical fatalities of all Canada, but the number of fatalities is proportional to the population size.

Cooking continues to be the most common cause of electrical fire-related fatalities, with home fires accounting for 87% of civilian fire fatalities. Of 84 electrical related fires
between 1995 and 2000, only 11 were attributed to faulty electrical system, wiring or equipment.

The number of injuries in the workplace caused by accidental electrical contact has increased by 20% during the 1996 to 2000 period. The manufacturing sector accounted for the most number of electrical related injuries of all industry sectors. However, injury cost implies that steel, chemical and construction electrical related injuries were the most severe of all industries. Multimeter use and working on voltage greater than 347 volts continue to cause serious injuries in Ontario.

Ontario’s non-occupational injuries are proportional to the population, but Ontario has the highest incidents of electrical injuries involving children compared to other provinces.

Please note that some of the efforts required reducing electrical fatalities, injuries and property damage were beyond ESA’s scope, mandate and responsibilities.

ESA is continuing with safety initiatives involving 347-volt system, outlets and powerline to reduce future electrical death, injuries and damage.
1.0. Introduction

The Electrical Safety Authority (ESA) is committed to addressing potential electrical safety hazards through electrical inspections, education, safety alerts, awareness campaigns, special programs, and changes to legislation when required. Regulation 89/99 designates ESA as the provincial authority responsible for public electrical safety in Ontario. This includes administration and enforcement of Section 113 of the Electricity Act, and the Ontario Electrical Safety Code (Ontario Regulation 164/99). The Act empowers ESA, subject to government approval, to make or amend the Ontario Electrical Safety Code and to make required change to regulations. In February 2004 a new regulation (Ontario Regulation 22/04) was approved that established minimum electrical safety requirements for the design and construction of electrical distribution systems in Ontario. Although ESA plans to influence the safety performance of electrical distribution systems in the future, it is obvious ESA’s new authority over electrical distribution will not be reflected in ESA’s 2003 safety performance.

The introduction of an Annual Safety Report from the Electrical Safety Authority is compiled from a number of information sources from across Ontario. Information gathered is analyzed to identify potential electrical hazards that can be gleaned from assessing trends in electrical accidents, injuries and property damage. The identification of potential hazards, high-risk areas, or electrical safety problems provides important information for the development of ESA’s strategic business direction, and the identification of key initiatives to help keep the Ontario public safe from electrical hazards. This is the third annual report, and ESA will continue to produce annual reports to maintain our pulse on electrical safety, and to evaluate the impact of our safety initiatives.

This report was made possible by the assistance of industry partners, namely: the Ministry of Labour (MOL), Workers’ Safety Insurance Board (WSIB) and the National Work Injury Statistics Program (NWIS) for occupational fatalities, injuries and incidents: the Office of Fire Marshal (OFM) for fire-related electrical accidents and incidents, the Chief Coroner for Ontario for cases of fatalities in Ontario, the Construction Safety
Association of Ontario for construction-related injuries and the Canadian Institute of Health Information (CIHI) for non-occupational injuries across Canada. Additional data has also been collected to complete the report from various Internet sources as indicated in the report.

This year’s report introduces an in-depth analysis of electrical fatalities. This has been achieved following ESA’s ability to gain access to electrocution records from 1997 to 2003. In addition, ESA has gathered more in-depth information on injuries and fatalities associated with children across Canada based from an externally conducted study.

It must be noted that some statistical data displayed in this report from one source may not match or correspond to another; or that the time period may differ. This is due to various reasons, such as data availability, when the collection of data was initiated, the reporting method and classification assigned by the data collecting agencies. The following are noted differences in fatality records:

a) MOL and the Coroner classify their occupational and non-occupational fatalities differently. When the MOL was involved in the investigation of the case, ESA classified the fatality as occupational.

b) The NWIS fatality count only includes employers who have registered with their respective provincial compensation insurance boards. Many self-employed contractors and small one-truck contractors are not necessarily registered with the compensation boards. NWIS fatality counts may not match those of the Coroner’s or MOL’s office.
2.0. Electrocutions and Fire Fatalities

This section is primarily based on the compilation of the Ontario Coroner’s records from 1997 to 2002, MOL records from 1998 to 2003, WSIB data, and ESA records from 1999-2003\(^1\). Electrocutions reported in this document are associated with accidental electrical contacts. Suicides and deliberate actions to injure are excluded, but electrocutions resulting from vehicle contact with utility poles where occupants are electrocuted are included.

This report also includes fatalities resulting from electrical fire, but these are shown separately. This method of distinguishing electrical fire fatalities from electrocution is consistent with the classification and recording of fatalities by other agencies and government jurisdictions.

To assist in understanding where fatalities are occurring, this report distinguishes occupational electrical fatalities from non-occupational fatalities, and fatalities caused by electrical related fires\(^2\). The Fire Marshal categorizes fires by the source of energy. It is for this reason that electrical fatalities by fires includes those associated with electrical product misuse, such as leaving an electric stove unattended when cooking.

Statistic Canada reports a rate of 26.4 accidental deaths per 100,000 population, or 264 deaths per million in Ontario in 1999. Electrical fatalities are responsible for approximately 1 death per million\(^3\). The electrocution rate\(^4\) caused by accidental electrical contact has been steadily decreasing in the past three decades as shown in Figure 1.

\(^{1}\) ESA’s records for 2002 and 2003 are preliminary and may change with confirmation from the coroner’s office.
\(^{2}\) As classified by the Office of Fire Marshal.
\(^{3}\) Actual electrocution deaths for 1999 is 12 fatalities.
\(^{4}\) Electrocuton rate is calculated as number of fatalities per million population.
Electrical fatalities resulting from fire vary from 1995 to 2003, but the number of fatalities for non-cooking related fires has been very low throughout this period as illustrated in Table 1. Electrical fires, not associated with cooking, that resulted in fatalities averaged 2 to 3 per year, with a high of 5 fatalities in 1998 and 0 fatalities in 2002 (Table 1).

