

Using Electric Offsets as Part of Fencing Systems

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One of the biggest challenges when renting pastureland is marginal perimeter fencing. It is very hard to justify the investment in new perimeter fencing if the lease agreement is short-term. One option is to install an electrified offset on the interior of the perimeter fence (Figure 1). This works especially well with old woven wire fences. The electrified offset 1) helps to contain livestock, 2) extends the life of the existing fence by keeping animal pressure off the marginal fence line, and 3) provides an electricity source to allow for further subdividing of pastures with temporary fencing. Lastly, offsets can be removed and utilized on other farms if the lease expires or is terminated.

Because electric fencing is a psychological barrier, it is imperative that the animal's first experience with it be safe but memorable. For this to occur, offsets need to be installed correctly. When installed correctly, electric fencing can be an extremely effective tool to control livestock and manage grazing. If corners are cut and inadequate materials not designed for electric fencing are used, a frustrating experience can occur. The objective of this publication is to provide practical tips for installing electrified offsets that can effectively control livestock and extend the life of new and existing fencing.

Use quality offsets. Make sure that plastic components are UV stabilized and any metal components have a Class III galvanization (Figure 2). Saving a few pennies now can cause problems later as plastic components start to break down in the sunlight and metal components rust.

Use 170,000 PSI 12.5-gauge high-tensile wire with a Class III galvanization. This wire is corrosion resistant, able to be hand tied, and economical. A good quality, high-tensile wire will cost pennies per foot. Once installed, wire should be tensioned just tight enough to take the slack out.

Mount offsets at nose height of the livestock that are being controlled. The height of the offset is important since the goal is to shock the animal in the face and create a psychological barrier. For cattle, this will be around 30 inches off the ground. For small ruminants, this will be between 18 and 24 inches off the ground, however it may also be necessary to add a second offset at 6 to 8 inches off the ground so the small ruminants cannot go under the fence and for predator protection.



Figure 1. Electrified offsets can breathe new life into an old fence. They control livestock, extend the life of an existing fence, and allow for further subdivisions using temporary fencing.



Figure 2. Plastic components in the offsets should be UV stabilized and any metal components possess a Class III galvanization.



Figure 3. Wire-mount offsets are easy to install and remove. The straightforward design is ideal for older fences since the mounts are flexible and move with the fencing material, thereby reducing the chance of shorts.



Figure 4. Offsets for wood posts are more rigid than wire mounts. The rigidity makes them a good choice to install at the beginning and end of runs where there will be additional pressure pushing back against them.

Use wire mount offsets for woven and barbed wire fences.

This type of offset consists of two spring steel, galvanized legs that are twisted onto the existing fence holding the electrified offset wire approximately 10 inches from the existing fencing. These offsets move with the existing fencing reducing the chances of the electrified wire contacting the old fence (Figure 3). In addition, they are easy to install and remove.

Use offsets designed for wood posts with a Class III galvanized spike at the beginning and end of runs and on problem posts. These more rigid offsets should be used at the beginning and end of runs to help hold the electrified wire off the existing fencing (Figure 4). These offsets can also be used on problem posts, such as old railroad ties that have the existing fencing wrapped around them (Figure 5).

Start and end runs with an end strain or bullnose insulator designed for high-tensile fencing. These insulators are constructed of either reinforced UV stabilized high density polymer or porcelain. If the electrified offset wire is close to the existing fence at the start and end of runs, install the bull nose insulator 4 to 6 ft from the end post (Figure 7).

Use a quality double-insulated cable designed for electric fencing for lead-out, jumping wires or going underneath gates. This wire should be the same diameter or greater than the offset wire. Never use residential grade or copper wire for electric fencing. This wire is designed to carry 120 Volts NOT 10,000 Volts. Avoid using dissimilar metals. For example, connecting copper and galvanized wire in an offset results in electrolysis (corrosion) and loss of conductivity.

Always place underground wires in protective tubing. When running a current carrying cable under the ground always place it in some type of PVC pipe or conduit that will protect it from future damage (Figure 8). If not protected, breaks will occur in these wires and these shorts can be difficult to find and repair. Wires going under gates should be buried to a depth of approximately 6 to 12 inches. Using larger diameter conduit (¾ or 1 inch) makes it easier to push the double insulated cable through it. Adding an end cap (no glue) with a hole drilled in it just large enough for the wire to slip through helps to keep water and dirt out.

