1 January 2007 to 31 December 2007

summary of reported electrical and gas accidents

Printed April 2008

Ministry of Economic Development
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foreword

Energy Safety (ES) is the power behind energy safety. This is our vision.

We have three strategies to implement the vision:

- *Criticality of issues* – Early and accurate identification of issues through systematic analysis of shared data
- *Clarity of expectations* – An internationally aligned regime implemented without fear or favour
- *Conformance and confidence* – Encouraging appropriate safety behaviour.

The emphasis of this yearly report is on the first and third of these strategies. Our role is continually to seek to promote safe practices to industry and to users of electricity and gas.

We seek to achieve our vision by working with industry and the public to create an environment where:

- People and property are safeguarded from the dangers of gas and electricity.
- Gas and electrical appliances, installations, and generation and distribution systems are safe.
- The quality and measurement of gas and electricity are maintained.
- We are a smart and effective centre focusing on the right energy safety issues.

ES is committed to safety, reliability and accuracy. We work with industry to promote high safety and quality standards in networks, installations and products. We also seek to ensure that appliances which those working in industry and the general public use are safe and are used safely. Our work is important in making sure that the benefits of energy are obtained safely, and that reliable data are created.

This report has been published annually for eight years and has these aims:

- To present a detailed history of electrical and gas accidents

- To help government and industry identify critical energy safety issues
- To provide workers and other consumers with information on best safety practice
- To enable appropriate international comparisons.

This publication is one of the tools ES uses to encourage employers and workers to embrace safety guidelines, seek appropriate training, and assess work practices regularly.

Achieving effective energy safety practices requires government, industry and the public to work together, while also taking their share of responsibility for safe energy, safe people and safe property.

Sanjai Raj
Group Manager – Energy Safety

NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2007 to 31 December 2007

executive summary

Overview of 2007

During 2007 there were:

- Seventy-seven notifiable electrical accidents, which caused 10 fatalities and injured 67 people. In three separate accidents, the homeowner was installing aluminium thermal insulation foil under their house when they stapled through live cables and received a fatal electric shock.
- Fifteen notifiable and 25 non-notifiable natural gas accidents were reported to ES, with three of the notifiable accidents causing injury to three people in total.
- Twenty-seven notifiable and 33 non-notifiable LPG accidents were reported to ES, with five of the notifiable accidents causing two fatalities and injury to 14 people.

The general trend of the last five years (2003-2007) indicates some reduction in electrical accidents to line mechanics and electricians. However, there has been an increase in fatal accidents to line mechanics and notifiable accidents reported to ES.

High-Risk Areas 1993-2007

Electrical and gas accident information from the last 15 years (1993-2007) has been categorised into relevant groups before being analysed for trends, frequency, common causes and the types of worker involved. The information is also analysed for the severity and frequency of total accident occurrences for each of these groups.

Electrical Accidents

Electrical workers

- Line mechanics made up 37% of electrical worker accidents (494), which caused 12 fatalities and injured 181 line mechanics. There have been 12 line mechanic fatalities in the last 15 years, six in the last five years.
- Electricians were involved in 38% of electrical worker accidents, which caused nine fatalities and injured 191 electricians.

- Trainee electricians were involved in 9% and trainee line mechanics in 3% of electrical worker accidents, which caused four fatalities and injured 64 trainees.

Other occupations (non-electrical workers)

- Farm workers made up 6% of other occupations accidents (386), which caused about 42% (10) of the total 23 fatalities for this group and injured 14 farm workers.
- A significant number of non-electrical accidents involved digging or carrying out non-electrical work near high-voltage live lines.

General public

- **Young people** (a combination of children and students under 25)
  Young people were involved in 45% of general public accidents (205), causing 12 fatalities and injuring 80 people.
- **Domestic environment**
  Over 50% of accidents involving the general public occurred in the domestic environment, causing 23 fatalities and injuring 86 people.

Natural Gas Accidents

Equipment

- **Mains/service and regulator stations**
  About 13% of the notifiable accidents (151) and over 50% of the total non-notifiable accidents (514) reported to ES involved mains/service/regulator stations. Eleven of these notifiable accidents caused injury to 14 people.
- **Water heaters/boilers**
  About 31% of the notifiable accidents involved water heaters. Ten of these accidents caused one fatality and injury to 13 people. Water heaters also accounted for about 5% of the total non-notifiable accidents.
- **Space heaters**
  About 28% of the notifiable accidents involved space heaters. Nine of these accidents caused one fatality and injury to 10 people. Space heaters accounted for 18% of the total non-notifiable accidents.

- **Cookers/ovens**
  About 16% of the notifiable accidents involved cookers/ovens. Seven of these accidents caused one fatality and injury to seven people. Cookers/ovens accounted for 10% of the total non-notifiable accidents.

Liquefied Petroleum Gas (LPG)

Intentional LPG inhalation accidents

Young people were involved in 15 fatal accidents. These accidents highlight the fact that containers and refillable cylinders are sometimes used in ways for which they were not intended.

LPG accidents

Equipment

- **Cookers/ovens**
  About 31% of the notifiable accidents (264) involved cookers/ovens. Fifty-four of these accidents caused 14 fatalities and injury to 73 people. Cookers/ovens accounted for 12% (448) of the non-notifiable accidents.
- **Portable heaters**
  About 35% of the notifiable accidents involved portable heaters. Forty-one of these accidents caused five fatalities and injury to 46 people. Portable heaters accounted for 32% (141) of the non-notifiable accidents.
- **Containers**
  About 8% of the notifiable accidents involved LPG refillable containers. Sixteen of these accidents caused four fatalities and injury to 18 people. These made up 19% (85) of the non-notifiable accidents.

Environmental

- **Caravans**
  About 12% (31) of the total notifiable accidents (264) occurred in caravans. Twenty-four of these accidents caused eight fatalities and injury to 30 people.

commentary

Background

ES is responsible for the administration of electricity and gas legislation. ES's aim is to bring a clear focus to safety, supply quality and measurement across the electricity and gas sectors. From 1 October 2006, ES became part of MED's Business Services Branch.

ES performs operational safety-related functions under "energy-related" legislation. ES is also responsible for ensuring the safe production, supply, installation and use of electricity and gas.

Key ES functions are to investigate serious electrical and gas accidents, and to implement improved safety procedures. The occupier or the person in charge of the accident area is required by law to report to ES any accidents caused by electricity or gas that result in fatalities, serious injuries or significant damage to property.

Data Collection and Recording

This publication contains brief descriptions of ES investigations into electrically-caused serious injuries (shock or burns) and significant property damage caused by fire. It also lists notifiable gas accidents reported to ES during the 2007 calendar year. In order to determine trends, notifiable electrical accidents (except fire) and notifiable and non-notifiable gas accident information collected since 1993 have been analysed.

Some accident investigations are quite complex and take a long time. This summary includes the latest information available at the time of preparation of this publication (January 2008).

NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
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Electrical Accidents

A "notifiable electrical accident" has the same meaning as a "notifiable accident" in the Electricity Act 1992. A "notifiable electrical accident" is defined as an accident that:

- Is caused wholly or partly by, or involves or affects, electricity, or involves or affects the generation, conversion, transformation, conveyance, or use of electricity; and
- Results in –
  - Serious harm to any person; or
  - Damage to any place or part of a place that renders that place or that part of that place unusable for any purpose for which it was used or designed to be used before that accident.

"Serious harm" means:

- Death; or
- Injury that consists of or includes loss of consciousness; or
- Injury that necessitates the person suffering the injury –
  - Being admitted to hospital; or
  - Receiving medical treatment from a health practitioner who is, or is deemed to be, registered with an authority established or continued by section 114 of the Health Practitioners Competence Assurance Act 2003 as a practitioner of a particular health profession.

A large number of electrically-caused fires are not reported to ES at all or are not reported in time to carry out an investigation. Further, a large number of electrical fires covered by the Electricity Act are caused by incorrect operation or misuse of electrical equipment. Therefore ES is not involved in most electrical fire investigations.

The New Zealand Fire Service (NZFS) collects information about the fire incidents it attends and publishes its analysis. Some analysis of key data about fires covered by the Electricity Act is included in this publication.

Gas Accidents

A "notifiable gas accident" has the same meaning as a "notifiable accident" in the Gas Act 1992. A "notifiable gas accident" is defined as an accident that:

- Involves the production, conversion, supply, distribution, or use of gas; and
- Results in –
  - Serious harm to any person; or
  - Significant property damage.

"Serious harm" means:

- Death; or
- Harm that incapacitates, or is likely to incapacitate, the person suffering harm for 48 hours or more; or
- Harm that incapacitates, or is likely to incapacitate, the person suffering harm due to the inhalation of carbon monoxide; or
- Harm of the kinds and descriptions that are serious harm under the Health and Safety in Employment Act 1992.

A "non-notifiable gas accident" is defined as an accident that:

- Causes property loss; and/or
- Causes injury below the threshold defined in the Gas Act 1992, and is involved with what is supposed to be a safe supply or use of fuel gas.

Information relating to non-notifiable accidents is received in two ways:

1. As a means of notification or collected by ES from various sources, including media, within a short time of the accident occurring.
2. From gas suppliers and the NZFS for recording purposes, infrequently and in bulk. This information is not collected systematically, which may lead to inaccurate analysis – particularly trend analysis. Therefore this type of infrequently collected information is not included in the analysis.

The accident summary sections cover only notifiable gas accidents.

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Reporting Accidents and Reliability of Data

ES has found that the more serious the accident, the more likely it is to be reported and the more accurate the information. This is because serious accidents are thoroughly investigated by the responsible authorities. There is also a higher likelihood of publicity of serious accidents, with subsequent public pressure to determine the cause of the accident with a view to preventing recurrence.

While ES believes its database contains most serious notifiable accidents, it may not capture all of the less serious notifiable accidents due to lack of reporting. The non-notifiable gas accident records held by ES may represent significantly fewer accidents, because there is no obligation to report them under the current legislation.

ES receives earlier notification and more accurate information from members of the energy industry than from the general public. Unfortunately, ES is not advised of some electrical and gas incidents, unless they result in a fatality or very serious injury.

Full and early reporting of accidents and incidents, no matter how minor, is important. It enables ES to monitor practices and behaviours, pinpoint problem areas, and take early action towards improving safety, before death, injury or serious loss occurs. ES asks both industry and the public to report all accidents so that a comprehensive database can be maintained. This can be done by completing the online report form on the website www.energysafety.govt.nz (click on the Report to ES tab to locate the form), or by contacting the ES accident notification service on:

Freephone:	0800 104 477
Freefax:	0508 723 336

Notified accident information from the last 15 years (1993-2007) has been analysed for trends, frequency, common causes and types of worker involved. This analysis includes a comparison of the initial five years (1993-1997) and the last five years (2003-2007) from the introduction of the current Electricity and Gas Acts. These periods were selected to compare the variation in current accident rates (2003-2007) with the immediate period after the introduction of the new legislation (1993-1997).

Even though the definition of "accident" is similar in the Electricity and Gas Acts, there are some differences in electrical and gas data collection and recording that may be significant:

1. A "notifiable electrical accident" may include an electrical fire. Fires, however, are not included for analysis, because not all notifiable electrical fires are reported to ES or investigated and recorded in the ES database. Generally, the NZFS investigates all electrical fires in the same way as it does other fires.
2. A "notifiable gas accident" means a gas accident causing fire and/or explosion and/or gas poisoning. All these are included for analysis because ES investigated these accidents and they are recorded in the ES database.
3. While electrical accident investigators specify a single major likely cause, gas accident investigators may specify up to four most likely causes for each gas accident.

It is important to note that the accident analysis does not explain the reasons behind the trends found. The changes (increase/decrease) may be due to one or several reasons, such as changes in the amount of work undertaken, the training and competency of the workforce, the variation in accident reporting level or improvements in safety practices. Establishing the real reason(s) behind most of these changes requires detail analysis and more information from the energy industry, which may or may not exist.

A new IT system called energy safety intelligent (ESI) will be implemented this year. This system will integrate electricity and gas operation activities, including electricity and gas accident information, into a single database. This system will provide staff and stakeholders with easy online access to current, accurate information.

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Electrical Accidents

Electrical injury accident information is collected and recorded in the ES database under three main target groups: electrical workers, workers in other occupations (non-electrical workers) and the general public.

The nature of each group's relationship with electricity (training, familiarisation and responsibility) is different. All accidents have similar types of cause, but the reasons for accidents and means of preventing them may be different. Therefore, accident causality is analysed differently for each group.

Accidents have been analysed for severity and frequency of occurrence for each group.

Graph 1 has information on all notifiable electrical accidents.

The NZFS maintains a database of fire incidents attended by its crews. The database is well constructed and contains valuable information regarding casualties, equipment involved and causes of fires. A key analysis of fire data covered by the Electricity Act is included in this publication.

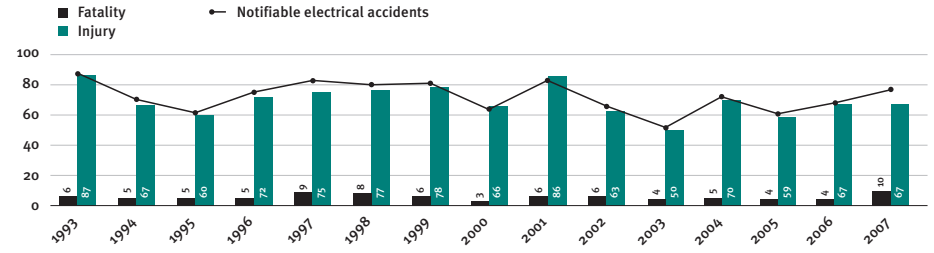
Graphs 2a and 2b have information on electrically-caused fires and electrical fire casualties[1].

There are two main types of electrical fire: arc-initiated fires and those started by heat from electrical equipment. Generally, arc-initiated fires are caused by short-circuiting of worn cables and damaged wiring. By contrast, fires initiated by heat from electrical equipment are normally caused by operating error (including overloaded electrical circuits), installation error or lack of maintenance.

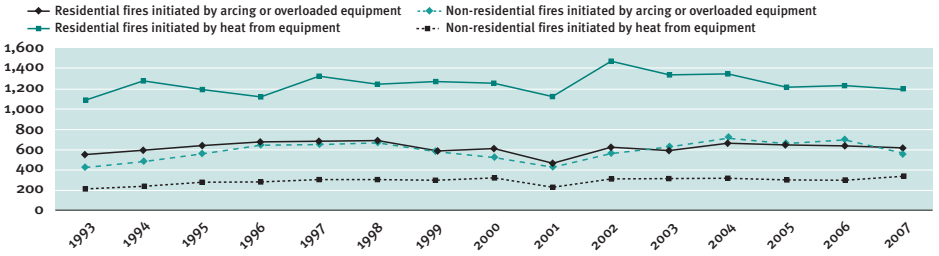
The NZFS may not establish the correct cause of every electrical fire it investigates due to its limited electrical expertise. For this reason, Graphs 2a and 2b may not be totally correct. Nonetheless, these graphs are accurate enough to establish general long-term comparative trends.

[1] The NZFS has supplied the data on electrically caused fires.

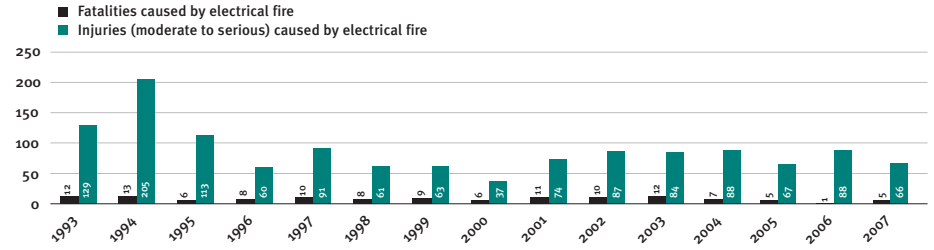
Graph 1 Notifiable Electrical Accidents 1993-2007



Graph 2a Electrically Caused Fires 1993-2007



Graph 2b Electrically Caused Fire Casualties 1993-2007



Electrical Workers

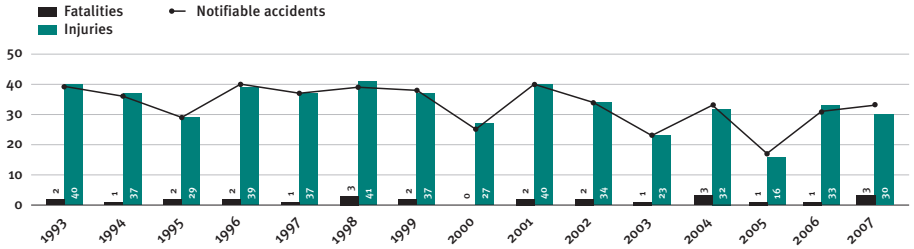
During 2007:

- There were three fatal accidents, one involving an electrician and two involving line mechanics. The average annual fatality rate for electrical workers is 1.7 over the last 15 years.
- There were 30 notifiable injury-causing accidents harming 30 electrical workers. The average accident and injury level for the last 15 years is about 30 and 33 per year respectively.
- Over 50% (16) of electrical-worker accidents involved 400 volts, and 20% involved 230 volts (single phase). The average accident and injury level for the last 15 years is about 13 per year involving 400 volts and about eight involving 230 volts (single phase).
- Over 43% of electrical workers involved in accidents received a shock and a corresponding proportion received a burn injury, similar to last year.

General trends

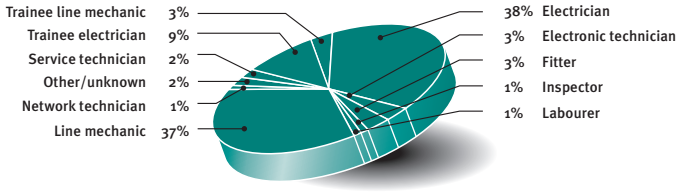
- There has been a small decline in the number of notifiable accidents involving electrical workers over the last 15 years (see Graph 3a).
- During the last five years (2003-2007) there has been some reduction in accidents involving electricians compared with the initial five years (1993-1997), from about 15 to about 10 annually (see Graph 4a).
- In the last five years, there has been a significant reduction in electrical accidents involving line mechanics, from an average of about 16 per year from 1993-1997 to about nine per year from 2003-2007 (see Graph 5a). However, there has been an increase in the number of fatalities involving line mechanics. There have been 12 line-mechanic fatalities in the last 15 years, six in the last five years and three each in the previous five-year period (1993-1997 and 1998-2002).
- During the last five years there has been a significant rise (from about two to about six annually) in accidents involving trainees (trainee electricians and trainee line mechanics), compared with the initial five years (1993-1997) – see Graph 5e.