### Table 1
**Electrical Fires Resulting in Fatalities**

1995-2003

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire fatalities – non-cooking</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Cooking</td>
<td>15</td>
<td>11</td>
<td>26</td>
<td>13</td>
<td>8</td>
<td>13</td>
<td>11</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>13</td>
<td>27</td>
<td>18</td>
<td>9</td>
<td>15</td>
<td>14</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

---

5 Based on Ontario Hydro’s fatality chart and the Coroner’s record.
7 The OFM distinguishes cooking fatalities from other electrical fatalities. On this table, cooking fatality numbers include other sources such as gas.
Figure 2 provides the actual number of electrocutions in Ontario\textsuperscript{8}. This figure clearly demonstrates the shift in occurrences in the last decade from non-occupational to occupational dominant. Occupational deaths were more prevalent after 2000, while non-occupational fatalities were more prevalent prior to 2000.

There is a noticeable shift in the past five years with the increased predominance of occupational related electrocutions. With the exception of 2002, occupational electrocutions accounted for approximately 80\% of all electrical related deaths in Ontario in the past 5 years.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Occupational and Non-Occupational Electrocutions\textsuperscript{9} 1996-2003}
\end{figure}

\textsuperscript{8} The number of fatalities in year 1998, 1999, 2000 and 2002 are different than that of ESA’s 2002 Electrical Safety Report. They have been adjusted to reflect findings from the coroner’s report and the MOL. Suicide cases were excluded from the record.

\textsuperscript{9} Based on coroners’, MOL and ESA’s record. The number of fatalities in year 1998, 1999, 2000 and 2002 are different than that of ESA’s 2002 Electrical Safety Report. They have been adjusted to reflect findings from the coroner’s report and the MOL. Suicide cases were excluded from the record.
Between 1997 and 2003, there were 77 electrocutions reported in Ontario. Not all detailed reports for all fatalities in this period were available. From the detailed reports (74 cases), the following highlights were noted:

- Males comprised 93% of reported electrocutions (69 occurrences).
- There were 5 females electrocuted in the same time frame. (representing 7% of all reported electrocutions). These were all non-occupational fatalities, and none of the deaths were the direct result of the victim deliberately attempting to connect, repair or maintain electrical wiring or products.
- There were 46 electrocutions in occupational settings, and 28 electrocutions in non-occupational.
- High voltage (powerline) contact accounted for 42 electrocutions or 57% of all electrocution fatalities.
- A total of 80% of all electrocutions occurred outdoors.
- Residential facilities were most prevalent in electrocution cases, with industrial and public places as second and third most prevalent facilities.
- The top five facilities with reported electrocutions include residential, (26 occurrences), industrial (13 occurrences), public places (12 occurrences), commercial (7 occurrences), and farms (6 occurrences).
- A total of 19 of the 26 residential electrocutions resulted from powerline contact; 9 of these were the result of contact with metal ladders.

All female electrocutions were non-occupational and none of the deaths were the direct result of the victim deliberately attempting to connect, repair or maintain electrical wiring or products.

Statistical data associated with electrocutions specific projects points to home projects as the area presenting the higher-risk. Next to residential electrocutions the second highest reports of electrocution came from maintenance work, and the third from the construction industry.

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10 Two electrocutions in 2000 had little or no information at all.
11 Voltage over 750 V
12 These are the do-it-yourself projects, where homeowner or a friend undertakes the work.
13 Based on Coroners’ and ESA records
2.1. Occupational Electrocutions

Traumatic\textsuperscript{14} occupational fatalities have increased approximately 38\% from 80 in 1995 to 110 in 2002\textsuperscript{15}. During this time occupational electrocutions have continued to result in approximately 8 deaths per year. There has been no new information from the United States of America regarding occupational electrocution rates\textsuperscript{16}.

Figure 3 illustrates the distribution of occupational electrical fatalities across Canada by province from 1997 and 2001. There were 87 electrocutions across Canada over this period, and 50\% of all occupational electrocutions occurred in Ontario. Table 2 provides a slightly different reporting of fatalities from the National Safety Insurance Bureau (NWIS). The difference in fatality numbers reported by NWIS and Ontario Coroner is

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{Occupational Fatalities, Electrocution and Fatal Electrical Fires\textsuperscript{17} 1995-2002}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.png}
\caption{Figure 4 illustrates the distribution of occupational electrical fatalities across Canada by province from 1997 and 2001. There were 87 electrocutions across Canada over this period, and 50\% of all occupational electrocutions occurred in Ontario. Table 2 provides a slightly different reporting of fatalities from the National Safety Insurance Bureau (NWIS). The difference in fatality numbers reported by NWIS and Ontario Coroner is}
\end{figure}

\textsuperscript{14}Traumatic fatalities are defined as sudden and usually violent death, which exclude occupational and disease type fatalities.
\textsuperscript{16}The United State’s National Safety Council reported that electrocutions were the fourth leading cause of occupational deaths.
\textsuperscript{17}Based on Coroner’s record and OFM’s record.
noted and the discrepancy can be attributed to fatality cases filed as opposed to actual fatalities in the workplace.; however, the data consistently places the greatest number of fatalities in Ontario.

**Figure 4**

**Occupational Electrocutions by Province**

*1997-2001*

<table>
<thead>
<tr>
<th>Province</th>
<th># of Fatalities</th>
<th>Fatality Rate/Million</th>
<th>% of Population</th>
<th>% of Electrical Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>9</td>
<td>0.756</td>
<td>38%</td>
<td>47.4%</td>
</tr>
<tr>
<td>Quebec</td>
<td>6</td>
<td>0.811</td>
<td>24%</td>
<td>31.6%</td>
</tr>
<tr>
<td>Alberta</td>
<td>1</td>
<td>0.327</td>
<td>10%</td>
<td>5.3%</td>
</tr>
<tr>
<td>British Columbia</td>
<td>1</td>
<td>0.245</td>
<td>13%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0.431</td>
<td>15.1%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Canada</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

18 NWIS only records fatalities where employers are registered with the respective province’s Insurance Boards. For example; small family business often do not file with the Insurance Boards.

19 Based on NWIS records

20 NWIS fatality count for electrocution differs than that of the Coroner’s Office. The difference can be attributed to companies not registered with the respective Insurance Compensation in their respective provinces; in which case, the fatality is not reported to the NWIS.
The area that has reported the greatest increase in electrocutions since 1990 has been the construction industry. Figure 6 shows an 8% increase of electrocutions in the construction industry between 1990 and 2003.

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21 Based on Coroners’ records
22 Based on CSAO data and confirmation from the Coroners’ Office. Note that the numbers shown in this report differ from the number shown in the 2002 report due to adjustment made with the Coroners’ report and MOL.
Although the number of electrocutions in occupational facilities has continued to represent approximately 8 deaths per annum, the prevalence of electrocutions compared to the labour population has actually been steadily decreasing as shown in Figure 7. Occupational electrocution was most prevalent in industrial facilities (28%), followed by residential (20%), and commercial at 15% (see Table 3).

