



Natural Resources Conservation Service

High Tensile Electric Fence For Cattle

Alabama Fence Job Sheet No. 382B



This practice is applied to facilitate the application of conservation practices by providing a means to control movement of animals and people.

The high tensile electric fence is well suited for the restraint and management of most species and classes of livestock. When constructed in accordance with the specifications, high tensile fence provides quality fencing with a lifespan of about twenty years. In addition, to its relatively long service the high tensile electric fence has advantages in its ease of construction, relative low cost to install, and maintain. A power source is an essential requirement for an electric fence. Note that while a high tensile electric fence is compatible with the restraint of most species/classes of livestock, the

effectiveness of the specific design is dependent of the size of the animal to be restrained. This job sheet is for cattle, if desired for other animals contact the local NRCS office.

Following are basic specifications for construction. Additional information is located within the attached drawings and in the Alabama NRCS Construction Specifications or Fence Job Sheet number AL382A. These may be located using this link to the Electronic Field Office Technical Guide (EFOTG) (<http://efotg.sc.egov.usda.gov/treemenuFS.asp>). This job sheet may be used in conjunction with Electric High Tensile Fencing Systems identified in the Alabama Environmental Quality Incentives Program (EQIP).

Component	Specifications	
Wire	<ul style="list-style-type: none"> Use new 12 ½ gauge high tensile steel with Class III galvanized and at least 170,000 psi tensile strength, or 12 ½ gauge aluminum. Construct interior cross fences with at least two wires, one is positive and one is the ground. Join wire using a figure 8 knot, crimping sleeve or other commercially approved connector. See attached drawings. 	
Line Posts	<ul style="list-style-type: none"> Commercial metal “T” or “U” posts (1.25 lbs./linear ft.) and at least 5.5 ft. long; preservative treated wooden posts 3” nominal diameter; or untreated posts of red cedar at least one-half diameter of heartwood, pine heartwood, Osage orange, black and honey locust, catalpa or mulberry. Commercial fiberglass, solid polyvinyl-chloride (PVC), and composite posts with minimum 1 inch diameter may also be used. Posts will be spaced ≤ 50 feet apart; or , ≤ 150 ft. using non-conducting stays, evenly spaced (max. of 50 feet). Attach wire to posts using the industry standard connectors and/or high quality commercial insulators. 	
Brace Units	<ul style="list-style-type: none"> Install appropriate brace assemblies at corners and at least every 1320 feet of straight fence. Also, install brace assemblies at major changes in slope or when fence changes in direction > 30 degrees. When using ≥ 3 strands of fence, tie off fence at 660ft. runs using appropriate brace assemblies. Wood anchor posts shall be ≥ 5” in diameter and set ≥ 36” in the ground. Anchor posts may be set in concrete in 12-inch wide holes, 30 inches deep. Cross member braces shall be ≥ 4”, at least 8 ft. long. Tighten brace with smooth 9 gauge or high tensile 12.5 gauge wires. 	
Energizer System	<ul style="list-style-type: none"> Provide a minimum of 4000 volts under 300 mAmps. Pulse rate ≤ .0003 of a second, with a rate of 35-65 pulses per minute. Appropriate solar powered systems are acceptable as well. <ul style="list-style-type: none"> May use 110 volt, 220 volt, or 12 volt deep cycle batteries (> 200 amps/hrs. needed for 3 weeks use for a 200 mAmps draw energizer without recharging). If the length of fence requires an energizer of more than 4 joules, a solar charger will be needed on the battery systems. Ground rods: ≥ 0.5 in. diameter ground rod(s), at least 6 ft. long; ≥ 3 ft. of rod properly buried for each 1 joule of power. Do not mix metal types while making connections. 	
New Wood Posts Preservative Treatment Levels (AWPA, U1-15, UC4A or later standard)		Retention (lb/ft3)
	Wood Preservative Treatment	UC4A (general use)
	Creosote coal tar	8
	Pentachlorophenol	0.4
	Copper naphthenate	0.055
	Ammoniacal copper zinc arsenate*	0.4
	Chromated Copper Arsenate	0.4
	Alkaline copper quat (ACQ)*	0.4
	Copper azole, type B (CA-B)*	0.21
	Copper azole, type C (CA-C)*	0.15
	Dispersed copper azole (ESR reports)	0.15
*Do not use aluminum fasteners or other products due to corrosion problems.		
UC4A: General use, agricultural posts, cross bracing. Do not use landscape wood products for fence construction.		