Graph 3a Notifiable Electrical Accidents Involving Electrical Workers 1993-2007



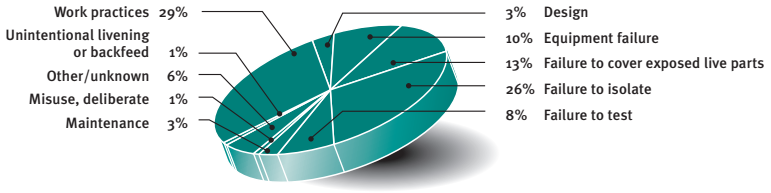
Graph 3b Notifiable Electrical Accidents Involving Electrical Workers 1993-2007

by worker category



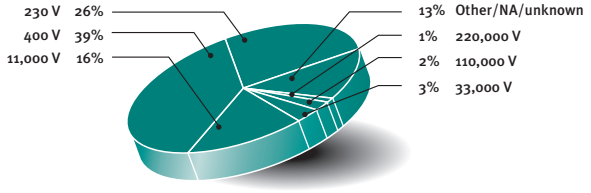
Graph 3c Notifiable Electrical Accidents Involving Electrical Workers 1993-2007

by causal factor



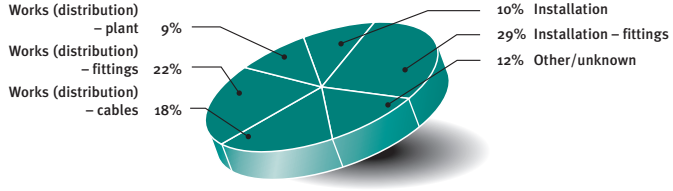
Graph 3d Notifiable Electrical Accidents Involving Electrical Workers 1993-2007

by voltage

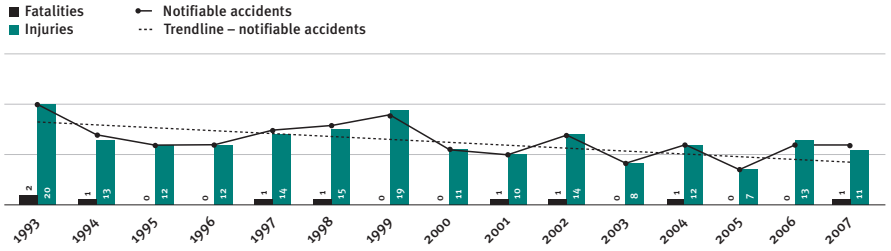


Graph 3e Notifiable Electrical Accidents Involving Electrical Workers 1993-2007

by equipment

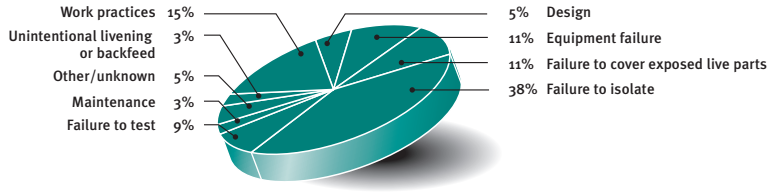


Graph 4a Notifiable Electrical Accidents Involving Electricians 1993-2007



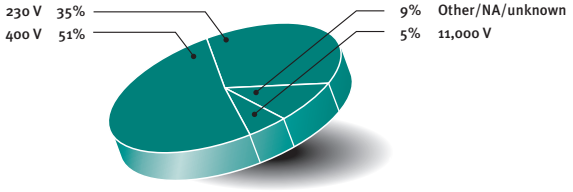
Graph 4b Notifiable Electrical Accidents Involving Electricians 1993-2007

by causal factor



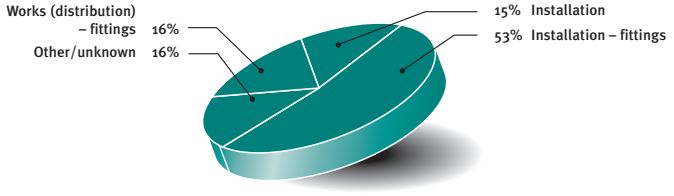
Graph 4c Notifiable Electrical Accidents Involving Electricians 1993-2007

by voltage



Graph 4d Notifiable Electrical Accidents Involving Electricians 1993-2007

by equipment



NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
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Trend analysis: consequence and frequency

During the last 15 years:

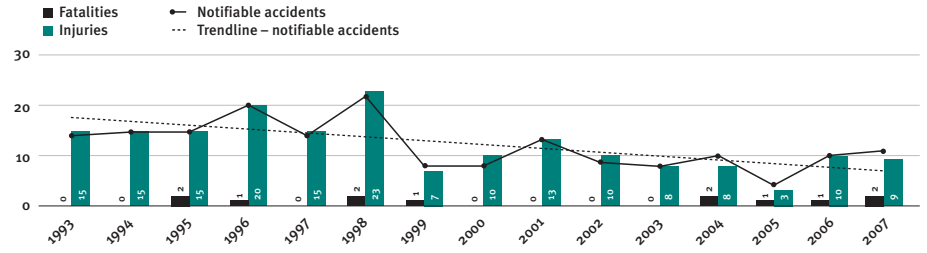
- There have been 26 fatal accidents involving electrical workers (nine electricians, three electrical apprentices, 12 line mechanics, one trainee line mechanic and one other class of electrical worker). In three accidents, homeowners were installing aluminium thermal insulation foil under their houses when they stapled through live cables and received fatal electric shocks.
- There have been 471 injury accidents involving 495 electrical workers.
- Electricians (38%), line mechanics (37%) and trainee electricians (9%) have experienced the highest accident rates in the electrical worker accident category (see Graph 3b).
- The main causes of accidents involving electrical workers have been failure to isolate from the power source (26%), not following correct work practices[2] (29%), failure to cover exposed live parts (13%), equipment failure (10%) and failure to test for a live supply (8%) – see Graph 3c.
- About 38% of accidents involving electricians have been caused by failure to isolate from the power source. Failure to cover exposed live parts (11%), failure to test (9%), not following safe work practices (15%) and equipment failure (11%) have also been significant causes (see Graph 4b).
- The causes of accidents involving trainee electricians have been similar to those involving electricians. The major accident causes have been failure to isolate (35%), failure to follow safe work practices (29%) and failure to test (8%).
- About 40% of accidents involving line mechanics have been caused by not following correct work practices and some 18% by failure to cover exposed live parts. Failure to isolate and failure to test the power supply have accounted for about 9% each (see Graph 5b). Accidents caused by failing to cover exposed live parts have decreased

[2] This is where the primary-cause work practice such as failure to test, failure to isolate or failure to cover exposed live parts was not clearly evident and there was blatant disregard for the safety rules or any written procedure, or where such activity was carried out and would be considered unacceptable industry practice.

significantly from 30% in the first five years (1993-1997) to 10% in the last five years (2003-2007). However, accidents caused by not following correct work practices have increased during the same period, from about 32% to 53%.

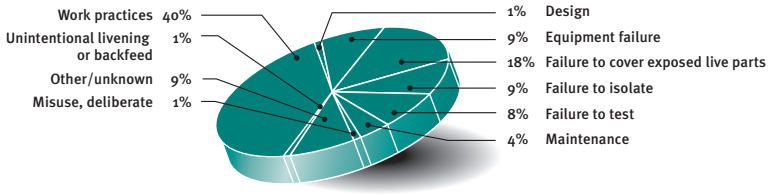
- Three widely operated voltages (230, 400 and 11,000) have caused over 80% of accidents involving electrical workers. Even though 230-volt systems are more widely used than 400-volt ones, more accidents have been caused by the latter. About 39% of electrical-worker accidents have been caused by 400-volt systems, while 26% of these accidents have been caused by 230-volt systems and 16% by 11,000-volt systems (see Graph 3d). However, each voltage system was involved in the same number of fatal accidents – three.
- Over 50% of accidents involving electricians have been caused by 400-volt systems, compared with about one-third caused by 230-volt systems (see Graph 4c). The relative accident rate for these two voltages has not changed for both five-year periods (1993-1997 and 2003-2007).
- About 30% of line-mechanic accidents have been caused by 11,000-volt systems and a similar proportion by 400-volt systems (see Graph 5c). However, more fatalities were caused by 11,000-volt systems than 400-volt ones over the last 15 years.
- During the first five years (1993-1997), about 20% of line-mechanic accidents were caused by 400-volt systems, while some 31% were caused by 11,000-volt systems. The relative accident rate has reversed for these two voltages in the last five years (2003-2007) – now fewer accidents are caused by 11,000-volt systems. During the last five years, 42% of accidents have been caused by 400-volt systems and about 26% by 11,000-volt systems.
- Over two-thirds of electrical-worker accidents have involved three categories of equipment: installation fittings (29%), works distribution fittings (22%) and works distribution cables (18%) – see Graph 3e. Installation fitting was involved in over 50% of electrician accidents (see Graph 4d), and works distribution cables and works distribution fittings were involved in 37% and 30% of line-mechanic accidents respectively (see Graph 5d).

Graph 5a Notifiable Electrical Accidents Involving Line Mechanics 1993-2007



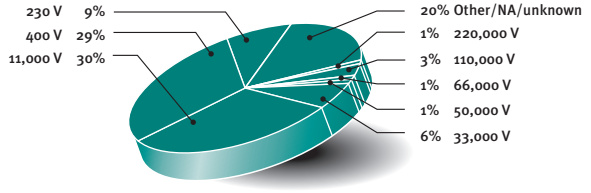
Graph 5b Notifiable Electrical Accidents Involving Line Mechanics 1993-2007

by causal factor



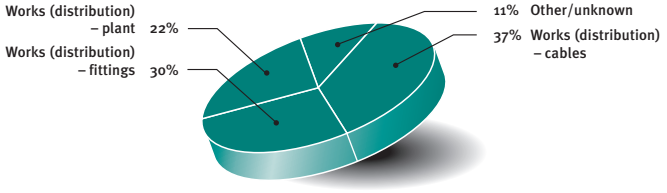
Graph 5c Notifiable Electrical Accidents Involving Line Mechanics 1993-2007

by voltage

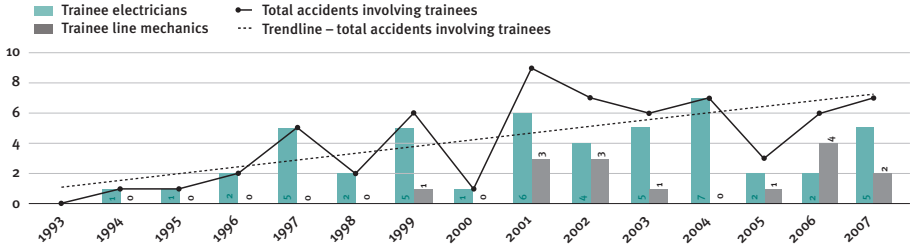


Graph 5d Notifiable Electrical Accidents Involving Line Mechanics 1993-2007

by equipment



Graph 5e Notifiable Electrical Accidents Involving Trainees (Electricians and Line Mechanics) 1993-2007



Other Occupations (Non-electrical Workers)

During 2007:

- There were three fatal accidents, one of which killed a farm worker and a truck driver. Two of the accidents involved 230-volt systems. The average fatality rate is 1.6 per year over the last 15 years.
- There were 26 injury accidents that injured the same number of workers. The average annual rate of accidents injuring workers in other occupations is 24.

General trends

- Over the last 15 years there has been no measurable change in the number of fatal and injury-causing accidents involving workers in other occupations (see Graph 6a).
- Over 40% of fatal accidents (10 from 24) in the last 15 years have involved farm workers. Five of the 10 fatal accidents involving farm workers were caused by 230-volt systems and three were caused by 11,000-volt systems. Half of farm-worker accidents (24) were caused by 11,000-volt systems and over one-third by 230-volt systems.
- There has been a significant reduction in accidents involving farm workers over the last five years. There have been two fatal accidents and only one injury-causing accident over the last five years, whereas in the initial five-year period there were three fatal accidents and eight injury-causing ones. Most of these accidents were caused by contact with overhead lines.
- Fifteen percent of accidents in the other occupations group have involved labourers and about one-third of these involved 11,000-volt systems. Farm workers, process workers, fitters, builders, kitchen workers and plumbers/gas fitters/roofers have been involved in a similar proportion of accidents, about 6% to 7% each (see Graph 6b). Over two-thirds of labourers involved in accidents have been injured by a system of more than 230 volts, mainly while working (either cutting or digging) near underground or overhead lines.
- There has been a significant increase (from five to 13) in accidents involving plumbers/gas fitters/roofers over the last five years compared with the initial five years.
- Electrical accidents involving truck drivers increased over the last five-year period compared with the previous two five-year periods. There were nine compared with one from 1998-2002 and five from 1993-1997.

Trend analysis: consequence and frequency

During the last 15 years:

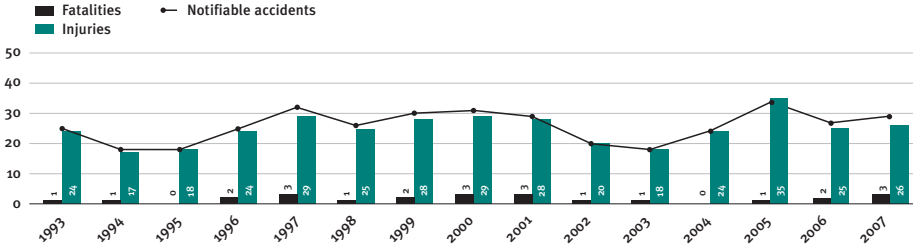
- There have been 24 fatal accidents affecting workers in the other occupations group. Over half (13) of these accidents involved systems of more than 230 volts. Ten of the fatal accidents involved 11,000 volts and nine involved 230 volts.
- There have been 365 accidents involving workers in other occupations, causing injury to 370 workers.
- The major causes of accidents have been not following correct work practices (32%), lack of maintenance (19%), and failure to isolate (12%) – see Graph 6c.
- Over 50% (210) of other occupations accidents (386) have involved 230 volts, about 13% involved 400 volts and 18% involved 11,000 volts (see Graph 6d). More accidents have involved 230-volt systems during the last five years (2003-2007), with an average of 16 per year, compared with the initial five years (1993-1997), which averaged 11 per year.
- Over three-quarters of other occupation accidents have involved three categories of equipment: installation and installation fittings combined (30%), appliances (21%) and works distribution cables (26%) – see Graph 6e.

General Public

During 2007:

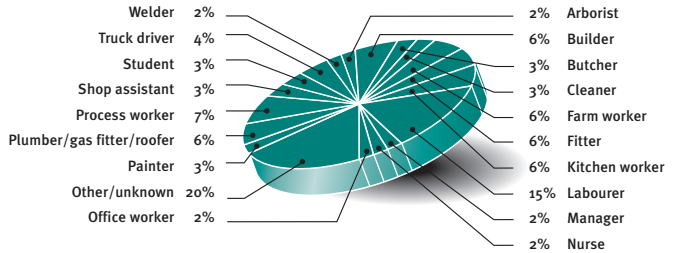
- There were four fatal electrical accidents, making this year one of the worst in terms of fatal accidents involving the general public. In three situations homeowners were installing aluminium thermal insulation foil under their houses when they stapled through live cables and received fatal electric shocks. The average annual fatality rate is 2.5 over the last 15 years.
- There were 11 accidents injuring 11 people. The average for the last 15 years is about 12 accidents per year.
- Over 50% of accidents (11), including four fatal ones, involved 230-volt systems. In the last 15 years, 230-volt accidents have averaged eight per year.

Graph 6a Notifiable Electrical Accidents Involving Workers in Other Occupations* 1993-2007



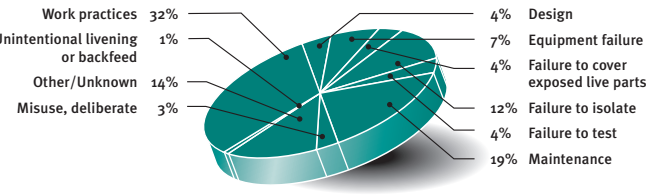
Graph 6b Notifiable Electrical Accidents Involving Workers in Other Occupations* 1993-2007

by worker category



Graph 6c Notifiable Electrical Accidents Involving Workers in Other Occupations* 1993-2007

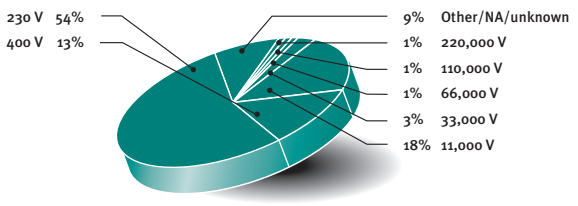
by causal factor



* Workers in occupations other than electrical work

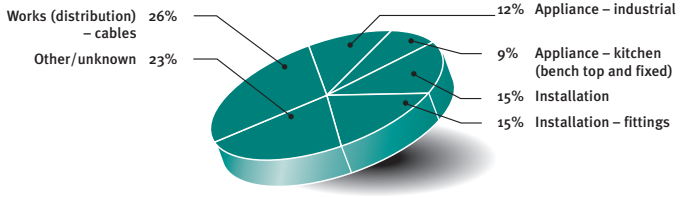
Graph 6d Notifiable Electrical Accidents Involving Workers in Other Occupations* 1993-2007

by voltage



Graph 6e Notifiable Electrical Accidents Involving Workers in Other Occupations* 1993-2007

by equipment



* Workers in occupations other than electrical work

General trends

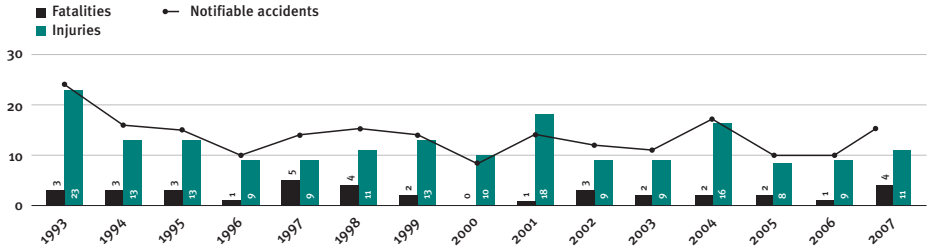
- There has been no significant change in the number of fatal and injury-causing accidents over the last 15 years (see Graph 7a).
- There have been significant reductions in fatal accidents (from seven to none) and injuries (from 33 to 16) involving young people in the last five years (2003-2007) compared with the initial five-year period (1993-1997).

