

Fencing Options for Grazing Systems

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One of the challenges of establishing a grazing system is building a fencing system that allows you to easily rotate cows from one grazing site to another. Ideally, this fencing system will be inexpensive, easy to build, and easy to maintain. In reality we sometimes have to sacrifice one or more of these goals to achieve another. Sometimes, for instance, it is better to put a little more into a fence to start with in order to lower long-term maintenance. Many times, “temporary” fences become permanent fences with high maintenance requirements. This presentation will attempt to give some pointers on choices of building materials, equipment, and construction methods that will reduce the overall cost of fencing systems.

Types of Fences

Rotational grazing fences usually fall into one of the following categories:

- 1) Field fence (also known as woven wire, page wire, or hog wire) – Excellent holding power with low maintenance, but high initial cost. Usually used for perimeter fencing.
- 2) Barbed wire – Lower cost (about half that of field fence), good holding ability as long as tension is maintained. Also good where vegetation tends to interfere with electric fencing.
- 3) Electric
 - a) Permanent – about half the cost of barbed wire, excellent holding power with good maintenance. Vegetation control and monitoring are necessary.
 - b) Temporary – Low cost, fast installation. Cost may be higher per foot than permanent because of higher priced materials, but flexibility is improved. This is especially beneficial for temporary cross fencing.

Wire

One of the most significant innovations in fencing has been the introduction of high-tensile, Class III galvanized steel wire. “High-tensile” means that the steel is much stronger than standard steel. The cost is usually less than standard steel wire because of the smaller wire size, yet the smaller wire is stronger than the larger standard steel wire. Perhaps more important than the cost difference is the fact that high-tensile steel wire is much more likely to stretch under stress (cows pushing against it, trees falling on it) and then return to its original length than is standard steel wire, which tends to stretch and stay stretched. As a result, **if the fence brace assemblies are adequate**, line posts can be spaced much farther apart (20 to 25 ft) than posts in standard wire fences (10 to 12 ft). Many people have reported cutting fallen trees off of high-tensile wire fences and watching the fence spring back to its original position with little or no repair work necessary.

Class III galvanizing is simply an extra thick coating of zinc on the wire. This typically gives the wire about twice the life that it would have with standard (Class I) galvanizing.

High-tensile, Class III galvanized wire is available in single wires (electric fencing), barbed wire, and field fence. There is one drawback to this type of fence wire. Since it is a harder, stronger wire, it is also harder to work with than standard steel wire. It is hard to bend, tends to break if you bend it too sharply, and is hard to cut. You need a cutting tool designed to cut this steel wire, else the cutting blades will be quickly dulled. If you have a pair of wire cutters designed for high-tensile steel wire, you must be careful not to twist the cutters or use them for pulling laterally since the cutting edges are very hard and therefore brittle, and they will break rather than bend. Once you learn how to work with high-tensile steel wire and have the right tools, I think you will find that its advantages (lower cost, longer life, resiliency, fewer line posts) outweigh its disadvantages.

For temporary fences, conductive ropes or tapes are generally recommended because they are very flexible and easy to roll up, move, and reinstall. Ropes seem to last longer than tapes, but tapes are more visible which is important when cattle encounter a fence where they are not accustomed to seeing it. Vinyl coated wire is another useful option on permanent electric fencing because it adds to the visibility of the fence. Vinyl coating is available in a conductive form so that the electric wire is still effective at shocking.

Posts

Traditionally, treated wood posts have been the most commonly used fence posts. Posts should be labeled for ground contact, which means they have enough chemical added to prevent rot when in contact with the ground.

Steel posts are another popular option, and the relative market price of steel vs. wood determines which is the best buy. One of the biggest problems with steel posts is that they are commonly painted rather than galvanized. A painted post will begin rusting in a very few years, resulting in rusting and early failure of the wire. A wire that should last 30 to 40 years may have its life cut in half by rust from non-galvanized metal posts, not to mention the degradation of fence appearance. If possible, I would obtain Class III galvanized posts so that you can take advantage of the full, expected life of the Class III galvanized wire. If wooden posts are used, use Class III galvanized staples for the same reasons.

High-density fiberglass posts are another good choice for electric fencing since they do not require insulators, have a long life, and are very strong. These posts are made from “sucker rod”, a byproduct of the oil industry, and are sometimes readily available, and sometimes hard to find. Their cost is similar to a wooden line post. These posts should be handled with gloves, especially after they are exposed to the weather for a few months because they are made of fiberglass, and the glass fibers will easily penetrate the skin.

For temporary fencing, there are a number of plastic and fiberglass “tread-in” posts available as well as small metal posts with insulators. These posts typically don’t have much lateral strength, but for electric fences, as long as the fence is straight and properly energized, that doesn’t usually present much of a problem.

