Electrical safety for plumbers

In most premises the earthing of the electrical installation is achieved by the connection of the main earth wire to an earthing electrode that is driven into the ground. This helps maintain the earthing system at ground potential and creates an earthing path for electricity should a fault develop in the electrical installation. However, because metallic water systems in the premises are also bonded to the earthing circuit they can be subject to a potential rise under electrical fault conditions.

IMPORTANT – Plumbers should be aware that they could receive a fatal electric shock from a metallic water service if they do not employ safe working principals as outlined in this publication.

The danger

Under normal conditions electric current for appliances, lights etc flows in the active and neutral conductors. The neutral conductor provides the return path back to the substation transformer. Under some fault conditions, current will flow in the earth wire and therefore will be imposed onto the water piping system.

Plumbers are at risk of serious or fatal electric shock if they:

- cut through the water pipe between the earth connection and the street main
- remove a water meter
- disconnect the main earth wire from the water pipe.

The danger is illustrated in the following summary of an actual electrical fatality:

'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.'

Between 1 January 1997 and 30 June 2009, 75 plumbers were reported as having received electrical shocks from water pipes while undertaking repairs or removing water meters. Four of these shocks were fatal.

CAUTION – Prior to undertaking any work, a full Hazard Assessment should be carried out.

Working on water pipes

If work is to be done on water pipes as mentioned previously, the following procedure should be adopted:

1. Locate the main switch/switches for the premises and turn off.
2. Use a bridging conductor to bond across the section of pipe to be cut and keep it in place until the work is completed. It is highly recommended that a braided copper lead, which will carry 70 amps or more with insulated screw clamps be used (refer to AS 3500). Make sure the surface of the pipe is thoroughly clean and in good electrical contact with the clamps of the bridging conductor.
3. If the main earth connection to the water pipe has to be disconnected, it will be necessary to contact an electrical contractor to perform this task and make any alternations necessary in order to maintain an effective earthing system.
4. If a metallic water service is being replaced with plastic water pipe, it will be necessary to have an electrical contractor make the necessary alterations to the earthing system, therefore ensuring that the installation main earthing system remains effective.

QUICK TIP – It is strongly recommended that a power point tester be purchased and used to check the customer's power point before connecting your equipment. These simple devices can be purchased from most electrical wholesalers.

Safety switches

A portable safety switch, also known as a Residual Current Device or RCD, should be used for all your equipment including extension leads. This will give you added protection against accidents such as cords being damaged or faults in equipment but it cannot protect

against all faults that could occur in the customer's premises.

Safety recommendations

The following tips are recommended for your safety:

- If you see electric arcs or experience tingles, contact the local electrical network operator as a fault may exist.
- Use a bridging conductor when cutting out sections of water pipe that could be carrying electricity.
- Use of insulated gloves is recommended.
- Use a safety switch to reduce the risk of shock from your portable tools.
- Before digging, find out if there are any underground cables (**dial 1100 before you dig**).
- Be very careful when the need arises to work in the vicinity of the overhead electrical connection to the premises. It may be necessary to have the supply conductors disconnected while works are carried out in their vicinity.

IMPORTANT – If you employ others, you are responsible for their occupational health and safety.

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