

FENCES THAT WORK:TEMPORARY ELECTRIC FENCE MATERIALS EVALUATION

David W. Pratt, U.C.C.E. Farm Advisor

LIVESTOCK & RANGE REPORT NO. 903 Winter 1990

Napa & Solano Counties U.C.C.E., Livestock/Range Management Program

Temporary electric fences give ranchers a powerful tool for pasture management. They consist of one or more flexible wires attached to insulated posts and charged with an energizer. The fences can be put up and taken down quickly.

CUTTING THROUGH THE PROPAGANDA

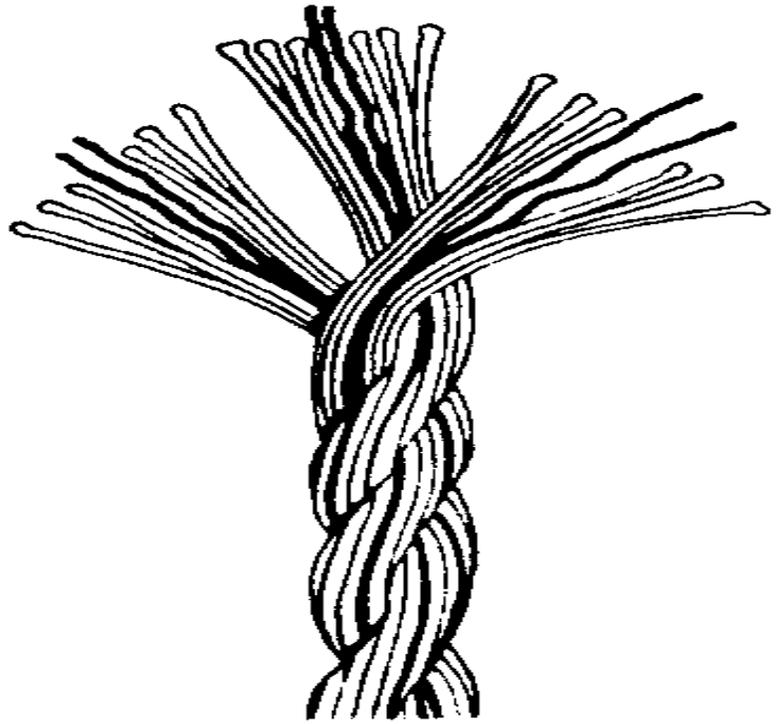
Some of the sales literature fencing companies provide is very informative and can help you design more effective electric fences. The most helpful publications are cited at the end of this report.

Other sales literature can be confusing. Predictably every manufacturer claims their product to be superior to all others.

In 1987 I began experimenting with a variety of fencing materials. My testing consisted of use of a wide variety of materials from several companies under field conditions for sheep and cattle on dryland range and irrigated pasture. This report describes my observations and recommendations regarding the temporary electric fencing products used.

WIRE TYPE

There are two basic types of temporary electric fence products: polywire and polytape. Polywire is a generic term referring to any of several brands of electroplastic twine. Polytape refers to electroplastic ribbon. Most polywires and polytapes are made up of stainless steel filaments interwoven with polyethylene, or polypropylene fibers. One brand consists of fiberglass fibers interwoven with strands of aluminum. The number of steel or aluminum strands varies from 3 to 9 depending on the product.



Maxishock cable is also marketed as a temporary portable fence wire. It consists of strands of galvanized steel woven into a flexible cable.

OBSERVATIONS:

Voltage dropped sharply in steel/polyethylene wires when over 1/2 mile from the energizer. Voltage in a fence with the aluminum/fiberglass material did not drop significantly when measured one mile from the energizer under field conditions. Aluminum is a better electrical conductor than steel. In addition, aluminum does not rust.

The steel/polyethylene material stretched considerably when initially installed. The day after building a fence with new wire, each wire had to be tightened. It took only a few seconds to take up the slack and was not a major problem since stock needed to be checked anyway. The fiberglass/aluminum product stretched very little. It did not require tightening, however, it became brittle after its first winter of use. It broke easily. My reels of aluminum/fiberglass wire are loaded with splices. In addition, the material is more bulky and more difficult to rewind than the polyethylene/stainless steel products. In storage mice chewed the aluminum/fiberglass materials. Mice didn't bother any of the other products.

Maxishock cable was stronger and more conductive than the other products. It is also heavier, bulkier, and more cumbersome to dispense and rewind.

RECOMMENDATIONS:

Go with the steel/polyethylene combination. It is easier to work and more durable than the aluminum/fiberglass product. The maximum effective distance you can charge polywire is 1/2 mile from the energizer (an energizer can power up to 1 mile of polywire if placed in the middle of the fence line).

If a longer fence is needed, install a separate fence with its own energizer. (Never put two energizers on the same fence.)

