

Lesson 2: Setting and Bracing Posts

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As indicated by the descriptions of a legal fence in the last lesson, strong, properly spaced posts are an important part of a fence. This lesson describes corner posts, line posts, and braces and explains how to install them.

Materials and Tools for Wood Posts and Braces

The basic materials needed when installing wood posts and braces are the posts and braces themselves, large nails, such as 16d tempered ring shank pole barn nails, wire for wire braces, and staples. Wood corner posts are often chemically treated to resist rotting and may last for 10 to 30 years. They are generally 6 or more inches in diameter and about 8 feet or more in length, since they will need to be set 3 to 3½ feet into the ground. Wood line posts are 2½ inches to 6 inches in diameter, with a diameter of 5 inches preferred for most fencing jobs, and 5½ to 8 feet in length. Most of these posts are chemically treated. Braces are the crossed or diagonal pieces of material running between the post being braced and the next post in line or a wood, metal, or concrete anchor. The most common brace material is a wood brace pole approximately 5 inches in diameter; they are commonly 8 feet in length, but longer braces of 10 or 12 feet add more structural support to the brace structure. Large nails attach the brace pole to the posts. The best type of wire to use for wire braces is 12½ gauge high tensile smooth wire. Staples are used to attach the wire to the posts.

Site preparation tools are necessary to install wood posts. The site preparation tools needed depend on the site, since all brush, old fencing, trees, and large rocks are removed. In some cases, filling low areas and excavating elevated ones is beneficial. An ax may be needed in many cases. A wheelbarrow and chain saw can be useful also. Sites requiring more preparation may call for heavy equipment, such as a tractor with a brush-hog type mower and a grading blade or a bulldozer.

Once the site is prepared, layout and construction tools are necessary. Tools needed to build the fence include a post hole digger, shovel, and hoe. Some of the tools used in site

preparation, such as a wheelbarrow and chain saw, may be used again. Layout tools include a tape measure 100 feet or more in length and a level.

Locating Wood and Steel Anchor-and-Brace Assemblies

Much of a fence's strength depends on the quality of the anchor-and-brace system, whether the posts are steel or wood. If the braces fail, the fence will too. Also, the appearance of the fence is important; corners and brace assemblies are the focal points and should be constructed neatly.

Fence corners generally require anchor-and-brace assemblies, sometimes referred to as fence structures. Brace assemblies may also be placed at points along the fence line to compensate for the effect of stresses exerted on the fence. The location of these structures will depend on the type of fence (barbed wire, woven wire, high tensile smooth wire, etc.), topography of the ground, type of ground (dry, rocky, swampy), length of the fence run, and bends in the fence line.

