

BRITISH COLUMBIA, RANGELAND, FOUR STRAND BARBED WIRE FENCE SPECIFICATIONS

The intent of these specifications is to ensure the construction of a sound and serviceable fence. Practices and use of materials outlined below are expected to be followed and any deviation from these specifications must be discussed with and approved by a Ministry representative. The best time for this is prior to construction so not to interfere with work once started.

Materials and fence components failing to meet specifications may be required to be removed and replaced at the contractor's expense.

These specifications have integrated wildlife friendlier practices that have been adopted by many jurisdictions across North America (Paige, 2020)¹. Wherever necessary, fence construction will allow relatively free passage for animals to jump over, crawl under or through. Wire heights have been adopted to accommodate wildlife and prevent entanglement. Visibility of wire fencing can be enhanced where game trails intersect fence lines or are adjacent to riparian areas and other preferred wildlife habitats. A properly constructed and well-maintained fence are the most important steps to being friendly for wildlife.



These specifications have been developed cooperatively between the B.C. Ministry of Forests, and the BC Cattlemen's Association.

Questions can be directed to B.C. Ministry of Forests, Range Branch at Range.Practices@gov.bc.ca

¹ Paige, C. 2020. Alberta Landholder's Guide to Wildlife Friendly Fencing. Alberta Conservation Association, Sherwood Park, Alberta. 68 pp.

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1.0 Posts:

Fence lines shall be constructed in a straight line between braces. A straight line can be achieved by driving line posts along a pre-tensioned line between braces (Diagram 1). Posts must be set perpendicular to ground (right angles to the fence wires).

1.1 Line posts:

Must:

- a. Be 2.1 m x 10-12 cm (7-foot x 4-5 inches), unless otherwise specified by the Ministry representative.
- b. Be 2.4 m x a minimum of 10-12 cm (8 feet x 4-5 inches) “planted” 1.22 m (48 inches) or if 2.1 m x 10-12 cm (7-foot x 4-5 inches) posts are used they will be planted 102 cm (40 inches) and spaced no more than 4.27 m (14 feet) apart in boggy areas. In extremely wet areas, a deadman (Diagram 10) should be used if posts are in a dip. Jack posts may be a better option but due to their weight they may settle into wet ground. Decisions on best methods in wet/boggy areas should be discussed with and approved by the Ministry Representative.
- c. Be No. 1 grade pressure treated pine. Natural cedar posts are acceptable for use in riparian areas. Use of other species or material must be approved in writing by the Ministry representative.
- d. Meet MOTI treated post guidelines (Section 909 - Treated Post Guidelines, Appendix 2 for more detail).
- e. Be "planted" a maximum of 5.5 m (18 feet) apart
- f. Be driven a minimum of 81 cm (32 inches) deep, where the ground will still receive a post strive for a depth of 91 cm (36 inches). This leaves 122 cm (48 inches) out of the ground.
- g. Remain in-tact, tops must **not** be cut off fence posts unless specifically allowed in writing by Ministry representative, cut tops must be treated with a copper sulfate mix.
- h. Only be heavy metal fence posts in locations pre-approved by the Ministry representative. Where it has been determined that treated posts cannot be “planted”, a 6-foot, heavy metal post weighing 1.25 pounds per foot may be used. Where metal posts are being used for other reasons than ground conditions (eg. requirement to construct by hand), a minimum 6-foot heavy metal post weighing 1.25 pounds per foot must be used. Metal posts must be planted no more than 4.3 m (14 feet) apart and wired with a minimum of 12 ½ gauge galvanized wire. Metal posts must not be used for brace assemblies.

1.2 Post placement

- a. Care must be taken to plant a post at each knoll top or draw bottom to ensure that the bottom wire stays between 38 cm to 46 cm (15-18 inches) above ground.
- b. Dip posts must be "deadmanned" (Diagram 10). Deadmans must not extend into the right-of-way so not to interfere with livestock or wildlife.
- c. Post spacing and location may need to be adjusted or the right-of-way may need to be levelled out if bottom wire exceeds 46 cm (18 inches).
- d. Anchor, gate, corner panels, type I and type II brace assemblies are to be installed using 2.4 m x 12-15 cm (8 feet x 5-6 inches) posts driven a minimum of 1.1 m (44 inches) deep with a target of 122 cm (48 inches).
- e. Jack posts and A-frames may be constructed where it is impossible to set a post. Treated posts or rails must be used for construction of the jack posts and A-frames (Diagram 12). The vertical posts of both jack posts and A-frames must be 10-12 cm (4-5 inches) in diameter and sufficient height for all four wires to attach. The platform to hold the rocks and diagonal brace of the jack post and A-frame as well as the A-frame base can be constructed with minimum 7.5-10 cm (3-4") diameter materials. Sufficient weight (ie. rocks) +/- 300 lbs (136 kg) must be added to the jack post platform to ensure stability. Cut ends exposed while constructing Jack posts and A-frames must be treated with a copper sulfate mix.

2.0 Braces:

- a. The type of brace required is dependent on the change in direction shown on Diagram 2. Angles will be checked by Ministry representative to ensure the proper brace type is constructed.
- b. Type I brace assemblies are best suited to 90-degree corners (Diagram 3). Consider using Type II brace (or alternative Type II) as angle starts to deviate from 90 degrees.
- c. Type II brace assemblies are required for changes in direction between 20 to 60 degrees and can be used up to 90 degrees. Hand-tighten slack wire between brace posts on a type II, four post brace assembly (Diagram 4).
- d. All type III braces for direction changes of less than 20 degrees are **not to be tied off**. This is the only brace structure that can use 2.1 m x 10-12 cm (7-foot x 4-5

inch) posts. Safe access for a quad or horse and rider **must** be maintained around Type III braces. Additional rails or barbed wire may be required on the “hip” to prevent damage to brace rail and wire as directed by Ministry representative. A type III brace is strongest when constructed on the outside (preferred) angle of the fence. Ensure counter bracing is done to correctly minimize forces on the fence.

