GROUNDING ELECTRIC FENCES

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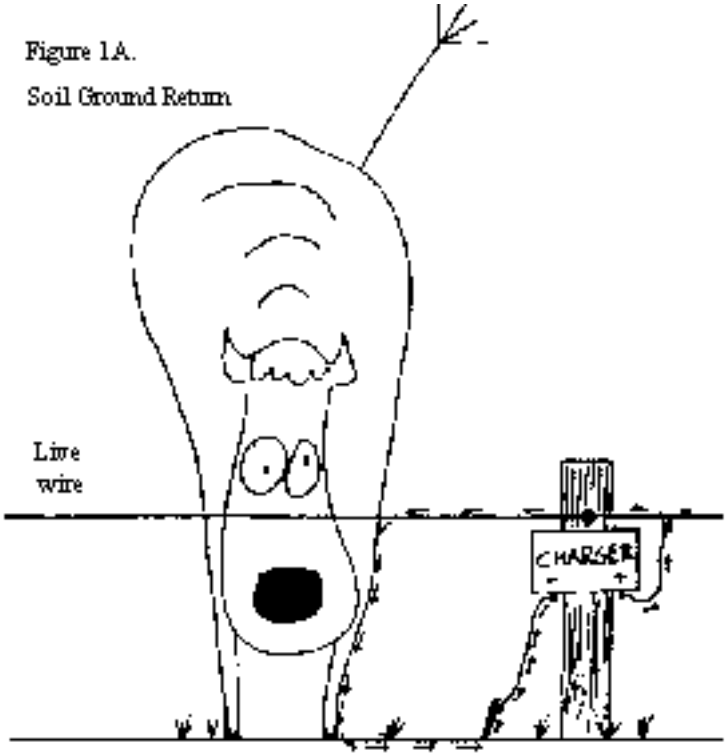
Poor grounding is the leading cause of electric fence problems. Eighty percent of electric fence problems can be traced to fault grounding systems.

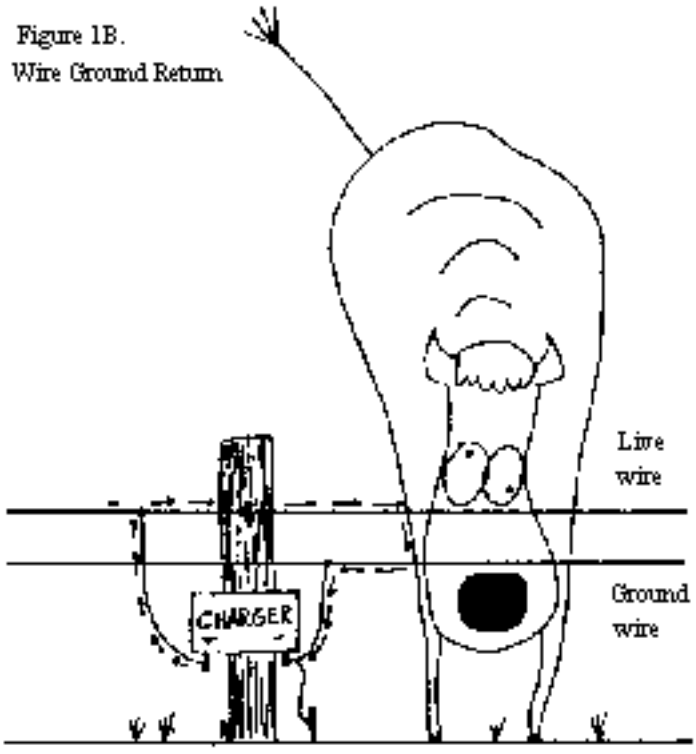
After reading this article you will be able to:

1. **Design an adequate grounding system for an electric fence**
2. **Determine the effectiveness of your present grounding system**

EFFECTIVE GROUNDING COMPLETES THE CIRCUIT

For an animal to receive a shock it must complete a circuit. The circuit can be either from the energizer through a "live" wire through the animal, through the soil, and through ground rods back to the energizer (figure 1A), or from the energizer, through a live wire, through the animal, through a ground wire back to the energizer (figure 1B).





