Misinformation about Earthing and Ground Currents

Gaétan Chevalier, Ph.D., director of the Earthing Institute
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Misinformation relating to the safety of Earthing abounds on the Internet. Among it is the common misconception about proliferating ground currents in the Earth potentially harming you if you ground yourself on "electro-polluted" ground.

Such baseless ideas sow fear and confusion in the minds of people already grounding or considering it.

And such misinformation unfortunately was repeated by Magda Havas, who studies electromagnetic field effects on health, in an article by Joseph Mercola on electro-hypersensitivity in September 2018:
https://articles.mercola.com/sites/articles/archive/2018/09/09/emf-filters-for-electromagnetic-hypersensitivity.aspx

Here are Havas' specific errors in the article:

1. *"It turns out you can have electricity flowing through the ground. This is happening more and more often. In part because of the way we use electricity in North America; with the way that we distribute it and transmit it."*
Response: The opposite is true. It is happening less and less. Only remote rural areas are still allowing the use of the ground as a return path. All American and Canadian cities use a neutral wire because it is much more effective and safe than using the ground. Much electric power is lost when the ground is used as a return path. For all practical purposes you do not have to worry about electricity flowing in the ground.

2. *"We have so many multiple grounds that the electricity from an area of high electrical conductivity can move to an area where there's less electrons, so they just move through the ground. When you have moving electrons, you can create a current."*
Response: This statement is both meaningless and baffling. Multiple grounds do not cause problems because there is no current flowing in grounding systems unless miswiring, short circuits, or a malfunction are present requiring the intervention of an electrician.

3. *"There are farms mostly in Wisconsin, Minnesota and Iowa that have a really serious ground current problem with their dairy cows. These cows are just constantly lifting their feet because they're being exposed to ground current. But it's not the 60-cycle that's most damaging. It's the dirty power [100 kHz] flowing through the ground that is causing it …"*
Response: Ground current problems are exceedingly rare and practically limited to outdated and inefficient electrical systems (single wire earth return, SWER) in remote areas. See below for an explanation of SWER systems. The so-called "dirty power" (also known as "dirty electricity") referred to here is a different issue. It involves rapid transients within the electrical power supply that generate electromagnetic fields (EMFs) and it is those EMFs that may disturb some sensitive people. Examples: power surges from refrigerator cycling, dimmer switches, or switching on-and-off of appliances could be

disturbing. But this does not affect the efficacy of grounding. Our research shows that grounding clearly protects the body against EMFs.

4. "*There are people who claim that the best thing you can ever do is get grounded. I would agree with that, provided you're in an area where you don't have a ground current problem. It's like you can drink clean water, you can drink dirty water. They have very different effects.*"
Response: The best thing indeed you can do is get grounded because grounding naturally reduces inflammation and pain, which are at epidemic levels worldwide. The comparison with clean and dirty water is meaningless. Grounding always works the same way, providing electrons to grounded individuals, independent of the presence or absence of electricity, EMFs, and ground currents.

5. *"If you have dirty electricity flowing through the ground, getting grounded means it's now entering your body, because it comes right in through one leg and down the other basically."*
Response: No current flows through one leg and down the other unless you are in a very unlikely area. You would need to be standing barefoot precisely on a surface with current flowing below ground, such as in a barn using the outdated electrical system (SWER), or in the immediate vicinity (within a few hundred feet) of an electric power station. Furthermore, you would also need to have your feet apart by about three feet in order to create a significant enough differential in electric potential. Cows are larger animals, with front and back hooves separated by several feet. If they are standing over ground with ground current beneath, they could indeed feel current flowing through their body. So why the warning here, as if this were some kind of a global danger? This is pure misinformation and exaggeration.

6. *"These devices that you plug into your electrical outlet that you then put on your bed so that you're grounded at night, people who use them are beginning to tell me that after a couple of days or a couple of weeks, they're actually beginning to feel quite ill."*
Response: Sometimes people feel some temporary malaise and flu-like symptoms after starting grounding. Such symptoms are generally related to a detoxification effect, a result, we believe, of the body operating more effectively, its self-healing mechanisms being enhanced. For more information, refer to the following article: *New to Earthing?* There can be no current on grounding products connected to a wall outlet because they are connected to one ground point only, and not part of a closed circuit necessary for a current to flow. However, anyone uncomfortable about using an outlet for grounding purposes can utilize instead a designated ground rod planted in the soil outside.