- e. Distances between braces should not exceed 400 metres (1/4 mile) if fence is running in a straight line. Depending on topography and changes in angles, shorter distances between braces will be required. It can be more difficult to achieve proper wire tension when not on flat, straight ground.
- f. The horizontal brace rail must be centered at 99 cm (39 inches) above the ground (between the top and third wire) and be a pressure treated 3.05 m optimum or minimum 2.95 m x 10-12 cm (10 feet or minimum 9 feet 8 inches x 4-5 inch) diameter (minimum) rail for adjustment between posts.
- g. The horizontal brace rail must be secured with a minimum 20 cm (8 inch) Ardox spike (Diagram 5). A minimum 7.5 cm (3 inches) of the spike should enter the brace rail. It is recommended that a pilot hole is drilled to guide the spike through the post and into the rail. The spike does not need to be driven flush if it is being used to tie off counter bracing wire. The spike should be driven flush when using a staple to secure the counter bracing wire.
- h. No notching for the horizontal brace rail is allowed.
- i. Counter (diagonal) bracing shall be constructed with high tensile smooth wire, doubled, and twisted. A gripple brace kit can be used for counter bracing as directed by the Ministry representative. The counter brace must be located 5 cm (2 inches) above the ground to prevent corrosion of the wire. All twitch sticks used for the counter bracing are to be pressure treated wood with a minimum 7.5 cm (3 inch) diameter x 60 – 90 cm (2 - 3 feet) in length. The twitch sticks must be resting and nailed or wired against the horizontal brace rail on the opposite side of the barbed wire (Diagrams 3-7).
- j. Gate brace panels (Diagram 6) and in-line brace anchor panels (Diagram 7) are built as a single panel. They must follow the same specifications outlined above (Diagrams 6-7).
- k. Jack posts can only be used for brace structures where it is impossible to set a post and must be approved by the Ministry representative. They must be held down with

sufficient weight (+/- 400 lbs) to ensure stability. Care needs to be taken when stretching wire from Jack post braces so not to pull them over.

3.0 Wire:

- a. Barbed wire must be 12 ½ gauge twisted double strand with a minimum breaking strength of 900 lbs. As directed by the Ministry representative it can be Canada Standard (**made in Canada**) or class one or three zinc coated (galvanized) wire.
*NOTE: Class three wire **must** be used on barbed wire fences adjacent to highways or other roads where salt is likely to corrode the wire.
- b. All barbed wire is to be pre-tensioned to 600 lbs and then released and stapled at 250-300 lbs per strand. All the stretch must be taken out of the wire to prevent future loosening and sag. Different situations (changes in topography and direction) require care to ensure that all the stretch is pulled out of the wire.
- c. Barbless 12 ½ gauge twisted double strand wire (Canada Standard) may be required in areas with wildlife concerns and top and bottom wire heights set at 42 and 18 inches respectively. High tensile wire **must not** be used other than for counter bracing unless approved by a Ministry representative.
- d. Wire is to be tied off at all brace panels, except type III. Barbed wire must be wrapped neatly twice around the tie off post with no spaces between wires (Diagrams 3, 4, 6 and 7). Barbless wire must be wrapped neatly three times around the tie off post with no spaces between wires.
- e. Four strands of wire to be fastened to posts at heights of (Diagrams 3 - 8):
Number 4, top wire: 107 cm (42 inches)
Number 3 wire: 79 cm (31 inches)
Number 2 wire: 61 cm (24 inches)
Number 1, bottom wire: 46 cm (38-46 cm or 15-18 inches is acceptable)

4.0 Staples:

- a. Minimum 5 cm (two inch) barbed staples (maximum 10.5 gauge) are to be used exclusively for securing wire to posts. Staples must never be driven home. Always rotate the staple so that each point of the staple is touching on opposite sides of the wire. When stapling rise or dip posts follow the procedure in Diagram 9.
- b. Fencing staplers are acceptable when approved by Ministry representative. When using a fencing stapler wire must be fastened to line and brace posts with 5 cm (2 inch) barbed staples (9 gauge). The prong tip must be used when power stapling to

brace and line posts. This tip allows you to rotate the stapler so that one tip hits the top of the wire, and the other tip hits the bottom wire. The V-tip does not allow the staples to be rotated. Power stapling of droppers to fence and gates use 3.3 cm (1 ¼ inch) 10.5 gauge staples. If minor splitting occurs or dropper does not receive staple to required depth use tie wire to fasten droppers to wire. If major splitting occurs the dropper must be discarded and replaced with a new one. Power staplers must be calibrated so that the depth of the staple still allows movement of the wire through the staple.

5.0 Stays/Droppers:

- a. Wooden stays/droppers shall be installed 2 per panel, equally spaced and must be 36 – 48 inches in length and 1 inch x 1.5 inches wide. Some situations (eg. high visibility) may require 3 stays/droppers per panel and will be directed by Ministry representative.
- b. It is preferred that wooden stays/droppers be installed with galvanized No. 16 gauge wire or loop ties of an appropriate length to all four (4) wires or attached using a power stapler as described above. No. 14-16 gauge ungalvanized wire or loop ties will be accepted.
- c. Wooden stays/droppers are to be attached on the opposite side of the stapled wire (stays go on same side of the wire as posts).
- d. Wooden stays/droppers are not to be interwoven in barbed wire and must not touch the ground (Diagram 11). It is acceptable for stays/droppers to touch the ground in cases where they may function to hold the weight of the fence (eg. heavy snowpack & gates) or as directed by the Ministry representative.
- e. Wooden stays/droppers must be structurally sound as determined by a Ministry representative.

6.0 Gates:

- a. Gates are to be installed at any stock trail or roads that would be blocked by the fence and/or at strategic locations designated by the Ministry representative.
- b. All barbed wire gates **must** be constructed with pre-tensioned wire. Mechanical gate closers (ie. Ty-ten) are to be used on all gates (Diagram 8). Chain and pry bar gate closers acceptable where approved by Ministry representative.

