

# METAL DETECTOR TROUBLESHOOTING GUIDE

Metal detector troubleshooting can be a frustrating experience. There are many factors that can interfere with the proper operation of the metal detector. Quite often the “metal detector” problems are found to be caused by outside influences rather than the metal detector itself. The following are the most common causes of poor metal detector performance:

## POWER LINE INTERFERENCE

Today's metal detectors are sophisticated electronic devices. They require a power source that is free from large fluctuations in line voltage. Power line “noise” is another possible source of problems for metal detectors. The noise or voltage spike, can be caused by a variety of other equipment running on the same power source as the metal detector. The most common sources of these spikes are motors, heaters, sealers or any other high current load. Metal detectors have some noise suppression circuitry built into them but if the spike is large enough it will cause the metal detector to false trigger.

## EXCESSIVE VIBRATION

Most metal detectors can handle quite a bit of vibration without loss of sensitivity. Severe vibration, especially sudden jarring bumps, can cause false triggers.

## TWISTING OR STRAINING OF THE METAL DETECTOR HEAD

It is very important for metal detectors to be mounted on a flat surface. An incline, decline or vertical mount is not the important consideration as long as the surface is flat. An uneven surface will cause the metal detector body to twist or strain when the mounting bolts are tightened. This causes the metal detector to be unstable and can cause false triggers or drifting. Also, if the metal detector is mounted to a conveyor or support stand it is important for the feet of the conveyor to be firmly on the floor. If the conveyor or stand rocks it can create the same effect.

## CHANGING OR INCONSISTENT PRODUCT

In food processing applications, if the metal detector is set up to run frozen product and occasionally a semi-thawed product comes through; this will cause a false trigger. This is because the metal detector is set up to recognize the signal from the frozen product as a normal signal. The signal from the semi-thawed product is different, therefore the metal detector interprets the signal change as a metal contaminant. Similarly in mining applications, varying levels of iron or copper in ore can cause the metal detector to false trigger, if the sensitivity is too high.

## RADIATED SIGNAL INTERFERENCE

Because the metal detector is made of a transmitting and receiving antenna, it is susceptible to other signals that might be present in the area. False triggers can be caused by such things as microwave type sealers or heaters, walkie-talkie type radios, or even faulty spark plug wires on a nearby forklift. Any machinery that can cause a burst of electrical energy is a possible source of interference. The best method to minimize the interference is to place a shield around the possible source and electrically ground the shield.

## GROUND LOOP INTERFERENCE

Many false triggers of a metal detector seem to have no obvious cause and can be very difficult to diagnose. One of the most common causes is a ground loop. When two pieces of metal make intermittent contact in the area of the metal detector it can cause a false trigger. Because the metal detector consists of a transmitter and receiving antenna, there is a very weak electrical field generated around the inspection head. The field will conduct itself through whatever is in its range, whether through the air or through any metal in the area. As long as the field remains stable, all is fine. If there is metal in the field that is making intermittent contact with another piece of metal, the shape of the field changes suddenly and the metal detector will give a false indication. Possible sources of ground loops are loose nuts or bolts, poorly designed reject devices, degenerating bearings in an idler or drive pulley, or even another piece of machinery bumping up against the metal detector system.

## SYSTEMATICALLY NARROW YOUR SEARCH

While finding the exact source of the problem may take some time, it is relatively easy to narrow the search. If a metal detector starts to false trigger, remove any product from the system and turn off the conveyor. If the detector continues to trigger then the problem is more likely to be electrical interference or a problem with the metal detector itself. If the detector stops triggering it is normally safe to assume the metal detector itself is ok. Now start the conveyor and see if the detector begins to false trigger. If it does then the problem is in the conveyor, possibly metal embedded in the belt or some type of ground loop interference (see above). If all is still fine then begin to run product through the system. If the detector triggers on each product or on occasional product, the detector is not properly adjusted for that product and adjustments must be made.



Have questions? We are here to help!



**ADVANCED DETECTION SYSTEMS®**

[www.adsdetection.com](http://www.adsdetection.com)

4740 West Electric Avenue, Milwaukee, WI 53219 USA

phone: 414-672-0553 • fax: 414-672-1283

[sales@adsdetection.com](mailto:sales@adsdetection.com)