NCB Dial Sweet Spot

Blocking Current and Dirty Electricity While Reducing the Electric Field

by Andrew McAfee June 17, 2022

When using a grounding mat or anything grounded that touches the body, current is likely going to be an issue. As the EPRI research[1] has shown that current is the killer, not voltage, we must not let current to access our body. Those using grounding mats and grounded sheets for therapeutic goals, may be unaware of the resulting issues created by touching grounded objects and the dangers associated with making contact with home grounding systems.

I developed the Nuisance Current Blocker (NCB[2]) for grounding mats and bed sheets to stop contact current and dirty electricity from traveling through the body while also reducing the electric field. Here is the video[3] that accompanies this article to help explain the procedure.

The challenge is to reduce the current to below a harmful level and still drain off enough of the electric field presence. This is a delicate dance getting both current and electric field reduction since allowing the current to flow releases the pressure (electric field/voltage) upon the body.

Simplistically put, voltage is pressure and by reducing the pressure you reduce the voltage. Voltage = electric field strength. If you block current flow, you build up electric pressure, like a dam holding back a river. The water pressure builds up as the water rises on the dam. Allowing current to flow releases this pressure and lowers the electric field.

The key equipment to accurately measure these levels are the Fluke 287[4] and NFA 1000[5]. The Fluke measures the current (and dirty electricity) and the NFA 1000 measures the electric field, as a floating measurement, not as a grounded reference. Adding another grounded reference skews the results as the electric field presence will be altered with the additional ground path.

There are multiple sources of current on a home grounding system. There are foreign grid based sources and also local, inside the home appliance and code violation sources. The equipment grounding conductors of the home always have some level of current on them so all grounded appliance frames and anything plugged into an outlet, are exposed to this current.

In short, it is unhealthy to touch anything associated with the grounding system in a home or business. We all need protection from this current and the dirty electricity riding on that current. The NCB is designed to do this especially when using a grounding mat or grounded sheets. Here is the Hazards of Grounding webinar[6] introducing the NCB. From this, you can see, it is highly recommended to first throughly repair all wiring code violations in a home before doing any shielding that requires grounding or if planning to use any grounding products that will touch the human body.

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1 Contact Current Timeline. https://img1.wsimg.com/blobby/go/fe5450ce-6fa0-41e3-9bd6-3fc41d3ca21c/downloads/Contact%20Current%20Timeline.pdf?ver=1654621978683

2 https://www.shieldyourbody.com/product/ncb/?billing_country=US

3 https://www.brighteon.com/0bc4415f-dc1e-4c2a-9388-5b3216f0a211

4 Fluke 287 True-rms Electronics Logging Multimeter with TrendCapture Discount: FLUKE-FUN-10

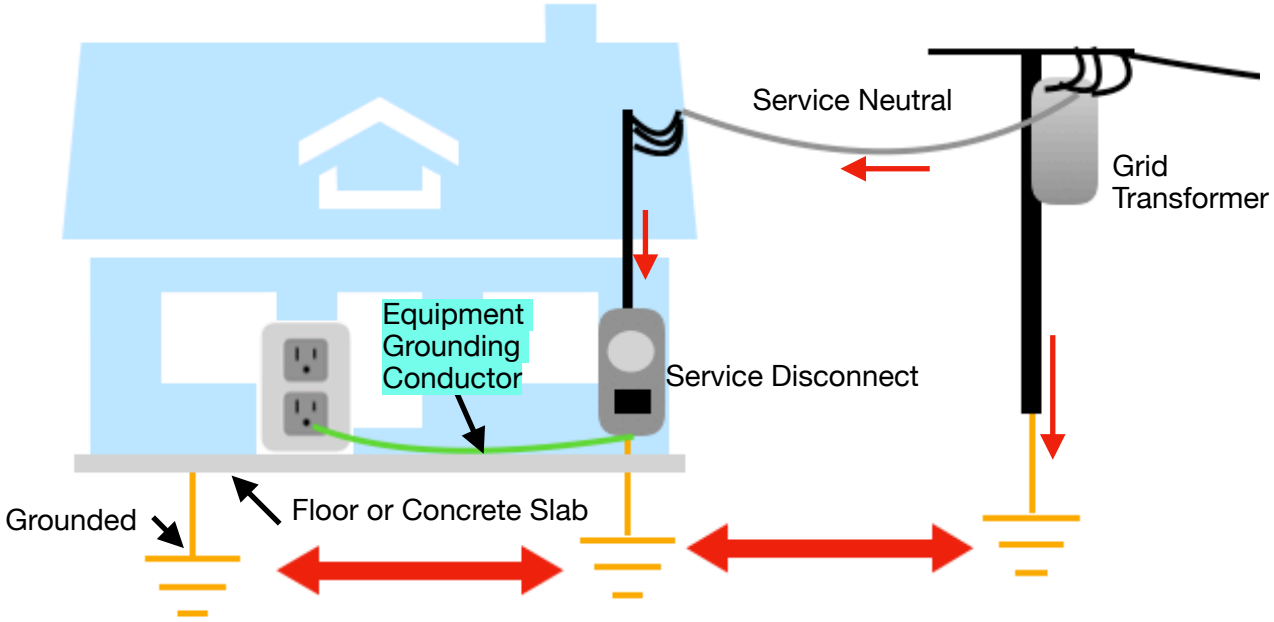
5 NFA 1000. https://safelivingtechnologies.com/NFA1000/ (Discount 5% off: RES-5)

6 The Hazards of Grounding & How to Ground Your Body More Safely. https://www.youtube.com/watch?v=lp5OJGHp2PA&t=3561s

Even after all of the home sources of current have been removed, there are still the foreign sources to address. Using the NCB Pro[7] can remove the foreign sourced current from a well pump, appliances that touch the concrete foundation, furnaces with grounded transformers, and so on. There is still one source that is currently not possible to remove, and that is the code required grounded neutral at the service. That neutral/ground point connects the entire grounding system of the home to the primary side[8] return current of the power grid transformer.