Table 3
Top Six Facilities in Occupational Fatalities
1997 to 2003

<table>
<thead>
<tr>
<th>Sector</th>
<th>Occurrences</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>13</td>
<td>28%</td>
</tr>
<tr>
<td>Residential</td>
<td>9</td>
<td>20%</td>
</tr>
<tr>
<td>Commercial</td>
<td>7</td>
<td>16%</td>
</tr>
<tr>
<td>Farm</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>Mining</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Utility</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>17%</td>
</tr>
<tr>
<td>Total for all Sectors</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7
Labour Force vs Occupational Electrocution Rate
1996-2003

Labour force is based on Statcan data, occupational fatality rate is calculated as deaths/million workers.

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23
Powerline contact accounts for more than 50% of all electrical fatalities in the workplace.

**Figure 8**

**Electrocution - Equipment Involved in Powerline Contact 1997-2003**

Figure 8 provides a breakdown of the tools used when powerline contact resulted in electrocutions. Ladders are the most predominant tool associated with these fatalities, followed by cranes, Aerial Work Platforms (AWPs) and antennas. Fatalities involving AWPs have appeared in the statistical reporting of electrocution for the first time in the 2003 in Ontario. These fatalities coincide with the emerging popularity of AWPs as a means of access for Ontario’s workforce. The device is flexible in its application, easy to use and is relatively inexpensive to rent, and is increasingly replacing cranes, ladders and scaffolds in many workplace applications.

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24 Based on Coroners’ records.
Workplace electrocutions impact workers in a number of different occupations. Figure 9 shows the distribution of type-of-occupation in workplace electrocutions. The figure clearly shows that there is no single occupation that is particularly susceptible to electrical fatalities – for example, maintenance personnel, the largest occupation group (in terms of number of fatalities), only accounted for 15% of all occupational electrocutions. Reports from the Coroner’s office provides statistical evidence on whether or not the victims of electrocution were trained electricians or they were maintenance workers/handymen performing electrical work. In ESA’s 2002 Electrical Safety Report, electricians were reported as the most predominant occupation associated with electrocution fatalities. The new information from the Coroner’s Office requires ESA to adjust the 2002 number from 33% to just over 10%.

Statistics on occupational electrocutions indicates the following:

- From 46 workplace electrical fatality cases, safe work procedures were lacking in 30 electrocutions.

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25 Based on coroners’ report.
• None of the electrocutions in residential facilities indicated that the victims had safe work procedures for their tasks.
• A total of 75% of workplace fatalities were associated with non-compliance with the Ontario Health and Safety Act and Regulations.
• More than 50% of the workplace electrocutions involved powerline contact.
• Occupational electrocutions primarily occurred in industrial facilities.
• Electrocutions have increased from 12% to 16% in the construction industry between 1990 and 2003.
• Maintenance/repair workers were primarily electrocuted indoors when repairing wiring, machines or electrical panels. More than 50% were unaware they were working with energized equipment.
• Fatalities involving handymen typically resulted from contact with voltages less than 750 volts, and workers were unaware that the wiring they contacted was energized.
• Electrical fatalities involving farmers mainly resulted from contact with overhead wire (80%).
• Contact between ladders and overhead wire was the primary cause of electrical fatalities involving labourers.
• Electricians who were killed as a result of electrical contact were in most cases aware they were working with energized equipment.
• Fatalities involving 347 Volt lighting occurred where 75% of the workers were aware they were working on an energized system.
• Electrocution resulting from faulty equipment constituted 10-15% of occupational fatalities.
• Approximately 25% of occupational fatalities indicated that the victims were aware they were working with energized equipment. The Coroner’s record is substantiated by the MOL findings presented in Figure 10.
• Only 25% of the fatalities indicated lack of awareness on the victim’s part.

Approximately 30 out of the 46 workplaces where electrical fatality occurred did not have a safe work procedure for the task the worker was involved in.
Figure 10 shows causes of electrical fatalities as determined by the MOL. Inadvertent contact and working with live equipment\textsuperscript{26} represented more than 75\% of occupational fatalities.

\textbf{Figure 10}
\textit{Cause of Occupational Electrical Fatalities}\textsuperscript{27}
\textit{1998-2003}

In 1999 and 2000, for example; all construction electrocutions were the result of powerline contact. Powerline contact accounts for at least 50\% of the yearly fatalities in the construction sector. Figure 11 shows the dominance of electrocution caused by contact with energized powerline in construction sector.

\textsuperscript{26} Working live means that the workers are aware they are working with an energized system.
\textsuperscript{27} Based on MOL records
Table 4

Ontario’s Number of Occupational or Workplace-Related Electrical Fatalities, Accidents and Incidents
1998-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Criticals</th>
<th>Non-criticals</th>
<th>Powerline Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>9</td>
<td>34</td>
<td>52</td>
<td>108</td>
</tr>
<tr>
<td>1999</td>
<td>8</td>
<td>34</td>
<td>83</td>
<td>115</td>
</tr>
<tr>
<td>2000</td>
<td>7</td>
<td>30</td>
<td>73</td>
<td>122</td>
</tr>
<tr>
<td>2001</td>
<td>9</td>
<td>34</td>
<td>86</td>
<td>120</td>
</tr>
<tr>
<td>2002</td>
<td>2</td>
<td>28</td>
<td>84</td>
<td>132</td>
</tr>
<tr>
<td>2003</td>
<td>8</td>
<td>25</td>
<td>82</td>
<td>148</td>
</tr>
</tbody>
</table>

Table 4 illustrates a relatively consistent number of occupation fatalities for 1998-2003, with the exception of year 2002. During this same period, critical injuries have decreased slightly, while non-critical injuries and powerline contacts have increased by more than 50% and 16% respectively.

