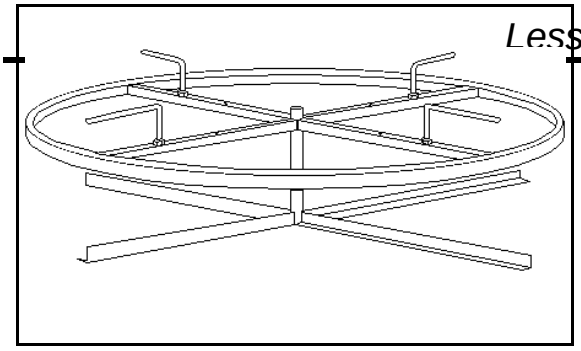


Lesson 4: High Tensile and Electric Fences

Barbed wire and woven wire fences are only two of the types of fences that may be found on agricultural operations. Other common fences are high tensile and electric fences. These types of fences have some advantages over fences made of barbed or woven wire. This lesson describes those advantages and explains the components of high tensile and electric fences and how they are constructed.

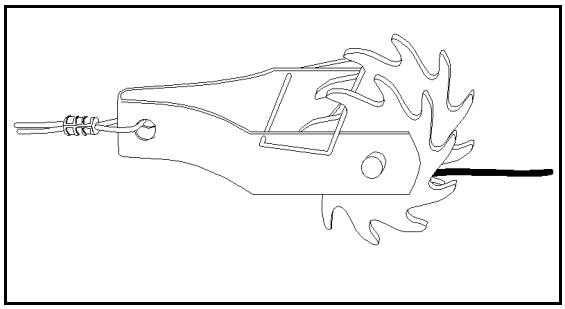
Advantages of High Tensile Fencing

High tensile wire gets its name from its tensile strength, since it can take a large amount of stress before breaking; this strength is its chief advantage. The wire is stronger and more durable than standard wire of the same gauge, which means that lighter wire can be used. A 13½-gauge high tensile wire is approximately equal in breaking strength to a 12½-gauge regular wire.

High tensile fencing also has other advantages. Because the strength of the wire makes it less prone to breakages, high tensile wire has a longer life span and lower maintenance requirements. It is also versatile, coming in a variety of forms, including strand wire, woven wire, and more decorative wire that is vinyl coated or covered with a board-like vinyl panel. This type of wire is easier to handle than barbed or woven wire, since it does not have dangerous barbs and is lighter than woven wire. High tensile fencing can easily be electrified. Finally, high tensile wire's strength makes it a good choice to replace barbed wire when the animals being fenced need protection from the barbs. A good example is show animals, where the owner wishes to avoid scars that could disfigure the animal.

Components of High Tensile Fencing

The basic components of high tensile fencing are similar to those for standard wire: high tensile wire, posts, and fasteners. Wood or steel posts may be used, although it is better not to use steel posts with an electrified fence. Wood posts may be either rounded or square. The corner posts should be at least 5 inches in diameter. Brace posts should be at least 4 inches in diameter, and line posts should be at least 3½ inches in diameter. The wire is



attached to the post using fasteners, either staples for wood posts or metal wire clips for steel posts. Staples should be 1¾ to 2 inches long to provide adequate holding power and keep them from pulling out of the post.

Some additional materials are used for high tensile fencing. Spacers called battens, stays, or droppers can replace some of the line posts in holding the wire in place. They are made of wood, steel, or fiberglass. Permanent in-line strainers (see Figure 4.1) or tension springs can maintain the tension of the wire over time. In-line stretchers are used for longer stretches of wire, while tension springs are only needed on short stretches of 500 feet or less.

Construction of High Tensile Fences

Some tools are needed for constructing high tensile fences. A wire spinner feeds out the wire. When using this tool, the wire is laid onto a rotating table, and L-shaped brackets then lock the wire in place and hold it as the wire uncoils. High tensile wire is springy, and attempting to work without a spinner generally leads to kinks. Also, high quality wire cutters, preferably ones designed for working with high tensile wire, should be used for cutting.