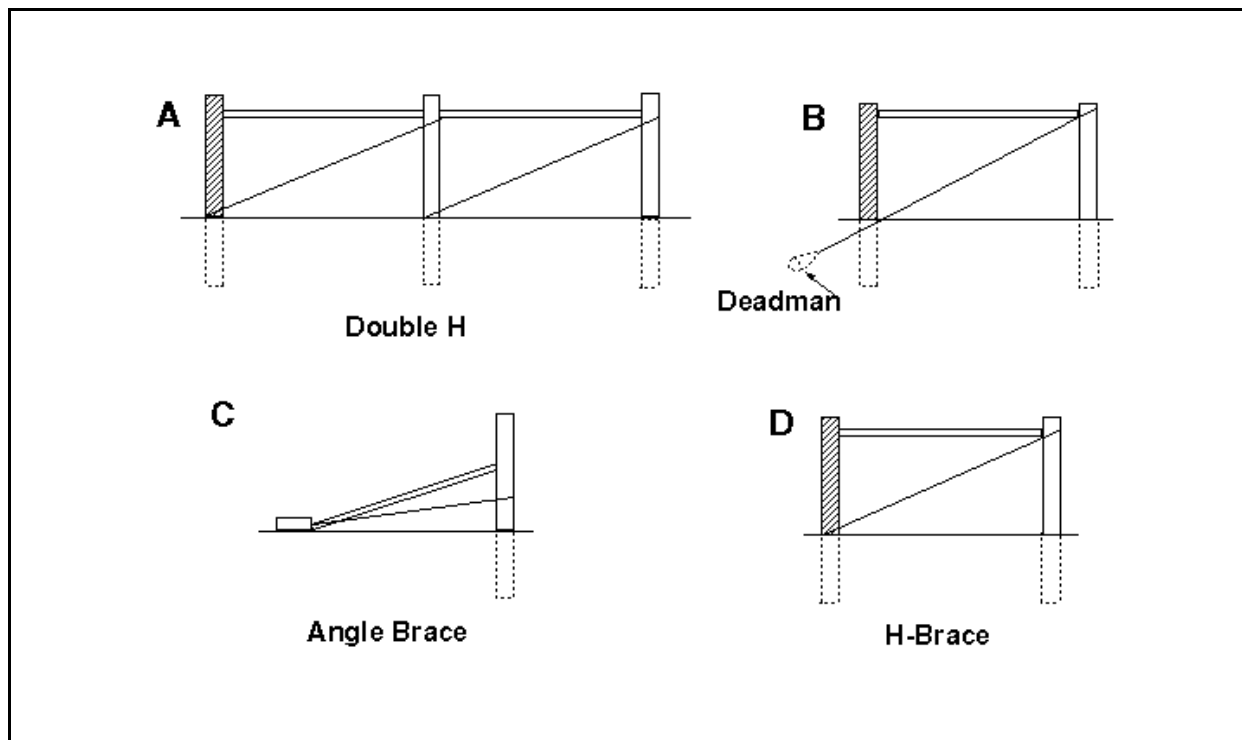
Installing Anchor-and-Brace Assemblies and Brace Wires

Figure 2.1 on the following page shows some different configurations used for corners or braced-line post systems. The most common type of fence structure is the H-brace, which consists of two posts set in the ground with a brace pole between them. A variation of this type of assembly is the double H-brace, which adds an additional post and pole to the structure.

The double H-brace is used for longer stretches of fencing and stretches where higher tension or stress loads will be placed on the structure. A third variety is the angle brace, which utilizes a single post, a brace pole, and a flat rock or formed concrete pad. The brace pole is placed at an angle to the post, with one end set into the post and the other fitted to the top of the rock or pad. This type of structure is commonly used when slight bends or turns are required in the fence line. Another assembly has an anchor called a deadman near the corner post. The anchor is driven in the ground or placed in concrete. A brace wire attaches the deadman to the post, adding rigidity to the assembly.

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The first step in installing the common H-brace



assembly is setting the posts in place. The end or corner post is placed first. Placing the post will involve digging a hole to an appropriate depth, setting the post in the hole, and filling in the hole around the post with dirt or gravel. The second brace post can then be put in place in line with the first at the desired distance. Because of the angles formed by an H-brace, a longer brace pole will provide more structural strength to the fence. The industry standard is 8 feet in length, but when a single H-brace is needed due to ground conditions or other factors, using a 10- to 12-foot brace is preferable.

Once the posts are properly set and tamped in place, a chain saw is used to form a notch for the brace pole in each post. The notches should be perpendicular to the fence line, so the flat surface at the base of the notch is at a 90-degree angle to the fence wires. Typically, a good height for the bottom edge of the brace pole is 36 to 42 inches from the ground, but the height should be determined by the spacing of the fence wires, so the brace does not interfere with wire placement. For structural soundness, the brace pole should be placed as high as feasible on the structure.

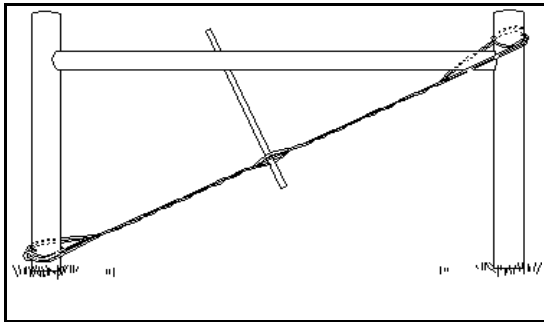
The next step is to install the twist wire. The wire is wrapped twice completely around each of the posts that the twist wire will connect. The direction of the fence pull will determine the placement of the wire. The direction of the pull depends on which section of fence coming into the brace is longer and will exert more stress on the brace post. The twist wire is loosely stapled low on the brace post farthest from the longer stretch of fence and just above the brace on the post next to the length of fence being braced. As much slack as possible is removed from the twist wire by pulling on both ends, and the wires are spliced together.