Exposed to that source of current, the house grounding system is constantly being pushed upon by that source for a path back to the substation. If our body gets into and completes a circuit for that current, it will flow through us. Current takes all paths.

The floor of the home and anything associated with the earth outside, like the home's concrete slab, is a conductor for this current. If we stand on that concrete and touch a grounded appliance or grounding mat, we will complete the circuit for that grid return current. Here is a visual for how this happens in and around the home.



The transformer on the pole (or green metal box out in the yard) has the neutral (return current wire) grounded to the earth, and also connected to the primary side of the transformer's return current path. According to EPRI, a large portion of that return current flows through the earth.[9]

That grid current enters the home on our service neutral, which is again grounded at our service disconnect. The concrete is touching the earth so is also a terminal, a connection point to the grid current. The green wire represents the equipment grounding conductor that runs to each outlet and appliance in our home. That green wire is both attached to a current carrying conductor, the neutral, and the earth (ground rod), at the service disconnect (the first whole house circuit breaker).

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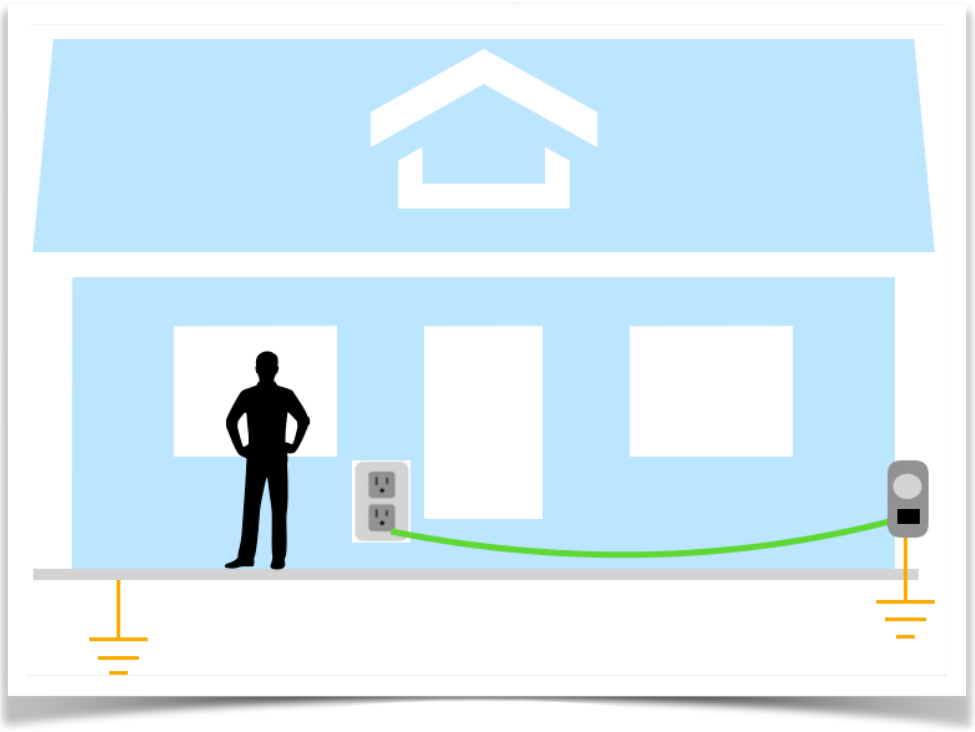
7 https://www.shieldyourbody.com/product/ncb-pro/?billing_country=US

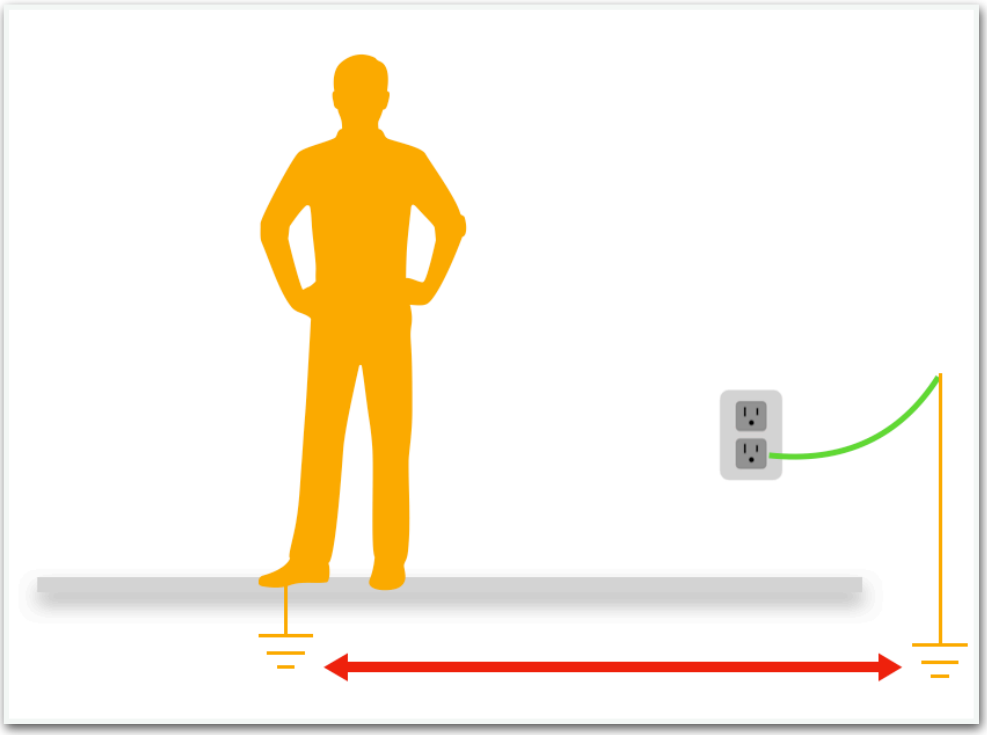
8 Current Flow Whack-A-Mole. https://img1.wsimg.com/blobby/go/fe5450ce-6fa0-41e3-9bd6-3fc41d3ca21c/downloads/Current%20Flow%20Whack-A-Mole%209.10.21.pdf?ver=1655403075774

