

# Fire and Rescue NSW Safety Bulletin 2011/04 Electric shock injuries



## Issue

In the last 18 months, five FRNSW firefighters have received electric shocks at incidents.

This highlights the need for improved awareness of the hazards at incidents where electricity is present.

## Incidents

- June 2010: a firefighter received an electric shock at a house fire when power was not turned off before firefighters entered the building.
- February 2011: a firefighter received an electric shock at a house fire after touching a metal gate on the property. Power had been turned off at the switchboard. However, the insulation on the consumers mains wiring was burnt away by the fire, electrifying metal building materials including the gate.
- March 2011: a firefighter received an electric shock at a sprinkler system activation after touching an electrified metal meter box.
- June 2011: a firefighter received an electric shock at a shop fire during the overhaul phase when metal being removed came in contact with the consumers mains. Power had been turned off at the switchboard.
- August 2011: a firefighter received an electric shock at a house fire while removing metal roof flashing. Power had been turned off at the switchboard. However, the consumers mains had electrified the metal.

## How electricity can kill you

You may be killed or injured if you become part of an electrical circuit and electricity flows through your body. This can occur through:

- Direct contact with an electrical circuit (eg you touch two live wires, or a live wire and the ground, at the same time).
- Indirect contact with an electrical circuit (eg you touch something that is in contact with a live wire or you stand in a 'pool' of electricity when electricity is released into the ground.)

The electrical current that will kill you is less than 3% of the current in a common domestic circuit. The average electricity distribution network carries over 4000 times the current of most domestic circuits.



## **WARNING**

**If you receive an electric shock, or suspect that you have received one, the Incident Controller must be informed. You must be transported to hospital for assessment and treatment.**

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### Electrical hazards

Turning power off at the switchboard only partially controls the electrical risk. The wires that deliver the power to the switchboard from the network, called the consumers mains (see Figures 1 and 2), remain live until the electricity company isolates the power.

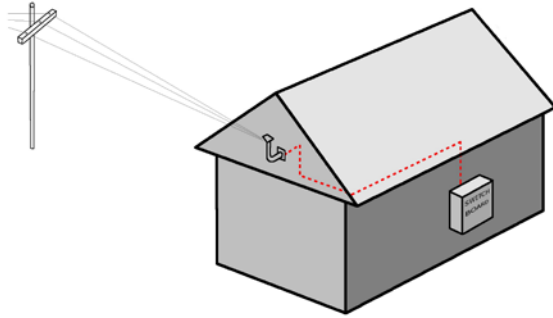


Figure 1: The consumers mains (shown as a dashed red line) when power is supplied overhead

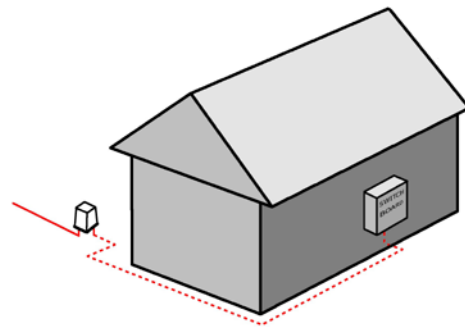


Figure 2: The consumers mains (shown as a dashed red line) when power is supplied underground

If a conducting material comes into contact with the consumers mains, it may become electrified (see Figure 3). Fire, water, structural collapse or some other mechanism increases the likelihood of an electrical fault.