Trend analysis: consequence and frequency

During the last 15 years:

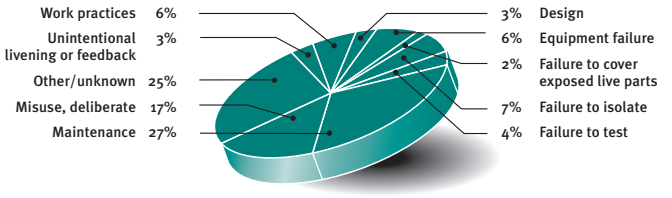
- There have been 36 fatal accidents affecting the general public, all of which were single-fatality. Two-thirds (24) of the fatal accidents involved 230-volt systems and about 14% (five) involved 11,000-volt systems.
- In these 36 fatal accidents, 12 of the victims were young people (children or students aged under 25). Eight of these cases involved 230-volt systems.
- Twenty-three of the fatal accidents happened in a domestic environment and 21 involved 230-volt systems. However, only nine of the 21 happened during the last five years (2003-2007).
- About 17% of fatal electrical accidents affecting the general public were caused by misuse of equipment. Lack of maintenance, failure to test power supply and failure to cover exposed parts each accounted for about 8% of these accidents.
- Lack of maintenance (27%) and misuse actions (17%) have caused a significant number of electrical accidents involving the general public (see Graph 7b).
- There have been 205 electrical accidents affecting the general public. Of these, 172 accidents caused injury to 181 people. Young people were affected by about 40% of accidents involving the general public.
- About 62% of the 205 accidents involved 230-volt systems and 17% involved 11,000-volt systems (see Graph 7c). Over 40% of 230-volt accidents (126) affected young people.
- Over 58% of accidents involving the general public have involved three categories of equipment: domestic installation (16%), domestic installation fittings (21%) and works distribution cables (21%) – see Graph 7d.

Graph 7a Notifiable Electrical Accidents Involving the General Public 1993-2007



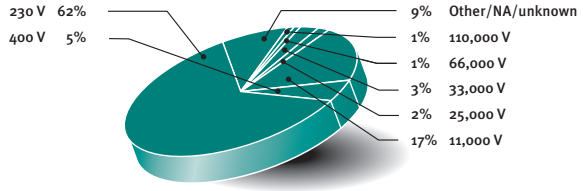
Graph 7b Notifiable Electrical Accidents Involving the General Public 1993-2007

by causal factor



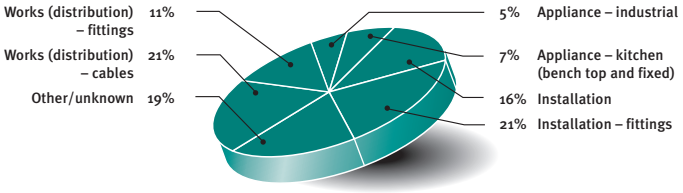
Graph 7c Notifiable Electrical Accidents Involving the General Public 1993-2007

by voltage



Graph 7d Notifiable Electrical Accidents Involving the General Public 1993-2007

by equipment



Electrical Accidents/Incidents

	Last 15 years (1993-2007)	Last 5 years (2003-2007)	Major contributors towards total accidents	Last 15 years (1993-2007) Consequence/ (Frequency)	Last 15 years (1993-2007) Main causes	Last 5 years (2003-2007) Consequence/ (Frequency)	Last 5 years (2003-2007) Main causes
Electrical Workers							
	Fatal: 26 (26)* *Injury:* 495 (471)	*Fatal:* 9 (9) *Injury:* 134 (130)	**Electricians**	*Fatal:* 9 (9) *Injury:* 191 (185)	• 38% failure to isolate • 11% failure to cover exposed live parts • 14% unsafe work practices • 11% equipment failure • 9% failure to test	*Fatal:* 2 (2) *Injury:* 51 (50)	• 22% failure to isolate • 8% failure to cover exposed live parts • 27% unsafe work practices • 12% equipment failure • 12% failure to test
			Line mechanics	*Fatal:* 12 (12) *Injury:* 181 (169)	• 40% unsafe work practices • 18% failure to cover exposed live parts • 9% failure to isolate • 8% failure to test • 9% equipment failure	*Fatal:* 6 (6) *Injury:* 38 (36)	• 53% unsafe work practices • 16% equipment failure • 9% failure to cover exposed live parts
			Trainees (electricians and line mechanics)	*Fatal:* 4 (4) *Injury:* 60 (59)	• 30% failure to isolate • 32% unsafe work practices • 8% equipment failure • 8% failure to test	*Fatal:* 1 (1) *Injury:* 28 (29)	• 38% failure to isolate • 28% unsafe work practices • 14% equipment failure

*The first number represents casualties and the bracketed number represents accidents.

Last 15 years (1993-2007)	Last 5 years (2003-2007)	Major contributors towards total accidents	Last 15 years (1993-2007) Consequence/ (Frequency)	Last 15 years (1993-2007) Main causes	Last 5 years (2003-2007) Consequence/ (Frequency)	Last 5 years (2003-2007) Main causes
Other Occupations						
Fatal: 24 (24) *Injury:* 370 (365)	*Fatal:* 7 (7) *Injury:* 128 (125)	**Farm workers**	*Fatal:* 10 (10) *Injury:* 14 (14)	• 32% unsafe work practices • 19% lack of maintenance • 12% failure to isolate	*Fatal:* 2 (2) *Injury:* 1 (1)	• 33% unsafe work practices • 11% lack of maintenance • 11% failure to isolate • 13% equipment failure
		Fitters	*Fatal:* 3 (3) *Injury:* 20 (20)		*Fatal:* 0 (0) *Injury:* 4 (4)	
		Process workers	*Fatal:* 1 (1) *Injury:* 25 (25)		*Fatal:* 0 (0) *Injury:* 6 (6)	
		Builders	*Fatal:* 1 (1) *Injury:* 24 (23)		*Fatal:* 0 (0) *Injury:* 9 (8)	
		Labourers	*Fatal:* 1 (1) *Injury:* 59 (57)		*Fatal:* 1 (1) *Injury:* 16 (15)	
		Plumbers/gas fitters/roofers	*Fatal:* 1 (1) *Injury:* 23 (22)		*Fatal:* 1 (1) *Injury:* 12 (11)	
		Truck drivers	*Fatal:* 2 (2) *Injury:* 13 (13)		*Fatal:* 2 (2) *Injury:* 7 (7)	
		Other workers	*Fatal:* 5 (5) *Injury:* 192 (192)		*Fatal:* 1 (1) *Injury:* 72 (73)	
General Public						
Fatal: 36 (36) *Injury:* 181 (172) (6 fatalities and 37 injuries in work environments)	*Fatal:* 11 (11) *Injury:* 53 (52)	**Children**	*Fatal:* 5 (5) *Injury:* 50 (48)	• 27% lack of maintenance • 17% deliberate misuse • 7% failure to isolate	*Fatal:* 0 (0) *Injury:* 14 (14)	• 13% lack of maintenance • 16% deliberate misuse • 13% unsafe work practices • 13% equipment failure
		Students	*Fatal:* 7 (7) *Injury:* 30 (27)		*Fatal:* 0 (0) *Injury:* 3 (3)	
		Home occupiers and others	*Fatal:* 24 (24) *Injury:* 101 (97)		*Fatal:* 11 (11) *Injury:* 36 (35)	

Last 15 years (1993-2007)	Last 5 years (2003-2007)	Major contributors towards total accidents	Last 15 years (1993-2007) Consequence/ (Frequency)	Last 15 years (1993-2007) Main causes	Last 5 years (2003-2007) Consequence/ (Frequency)	Last 5 years (2003-2007) Main causes
Electrical Fire Accidents						
Fatal: 123 *Injury:* 1,311	*Fatal:* 30 *Injury:* 393	Residential fires initiated by arcing or overloaded equipment	*Fires:* 9,519	Faulty, loose or broken conductors and defective or worn insulation involved in a significant number of incidents	*Fires:* 3,210	Faulty, loose or broken conductors and defective or worn insulation involved in a significant number of incidents
		Residential fires initiated by heat from electrical equipment	*Fires:* 18,986	Cooking appliances contributed to a significant number of incidents, the causes being not attending to or not keeping an eye on equipment, or falling asleep	*Fires:* 6,419	Cooking appliances contributed to a significant number of incidents, the causes being not attending to or not keeping an eye on equipment, or falling asleep
		Non-residential fires initiated by arcing or overloaded equipment	*Fires:* 8,878	Light fixtures involved in a significant number of incidents	*Fires:* 3,213	Light fixtures involved in a significant number of incidents
		Non-residential fires initiated by heat from electrical equipment	*Fires:* 4,506	Cooking appliances and light fixtures involved in a significant number of incidents	*Fires:* 1,612	Cooking appliances and light fixtures involved in a significant number of incidents

Gas Accidents

Gas accident data predominantly cover the two types of widely used fuel gas: natural gas and LPG. These two gases have different characteristics, fuel industries, categories of appliance, and methods of fuel distribution and use.

The gas accident database contains information about fatalities, injuries, fires, explosions and minor accidents for natural gas and LPG. Gas accidents have been analysed for severity (fatal, notifiable injury and non-notifiable reported to ES) and frequency of similar types of accident. "Non-notifiable" means an accident or incident causing loss, or injury, below the threshold defined in the Gas Act 1992.

Natural Gas

During 2007:

- There were no fatal natural gas accidents, but there were three accidents that injured three people. The annual average for injury accidents is 3.4 over the last 15 years.
- There were 14 notifiable accidents, including the three accidents causing injury. Four of these involved heaters/furnaces, three involved water heaters/boilers, and three involved mains/service and regulator stations. All but two of these accidents resulted in a fire, explosion or both.
- There were 26 non-notifiable accidents reported to ES. Mains/service or regulator stations were involved in 54% (14) of these. Non-notifiable accidents are down by about half in the last two years.
- Over 40% of the notifiable and non-notifiable accidents (mainly mains/service/regulator and fixed heater accidents) were reported by the gas industry (gas suppliers, retailers and gas industry associates).

General trends

- The significant trend for fatal and injury-causing accidents over the last 15 years is that there have been no fatal accidents during the last eight-year period (2000-2007) – see Graph 8a. No other trend has been identified due to the infrequency and low number of accidents (three fatal and 41 injury-causing accidents in 15 years).

- Water heaters/boilers were involved in about one-third (49) of all notifiable accidents. The majority (88%) of water-heater accidents caused a fire/explosion. The main causes of about 80% of these water-heater/boiler accidents were inappropriate installation, lack of maintenance, and/or storage of combustible material close to the appliance.
- There has been an increase (60%) in the number of non-notifiable accidents reported to ES in the last five years (2003-2007) – see Graph 8b. There have been 194 non-notifiable accidents in the last five years (2003-2007), compared with 121 in the initial five years (1993-1997). However, the non-notifiable accident level has dropped in the last two years.
- The number of non-notifiable accidents reported by the gas industry has more than doubled, from 44 in the initial five years (1993-1997) to 92 in the last five years (2003-2007).
- Over half of the non-notifiable accidents (274) since 1993 relate to mains, services, regulator stations and meters (see Graph 8d). This is an increase of over 110% in the last five years compared with the initial five years (1993-1997).

Trend analysis: consequence and frequency

During the last 15 years:

- There have been three accidents causing three fatalities where fixed space heaters, cookers and water heaters have been involved. The last fatal accident happened in 1999.
- There have been 41 notifiable injury accidents injuring 51 people. There has been no measurable change in this type of accident and no significant change in injury level.
- About 73% (110) of the 150 notifiable accidents caused no injury, only property damage.
- Over three-quarters of notifiable accidents have involved three categories of appliance: water heaters/boilers (32%), space heaters/furnaces (27%) and cookers/ovens (16%) – see Graph 8c. The outcome in over 90% of these accidents was fire/explosion.
- About 23% of notifiable accidents were caused by incorrect

assembly/connection/installation/alteration. Lack of maintenance accounted for about 14% of notifiable accidents, and not following appropriate work practices/third-party damage accounted for 12% (see Graph 8e).

- Over half of the 515 non-notifiable accidents reported to ES have involved mains, services, regulator stations and meters (see Graph 8d), with a gas leak being the outcome in over 80% and fire in less than 10%.
- Over one-quarter of the 515 non-notifiable accidents reported to ES have involved space heaters/furnaces or cookers/ovens. Fire was the outcome in over 70% of these accidents.
- About one-third (31%) of the non-notifiable accidents reported to ES were caused by not following correct work practices or by third-party damage. About 10% were caused by incorrect assembly/connection/installation/alteration and 10% by not following correct procedures (see Graph 8f).
- There has been a total of 665 accidents, both notifiable and non-notifiable.
- Space heaters/furnaces have been associated with about 21% of the 665 natural gas accidents, while cookers/ovens have been associated with about 11%.
- About 44% of the 665 accidents and 13% of the 150 notifiable accidents have been related to mains, services, regulator stations and meters. About two-thirds (11 from 19) of notifiable accidents resulted in injury.
- About two-thirds of total mains, service, regulator station and meter accidents have been caused by not following appropriate work practices/third-party damage/operation error.

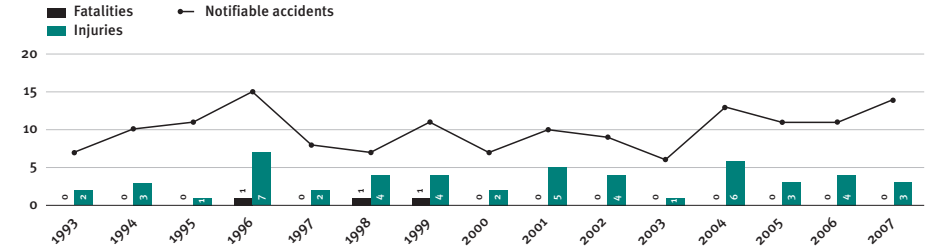
LPG (1993-2007)

LPG is normally used as a fuel for heating, cooking or lighting. However, in a few cases LPG is deliberately inhaled, with serious consequences.

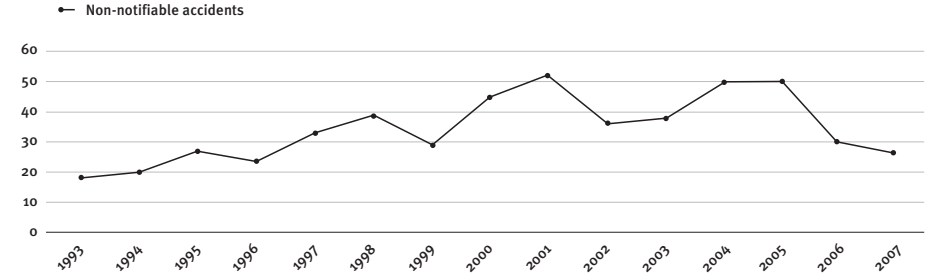
Deliberate LPG inhalation accidents are different from other LPG accidents in terms of the way the fuel is knowingly used/handled without any fault in the equipment or fuel. A combined analysis might give the impression that LPG is a more dangerous fuel than it actually is. Therefore, LPG accidents are analysed and presented in two categories: intentional LPG inhalation accidents and LPG accidents.

NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2007 to 31 December 2007

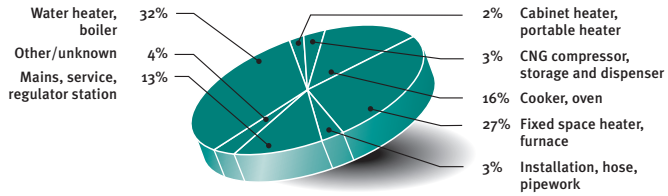
Graph 8a Notifiable Natural Gas Accidents 1993-2007



Graph 8b Non-notifiable Natural Gas Accidents 1993-2007

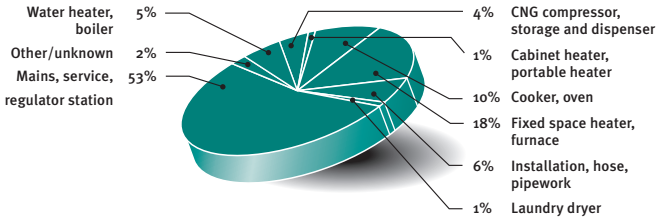


Graph 8c Notifiable Natural Gas Accidents 1993-2007
by equipment



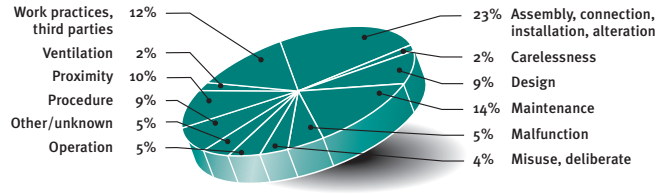
Graph 8d Non-notifiable Natural Gas Accidents 1993-2007

by equipment



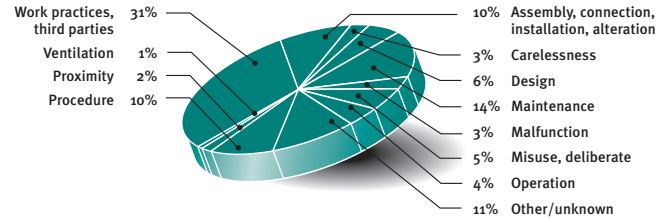
Graph 8e Notifiable Natural Gas Accidents 1993-2007

by causal factor



Graph 8f Non-notifiable Natural Gas Accidents 1993-2007

by causal factor



ES is not the lead agency for investigating deliberate LPG inhalation or recording it adequately. ES only records data from accidents which have been notified to it. This means information about intentional LPG inhalation may not be complete.

Intentional LPG Inhalation Accidents

Deliberate LPG inhalation abuse accidents are not always reported to ES unless they have involved fire or explosion, which are usually fatal.

No fatal accidents were reported during 2007.

General trends

- Victims are generally young people.
- Victims generally inhale LPG from a canister, but in some cases they use large refillable cylinders.

Trend analysis: consequence and frequency

During the last 15 years:

- There have been 17 deliberate LPG inhalation accidents in the ES database that resulted in 17 fatalities[3], 15 of which were reportable under the Gas Act. Teenagers or young men were involved in all of these accidents.