28 Based on CSAO’s record
29 Based on Ministry of Labour’s data, unconfirmed
Table 5
Occupational Electrocution in Ontario and Canada for Companies Registered with NWIS 1996 to 2002

<table>
<thead>
<tr>
<th>Event</th>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with electric current, unspecified.</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Contact with electric current of machine, tool, appliance, or light fixture</td>
<td>14</td>
<td>32%</td>
</tr>
<tr>
<td>Contact with wiring, transformers, or other electrical components</td>
<td>14</td>
<td>31%</td>
</tr>
<tr>
<td>Contact with overhead power lines</td>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

The electrocution rate associated with contact with electric currents in machines, tools and appliance’s is larger in Ontario than Canada. It is noted that NWIS only recorded 4 fatalities between 1996-2002; while ESA’s record, the MOL and the Coroner’s Office indicated 22 fatalities for the same period. The difference can be attributed the reporting method, that only companies with Insurance Compensation are recorded by NWIS.

2.2. Non-Occupational Electrocutions

Contrary to occupational electrocutions, non-occupational electrocutions have been steadily declining since 1998. Non-occupational electrocutions account for 37% of all electrocutions in Ontario. Not surprising, residential facilities make up 67% of these fatalities, with public places such as roads and marinas accounting for another 33%.

Electrocutions associated with powerline contact are just as prevalent in non-occupational settings as occupational, accounting for 18 of the 28 fatalities.

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30 Based on NWIS data. Ontario record has been adjusted to match that of Ontario coroner’s office record and the MOL.
There is a wide array of tools linked to non-occupation electrocutions, as shown in Figure 12. Car electrocutions were mainly the result of vehicle accidents; the car hitting the utility poles where the broken pole resulted in the energized line electrocuting the occupants of the vehicle. Fatalities involving powerline contact also involved ladders, and were linked with trimming trees. In addition, the installations of antennas and communication towers have resulted in contact with overhead powerlines, causing electrical fatalities.

Statistics on non-occupational fatalities indicate:

- A total of 23 of the 28 non-occupational fatalities occurred outdoors.
- Female electrocutions all occurred in non-occupational setting; 2 were indoors and 3 were outdoors.
- Overhead powerline contact accounted for 18 non-occupational fatalities.
- Faulty or non-code compliant\(^{31}\) wiring resulted in 5 electrocutions.

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\(^{31}\) Means the wiring did not comply with the OESC.
Electrocutions of children most often involve those aged 5 to 19, are linked to high voltage lines, and usually involve a decision to take risk (not following no trespassing and danger signs at high voltage installations)\textsuperscript{32}.

\textbf{2.3. Powerline Fatalities}

From the 74 electrocutions studied, 42 cases (almost 60\%) involved accidental contact with powerlines.

Between 1997 and 2003, 43\% of powerline fatalities were non-occupational in nature. Ladders were the most predominant tools involved in powerline fatalities (see Table 6). There were nine ladder fatalities in residential settings. Occupational fatalities involving ladders accounted for 66\% of ladder fatalities in the residential sector. Antenna fatalities mostly (80\%) occurred in residential setting and 60\% of these fatalities were non-occupational in nature. Car electrocutions were non-occupational, and involved accidents with utility poles.

More than 90\% of ladder fatalities by electrical contact occurred in residential facilities.

\begin{table}[h]
\centering
\caption{Equipment Used in Powerline Contact Fatalities 1997-2003\textsuperscript{33}}
\begin{tabular}{|c|c|c|}
\hline
\textbf{Equipment Used} & \textbf{Number of Occurrences} & \textbf{Prevalence from all Equipment} \\
\hline
Ladder & 12 & 29\% \\
Antenna & 5 & 12\% \\
NA* & 4 & 10\% \\
Crane & 3 & 7\% \\
Total Powerline Deaths\textsuperscript{34} & 42 & 42 \\
\hline
\end{tabular}
\end{table}

* NA are non-equipment such as directly touching powerline with hands, or prankish and daredevils acts.

\textsuperscript{32} Nguyen, MacKay, Bailey and Klassen; Epidemiology of electrical and lightning related deaths and injuries among Canadian children and youths.

\textsuperscript{33} Based on Coroners’ records

\textsuperscript{34} Cases where information is available
Non-occupational activities represented the largest group as seen in Figure 13; they represent almost 40% of all powerline related fatalities between 1997-2003. The second largest groups involved labourers and farmers. Most electrical fatalities that involved farmers resulted from inadvertent contact with powerlines.

**Figure 13**

**Powerline Contact Fatalities**

**Occupation-Type**

1997-2003\(^{35}\)

Powerline related electrocutions occurred largely due to people performing non-work related activities, and impact labourers and farmers most predominately (five and four respectively). Figure 13 shows the wide array of occupations affected by powerline contact.

### 2.4. Electrical Fires Fatalities

The Ontario Fire Marshal (OFM) provides a breakdown of the type of fires that result in fatalities. Fires involving electrical appliances, wiring and equipment are reviewed in this report. Table 7 provides statistics on the Electrical Source of Fire Fatalities (excluding cooking fires associated with electric ranges)

\(^{35}\) Based on Coroners’ records
Table 7
Electrical Source on Fire Fatalities
Other than Cooking
1990-2003\textsuperscript{36}

<table>
<thead>
<tr>
<th>Electrical Source</th>
<th># of Occurrences</th>
<th>Electrical Source</th>
<th># of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter</td>
<td>1</td>
<td>Terminations</td>
<td>2</td>
</tr>
<tr>
<td>Distribution equipment</td>
<td>2</td>
<td>Extension cord, temporary wiring</td>
<td>4</td>
</tr>
<tr>
<td>Circuit Wiring</td>
<td>6</td>
<td>Cord, cable for appliances</td>
<td>1</td>
</tr>
<tr>
<td>Other Electrical Distribution</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In reviewing the OFM fire-related fatalities;

- There were no fire fatalities involving utility lines or transformers.
- No aluminum circuit or termination fires resulted in fatalities.
- Fires resulted from the ignition of household items such as wood, bedding, rugs or carpet accounted for 5 fatalities.
- Wiring insulation as the first object ignited was responsible for 5 fatalities.

More specific information on the causes of fire fatalities was not available.

3.0. Injuries

3.1. Occupational Injuries

The WSIB registered 1,017,000\textsuperscript{37} (allowed) claims between 1993 and 2002, an average of 107,000 claims per annum. WSIB’s annual report \textsuperscript{38} indicated that claims with no Lost Time Injury (LTIs) add an additional 1,800,000 to the total. For 1996-2002, WSIB

\textsuperscript{36} Based on OFM records


\textsuperscript{38} ESA’s 2002 report only includes claims resulting in LTIs. Claims with no LTIs in some cases, double the LTI claims for that given year.
registered 1,016 electrical related LTIs injuries\(^{39}\). Electrical injuries have cost the industry roughly $11,000,000 from 1996-2002. Average cost of injuries has dropped from $18,551\(^{40}\) in 1996 to $3,432 in 2002.

