

Loops: Phantom Detections and Air pockets

By Brian Dickson

“So that’s why my gate opens when I come down my driveway on my horse!” Proclaimed Mr. J. “I was told it was the metal in the horse shoes, but the gate would still open even when they were off.” This is what one my friends said after I educated him about air pocket in loop design. The problem with Mr. J.’s gate is his horse was causing ground vibrations that resulted in a Phantom Detection. Phantom Detections happen when the gate/door opens when nothing is there, or when its not suppose to. This is one of the leading reasons why installers must do a repeat service call on brand new gate/door systems with loops installed. The amount of time traveled to get to the job site could cost quite a bit. I’m from California and it takes 1-2 hours to revisit a job site with traffic. Therefore understanding what is causing these “Phantom Detections” and how they can be prevented can save you money and preserve your image of professionalism and knowledge to your customer.

The best place to start would be to understand how an inductance detector and loop works. The detector will energize the loop wire with an oscillating signal current. This current will cause Electro Magnetic Field (EMF) fields around each wire and a level of inductance will result. The inductance level will change if any conductive material enters the detection field. This change in induction will cause a change in current flow. The detector has a circuit that looks for a change in current and will trip a switch when a change is detected.

A change in inductance can be caused by slightly moving the loop wire windings closer or further apart from each other (an example is the vibration caused when a horse comes down the driveway). This moving of the loop winding CAN TRIGGER the detection circuit. When loop windings are lying loose in a conduit or air hose, slight ground vibrations from a vehicle or gate/door movement could cause loop winding to move ever so slightly that end up setting off the detector. To see this effect for yourself, hook up a coiled up induction loop to a detector and slightly disturb the coil. You will experience a detector trip with the slightest movement. This happens because each loop wire has its own EMF field that will interact with the adjacent wire’s EMF field. Depending on the field relationship, either the fields will double in value or cancel each other out. This change will either increase or decrease the inductance that will result in a change in loop current.

Depending on which loop in the loop system is being affected by ground vibration will cause different results. A free exit loop (Automatic exit loop) the gate/door will open on its own. A reverse loop (Obstruction detection loop) the gate/door will being to close then reopen. By understanding which loops are being affected gates/doors can be serviced more efficiently.

Sadly it is still common practice that installers will continue to make their own direct burial loops by running wire through PVC or an air hose. Another problem is the air pocket in the loop design can weaken a concrete structure, in some cases as much as 40%. If a loop is being installed in a parking garage or where the concrete is vital to structural integrity, an air pocket shouldn’t be allowed at all. Loops wrapped through PVC also have a history of water getting inside of the air pocket causing the loop to short to ground causing the loop to not work at all. Problems can often occur after rain or sprinklers then magically disappear. This is because an air

pocket is present. To prevent an air pocket in the loop, try using a preformed loop without an air pocket or a loop filled with a sealant throughout the entire loop.

Brian Dickson is the Production Manager of BD Loops, a manufacturer of preformed direct burial and sawcut inductance loops for the gate/door industry for more than eight years. BD Loops has over 200,000 loops installed with only one loop failure, and is available through 130 distributors nationally. The company has several letters of recommendation testifying their professionalism and design, and is a member of the following associations: AFA, IDA, NOMMA and IMSA. Visit BD Loops at www.bdloops.com and use the distributor locator tool to find a distributor near you. Call BD Loops at 714.890.1604.