UNIT VII - FENCING

Lesson 3: Barbed and Woven Wire Fences

Competency/Objective: Describe techniques for building barbed and woven wire fences.

Study Questions

1. What materials and tools are needed to install barbed wire fencing?
2. How is barbed wire laid out on the fence line?
3. How is barbed wire stretched?
4. How is barbed wire attached?
5. What materials and tools are needed for woven wire?
6. How is woven wire laid out?
7. How is woven wire stretched?
8. How is woven wire attached?

References

1. *Agricultural Structures (Student Reference).* University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VII.
2. Transparency Masters
   a) TM 3.1: Staple Positioning
3. Activity Sheet
   a) JS 3.1: Constructing Barbed Wire Fencing

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TEACHING PROCEDURES

B. ***Review***

Lesson 2 described how wood and steel posts should be set when building fences for agricultural operations. Barbed and woven wire fences are two common types of fences in agriculture. In this lesson, the materials, tools, and wire installation techniques for these types of fences are outlined.

C. ***Motivation***

Display some basic fencing materials and tools, such as staples, fencing pliers, and fence stretchers. Ask students to explain how they are used for fencing.

D. ***Assignment***

E. ***Supervised Study***

F. ***Discussion***

1. Some samples of barbed wire (consisting of a few inches of 12½ and 14 gauge wire with 2 or 4 points) will be of help in presenting this lesson. Discuss the following materials and tools with the class.

What materials and tools are needed to install barbed wire fencing?

a) Materials
   1) Barbed wire - fencing material made of wire strands twisted together with wire barbs placed at various intervals
      (a) Gauge
         (1) Number representing the diameter of the wire, with a lower number corresponding to a larger diameter
         (2) 12½ and 14 gauge - most common in Missouri
      (b) Number of barbs - most commonly two and four points
      (c) Wire coating
         (1) Zinc
         (2) Aluminum
      (d) Made of soft wire or high tensile wire
   2) Staples or metal clips

b) Tools
   1) Claw hammer
   2) Fencing pliers
   3) Fence stretcher

2. Discuss how a barbed wire fence is laid out.

How is barbed wire laid out on the fence line?

a) Wrap the bottom strand of the wire around a corner post two or three times and staple it securely.
b) Twist the end of the wire tightly around the wire strand.

c) The number of strands of wire used determines the height of the bottom strand.

d) Unroll the wire along the fence line on the stock side of the posts.

1) The length unrolled depends on the topography, fence layout, and the position of fence brace structures.

2) Barbed wire comes in rolls of wire a quarter mile long; the entire length of the wire can be laid out at once under the proper conditions.

3) Using short stretches of wire is more costly.

e) Use the same procedure for each strand, from the bottom to the top.

f) Place the wire as close as possible to the fence line.

g) Walking the fence line and moving the wire into place may be necessary to help remove excess slack prior to stretching the wire.

3. Show students a wire stretcher. If possible, demonstrate how hand-operated fence stretchers work. Discuss how wire is stretched.

How is barbed wire stretched?

a) Attach the stretcher to the wire being stretched.

1) The stretcher can be attached to a solid object in line with the wire, usually the post of a brace structure or a piece of equipment.

2) For longer stretches, the wire can be stretched and spliced in the middle to distribute the pull more evenly; the stretcher then connects to the wire only.

b) The length of wire to be stretched at a time depends on the topography of the area and the stretching tools.

1) Hilly areas require stretching short sections at a time to keep the wire level.

2) A rule of thumb is to stretch from 5 to 20 rods at a time.

3) Stretching longer sections of wire will take less time.

c) Slowly stretch the wire just to the point of being relatively tight and straight.

d) Depending on the length of the stretch, it may be necessary to walk along the fence line and untangle the wire.

4. Show the class some examples of fence staples and metal post clips and discuss how they are used to attach barbed wire. Use TM 3.1 to illustrate how staples should be set in a wood post. If possible, demonstrate how wire clips work with a steel post. Hand out JS 3.1. In order for students to practice constructing a barbed wire fence, solid posts should already be in place to complete this activity.

How is barbed wire attached?

a) Attach the wire to the post while the stretchers are still in place.

b) The end of the wire should be long enough to wrap completely around the post twice and then be tied off back onto the wire.

c) Staple the wire to the post.

d) Use staples to attach wire to wood posts.