LPG Accidents

During 2007:

- There were two fatal accidents involving a cabinet heater and a cooker, causing two fatalities. Over the last 15 years, the average number of fatalities has been 1.8 per year.
- There were eight accidents that injured 14 people. Cabinet heaters were involved in four and cookers in three of these accidents. These levels of accidents and injuries in a year are common. The average number of accidents over the last 15 years has been about eight, causing an average of 11.7 injuries.

[3] ES is also aware of a number of cases where teenagers died by inhaling LPG propellant, but these cases are not included in this analysis because LPG propellant is not covered by the Gas Act 1992.

- There were 27 notifiable (including fatal and injury) accidents, which is nine more than last year. This is higher than the average annual rate of 16.7 in the past 15 years. Cabinet heaters and cookers/ovens were involved in over 70% of accidents. All cooker and heater accidents resulted in fire and/or explosion.
- There were 33 non-notifiable accidents reported to ES, which is similar to the annual number (30) over the last 15 years. Almost three-quarters (23) of non-notifiable accidents involved permanently installed LPG equipment, and about 21% involved cookers and 21% involved containers.
- About 50% of the non-notifiable accidents were reported by the gas industry, about 10% by the NZFS and 10% by Occupational Safety and Health (OSH).

General trends

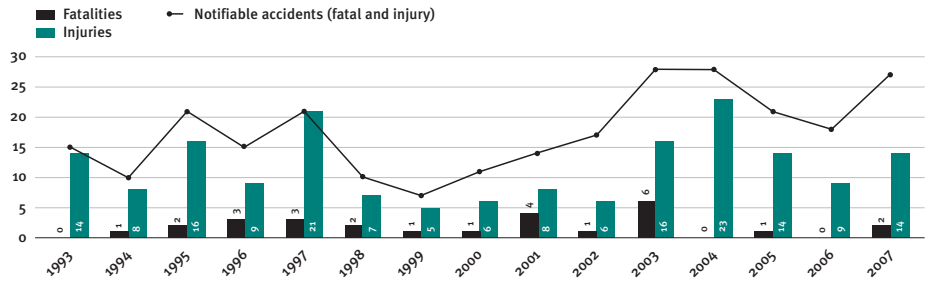
- There is no clear trend to indicate any change in the number of fatal accidents over the last 15 years. However, there was an increase in injury accidents over the last five years (2003-2007) compared with the previous two five-year periods (1993-1997 and 1998-2002).
- There was an increase in notifiable and non-notifiable accidents over the last five years compared with the previous five-year period (1998-2002).

Trend analysis: consequence and frequency

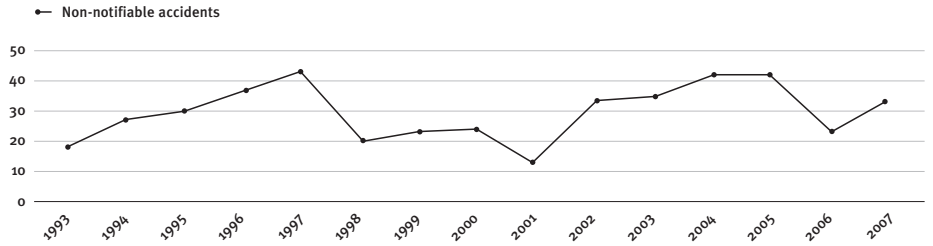
During the last 15 years:

- There have been 21 fatal accidents, which resulted in 27 fatalities. Cooking equipment (cooker/oven) was involved in about 50% (10) of these accidents, causing about 50% (14) of fatalities.
- Nearly half (15) of the 27 fatalities were caused by 13 fire/explosion accidents and 11 were caused by seven carbon monoxide poisoning accidents.
- Over 30% of the total 264 notifiable accidents and more than 37% of the total 448 non-notifiable accidents were caused by poor assembly, connection or installation of or alteration to an appliance. Many of these accidents may have had more than one cause.
- A total of 124 notifiable injury accidents injured 176 people. There has been about a 15% increase in the number of injury-causing accidents, and about an 11% increase in the number of people injured over the last five years (2003-2007) compared with the initial five-year period (1993-1997).

Graph 9a Notifiable LPG Accidents 1993-2007

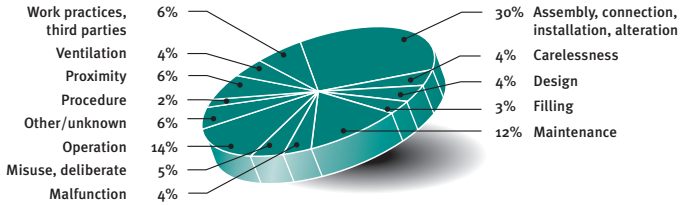


Graph 9b Non-notifiable LPG Accidents 1993-2007



Graph 9c Notifiable LPG Accidents 1993-2007

by causal factor

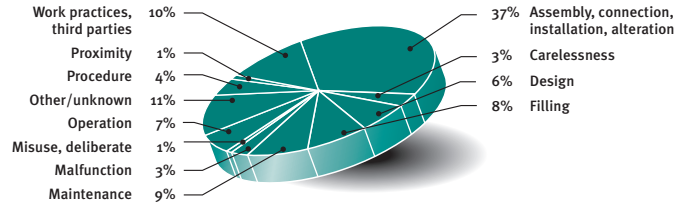


- Cookers/ovens were involved in 39% of injury accidents and cabinet heaters in over 30%. Close to two-thirds of injuries were caused by these two types of equipment.
- Of the total 264 notifiable accidents, about 46% (122) were non-casualty fire/explosion.
- There have been 448 non-notifiable accidents reported to ES and no accident trend has been demonstrated over this period (see Graph 9b). About one-third of these accidents involved portable heaters, 19% involved containers, 16% barbecues and 12% cooking/oven equipment.
- Fire/explosion was the outcome in over 61% of non-notifiable accidents and gas escape in more than 34%.
- About 28% of the total 712 accidents (notifiable and non-notifiable) were notified by OSH.
- The main causes of the notifiable accidents have been incorrect assembly/connection/installation/alteration (30%), incorrect operation (14%), lack of maintenance (12%) and operating close to flammable material (6%) – see Graph 9c. These causes were also the major contributors to non-notifiable accidents reported to ES (see Graph 9d).
- Cabinet heaters (35%), containers (8%) and cookers/ovens (31%) have been the major contributors to notifiable accidents (see Graph 9e). This equipment has contributed to a similar level of non-notifiable accidents (see Graph 9f). Together, these three types of equipment have contributed to about two-thirds of the total number of non-notifiable accidents. Barbecues have contributed to about 16% of non-notifiable LPG accidents, but only to about 3% of notifiable accidents.
- Gas equipment fuelled by canisters was involved in 17 notifiable accidents over the last 15 years, which is about 6% of total LPG notifiable accidents.
- Two notifiable accidents caused five fatalities (about 18% of total LPG fatalities) and 15 accidents injured 24 people (about 14% of total LPG injuries).
- Over 10% (31) of notifiable LPG accidents (264) occurred in caravans. Seven of these were fatal, causing eight fatalities. Seventeen of the notifiable accidents injured 30 people, about 17% of total LPG injuries.

NOTIFIABLE ELECTRICAL AND GAS ACCIDENTS
1 January 2007 to 31 December 2007

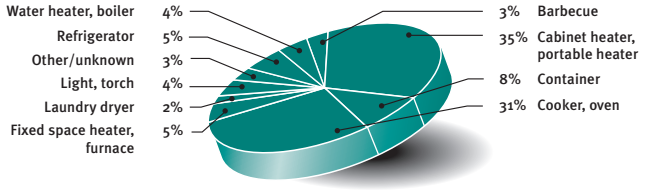
Graph 9d Non-notifiable LPG Accidents 1993-2007

by causal factor



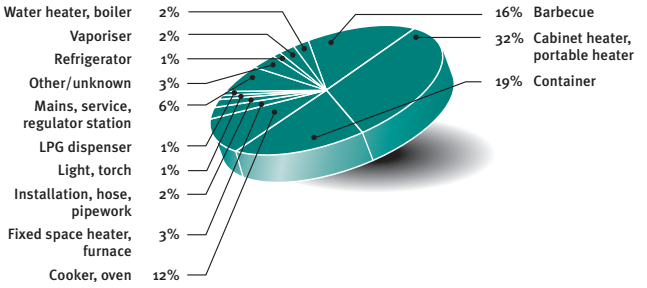
Graph 9e Notifiable LPG Accidents 1993-2007

by equipment



Graph 9f Non-notifiable LPG Accidents 1993-2007

by equipment



Gas Accidents/Incidents

Last 15 years (1993-2007)	Last 5 years (2003-2007)	Major contributors towards total accidents	Last 15 years (1993-2007) Consequence/ (Frequency)	Last 15 years (1993-2007) Main causes	Last 5 years (2003-2007) Consequence/ (Frequency)	Last 5 years (2003-2007) Main causes
Natural Gas						
Fatal: 3 (3)* *Injury:* 51 (41) *Notifiable:* (150)	*Fatal:* 0 (0) *Injury:* 17 (15) *Notifiable:* (55)	**Mains/service and regulator stations**	*Fatal:* 0 (0) *Injury:* 14 (11) *Notifiable:* (19) *Non-notifiable:* 274	• 23% assembly, connection, installation, alteration • 12% work practice, interference by third parties, operation error • 14% lack of maintenance • 5% operating procedure • 10% proximity • 9% design factor	*Fatal:* 0 (0) *Injury:* 1 (1) *Notifiable:* (4) *Non-notifiable:* 112	• 23% assembly, connection, installation, alteration • 15% work practice, interference by third parties, operation error • 11% lack of maintenance • 7% operating procedure • 6% proximity • 6% design factor
		Fixed heaters	*Fatal:* 1 (1) *Injury:* 10 (9) *Notifiable:* (41)		*Fatal:* 0 (0) *Injury:* 6 (6) *Notifiable:* (18)	
		Cookers/ovens	*Fatal:* 1 (1) *Injury:* 7 (6) *Notifiable:* (24)		*Fatal:* 0 (0) *Injury:* 4 (3) *Notifiable:* (11)	
		Water heaters	*Fatal:* 1 (1) *Injury:* 13 (10) *Notifiable:* (49)		*Fatal:* 0 (0) *Injury:* 5 (4) *Notifiable:* (17)	
LPG						
LPG *(Normal use)* *Fatal:* 27 (21) *Injury:* 176 (134) *Notifiable:* (264)	**LPG *(Normal use)*** *Fatal:* 9 (7) *Injury:* 76 (54) *Notifiable:* (123)	**Cabinet heaters** (no canister connectable equipment found)	*Fatal:* 6 (5) *Injury:* 46 (37) *Notifiable:* (95)	• 30% assembly, connection, installation, alteration • 14% operation error • 12% lack of maintenance	*Fatal:* 3 (2) *Injury:* 22 (20) *Notifiable:* (45)	• 33% assembly, connection, installation, alteration • 13% operation error • 13% lack of maintenance
		Cookers/ovens (excluding canister equipment)	*Fatal:* 9 (8) *Injury:* 54 (37) *Notifiable:* (68)		*Fatal:* 5 (4) *Injury:* 23 (14) *Notifiable:* (30)	
		Containers (excluding canister equipment)	*Fatal:* 4 (4) *Injury:* 15 (19) *Notifiable:* (18)		*Fatal:* 0 (0) *Injury:* 4 (3) *Notifiable:* (6)	
		Refrigerator (no canister connectable equipment found)	*Fatal:* 3 (2) *Injury:* 5 (5) *Notifiable:* (14)		*Fatal:* 1 (1) *Injury:* 2 (2) *Notifiable:* (4)	
		Canister and canister equipment (mainly cookers)	*Fatal:* 5 (2) *Injury:* 24 (17) *Notifiable:* (17)		*Fatal:* 0 (0) *Injury:* 11 (7) *Notifiable:* (7)	
		Environment Caravan/ vehicle	*Fatal:* 13 (10) *Injury:* 36 (25) *Notifiable:* (46)		*Fatal:* 4 (3) *Injury:* 11 (7) *Notifiable:* (14)	
LPG abuse *Fatal:* 16 (16)	**LPG abuse** *Fatal:* 16 (16)	**Mainly from containers**	*Fatal:* 15 (15)	• 100% deliberate misuse	*Fatal:* 11 (11)	• 100% deliberate misuse

*The first number represents casualties and the bracketed number represents accidents.

summaries

Part 1

Electrical Workers

Accident Number: 2007/006

Voltage:	400
Result:	Head injury
Location:	Works

A line mechanic received a head injury when a wooden pole located in a private right of way failed and fell to the ground while he was working on the line. The line mechanic had failed properly to ascertain the condition of the old hardwood service pole before climbing. The pole broke as a conductor was removed from one side of the cross arm, causing the pole to twist and fail.

Accident Number: 2007/009

Voltage:	400
Result:	Electric shock
Location:	Industrial

An electrician received an electric shock when he was moving cables in a switchboard. He had removed the cover of the switchboard and was moving cables when his hand touched a live terminal on the main switch. The switchboard was an older style. The main switch terminals were not insulated and were due to be replaced.

Accident Number: 2007/010

Voltage:	230
Result:	Fatal
Location:	Commercial

An electrician was changing a metal halogen light bulb with the fitting energised. The bulb broke and he received an electric shock which resulted in his falling off the ladder and banging his head on a hard surface. The electrician was taken to hospital and later died.

Accident Number: 2007/012

Voltage:	230
Result:	Electric shock
Location:	Industrial

An electrical service technician received an electric shock from a multi-core cable due to a direct short circuit between a live core and a spare core on a traffic-light controller. The fault was attributed to damage during installation. Commissioning tests did not identify the fault and no check was done to verify that the cable core was safe to touch before work started.

Accident Number: 2007/013

Voltage:	N/A
Result:	Fall, bruising
Location:	Works

A line mechanic fell from a ladder while carrying out faults work in adverse weather conditions. He suffered severe bruising. The pole strap became disengaged when he changed position up the pole, the clip probably having been caught up in his clothing.

Accident Number: 2007/017

Voltage:	400
Result:	Electric shock
Location:	Works

A trainee line mechanic received an electric shock when he failed to isolate the supply. The trainee had been testing a transformer in the workshop and had completed all the tests when he inadvertently disconnected the test leads while they were still live and received a 400-volt electric shock. The company has reviewed its procedures and introduced additional safety measures when carrying out live testing.

Accident Number: 2007/022

Voltage: Other
Result: Electric shock
Location: Works

A faultman was keeping the public clear of a cable that was being tested on a kiosk berm side substation, when he received a call to attend a lines-down emergency. While he was packing the equipment away the cabinet door swung closed, causing his leg to touch the cable being tested. This caused him to receive an electric shock. The company has revised its procedures to ensure cable ends are fitted with an insulating boot while a cable is being tested, and the appropriate safety barriers and safety measures are maintained at all times while the equipment is tested.

Accident Number: 2007/023

Voltage: 400
Result: Electric shock
Location: Industrial

A technician received an electric shock when he made inadvertent contact with an exposed live terminal on a low-voltage fuse rack that was being backfed. An investigation found that as he reached around to the back of the fuse rack to work on the transformer leads, he touched the fuse rack that was damaged, exposing live parts. The company arranged repairs and reviewed the procedures regarding personal protective equipment.

Accident Number: 2007/024

Voltage: 230
Result: Electric shock
Location: Commercial

A trainee electrician received an electric shock while inserting a light fitting into a live lighting track. An investigation found that the phase wire in the fitting had been pinched and livened the outer case. The accident was referred to the Electrical Workers Registration Board (EWRB).

Accident Number: 2007/031

Voltage: 11,000
Result: Burns
Location: Works

A technician was carrying out tests on an 11,000-volt switch at a substation when he applied test leads to the live terminals of the open switch and there was a flashover. He received burns to his face and hands. He had racked out the 11kV switch in readiness for carrying out tests on the switch and the transformer supplied by it. He realised he did not have a voltage tester, so he sent his assistant back to the workshop for one. In the meantime he decided to carry out tests on the switch without first checking for voltage. The company has reviewed its procedures when working on switchgear and where possible will isolate downstream from equipment being worked on.

NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2007 to 31 December 2007

Accident Number: 2007/033

Voltage: 400
Result: Burns
Location: Industrial

An electrician received flash burns to his face and wrists when the adjustable wrench he was using slipped while he was tightening a bolt on a live switchboard. The wrench fell from his hand and touched the live contacts of the main switch. The company has reminded employees about procedures while working with live contacts. The EWRB has been advised.

Accident Number: 2007/034

Voltage: 400
Result: Electric shock
Location: Commercial

An electrician received an electric shock when a cable was inadvertently livened while he was attempting to connect it. The company has since revised its procedures for ensuring cables are safe to work on.

Accident Number: 2007/036

Voltage: 230
Result: Electric shock
Location: Industrial

An electrician received an electric shock while installing surge protection on a circuit board. The electrician was holding the circuit board with one hand and moving wires with the other. One of the wires had damaged insulation, allowing the electrician inadvertently to touch exposed live copper.

Accident Number: 2007/037

Voltage: 11,000
Result: Electric shock
Location: Works

A line mechanic received an electric shock while removing an 11kV fuse from the fuse base. He had observed some isolation fuses down the road and had assumed the fuse elements had ruptured. No testing had been carried out to ensure isolation. The line mechanic was in the process of removing the high-voltage fuse on a transformer further down the road when his hand inadvertently slid up the fuse puller towards the dropout fuses. The line mechanic had been wearing all his PPE gear at the time of the accident, but an investigation found he was only using one section of the fuse puller and his high-voltage protection rubber gloves were wet on the inside.

Accident Number: 2007/038

Voltage:	230
Result:	Electric shock
Location:	Commercial

An electrician was changing the lamp in an outdoor light standard when he received an electric shock and fell from the ladder. The light fitting was corroded, the wiring insulation was in poor condition and the earth connection had broken due to rusting. The circuit had not been isolated and in the process of inserting the lamp in the holder, the electrician made contact with live exposed wiring and the metal fitting. An apprentice holding the ladder at the time of the accident was able to assist the victim and call for an ambulance. The victim was treated for electric shock and discharged from hospital.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: **0800 104 477**.

An electrical accident notification report must also be completed. This should be filed with ES within two weeks of the incident.

