

**FARM FENCES:  
PLANNING AND CONSTRUCTION  
Ken Andries, Ph.D.  
Animal Science Specialist  
Kentucky State University**

## **Introduction**

Fences have been used for livestock control for many centuries. Control of movement of domestic and wild animals has been their primary purpose. The location, type of animal, and its habits determine what type of fence works best.

Most livestock fences today are constructed of wire or wood. The type of wire is often determined by the type of livestock, location on the farm, and part of the country. Wire types include barbed, smooth, and net or woven. All types can come in high tensile wire today. Each type has its uses, some are better than others for specific locations on the farm and types of livestock.

Regardless of materials, construction of the fence determines how long and how well the fence will do its job. Proper construction evolves planning as well as material selection and the actual building of the fence.

## **Planning Process**

We must start with a good plan to build a good fence. This is true whether building a permanent or temporary fence. Good planning includes making a map of the area, laying out the desired fence locations, and material selection.

The planning process starts by deciding where the fence will go, this means preparing a map of the area.

You will need information from three sources for the map: 1) soil type map, 2) aerial photograph, and 3) a topographical (topo) map of the location. Land capability or soil type maps show what soil types are in an area and what use and management practices are best for the land. Aerial photos show details of the present farm layout and give you an overall perspective of the land. Topo maps tell you the “lay of the land” or elevations and contours of your farm. These three pieces of information should be available from your local farm service agency (FSA) or Natural Resources Conservation Service (NRCS) office.

The information is extremely important if you are working with a new place. However, it is just as useful on property you have owned or farmed for years. The information will help you avoid problem areas and possible unknowns when working with larger tracts of land.

Once you have the information, map out boundaries of hay, crop, pasture, and all other use areas for the property. This defines the boundaries you will be working with. Use the soil and topo maps to avoid problem areas such as wet locations as much as possible. Fence out ponds and low wetland areas that hold water on regular bases to improve herd health and maintain a clean water supply for the animals.

You should review the plan and if possible view the location of the new fences. Where drainage ditches or ponds added since the last aerial photo, do you need to clear a lane through a wood lot, are old fences present that were not on the map or photo? These are all things that cause adjustments or modifications to your plan.

With the map complete, you should be ready to determine the size of your pasture. Plot the new fences and plan for gate locations, allies/lanes, and other features you will need to move and work your animals. Then measure the length and plan for corner post, gate post, and in line bracing or pull post. This will allow you to make an accurate list of material you will need for the project.

Lanes are very useful in moving livestock from one pasture to another or for moving to a central working facility. Gates should be located in corners for ease of moving livestock and across from each other along lanes.

### **Types of Fences**

There are two basic types of fences, permanent and temporary. Permanent fences are designed and constructed to last a long time, generally 20 to 40 years, while temporary fences are used for a short time, usually a few months or a year. The material and construction methods differ with each type. Permanent fences are made with sturdier post and constructed to provide long service with minimal maintenance. Temporary fences are generally used for rotational or seasonal grazing, to keep livestock away from hay stacked or cut in a pasture, or to provide a “quick fix” while a permanent fence is being repaired.

Permanent fences are used around the perimeter of your property as well as major dividing fences or cross fences in pastures. They are constructed with mettle and/or wood post in general and define the basic shape of your pasture. Temporary fences are not as well constructed and generally have fewer strands of wire, greater distance between post, and generally will only last 3 months to a year.

In the planning stage you will need to plan for both types of fences as they fit your operation. All perimeter fences need to build as permanent fences. Also any cross fences should be permanent as well as those around ponds. Temporary fences can be added at a later date and moved as needed. However if you plan to use temporary fences a sturdy post in key locations along the permanent fence can be very helpful. Also the type of permanent fence may be selected to aid in adding the temporary fences later.

### **Material Selection**

Now that the fence is planned and you have the measurements, its time to select the materials. Fencing materials commonly used include boards, barbed wire, woven wire, and high tensile smooth wire. Electricity can be added to most fence types to increase effectiveness. Post materials include wood, metal, plastic, fiberglass, and composite materials. The purpose of the fence will determine the most appropriate material for your situation.

### **Fencing materials**

Board and chain link fences are very nice and if maintained properly they will work for many years. However, their cost makes them impractical for most operations. These materials would be good choices however, for around farm buildings, yards, or gardens. They can improve or enhance the appearance of a home or farm yard.

