UNIT VII - BUILDING FENCES

Lesson 4: High Tensile and Electric Fences

Competency/Objective: Describe techniques for building high tensile and electric fences.

Study Questions

1. What are the advantages of high tensile fencing?
2. What are the components of high tensile fencing?
3. How are high tensile fences constructed?
4. What are the advantages of electric fences?
5. What are the components of electric fences?
6. How should electric fence chargers be selected?
7. How are electric fences constructed?

References

1. *Agricultural Structures (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Master
   a) TM 4.1: Electric Fencing Components
3. Activity Sheet
   a) AS 4.1: Tensioning Fences

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TEACHING PROCEDURES

B. ***Review***

Lesson 3 discussed barbed and woven wire fencing, which are commonly used for agricultural purposes. Other types of fences frequently used in agriculture are high tensile and electric. This lesson outlines some basics for both types of fencing.

C. ***Motivation***

Ask the students if they have come in contact with an electric fence. Have them describe the sensation they experienced. Describe how the shock is transmitted from the fence to people or livestock that come into contact with it.

D. ***Assignment***

E. ***Supervised Study***

F. ***Discussion***

1. Ask the students to list some advantages of high tensile fencing. Discuss the properties of high tensile wire.

What are the advantages of high tensile fencing?

a) Chief advantage - high tensile strength, which allows the wire to take a large amount of stress before breaking
b) Longer life span
c) Lower maintenance requirements
d) Versatile, coming in a variety of forms
e) Easier to handle than barbed or woven wire
f) Easily electrified
g) Good choice to replace barbed wire when the animals being fenced need protection from the barbs, as in the case of show animals

2. Describe the components of high tensile fences and discuss them with the class.

What are the components of high tensile fencing?

a) High tensile wire
b) Wood or steel posts
    1) Either rounded or square wood posts
    2) Wood corner posts at least 5 inches in diameter
    3) Brace posts at least 4 inches in diameter
    4) Line posts at least 3½ inches in diameter
c) Fasteners
    1) Staples that are 1¾ to 2 inches long
    2) Wire clips
d) Spacers called battens, stays, or droppers
    1) Replace some of the line posts in holding the wire in place
    2) Made of wood, steel, or fiberglass

e) Permanent in-line strainers or tension springs

3. Ask students to review the steps in constructing barbed and woven wire fences. Discuss their similarity to the steps in high tensile fence construction.

How are high tensile fences constructed?

a) Set the anchor post and brace structure; double brace structures should be used because they can hold more tension.
b) Set the line posts, spacers, and line brace structures.
    1) Include line brace structures at appropriate intervals and at the top and bottom of slopes.
    2) Set the line posts 2½ feet into the ground for stability.
    3) The distance between line posts will vary with the purpose of the fence; 16 feet apart is a good rule of thumb for large pastures with little pressure on the fence.
    4) The use of spacers allows them to be set further apart.
c) Attach the wires working from the bottom to the top.
d) Place a spinning jenny somewhere in the middle of the span.
e) Pull the first wire from the spinner to one brace structure.
f) Wrap it around the post twice and tie it off.
g) Cut the wire at the spinner.
h) Attach the strainer to the end of the wire.
i) Pull the wire from the spinner to the other brace structure and tie it off.
j) At the spinner, run about 3 feet of wire past the strainer and cut the wire.
k) Place the end of this wire in the strainer, and take up tension by turning its drum.
l) After applying some tension, loosely staple the wire in place.
m) Once all the wires are in place, tighten the wires to the proper tension and staple them to the posts, with the wire left slightly loose in the staples.
n) Attach the wires to the spacers.

4. Have students list all the advantages they can think of concerning electric fences. Could they be considered low maintenance? Why or why not?

What are the advantages of electric fences?

a) Low in cost
b) Quick and easy to construct
c) Versatile - used for all types of animals
d) Long life span because the animals generally leave the fence alone
e) No physical damage to animals from shock

5. Ask students to list the components of an electric fence. If possible, show the class a charger, ground rod, and sample insulators. Show students TM 4.1.