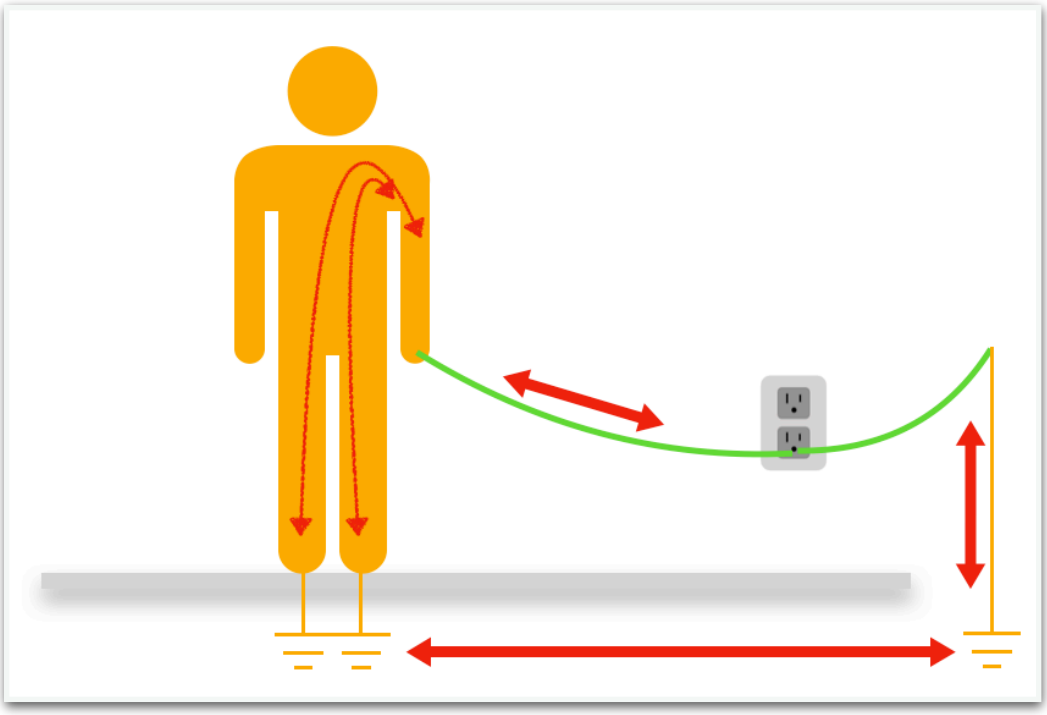
9 Current Flow Whack-A-Mole. https://img1.wsimg.com/blobby/go/fe5450ce-6fa0-41e3-9bd6-3fc41d3ca21c/downloads/Current%20Flow%20Whack-A-Mole%209.10.21.pdf?ver=1655403075774



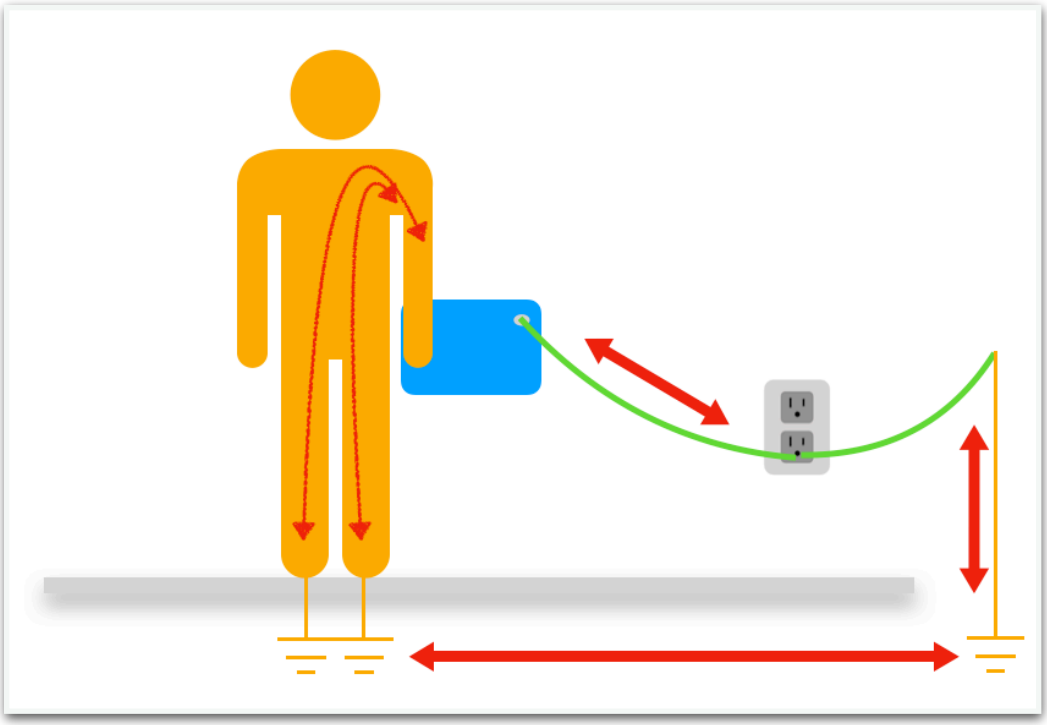
Current flows in a circuit, a circle from the source, out, and back to the source. We have to be in this circuit for current to flow through us. Just touching the floor will not necessarily mean we have current flowing through us.