In construction of high tensile fences, the posts must be installed before working with the wire. The first step is to set the anchor post and brace structure. Double brace structures should be used because they can hold more tension, with loads up to 9,000 pounds, which is appropriate for longer runs of wire and large livestock. Next, the line posts, spacers, and line brace structures should be set. Line brace structures should be included in the fence at appropriate intervals and at the top and bottom of slopes. The line posts should be set 2½ feet into the ground for stability. The distance between the line posts will vary with the purpose of the fence. For large pastures with little pressure on the fence, a good rule of thumb is placing the line posts 16 feet apart, with shorter distances used for smaller areas. The use of spacers allows the posts to be set further apart.

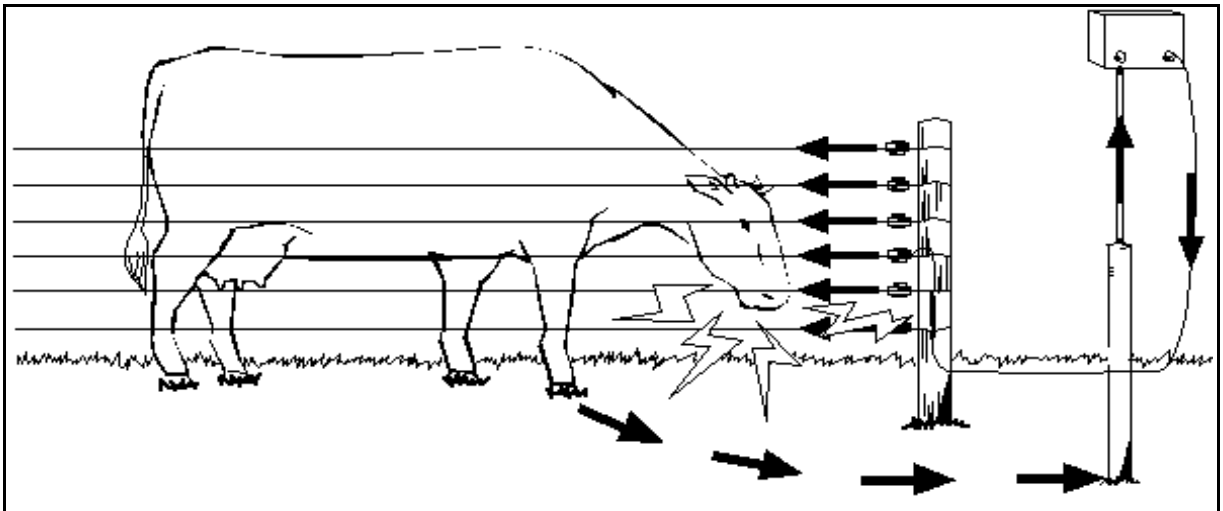
When the posts are set, the wire is laid out, stretched, and attached. The wires are attached working from the bottom to the top. The best method for putting up high tensile wire is to work from the middle. A spinning jenny, which is a device that aids in unrolling wire from the spool (see Figure 4.2), should be placed somewhere in the middle of the span. The first wire is pulled from the spinner to one brace structure. It is wrapped around the post twice and tied off. At the spinner, the wire is cut, and an in-line strainer is attached to the end of the wire. The wire is then pulled from the spinner to the other brace structure and tied off. At the spinner, about 3 feet of wire is run past the strainer, and then the wire is cut. The end of Electric fences have several advantages. They are low in cost, requiring fewer materials and less labor to construct than other types of fences. this wire is placed in the strainer, and tension is taken up by turning its drum. After applying some tension to the wire, it should be loosely stapled in place. Once all the wires are in place in the fence line, the wires are tightened to the proper tension and stapled to the posts, with the wire left slightly loose in the staples so it can move as it expands and contracts due to weather conditions. To complete the fence, the wires are attached to the spacers in the fence line.

Typically, high tensile wire is electrified. If the fence is not electrified, more fence posts and stays are necessary because the posts should only be 6 to 10 feet apart in order to keep the animals in. With the posts farther apart, livestock will basically walk through the fence.