Attachments:

- Drawing AL-ECS-382-06, Wire Fence Braces
- Drawing AL-ECS-382-11, 1-2 Strand Electric Fence
- Drawing AL-ECS-382-18, Methods for Tying H. T. Electric Wire
- Drawing AL-ECS-382-10, Electric Fence Gate Options
- Guide Sheet AL-382A, Selection and Use of Wood Utility Poles in Fence Systems

Practice Design (planning process) and Construction Certification

Landowner/Cooperator: _____

Field Office: _____

Farm/Tract Number: _____

All substitutions in materials or modifications in design from those given under specifications must be approved by NRCS prior to beginning construction.

Planned Fence Amounts and Construction Approval*

Farm No.	Tract Number	Field Number	Fence Run Number	Planned Length	Applied Length	Meets Standards and Specifications/Approved by:	Date Fence Construction Approved

Additional Planning Notes:

*Attach drawings or maps that identify planned fence run identification, locations, length and constructed location and lengths.

Approved Modifications:

Prepared By: _____ **Date:** _____

Landowner signature: _____ **Date:** _____

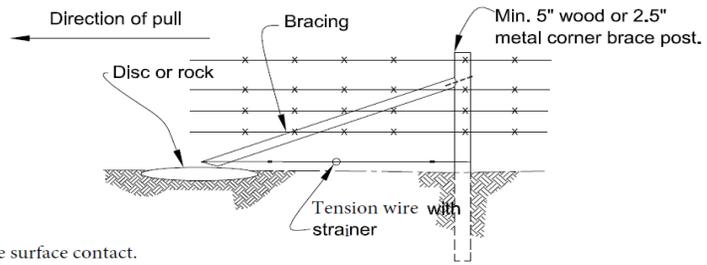
Post Fence Construction Notes:

Prepared By: _____ **Date:** _____

Landowner signature: _____ **Date:** _____

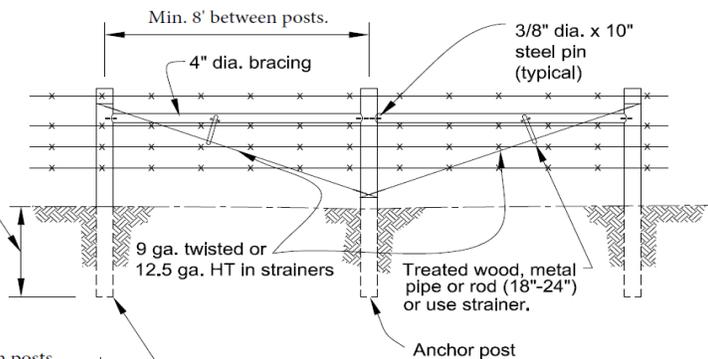
Notes for floating brace:

1. Use 2" dia. steel pipe or 4" dia. wood cross-member. Landscape timbers are not permitted.
2. Use 8" spike nail or brace pin at connection to post.
3. Use 15" min. disc blade or flat stone as shown.
4. Notch brace member 3/8" at lower end to accept tension wire. Make slight cut on lower side of angle brace to provide more surface contact.
5. Cinch tension wires both directions with wire or crimping sleeve.
6. Set posts in ground at least 36" deep (or 30" deep in concrete) in 12" dia. hole.
7. Steel reinforced solid concrete block or treated board min. of 2 inches thick may also be used to support the angle brace.