7. *"My guess is that they've got dirty electricity coming through the ground, into their sleeping area, and hence, making them sick. You have to be very, very careful where you're grounded ..."*
Response: This is an erroneous guess. See the explanation above. Moreover, so-called "dirty electricity" does not come from the ground. Dirty electricity generates EMFs as a result of rapid spikes in the power system, as already explained. Grounding protects you against EMFs generated by power lines, including those generated by dirty electricity. Your body becomes like a Faraday Cage.

Several studies have been conducted showing the safety of Earthing inside using wall outlets even in the presence of EMFs, and one of the studies includes premature infants. ALL show major reduction of common 60 Hz EMFs induced on the body when grounded. These studies are summarized here: http://www.earthinginstitute.net/studies-confirm-indoor-grounding-safety-and-reduced-exposure-to-ac-voltage-emfs/

And here is an article exposing much of the typical misinformation about Earthing circulating on the Internet: http://www.earthinginstitute.net/wp-content/uploads/2017/12/beware-of-earthing-misinformation.pdf

As of September 2018, nearly 25 studies on Earthing have been published, most of them in peer-reviewed health journals, describing that grounding generates hugely significant effects throughout on the body. Life changing, in many cases.

I have personally participated in many of the studies, and most of them have been conducted using grounded indoor outlets, as is the practice of most people grounding themselves. Earthing does not run on electricity, but facilitates the transference of the Earth's electrons to the individual grounded via the use of various conductive mats, bands, and patches connected to the grounding systems of houses and buildings or a designated outside ground rod.

Single Wire Earth Return (SWER) Systems: Can the Ground Be Used as a Power Line Return and Harm People Who are in Contact with the Ground?

Here's the answer and background to a practice that has caused much unnecessary speculation and concern.

The first misconception: this practice is widely used, even in densely populated areas.

That's false. SWER is used in rural and remote areas (including within Canada, Australia, and New Zealand, and under special approval, in the U.S.) and more widely in a few developing countries (such as Brazil, India, and Laos), and parts of Africa.

The U.S. National Electrical Code does not permit using the Earth as the return path; it requires a metallic return line (neutral wire) from the load (appliances, interior and exterior lighting, computers, and any object that uses electricity) to the generator. The code, however, allows the use of the ground as a return path only as an exception that requires approval by local authorities. [1, 2]

The advantage of SWER is its low cost. Electric power companies use the ground as the return path of the AC circuit instead of a return (neutral) wire, and by doing so save on the expense of many miles of wires needed to meet increasing demands for electricity.

But there are definite disadvantages, including the following, which is why SWER is being abandoned, at least in most industrialized countries.

1) Large power losses, especially when the soil has high resistance (dry soil or rocky terrain, in particular).
2) SWER lines tend to have high resistance in any case because of the long distances between poles carrying the hot wires, so a voltage drop is often a problem and causes an irregular voltage supply.
3) Voltage delivered to end users along the SWER lines can also be affected by the electric power demand at any given time resulting in surges and deficits.
4) Most hazardous is the presence of significant current, on the order of 8 amperes, flowing through the ground immediately adjacent (within a few feet) to the earth

point (where the return wire/rod is planted in the ground). A good-quality grounding method needs to be used to prevent this risk. Such places, while few in number and quite remote, should be avoided.

5) In the U.S., the National Electrical Code requires that the current produced by a short circuit of any kind (called a fault) be able to trip a circuit breaker or blow a fuse to prevent injury to people or damage appliances/equipment. This can only happen with a neutral wire that connects with the local power source, which a SWER system doesn't include. The code also requires that electrical systems include a ground connection to stabilize voltages in the presence of lightning, line surges, or accidental contact between regular power lines and high-voltage lines. [1]
   The electrical code is not a law, but insurance companies in the U.S. require compliance, and regulating agencies oversee compliance. The standards are usually followed closely because one can be sued if the guidelines are not followed.

The second misconception: if you are in the path of the return ground current you may receive a shock if walking barefoot or using grounding equipment indoors.

The concern is really false, unless someone were to stand or walk barefoot precisely on ground under which there was SWER current. This would be an extremely unlikely situation, and what you might feel is more like strong tingling than a shock. Just like the cows feeling the tingling and, in response, they lift their legs. Regarding potential harm if you are using Earthing equipment indoors, there is no way that a current can flow up the grounding wire, to the Earthing equipment, and enter your body. Current requires a closed circuit. Earthing involves connection to one ground point, essentially an open circuit. Moreover, Earthing cords include a 100k ohm resistor which would substantially limit any current and protect you from a shock, even if you were to touch a live wire while grounding.

References

1. National Electrical Code, 2008 edition. Section 250.4(B)(4) of National Fire Protection Association.
2. Single-wire earth return, Wikipedia, accessed January 21, 2015: http://en.wikipedia.org/wiki/Single-wire_earth_return