There is a voltage (electric field), a pressure pushing upon us from the grid current, trying to go through us. It can't go through us unless we enter into and complete the circuit.



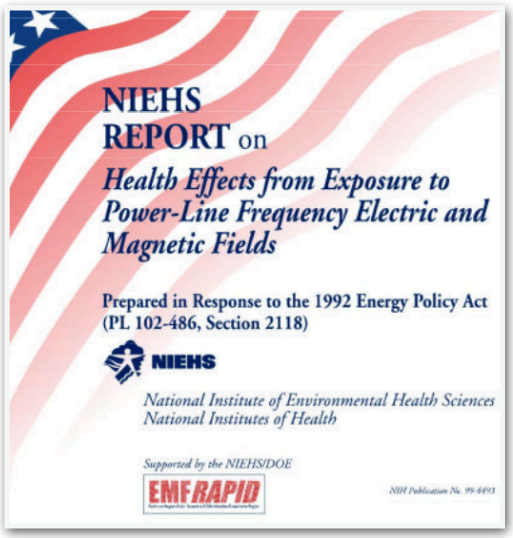


If we do touch an equipment grounding conductor (which is attached to all metal framed appliances), we will complete a circuit for current to flow between the grounded points.



A grounding mat is the same as touching an equipment grounding conductor or metal framed appliance. The grounding mat is connected to the equipment grounding conductor that contains the grid current. The contact, the touch, is the key for current flow.

The Electrical Power Research Institute has done excellent research into current that makes contact with the body (contact current) and its possible health effects. The levels that exceed the NIEHS threshold to become a potential cancer causing environment (especially leukemia in children) is of considerable importance and relevant to our topic. Please take time to read the research[10] and watch this webinar[11] to absorb the ramifications if we actually apply the results.



In 1992, Congress threw a whole bunch of money at the National Institutes of Environmental Health Sciences (NIEHS) to figure out why children were getting leukemia around power lines. The final release of the NIEHS report in 1998 revealed one very important number, 1 mV/m. If there were an internal voltage gradient of 1 mV/m (one millivolt per meter) in the bone marrow of a child, that would be biologically active towards leukemia and other types of cancer and/or disease.

In Sept. 2001, EPRI published information to help us understand just how much contact current would exceed that NIEHS threshold or limit.

"The results indicate that as little as 5 μA into the hand produces between approximately 20 mV/m (average) to 60 mV/m (95th percentile) within a child's lower arm bone marrow. Lower electric field values, but still greater than the benchmark 1 mV/m, are expected within the child's bone marrow at other sites."[12]

This means that 5 μA exceeds the 1 mV/m benchmark by 20-60x. Therefore, we need 20-60 times less than 5 μA. 5 divided by 20 = 0.25 μA. 5 divided by 60 = 0.083 μA. Are we going to be testing to see if there is 0.08 μA making through our bodies from grounding systems or surfaces that we touch? Wouldn't it be easy enough to say that if ANY measurable current makes it through the body we have exceeded the NIEHS threshold? Pretty much. That is the character and power of a minuscule amount of current through our body to do damage.

We of course don't want a cancer causing environment but what about way before we get to that extreme? How about just an unhealthy electrical environment from grounded surfaces?

To boil it down to a punch line, any measurable current through the body is harmful. Yep, any current at all. The properties of current flow are unique and can be equated to or be as much or more damaging than ionization radiation.[13] To say the least, to be healthy, we need to avoid current above all other electromagnetic influences because of the properties of current flow.

And, understanding how the current flows through the body to grounded references is also important to understand in order to test it accurately as well as to protect oneself. Here are pictures from one study showing current flowing to anything grounded.