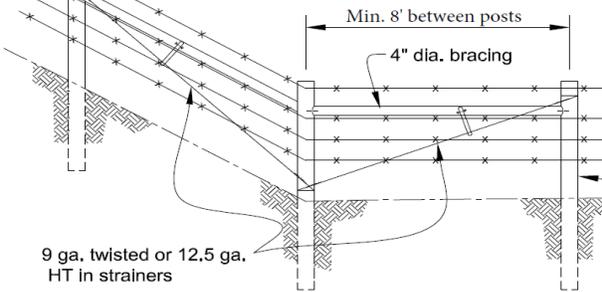


FLOATING BRACE

- For ALL corner or pull posts:**
- 3' min. depth if using wood posts without concrete.
 - 30" min. depth if using wood or steel posts with concrete in 12" dia. hole.
 - Concrete shall be used with all steel posts.

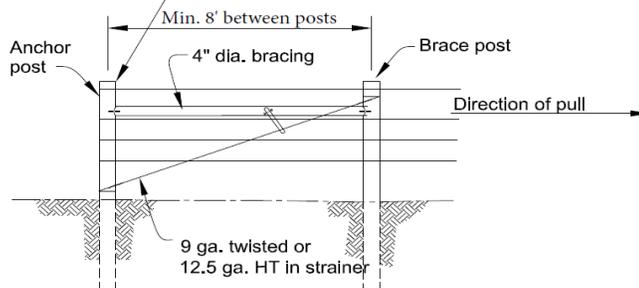


IN-LINE BRACE



CORNER BRACE

- 5" dia. in-line brace, non-corner wood post or 2.5" nominal steel post.
- 5" dia. wood corner posts or 2.5" nominal steel post, capped.



H BRACE

For all horizontal brace members:

- Min. of 8' long
- Min. 4" diameter treated wood or 2" diameter steel pipe
- Place 8" - 12" below top of fence post.

Drawing not to scale. Standardized drawing must be adapted to the specific site.



**WIRE FENCE BRACES
(Floating, In-line,
Corner and H-braces)**

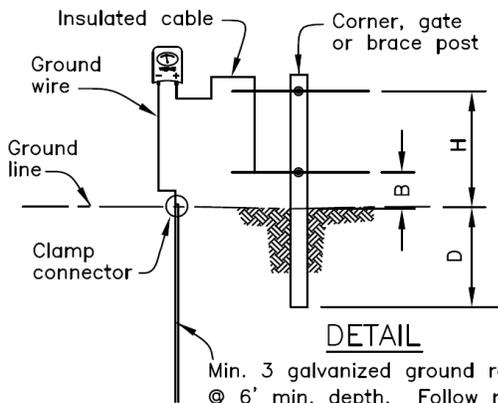
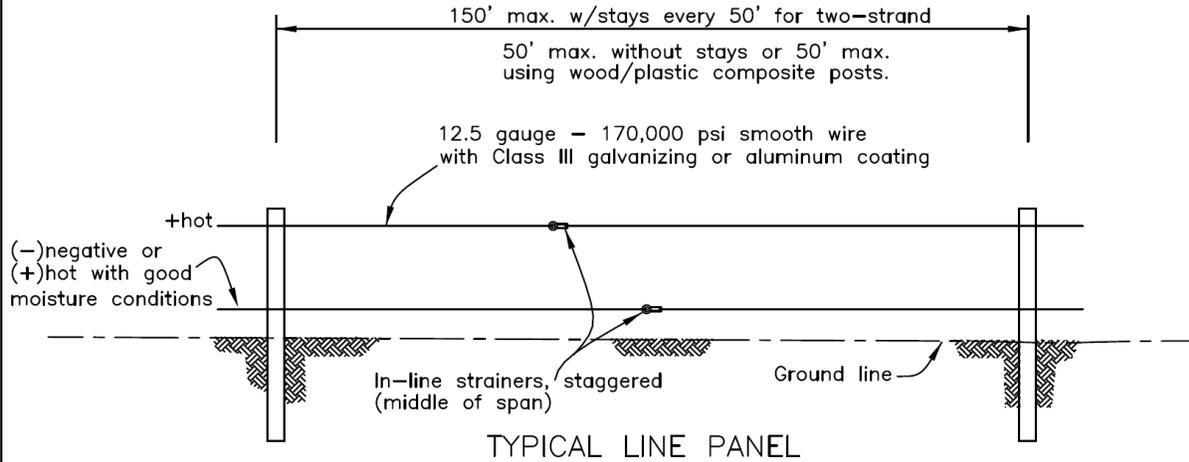
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USDA-NRCS
ALABAMA
STANDARD
DRAWING