1) Set the staples at a slight downward angle diagonal to the side of the post.

2) Drive the staple into the post.

3) Staples should not be driven in so tightly that they and the wire become embedded in the post.

e) If steel posts are used, attach the wire using metal clips.

5. Show the class pictures of different types of woven wire. Discuss the tools needed to install it.

What materials and tools are needed for woven wire?

a) Materials

1) Woven wire

(a) Fencing material in which wires are connected together to form a mesh

(1) Hinge lock - has short pieces of wire wrapped into a knot at each horizontal wire, so the stay is not one piece of wire

(2) Stiff stay - has a continuous stay with short sections of wire forming the knots that attach the stay to the horizontal wire

(b) Either soft wire or high tensile wire

(c) System of labeling - a three-number designation identifying the number of horizontal wires, the height of the fence, and the distance between vertical stay wires

b) Tools

1) Claw hammer

2) Fencing pliers

3) Fence stretcher

6. Discuss how woven wire is laid out along the fence line.

How is woven wire laid out?

a) Unroll the wire past the corner post on the side of the post to which the wire will be attached.

b) Lay out enough wire to wrap around the post once.

c) Remove three or four stays to wrap around the post cleanly.

1) Hinge lock fencing

(a) Cut the stay in the middle of each block.

(b) While using pliers to hold the knot, grab and twist the ends of the cut wire in the opposite direction from the knot.

(c) The sections of the stay wire should slide off the horizontal wire.

2) Stiff stay wire - Cut the small knot wire that holds the vertical stay in place.

d) Set the wire to the desired height against the anchor post.

e) Wrap the wires around the post.

f) Tie them off by splicing the end of each wire onto itself.

g) Roll out the wire either to the brace structure that it is to be attached to or to the point where it will be spliced onto another roll.

1) Rolls of woven wire are 330 feet long.

2) The maximum length that can be stretched at one time is a quarter mile, or four rolls of wire.

3) For short stretches of wire, the wire will be rolled out past the brace structure to be stretched.

4) If two or more rolls are required, one roll is fastened to a post at each end, and then the wire rolls are stretched and spliced in the middle.

5) An alternative method is to attach one end of the first roll to a post and then tie the other end to the next roll to tighten the entire length at the same time; the wire will not be as tight.

7. Explain how woven wire is stretched.

How is woven wire stretched?

a) Woven wire can be stretched using stretcher boards.

1) Wood stretcher boards are made of 2" × 4" boards that are bolted together to hold the woven wire.

2) Metal stretcher boards can be purchased from retailers that carry fencing supplies.

b) Attach the stretcher boards to the wire a few feet past the post to which the wire will be tied off.

c) Attach the stretcher board in line with one vertical stay.

d) Wrap the ends of a heavy chain around the top and bottom of the boards.

e) Attach the cable winch-puller to the chain and to a secure point, such as a truck, tractor, or another anchor post.

f) Tension the fence slowly.

1) Remove ½ to _ of the tension bump.

2) The wire is too tight if the tension bump is completely straightened.

g) The fence may need to be shaken to free it from snags.

8. Discuss how staples and metal clips are used.

How is woven wire attached?

a) Tie off each wire, one at a time.
   1) Cut the wire at a point far enough past the post for the wire to wrap the post.
   2) Any stays that might interfere with the post should be removed.
   3) Wrap the wire around the post, tie it off, and staple it tightly to the post.

b) Remove the stretcher boards.

c) Attach the horizontal wires to the line posts.
   1) With wood posts, staple each wire tightly.
      (a) Set the staple and wire into the post.
      (b) Place the staples crosswise with a slight downward angle.
   2) If metal posts are used, fasten wire clips according to the manufacturer's recommendations.
   3) For fences up to 4 feet tall, only five staples or clips are needed per post.
   4) Taller fences may require a few more fasteners.
   5) Attach the top and bottom wires at every post.
   6) Stagger the other fasteners on different wires at each post.

G. ***Other Activities***

Observe a local fencing contractor constructing new fencing using barbed and woven wire. Have students observe techniques for stretching and attaching wires.

H. ***Conclusion***

Fencing is essential for many agricultural operations. Barbed wire and woven wire fences are two common fence types. Similar materials and tools are needed to build these types of fences: barbed or woven wire, fasteners, a claw hammer, fencing pliers, and fence stretcher. In each case, the wire is laid out along the fence line, stretched properly, and then attached to the posts.