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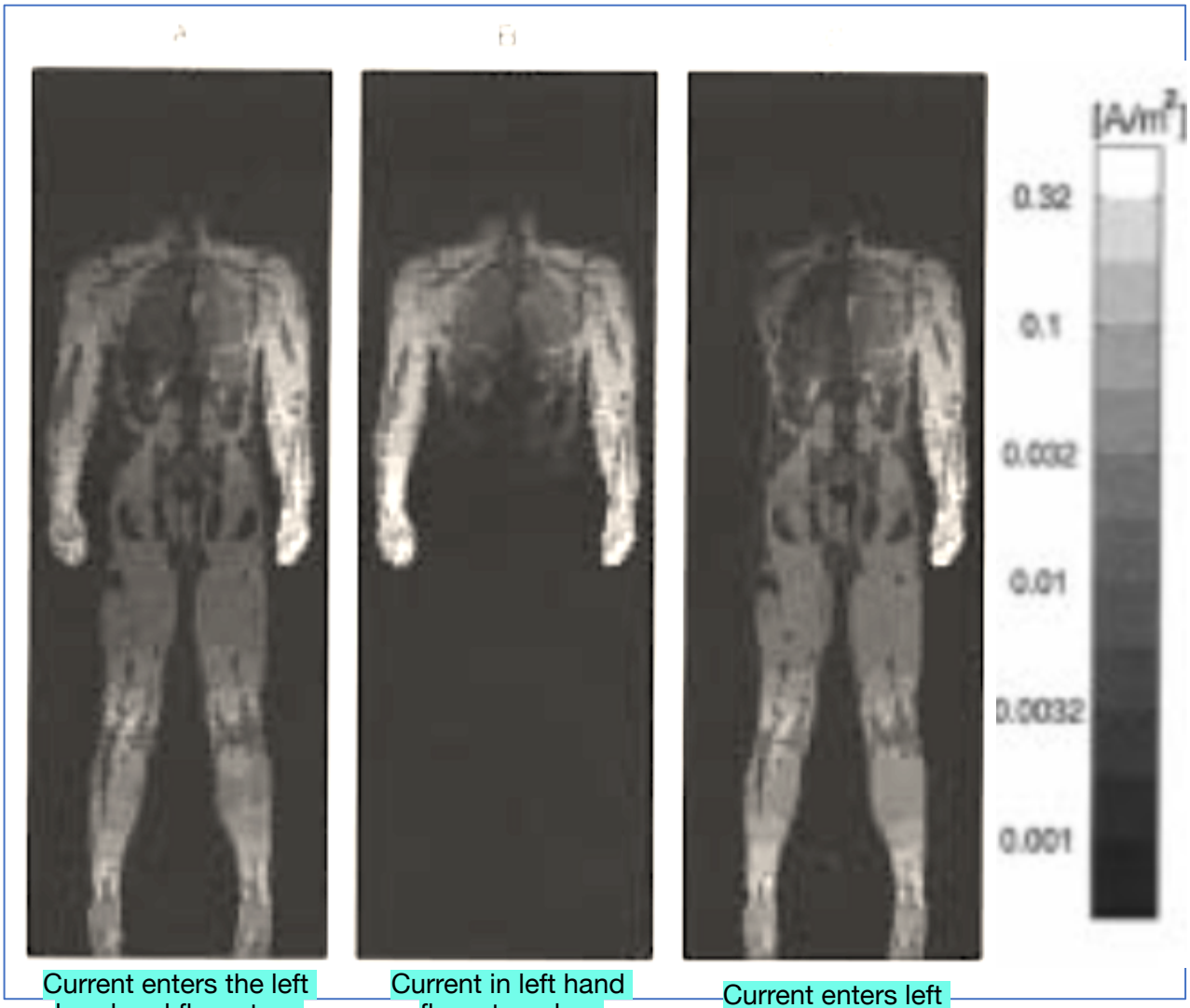
10 Contact Current Timeline. https://img1.wsimg.com/blobby/go/fe5450ce-6fa0-41e3-9bd6-3fc41d3ca21c/downloads/Contact%20Current%20Timeline.pdf?ver=1654621978683

11 Introducing the NCB Pro, https://www.youtube.com/watch?v=drjB93wuKGk

12 Electric Fields in the Human Body Resulting From 60-Hz Contact Currents. Trevor W. Dawson, Senior Member, IEEE, Krys Caputa, Maria A. Stuchly*, Fellow, IEEE, and R. Kavet IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, VOL. 48, NO. 9, SEPTEMBER 2001

13 EMF Tracing 102, pg 51. https://homeemftracing.com/shop/ols/products/home-emf-tracing-102

Current Flows Through the Body



Current enters the left hand and flows to a grounded right hand and both grounded feet.

