

Re: O.T. Step Potential ...

Source: <http://sci.tech--archive.net/Archive/sci.electronics.repair/2008-04/msg00722.html>

- *From:* "Michael A. Terrell" <mike.terrell@xxxxxxxxxxxxxx>
 - *Date:* Tue, 15 Apr 2008 11:30:57 -0400
-

Arfa Daily wrote:

"Michael A. Terrell" <mike.terrell@xxxxxxxxxxxxxx> wrote in message
news:Wt2dne14LYi1aJ7VnZ2dnUVZ_t6onZ2d@xxxxxxxxxxxxxx

Arfa Daily wrote:

Sorry all. O.T. as a repair issue. Just something I read about today that I'm not sure I understand.

Anybody come across the term "step potential" or its effect in regard to a downed live power line in contact with the ground ?

It is the voltage drop across the surface of the soil or concrete, and if it is high enough simply taking a step will electrocute you. There was a story about this on an Orlando TV station a few years ago about a police horse being electrocuted in the downtown area. An old outdoor sign had been removed, and the wires abandoned. Apparently, someone turned the breaker back on, and it didn't trip. The officer was on patrol when his horse crossed the path, and was killed. The shorter the path to a good ground, the higher the available voltage is, per step.

Ok Michael. This is kind of the way this article describes it, except it states thus :-

Re: O.T. Step Potential ...

"When a power line comes in contact with the ground, electrical energy spreads out through the surrounding earth – like the ripples in a pond from a tossed stone. Each expanding concentric circle has a different electrical potential. Under these circumstances, taking a step could place your feet in areas of different voltages, allowing electricity to course through your body, entering one foot, and exiting through the other. The consequences can be fatal."

There is a drawing of a power line, and someone trying to leave the car that brought it down, and standing on two of these neatly drawn circles.

Now, I can see what the article (and you) are saying, but what I didn't understand was the mechanism that caused these "expanding concentric circles" of potential difference, which would be close enough together – what's the length of a step, 45cm (18") perhaps? – to allow you to step on two of them together. At what speed are they expanding? Presumably, slowly enough to allow you to step on two for long enough to fry you? Or has the person writing the article, or the artist, got it basically wrong, or are attempting to over-simplify or create a non-realistic model that might better allow a semi-layman to understand the concept?

That description is more than simplistic, it is completely wrong. There are usually more than one good ground path, so you can have a gradient even if you walked in perfect circles. It all boils down to Ohm's law, and the current path to every point that is well grounded. If you have no other choice, you want to take as small of a step as possible, but a pair of dry shoes add a lot of protection. It's possible that the ground might only be 10 feet from where the wire touches the ground. If that is a 7200 volt line, that would be 720 volts/foot. In that case you would get a shock, even if you are standing on one foot.

I can see, maybe, how you might get a travelling wave radiating out from a high voltage point, but with a wavelength equivalent of several hundred kilometers at 50 or 60Hz, and I might be able to see how you could possibly get an interference pattern between multiple downed phases, but I'm struggling with the basic electrical physics of this. Any other thoughts, Michael? Anyone?

The article was a H&S publication from 2003 by National Grid, who apparently own a number of large utility companies your side of the pond.

It was probably written by the marketing department. A good technical paper could run 100 pages or more, and include actual case studies. No one outside the industry would read that, so the dumb it down to the point most people will at least take a quick look before tossing it into

the trash.

--

aioe.org is home to cowards and terrorists

Add this line to your news proxy nfilter.dat file

* drop Path:*aioe.org!not-for-mail to drop all aioe.org traffic.

<http://improve-usenet.org/index.html>

Use any search engine other than Google till they stop polluting USENET
with porn and junk commercial SPAM

.