Make all connections with clamps or crimps. Loose connections result in loss of voltage. Connections should NOT be wrapped, but rather clamped together with a high-quality clamp or crimp that is designed for high-tensile fencing (Figure 9). Never use clamps that are constructed of dissimilar metals. Although economy clamps constructed of cast metal are sometimes available, they often fail upon tightening. Clamps offer the more flexibility in terms of removal for trouble shooting and line replacement.



Figure 5. Wood post offsets are also a good option for getting the hot wire away from posts that protrude and are littered with old fence.



Figure 6. The beginning and ends of runs should be terminated using a bull nose insulator designed for high-tensile fencing.



Figure 7. If the electrified offset wire is close to the existing fence at the start and end of runs, install the bull nose insulator 4 to 6 ft from the end post.



Figure 8. Double-insulated lead out wires going under gates should always be placed in a PVC pipe to protect the double insulated wire from breaks.

Use a doughnut or bull nose insulator secured to a wood post to make gentle turns. Gentle turns located where the offset wire pulls away from the post can be made using a doughnut type or bull nose insulator secured to a stable post (Figure 10). NEVER use wrap around insulators. They almost always fail prematurely, resulting in large numbers of hard-to-find shorts.

Use heavy duty insulators designed for wood post to make gentle turns. Gentle turns that pull the offset wire against the post can be made by securing one or more heavy duty insulators to a stable wood post. In cases where the offset wire is too close to the old fencing, a treated 2" x 4" can be secured to the post with deck screws. Then, the insulators can be affixed to the board (Figure 11).

Use a high-quality energizer. Energizers are the heart of electric fencing systems. Economizing on this component will compromise the whole fence. If electrical service is available, AC powered energizers are considerably more powerful and offer the best value in terms of cost to power ratio compared to solar or battery powered energizers. Nonetheless, for smaller acreages in remote areas, solar or battery powered energizers are viable alternatives to AC powered units. Power comparisons of energizers should be performed using "stored energy" which is measured in Joules. One feature that offers a lot of convenience is an energizer with a remote control or Wi-Fi enabled app that allows for the fence to be shut off remotely.

Proper grounding is essential. For electric fencing to work properly, current from the fence must travel through the animal, into the ground and back to the energizer. The grounding system on the energizer works as an "antenna" to collect this current and complete the circuit. Most of the problems associated with low voltage on an electric fence are caused by an improperly constructed grounding system. Grounding systems should have a minimum of three galvanized grounding rods, 10 ft apart, 6 ft in the ground, all connected with a single galvanized wire running from the energizer. For very large energizers or very dry conditions more grounding rods may be needed. More information on installing and testing ground systems can be found in Gallagher's *Power Fence Systems Manual*.

Control vegetation under offsets. Uncontrolled vegetative growth under electrified offsets will result in reduced voltage and ineffective livestock control. Ideally vegetation should be controlled by clipping rather than the application of non-selective herbicides. The use of non-selective herbicides results in bare soil, which can increase rates of erosion under fence lines.

Offsets should always be kept electrified. Livestock should never have access to non-electrified offsets. They will rub against the offsets resulting in failure (Figure 12).



Figure 9. Make all connections using a high-quality, galvanized clamp or crimp. Wrapping wires results in loose connections which results in voltage losses.



Figure 10. Doughnut or bullnose insulators can be used to make gentle bends in the offset that pull away from the post.



Figure 11. Gentle bends that pull toward the post can be made using heavy-duty wood post insulators. If the electrified offset wire is too close to the existing fence, then a treated 2" x 4" board can be mounted to the post.



Figure 12. Electrified offsets should always be maintained "hot" to prevent livestock rubbing against them, which will result in premature failure.

The above tips will enable the addition of electrified installation of offsets to existing fences which can extend exterior fence life. These energized offset fences will be capable of controlling all classes of livestock. Remember that just as with other types of electric fencing, offset wires must be checked routinely and be maintained to ensure optimal performance.