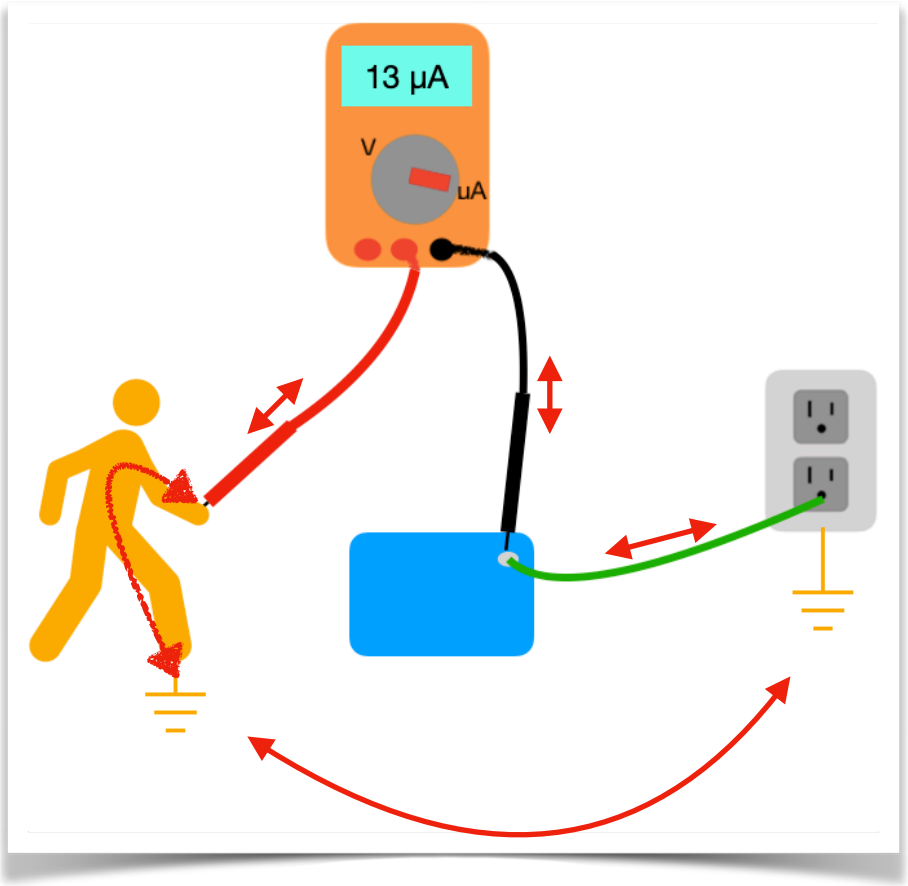
Current in left hand flows to only a grounded right hand.

Current enters left hand and flows to both grounded feet.

"Current injection via the left arm is clearly visible in all scenarios. Current spreading beyond "the shortest path" can be seen. Again, this is not surprising, as spatial distribution of tissue conductivity determines the complex patterns in which the injected current flows to grounded electrodes."

"Electric fields in the human body resulting from 60-Hz contact currents." Dawson, Caputa, Stuchly, Kavet. *IEEE Transactions on Biomedical Engineering*, vol. 48, no. 9, pp. 1020-1026, Sept. 2001. doi: 10.1109/10.942592

Measuring these extremely low levels of current using the Fluke 287 is now possible. Here is how to set it up. Just place the meter between the contact point on the body (the hand) and the contact point of the source, or what ever you would be touching (a grounding mat).



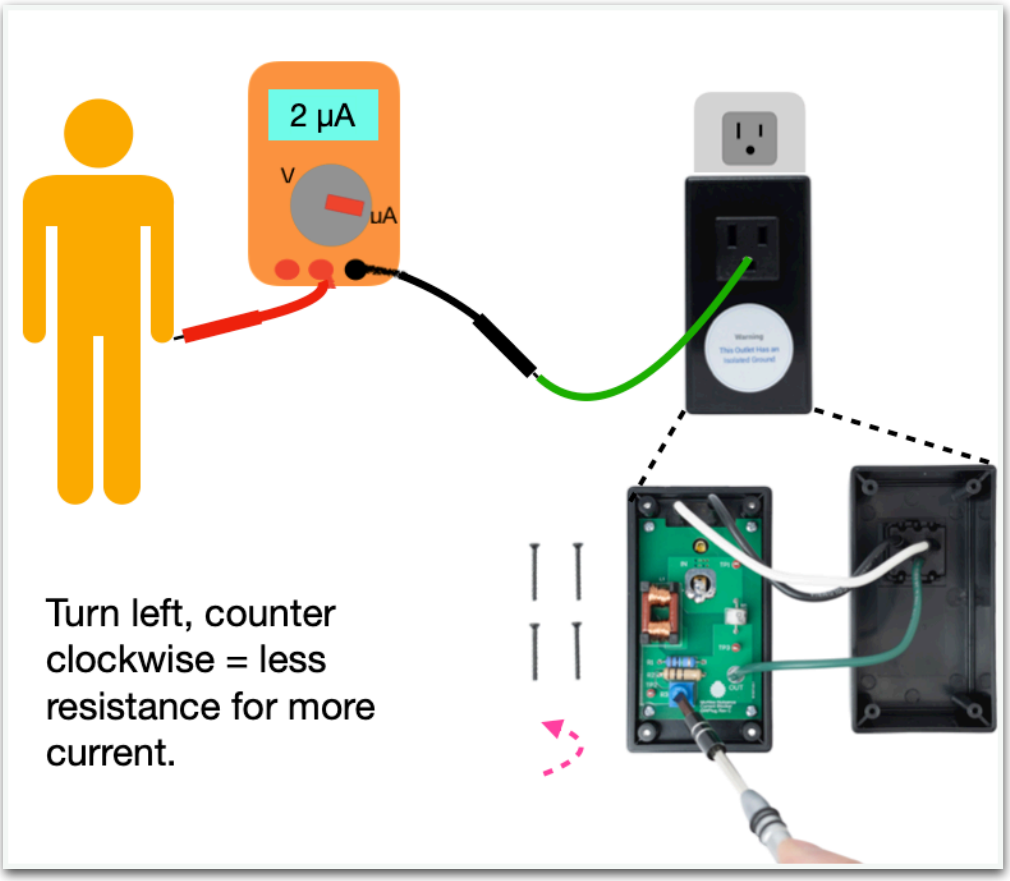
This is set up in series, in a straight line, so there is only one path for the current between your hand and the mat. The Fluke will tell you if your body is completing a circuit for current and also how much current is making it past the skin and all the way, internally, through the body.