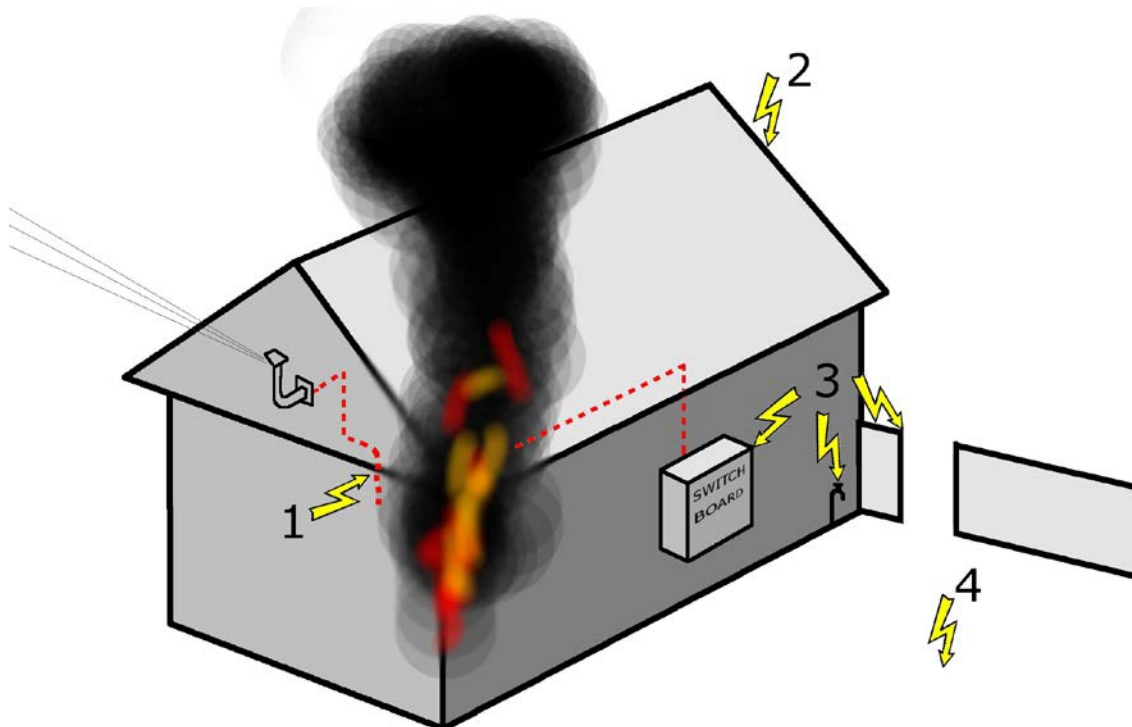


Figure 3: In this example, power has been turned off at the switchboard but the consumers mains (red dashed line) has been damaged and comes in contact with conductive building materials (1). This electrifies the metal roof (2) and other items such as the fence, tap and the meter box enclosing the switchboard (3). A voltage gradient is created on the ground (4). There is still potential for firefighters to receive an electric shock.

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Under normal conditions it is safe to touch conductive material such as the metal meter box enclosing the switchboard. However, during an incident this task may become 'unsafe' unless controls are put in place.

Even if an electrical fault is not present upon first arrival, a fault may develop, electrifying material that was not previously electrified. Constantly evaluate the situation.

### Control measures

Control measures that must be considered are:

- Call for the electricity company as soon as possible.
- Establish an Exclusion Zone until the electricity company isolates power.
- If firefighters need to work in the location before the electricity company isolates power:
  - Restrict work as far as is reasonably practical to that required to protect life or prevent dangerous expansion of the incident.



### WARNING

**Carefully consider whether the possible benefits of undertaking the work outweigh the risks.**

- Assume all conducting material (including wet ground) is live.
- Turn off power at the switchboard.
- Avoid contact with anything that could conduct electricity.
- If you must touch conducting material with your hands, don the two pairs of gloves within the electrical safety kit, remembering that the gloves are only rated to a maximum of 650V and must not be worn while directly involved in firefighting.
- Use the non-contact voltage detector to identify electrical sources, being aware of the limitations of this device as outlined within the [GLM Mini Rescue: Non-contact voltage detector Recommended Practice](#).

Electrical hazards are present at most of the incidents that FRNSW attends. Proactively controlling this hazard will reduce the likelihood of you, or a fellow firefighter, receiving a life threatening injury.

**Contact officer:** Station Officer Luke Unsworth, Operational Safety Coordinator, 0438 640 279, [luke.unsworth@fire.nsw.gov.au](mailto:luke.unsworth@fire.nsw.gov.au).

Noted: Station Commander	A	B	C	D	Other
Checked: Duty Commander					

**Previous Safety Bulletin:** [Safety Bulletin 2011/03, Solar panels damaged by storms](#)