

*Here a paraphrased article by Dave Johnson. He did the MXT as I remember, and is with Fisher now. It's a good read. - Rob Olszta, Find's Treasure Forums*

## **Electrical Interference**

Because of the high sensitivity of modern metal detectors coupled with the proliferation of sources of electromagnetic interference, you are likely to encounter electrical interference. It is important that you recognize electrical interference when present, and take appropriate measures to deal with it.

### **Symptoms of electrical interference**

Electrical interference can cause a metal detector to chatter spontaneously, to lose sensitivity for no apparent reason, or to cause periodic audio wobble or slow waves of spontaneous sound. All metal detectors are susceptible to electrical interference, but they vary in what kinds of electrical interference affect them. In a given environment some metal detectors may be affected by electrical interference whereas others may not.

### **Common sources of electrical interference**

Common sources of electrical interference include: overhead electric power lines, underground power lines, other metal detectors, telephone lines carrying electronic data, computer systems, electric fences, old CRT-based televisions, cell phones, thunderstorms, fluorescent lights, metal vapor lamps, military aircraft with electronic warfare countermeasures turned on, electric motors, VLF military communications systems, and automobile ignition systems. It will sometimes be the case at home, in the showroom, or in an urban environment that there are several different sources of electrical interference present simultaneously.

**WOW!!!**

All metal detectors generate a certain amount of electronic noise internally. On most metal detectors, especially the higher performance models, the sensitivity can be adjusted high enough to work into the noise. This is not a defect, but an intentional design feature. Experienced users striving for maximum depth often adjust the machine to work into the noise, and then they listen through the noise for the sound of real targets.

### **Is electrical interference a bigger problem than it used to be?**

Stricter regulations have cut down on interference from electric light dimmers and auto ignition systems. However there has recently been a proliferation of VLF-UHF wireless communication systems (cell phones, Bluetooth, (WI-FI, etc.) which often affect metal detectors. Overall, the potential for electrical interference is greater than it was a few years ago.

Also, modern high-end metal detectors are a lot more sensitive than older units,

which will increase their vulnerability to electrical interference. Engineers are working on ways to reduce that vulnerability, but the battle will never be won because metal detectors are by their nature designed to detect magnetic fields, and electric current always produces magnetic fields.

### **What can a user do about electrical interference?**

All metal detectors are equipped with a sensitivity control, or with other controls (for instance gain or threshold) which have the effect of controlling sensitivity. The primary reason metal detectors provide sensitivity control, is so the user can reduce sensitivity in order to eliminate response to electrical interference. Some users are reluctant to reduce sensitivity out of fear of losing depth. Well, you're going to lose some depth, but you can still search. If you give up and walk away, you lost 100% of your depth. The sensitivity control is your first line of defense against electrical interference.

Many midrange and high end metal detector models have a feature called frequency shifting. This can be used to reduce or eliminate certain kinds of electrical interference, especially from other metal detectors. It is effective in dealing with power line interference. It is not effective against electrical interference from thunderstorms, electric fences, or auto ignition systems.

Many metal detector models have both a discrimination mode, and a motion all metals mode which has a slower, smoother response than the discrimination mode. Electrical interference is often more controllable in the all metals mode than in the discrimination mode. In the discrimination mode, setting the discrimination level into the foil region will usually reduce electrical interference problems: however there are many different discriminator designs out there in beeper land and this trick doesn't work for all of them. In the discrimination mode, you will often find that although the machine may be chattering if the search coil is not in motion, once you start sweeping over the ground, the signal from the ground will suppress the electrical interference chatter except for an occasional pop or click.

If you carry a cell phone or other high-tech electronic equipment with you while metal detecting and run into problems with electrical interference, try turning off the electronic equipment (all the way off, not just standby) and see if that solves the problem.

When working near overhead power lines, you will often find that you get the best results right under the power line and the worst results at about a 30 to 45 degree angle away from the power lines. Many sources of electrical interference are intermittent. You may find that an area which is difficult to search at one time of day may be easier after 5 PM or on weekends. Power lines are usually quietest late at night, and early weekend mornings.

Small search coils usually pick up less electrical interference than larger search coils. For a given size search coil, a concentric coil usually picks up less electrical interference than does a DD.

### **Distinguishing electrical interference from other problems**

The loudness of electrical interference will usually vary as you walk around holding the machine, and also it will usually vary with changes in the orientation of the search coil. This is almost never the case if the problem is in the metal detector itself.

The most common cause of a noisy metal detector where the problem is not electrical interference is a defective search coil (including cable and connector). In many cases a defective search coil is intermittent which can be determined by giving the coil a whack with your hand (not with a hammer!). If whacking the search coil with your hand fixes the problem at least briefly, the problem isn't electrical interference. Also, it is often the case with a noisy search coil that the noise has a sporadic character, and is almost as bad with sensitivity adjusted to a low level as it is with sensitivity adjusted high.

The second most common cause of a noisy metal detector is an internal calibration which has drifted over time. This is rarely seen with the most modern designs which have few calibration adjustments because nowadays so much of the function is in software. However some of the most popular machines are ones which have been around a long time with a proven track record, and some of these older mostly circuit-based designs have a number of internal calibration adjustments to maximize performance.

The third most common cause of a noisy metal detector is dirt or water in the search coil cover (scuff plate). If you use a search coil cover to protect the search coil from abrasion, it should be periodically removed and cleaned