



Plumbing Newsflash

Electrical Safety for Plumbers

Purpose

The purpose of this newsflash is to raise awareness of possible dangers associated with plumbing and electrical services.

Background

All metallic water pipes in an installation need to be bonded to the general mass of earth to allow electricity to be safely discharged. Over the years electricians have used a variety of methods to earth electrical installations and associated equipment. Electricians connect the water pipes to the buildings' main earth conductors (see figure 1).

In addition, the water reticulation system has changed dramatically over recent years and these changes may affect existing earthing systems. For example, the insertion of plastic pipes or insulated meters, for repairs or alterations of existing plumbing, may have interrupted the low resistance earthing network.

The danger

If there is an electrical fault in an electrical appliance or fixture and there is a damaged neutral-earth conductor, electrical current may flow along the water pipe. In some circumstances, plumbers may face risk of a fatal electric shock when they-

- cut through the water pipe;
- remove a water meter; or
- disconnect the main earth wire from the water pipe.

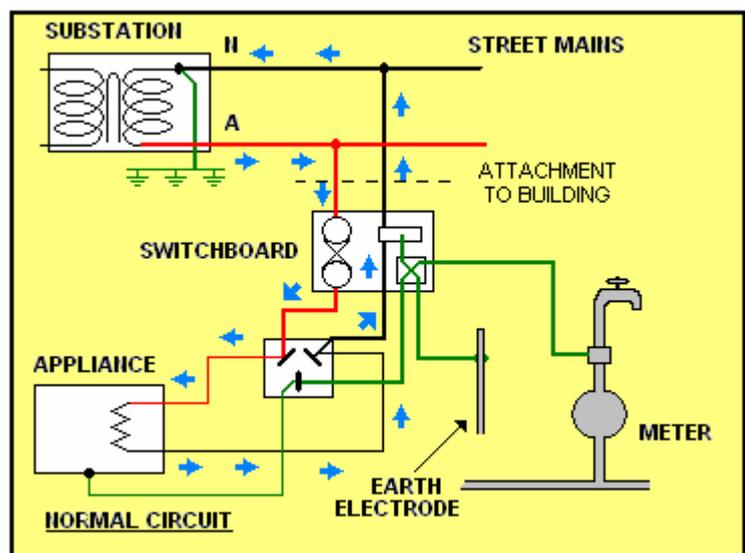


Figure 1

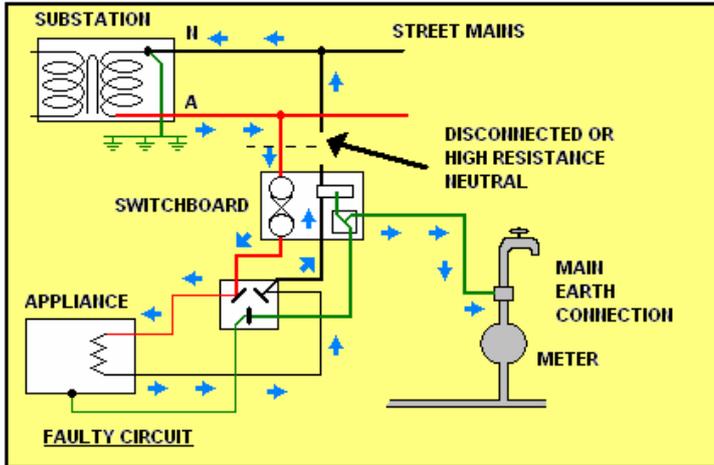


Figure 2

Figure 2 shows the wiring configuration in a building where a fatal accident occurred. The following paragraph summarises the incident-

'The deceased and a friend cut a water pipe under the friend's house and the victim suffered a fatal electric shock. The main service neutral had become detached and all load current flowed through the Multiple Earthed Neutral (MEN) point and the earthing system, which included the water pipe.'

Working on water pipes

If an electrical fault is present due to incorrect or damaged wiring, any person who removes, repairs or installs a section of the water pipe, water meter or other plumbing fixture may receive an electric shock. In some extreme circumstances, merely touching the water pipe can result in an electric shock.

If work is to be done on water pipes, the following procedures should be strictly followed-

1. Locate the main power switch for the premises and turn it off. Attach a 'Danger - do not close' tag.
2. Use a **bridging conductor** to span the section of metallic pipe to be cut and keep it in place until the work is completed. A battery jumper lead would be suitable, as long as the surface of the pipe is clean.
3. If the main earth or bond connection has to be disconnected, the bridging conductor should be connected to it before disconnection occurs.
4. If a metallic water service is being replaced with plastic water pipe, you must ensure that the installation is still effectively earthed by engaging the services of a licensed electrician. It is illegal to perform electrical work without an appropriate electrical licence.

Safety switches

Don't rely on the integrity of customers' safety switches, as dangerous faults may still be present. A portable safety switch should be used for all equipment including extension leads. This will give you added protection against leads being damaged or faults in equipment.

Other Potential Electrical Hazards

- Damaged insulation on cables may cause metal roofs, gutters and pipes to become live.
- Broken or high resistance neutral conductors may cause the earthing system to become live.

IMPORTANT
**Plumbers should be aware an electrical fault in a building
may result in a fatal electric shock through water pipes.**

Safety recommendations

- Contact your local electrical service provider or an electrical contractor if a fault is suspected.
- Use a bridging conductor when cutting out sections of metallic water pipe.
- Use a portable safety switch to reduce the risk of shock from portable tools.
- Check gutters and metal roofs prior to commencing a job, as they can become live due to deteriorating insulation on electrical wiring. This can be done by using a voltage indicator/proximity tester.
- Before commencing digging, determine if there are any underground cables.
- Exercise extreme caution when working near electrical supply lines. Exclusion zones limit the minimum distance work can be carried out near electrical wiring, and you must be aware of these distances. Further information on exclusion zones can be found in the *Electrical Safety Regulation 2002* and the *Code of Practice Working Near Exposed Live Parts*.

Legislation

Amendments to AS/NZS 3500.1:2003 – Water Supply are currently being drafted to advise plumbers of the updated safety precautions.

Electrical work must not be performed without an appropriate electrical licence.

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