Chargers

For electric fences, one of the most expensive **and most important** components is the fence charger (also known as the energizer or controller). Probably the most important factor to look for in a charger is how well it holds up when the fence gets in poor repair (vegetation touching the fence, spider webs, broken insulators, etc.) ASABE (American Society of Agricultural and Biological Engineers) has established a standard for testing fence chargers. Basically, the voltage and the energy output (in Joules per pulse) are measured with the following resistors placed between the fence terminal and the ground terminal.

50,000 ohms (represents a fence in excellent condition)

5,000 ohms

500 ohms

100 ohms (represents a fence in very poor condition)

I would encourage you to look for a controller that has been tested by this standard and maintains a high voltage (at least 1,000 volts) under the extreme conditions of a 100-ohm resistor. This will assure you a strong charge even when the fence is compromised by vegetation and other maintenance factors.

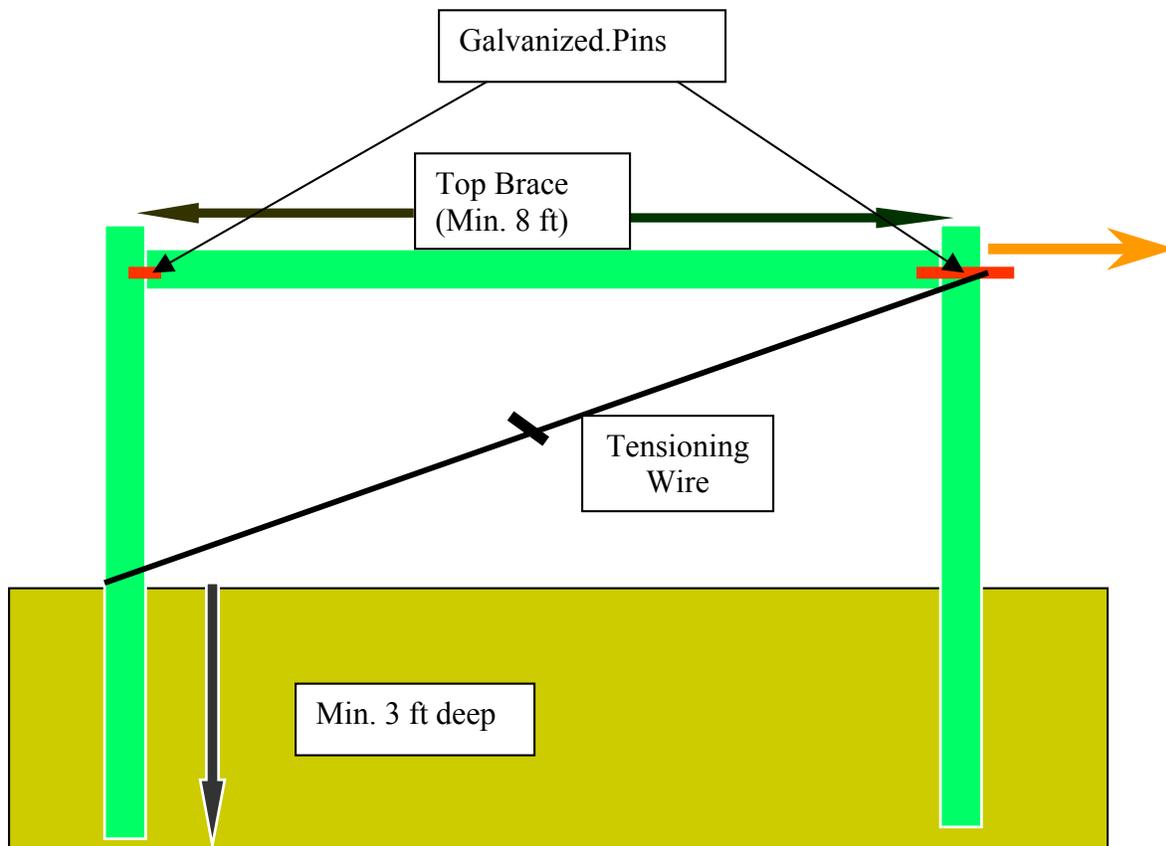
Construction

Building a fence is somewhat like building a house or a barn. Each component plays an important part in the success of the structure, but the one component that everything else depends on is the foundation. Without a good foundation, a building will lose its integrity regardless of how the rest of the structure is built, and the same is true of a fence. The foundation of a fence is the brace assemblies. Each section of fence is basically two brace assemblies with wire stretched between them and line posts to help keep the wires in the right position. Line posts are used to guide the wires along gentle curves, up and down over rolling terrain, and to keep the wires spaced properly. More line posts are needed for standard steel wire than for high tensile wire because standard steel will not recover its original shape as well and thus tends to sag more. High tensile steel will sag as well due to seasonal temperature differences, but if properly installed, can be retensioned easily.