Maxishock cable is another option for building longer or semipermanent fences. In addition, this material would deliver more power to the ends of the fence where fence wires pass through a lot of wet grass. Since it is more expensive than polywire, you will save money by using it only where vegetation is a potential problem (i.e. the bottom wire on a multi-wired fence).

POLYTAPE OR POLYWIRE

OBSERVATIONS:

Polytape is more visible than polywire. However, it is also bulkier (a full reel of polywire builds more fence than the same reel full of polytape). Polytape is slightly more difficult to

rewind, and it wears out more rapidly than polywire. Polywire is also less expensive (polywire average = \$0.021/foot; polytape average price = \$0.051/foot).

RECOMMENDATIONS:

Use polytape where visibility is important (horses). Use polywire for all other applications, especially multiple wire fences.

NUMBER OF CONDUCTIVE STRANDS

OBSERVATIONS:

I have used steel/polyethylene polywire with 3, 6 and 9 strands of conductive material. Predictably the six wire polywires were more conductive than the three strand materials. The nine strand polywires were more conductive than the 6 strand products. The nine strand polywires are stronger than the other products. However, the nine strand materials were bulkier and slightly more difficult to rewind. A full reel of nine strand wire held about 300 feet less wire than the same reel loaded with 6 strand material. The nine strand polywire was also more expensive (6 strand polywire average = \$0.021/foot; 9 strand polywire average price = \$0.027/foot).

RECOMMENDATIONS:

Six is enough. Under most applications six conductive steel filaments is plenty to do the job. While the nine strand material is stronger, you don't need strength for an effective psychological barrier.

COLOR

OBSERVATIONS:

If an animal doesn't see the wire they can't respect it. Visibility is critical, especially with poorly trained stock or where wildlife may challenge fences. Polywire comes in several colors and color combinations: white, orange, orange & black, yellow, and yellow & black. Orange and yellow wires look best on the farm supply store shelf but in the field white has them beat hands down. Against a lush green or dried yellow background, white is more visible. Time and time again untrained animals noticed white polywire from farther away than they noticed other colors.

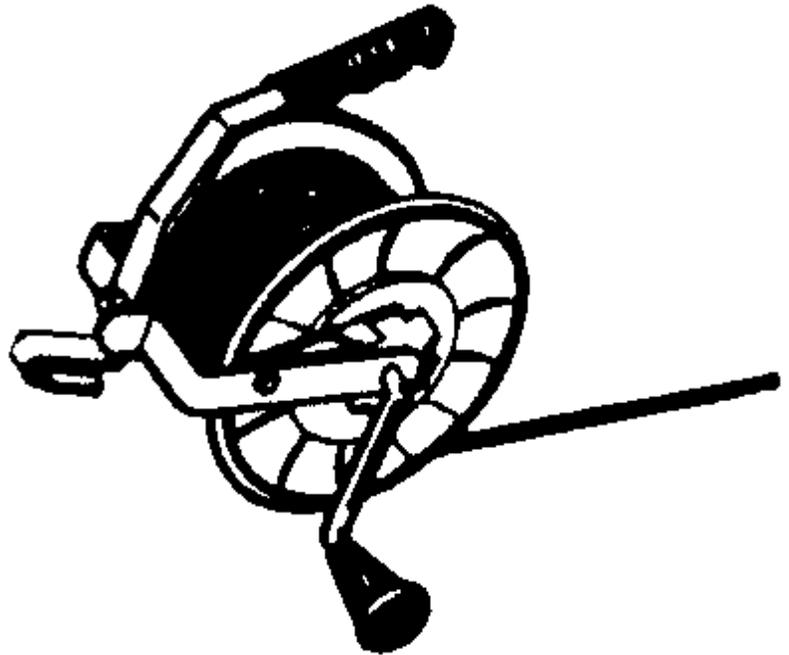
RECOMMENDATIONS:

White is best! Buy white polywire unless you have to deal with snow for part of the year. In snow country use orange polywire.

REELS

OBSERVATIONS:

Rolling polywire on anything but a reel was difficult and frustrating. Some reels weren't much better. A plastic minireel used didn't hold much wire and was difficult to wind. Plastic handles for rewinding the wire (cranks) were not durable. Some became so warm on hot days that gears stripped when wire was over-tightened. When cattle broke through a fence they occasionally knocked a reel down and dragged it several feet. The plastic cranks frequently broke off. Of the 12 reels I had with plastic handles, only one of the original cranks was not broken. I have never broken or had a problem with any of the reels with steel cranks I have used.



RECOMMENDATIONS:

A reel is essential. Rolling polywire back on the spool, on a stick or around your arm (the way you would roll an extension cord) simply won't work. You'll wind up kicking the dog, yelling at the kids and having nightmares about the money you've wasted and the mess you made.