- c. All gates must have a minimum clearance of 41 cm (16 inches) between the ground and the bottom rail/wire and have a 5.5 m (18 foot) opening or width approved by Ministry representative.
- d. Barbed wire gates must be constructed with minimum 7.5 cm (3 inch) treated end posts and a minimum of 5 wooden stays evenly spaced. Stays on gates should be double loop-tied on each wire (Diagram 8).
- e. Gates need to be visible, especially where moving livestock is important and should have a false panel of rails on either side. False panels are constructed with three rails. Minimum rail size is 7.5 – 10 cm (3 to 4 inch) by 3.05 m (10 foot) and a minimum panel size of 2.95 m (9 foot 8 inches) unless situation does not allow, and alternative panel size can be approved by a Ministry representative. A brace must be installed adjacent to each false panel to stretch the next section of wire from.
- f. A hinged gate to be installed as designated by the Ministry representative.

7.0 Other:

- a. High visibility may be required in riparian areas and known game crossings. The recommended option to increase the visibility of a fence is to add three 91 cm (36 inch) droppers per panel evenly spaced. This creates a visual barrier to livestock while allowing free passage of wildlife over or under the fence. Other options can be discussed and implemented following approval from the Ministry representative.
- b. Other general requirements and best management practices for fence construction can be found in Appendix 1, General Requirements and Best Management Practices for Fence Construction.

List of Materials:

Posts:

All wooden posts and rails must be in accordance with CSA Standard O80.

Line posts	4-5" x 7' pointed
Brace posts	5-6" x 8' pointed
Brace rails: Type I & II Type III	4-5" x 10' 4-5" x 7'
Twitch sticks	minimum 3" x 2-3'
Metal posts	Minimum 6' (heavy duty, 1.25 lbs/foot)
Rock Jack posts	4-5" diameter vertical post or rail cut to length 3-4" diameter (minimum) post or rail cut to length for platform and side brace arms
A-frame	4-5" diameter vertical post or rail cut to length 3-4" diameter (minimum) post or rail cut to length for ground and brace support

Wire:

Barbed wire	12 ½ gauge Canada Standard (made in Canada) or Class I or III galvanized (as directed by Ministry representative)
Double-strand smooth wire (barbless wire)	12 ½ gauge Canada Standard (made in Canada)
Brace wire	High tensile smooth wire, doubled and twisted
Dropper ties	Preferred No. 16 gauge ungalvanized wire or loop ties Acceptable, No. 14-16 gauge wire or loop ties Power fastening accepted upon approval

Other Hardware:

Staples: <ul style="list-style-type: none"> • for attaching barbed wire to posts • for attaching droppers to barbed wire (if using power stapler for attaching droppers) 	2" barbed (maximum 10.5 gauge) 1 ¼" 10.5 gauge
Brace spike	1 cm (3/8 inch) diameter x minimum 20 cm (8 inch) Ardox spike (minimum 3 inches into brace rail)

Diagram 1: How to build a straight fence on a crooked right-of-way.

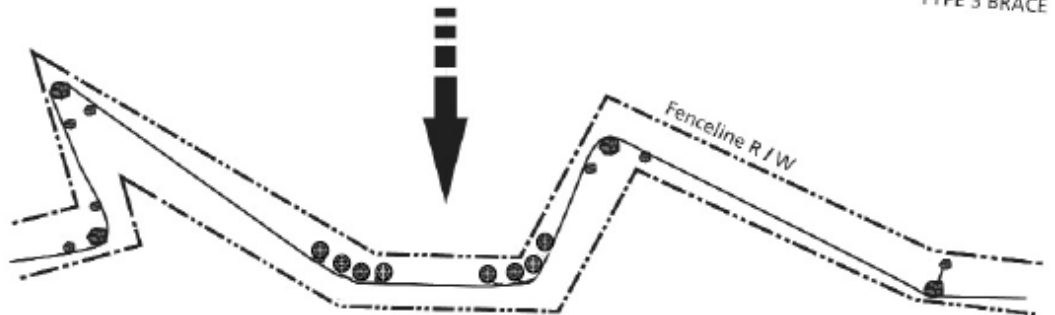
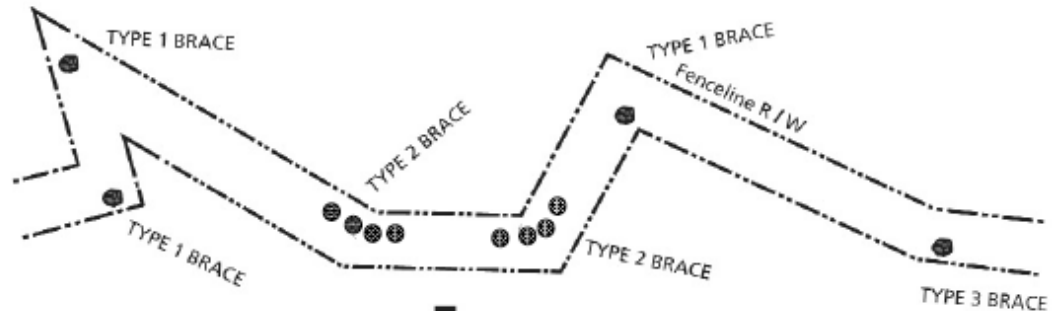


STEP 1: Drive Post on corner of right of way



STEP 2: Stretch one wire on the ground

STEP 3: Build the correct braces using the "Brace Finder"