Cable and pipe are also good fence material for specific applications. These materials work very well when used for holding pens or dry lot operations. Cable and pipe are both very strong fences. Cables allow for some give to the fence while pipe is very ridged. Again the cost of these types of fences are prohibitive for most applications.

Barbed wire is probably the most common type of wire used today. The typical barbed wire fence will have 3 to 6 strands of wire and is used for cattle, horse or large exotics. This type of fence is not well suited for control of smaller animals or for wildlife control. Barbed wire is generally sold in roles of 80 rods (80 rods = 1320 ft. = 1/4 mile) in length and is available in several styles and sizes. A standard barbed wire fence has post spacing of 10 to 20 ft and may have wire stays between the posts on the longer distances.

High-tensile fences are growing in popularity and can be used in place of barbed wire. These fences are made of smooth wire and generally have 4 to 10 strands. The wire is stretched between pull post with tension being maintained by ratchet tensioners and may have springs to help keep the desired tension. The advantages are that it is somewhat easier to handle, easier on livestock, and easy to adapt. It is also generally more economical than other fences and has a longer life expectancy. High tensile fences work well for large and small livestock and can be adapted better than barbed wire.

Woven or net wire, also known as hog wire, fences are the last type we will discuss. These fences are best suited for small animals such as sheep, goats, or hogs. It is also the best for controlling some types of wildlife. The wire is a series of horizontal wires held apart by vertical stays. The square or rectangle gaps in the wire generally get smaller towards the bottom of the fence. The wire generally comes in 26 to 48 inch heights. There is also some variation in the width of the stays, ranging from 4 to 12 inches. Woven wire comes in both low and high tensile types with the high tensile generally being more expensive but more reliable. Woven wire is generally more expensive than barbed or high tensile, single strand, wire. In many applications a single strand of barbed wire is placed above the net wire to help keep animals from jumping or to keep large animals from reaching over the top. A barbed wire at the bottom of the fence will do the same to discourage going under the net wire.

### Electric fencing

Electric fences are becoming more popular due to their effectiveness and ease of making quality temporary fences. Electricity can be added to any fence with a little modification. Electric fences are very effective because they provide a physical and physiological barrier.

Electric fences can be temporary or permanent. Permanent electric fences generally utilize high tensile fencing materials and are either a fence themselves or a single wire added to an existing permanent fence. Temporary electric fences can then be made as extensions off the permanent fence.

The addition of insulators is all it generally takes to make the conversion from a regular to an electric fence. Offset stays are used to add an electric wire to existing conventional fences. In a new application of high tensile fences, every other wire or each wire can be “hot”.

To make an electric fence effective you need a good fence charger. The setup of the charger is also important. A charger that is not well grounded will not be effective. You also need to follow recommendations for lightning protection provided by the manufacture. Poor installation or lack of maintenance can make electric fences very dangerous. Home made chargers and improper installation can result in serious injury or death.

The fence needs to be grounded to work. Most permanent fence applications have every other wire hot. The other wire acts as a ground. In single wire applications the moisture in the ground allows for completion of the circuit and improves effectiveness of the fence.

When selecting a charger, be sure to consider current and future plans. Chargers are designed for a specific length of fence. If you exceed that length you reduce the effectiveness of the fence and in some cases can render the fence useless. Additions of cut-off switches and spring gaps also improve your ability to work on a fence if problems occur. Again planning is important to decide the best strategies for your situation.

### **Post Selection**

Fence posts are a very fundamental part of a fence and proper selection and installation will determine the life of the fence. There are three basic materials used for post: wood, metal, and fiberglass. Plastic and some other recycled or composite materials are also being used but are not common in most areas.

When selecting post materials, we need to look at ease of installation, longevity, and availability. The type of the fence, permanent or temporary will also play a role.

Corner post, gatepost and all pull post/brace assembly need to be very sturdy to hold the tension in the wire and/or weight of a gate. You should have a brace assembly or corner post with brace every 650 feet or less along a fence to insure good tension on the wire. Wooden post for these uses should have a top diameter of 8 inches. Metal post should be 3 to 4 inches minimum with a concrete anchor 20 sq. inches and 3 ½ feet deep to insure it holds.