A report form can be found at the back of this book and online by visiting the ES website at: **www.energysafety.govt.nz**.

Accident Number: 2007/039

Voltage:	400
Result:	Fatal
Location:	Works

During the connection of a low-voltage cable to the live overhead network, a line mechanic received a fatal electric shock. An investigation has revealed that during the installation of the LV cable at the transformer connections the insulation covering the termination lugs had failed, causing the red and white phases to touch. The line mechanic carrying out the connections on the overhead network had connected the red phase and was about to connect the white one when he received the fatal electric shock.

Accident Number: 2007/041

Voltage:	N/A
Result:	Bruising
Location:	Works

A line mechanic received bruising and a dislocated finger when the single-person elevated work platform (EWP) he was working on rapidly descended when a rod end on the lower boom fractured, causing the other three rod ends to fail as well. The line mechanic was fully attached and wearing a full body harness at the time. The EWP was due for re-inspection soon afterwards. A safety alert was issued to the industry.

NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2007 to 31 December 2007

Accident Number: 2007/043

Voltage:	400
Result:	Electric shock and burns
Location:	Industrial

An apprentice electrician received an electric shock and burns while working on a live switchboard disconnecting a three-phase motor. He inadvertently removed the live conductors from the fuse base. The company has put further procedures in place and provided additional test equipment to reduce the risk of further accidents.

Accident Number: 2007/044

Voltage:	400
Result:	Electric shock and burns
Location:	Works

A line mechanic received a hand-to-hand 400-volt electric shock and burns to both hands. He suffered cardiac arrest but was successfully revived. The line mechanic was in the process of removing live bare conductors from the temporary supporting live line equipment when he made contact between two live conductors hand to hand.

Accident Number: 2007/045

Voltage:	400
Result:	Burns
Location:	Industrial

An electrician was removing a neutral screen cable from a live switchboard when the screen touched a live contact in the switchboard. He received burns to his left hand. The company has since issued an instruction that all switchboards must be isolated before work starts or barriers must be fitted to ensure that all live contact points are covered.

Accident Number: 2007/046

Voltage:	N/A
Result:	Broken ribs
Location:	Works

A trainee lineman suffered broken ribs and a punctured lung when a hardwood pole he was working on broke below ground level. The work involved changing conductors on the transformer pole. The 11kV and LV conductors had been slackened off. The pole had been set in concrete. Sounding and visual checks before the work was carried out did not detect the condition of the pole in the ground.

Accident Number: 2007/051

Voltage: 230
Result: Electric shock and cuts
Location: Commercial

An electrician was examining a control box for a downlight to replace a faulty ballast. He received an electric shock causing him to fall off the ladder and severe cuts to two fingers from the sharp edges of the control box while freeing himself. On investigation it was found that the insulation on the phase conductor in the control box was damaged. The damage was caused by the cover plate closing on to the sharp edge with the phase conductor between. The circuit was not isolated; there was a problem in identifying the circuit because the circuits were not labelled on the switchboard. The owner of the premises was asked to identify and label all circuits on the switchboard.

Accident Number: 2007/053

Voltage: 400
Result: Burns
Location: Commercial

A trainee electrician received a burn to his finger as he was attempting to disconnect a live three-phase socket outlet. The trainee did not isolate the socket outlet or carry out any tests before accessing the socket outlet terminals. The company carried out testing for safety training day as a result of the incident.

Accident Number: 2007/055

Voltage: N/A
Result: Cuts
Location: Works

A line mechanic fell from a ladder positioned against a wooden pole. As he attempted to climb the ladder it twisted and he fell, receiving cuts to his head. The ladder had a plastic brace that was in contact with the pole at the time of the accident. This made the contact surface slippery. Normally a leather strap was in contact with the pole, but the plastic brace had moved and touched it.

Accident Number: 2007/057

Voltage: 400
Result: Burns
Location: Works

A line mechanic received burns while attempting to parallel two transformers on the low-voltage side of a transformer. The high-voltage cable had been repaired and put back into service. While the line mechanic was attempting to install the low-voltage links in the transformer, an arc flash occurred causing hot metal to be emitted. The cause of the fault could not be determined. Following this accident the company has implemented further procedures regarding paralleling of low-voltage supply cables.

NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2007 to 31 December 2007

Accident Number: 2007/065

Voltage: 230
Result: Electric shock
Location: Works

A repeater site was being connected to a trailer-mounted mobile generator due to the 11kV lines feeding the distribution transformer being down. An electrician, accompanied by a trainee, removed the LV leads from the transformer and connected the service line that supplied the repeater site to the generator. The generator was started to allow it to warm up, with the output isolating switch assumed to be in the "open" position. When the electrician tried to close the isolator to put the generator on load, he received an electric shock as he touched the control-panel door on the generator. A voltage of 230 was measured from the generator frame to earth. It was assumed that the generator had an electrical fault and it was disconnected and taken to the workshop for checking. Investigation revealed that the position of the isolator was not confirmed before starting and the neutral of the service line was not identified before connection. The earthed casing became live via the neutral due to the generator output phase being connected to the service line neutral.

Accident Number: 2007/066

Voltage: Other
Result: Burns
Location: Industrial

A worker was in the process of removing redundant cables when he cut through a live one. On investigation it was found the worker cut through a cable that had been incorrectly identified. The cable was not tested before cutting. The worker was using an electric saw and suffered superficial burns to his face and hands from the flashover.

Accident Number: 2007/068

Voltage: 400
Result: Burns
Location: Commercial

An electrician received burns to his face while removing a circuit breaker from a live switchboard. The metal terminals of the MCB shorted to the busbars of the switchboard as he attempted to manoeuvre the circuit breaker into position. The company has made it a policy that switchboards should be isolated before work is done.

Accident Number: 2007/069

Voltage: 400
Result: Burns
Location: Works

A line mechanic received burns to his face as he was attempting to connect a three-phase fuse unit in a live pillar box. He was using a socket to hold the live conductor on a bolt. As he moved the cable towards the fuse connection, the cable flicked off the bolt and contacted an opposing phase causing a flash. The company has since reviewed its procedures for working on this type of fuse switch.

Accident Number: 2007/070

Voltage: 11,000
Result: Fatal
Location: Works

A line mechanic came into contact with an 11,000-volt conductor when carrying out live line work and received a fatal electric shock. It appears that the insulated covers on the live lines may have been disturbed during the work, allowing the mechanic to touch the live conductor and a second point of contact on the pole.

Accident Number: 2007/072

Voltage: 400
Result: Burns
Location: Works

A trainee line mechanic was connecting an earth conductor to a surge diverter when the earth wire he was connecting swung free and contacted the line side of a fuse, causing a flash. He received superficial burns to both hands.

Accident Number: 2007/075

Voltage: 400
Result: Electric shock
Location: Works

A trainee electrical fitter was holding the handles of a truck used to rack out an oil circuit breaker while the control cables were being connected. It appears that one of the plugs became misaligned when the worker slipped as he was inserting the plug, causing the earth pin to contact a phase terminal in the box, which in turn livened the metal parts of the oil circuit breaker and the truck at 230 volts.

NOTIFIABLE ELECTRICAL ACCIDENTS
1 January 2007 to 31 December 2007

Accident Number: 2007/076

Voltage: 400
Result: Burns
Location: Works

A line mechanic received burns to his hand and arc flash to his eyes while connecting a conductor tail to a street light relay in a kiosk substation. He had bared the end of the conductor and was reaching for his insulating gloves when the unrestrained conductor tail made contact across phases, causing a short circuit arc. He was not wearing insulating gloves or eye protection at the time.

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Part 2

Other Occupations

Accident Number: 2007/001

Voltage:	230
Result:	Burns
Location:	Commercial

A worker received a flash burn to his hand when he opened a refrigerator door, which dislodged a brittle lampholder that shorted and flashed to earth. The company had a maintenance programme in place but this did not include the refrigerator lighting as it was considered the refrigeration engineer's area. The company has had all of the lamp holders replaced in the refrigerators.

Accident Number: 2007/002

Voltage:	230
Result:	Electric shock
Location:	Commercial

An air-conditioning service technician was checking for water leaks in an air-handling unit when he touched a live terminal and received an electric shock. A cover had been left off a terminal block but the culprit could not be identified.

Accident Number: 2007/004

Voltage:	230
Result:	Electric shock
Location:	Works

A person received an electric shock while in the process of planting a series of small bushes in a garden bed beneath the outside meter-box of a new townhouse. The accident occurred when contact was made with the earth electrode while packing dirt around a bush directly below the meter-box adjacent to the earth electrode. Investigations revealed that the phase and neutral connections had been transposed at the meter-box, causing the earth electrode to become live. This was reported to the EWRB.

Accident Number: 2007/005

Voltage:	230
Result:	Fatal
Location:	Industrial

A person who gained unlawful entry to a construction site attempted to remove copper electrical cables. The cables he was attempting to remove were live. When his cable cutters cut through the insulation and made contact with the copper cores he received a fatal electric shock.

Accident Number: 2007/007

Voltage:	33,000
Result:	Burns
Location:	Works

A contractor received burns to his hand as a result of striking a 33kV underground cable while using an air hammer to break up hard ground. A network representative was on site as a safety observer, but he had to leave for a short time. The cable was struck while the safety observer was off site. The company has reviewed its procedures.

Accident Number: 2007/008

Voltage:	11,000
Result:	Burns
Location:	Works

A truck driver received an electric shock and burns while standing on top of a stock-crate prodding cattle. His hand contacted live 11,000-volt overhead lines. The network owner wrote to other owners of stock races near overhead lines advising them of the hazard.

Accident Number: 2007/015

Voltage:	**400**
Result:	**Electric shock**
Location:	**Works**

A steel fence support pipe was installed in the ground near a low-voltage underground cable. About two years after the installation a student received an electric shock when she touched the steel pipe. On investigation it was found that the pipe had pierced the live cable, causing the pipe to become live.

Accident Number: 2007/016

Voltage:	**230**
Result:	**Electric shock**
Location:	**Commercial**

A checkout operator received an electric shock when she accidentally slid a till lid between a socket outlet and the three-pin plug that was not fully inserted. The company repositioned the socket outlet and undertook to fit insulated three-pin plugs to appliances.

Accident Number: 2007/018

Voltage:	**22,000**
Result:	**Fatal**
Location:	**Works**

A truck driver received a fatal electric shock when the truck-mounted crane he was operating contacted the 22,000-volt overhead line. The operator unloaded pipes somewhere other than where he was instructed to put them. At the time of the accident there was no warning sticker near the operator's control warning of overhead lines.

Accident Number: 2007/020

Voltage:	**230**
Result:	**Electric shock**
Location:	**Commercial**

A hotel worker received an electric shock when she turned on a television. The television was found to have developed a fault on the main printed circuit board by the push-button power switch that flashed over when the set was turned on.

Accident Number: 2007/025

Voltage:	**230**
Result:	**Electric shock**
Location:	**Commercial**

While wiping down a wet bench, a healthcare worker received an electric shock when contact was made with a live conductor on a jug flex. An investigation found that the lead had been damaged, exposing a live conductor. The property owner has installed RCD protection and introduced an in-service testing regime for appliances.

Accident Number: 2007/026

Voltage:	**230**
Result:	**Electric shock**
Location:	**Commercial**

A hotel worker attempted to unplug a standard lamp from a wall socket outlet and made contact with the plug pins, causing him to receive an electric shock. At the time of the accident the worker had wet hands and arms, having just come in from a rain shower. He made no attempt to turn off the socket outlet before removing the plug. An investigation did not reveal any fault with the socket outlet or plug, although they were both old. The hotel manager had the socket outlet and plug replaced with new fittings and the wiring checked. The switchboard was old but had MCBs protecting the circuits.

Accident Number: 2007/028

Voltage:	**400**
Result:	**Electric shock**
Location:	**Works**

A labourer was installing a new gas connection. He punctured a 400-volt electric cable, resulting in an electric shock. The labourer was working contrary to company policy, which was not to thrust across berm.

Accident Number: 2007/029

Voltage:	**230**
Result:	**Electric shock**
Location:	**Industrial**

A gas welder was working in a plant room when he touched a live 230-volt cable and received an electric shock. It was thought that all circuits to the room were isolated from a switchboard supplying the room. However, the cable that caused the electric shock was fed from another switchboard the welder did not know about.

Accident Number: 2007/030

Voltage:	**230**
Result:	**Electric shock**
Location:	**Commercial**

A cleaner received an electric shock and a burn to a hand while attempting to disconnect an extension lead that had got caught on a shelf. The lead exploded in the cleaner's hand. It appeared that it may have been damaged when it snagged on the shelf. The company took the faulty lead out of service.

Accident Number: 2007/035

Voltage:	230
Result:	Electric shock
Location:	Domestic

A plumber received an electric shock when he cut the shattered end of a PVC pipe with a live cable encased in it. The plumber was in the process of relocating underground services when he inadvertently cut through a conduit that encased a live power cable. The company has reviewed its procedures when locating underground services.

Accident Number: 2007/040

Voltage:	400
Result:	Electric shock
Location:	Industrial

A serviceman was called to a company to tension a roller shutter door. He was on a ladder when he made contact with exposed live wires behind the roller door and received an electric shock. On investigation it was found that an isolator switch had been removed and a joint had been made by twisting the wires and leaving the joint exposed. The company had recently moved to the premises and found a number of other electrical defects. The company has attended to the defect causing the accident and was in the process of attending to the others.

Accident Number: 2007/042

Voltage:	N/A
Result:	Electric shock
Location:	Commercial

A woman who was directing a turning vehicle in a commercial area tripped on the kerbstone and fell against an electric security fence. There were no superficial injuries but the victim visited the doctor because she was pregnant.

Accident Number: 2007/048

Voltage:	400
Result:	Electric shock
Location:	Works

A worker was digging around a cesspit when he struck an underground cable and received an electric shock. The cables were located and marked, and plans were with the contractor. The cables were marked on cobblestones, which were removed in the digging process. A worker was using a crowbar near the cables, but before he could be warned he struck the cable.

Accident Number: 2007/049

Voltage:	110
Result:	Electric shock
Location:	Commercial

A baker received an electric shock while switching on a bread roller that had recently been transported to the bakery. It is believed that during transit the electric wires moved and were in contact with rotating parts of the roller. When the roller was switched on the insulation on the wires was damaged, causing the machine to become live.

Accident Number: 2007/050

Voltage:	230
Result:	Electric shock
Location:	Commercial

A shop assistant was filling a fridge in a supermarket when she put her hand under the shelf, came into contact with a light fitting and received an electric shock. On investigation it was found that the light fitting had no lamp and she had touched the live parts in the socket.

Accident Number: 2007/054

Voltage:	110,000
Result:	Electric shock, burns
Location:	Works

A gardener received an electric shock and burns when he inadvertently touched live 11kV overhead lines. The operator was cutting a hedge using a work platform and a brush cutter with a hedge-cutter attachment. An investigation found no contact had been made with the owner of the lines and no close approach permit had been obtained.

Accident Number: 2007/056

Voltage:	110
Result:	Electric shock
Location:	Industrial

A factory worker received an electric shock when he touched a conveyor attached to a machine. An inspection of the power socket supplying the machine revealed that the earth connection had come loose and was possibly touching the frame of the conveyor, which was not earthed. A test carried out on the machine after the accident indicated a voltage of 110. The conveyor system underwent a full examination and testing to ensure that all of the earthing systems were compliant and all metalwork was bonded.

Accident Number: 2007/059

Voltage: 230
Result: Electric shock
Location: Commercial

An employee at a fast-food outlet received an electric shock when she touched an extractor fan switch with wet hands. Issues concerning IP ratings of fittings in the damp location and provision of RCDs were being addressed by the company.

Accident Number: 2007/061

Voltage: 230
Result: Electric shock
Location: Domestic

A plumber received an electric shock when he cut through a copper water pipe while preparing to replace a water valve. An investigation found that the main neutral connection point at the house fascia had failed, resulting in the copper pipe becoming live through the earthing system. Although the company had procedures in place, the plumber failed to connect a jumper across the piece of pipe being removed while cutting water pipes.

Accident Number: 2007/064

Voltage: 230
Result: Fatal
Location: Industrial

A farm worker drove a tipped trailer into a live LV line supplying power to a shed. He got down from the tractor and when he stood on the ground with his hands still touching the vehicle, which was in contact with the power line, he received a fatal electric shock. The power line was covered with PVC, which was cut by the edge of the trailer as it struck the line. The power line was compliant with the regulations in place at the time of installation.

Electrical accidents must be notified immediately (section 16 of the Electricity Act 1992). This can be done by freephone on: **0800 104 477**.

An electrical accident notification report must also be completed. This should be filed with ES within two weeks of the incident.

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Accident Number: 2007/067

Voltage: 230
Result: Electric shock
Location: Industrial

A worker received an electric shock when he attempted to turn on a pump motor. He was testing a sprinkler system that leaked and wet all the equipment in a pump room. The equipment was wiped down and when he touched the switch for the pump motor he got an electric shock. The switch was still damp and tracking due to water causing the switch to become live. The company has implemented a policy that if equipment becomes wet an electrical operator will be sent to the site to carry out testing in order to ensure that the equipment is safely isolated before cleaning up.

Accident Number: 2007/071

Voltage: 400
Result: Burns
Location: Industrial

A process worker was locking out a motor control cell. A guard that usually prevented contact with the busbars had been removed by an unknown person. The chain on the isolating padlock contacted the exposed busbars. An arc with accompanying flash occurred, resulting in the worker receiving minor electric shock and flash burns to the right arm.

Accident Number: 2007/077

Voltage: 400
Result: Burns
Location: Commercial

A builder was sent to demolish hockey clubrooms that had been left unoccupied for a number of years with internal fittings gutted. On the outside of the building was an old metal meter-box that had been vandalised and had a metal pipe containing a supply cable leading to it. The builder attempted to cut through the pipe with a hacksaw in order to remove the meter box as he assumed the supply to the building had been de-energised. As he cut the pipe he received an electric shock when the hacksaw blade came into contact with the live 400-volt neutral screen cable inside the pipe. The local network company was sent to investigate the cause of the accident and found that the supply had not been disconnected when the building was vacated, and that the cable was connected to another cable in a carpark some distance away. There was no record of the building being connected to the network or any disconnection request. According to the local council, the building had been de-commissioned about 18 to 20 years before.