The population in Ontario has been increasing at the same rate as the labour force\(^{41}\) since 1996. The labour force increased from 5,700,000 in 1996 to 6,530,000 in 2002, an increase of 0.12 million per annum. During this time, occupational injuries steadily increased until 1998 at which time, there was a decreasing trend. At its peak, Ontario recorded 160 work related electrical injuries in 1999. Figure 13 shows the decreasing trend in work related injuries from 1999 to 2002.

**Figure 13**  
Lost Time Injuries – Electrical Related\(^ {42} \)  
1996-2002

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\(^{39}\) This number differs slightly than the number shown in the WSIB report due to different methods of statistic gathering – fields included in the search  
\(^{40}\) ESA’s 2002 report indicated a lesser average injury cost for year 1993. The change in the average cost shown in this report is due to additional pension cost charged against the 1993 injuries as a result of court settlements.  
\(^{41}\) Statscan  
\(^{42}\) Based on WSIB records
Table 8
Cost of Electrical Injuries by Industry in Ontario
Highest Cost per Claim for the Top Five Industries
1996-200243

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Injury Cost</th>
<th># of Injuries</th>
<th>Injury Cost Ave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>$847,718</td>
<td>34</td>
<td>$24,993</td>
</tr>
<tr>
<td>Construction</td>
<td>$3,078,813</td>
<td>143</td>
<td>$21,530</td>
</tr>
<tr>
<td>Chemical</td>
<td>$707,355</td>
<td>35</td>
<td>$20,210</td>
</tr>
<tr>
<td>Agriculture</td>
<td>$207,271</td>
<td>14</td>
<td>$14,805</td>
</tr>
<tr>
<td>Education</td>
<td>$64,975</td>
<td>6</td>
<td>$10,829</td>
</tr>
</tbody>
</table>

Table 8 shows sectors with the most severe injuries in a 7-year span. Previous years analysis pointed to the steel, construction and chemical sectors as industry sectors having the highest average injury claims. This year, the analysis still shows these three industry sectors as the ones with the highest injury claims.

Table 9 shows industries with the highest cost claims. Again, the steel, construction and chemical sectors were the industries with the highest claims. The manufacturing sector shows high total cost due to the sheer number of injuries in the sector. However, average claim cost in this sector indicates that in general, injuries in the manufacturing sector are not as severe as injuries in the steel, chemical and construction sectors.

43 Based on WSIB records
Table 9
Cost of Electrical Injuries by Industry in Ontario
Highest Total Claim Cost
1996-2002

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Injury Cost</th>
<th># of Injuries</th>
<th>Injury Cost Ave</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>$3,078,813</td>
<td>143</td>
<td>$21,530</td>
</tr>
<tr>
<td>Service</td>
<td>$2,229,194</td>
<td>249</td>
<td>$8,953</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>$1,904,377</td>
<td>247</td>
<td>$7,710</td>
</tr>
<tr>
<td>Steel</td>
<td>$847,718</td>
<td>34</td>
<td>$24,993</td>
</tr>
<tr>
<td>Chemical</td>
<td>$707,355</td>
<td>35</td>
<td>$20,210</td>
</tr>
<tr>
<td>All Sectors</td>
<td>$11,099,365</td>
<td>1016</td>
<td>$10,924</td>
</tr>
</tbody>
</table>

ESA’s 2002 safety report pointed to a few severe injuries in the chemical and steel sector that drove the average claim to a high level. These same claims still affected the injury costs for 1996-2002. Figure 14 shows the respective numbers of injuries in each sector. Note that service and manufacturing traditionally have the highest number of claims.

Figure 14
Lost Time Electrical Injuries by Industry Sector
1996-2002

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44 Based on WSIB records
45 Based on NWIS records
The most prevalent injury is electric shock at 558 injuries, accounting for 50% of injury-type, followed by second-degree electrical burns at 270. Table 10 shows the cost of injuries according to ‘type of injuries’ across all industry sectors.

**Table 10**
**Injury Type and Cost**
**1996-2002**

<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Occurrences</th>
<th>Total Claim Cost</th>
<th>Average Claim Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Shocks</td>
<td>558</td>
<td>$4,169,189</td>
<td>$7,472</td>
</tr>
<tr>
<td>Second Degree Burns</td>
<td>270</td>
<td>$1,955,066</td>
<td>$7,241</td>
</tr>
<tr>
<td>First-degree Burns</td>
<td>93</td>
<td>$974,094</td>
<td>$10,474</td>
</tr>
<tr>
<td>Third Degree Burns</td>
<td>73</td>
<td>$3,965,369</td>
<td>$54,320</td>
</tr>
<tr>
<td>Heat Burns.</td>
<td>22</td>
<td>$35,645</td>
<td>$1,620</td>
</tr>
<tr>
<td>Total Occurrences</td>
<td>1016</td>
<td>$11,099,365</td>
<td>$10,924</td>
</tr>
</tbody>
</table>

Third degree burns are the most severe injuries as indicated by the compensation cost, averaging $54,230 per claim, with first degree burns as the second most costly injury. The average claim cost of first-degree burns is almost 50% higher than that of second-degree burns. Further examination of the data reveals that two very costly claims (more than $300,000 each) were the reason for the high average claim for the first degree burns.

ESA’s 2003 accident reports showed that accidents with multimeters and 347 Volt Lighting still continue. ESA 2003 accident reports also reveals injuries or close calls involving AWP’s. The potential of having more than one fatality when this device comes in contact with a powerline is great since there is frequently more than one passenger in an AWP.

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46 Based on WSIB records
The potential of multiple injuries or fatalities when using AWPs is great. This was already demonstrated in 2003 by one fatality and one close call involving contact with overhead powerline where there were 2 workers on the platform.

**Figure 15**
MOL Reported Injuries
1998-2003

MOL reports indicated that critical injuries account for roughly 33% of the total injuries (Figure 15). It is more likely that the actual proportion of critical injuries is slightly higher, considering many injuries are not reported. Comparing the number of injuries reported to MOL and WSIB (Figure 16), we can clearly see the difference.
Table 11 shows sectors of the industry with the highest cost in three-degree burns. Steel and construction sustain the third and fourth highest average cost in the industry. These figures are more alarming when 7 of 34 (20%) electrical injuries in the steel sector and 22 of 143 (almost 17%) in construction sector resulted in serious injuries.
Roughly 20% of electrical injuries in the steel and construction sector resulted in third degree burns.