FOTG SECTION IV
CONSERVATION PRACTICE

CODE 382 - FENCE
1-2 STRAND ELECTRIC FENCE

STANDARD DRAWING NO.
AL-ECS-382-11
APPROVED: 5/12
DRAWN BY:
REVISED BY:



Min. 3 galvanized ground rods @ 6' min. depth. Follow mfr. directions and specifications.

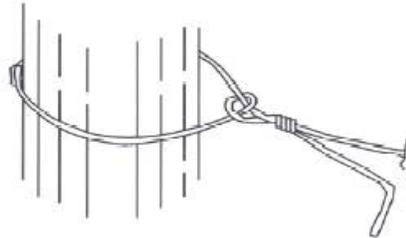
Wire Spacing Guidelines

Wires	Animal Type	B (inches)	H (inches)
1	Cattle	-----	28
2	Cattle, Calves	14-24	30
	Hogs	6	18

- LINE POSTS:** Steel (> 1.25 lb/ft) D=18 in. min.
Wood (3 in. nom. dia.) D=24 in. min.
Wood/plastic composite - Follow manufacturer's recommendations for size, length and placement depth. Use stabilizing 4" dia. wood posts on ridge tops, low places and slight bends in fence lines. *Do not use landscape timbers
- CORNER AND GATE POSTS:** Steel (2.5" dia. min. w/cap) D=30 in. with concrete in 12" wide hole
Wood (5 in. nom. dia.) D=36 in. min.
- BRACE OR PULL POSTS:** Wood (5 in. dia. min.) may be used D=36 in. min.
- ENERGIZERS:** 110-volt or 220-volt line-powered
12-volt battery > 600 amps/hr (min.) deep cycle Marine battery
solar-powered
low impedance
lightning arrestors on all energizers
surge protection on AC power sources
min. 4000 volts output, pulse <0.0003 seconds
- FASTENERS:** Porcelain or UV stabilized plastic insulators
- STAPLES:** 9 gauge (min), 1 1/2" w/barbs for softwoods and 1" for hardwoods
- STAYS:** 5/8" min. fiberglass or 1"x1.5" high density wood

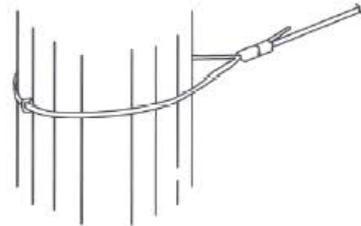
Drawing not to scale. Standardized drawing must be adapted to the specific site.