Line post should be placed every 12 to 20 feet for wooden post over 3 ½ inches in diameter or 12 to 15 feet for metal T- post or wooden post under 3 ½ inches in top diameter.

Fiberglass post can be used in the place of metal or wooden post on the 15ft or less spacing. These posts give some flexibility and are very useful for electric fences. Composite and recycled material post can be use similar to wood or t - post depending on their size and manufacture's recommendations.

When selecting wooden post consider the type of wood as well as wood treatment. Treatment can double or even triple the life expectancy of a wooden post. Black locust and cedar make very good post. Many other hard woods also have a long life expectancy if pressure treated. Softer woods are more subject to rot as is hickory and red oaks.

Mettle posts have replaced wood post in most areas due to their ease of handling. Mettle posts are driven in to the ground and wire is attached by clips. Small wood post can also be driven but larger ones require digging post holes for proper placement.

Composite and plastic post can be used in place of other types depending on material and construction. These materials are generally used for temporary fences and electric fences.

A final note about fence post. A living tree should never be used as a fence post. As the tree grows the wire becomes imbedded in the wood. This causes pressure on the wire and increases the degeneration rate of the wire increasing wire breakage. It also decreases the future value of the timer. If necessary cut trees along the planed fence line and kill the stumps. Keep trees and other weeds from growing up around the fence to increase its useful life.

## Fence Construction

### Corner and Brace assembly

One of the major challenges in fence construction is keeping the wire taught over the years. This is the job of the brace and corner assemblies. These groups of post must be designed to take the pressure and strain of keeping the wire tight and holding gates over the years without moving. Proper construction and placement will increase the life of the fence while reducing maintenance.

Corner post and brace post assemblies consist of two to three large diameter post (top diameter 8 in or grater) and need to be supported with a cross post and tied together with a diagonal wire loop, this assembly is commonly referred to as an "H" brace. This loop should go from the top of the post in the direction the pull is coming from and the bottom of the support post (middle in a three post design). This allows the post to transfer the force being placed on its top to the ground level of the support post anchoring it in place. See the figures for more information on design and placement of brace assemblies.

Figure 1. Double span brace post assembly. Post depths shown are considered to be minimum.

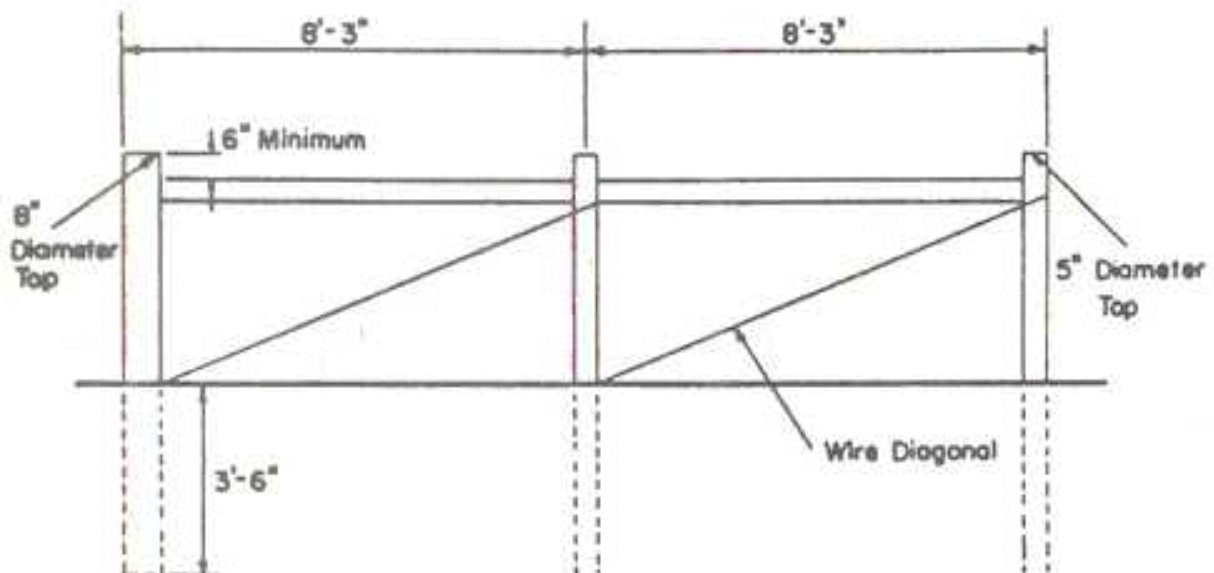


Figure 2. Correct procedure for threading the wire used as diagonal in the brace assembly