Part 3

General Public

Accident Number: 2007/003

Voltage:	230
Result:	Fatal
Location:	Domestic

A person received a fatal electric shock when contact was made with earthed metal that had become live as a result of a phase neutral transposition. The building was disconnected following the accident. This incident is still under investigation.

Accident Number: 2007/011

Voltage:	230
Result:	Fatal
Location:	Domestic

A homeowner received a fatal electric shock when he accidentally stapled a live electrical cable. He was installing foil insulation to the underside of a floor, working under the house. He had nearly completed the work when he stapled a live cable clipped close to a floor joist. He was lying on the dirt floor, which would have given a good earth path for the shock current.

Accident Number: 2007/014

Voltage:	25,000
Result:	Electric shock and burns
Location:	Industrial

A member of the public entered a railyard and climbed on to a parked wagon. He was heard to say there was a wire up there and was advised by someone on the ground to be careful. He received an electric shock from the 25,000-volt traction overhead line and fell to the ground. There were entry marks on the right side of his head and major exit burns on his left knee.

Accident Number: 2007/019

Voltage:	230
Result:	Fatal
Location:	Domestic

A homeowner was installing aluminium foil thermal insulation under his house when he stapled through a live TPS cable and received a fatal electric shock.

Accident Number: 2007/021

Voltage:	Other
Result:	Electric shock
Location:	Industrial

A child received a shock from an electric fence. An investigation could not determine the cause because the scene had been disturbed and ES was unable to complete interviews.

Accident Number: 2007/027

Voltage:	230
Result:	Electric shock
Location:	Works

A boy received an electric shock from a fence. A street-light box was vandalised and the street circuit was connected to the fence. The boy was encouraged to jump the fence and became hooked to it until the street-light circuit was disconnected from the fence by the vandals, who were watching.

Accident Number: 2007/032

Voltage:	230
Result:	Fatal
Location:	Domestic

A homeowner received a fatal electric shock while he was stapling aluminium foil. The subsequent investigation found a staple had penetrated the phase conductor of a TPS cable in the area where the victim had been working.

Accident Number: 2007/047

Voltage:	230
Result:	Electric shock
Location:	Domestic

A fault person was given the task of disconnecting a service cable from a pillar box so that a house could be demolished. He removed the fuse from the carrier and disconnected the cable from the fuse holder. He then placed

the empty fuse bridge back in the fuse holder and pushed the tail down the back of the pillar. Some time after the disconnection the pillar box became damaged and the fuse bridge fell out. The disconnected tail sprang out and touched the live terminal of the fuse carrier. A person near the site saw a cable on the ground and picked it up. This person touched the end of the cable, which was now live, and received an electric shock. The company had a procedure for disconnection and making safe, and will be reaffirming the requirements for permanent disconnection to all staff.

Accident Number: 2007/052

Voltage:	**Not determined**
Result:	**Electric shock**
Location:	**Domestic**

A homeowner received an electric shock, possibly from a television, a DVD player or a Sky television decoder. The appliances were tested but no faults were found. The other appliances in the house were also tested along with various powerpoints. No faults could be identified.

Accident Number: 2007/058

Voltage:	**Not determined**
Result:	**Nil**
Location:	**Works**

A 33,000-volt cross arm failed on a power pole, faulting to earth and causing earth potential rise to enter a house with a concrete foundation, resulting in the occupants possibly receiving electric shocks. Investigations could not positively conclude that an earth potential rise occurred because the protection did not indicate an earth fault during the incident. The cross arm had probably failed due to rot in the timber, which was difficult to identify during routine inspection.

Accident Number: 2007/060

Voltage:	**230**
Result:	**Burns**
Location:	**Domestic**

A homeowner received a small burn to an arm while using a hairdryer. The cord flex failed at the flex support due to normal wear and tear.

Accident Number: 2007/062

Voltage:	**230**
Result:	**Electric shock**
Location:	**Domestic**

During a storm, a tree brought down a neutral wire supplying power to a house. The homeowner noticed that

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some of the appliances were making noises and she decided to turn off the main switch at the switchboard. When she touched the metal surround of the switchboard, she received an electric shock. The main earth for the house had a loose connection, causing a voltage rise on all the earthed metal around the house.

Accident Number: 2007/063

Voltage:	**230**
Result:	**Burns**
Location:	**Commercial**

A student at a school received a burn when he attempted to turn on a stove in a classroom. The stove had developed an earth fault and when it was turned on a spark erupted from the back panel, causing the child to receive a small burn. The stove was repaired, tested and put back into service.

Accident Number: 2007/073

Voltage:	**400**
Result:	**Electric shock**
Location:	**Works**

A service line came down and landed on a wire fence, livening it as well as other metalwork such as gates. A child went to close a gate close to where the power line had come down and received an electric shock. The lines were repaired and tested for the correct phase connections.

Accident Number: 2007/074

Voltage:	**11,000**
Result:	**Burns**
Location:	**Works**

A person received an electric shock and serious burns to his arms when the whitebait net he was carrying made contact with an 11,000-volt overhead line. He was climbing a metal gate on a stopbank while holding the aluminium pole of the net in a vertical position when it made contact with the live power line. Earthworks appear to have been carried out on the stopbank, which reduced the distance of the power line above ground to below the minimum height required by the code.

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Part 4

Electrical Fires

Number:	2007/004f
Result:	Severe damage to house
Location:	Domestic

A house was severely damaged and an examination of the scene was made to establish whether the fire was electrically initiated. The scene was found to have been interfered with by builders and an electrician. The area of origin had TPS cables and a light switch that supplied an outside light. This could not be ruled out as the ignition point.

Number:	2007/007f
Result:	Damage to laundry
Location:	Domestic

A fire involving a switchboard and a dryer severely damaged a laundry. An investigation found that two dryers had been connected via a double adaptor and two-core flex. The flex was covered with clothing and as a result had heated up, causing the clothing to ignite. The switchboard fire occurred as a result of the fire spreading from the burning clothes to timber shelves underneath the switchboard. The owner was advised to install socket outlets for supplying power to large loads such as clothes dryers and not to use power leads without an earth conductor.

Number:	2007/008f
Result:	Minor damage
Location:	Commercial

A fire occurred in a storeroom of a retail shop in a shopping centre at the connection point of leads that supplied power to a number of refrigerators, causing a socket outlet to overheat and catch fire. Smoke detectors operated before the fire caused major damage. The shopping centre will be reviewing its procedures with tenants and the way power is supplied to heavy loads.

Number:	2007/010f
Result:	Damage to house
Location:	Domestic

A fire severely damaged a house when a wall-mounted heater-selector switch failed. The fire started in the selector switch. An investigation found that the heater-selector switch was set to "high" and the thermostat to maximum at the time of the fire.

Number:	2007/011f
Result:	Damage to garage
Location:	Domestic

A fire severely damaged a garage. An investigation indicated that cables may have been damaged where they passed through a hole in the timber structure during the installation wiring process a number of years earlier.

Number:	2007/012f
Result:	Damage to switchboard
Location:	Commercial

A fire destroyed a switchboard containing electrical control gear and isolating switches. An examination of the remains was carried out and from the evidence available an electrical ignition may have taken place inside the switchboard, causing damage to the equipment in it.

Due to the low and inconsistent level of reporting to ES on electrically initiated fires, it is difficult to print conclusive and meaningful information in this section. ES recommends the New Zealand Fire Service website **www.fire.org.nz**, where more detailed information on electrically initiated fires is published.

Number:	2007/013f
Result:	Damage to switchboard
Location:	Commercial

A fire at a school was contained within a metal switchboard enclosure. An investigation found that an old type of switchboard had been retro-fitted with circuit breakers. A loose connection on a circuit breaker resulted in a flashover between the three busbars. The school's maintenance electrician has been advised to check all other switchboards in the school.

Number:	2007/014f
Result:	Minor damage to bathroom
Location:	Domestic

A report was received from the fire service concerning a fire involving a heated towel rail. On investigation it was found that the towel rail was six years old and children had been using it as a ladder. This had stressed the cable, causing an electrical fault resulting in a fire. The fire was confined to the bathroom.

Number:	2007/015f
Result:	Damage to roof
Location:	Domestic

Following a number of storms and heavy rain a mains entry box supplying power to a house failed and caught fire, either (the fire service determined) as a result of water ingress or possibly a loose connection.

Number:	2007/016f
Result:	House destroyed
Location:	Domestic

A house in a rural area was burned to the ground following what is believed to have been a loose connection on the load side of a main switch. There was no evidence to determine what caused the fire because only a pile of rubble remained.

Number:	2007/017f
Result:	Minor damage to display stand
Location:	Commercial

A desk fan was left running overnight in a shop window, causing a small fire on a display stand. A passer-by called the fire service. The details of the fan are being investigated by the supplier.

Number:	2007/018f
Result:	Damage to walls and ceiling
Location:	Domestic

A bathroom was damaged as a result of a wall-mounted fan heater catching fire. The supplier of the product currently has a nation-wide recall as a result of the fire, caused when the fan motor stopped and the heating element stayed on. This caused a build-up of heat and melting of the heater casing.

Number:	2007/019f
Result:	Minor damage to internal wall
Location:	Domestic

The fire service was called to a house that was being renovated. The fire started in a partially built room where some wires in a flush box were found to be live with unterminated wires that shorted together, causing arcing and building paper in a wall to catch fire. An electrical inspector visited the site and arranged to have the power removed from the house until the wiring was made safe.

Number:	2007/020f
Result:	Damage to bedroom
Location:	Domestic

A call was received from the fire service concerning a fire involving a dehumidifier in a bedroom. Examination of the scene determined that the dehumidifier was located at the point of the fire's origin, but close examination of the dehumidifier revealed very little internal damage. From the burn patterns on the plastic housing it is believed that a candle placed on top of the dehumidifier had made the plastic housing burn.

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Part 5

LPG

Date:	13/01/2007
Location:	Far North District
Equipment:	Cooker
Accident type:	Fire

Losses: Total loss of caravan and possessions inside.

Summary of events: An operator changed a two-kilogram LPG cylinder on a cooker/gas ring and lit it. The cylinder was one to two weeks old and only on its second fill. A fire at the cooker end travelled down the hose from the cooker to the cylinder to ignite gas from the cylinder.

Suspected causes and significant factors: Gas leakage from connection to cylinder suspected.

Date:	29/01/2007
Location:	Christchurch
Equipment:	Cooker
Accident type:	Explosion

Losses: Oven damaged beyond repair.

Summary of events: LPG cylinders were changed, with interruption of the gas supply. A staff member subsequently turned on gas to a stove burner, apparently without realising that the pilot was not alight. Later, another staff member attempted to light the pilot. At this stage there was an explosion. The oven door blew open with emergent flame. Oven insulation was blown out.

Suspected causes and significant factors: The gas supply was evidently interrupted during the cylinder changeover, due to failure to follow procedures. Gas was apparently not detected before the explosion. The pilot flame was invisible and unsupervised.

Date:	16/03/2007
Location:	Queenstown Lakes District
Equipment:	Container
Accident type:	Fire

Losses: Campervan and contents destroyed by fire. Holiday prematurely terminated. Slight burns to occupant's feet.

Summary of events: Two tourists using a loaned, older campervan, parked off the highway for lunch. They changed the LPG cylinder, located under the sink, and lit the cooker. There was a low-level fire requiring immediate evacuation. The fire developed rapidly, causing the destruction of the campervan. Shortly afterwards there was a boom and fire as something ignited inside the caravan – probably a gas cylinder. The tourists could not get to the extinguisher because the fire was beside it. The fire service was called and as they arrived there were two further explosions, probably caused by two other cylinders in the campervan.

Suspected causes and significant factors: The accident was probably caused by gas leakage from an insecure connection between the regulator and cylinder, with gas ignited by the cooker. Fire service personnel reported that the operator had detected gas before the fire and that the fire had originated near the gas equipment.

Date:	19/03/2007
Location:	Waitaki District
Equipment:	Cooker
Accident type:	Fire

Losses: Fire destroyed several rooms at the back of a building and resulted in extensive charring and water damage to the front of a butchery and roof. There was loss of business.

Summary of events: A butcher was beginning to cook chops in the smoko room using an old, partially functioning cooker that had been lit with a match. Flames flashed back behind the cooker. Fire spread rapidly in the old building from the shelf above and nearby loose paper and other combustibles. Subsequently the cylinder contents vented. The fire service was called.

Suspected causes and significant factors: There was inappropriate use of an old camping appliance. The fire service advised that from information provided following the fire and

examination of burn patterns, the fire appeared to have been caused by a gas leak from a hose clamp at the cooker. One side of the cooker was reportedly not working.

Date:	20/03/2007
Location:	Dunedin
Equipment:	Water heater
Accident type:	Fire

Losses: Water heater destroyed by fire.

Summary of events: Looking out of a window, a staff member saw smoke coming from a gas water heater and called the fire service. The attending fire brigade called for assistance from a gas supplier who arranged for a gasfitter to attend.

Suspected causes and significant factors: There was gas leakage from a worn valve-control gasket. The gasfitter noted that the fire appeared to be centred around the control area, with no fire damage around the supply cylinders. There was no obstruction around the flue. The appliance was regularly maintained, but the maintenance company considered that the appliance was too old to continue being used safely.

Date:	23/03/2007
Location:	Christchurch
Equipment:	Cooker
Accident type:	Fire, explosion

Losses: An appliance and a workbench were destroyed and a wall was damaged by fire. The user was treated and discharged from hospital with skin peeling from her face, and singed eyebrows and hair.

Summary of events: A hob was fitted the previous day. It was being used for the second time to cook stew on one burner. The occupant, hearing noise, walked towards the stove and felt heat, then saw flames. She grabbed a jug to throw water on the flames. As she did so there was a big bang that pushed her back, with flames thrown towards her. She left and called the fire service using her mobile phone.

Suspected causes and significant factors: The pattern of fire damage was consistent with ignition in the area where the hose was connected to the appliance.

Date:	06/04/2007
Location:	Palmerston North
Equipment:	Cabinet heater
Accident type:	Fire

Losses: Heater destroyed by fire.

Summary of events: A heater cylinder was filled 18 months previously and was subsequently used five or six times over the following winter months including the previous evening. The heater had operated satisfactorily when last used. About a month before, the owner used the heater cylinder with a barbecue.

The owner turned on the gas at the cylinder and regulator, detected gas (but no hissing) and applied flame to light the heater (piezo ignition didn't work) while holding the ignition button down. The heater was on "low" setting. The heater initially lit satisfactorily but then went out. The owner repeated this procedure three times. On the third attempt flames erupted at the back and under the heater, and set alight the regulator coupling. The flames kept burning where the gas cylinder and regulator connect. The cylinder retention plate was not in place. The owner used a wet towel in an unsuccessful attempt to turn the heater off. He then took the heater outside and put dirt over it, and called emergency services for assistance.

Suspected causes and significant factors: There was possible leakage at the adaptor, which was found to be loose after the fire. Expert advice was received that thread-locking compound had not been used with the adaptor. The cylinder was used to supply the barbecue during summer. The adaptor may have been replaced by a different type of fitting for the barbecue.

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Date:	12/04/2007
Location:	Auckland
Equipment:	Cabinet heater
Accident type:	Gas leak or escape, fire

Losses: One room was destroyed and another room and the roof were fire-damaged.

Summary of events: A heater and cylinder were purchased new some six months before the fire. The cylinder was last filled during the previous winter. The heater was used for the first time during the next heating season in a bedroom. The middle burner was not working and there was a smell of gas when the heater was operating. The heater was lit in an adjacent bedroom the next day with three occupants present. There were problems lighting it. Some time after lighting there was a loud hissing, when two occupants escaped via the bedroom window. The heater then caught fire with flames from around the cylinder. The remaining occupant attempted to remove the heater but tipped it over. The fire service was called. Attending officers took the cylinder outside.

Suspected causes and significant factors: Gas leakage from the connection to the cylinder.

Date:	18/04/2007
Location:	Christchurch
Equipment:	Fixed space heater
Accident type:	Explosion

Losses: Heater unusable.

Summary of events: The owner (user) reported that the heater was being used with no-one in the room. The thermostat had turned the main burner off, then there was a loud "whoomf" and glass was blown across the room towards a table and other furniture. The heater had been serviced in October 2006, with the burner and cross-lighter being replaced.

Suspected causes and significant factors: There was delayed ignition of unburnt gas. The notifier's theory was an intermittent fault with the thermostatic valve, but this was not confirmed.

Date:	28/04/2007
Location:	Tauranga
Equipment:	Cabinet
Accident type:	Fire

Losses: There was fire damage to a wall, curtains and floor, and melting of plastic guttering on the outside of a house. The heater and cylinder were unusable. The owner was taken to hospital for treatment of burns to the fingers of one hand and was certified as unfit for work for nine days, but returned to light duties.

Summary of events: The cylinder filler replaced a rubber seal after finding a leak during refilling. The owner took the re-filled cylinder home and connected it to the heater, without reattaching the cylinder retention plate at the back. He then lit the heater and ran it on a "medium" setting. There was some sputtering at the radiant, similar to when the cylinder was running empty. Some five to 10 minutes after lighting, when the operator was sitting in front of the heater, flames came out the back and up the wall. After unsuccessfully trying to turn the heater off, the operator carried it outside. The heater burnt the floor at several points as he did so. The fire service attended the fire.

Suspected causes and significant factors: The fire probably started as a result of an ullage screw being left open on the cylinder after filling, and was probably accelerated by the hose coming off the regulator. The hose and hose clamps were found to be too large for the regulator spigot. The owner noted that the filler did not carry out a soapy water check for leaks about the cylinder after filling. The heater itself, an older model, had not been serviced.

Date:	14/07/2007
Location:	Auckland
Equipment:	Cabinet heater
Accident type:	Fire

Losses: A heater and cylinder were destroyed and a carpet damaged. There was smoke and soot damage to paintings, a ceiling, curtains and furniture. The user suffered slight burns to a hand.

Summary of events: The heater had been used for some four years without problems. It was tested for two minutes after the cylinder was re-filled, then later re-lit. Some 15 to 20 minutes after the heater had been running on low, it suddenly burst into flames. One of the owners turned the cylinder hand wheel off with a towel but the heater continued to burn, so he took it outside. The fire service was called and put the fire out.

Suspected causes and significant factors: There was leakage from a point at, or close to, the supply hose, possibly at the connection to the cylinder. Overfill was ruled out as a cause by weighing the cylinder contents. There was no evidence of leakage at either the ullage screw or connection point after the fire, although a plastic QCC nut was fused to the cylinder.