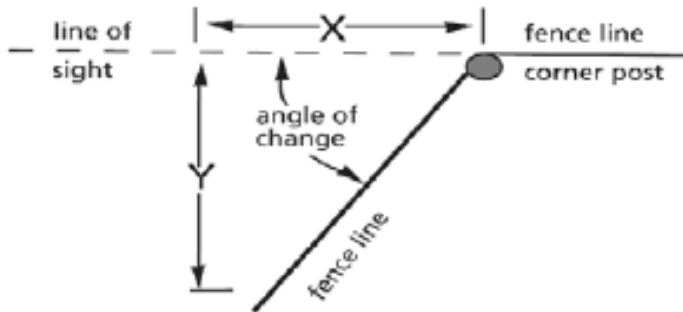
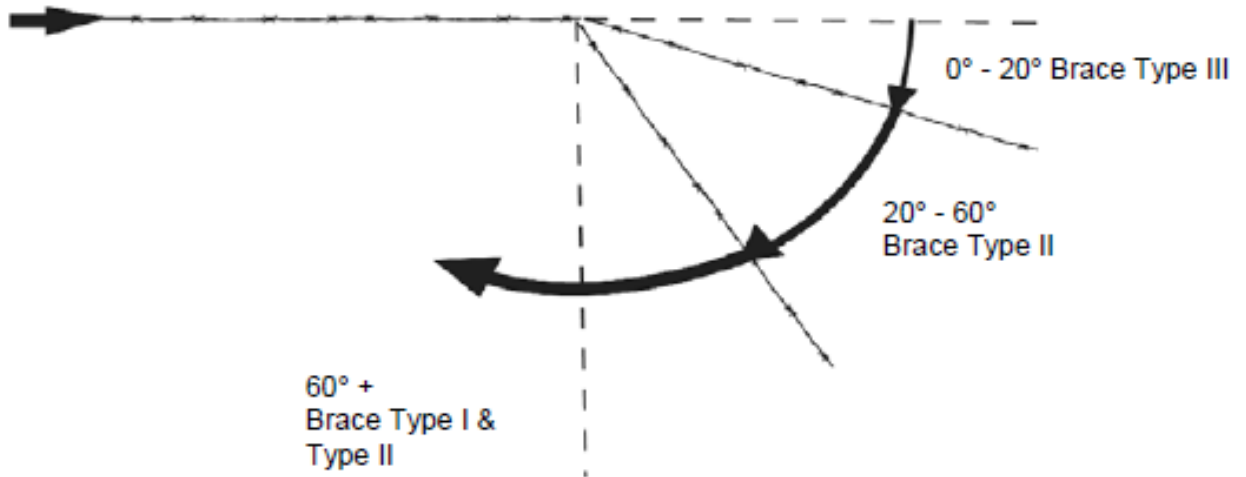


STEP 4: Drive line posts to the stretched wire which is on the ground

Diagram 2: Brace finder

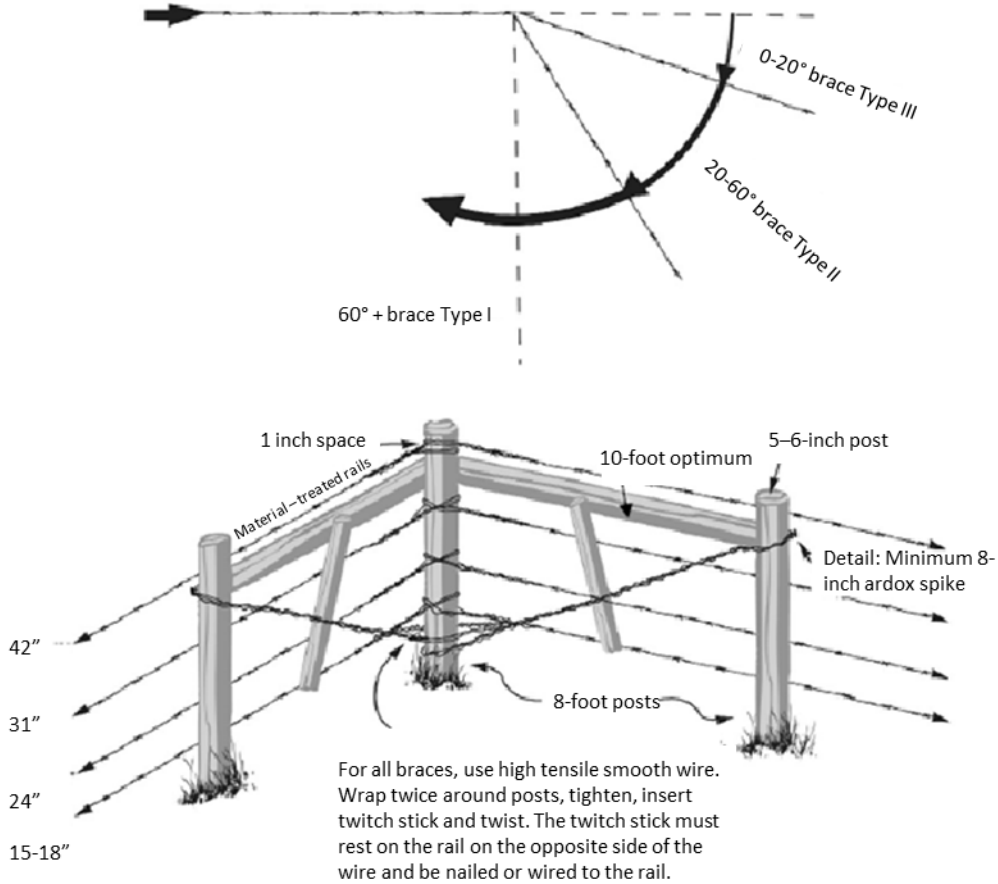
When the fence changes direction, select the appropriate brace for the angle of the turn as follows:

- 0° - 20° Brace Type III
- 20° - 60° Brace Type II
- 60° + Brace Type I & Type II



FOR X = 10 FEET	
Y	ANGLE
1 FT. 9 IN.	10°
3 FT. 8 IN.	20°
5 FT. 9 IN.	30°
8 FT. 5 IN.	40°
11 FT. 11 IN.	50°
17 FT. 4 IN.	60°

Diagram 3: Type I brace assembly (most suitable for 90-degree corners)



Wire Spacing for Four Stand Barbed Wire

- Number 4 Top Wire at 42"
- Number 3 Wire at 31"
- Number 2 Wire at 24"
- Number 1 Bottom Wire at 15"-18"

Diagram 4: Type II brace assembly (20 – 60 degrees)

**Change of Direction
at a Tie Off Point**

If a fence change of direction occurs when it is appropriate to tie off the fence wires, a separate end brace can be constructed for each fence section. Rather than 'share' a common tie off post, each section is tied off to a separate end post producing no forces out of line with the braces. This requires an extra driven post per corner and 'slack' wiring the opening often used in changing fence direction over 20°.