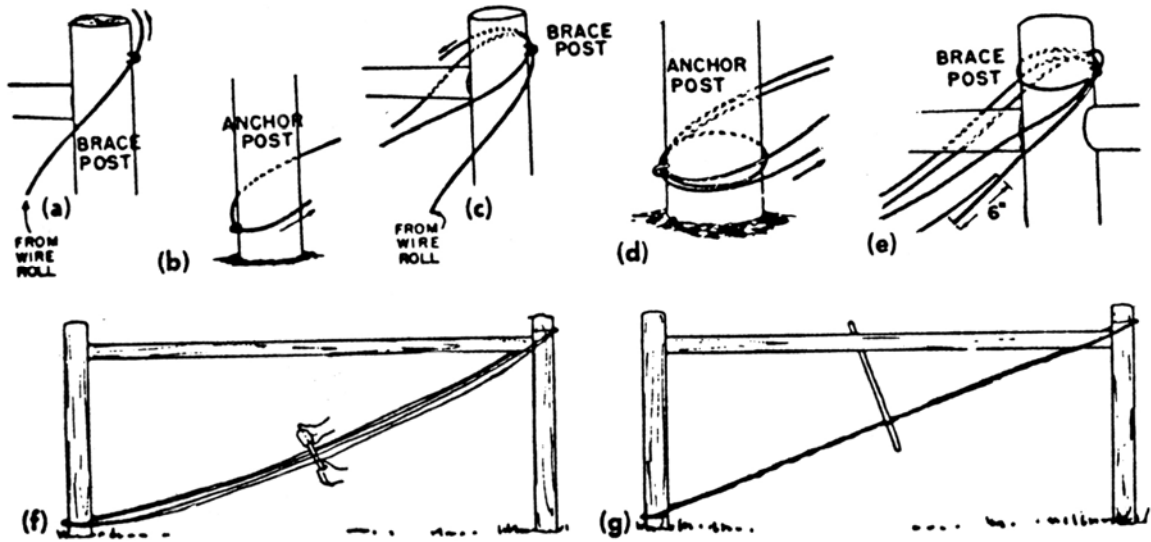
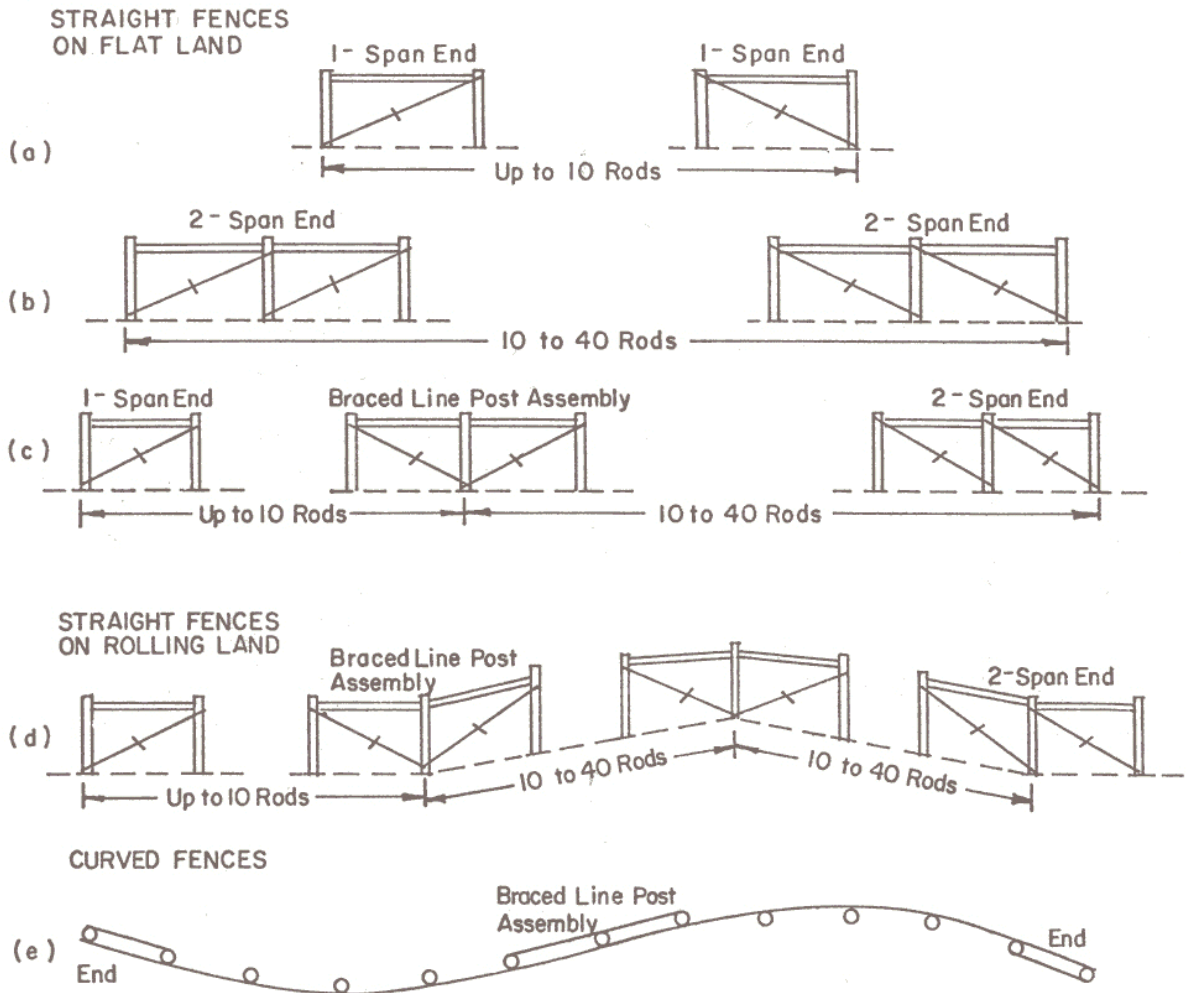


