



GROUNDING & BONDING

(Q) I hear about grounding & bonding being so important in my plant's electrical system. I am not from an electrical background. Can you explain why this is so important?

(A) How would you measure 8oz of milk unless the base isn't at zero ounces? How would you time out intervals in a game if the clock doesn't start at zero?

Well, in electrical circuits, ground generally means a zero reference - zero volts to be more precise. When we speak about a single phase 120V, it actually means 120V relative to zero volts (+120V and -120V). But that's just the beginning...

Electrical energy just wants to flow to zero volts or ground. Its like gravity always pulling stuff to the ground - it is like that but in electrical terms.

So why is this SO important?

- Electrical energy is LAZY. The electrical energy wants to flow to ground through the least resistive path. Generally a workers body offers too much resistance compared to a neatly and adequately connected grounding wire. If a circuit fails then MOST of the energy flows through the wire and not our body. If that ground wire was absent - the electrical energy would just force itself through our body. Great for the electrical energy - bad for the body!

Does the application of portable grounding close to an employee working on overhead line now make sense?

- Now electricity is made to do work for us. It is a waste of money just generating electricity to let it go to ground. Sometimes when things go wrong and the electrical energy tries to make a run for ground, the police then take them out. You would know these law enforcing officers as protective devices. A protective device (fuse, breaker, etc.) sense that some electrical energy is flowing to ground, they immediately trip the source. A ground fault is very sensitive and trips early enough to result in less damage. (Think about one prisoner trying to scale a prison wall compared to thousand prisoner busting out the front gate!)

United we stand, divided we float!

- Since the ground may not be located at every panel, we run a ground wire to each disconnect. This is called the power system ground. Then we connect the metal frames of electrical equipment to each other. This is called bonding. United, these grounds keep us safe and allow protective devices to work. Without these, the system is considered floating - it has no reference. Our (grounding) strength lies in unity - one poor connection makes us weak - a floating system is a dangerous system.

Finally, lightning strikes wreak havoc on electrical equipment and people.

- A good (to great) grounding system sends all the energy to ground instead of having it flow through people or equipment.
There are several other reasons for grounding and bonding - but these are perhaps the most important: Worker safety, equipment safety (protective device operation), and lightning protection. We recommend that you test ground periodically (between 3-5 years). There are IEEE and NFPA guidelines on these. Feel free to contact EH&S for advice on care and maintenance of grounding systems.