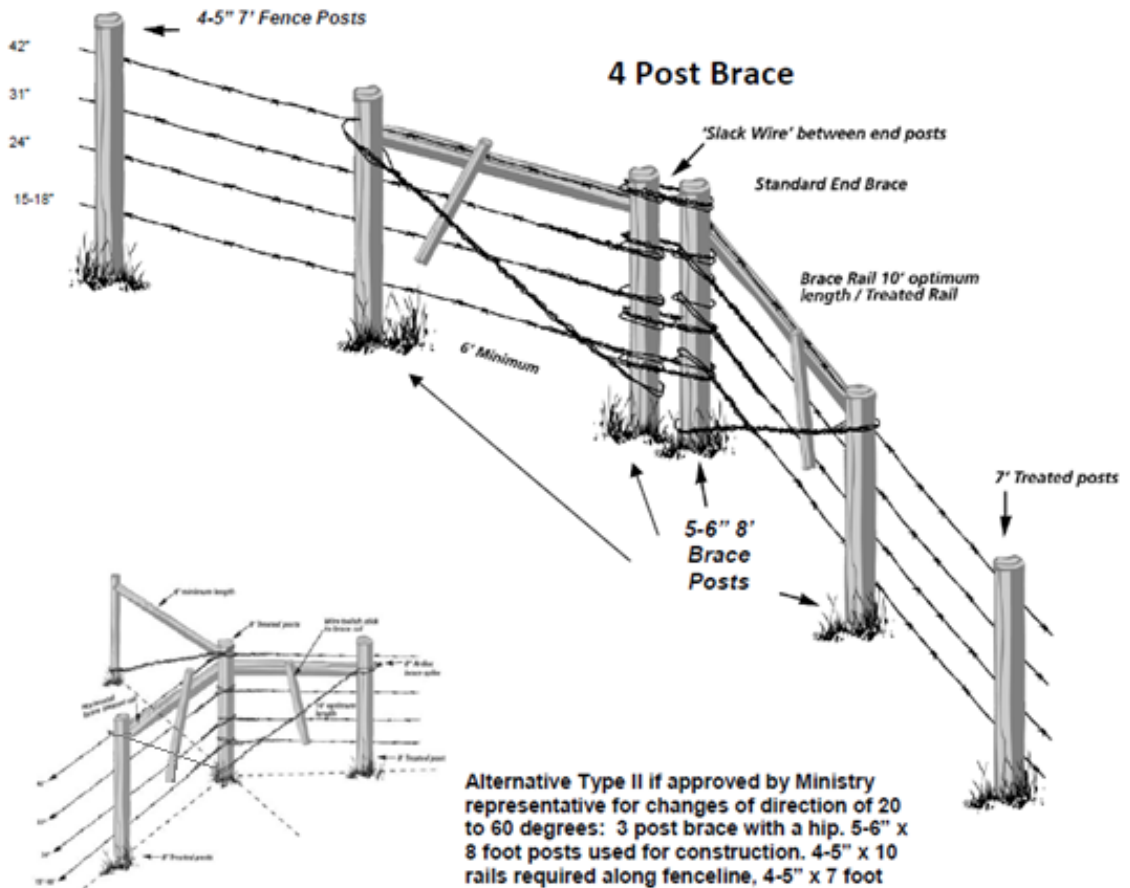


Diagram 5: Type III brace assembly (0 – 20 degrees)