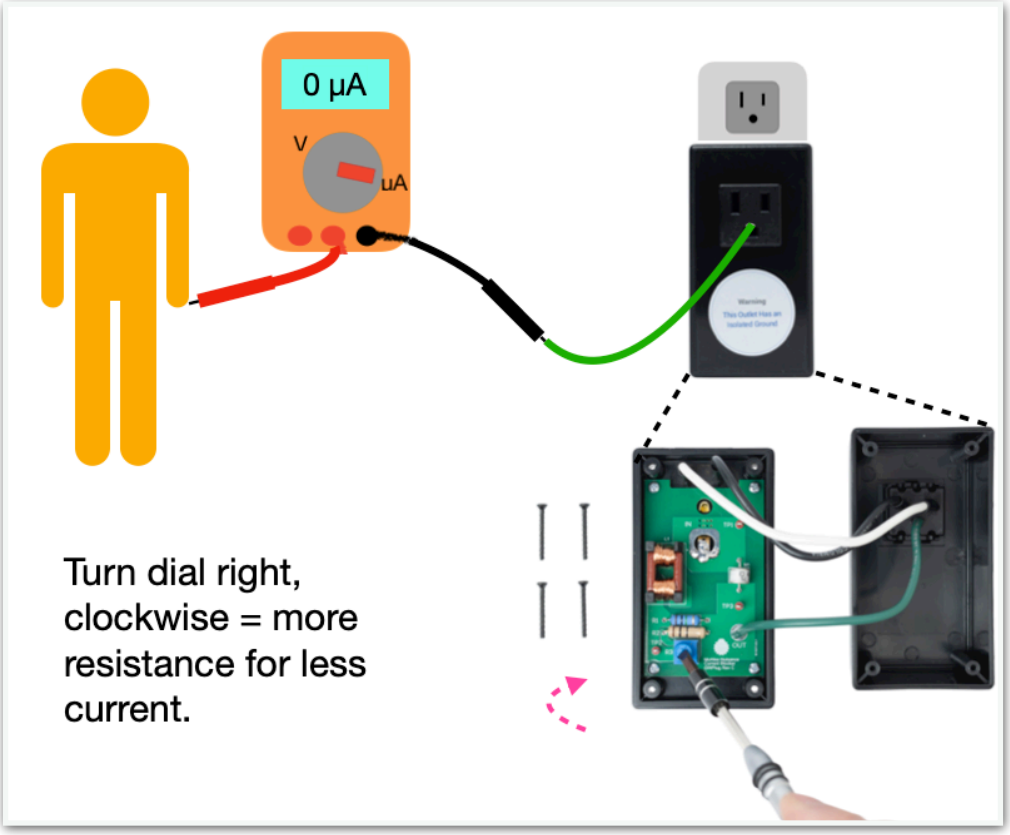
The next step is to see how the NCB can stop the current while preserving the benefits of the grounding mat to reduce the electric field presence. This can get confusing fast so I am only going to focus on the current, first, and then later address the electric field component.

By plugging the NCB into an outlet, and plugging in the grounding mat to the NCB, you will often see a dramatic reduction in the current just from that action. If the dial (inside the box) is turned all the way to the left (counter-clockwise), the resistance (or impedance) to the current is about 14 Ω (ohms).

If the dial is turned all the way to the right (clockwise), the resistance (or impedance) will be about 500 kΩ (500,000 ohms or 500 kilohms). The more resistance (impedance) against the current, the less flow. You squeeze a hose of water and the water slows down.

If you reduce the resistance (less impedance to the flow) the more current is allowed to flow. This is what the dial does and that is why it is called a dial resistor. An extremely important feature about the NCB is that it also provides an **effective ground-fault path**. It keeps your circuit breaker and GFCI's for your protection, unlike other products with just a resistor.

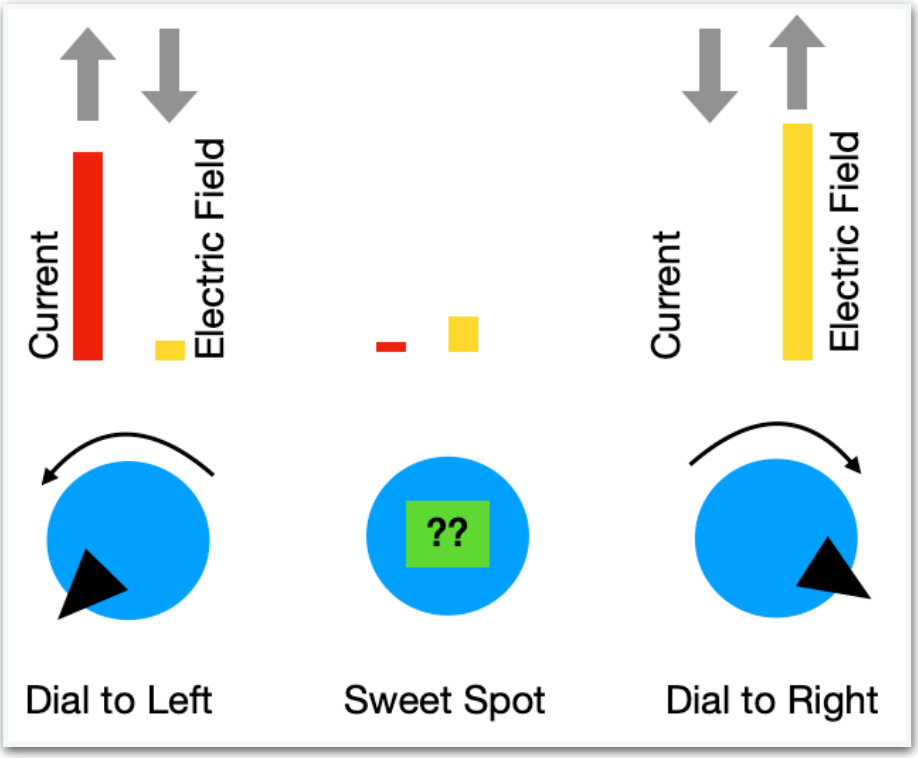

2 µA
V
uA
Turn left, counter clockwise = less resistance for more current.