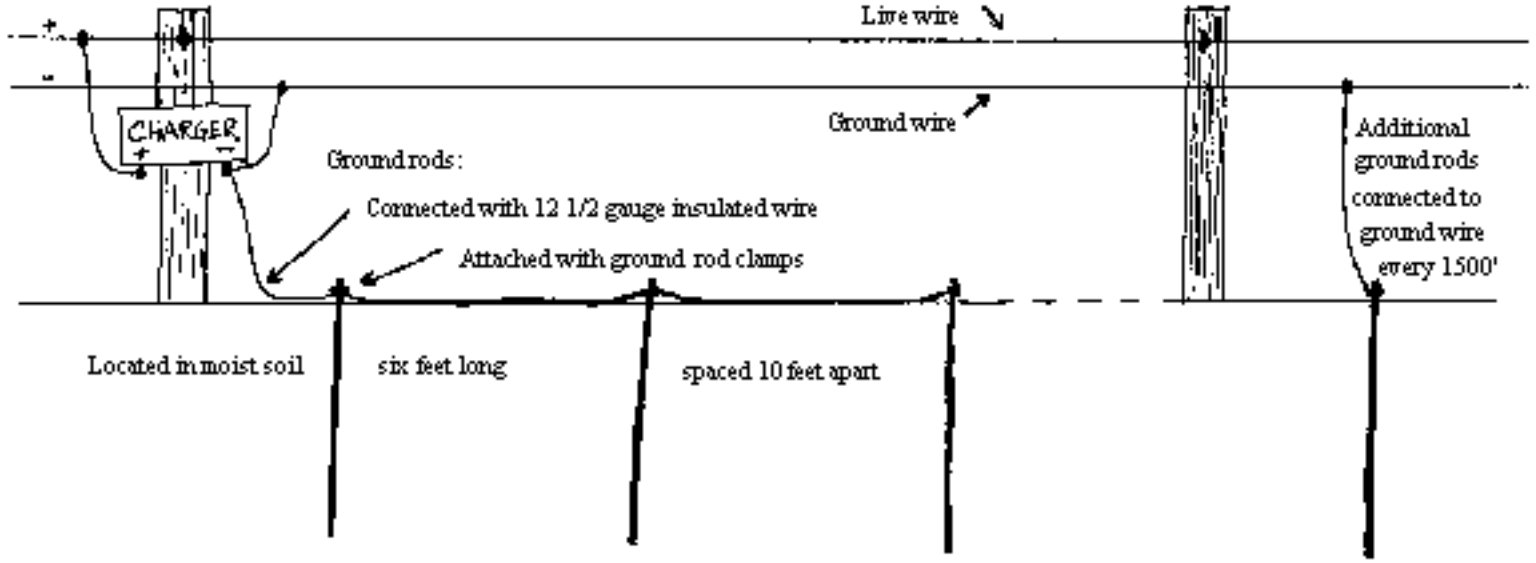
Moist soil is a good conductor of electricity. Therefore, electric fences on irrigated pastures rarely require ground wires. However, when soil moisture is depleted (for example, summer on dryland range) animals will not be shocked by electric fences unless ground wires are included on the fence.

DESIGNING AN EFFECTIVE GROUNDING SYSTEM

The grounding system for an electric fence is a little like a radio antenna. With a radio, the bigger the antenna, the better the reception. Likewise, your electric fence energizer requires a large grounding system to collect enough electrons from the soil to complete a powerful circuit.

A minimum of three ground rods should be used for each energizer. One half inch diameter galvanized steel rods or 3/4" galvanized pipe make the best ground rods. They should be at least 6 feet long and driven 5-1/2 feet into the soil. They should be spaced at least ten feet apart. More ground rods may be needed in dry areas. If your fence includes ground wires, it is advisable to install additional ground rods connected to the ground wire at 1500 foot intervals along the fence line (3000 foot intervals are adequate where soil is moist year round).