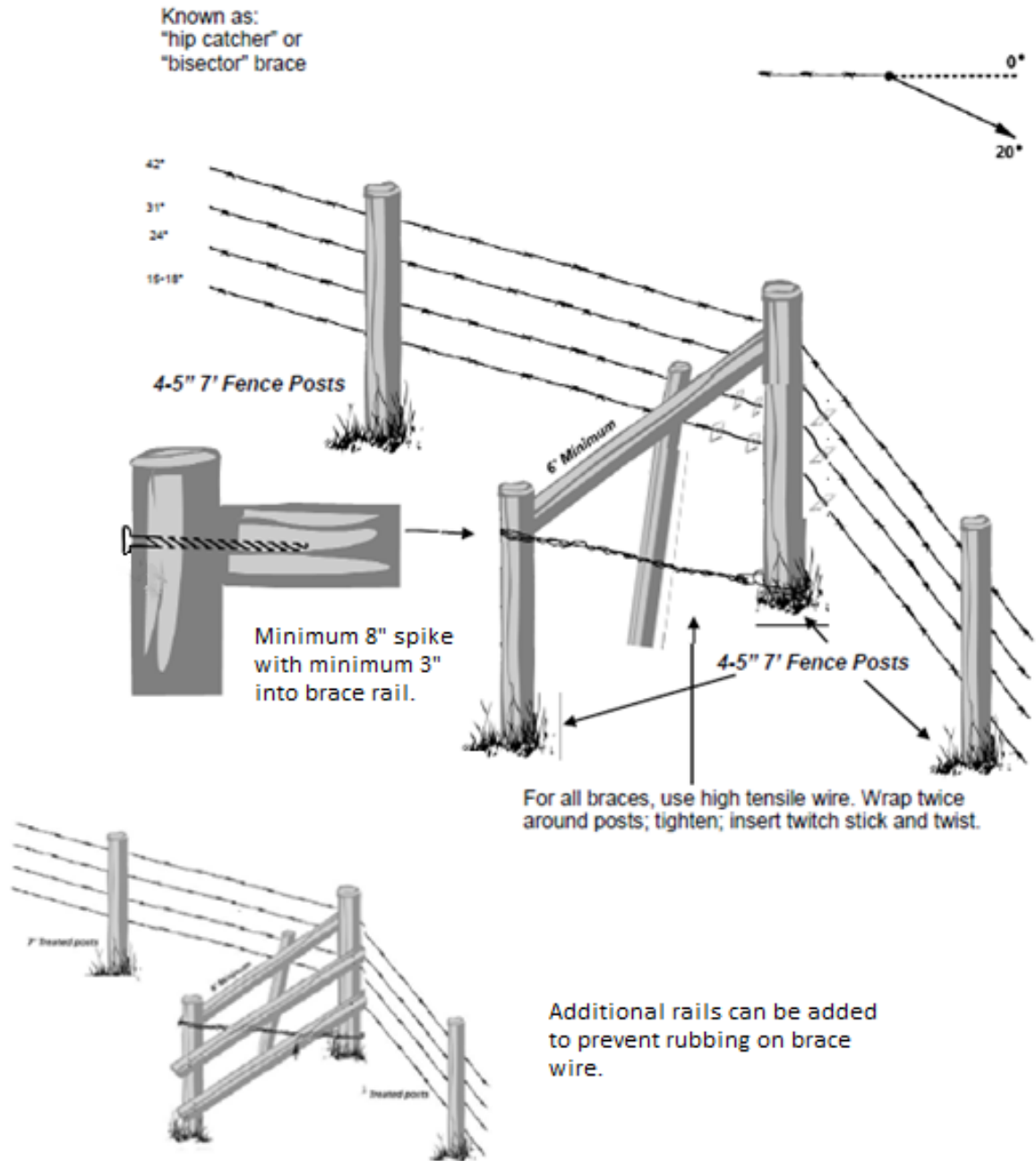


Diagram 6: Gate brace panel

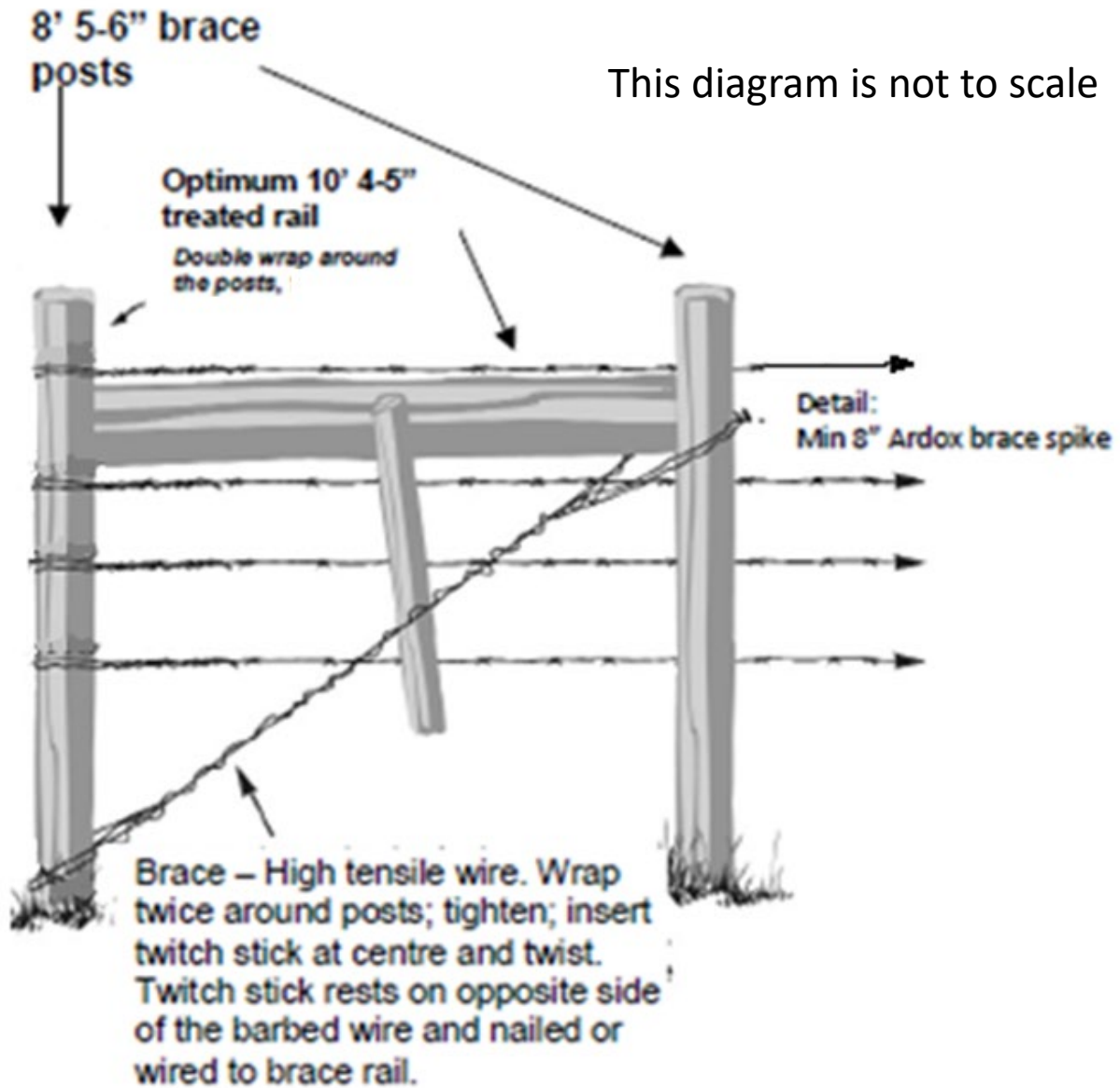
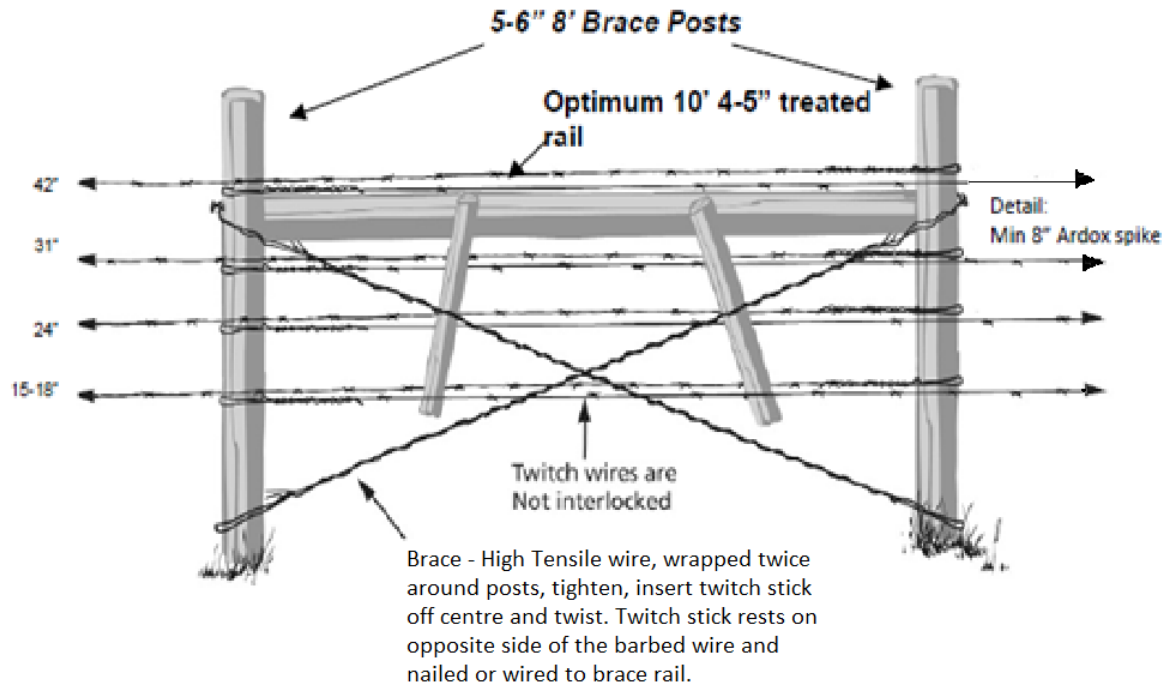


