



Insight & Expertise

A Guide to Power Earthing Step and Touch

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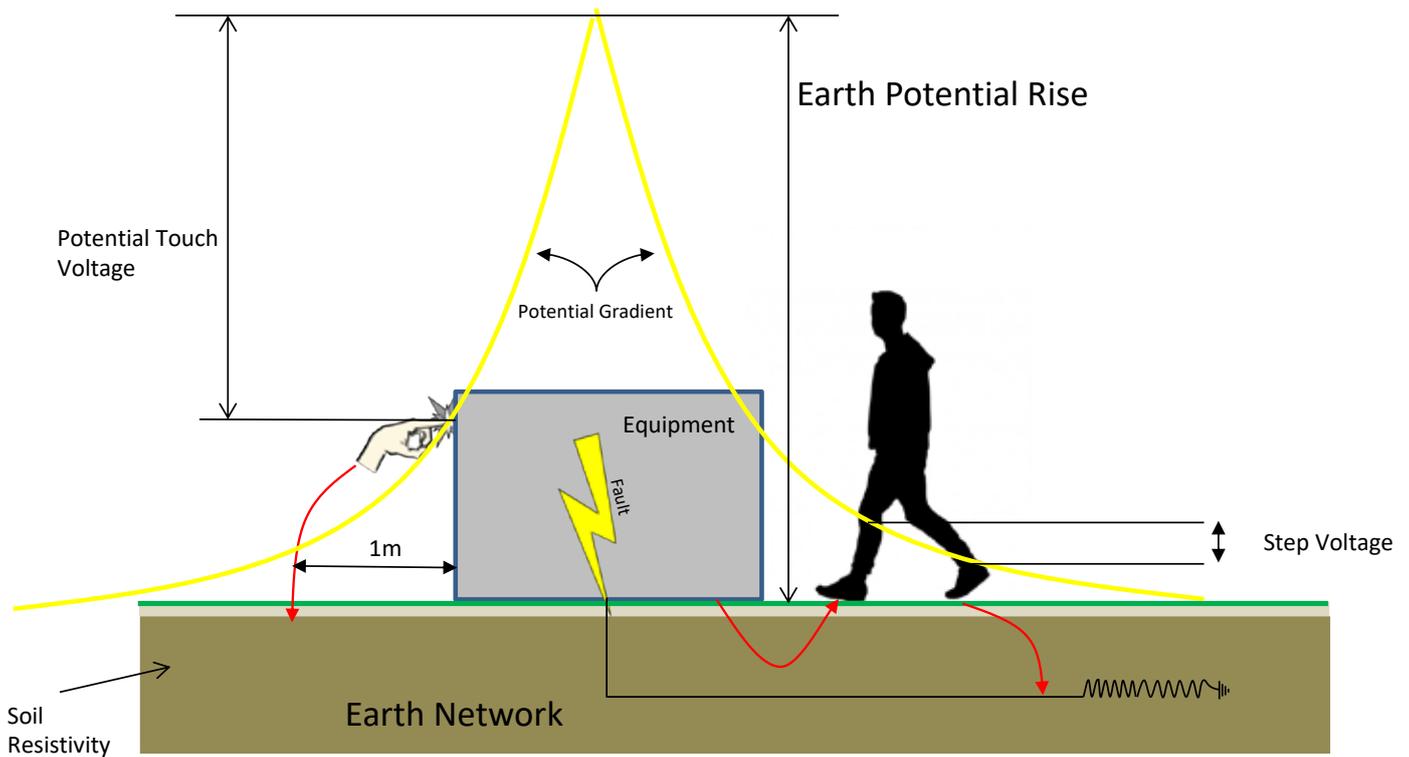
What is Earthing?

The topic of Earthing Systems covers a wide range of issues. Here we discuss Earth Potential Rise (EPR) Step & Touch Potential for Electrical Power Systems.

Earthing of electrical systems has been around almost as long as the electrical system itself. EPR is caused by electrical faults that occur at electrical substations, power plants and HV transmission lines. While there are still some specialised electrical systems out there that don't need to be earthed as part of their design and operation, the vast majority of the ones we deal with do!

Quite simply, Earthing Systems exist to safeguard against electrical shock. Electrical shock incidents can result in harm to a person in various degrees of harm ranging from burns to death. There are different codes of practice regarding Earthing that depend on where you are in the world. Consequently, they all approach this subject in different ways through national regulations and standards. However, they all share the aim to achieve specific common objectives: the most important of which being safety to personnel.

When an Electrical fault occurs, the short circuit current must be dissipated as safely and as quickly as possible for the protection system to interrupt the current flow. Typically, part of the short-circuit current flows to earth rods and dissipates into the general mass of the Earth, causing a voltage rise around the area of the substation where the Earth Rods are located.



What is Step and Touch Potential?

The difference in the surface potential experienced by a person bridging a distance with their feet apart without contacting any other grounded object is often referred to as Step Voltage Potential.

You could be at risk of injury during a fault simply by standing near the grounding point. The potential difference between the ground potential rise and the device surface potential at the point where a person is standing while in contact with the faulted structure is often referred to as Touch Voltage Potential.

What causes Step and Touch Potential?

There are a variety of causes that lead to high Step and Touch potentials. A definitive Earthing design and its continued upkeep is essential to avoid electric shock events.

A well-designed Earthing system considers all possible causes to provide an effective means of dissipating the fault current into the earth without exceeding the safety boundaries or adversely affecting continuity of service. It provides a safe environment to protect personnel in the vicinity of those grounded facilities from dangers of electric shock under the fault condition.





What should I be doing?

You should understand what Earthing arrangements are in place, which should be documented, reviewed and tested and above all, you need to be clear that any mitigation you have in place is sufficient. If you don't, then seeking the advice and support from a professional electrical engineering company would be a great place to start.

Above all, always remember that the Earthing of electrical systems serves an invaluable purpose to keep both people and equipment safe.

Can I do this myself?

There are some basic steps that you can take to understand the level of risk associated with your Earthing systems. These include;

- > Carry out a detailed non-intrusive survey of the substations
- > Obtain HV Earth Fault protection and cable information and the Earth grid resistance values
- > Build a site Single Line Drawing representing ground fault conditions
- > Provide recommendations for each substation area identifying any hazards





[Where Covol can help](#)

At Covol, we undertake studies and site assessments to determine the overall effectiveness of the various Earthing systems to satisfy the requirements of the appropriate British Standards.

We are able to carry out Step/Touch calculations for each of your substation as per BSEN50522 standard and provide a report with recommendations on any remedial actions that may be required to improve your safety systems at your site/facility.

To find out more about how we can help your company engineer change, get in touch today.



Ready to engineer change and progress in your business?

Get in touch to speak to our experts

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