Figure 3. A. Types of anchor and brace assemblies and where to locate them. (a) for fence lengths of 10 rods or less, use single span end construction. (b) for fence lengths of 10 to 40 rods, use double span end construction. (c) for fences more than 40 rods long, use a brace line post assembly to divide the fence lengths. (d) on rolling land, fence stretching is easier if braced line-post assemblies are located at the foot and top of each hill. (e) Contour fences, more than 20 rods long should have a braced line post assembly installed to keep the stretches to 20 rods or less. Install in straight section at least one post span away from a curve. Don't install on a curve. It won't hold well.



## Conclusions

Proper fence construction will result in many advantages. The fences will last longer and be more effective if planned and constructed properly. There are many products available for use in fence construction. This makes the planning process more important because they are not all effective for all types of animals and in all situations.

The building process should always start with a plan. The plan needs to include current and predicted future needs. Take into consideration the lay of the land and current boundaries. Be sure to clear a path for the fence through woods and thickets. This will help in building a strong fence and increase its life.

Electric fences are very good for keeping livestock confined. They can also increase the life of existing fences. However, be careful and select only quality products and have them tested regularly to be sure they are safe.

Finally, remember that a well constructed fence is no guarantee that livestock will not get out. Proper maintenance and checking for problems is very important to reduce your chances of liability. To our knowledge there is not uniform law related to fences in Louisiana as to what makes a legal fence. The better the fence is constructed and the better maintained the better for you. Parameter fences are the major concern in these types of situations. For cattle they should be five strands of barbed wire or net wire. Electric fences are also helpful but pose their own problems. Check with the local district attorney's office for information on local regulations related to fences and livestock confinement.

### Literature Cited

Kay, Furman W. Fences for the Farm. University of Georgia Cooperative Extension Service Circular 774, 1985.

Turner, L.W., C.W. Absher, and J.K. Evans. Planning Fencing Systems for Intensive Grazing Management. University of Kentucky, Cooperative Extension Service ID-74, 1986.

Watson, Harold. Electric Fences. Southern Regional Beef Cow-Calf Handbook. SR7002, 1977

Watson, Harold. Wire Fences. Southern Regional Beef Cow-Calf Handbook SR7004, 1978