Diagram 7: In-line brace assembly



NOTE: This brace is to be used in line with the fence (not on changes of direction).

Wire spacing for four-strand barbed wire:

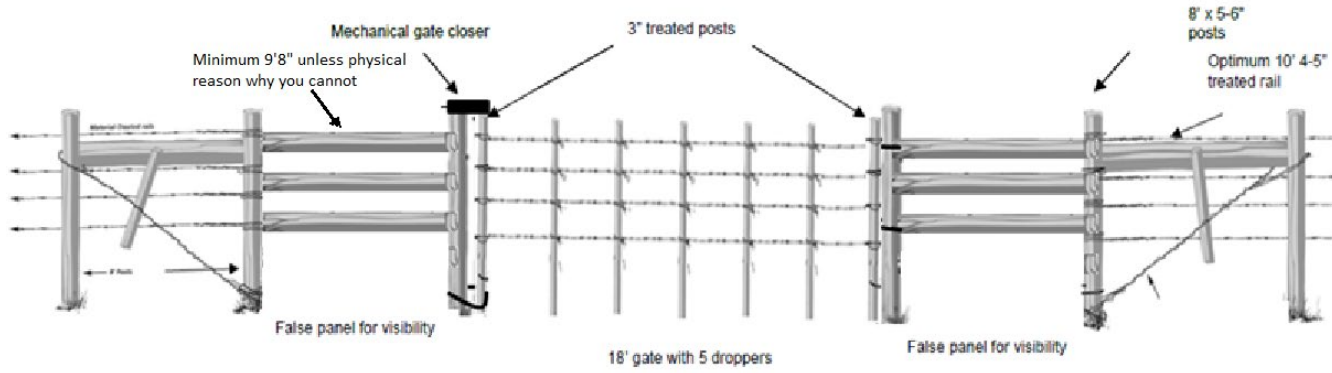
Number 4 Top Wire at 42"

Number 3 Wire at 31"

Number 2 Wire at 24"

Number 1 Bottom Wire at 15-18"

Diagram 8: Anchor brace assembly for gates and cattleguards



Gate and cattleguard diagrams not to scale

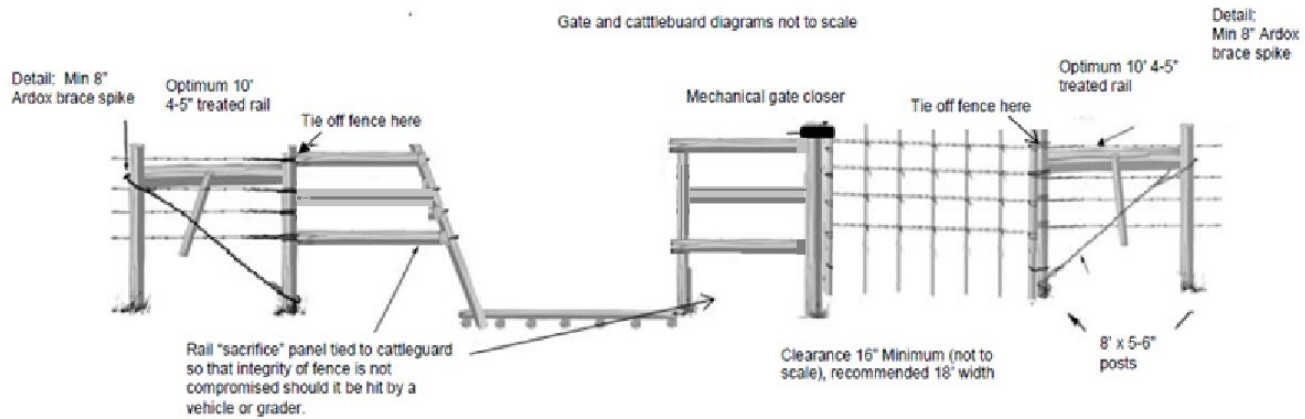
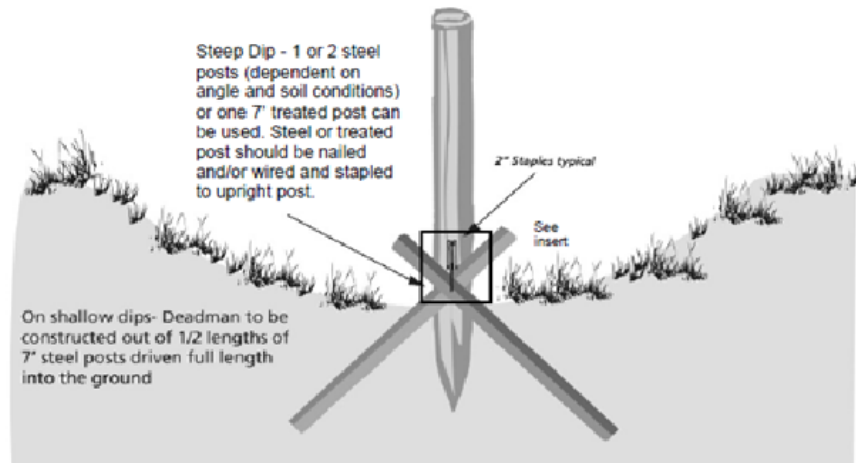
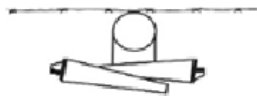