Advantages of Electric Fences

Unlike the other types of fences discussed in this unit, an electric fence is a psychological barrier, not a physical one. It operates using an electric fence charger that converts electricity into a pulse that travels along an insulated fence line. When an animal touches the wire, the current flows from the fence line, through the animal, and then through the earth to the ground system to complete the circuit, as shown in Figure 4.3. The brief shock that results keeps the animal from putting pressure on the fence. Livestock eventually become trained and avoid the fence.

Because electric fences use fewer materials and do not have to be stretched, they are quicker and easier to construct than other types of



fences. Another advantage is that they are versatile; electric fences can be used for many types of animals. Because the animals generally leave the fence alone, it has a long life span. Also, no physical damage occurs when animals are shocked.

Depending on the purpose of the fence, electric fences can require a lot of maintenance. Plants growing to the point where they touch the wire may ground the system and prevent it from working effectively. Limbs falling across the wire and touching the ground will have the same effect. Livestock and wild animals, such as deer, often break smaller strands of wire when they accidentally run into them. Most fence chargers, which supply electricity to the fence, indicate whether the fence is electrified with an indicator light or by making a regular popping sound. To catch potential problems, a producer should check the charger often and walk the fence line.

Components of Electric Fencing

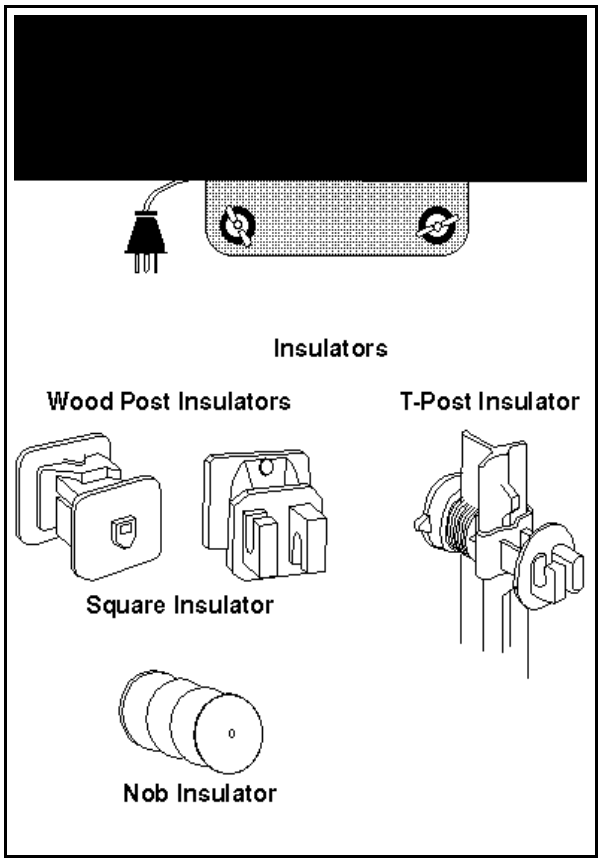
An important component of an electric fence is the wire that forms the fence. The best wire to use for electric fences is 12½ gauge or 14 gauge high tensile or soft wire. A smaller gauge will constrict the flow of electricity, decreasing the efficiency of the fence. High tensile wire is preferable. For temporary fences, poly wire is a useful alternative; poly-wire is a stranded polyethylene wire specifically designed for electric fences that has smaller wire conductors embedded in it.

Two other fence components are a fence charger (see Figure 4.4) and one or more ground rods. Most fence chargers convert power from a 120-volt electrical system or a battery, usually 6 or 12 volts, into the charge sent along the fence. A ground rod serves as a connection between the charger and the ground, allowing a completed circuit to be made.

Posts are also needed for electric fences. Generally, wood posts at least 5 or 6 inches in diameter are used. Steel posts may also be utilized, although good insulators are a necessity to keep them from conducting electricity. Small fiberglass rods 3 to 5 feet in length are sometimes useful when constructing a temporary electric fence. These rods will not conduct electricity and do not require insulators.