After some tension is put on the structure, the ends of the brace pole are nailed to the posts using the 16d nails ring shank nails. Four nails are used at each end, one on top, one on each side, and one on the bottom.

Next, a twist stick is inserted between the wires. The stick may be a 1-inch wood dowel, fiberglass rod, or a short section of 2" x 4" or 2" x 2". The twist stick should be a minimum of 20 inches in length. Rotating the twist stick will put tension on the wires.

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The wires are twisted so that when the assembly is finished the stick will be pulled against the brace pole on the opposite side from where the wire is attached. As tension is placed on the twist wire, the structure should begin to move in the opposite direction from the pull of the fence. A good rule of thumb is to move the end post approximately $\frac{1}{2}$ to $\frac{3}{4}$ of an inch out of plumb away from the direction of pull. Less tension may be necessary if a gate will be attached to the end post, thus providing more balance



against the pull of the fence, or on short fence runs where the fence wire has less tension.

Once the structure is tensioned into place, the twist stick is attached to the brace pole. The preferred method is to drill a $\frac{1}{4}$ -inch hole through the twist stick in line with the brace and then drive a 16d galvanized nail through the stick and into the pole. This method is preferable because the nail can easily be removed to tension the wire again. A completed H-brace is shown in Figure 2.2.

Installing Wood Line Posts

Wood posts are common for corners and braces, but they are becoming less popular for line fencing. They require more maintenance and have a shorter life span than steel, which has made their use selective.

Before the posts can be installed, the fence line must be laid out. Laying out the fence line can be done by having one person stand behind a corner post and another person move down the fence line toward the next corner post. The person moving down the fence line holds a movable post, or sighting pole. The person at the corner post directs him or her to a position that lines up the corner post, the post being held, and the next reference point, which may be either the corner post or, for hilly ground, the farthest point that can be viewed clearly. The

spot is marked for reference in aligning the posts.

The installation of wooden line posts is a relatively simple process. The first step is to measure off the line post spacing. The placement of wooden line posts is determined by the type of fence, the amount of pressure that will be placed on the fence by livestock, dips and rises in the ground, and whether steel, fiberglass, or other types of posts are also placed in the fence line. For field fencing, line posts are commonly 14 to 20 feet apart, while 8 to 16 feet is typical for more confined lots. A tape measure may be used to measure out the exact spot for each post, or the distance between them may simply be estimated by pacing out the distance. An individual may lay out a 100-foot measuring tape and walk the length of it, counting the number of steps taken. Dividing 100 by the number of steps can give a relatively accurate length pace, which may be used for post layout.

Then the ground line is marked on the posts; line posts are usually set at least 30 inches into the ground. The holes are dug to the proper depth, and the posts are set in packed dirt. A level may be used to check the posts' plumbness. An alternative method of placing wood posts is sharpening and driving them into the ground with a post maul or a hydraulic post driver mounted on a tractor. Posts that are driven into the ground are stronger than those that are hand set.

Special considerations for setting any line posts are topography and ground conditions. Wet areas will typically require a longer post driven deeper into the ground to provide stability for the fence. Posts set in low areas may need special bracing to keep them from lifting out of the ground. One method is to nail a pressure-treated 2" \times 6" about 24 inches long horizontally to the bottom of the post. Another method is to drive a steel t-post 4 to 5 feet long as deep as possible at an angle next to the post and attach a wire or chain to the t-post and wooden post.