Diagram 9: Simple deadman for dip posts

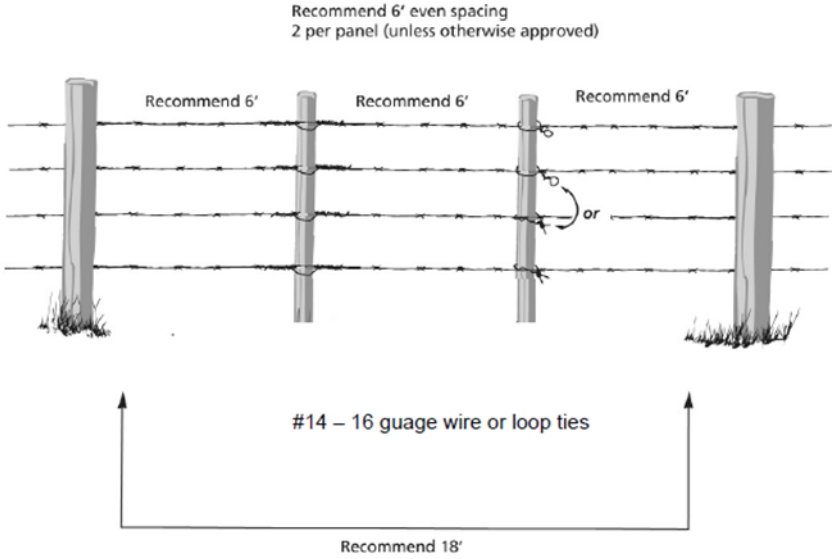


Nailing the deadman to the post is preferred, wire tends to loosen over time.



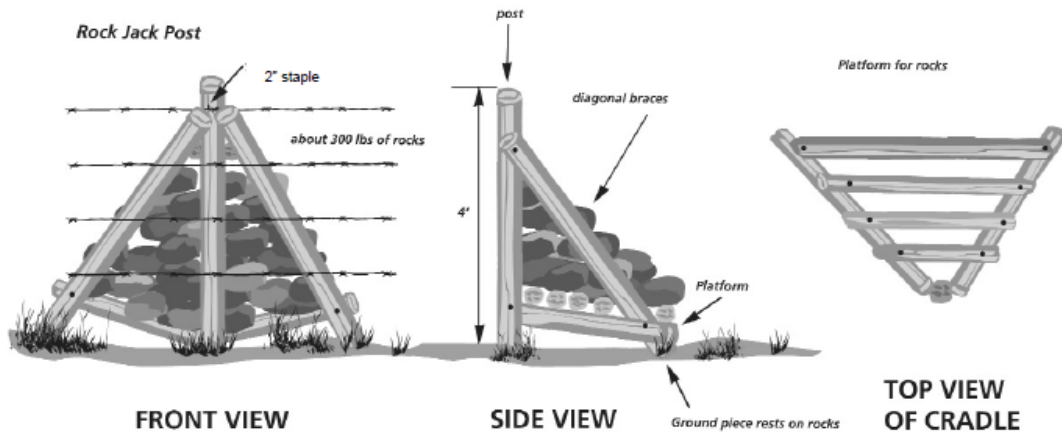
Drive steel posts at angle so that above ground portion is in line with fence wire

Diagram 10: Proper installation of stays/droppers

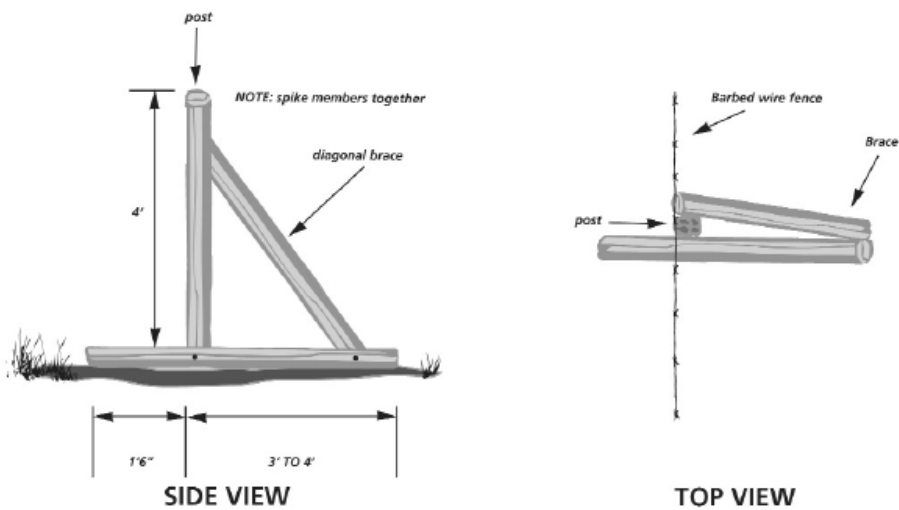


Wooden stays are to be wired to each barbed wire strand on the same side as the posts and not woven (ie. On a four-strand barbed wire fence, wooden stays are wired in four locations. Stays can be power stapled if approved by a Ministry Representative.

Diagram 11: Jack posts (for areas where it is impossible to set a post)



A-Frame



A second horizontal post on the ground on the opposite side of the vertical and diagonal post creates a cradle for rocks to provide additional support to an A-frame post (not shown in diagram).