What are the components of electric fences?

a) Wire
    1) 12½-gauge or 14-gauge high tensile or soft wire
    2) Poly-wire
        (a) Useful alternative for temporary fences
        (b) Stranded polyethylene wire that has smaller wire conductors embedded in it
b) Fence charger
c) Ground rod
d) Posts

1) Wood posts that are at least 5 or 6 inches in diameter
2) Steel posts
3) Small fiberglass rods 3 to 5 feet in length for constructing a temporary fence

e) Insulators

6. Discuss considerations that affect the selection of a fence charger.

How should electric fence chargers be selected?

a) Location of the fence
   1) Determines if electricity is available
   2) Battery types
      (a) Useful for remote areas
      (b) Solar-powered battery charger built into the charger in some units
   3) Plug-in chargers - used to take advantage of main line power where electricity is available
b) Voltage put out by the charger
c) Length of the fence
d) Amount of vegetation
   1) Grass and weeds - rob the fence of some of its power
   2) Low impedence fence chargers
      (a) Useful when vegetation is high
      (b) Increases its energy output as power is drained off by plants touching the fence
e) Species of livestock
   1) Less voltage needed for animals that have thin coats
      (a) Horses
      (b) Short-haired cattle
   2) Higher voltages required for animals with thicker coats
      (a) Sheep
      (b) Goats
f) Safety - approved by the Underwriters Laboratories or another reputable agency

7. Describe the process for constructing an electric fence.

How are electric fences constructed?

a) Install the charger in a dry, protected area.
b) Set the ground rod in place and attach it to the charger.
   1) The ground rod must be in solid contact with moist earth, which may mean driving it to a depth of up to 6 feet.
   2) Drier conditions may require the use of more than one rod.
c) Clamp a heavy wire to the top of the rod and attach the other end to the charger's ground terminal.
d) When the posts and wire for the fence are in place, run another wire from the positive terminal of the charger to the electric fence or to a lead wire.
e) If permanent posts are in place, they should be used; if not, set the posts in place.
   1) The posts should be set to a depth of 3 to 3½ feet.
   2) The distance between the posts may vary between 20 and 50 feet.
   3) For a temporary fence, the corner and line posts are set to a depth that feels solid.
f) Place the insulators on the posts at two-thirds of the height of the livestock being fenced.
g) Attach the wire to the posts.
   1) One or two strands of wire are sufficient for an electric fence.
   2) Attach the end of the wire to the insulator on the anchor post, and unroll the wire along the fence line.
   3) Stretch soft wire using fence stretchers.
   4) Attach it to the insulators.

5) If high tensile fencing is used, the wire should be laid out and stretched as appropriate.

G. ***Other Activities***

1. Have the students collect some electric fence insulators to use as examples when teaching this lesson.

2. Allow students to observe a local fencing contractor building a high tensile fence.

H. ***Conclusion***

High tensile and electric fencing have many advantages for agricultural operations. High tensile wire is useful where strong wire that does not break easily is needed. Among the advantages of electric fencing are low cost and ease of construction. High tensile fencing is often electrified to provide the advantages of both types of fencing.

I. ***Answers to Activity Sheet***

1. To tension or tighten the wire

2. Wires should not be stretched tightly on hot days because the wire will contract as it cools and possibly break. Wires should not be left loose on cold days, as the wire will expand as temperatures increase, leaving too much slack in the wire.

3. Putting the strainer in the middle will provide more even tension through the span.

J. ***Answers to Evaluation***

1. d
2. c
3. b
4. d
5. Two-thirds of the height of the livestock being fenced
6. The location of the fence, the voltage put out by the charger, and safety
7. Because they can hold more tension

8. Answers may include any two of the following: low cost, quicker and easier construction, versatile, long life span, and no physical damage to animals from shock.

9. To maintain the tension on the wire

10. A component of high tensile fences that can replace some of the line posts holding the wire.

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EVALUATION

Circle the letter that corresponds to the best answer.

1. Which of the following is a component of an electric fence?

   a. Spacers
   b. Stays
   c. Staples
   d. Ground rod

2. What is the main advantage of high tensile fencing?

   a. It is low in cost to construct.
   b. It does not need to be electrified.
   c. It can take a large amount of stress.
   d. It requires only small rods for posts.

3. In pastures with little pressure on the fence, how far apart can the posts of a high tensile fence be spaced?

   a. 14 feet
   b. 16 feet
   c. 18 feet
   d. 20 feet

4. How far apart are the posts in an electric fence generally set?

   a. 5 to 15 feet
   b. 10 to 30 feet
   c. 15 to 45 feet
   d. 20 to 50 feet

Complete the following short answer questions.