### Table 12
Cost of Injuries – Contact with Electrical Wiring/Products

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Occurrences</th>
<th>Total Cost</th>
<th>Average Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with Powerlines</td>
<td>17</td>
<td>$891,504</td>
<td>$52,441</td>
</tr>
<tr>
<td>Contact with Electrical Current (not specified)</td>
<td>141</td>
<td>$3,009,845</td>
<td>$21,346</td>
</tr>
<tr>
<td>Contact with Wring, Transformers</td>
<td>223</td>
<td>$4,006,668</td>
<td>$17,967</td>
</tr>
<tr>
<td>Explosions.</td>
<td>31</td>
<td>$277,313</td>
<td>$8,946</td>
</tr>
<tr>
<td>Contact with Hot Objects</td>
<td>172</td>
<td>$383,720</td>
<td>$2,231</td>
</tr>
<tr>
<td>Contact with Electrical Current of Machines</td>
<td>316</td>
<td>$1,525,489</td>
<td>$4,828</td>
</tr>
<tr>
<td>Other Occurrences</td>
<td>116</td>
<td>$1,004,826</td>
<td>$8662</td>
</tr>
<tr>
<td>Total Occurrences</td>
<td>1016</td>
<td>$11,099,365</td>
<td></td>
</tr>
</tbody>
</table>

Powerline contact is widespread in all sectors, but the construction and electrical sectors report the greatest injuries at 5 and 4 injuries respectively. It is not surprising to find powerline contact to have the highest cost claim average. Contact with electrical current from machines, the most common injury in the manufacturing sector has the lowest injury cost. This is consistent with the low injury cost of manufacturing sector when it comes to electrical related injury.

### 3.2. Non-Occupational Injuries

This is the second year that ESA has been able to gain access to non-occupational injury data as a result of a working agreement with the Canadian Institute of Health Information

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47 Based on WSIB records

48 These are miscellaneous injuries as a result of contact with electricity; none were significant in cost or number of injuries.
2003 Annual Safety Report

(CIHI) and ESA. As a result of a recently published epidemiological study of electrical related deaths and injuries among Canadian children and youth, ESA has received additional insight on injuries to children.

CIHI collects information from all Canadian hospitals, including Emergency Wards, and codes its data according to the International Classification of Deceases Revision # 9. CIHI adheres to the Freedom of Information Act guidelines when providing public information, ensuring that confidentiality and protection of information involving private citizens are maintained. Due to the restrictions, there are limits to what ESA can retrieve from CIHI.

Ontario continues to have a relatively low injury rate in comparison to its provincial counterparts across Canada. While Ontario had 38% of Canada’s population in 2000, the non-occupational related injuries of electrical nature only represents 17.4% of the entire country.

Table 13
Non-Occupational Electrical Injuries

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>19</td>
<td>2.9%</td>
<td>10%</td>
</tr>
<tr>
<td>British Columbia</td>
<td>36</td>
<td>5.4%</td>
<td>13%</td>
</tr>
<tr>
<td>Ontario</td>
<td>115</td>
<td>17.4%</td>
<td>38%</td>
</tr>
<tr>
<td>Quebec</td>
<td>380</td>
<td>57.5%</td>
<td>23%</td>
</tr>
<tr>
<td>All Canada</td>
<td>661</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

49 Based on CIHI data and Statscan
The number of non-occupational electrical injuries per year has decreased from 1995 to 2000. Table 14 shows non-occupational injuries of electrical nature for Canada and selected provinces.

### Table 14
**Number of Non-Occupational Electrical Injuries Per Year**
**The Largest Provinces in Canada**
**1995-2000**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>139</td>
<td>101</td>
<td>100</td>
<td>92</td>
<td>102</td>
<td>126</td>
</tr>
<tr>
<td>Ontario</td>
<td>34</td>
<td>17</td>
<td>15</td>
<td>15</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Quebec</td>
<td>77</td>
<td>58</td>
<td>61</td>
<td>66</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>BC</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Alberta</td>
<td>6</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Shock and burns are the most common injuries in non-occupational electrical accidents, accounting for approximately 70% of all injuries in Ontario. Some 17% of injuries occur to the hand area. In 2000, there were 11 males injured compared to 4 females. The disproportion of male to female ratio in electrical injuries is typical and consistent with reports on electrical fatalities. Eleven electrical injuries in 2000 were to children under age 15.

Children under 15 accounted for 73% of non-occupational electrical injuries in 2000.

The study on the epidemiology of electrical fatalities and injuries among Canadian children concluded that non-fatal electrical injuries in children were mostly derived from contact with low voltage found in household electrical outlets. The study also found that these injuries were in general, minor and required little or no treatment.

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50 Based on CIHI records
Table 15 illustrates the predominance of placed-object-finger-in-outlet and appliance/electrical device injuries in children, particularly children under the age of nine. Injuries to this age group constituted 78% of all children injuries.

**Table 15**  
**CHIRPP reported electrical injuries by circumstance and age 1991–1996**

<table>
<thead>
<tr>
<th>Circumstance</th>
<th>0–4</th>
<th>5–9</th>
<th>10–14</th>
<th>15–19</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placed object/finger in outlet</td>
<td>229</td>
<td>18</td>
<td>7</td>
<td>3</td>
<td>257 (42)</td>
</tr>
<tr>
<td>Appliance/electrical device</td>
<td>115</td>
<td>41</td>
<td>42</td>
<td>19</td>
<td>217 (36)</td>
</tr>
<tr>
<td>Put cord in mouth</td>
<td>35</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>37 (6)</td>
</tr>
<tr>
<td>Touched live wire*</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>28 (5)</td>
</tr>
<tr>
<td>Water involved</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>24 (4)</td>
</tr>
<tr>
<td>Touched 2 sources of electricity at once</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>16 (3)</td>
</tr>
<tr>
<td>Struck by lightning</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>9 (1)</td>
</tr>
<tr>
<td>Other†</td>
<td>3</td>
<td>0</td>
<td>7</td>
<td>2</td>
<td>18 (3)</td>
</tr>
<tr>
<td><strong>Total (%)</strong></td>
<td>411 (68)</td>
<td>84 (14)</td>
<td>79 (13)</td>
<td>32 (5)</td>
<td>606</td>
</tr>
</tbody>
</table>
Figure 17 shows how large the proportion of young children injuries are in non-occupational related injuries.