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Date:	14/07/2007
Location:	Far North District
Equipment:	Cabinet heater
Accident type:	Fire

Losses: Loss of cabinet heater, $2,200 assessed damage to carpet.

Summary of events: The consumer purchased a heater and cylinder some six to eight weeks before the fire, using it regularly for short periods without incident. During the afternoon the cylinder was refilled and brought home. In the evening, the husband brought the cylinder to the heater, connected it to the regulator, put on the cylinder retention plate, turned on the cylinder hand wheel valve and ignited the heater. When he connected the cylinder to the heater there was a hissing sound for about two seconds which he had heard on a few previous occasions. He lit the heater as usual and noticed it operating satisfactorily. He then went to another room. After the heater had been going for less than five minutes, his wife saw bright yellow flames, coming mostly from the back, extending over the top of the heater. Her husband, responding to screams, came running and saw flames coming from the back of the heater, seemingly from the top of the cylinder and extending about 61 centimetres above the heater. He threw a mat over the heater and then pulled it away. Using towels provided by his wife, he carried the heater some three metres through a ranchslider on to a deck outside. He applied about two litres of water to cool the heater, but this did not seem to affect the flames at all. In the wind and darkness the flames seemed to gather momentum, billowing 90 centimetres above the heater, making it difficult to turn the heater off. There was a whooshing sound (not noticeably loud) like a bunsen burner. The wife brought the husband a wet towel. He tried to turn the heater off. Meanwhile the hose from the regulator had almost burnt off. The flames then died down and went out. The fire service arrived a few minutes later.

Suspected causes and significant factors: There was intermittent leakage from the QCC system and evidence that the pressure-relieving device had lifted and re-seated.

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Date:	26/07/2007
Location:	Rodney District
Equipment:	Cabinet heater
Accident type:	Fire

Losses: Extensive burns required treatment in a specialist burns unit and lengthy hospitalisation. A child's pyjamas were burnt.

Summary of events: A young child was in a room with a heater on "low" setting when the caregiver left briefly. The child's pyjamas were ignited by the heater, leading to serious burns.

Suspected causes and significant factors: The Commerce Commission had the burnt pyjamas tested. Labelled "low fire danger", the pyjamas passed both the dimension requirements for close-fitting garments and the "surface burn after washing" test in the mandatory standard.

Date:	29/07/2007
Location:	Far North District
Equipment:	Cabinet heater
Accident type:	Fire, gas leak or escape

Losses: A heater was destroyed and a carpet burnt.

Summary of events: The owner purchased the heater and cylinder new some eight years previously. On the day of the fire, the owner had the cylinder re-filled and brought it home. Some four hours after the cylinder had been filled, he disconnected an empty cylinder from the heater, connected the newly-filled cylinder and turned it on. He then attempted to ignite the heater. The heater did not light at the first attempt. At the second attempt gas came out of the connection point between the cylinder and regulator and ignited, with flames burning fiercely. The owner smothered the fire with wetted towels – there was too much heat to turn the cylinder hand wheel off.

Suspected causes and significant factors: There was leakage between the cylinder and regulator connection point. The owner tested the black plastic nut on the QCC and found it to be secure after the fire. The plastic nut and regulator hose had partially melted. Damage to the hose was some 20 to 30 centimetres from the connection point. No previous problems were reported.

Date:	03/08/2007
Location:	Masterton
Equipment:	Cabinet heater
Accident type:	Fire, gas leak or escape

Losses: A cabinet heater was destroyed and a cylinder rendered inoperable. Slight fire damage was caused to a curtain and carpet.

Summary of events: The elderly owner purchased the heater and cylinder together a year previously. During earlier use, after the cylinder had been refilled, he had briefly felt leaking gas on his hand, but this did not continue. The owner had the cylinder filled in the late afternoon and took it home. Two hours later he connected the regulator to the cylinder securely and turned the cylinder hand wheel on; he felt gas on his hand at the connection point so he turned the hand wheel off and then back on again. There was weaker pressure the second time, so assuming that the gas had dissipated, he left the cylinder hand wheel on. At that time there was a strong smell of gas. The cylinder retention plate was not in position. Flames flared up as he depressed the red piezo igniter, with flames reaching the ceiling and burning strongly. He opened a ranchslider that was adjacent to the heater and pushed the heater outside with his walking stick. The cylinder came away from the heater, with flames continuing to issue from the cylinder but diminishing. He left the heater and cylinder where they landed. There was no loud sound when flames were coming from the heater.

Suspected causes and significant factors: Gas leakage from the QCC connection system appeared the most likely cause. Overfill was unlikely because the service station docket showed 8.7 kilograms of gas dispensed. Gas had evidently escaped from the excess flow valve as shown by heat damage to the valve protection ring and partial melting of the plastic valve dust cover. The owner apparently had a hearing impairment, which may explain why he did not hear any leaking or flow of gas from the excess flow valve.

Date:	05/08/2007
Location:	Waimakariri District
Equipment:	Fixed space heater
Accident type:	Explosion

Losses: A heater was lost, with carpets, furniture and other chattels requiring cleaning, and redecoration was needed.

Summary of events: The heater had been serviced on 19 April 2007 when the user noted soot "puffing out on to carpet". This problem recurred after a few weeks and the user had the heater serviced again. On the evening of the explosion the heater had been in use until about 30 to 45 minutes previously. The user restarted the heater. It did not catch the first time but started promptly

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the second time. When the user walked away there was a "loud boom and a flash", and glass in large shards and debris exploded into the lounge.

Suspected causes and significant factors: The explosion appeared to be the result of ignition of unburnt gas that was able to accumulate in the confined space due to the mis-alignment of the cross-lighting tube and leakage through the gas valve. It was found that the fan was clogged with dust and dirt, there was a small leak on the gas valve, the burner injector was out of line with the air intake on the burner, and the cross-lighting tube was out of alignment. There were no positive "off", "pilot" and "on" positions on the gas valve, allowing gas through to the main burner without ignition when in the "pilot" position. The sooting could have been the result of mis-alignment of the injector.

Date:	10/08/2007
Location:	Auckland
Equipment:	Cooker
Accident type:	Fire

Losses: There was fire damage to a kitchen wall, sink and floor, and gas supply hose.

Summary of events: A passer-by extinguished a fire involving an LPG camping cooker in a domestic dwelling.

Suspected causes and significant factors: There was gas leakage from an insecure connection to the cooker. A hose spigot was bound with plumber's tape and held in place by a Jubilee clip.

Date:	10/08/2007
Location:	Grey District
Equipment:	Cabinet heater
Accident type:	Fire

Losses: A house was damaged beyond repair. Some contents were destroyed and the owner suffered respiratory discomfort from smoke inhalation.

Summary of events: The elderly owner purchased a heater and cylinder some three to four years before the fire and obtained a spare cylinder at the same time. He ran the heater and cylinders without previous problems. His daughter in law had the spare cylinder filled a few days earlier. The owner removed an empty cylinder from the heater and connected a newly-filled spare beside the heater. He lifted the cylinder into the back of the heater without installing the cylinder retention late. He turned the cylinder hand wheel fully on, then backed it off by a quarter turn, believing this would achieve the greatest possible flow of gas. There was no smell of gas or hissing sound. He pushed down the control knob and gave it a quarter turn to activate the piezo igniter. A little blue flame came on at the front of the

heater, followed by a big red light coming straight out of the bottom front. He went to the back of the heater, where he saw flames coming from the top. He attempted to stuff some jeans into the rear of the heater so that he could turn the cylinder hand wheel off, but the jeans caught fire. He then left the house. The fire service was called and they eventually suppressed the fire after it had destroyed some 60% of the house.

Suspected causes and significant factors: The most likely cause was high-pressure leakage, although overfill could not be ruled out. A hole was found in the brass control valve, indicating intense heat.

Date:	15/08/2007
Location:	Grey District
Equipment:	Cooker
Accident type:	Fire

Losses: The operator was evacuated by helicopter with serious burns from head to foot at the front of his body and respiratory burns. Another occupant was taken to hospital with burns to his arm. Insulation was blown out of an oven and a house bus was soot-damaged.

Summary of events: An elderly man, temporarily living in a house bus beside a hotel, had been attempting to light an LPG cooker in the early morning when the spark switch failed. He returned with a lighter but the gas had been left running. The oven was filled with gas, exploding as soon as he ignited the lighter. His wife, who received burns to an arm, sought help from the hotel. Emergency services were called. The son-in-law provided first aid before emergency services arrived.

Suspected causes and significant factors: There was a build-up of gas in the oven from the cooker being left on, ignited by the lighter.

Date:	12/09/2007
Location:	Timaru
Equipment:	Fixed space heater
Accident type:	Explosion

Losses: There was minor injury to the owner, who was treated at accident and emergency. The front glass panel of a heater shattered into the living space, requiring commercial cleaning. Clothing needed replacement.

Summary of events: The heater was the only gas appliance at this installation. It had been serviced some six weeks previously. One of the gas bottles had just been changed and the pilot had gone out. (It appears that the supplier had turned the bottles off, which is routine procedure.) The user went to light the pilot and there was an explosion that shattered the front glass panel and blew into the room. The user received a cut on his forehead, which

was treated at accident and emergency.

Suspected causes and significant factors: The attending gasfitter believed the main gas valve allowed gas to come through to the main burner at the same time as the pilot was out and being lit. This caused a build-up of gas in the burner, which exploded. The main gas valve was described by the gasfitter as "old technology".

Date:	29/09/2007
Location:	Thames-Coromandel
Equipment:	Cooker, water heater
Accident type:	Explosion

Losses: Six people were injured, all requiring hospital treatment. A motorised catamaran was lost.

Summary of events: The catamaran was on its first voyage of the season and the boat's spare LPG cylinder had been refilled and replaced in the LPG compartment. The boat was moored overnight off Whanganui Island near Coromandel town. The explosion occurred early the following morning when the owner got up to make a cup of tea. All six occupants (two adults and four children) were taken to hospital, with some admitted to intensive care. The boat was a total loss. After the explosion occurred and the fires were extinguished, the spare LPG cylinder was seen to be leaking and was thrown overboard. When retrieved, the ullage valve was found to be open.

Suspected causes and significant factors: The damage pattern indicated that the seat of the explosion was near the water heater. LPG appears to have leaked from the spare cylinder in the compartment along a conduit, and accumulated in the mid-section of the boat overnight. The resulting gas-air mixture appears to have exploded when the owner got up to make a cup of tea and turned on the water mixer tap in the galley, thus activating the continuous-flow water heater.

Serious gas accidents must be notified immediately (section 17 of the Gas Act 1992). This can be done by freephone on: **0800 104 477**.

A serious gas accident notification report must also be completed. This should be filed with ES within seven days of the accident occurring.

A report form can be found at the back of this book or online by visiting the ES website at: **www.energysafety.govt.nz**.

Date:	03/10/2007
Location:	Wellington
Equipment:	Cabinet heater
Accident type:	Fire

Losses: There was significant fire damage to a house interior and particularly exterior. There was also loss of house plants and a cabinet heater.

Summary of events: The owner purchased the heater and cylinder separately some four to five months previously. She had the cylinder filled during the late afternoon. In the early evening she connected the regulator cylinder to the heater and noticed a strange sound on opening the cylinder valve. She disconnected and reconnected the regulator to the cylinder and turned the heater to "low" setting, but the sound persisted. Some five minutes later, alerted by a smoke detector, she returned to find the heater on fire with flames coming from the connection point. She dragged the heater outside, into an alcove. The cylinder toppled. The owner unsuccessfully attempted to turn it off using a wet towel and hose. She then left the premises and got help. The fire service was called and they contacted an ambulance because the user was distressed.

Suspected causes and significant factors: There was suspected leakage from the QCC connection system and subsequent venting from the overpressure relief valve.

Date:	11/10/2007
Location:	Dunedin
Equipment:	Cabinet heater
Accident type:	Fire

Losses: An elderly woman died and there was significant fire damage to her home.

Summary of events: The woman activated her MedicAlert, which led to a call out by the fire service. They found she had been severely affected by fire. She indicated that the fire had been caused by a cabinet heater. Later she died.

Suspected causes and significant factors: This accident is subject to coronial inquest. Overfill is not suspected – there were about six kilograms of LPG in the cylinder.

Date:	24/10/2007
Location:	Christchurch
Equipment:	Water heater
Accident type:	Fire

Losses: A van and new house (with contents) were destroyed by fire. A fence and another house were also fire-damaged.

Summary of events: A newly-appointed operator was cleaning carpet in the house, using an LPG water heater in a van parked in the driveway. The water heater was supplied from a nine-kilogram cylinder. The cylinder was beside a 40-litre plastic tank of petrol connected to a generator. The operator left the house to investigate after hot water appeared to run out. As he approached the van, it was engulfed in flames that spread to the house.

Suspected causes and significant factors: The investigator engaged by ES suggested that a possible downdraught, in windy conditions, caused overheating in the van. Another investigator suggested possible gas leakage, with poor ventilation being a factor.

Date:	29/10/2007
Location:	Auckland
Equipment:	Other
Accident type:	Fire

Losses: There was extensive smoke and water damage from a sprinkler system. A food warmer and associated cylinder were damaged beyond repair, and there was loss of business.

Summary of events: The fire service was called out after one of several portable (bain-marie type) food warmers, supplied by a small LPG cylinder, caught fire in the restaurant. The fire service was called because staff were unable to suppress the fire or turn the cylinder off. The restaurant's leading sprinkler system was activated and staff applied two fire extinguishers.

Suspected causes and significant factors: There was a gas leak at the screwed thread to the regulator, adjacent to the cylinder connection point. There was evidence of a relatively small gas leak that eventually lit from the appliance burner, leading to melting of the adjacent plastic connection tightening wheel. Flame then melted the elastomer gas supply hose.

Date:	02/11/2007
Location:	Central Hawke's Bay District
Equipment:	Cooker
Accident type:	Fire, explosion

Losses: A man died following treatment at a specialist unit for severe burns to his hands and feet, burns to his face and singeing of his beard and eyebrows. A transportable home (insurer's estimate $66,000) and contents (insurer's reserve $25,000) were destroyed.

Summary of events: An explosion and fire occurred in the morning as the occupant of a holiday home in a remote area reportedly lit a cigarette. Emergency services were called and the injured occupant was evacuated to a specialist burns unit.

Suspected causes and significant factors: This accident is subject to coronial inquest.

Date:	27/12/2007
Location:	Nelson
Equipment:	Water heater
Accident type:	Fire

Losses: A house was rendered uninhabitable due to fire and smoke damage. A water heater was destroyed.

Summary of events: Pipework in a gas installation had been pressure tested but appliances had not been commissioned. The owner received permission from the installer to turn on the gas and use it (the installer was to commission the next day). Due to a leaking fitting, fire ignited in an external instantaneous water heater mounted in a recess box. Heat from the gas fire ignited the soffit above and the fire spread into the ceiling space.

Suspected causes and significant factors: The appliance had not been commissioned and gas leaked from a loose fitting. Gas built up in the recess box and was ignited, probably from use of the water heater.

NOTIFIABLE GAS ACCIDENTS
1 January 2007 to 31 December 2007

Serious gas accidents must be notified immediately (section 17 of the Gas Act 1992). This can be done by freephone on: **0800 104 477**.

A serious gas accident notification report must also be completed. This should be filed with ES within seven days of the accident occurring.

A report form can be found at the back of this book or online by visiting the ES website at: **www.energysafety.govt.nz**.

Part 6

Natural Gas

Date:	24/01/2007
Location:	Waitakere
Equipment:	Service
Accident type:	Fire

Losses: Timber framing, water, electrical and air-conditioning services melted. A gasfitter was hospitalised after receiving burns to both arms and one leg.

Summary of events: The gasfitter was brazing a new copper outlet pipe on a house extension. After completing the braze he turned the torch away to inspect his work. Flame from the torch came into contact with a 10-millimetre PE service riser that had been left lying on the ground to allow a concrete pad to be poured for a new floor. Heat from the torch melted the PE service riser and escaping gas ignited, causing fire on timber framing.

Suspected causes and significant factors: Inattention by the gasfitter resulted in him rupturing an exposed PE service riser with his brazing torch. Someone had moved the GMS, exposing the service line.

Date:	19/02/2007
Location:	Wellington
Equipment:	Service
Accident type:	Fire

Losses: There was significant fire damage to a wall and kitchen. The unit was uninhabitable while repairs were carried out.

Summary of events: The fire service was called after the external wall of tenanted premises caught fire. Fire spread to the kitchen before being extinguished. The fire was evidently accelerated by gas after a nearby plastic installation pipe was ruptured by the heat.

Suspected causes and significant factors: The fire was investigated by the fire service and police, neither of which could identify the initial cause although the fire was not treated as suspicious. The fire was evidently accelerated by escaping gas after a plastic installation pipe ruptured near the seat of the fire.

Date:	10/03/2007
Location:	Hastings
Equipment:	Other
Accident type:	Fire

Losses: There were possibly about $200,000 in losses and structural damage of some $100,000, plant loss and one week's down time.

Summary of events: The alarm was triggered when a wool scour dryer caught fire. The operator, alerted by the alarm, called the fire service and applied a fire extinguisher. The fire service found the fire extinguished on arrival. It was discovered that wool dust in the dryer caught fire and spread to a conveyor belt and the gas system. The safety system had shut the gas down and triggered the alarm.

Suspected causes and significant factors: Accumulated wool and other dust near a grate, missed during cleaning some two days previously, caught fire, with the fire rapidly spreading to the conveyor belt.

Serious gas accidents must be notified immediately (section 17 of the Gas Act 1992). This can be done by freephone on: **0800 104 477**.

A serious gas accident notification report must also be completed. This should be filed with ES within seven days of the accident occurring.

A report form can be found at the back of this book or online by visiting the ES website at: **www.energysafety.govt.nz**.

Date:	04/04/2007
Location:	Auckland
Equipment:	Installation pipework
Accident type:	Fire

Losses: There was fire damage to the side of a house requiring removal and reinstatement of a meter. There was interruption to the gas supply and the cost of a comprehensive safety check following the fire.

Summary of events: The householder left the house in the early afternoon, returning some 90 minutes later to find bunsen burner-like flame from a gas pipe adjacent to the meter and the house in the early stages of fire development. The fire service was called and the fire extinguished.