METHODS OF TYING HIGH TENSILE STRENGTH WIRE



THREAD THROUGH KNOT

* Attach Insulator For
Positive Charged Wire
Or Use Insulated Tube



CRIMPING SLEEVE

* Attach Insulator For
Positive Charged Wire
Or Use Insulated Tube



SQUARE KNOT



FIGURE EIGHT KNOT



WESTERN UNION SPLICE

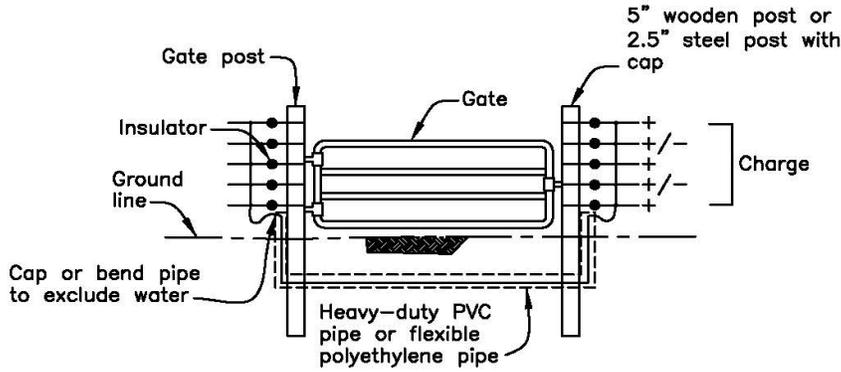


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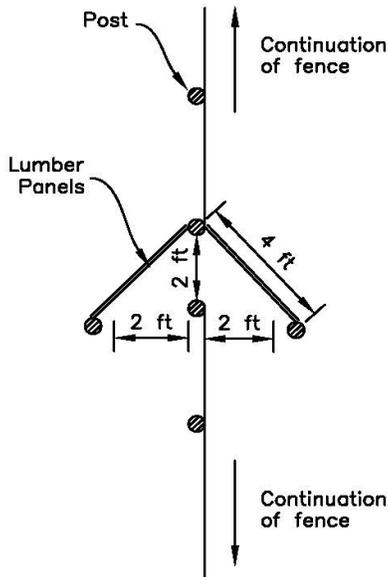
USDA-NRCS
ALABAMA
STANDARD
DRAWING

FOTG SECTION IV
CONSERVATION PRACTICE
CODE 382 - FENCE
ELECTRIC FENCE GATE OPTIONS

STANDARD DRAWING NO.
AL-ECS-382-10
APPROVED: 5/12
DRAWN BY:
REVISED BY:



ROAD CROSSING DETAIL



Walk Through Gate Notes

1. Options:
 - a) Use 1-2 strands of 12.5 gauge high tensile coiled or expandable wire or cables attached to an insulated handle, or
 - b) 12 gauge direct burial, or
 - c) THHN wire or equivalent in underground pipe or
 - d) Non-electric fence
2. Install safety sign identifying "hot" wires and gate.
3. Preference should be given to underground burial of electric wires.

WALK-THROUGH GATE DETAIL

Drawing not to scale. Standardized drawing must be adapted to the specific site.



Natural Resources Conservation Service

Selection and Use of Wood Utility Poles in Fence Systems

Alabama Guide Sheet No. AL382A



In order to meet the national and state NRCS conservation practice standards (CPS), fencing materials shall be durable and of high quality. Wood utility poles may be used in fencing in limited circumstances and primarily for gate posts, pull assemblies, and bracing.

The section from the wood utility pole (called utility fence post) used in fencing must be of high quality, without rot, structural damage or damage from insects or woodpeckers. Additionally, it must be free of drilled holes, non-fence related appurtenances, or visible cracks into the heart wood of the post.

To check the utility posts for internal rot strike the post in question with a hammer to detect voids or rot in the wood. Voids will make "hollow sounds" when the post is struck by the hammer. Typically hammers will rebound more from a solid post than when hitting a section with an internal decay pocket. The internal decay pocket may also cause a sound that is dulled compared to the crisp sound of a solid pole section.

When internal rot is detected in the utility pole, either replace the pole or trim the pole as needed to ensure the section used for the post is rot free.

Due to their high risk of rot, sections of older utility poles that have previously been used at ground level and below shall not be used as a fence post.

The heartwood of the utility fence post must equal or exceed the diameter of the planned post in the NRCS Fence standard. See examples in Figures 1 and 2. The non-heartwood or outer shell of the post must be of sufficient quality to properly hold appurtenances needed in fencing, such as staples, nails, stand-off insulators or gates.

Used wooden utility fence posts will be a minimum of class 10 American National Standards Institute (ANSI) or about 12 inches in diameter.