Tools Needed for Braces and Steel Posts

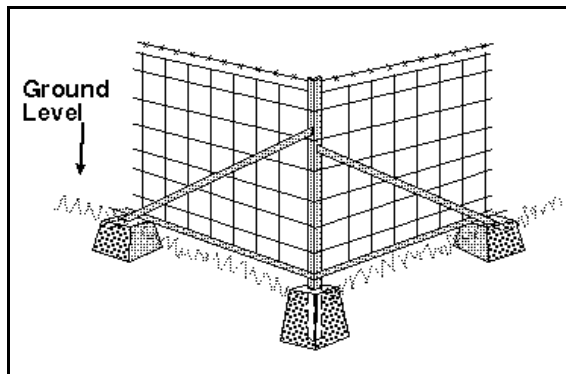
As wood posts become less common, steel posts are growing in popularity. Steel posts have several advantages over wood; they are

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fireproof, economical, and easy to install and maintain.

Steel posts are commonly available in lengths of 5 to 8 feet. The same type of post may be used. Some of the same tools used with wood posts are needed with steel posts. Tools for clearing a fence line, such as a chain saw, ax, or heavy equipment, may be used as described previously.

Some additional tools are required to work with steel posts. A metal post driver is an indispensable tool for setting posts. Some metal fence systems use bolts and nuts to attach braces. A set of wrenches or a socket set will meet these needs. Other metal brace systems



are welded in place, thus requiring a portable arc welder. Metal posts vary in configuration and sometimes require specific fasteners that are supplied with the posts. Most fasteners are easily attached with fencing pliers. If a special tool is needed for the fasteners, it should be available from the retailer. Metal corner posts and braces are often set in concrete, as shown in Figure 2.3. Tools needed for working with concrete include either a portable cement mixer or a wheelbarrow, a shovel, and buckets or a hose to supply water.

Installing Steel Post-and-Brace Assemblies

The first step in installing steel post-and-brace assemblies is to dig the anchor post hole. The hole for the anchor posts should be 3 feet deep. The post hole will provide more stability if it is approximately 20 inches in diameter at the bottom and 18 inches in diameter at the top. The ground line is then marked on the post.

for both corner and line posts in a light duty fence. However, often the corner post is a metal pipe 5 or 6 inches in diameter that has been filled with concrete.

The next step is to bolt or weld the braces to the anchor post. Braces are generally set at angles of approximately 45 degrees. Holes are then dug where the braces touch the ground. The hole must extend 6 inches below the frost line. The depth varies depending on the geographical region, but the hole should be a minimum of 18 inches deep and is preferably deeper, usually 2 to 3 feet.

When the holes are ready, the concrete is placed around the post and braces. The top of the concrete should be molded to slope away from them to direct water away from the post and prevent problems caused by freezing. Finally, a level is used to make sure the post is plumb.

The anchor-and-brace system for corner and line posts is basically the same. The only difference is that with line posts the braces are attached to extend directly along the fence line rather than form a 90-degree angle.

Installing Steel Line Posts

Installing steel line posts is simpler than working with wood line posts. The first step is measuring the line post spacing and aligning the posts. The ground line is marked on the posts, which are set 2 to 3 feet deep. They are then driven to the proper depth using a steel post driver.

Factors Affecting Gate Installation

Fences would be of little use without a gate to allow entrance and exit. The size and weight of the gate will greatly affect the fence and brace structure construction. A heavy gate will provide a counter force to the pull of the fence, so the weight of the gate should be taken into account when tensioning the brace structure. Also, gates should not be hung from lone posts, which are single posts without bracing, because they will not give enough support. A larger post, 7 inches in diameter or more, should be used for the gate post. Gates should be hung in line with the fence structure, providing maximum support for the gate. If double gates are hung,

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a brace assembly must be installed on both sides of the opening.

Summary

The first step in building a fence is installing the posts. Both wooden and steel posts are commonly used for fences. Two types of posts make up fences: anchor-and-brace posts and line posts. Anchor-and-brace assemblies are

necessary at fence corners; the placement of other fence structures along the fence line will depend on the type of fence, topography of the ground, type of ground, length of the fence run, and bends in the fence line. Because the size and weight of gates will affect the fence, these factors must be taken into account when installing a gate.

Credits

Ramsey, Dan. *The Complete Book of Fences*. Blue Ridge Summit, Pa.: TAB Books, Inc., 1983.

University Extension agricultural publications, University of Missouri-Columbia.

G1191: Selecting Wire Fencing
Materials
G1192: Constructing Wire Fences