Suspected causes and significant factors: Metallurgists suggested that a hole in a copper pipe was probably caused by electrical arcing. The copper appeared to have been in contact with zinc-coated reinforcing wire embedded in the plaster coating of the house. An electrical expert checked for voltage potentials but could find none and could not establish any reason for the arcing. The fire service suggested leaking gas may have been ignited when a garage door was opened.

Date:	08/05/2007
Location:	Auckland
Equipment:	Main
Accident type:	Explosion, gas leak or escape

Losses: Wall lining was blown off a wall and shelves and contents damaged or destroyed. Stock was also destroyed.

Summary of events: The café owner opened the premises in the morning. She turned on a grill hotplate; as it reached 120 degrees Celsius there was an explosion in an internal wall near where she was standing. Pieces of wall lining, about half a square metre, were thrown some 14 metres across the room. An electrician was called to investigate. He and a person from a neighbouring shop detected gas outside and this was reported to the local gas network operator. It was established that gas had migrated into the shop, which did not have gas supplied to it.

Suspected causes and significant factors: Four joints in the gas main were found to be leaking in the immediate vicinity of the café. Gas from one or all of these joints was suspected to have migrated into the café wall cavity and to have been ignited by an electrical source. The footpath leading to the wall of the building provided a seal and prevented gas venting to the atmosphere.

Date:	05/06/2007
Location:	Horowhenua District
Equipment:	Fixed space heater
Accident type:	Fire

Losses: There was significant fire damage to a house and contents.

Summary of events: The former landlord advised that some years previously he had a heater disconnected and then took the flue outside the house and covered the flue outlet over. The present landlord advised, however, that the heater had not been disconnected. She also advised that she was not aware that the flue outlet had been covered. The heater evidently was not used for several years. Shortly after moving into the house, a new tenant started using the heater. One evening, after the heater had run for several hours, the tenant detected burning and saw black marks appearing on the wall. He turned the heater off and went out to investigate, and saw flames emerging through the side of the house. He threw water over the flames and called the fire service.

Suspected causes and significant factors: There was ignition of combustible material by hot flue gases entering the wall cavity as a result of removal of the flue and blocking of the flue outlet at the wall. There was conflicting evidence as to whether the heater had been disconnected from the gas supply when the flue was removed.

Date:	13/06/2007
Location:	Napier
Equipment:	Boiler
Accident type:	Fire

Losses: There was significant fire and water damage, as well as lost time and possible lost business.

Summary of events: The fire service was called to a backpackers hostel after the area around a boiler caught fire.

Suspected causes and significant factors: Combustible material came into contact with the hot surface of a gas-fired boiler and was ignited by the burner. The boiler room was readily accessible to lodgers.

Date:	28/06/2007
Location:	Masterton
Equipment:	Water heater
Accident type:	Fire

Losses: A water heater was destroyed and house paint damaged.

Summary of events: An outlet connection pipe blew out from a heat exchanger in the morning, during a heavy frost (the temperature was -7 degrees Celsius), leading to continuous operation of a burner and fire.

Suspected causes and significant factors: A joint, comprising a rubber O-ring and washer, was blown out by the force of expanding, near-freezing

cooling water. This caused the water heater to operate. Full-pressure water escaped into the internal case of the water heater, affecting combustion, with flames erupting out of the side of the flue wrap. The thermal fuse (which normally melts and cuts out the gas supply) did not come into operation, so the burner continued to operate. The heater manufacturer found the thermal fuse had been bridged out. A frost plug was fitted in line but this did not work. Fire damage was limited because the occupants were at home and called the fire service, and because the outside wall was metal-clad.

Date:	**07/07/2007**
Location:	**Auckland**
Equipment:	**Oven**
Accident type:	**Fire**

Losses: There was minor heat damage to an industrial oven.

Summary of events: A fitter, working on another system above an oven, noticed a burning smell. He requested operational staff to shut down the oven so that he could investigate. He removed some panels on the outside of the oven and saw smoke. Staff fetched a fire extinguisher, while other panels were removed. The fire service was then called and the building was evacuated due to the amount of smoke.

Suspected causes and significant factors: There was a possible build-up of combustible dirt.

Date:	**08/07/2007**
Location:	**Waipa District**
Equipment:	**Fixed space heater**
Accident type:	**Fire**

Losses: A child was hospitalised for three weeks. Skin grafts were required on his back and upper arm. His singlet and pyjamas were burnt.

Summary of events: A three year old and a 13 year old were in the lounge. The older child turned the heater and TV on. The younger child's pyjamas were ignited by the heater flames. The parents, alerted by the cries of the older child, found the younger child running towards them with flames coming from his nightclothes.

Suspected causes and significant factors: The pyjamas were ignited by the heater. The Commerce Commission found that the pyjamas complied with the mandatory product safety standard. The pyjamas, labelled "low fire danger", passed both the dimension requirements for close-fitting garments and the "surface burn after washing" test.

Date:	**15/07/2007**
Location:	**Gisborne**
Equipment:	**Fixed space heater**
Accident type:	**Explosion**

Losses: Glass panels on a heater were broken. An insurer estimated the cost of repairs at between $1,700 and $1,800.

Summary of events: The owner had attempted to light a gas heater over a one-hour period. Unburnt natural gas apparently ignited, causing glass panels to shatter. Glass was thrown up to three metres across the room. The daughter reported that the gas fire had become harder to light, and that there had been a previous incident where a side window had blown out.

Suspected causes and significant factors: It appears that difficulty in lighting the fire led to a build-up of gas inside the fire box.

Date:	**21/09/2007**
Location:	**Wellington**
Equipment:	**Central heating unit**
Accident type:	**CO poisoning**

Losses: The occupant suffered symptoms consistent with CO poisoning, although no blood tests were done. The central heating unit had suffered damage from a delayed ignition event some time previously.

Summary of events: On 21 September, the homeowner had returned from a walk and felt very ill. She collapsed on a sofa in the bedroom and did not wake until the next morning. She managed to phone her daughter for help with some difficulty. The daughter reported that the homeowner's speech was very slurred. Upon leaving the house, her condition improved.

A delayed ignition explosion in the central heating furnace had buckled the cover of the combustion chamber. The resulting air leak into the chamber had upset the air differential across the controller, resulting in a rich mixture producing large amounts of CO through the external flue.

There was heavy sooting of the wall beside the flue outlet. CO was somehow infiltrating the house from outside and affecting occupants. Occupants had reported milder symptoms for several months before the incident, but the service agent who called on 13 September said there was no sooting.

The ESS investigator could not establish the reason for the delayed ignition, but said low supply pressure might cause such an event. The supply company was contacted to see if there were any incidents between 13 and 21 September, but no incidents were recorded.

While large amounts of CO (3,000 ppm) were detected in flue gases, no CO was detected in heating air entering the house when the central heating was run in fault condition. After running it in fault condition for some time, no CO could be measured in the house.

Low amounts (15 to 20 ppm) could be detected intermittently through an open window directly above the flue outlet. The occupant said she rarely had that window open.

Suspected causes and significant factors: The owner appears to have suffered CO poisoning, although it has not been established how CO from the faulty appliance entered the house.

Date:	15/10/2007
Location:	Franklin District
Equipment:	Water heater
Accident type:	Fire

Losses: A unit valued at $2,000 was replaced. The cost was in a replacement unit plus installation.

Summary of events: The owner went outside in the morning to check a water heater after hot water had been lost. He found that the control unit had partly melted due to fire damage. He approached the installing company but they referred him to the heater manufacturer.

Suspected causes and significant factors: The manufacturer thought gas had leaked from the back end of a nut on the compression fitting. They advised that the fitting was found to be loose, with hardly any flare. (The fitting was re-flared and re-used on the replacement installation.)

Date:	31/10/2007
Location:	Auckland
Equipment:	Installation pipework
Accident type:	Fire, explosion

Losses: There was minor fire damage and significant damage to a wall and bench top during fire suppression.

Summary of events: A fortnight previously, a gasfitter fixed a gas leak at the connection point to a gas hob after the consumer reported a smell. Following the repair, the gas smell significantly diminished but did not disappear.

On the morning of the fire, the consumer heard a noise that she attributed to street activity. Some 45 minutes later she detected burning and found smoke. She then contacted the fire service, who traced fire to an elbow in the gas installation supplying the gas hob. The fire service suppressed the fire with a carbon dioxide extinguisher.

Suspected causes and significant factors: There was a gas leak from the elbow fitting near the gas hob, ignited by the hob. The gasfitter, earlier called to check for leaks, evidently did not carry out a pressure drop test, and according to the consumer did not check for leaks at the elbow. Another gasfitter found that this and another fitting were leaking and faulty. Installation of the hob was faulty and apparently uncertified (neither the Plumbers, Gasfitters and Drainlayers Board nor the consumer had a copy of the gasfitting certificate).

accident notification reports

NOTIFICATION REPORT — Electrical Accident

Ministry of Economic Development
Manatū Ōhanga
Energy Safety

Electricity accidents must be notified immediately *(section 16 of the Electricity Act 1992).*

The notification numbers are:
All-hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

An **electrical accident notification report** must also be completed. This should be filed with Energy Safety within two weeks of the incident.

The address is at the bottom of this page

When reporting, please photocopy this form to preserve your book, or download a copy from **www.energysafety.govt.nz**.

Details of victim

Name _____ ☐ Male ☐ Female

Address _____

_____

_____

Age _____ Occupation _____ Company _____

Place and time of accident

Place of accident _____

Date of incident ___/___/_____ Time of incident _____ ☐ am ☐ pm

Causes

Description of accident (attach full details of accident including sketches/photographs) _____

_____

_____

_____

Possible cause(s) of accident _____

_____

_____

_____

_____

_____

continues 1/2

Injuries

Type(s) of injury (tick or number) ☐ Fatal ☐ Non-fatal

Was medical treatment required? ☐ Yes ☐ No

Was resuscitation given? ☐ Yes ☐ No

Method of resuscitation _____

DAMAGE

Describe any damage or loss incurred by the accident _____

_____

Name(s) of any witness, investigator or other person who could provide information _____

_____

Address and contact number _____

_____

EQUIPMENT INVOLVED

Equipment involved (type) _____ ☐ Voltage

Condition of equipment involved _____ Date installed ___/___/___

Electrical protection involved (type) _____

Did it operate correctly? ☐ Yes ☐ No

If "No", state reason it did not operate correctly _____

_____

NOTIFIER

Name of person reporting accident _____

☐ Owner ☐ Occupier ☐ Registered person ☐ Employer ☐ Other

Company _____

Address _____

Telephone ( ) _____ Facsimile ( ) _____

Date ___/___/_____

NOTIFICATION REPORT — Gas Appliance and Installation Accident

Ministry of Economic Development
Manatū Ōhanga
Energy Safety

Gas accidents must be notified immediately *(section 17 of the Gas Act 1992).*

The notification numbers are:
All-hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

A **gas accident notification report** must also be completed. This should be filed with Energy Safety within seven days of the incident.

The address is at the bottom of this page

When reporting, please photocopy this form to preserve your book, or download a copy from **www.energysafety.govt.nz**.

SECTION A Gas appliance and installation incidents or accidents

Date of incident ___/___/_____ Time of incident _____ ☐ am ☐ pm

Address and/or exact location _____

Gas type

☐ LPG ☐ Natural (except CNG) ☐ CNG ☐ Tempered LPG ☐ Biogas

Accident type (tick all applicable)

☐ Fire ☐ Gas leak or escape ☐ Explosion
☐ Overheating ☐ Carbon monoxide poisoning (incomplete combustion)
☐ Other (please specify) _____

Environment

☐ Building ☐ Outside ☐ Caravan/Mobile home
☐ Car, van or truck ☐ Other (please specify) _____

Losses involved (tick all applicable)

☐ Property damage ☐ Injury ☐ Fatality
☐ Other (please specify) eg lost time _____

continues 1/4

Energy Safety, 33 Bowen St, PO Box 1473, Wellington, New Zealand, telephone 0800 104 477, fax 0508 723 336

Equipment type (tick all applicable and complete Section B)

Appliance ☐ **Commercial** ☐ **Industrial**

☐ Cabinet heater ☐ Fixed space heater ☐ Laundry dryer ☐ Vaporiser
☐ Barbecue ☐ Cooker ☐ Oven ☐ Fryer
☐ Light ☐ Water heater ☐ Refrigerator ☐ Boiler

CNG station

☐ Dispenser ☐ Storage vessel ☐ Compressor
☐ Container ☐ Installation pipework ☐ Other (please specify) _____

Summary description of events surrounding incident or accident (attach sketches, photos etc)

Actions to ensure safety at scene (eg soundness test, odorant check, emergency services call-out)

Description of loss (injuries, extent of damage, costs etc) _____

Causal factor(s) (tick all applicable)

☐ Alteration ☐ Assembly ☐ Carelessness
☐ Connection problem ☐ Design fault ☐ Filling of cylinder
☐ Installation ☐ Maintenance lacking ☐ Manufacturing defect
☐ Misuse ☐ Operator error ☐ Proximity to combustibles
☐ Record error ☐ Supervision lacking ☐ Third-party damage
☐ Ventilation poor ☐ Working procedure error ☐ Workmanship lacking

Suspected cause(s) and/or significant factors _____

Remedial action taken or recommended (to minimise the chance of recurrence elsewhere)

Owner/user or person working on or near equipment

Name _____ Status (eg owner, hirer, servicer) _____

Contact details _____

Occupation (of worker or user)

☐ Gas worker ☐ Other worker ☐ General public

Affected parties (person(s) affected by loss)

Name _____ Occupation (if relevant) _____

Contact details _____

_____ Age (if relevant) _____

Notifier (person completing this form)

Name _____ Date notified _____

Other persons (person(s) who may assist with enquiries)

Name _____ Occupation (if relevant) _____

Contact details _____

Other reports (attach, or provide name and contact details) _____

SECTION B Gas equipment details

Appliance

Manufacturer _____ Make _____

Model/serial number _____ Manufacture date or age of appliance _____

Rating (output/pressure etc) _____ Date installed or purchased _____

Installer _____ Certifier _____

Last service details _____

continues 3/4

Portable LPG

Regulator fitted? ☐ Yes ☐ No

Connection to regulator or cylinder (type)

☐ Screwed by spanner ☐ Quick-fit/clip-on ☐ QCC

☐ Screwed by hand (with spring loading)? ☐ Yes ☐ No

☐ Other (please specify) _____

Container (type) _____ ☐ Refillable ☐ Disposable

Net capacity of LPG container _____

Container and value details (markings) _____

Regulator details (make and markings) _____

Adaptor details (markings or type) _____

Installation (type) ☐ Pipework ☐ Flue ☐ Control/safety ☐ Device ☐ Building related ☐ Ventilation

Pipe material ☐ PE ☐ Copper ☐ Steel ☐ Other (please specify) _____

Jointing ☐ Weld and solder ☐ Mechanical ☐ Other (adhesive)

CNG station

Storage vessel ☐ Cascade ☐ Bottle test dates ☐ Bullet ☐ Relief setting Date __/__/__

Compressor

Make _____ Model _____

Relief setting _____ Date __/__/__

Dispenser _____

Make _____ Model _____

Hose markings Semi-conducting? ☐ Yes ☐ No

Other (please specify) _____

NOTIFICATION REPORT — Gas Distribution Accident

Ministry of Economic Development
Manatū Ōhanga
Energy Safety

Gas accidents must be notified immediately *(section 17 of the Gas Act 1992).*

The notification numbers are:
All-hours accident notification service 0800 104 477
Freefax 0508 SAFE ENERGY – 0508 723 336

A **gas distribution accident notification report** must also be completed. This should be filed with Energy Safety within seven days of the incident.

The address is at the bottom of this page

When reporting, please photocopy this form to preserve your book, or download a copy from **www.energysafety.govt.nz**.

Date of incident ____/____/_____ Time of incident _____ ☐ am ☐ pm

Address and/or exact location _____

_____

Gas type (tick all applicable) ☐ Natural ☐ Tempered LPG ☐ Landfill

Accident type

☐ Fire ☐ Gas leak or escape ☐ Explosion
☐ Overheating ☐ Carbon monoxide poisoning (incomplete combustion)
☐ Other (please specify) _____

Environment

☐ Building ☐ Outside ☐ Underground
☐ Other (please specify) _____

Losses involved

☐ Property damage ☐ Injury ☐ Fatality
☐ Other (please specify) eg lost time _____

_____

_____

_____

Notifiable under the Gas Act?

☐ Yes ☐ No ☐ Not sure

continues 1/4

Energy Safety, 33 Bowen St, PO Box 1473, Wellington, New Zealand, telephone 0800 104 477, fax 0508 723 336

Equipment type

☐ Mains ☐ Service ☐ District regulator station
☐ Customer measuring station ☐ Sales gate station
☐ Meter ☐ Other (please specify) _____

Equipment details (pipes)

Material ☐ PE ☐ Cast ☐ Steel
☐ Other (please specify) _____

Pressure ☐ HP ☐ IP ☐ MP
☐ LP Size _____ KPa/WG ____

Jointing ☐ Hf (heat) ☐ Ef (electro) ☐ Weld
☐ Mechanical ☐ Other (please specify) _____

Equipment details (regulators and meters)

Make _____ Model _____

Pressure _____ Last service details _____

Summary description of events surrounding incident or accident (attach sketches, photos etc)

_____

_____

Actions to ensure safety at scene (eg soundness test, odorant check, emergency services call-out) _____

_____

_____

Description of loss (injuries, extent of damage, costs etc) _____

_____

_____

_____

_____

_____

_____

Causal factor(s) (tick all applicable)

- ☐ Carelessness
- ☐ Communications
- ☐ Corrosion
- ☐ Design fault
- ☐ Maintenance lacking
- ☐ Material defect
- ☐ Misuse
- ☐ Working procedure error
- ☐ Record error
- ☐ Supervision lacking
- ☐ Third-party damage
- ☐ Training inadequate
- ☐ Workmanship lacking
- ☐ Other _____

Suspected cause(s) and/or significant factors _____

Remedial action taken or recommended (to minimise the chance of recurrence elsewhere) _____

Owner/persons involved or reporting incident

Name _____

Status (eg employee, contractor) _____

Organisation _____

Contact details _____

Notifier (person completing this form)

Name _____

Date notified _____

Contact details _____

continues 3/4

GAS ACCIDENT NOTIFICATION REPORT

Other persons (person(s) who may assist with enquiries)

Name _____

Occupation (if relevant) _____

Contact details _____

Other reports (attach, or provide name and contact details)

Name _____

Date of report _____

Contact details _____