Insulators are nonconducting wire holders that attach to the posts to hold the wire, keeping it from making a connection with the earth. Many different designs are available, as shown in Figure 4.4. For tie-off points at the end of the stretch, specialized terminal insulators made of ceramic or plastic are used. For wood line posts, brightly colored nail-on plastic insulators are often used to hold the wire, which either wraps around the insulator or passes through a bracket. An insulator called insultube is used with high tensile wire; insultube is plastic tubing that slides onto the wire and is stapled to the post. T-post insulators clip onto steel posts and hold the wire in a bracket.

A simple gate may be easily constructed using a special insulated gate handle. These insulated handles are usually made of plastic with a spring attached. One end attaches to the wire and the other has a hook that connects the fence.



Selecting Electric Fence Chargers

One factor to consider when selecting a charger for an electric fence is the location of the fence, which will determine whether electricity is available. The battery types are useful for remote areas where no electrical systems are available. Some units have a solar-powered battery charger built into the charger; the batteries are recharged by sunlight. Where electricity is available, plug-in chargers should be used to take advantage of main line power.

Two related considerations when selecting chargers are the voltage put out by the charger and the length of the fence. Fencers can provide powerful electric charges, commonly up to 30,000 volts. An electric fence that has been correctly constructed can carry a charge of this intensity through miles of wire. Fence chargers generally indicate the amount of voltage they put out and how many miles of fence they can supply with power.

The amount of vegetation around the fence will affect the fence charger chosen. Grass and weeds can rob the fence of some of its power, so a fence charger that could supply power to 20 miles of fence under conditions with less vegetation would not be able to provide that much electricity to a fence overgrown with weeds. Low impedence fence chargers are useful when vegetation is high. This type of charger increases its energy output as power is drained off by plants touching the fence. It can overcome the voltage loss caused by the vegetation.

The species of livestock will also affect the selection of a charger. Less voltage is needed for animals that have thin coats, like horses and short-haired cattle. Animals with thicker coats, like sheep or goats, require higher voltages.

Safety must be considered when choosing a charger. Any charger selected must have been approved by the Underwriters Laboratories or another reputable agency. The current from homemade fence chargers has killed livestock and people.

Constructing Electric Fences

Once a charger has been selected, it should be installed in a dry, protected area, such as a barn or shed. After installation, a ground rod must be set in place and attached to the charger. The ground rod must be in solid contact with moist earth, which may mean driving the metal rod to a depth of up to 6 feet. Drier conditions may require the use of more than one rod. Once the ground rod is in place, a heavy wire is clamped to the top of the rod and the other end attached to the charger's ground terminal. When the posts and wire for the fence are in place, another wire is run from the positive terminal of the charger to the electric fence or to an insulated lead wire to carry the current to the fence.

If permanent posts are in place, they should be used for the fence; if not, the next step is setting the posts in place. The posts should be set to a depth of 3 to 3½ feet. The distance between the posts may vary between 20 and 50 feet. For a temporary fence, the corner and line posts are set to a depth that feels solid. They should not be driven too deep, since they will eventually be moved. Insulators should be placed on the posts at two-thirds of the height of the livestock for which the fence is being built.

Next, the wire is attached to the posts. One or two strands of wire are sufficient for an electric fence. Using at least two wires enhances the functioning of permanent and semi-permanent fences, with one wire serving as the hot wire and the other acting as a return ground in addition to the ground rod. The end of the wire is attached to the insulator on the end post, and the wire is unrolled along the fence line. Soft wire can be stretched with fence stretchers. It is then attached to the insulators. If high tensile fencing is used, the wire should be laid out and stretched as appropriate before it is attached to the insulators.

Sometimes an electric fence is used in conjunction with an existing fence. Placing a single strand of wire close to the bottom of a woven wire fence for hogs or along the top of a barbed wire fence for cattle greatly reduces the animals' contact with the fence.

Summary

In addition to barbed and woven wire, high tensile and electric fencing are options for agricultural operations. High tensile wire is useful where very strong wire is desired. Electric fencing has several advantages, including low cost and ease of construction. In

addition to the posts and wire needed for both types of fence, high tensile fencing requires fasteners, spacers, and permanent in-line stretchers, while electric fences call for chargers, ground rods, and insulators.

The basic procedure for building both types of fences consists of setting the posts and attaching the wire, although the details of the process do vary somewhat.

Credits

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