Reels with steel cranks cost about \$10 more than reels with plastic cranks. Spend the money. I don't suggest you over-tighten polywire, or let cattle stamped through a fence (which can happen during training), but a reel should be able to take a little abuse, after all this is for use on a ranch, not a china shop.

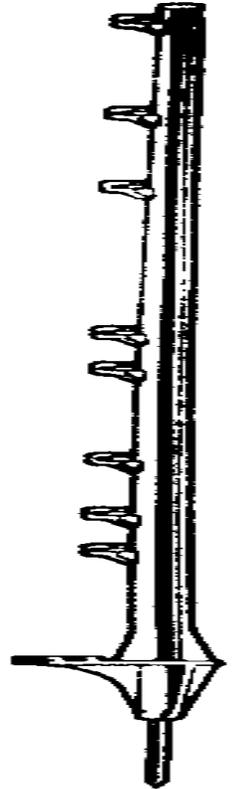
POSTS

OBSERVATIONS:

Metal "t" posts were strongest, but most labor intensive to install and remove--a distinct disadvantage for temporary portable electric fences. The "t" posts also required insulators. I was unable to find "t" post insulators that fit polytape. Fiberglass rods were easily tapped in with a hammer. Rod ends splintered when tapped. Fence suppliers sell a cap to place over the end of the rods to protect them when you tap them in. An expended shot gun shell works equally well and doesn't cost anything.

Polywire is attached to the rods using a wire clip or plastic insulators that slide on the rods. Several types of wire clips were used. Some clips were difficult to adjust. The plastic insulators were most difficult to adjust in the field. Clips made for use with polytape (with an extra wide area to hold the wire) were easy to adjust and had auseful locking feature. Polytape did not fit easily into the plastic insulators or move freelyonce installed.

Three kinds of tread-in posts were used. A lightweight fiberglass post with one stationary and two adjustable clips did not go into the soil as easily as the two other tread-in post styles. Lightweight and heavyweight polyethylene tread-in posts with wire loops molded into the post and a steel spike at the bottom were also used. By stepping on a small platform at the base of the posts the spike tip went in easily and adequately secured the post. Under dry conditions they were difficult and sometimes impossible to install. The premolded loops provide plenty of flexibility for a variety of wire spacings.



RECOMMENDATIONS:

For irrigated pasture I prefer the convenience of the tread-in posts with premolded loops (either lightweight or heavy duty). However they are more expensive than the fiberglass rods. (Tread-in posts average \$3.05/post; 4'-fiberglass rods average \$1.20/post + \$0.12 per clip). Fiberglass rods make just as effective a fence but take a little longer to install. They are more versatile since they can be used under dry range conditions. Carry a shotgun shell with you to place over the top of rods when you tap them in. Use the locking polytape clip even if you are using polywire. It is subject to fewer tangles and the locking feature is handy.

Do not use metal "t" posts.

ENERGIZERS

An energizer (also called a charger or controller) regulates the flow of electricity in an electric fence. It stores electrons in a "capacitor" and then releases them in a "pulse." After each pulse the capacitor stores up electrons for the next pulse.

Your fence, regardless of the animal being controlled, does not need more than 5,000 volts. Commonly the best energizers will deliver 4,500 to 7,000 volts. Energizers are available that produce even higher voltage. In fact one cheap charger blew my volt meter off the scale (it reads up to 10,000 volts) and knocked me on my #%\$&!. Avoid these cheap high impedance "weed chopper" type chargers.

The portability of your fences can be maintained by using a DC energizer with deep cycle batteries. A solar panel can eliminate the need for replacing batteries.

For more information on energizers refer to *Livestock & Range Report 913: Electric Fence Energizers*.

EXPERIENCE IS THE BEST TEACHER

Some people like Fords. Some like Chevrolets. The same can be said of fencing materials. Different people tend to like different things. There is no substitute for actually using these products to find what works best for you. Therefore, when my materials are not being used in grazing research projects I loan them out to ranchers thinking about purchasing their own materials. This first hand experience is the best way to make sure you buy equipment that is right for your needs. This offer is available to ranchers in Napa, Solano and Yolo counties.

FENCING PUBLICATIONS

A guide to: Fencing that Works!

Premier, P.O. Box 89, Washington, IA 52353

Electric Fence Systems Instruction Manual

Twin Mountain Ranch Supply, P.O. Box 2240, San Angelo, TX 76902

Gallagher Power Fencing Manual.

Snell Systems Inc., P.O. Box 17769, San Antonio, TX 78217

Know How: Electric Fence Systems

Live Wire Products, 1127 E. St. Marysville, CA 95901

The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities. Inquiries regarding this policy may be addressed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, CA. 94612-3560. (510) 987-0097.