0 µA
V
uA
Turn dial right, clockwise = more resistance for less current.

Simple enough. Now to understand the electric field response. With a constant voltage source, like from the grid, we are going to play with the resultant effects of blocking the current flow.

The electric field will, most of the time, go in the opposite direction. If you reduce current, the electric field increases. If you increase current flows, the electric field decreases. The more resistance, the higher the electric field. The less resistance, the lower electric field.

By turning the NCB dial, you will be doing two things and opposite actions will be taking place.



What we want is the best of both worlds. But most of all, the greatest reduction in current is vitally important. How far do we have to turn the dial to get rid of the current but keep the electric field as low as possible? That is why we have to use the Fluke 287 and the NFA 1000.

You want to place the NFA 1000 near the body, but not touching the body. The NFA 1000 is measuring the interaction of the fields to and from your body. We don't want a lot of push and pull of forces around your body.

Place the NFA between your feet on the floor, or on a desk between you and your equipment. Don't put it on your lap or hold it in your hand. Measure the electric field between your body and a nearby voltage source, like a laptop, lamp or other energized object. See the video[14] for an example of how this is all set up and measured.

One vital rule to follow is to first, always ground appliances, not the body. Do as much as you can grounding lamps, computers, anything around you to pull or attract the electric fields away from you, first. See this video[15] and how effective it is. Then the grounding mat touching your body will do a much, much better job and will be much easier to manage using the NCB.

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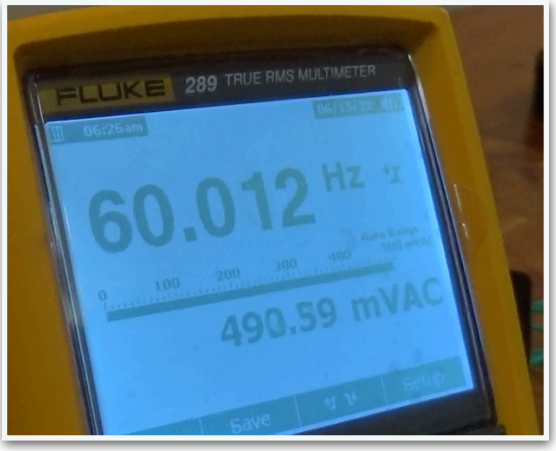
14 https://www.brighteon.com/0bc4415f-dc1e-4c2a-9388-5b3216f0a211

15 Lamp Grounding. https://www.brighteon.com/21e14900-5b15-4900-9a7b-cd102393f9ec

Another rule especially in sleeping areas is to turn the power off. De-energize the circuit or unplug things to remove the electric field as much as possible, first. Then the remaining fields are much easier to manage. Of course, replace lamp cords with shielded/grounded cords[16] and use shielded power strips[17] and extension cords[18] as much as possible. You can add a USB grounding cord[19] into your laptop and a grounding adapter[20] for your ethernet. Basic alligator clips to plug cords[21] from LessEMF are handy. See my Resources[22] page for more links.

Now the bonus from stopping the current, is also reducing the high frequency voltage spikes called dirty electricity (DE) from entering your body. You don't want to be filtering the power grid's DE through your body. Stopping the current stops the dirty electricity riding on that current wave. The higher the frequencies, the deeper the penetration into the body and cells.

The picture on the left is with the dial turned to the left, allowing some current and the resultant 2.28 kHz frequencies. The picture on the right is with the dial turned to the right, choking the current and also the dirty electricity. Only the 60 Hz electricity in the room is left.



If you have power on in the room, there is still 60 Hz electric fields all around you and the Fluke 287 will be recording that energy upon your body and on the grounding conductor. Turning off the power, greatly reduces that 60 Hz power and the remaining frequencies are much easier to address and manage.

If considering RF shielding for 5G, I highly recommend this mini course called "Staying Healthy in a 5G World." Use this code ANDREW5GDISCOUNT for an incredible price reduction. The take-away is turn off the power in that area and use ungrounded shielding options.

To answer many of the questions, watch this introductory webinar and this webinar for experts. Watch for more info here: www.homeEMFtracing/NCB and www.shieldyourbody.com/NCB

Thank you very much! Andrew McAfee

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16 https://www.electrahealth.com/device_cords.html?aff=6

17 https://www.electrahealth.com/shielded_grounded_low_emf_6_outlet_power_strip.html?aff=6

18 https://www.electrahealth.com/Extension-Cords_c_57.html?aff=6

19 https://www.electrahealth.com/Premium-USB-Grounding-Adapter-for-Laptops-and-Other-Devices_p_159.html?aff=6

20 https://www.electrahealth.com/Ethernet-grounding-adapter-kit_p_129.html?aff=6

21 http://www.lessemf.com/ground.html

22 https://homeemftracing.com/resources