4.0. Fires

There were a total of 28,222 fires in 2002. The number of fires has been steadily decreasing by 25%, compared to 1995, when there were approximately 37,000 fires\textsuperscript{52} in Ontario. Electrical fires (fires where electricity is the energy source) account for roughly 15% of all fires in Ontario. Data for this section was acquired in two ways. Both sets of data originate from the OFM. General fire data was acquired through the Internet (1990 to 2002). Data specific to electrical fires is obtained through requests for aggregate data.

\textsuperscript{51} Based on CIHI records
\textsuperscript{52} http://www.ofm.gov.on.ca/english/publications/Statistics/fireloss/default.asp.
In 2000, electrical fires resulted in 249 injuries. Range top fires accounts for 131 of the 249 injuries (52%).

Fires in residential setting accounts for more than half of electrical related fires, with vehicle related fires as almost a quarter of all electrical related fires. Cooking equipment was responsible for 30% fires that were electrically related. Cooking equipment was the largest causes in electrical related fires.

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53 Based on OFM records.
### Table 16
Electrical Fires According to Building Type
#### 2000

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Occurences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2229</td>
</tr>
<tr>
<td>Vehicles</td>
<td>902</td>
</tr>
<tr>
<td>Structures/Properties not classified by O.B.C.</td>
<td>233</td>
</tr>
<tr>
<td>Industrial Occupancies</td>
<td>216</td>
</tr>
<tr>
<td>Assembly Occupancies</td>
<td>137</td>
</tr>
<tr>
<td>Mercantile</td>
<td>85</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3927</strong></td>
</tr>
</tbody>
</table>

Residential electrical fires have been steadily decreasing since 1995 as shown in Figure 19. Residential fires account for roughly 60% of all electrical fires in 1995-2000. In 5 years, incidents of electrical fires in residential building have decreased by 33%.

#### Figure 19
Residential Electrical Fires
1995-2000

54 Based on OFM records.
55 Based on OFM records
5.0. Conclusion

The trend in Ontario continues to show a decrease in electrical fatalities, injuries and fires. The trend also shows that electrical related accidents and fires remain as a small portion of accidental deaths, injuries and fires respectively in the province.

Overhead contact with energized powerlines continues to play a predominant role in electrical fatalities in Ontario accounting for more than 60% of accidental electrical fatalities.

Electrical related injuries and fatalities occurred in a wide array of trades and industries. Electricity touches a number of aspects of our lives in Ontario, and the recorded electrical injuries and fatalities continue to reinforce that caution must be used when working with electrically powered equipment or near an energized line.

Over the past 10 years there has been a shift in the sectors where electrocutions occur in Ontario. Over the past 5 years there have been an increasing number of occupation fatalities from electrocution, whereas 10 years ago electrical fatalities from electrocution were predominately associated with non-work related activities.

The reports of powerline contact with ladders continued to represent a major number of electrical fatalities in the occupational segment. The past seven year’s of Coroner’s records as well as ESA accident reports indicate that an average of 16% of electrocutions involve ladders. In the residential sector electrocutions involving ladders represents almost 50% of all electrical related fatalities.

In 2003, statistics indicate the emergence of electrical fatalities and serious injuries associated with AWPs. There were two AWP fatalities and one critical injury in the past year. The danger associated with this device is associated with the fact that; a) there is no certification required to operate the device, b) there is little training required to operate the device, and c) the potential for double fatalities given that two occupants can work on these platforms.
Information from the Coroner’s office reports that non-electricians performing repairs to electrical equipment or devices were the most prominent in occupational electrocutions. This is primarily due to the large number of maintenance workers in the province. Electrical fatalities involving electricians represent a tenth of all occupational electrocutions.

As of 2003, workplace electrocutions have exclusively involved men. The Coroner’s office reported that all female fatalities from 1997 to 2003 were non-occupational, and none of these deaths were the result of the victim deliberately attempting to connect, repair or maintain electrical wiring or products. The predominance of male fatalities and injuries appears to be linked to the fact that repairs, maintenance, and installation of electrical wiring or equipment, as well as work requiring the use of extension ladders, is most often work done by males. This conclusion is made as a general observation, and there are at this time no statistics to back this conclusion.

The Coroner’s office also indicates that the lack of safe work procedures and job planning can be associated with more than half of the fatalities. In addition, three quarters of these cases indicated violations to the OHSA and Regulations. A general lack of electrical safety awareness also played a major part in electrical fatalities.

Reported electrocutions in residential facilities and non-occupational activities represented the greatest number in 1997-2003. In occupational type projects, repair and maintenance had the highest prevalence of electrocutions for the same period while the prevalence of electrocution in construction is on the rise.

Fire fatalities are on a downward trend and are dominated by residential fires. Fatalities and fires were primarily associated with cooking – and are classified as electrical fires in all cases where the cooktop/stove was an electrical appliance.

Occupational electrical related injuries have shown a downward trend since 1999. The rate of injury has steadily declined in the past five years at a rate of 3% per annum. The manufacturing sector continues to have the highest reported number of electrical related
injuries while the steel, chemical, and construction segments continue to have the most severe injuries reported in this sector.

Accidents involving electrical distribution equipment and electrical panels were more dominant in construction than any other industry segment, and resulted in serious injuries that drove the overall injury cost to a high point. Both the steel and chemical segments reported a relatively low number of electrical injuries, but injury costs illustrate how dangerous both environments are when electrical accidents occur.

Serious accidents and injuries involving the use of multimeters continue to exist primarily due to improper procedures.