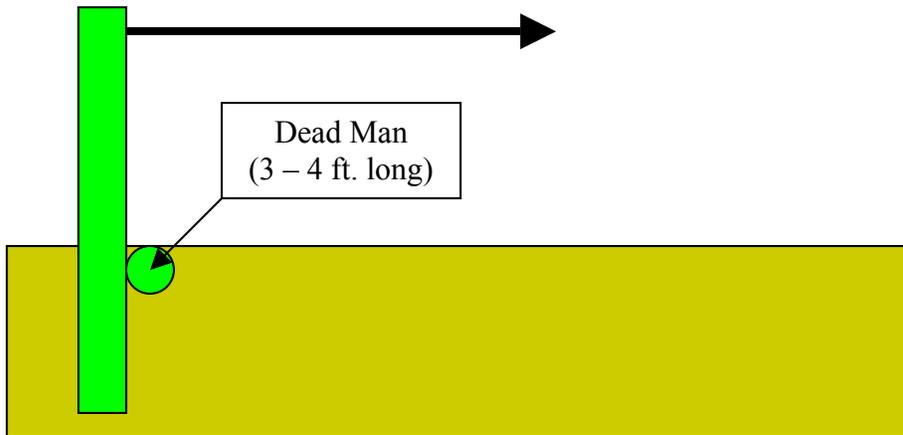
There are two common types of brace assemblies – the H-Brace and the Dead Man.

H-Brace: The H-Brace (shown below) works by transferring the load from the top of the corner post to the bottom through the horizontal brace post and the tensioning wire. There are two keys to making the H-brace work to its maximum advantage that are often overlooked.

1. The top (horizontal) brace post must be held in place. Over time, the ground tends to shift and cause the post to move so that it no longer supports the brace. The best way to accomplish this is to use small (1/2") galvanized pins as shown in the figure below. "Toenailing" with nails will not hold as well as this method.
2. The tensioning wire must be installed at a low angle with the ground. Otherwise, the wire will try to pull the corner post out of the ground when it is tightened. To assure the proper angle, the top brace post should be 8 to 10 feet long (for a 4-ft. high fence).



Dead Man Brace: The “dead man brace” uses a short post about 3 to 4 ft. long buried in the ground at the bottom of the corner post and perpendicular to the post and the fence (see illustration below.) The strength of this brace comes from the fact that the corner post must push the “dead man” through the soil in order to move in the direction of the fence pull. If a large corner post is used, this is a fairly effective brace, especially for short runs of a few hundred feet, and is cheaper and easier to build than the H-brace. For longer runs (up to a quarter mile), I would recommend using the H-brace.



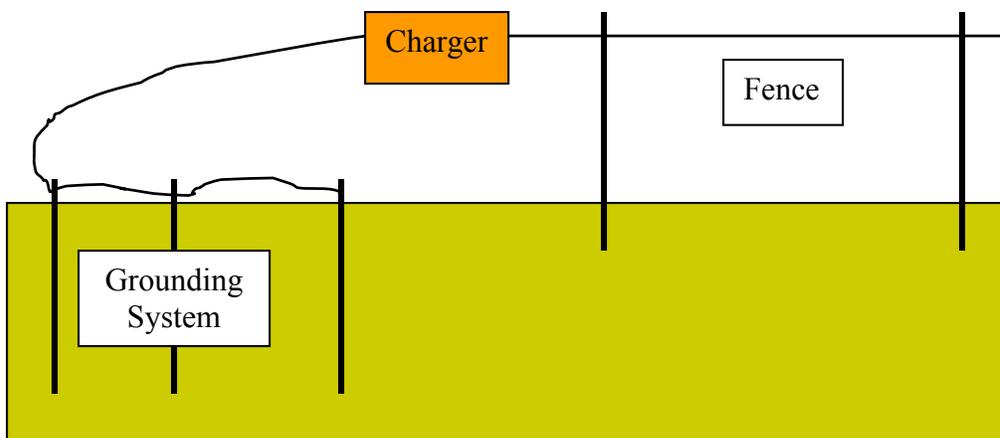
Post Installation: Wooden posts can be installed either by digging a hole and tamping dirt around the post or by driving it into the ground with a post driver. Driven posts tend to be stronger. If driven, the posts should be driven with the small end down. If tamped, it is important to put a small amount of dirt into the hole, tamp it, and then put more dirt in. You can't fill the hole up and then tamp it or it will not hold. Metal and fiberglass posts are best driven into the ground by hand or with a power post driver.

Staples: Again, I would recommend using Class III galvanized staples, and they should be 1 3/4" long if used in soft (pine) wood. Here are a few important tips to remember about the proper installation of staples.