5. At what height should insulators be placed on a fence post?

6. What are three factors to consider when choosing a charger for an electric fence?

   a.

   b.

   c.

7. Why are double brace assemblies useful with high tensile fencing?

8. What are two advantages of electric fences?

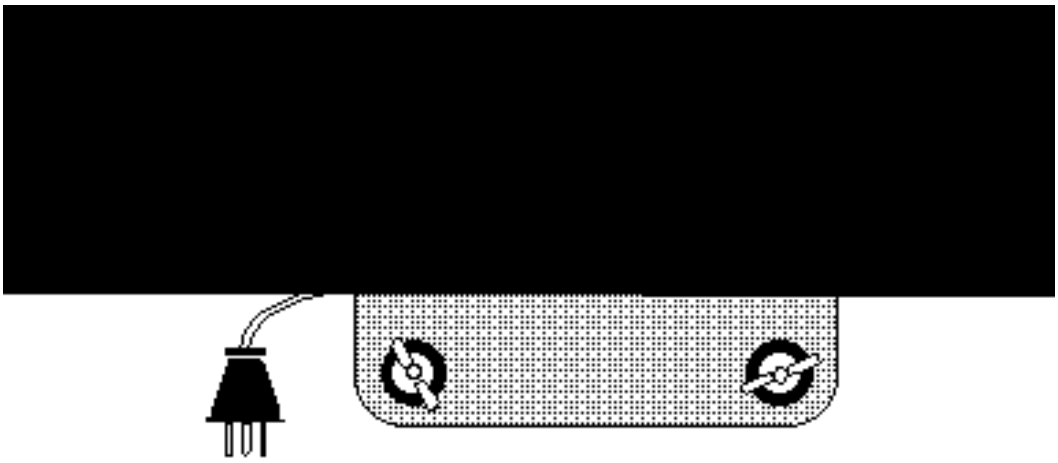
   a.

   b.

9. What is the purpose of adding a permanent in-line strainer when building a high tensile fence?

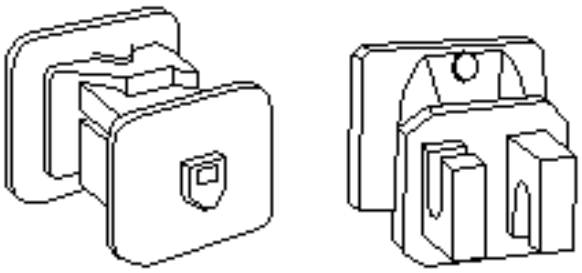
10. What are stays?

Components of Electric Fences



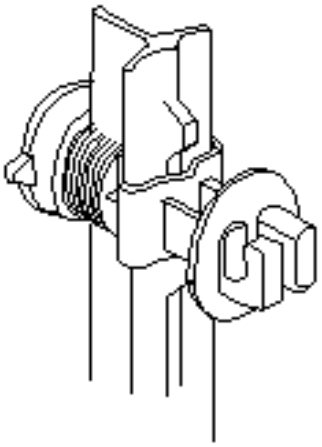
Insulators

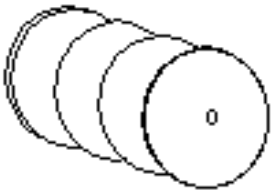
Wood Post Insulators



Square Insulator

T-Post Insulator





Nob Insulator

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Tensioning Fences

Objective: Tension an electric fence.

Materials and Equipment:

14-gauge soft wire
Strainer
Wire cutters

Procedure:

In this activity, you will practice tensioning soft wire using the process described for high tensile wire in your student reference.

1. Wrap the wire at least twice around a post selected by your instructor. Wrap the tail of the wire around the fence line wire at least three or four times.

2. Unroll enough wire to span approximately half the length of the fence, and cut the wire.

3. At the opposite post, repeat step 2.

4. From the second post, unroll enough wire to reach the first wire and extend 2 to 3 feet beyond it.

5. Run one wire through the hole on the body of the strainer and tie or crimp the wire to the strainer.

6. Run the other wire into the hole on the drum of the strainer.

7. Turn the drum until the wire is relatively tight.

Key Questions:

1. What is the purpose of the strainer?

2. Suppose that you are going to tighten the wire in more extreme weather conditions, when it is 35 or 90 degrees Fahrenheit. How would these temperature extremes affect how much you would tighten the wire?

3. Why is putting the strainer close to the middle of the span recommended?