6.0. Recommendations and Strategies


As a result of ESA’s 2002 Annual Safety Report three action items were initiated:

\textit{a) Powerline fatalities - Hazard awareness campaign with partners in the industry}

ESA, together with all partners in Elecsafe alliance developed and launched a powerline safety awareness campaign. ElecSafe is a not-for-profit Electrical Safety Partnership established and chaired by the Electrical Safety Authority that has been formed to provide Ontarians with access to important information about electricity that can keep them safe where they live, work & play. The ElecSafe partners include ESA, the Electricity Distributors Association, Hydro One, Ontario Power Generation, Electrical Contractors Association of Ontario, Ontario Electrical League, International Brotherhood of Electrical Workers, Construction Safety Association of Ontario, the Electrical and Utilities Safety Association, CSA International, ElectroFederation Canada and CLB Media Incorporated.
In 2003/2004 Elecsafe, in conjunction with the Education Safety Association of Ontario developed a powerline safety video that was made available to all schools across Ontario and on the Elecsafe.info website. A powerline safety brochure targeted to farmers was developed and distributed by the Farm Safety Association, and a powerline safety poster campaign for construction workers was developed and implemented in cooperation with the Construction Safety Association of Ontario.

b) Investigate partnerships with all SWAs, Union and Contractors’ associations and the Utility industry to reduce occupational injuries related to the use of multimeters and working with 347 Volts system

ESA has taken steps to increase awareness among the trade of these common occupational hazards. These efforts have included a “flash notice”, articles in trade publications, and electrical safety awareness presentations to apprentices and electricians. In response to awareness created around the issue of working near energized circuits and equipment the Electrical Contractors Association of Ontario and the International Brotherhood of Electricians have agreed that all new and existing apprentices shall be issued proximity sensors and training as part of their trade safety orientation.

ESA, in conjunction with members of our Industry Advisory Council has proposed an amendment to the Canadian Electrical Code, which it believes would address the safety concerns associated with 347 Volt lighting systems. The recommendation to amend to the Code was approved by the Ontario Provincial Code Council at their fall 2003 meeting.

The formal request to amend the Canadian Electrical Code, along with supporting data and rationale, has been submitted to the Canadian Electrical Code Part I Sub-Committee.
Similarly, ESA has developed a proposal to improve the safety standard for meters. This standard change has been submitted to the Canadian Standards Associations Technical Committee for Commercial and Consumer Products for their consideration.

c) Fire fatalities – explore with the OFM, manufacturers and standards development organizations opportunities to reduce fatalities initiated by cooking appliances.

ESA as a member of the Ontario Fire Marshal’s Public Fire Safety Council has agreed to chair and participate along with representatives from CSA, ULC and the Fire Marshal’s office in a Council working group tasked with identifying solutions to this issue. Additionally on behalf of the Public Fire Safety Council a formal request has been made the Canadian Standards Association for their support and assistance in improving the standard for stoves and ranges to address the fire safety concerns.

d) Investigate the nature and root cause of injuries to children

ESA contacted, provided information to, and has been monitoring the work underway by researchers at the Hôpital Ste-Justine in Montreal, the Children’s Hospital of Eastern Ontario in Ottawa, Stollery Children’s Hospital in Edmonton, University of Alberta, Edmonton, AB. This study highlights electrical and lightning related deaths and injuries among Canadian children and youth and has recently been published in the Journal of Injury Prevention. This study provides more information on the nature and cause of electrical injuries to children. For example, it identifies that 44% of all electrical injuries to children result from contact with electrical outlets. Educational programs for parents and children perhaps legislated standards for child safe outlets and are recommended by
6.2. ESA’s future initiatives

a) 347 Volt and Multimeter Safety Awareness

ESA is continuing to increase awareness among the electrical trade about the hazards associated with working on 347-volt systems and the use of multi meters. For fiscal year 2005 this has been adopted as an important component of ESA’s strategic plan and is one of ESA’s 11 key performance indicators.

b) Outlet Safety

Based in part on new research associated with injuries to children, for 2004 Elecsafe has formed a partnership with the National Electrical Safety Foundations (NSFI). The 2004 campaign will focus on outlet safety and includes information targeted to children at numerous children’s safety villages across Ontario, families in cooperation with 1200 plus municipal libraries across Ontario, 70,000 workers with the cooperation of CSAO, and children and homeowners through an interactive electrical safety website at elecsafe.info.

c) Powerline Safety

In 2004/2005 ESA will focus on the implementation of the new Electrical Distribution Safety Regulation. Powerline safety awareness information continues to be a key component of the Elecsafe.info website.
d) Aerial Work Platform (AWP)

ESA will approach the MOL and rental houses dealing with AWP concerning the problem involving powerline electrical contact and the use of AWP. The need for hazard awareness training goes hand-in-hand with powerline safety.
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Glossary

**Accident** – An undesired or unplanned event, resulting in property damage, injury or a fatality.

**Aerial Work Platform** (AWP) – a self-propelled work platform device, capable of lowering and lifting its work platform by mechanical means.

**AFI** – Application For Inspection, an application for performing electrical installation that requires inspection, as defined by the Ontario Electrical Safety Code.

**CIHI** – Canadian Institute of Health Information, a subsidiary of Health Canada, a not-for-profit organization responsible for collecting all health information across Canada.

**Cost of Injury** – Cost of injury as calculated by the WSIB in compensation, medical aid and pension.

**CSAO** – Construction Safety Association of Ontario, an accident prevention advisory organization, funded by the WSIB, serving the construction sector.

**Electrician** – A worker whose occupation is identified as working primarily with electricity.

**Electrocution** – an accidental death, caused by contact with electricity.

**Fatality** – an injury resulting in a death.

**Human error** – An inappropriate or undesired human decision or behaviour that reduces or has the potential to reduce the safety or system performance.

**LTI** – Lost Time Injury, a term defined by the WSIB for an occupational injury that resulted in a worker missing more than one shift of work.

**MOL** – Ministry of Labour of Ontario.

**NIOSH** – National Institute of Occupational Safety and Health, a government organization of the United States, whose primary function is to study injuries for the purpose of accident prevention.

**Non-Occupational injuries** – Injuries occurring in other than workplace.

**NWIS** – National Work Injury Statistics Program, an organization that serves as a repository of all occupational injuries in Canada.

**Occupational Injury** – an injury occurring in a workplace.

**OFM** – The Office of Fire Marshal, a provincial organization responsible for the prevention of fires in Ontario.
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**Powerline** – Electrical cable or wire, used to transmit electrical energy.

**Traumatic Injury** – Injury as a result of a sudden or violent act

**WSIB** – Workplace Safety Insurance Board, an organization responsible for compensation of workplace injuries.
References

7. Statistics Canada, Mortality – Summary List of Causes, 1999
12. Nguyen, MacKay, Bailey and Klassen; Epidemiology of electrical and lightning related deaths and injuries among Canadian children and youths