Utility fence posts shall be installed according to instructions in Alabama CPS, Fence, Code 382, and related guidance documents. For example, the length of the utility fence post must equal or exceed the designed post length. In addition, all installed posts will have an impervious barrier placed on top of post to keep water from entering into the post.

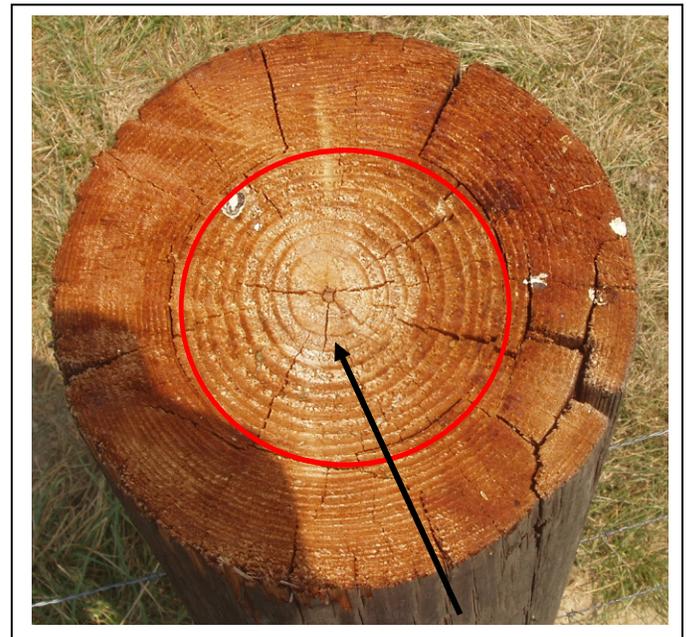


Figure 1. Suitable Utility Post. The red circle shows the approximate boundary of heartwood. Wood splits are mostly from outer edge of post to the edge of the heartwood.

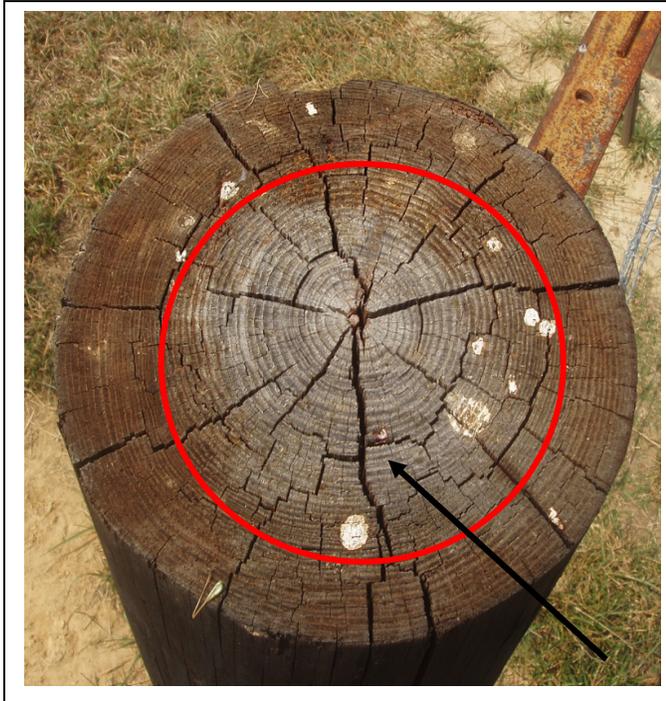


Figure 2. Non-suitable Utility Post. The red circle depicts the approximate boundary of heartwood. Numerous cracks penetrate into the center.

References

USDA RUS Bulletin, 1730B-121, Wood Pole Inspection and Maintenance,

http://www.rd.usda.gov/files/UEP_Bulletin_1730B-121.pdf

Standard Specifications for Wood Poles, USDA Forest Service,

<http://www.fpl.fs.fed.us/documnts/pdf1997/wolfe97b.pdf>