1. Staples should be driven into line posts in such a way as to allow the wires to move under the staples. This allows the wire to move on impact or when heated or cooled by the weather, and then return to its original position. Staples should only be driven tightly on brace post assemblies.
2. Only horizontal wires should be stapled.
3. Staples should be installed with a slight rotation from vertical. Installing a staple vertically (parallel to the post) tends to encourage splitting of the wood. It is important that you rotate the staple in the right direction in order to cause the ends of the staple to spread out and greatly increase the holding power of the staple. There are two types of staples on the market, commonly referred to as right-handed and left-handed staples. Put the staple in your hand with the points aiming away from your body. If there is a slash (flat area) visible on the right-

hand point, it is a right-handed staple. Rotate it slightly to the right (clockwise) before driving. If the slash is visible on the left-hand side, rotate it to the left.

Fence Charger Installation: One of the most important things to remember about installing a fence charger is getting a **good grounding system**. Current can only flow through a complete circuit, and the completion of the electric circuit depends on getting current back through the ground to the grounding system and thus back to the charger. The better the grounding system is, the easier it is for the charger to accomplish this task. Follow the charger recommendations, but usually they recommend installing at least 3 8-ft copper-clad ground rods at least 10 ft apart and connected together with heavy (#6 or #8 copper) wire. This grounding system should be completely separate from any other farm grounding system to minimize the chance of getting stray voltage onto the farm electrical systems.

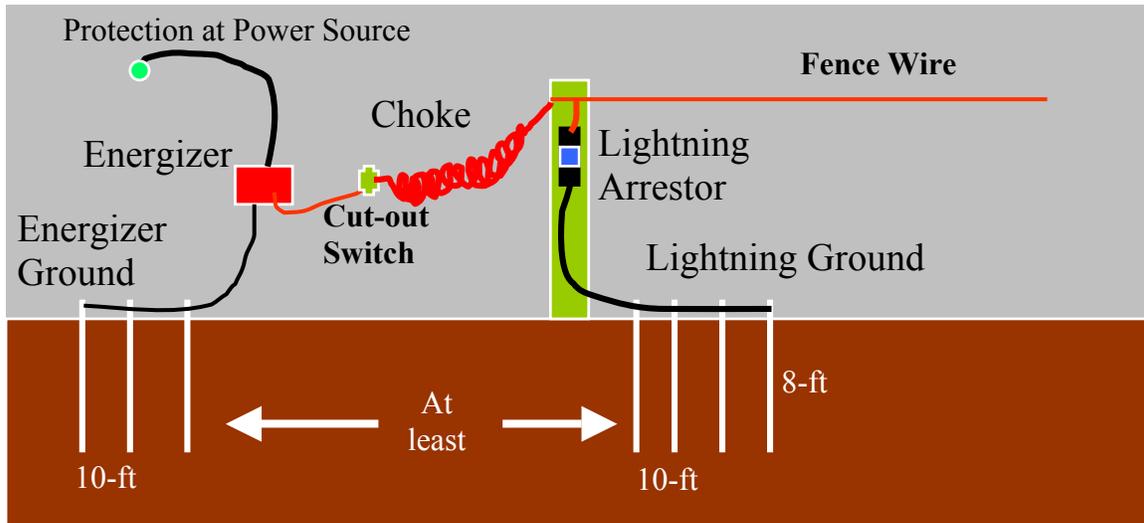


Another strategy that can help, especially in times of drought, is to **ground every other wire (connect them directly to the ground of the charger.)** When the ground is dry, it makes a poor conductor, and it is hard to get current to pass through cows and the dry ground and get back to the charger. If every other wire is a ground wire, then the cow only has to touch two wires, and the current will pass from the hot wire through the cow to the ground wire.

Lightning Protection: Another important issue for any fence, but especially for electric fences is lightning protection. Lightning will always find a path to ground, and it usually will find a number of paths. The goal is to get lightning to the ground through a path that will not cause harm to cattle or equipment. Here are a few things to remember about lightning protection:

1. Nothing is lightning proof! If it hits directly enough, it will destroy almost anything.
2. I recommend using lightning protection supplied by the fence charger manufacturer to protect the charger. That makes it more likely that their warranty will be honored (if they have a warranty against lightning damage).

3. It is a good idea to ground the fence about every ¼ mile by driving a ground rod and attaching it electrically to any grounded wires in the fence. This will provide multiple paths to ground for the lightning. Obviously, if you use metal posts, this would be unnecessary.
4. The figure below shows some guidelines for a good lightning protection system.



Summary

Desirable qualities of a fence are resiliency (springs back after being hit or stretched), high visibility, economy, and ease of installation. If you plan carefully, use the right materials, and put a little extra effort into the installation, your fence should be a good investment that will require a minimum of maintenance and will help make your rotational grazing system a success.