Energizers should be connected to ground rods with 12-1/2 gauge wire attached with ground rod clamps (figure 2). The connecting wire should be insulated so that it does not come in direct contact with the soil (i.e. 12-1/2 gauge direct burial cable is ideal). Use one continuous wire to connect all ground rods.



Try to place ground rods near permanent moisture (electron flow to ground rods in moist soil greatly exceeds the flow in dry soils). Locate ground rods where they are:

- Highly visible
- Near permanent moisture (within a few hundred yards of a creek or pond is ideal)
- Not likely to interfere with mowing or cultivation

- Not likely to be damaged from, or cause injury to, livestock

Ground rods should be located away from:

- Vehicle and machinery traffic
- Any ground rod connected to other electrical systems
- Telephone ground rods
- Underground plumbing or metal piping (even if not in current use)
- Any metal building in contact with the soil

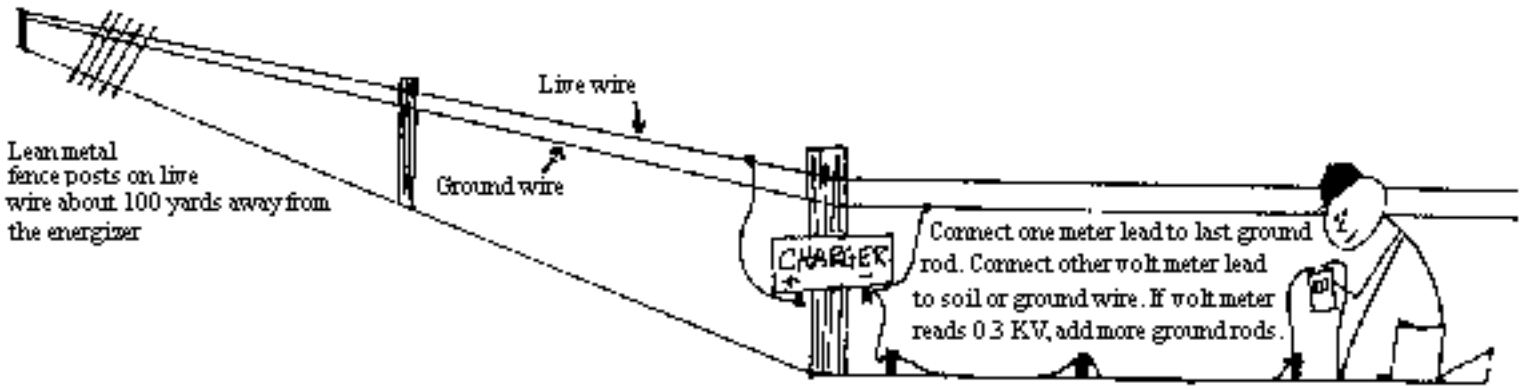
TEST THE EFFECTIVENESS OF YOUR GROUND SYSTEM

You can test the adequacy of your current grounding system using the simple procedure outlined below. This test is best conducted during the driest part of the year.

1. Lean several metal "t" posts against a "live" fence wire and the soil about 100 yards away from the ground rods. Use enough posts so that your voltmeter shows less than 1,000 volts (1.0 kV) in the live wire (figure 3).
2. Connect one lead from your voltmeter onto the ground rod furthest from the energizer.
3. Make a firm connection with the other voltmeter lead to the soil (it may help to tap a stiff wire into the soil several inches, connecting the voltmeter lead to the end of this wire).
4. If the voltmeter detects over 300 volts (0.3 kV) then suspect the following problems:

- Insufficient number of ground rods (this is the most common culprit)
- Ground rods too close together
- Poor connections between wires and ground rods

If you have ground wires on your fence, try connecting one voltmeter lead to the ground wire. Connect the other lead to the last ground rod. Again if the voltmeter reading is over 300 volts suspect one of the problems listed above.



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