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

1. Tightening the wire could pull the post over.

2. The bumps on the post hold the wires in place.

3. The number of wires used will depend on the type of livestock for which the fence will be used.

J. ***Answers to Evaluation***

1. a
2. d
3. b
4. d
5. a
6. At a slight downward angle diagonal to the side of the post
7. Hinge lock and straight stay
8. Claw hammer, fencing pliers, and fence stretchers
9. Stretcher boards
10. Top and bottom wires

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EVALUATION

Circle the letter that corresponds to the best answer.

1. When installing barbed wire, which strand is attached first?

   a. Bottom
   b. Middle
   c. Top
   d. Any

2. Barbed wire can be attached to steel post with:

   a. Staples.
   b. Metal tape.
   c. Wire.
   d. Clips.

3. How many points does barbed wire commonly have?

   a. One or three points
   b. Two or four points
   c. Three or five points
   d. Four or six points

4. What is the rule of thumb for the length of wire to be stretched at one time?

   a. 2 to 5 rods
   b. 3 to 10 rods
   c. 4 to 15 rods
   d. 5 to 20 rods

5. When laying out woven wire, unroll enough to wrap the wires _____ around the post.

   a. Once
   b. Twice
   c. Three times
   d. Four times

Complete the following short answer questions.

6. How should staples be set in a wood post?

7. What are two types of woven wire?

   a.

   b.

8. What are three tools needed to install woven wire fences?

   a.

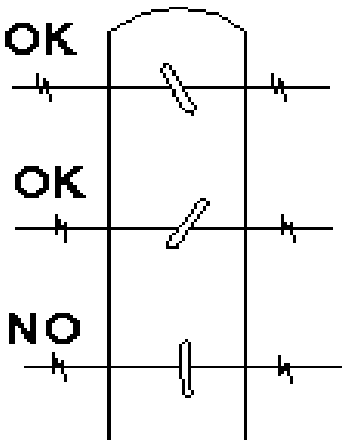
   b.

   c.

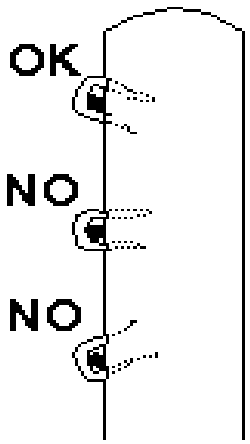
9. What special tool is used to stretch woven wire?

10. When attaching woven wire to posts, which wires should be attached at every post?

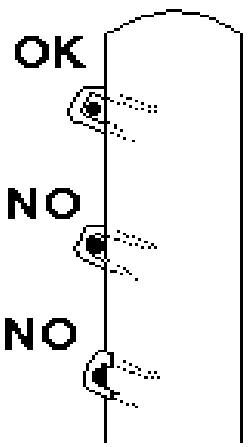
Staple Positioning



Staples at an Angle to Post's Side



Staples at Proper Angle



Wire Loose in Staple

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Constructing Barbed Wire Fencing

Objective: Practice the skills used in constructing barbed wire fencing.

Materials and Equipment:

Barbed wire
Fence stretchers
Metal fence posts
Metal post driver
Wire clips
Fencing pliers
Standard screwdriver
Claw hammer
Fencing staples

Procedure:

In this activity, you will be constructing a small sample barbed wire fence by stretching and applying the wire to posts to wood and metal posts.

1. Using the wood posts identified by your instructor as the end posts, lay out the steel posts where they will be driven into the ground. Steel posts should be placed about 15 feet apart.

2. Stand one of the posts upright in line with the two brace posts. Have another person help you align the post by looking to see whether line posts line up with the two end posts.

3. Turn the post so the ridges on the side of the post are at a 90-degree angle to the line of the post. The ridges help to keep the wire in line vertically on the post. It is important to make sure all the line posts are turned the same way.

4. Using the post driver, pound the post in until the metal clip towards the bottom of the post is completely underground, a distance of about 18 inches.

5. Repeat steps 2 through 4 until all the line posts are set.

6. Starting at one brace post, unroll enough wire to wrap around the post at least twice with another 2 feet to spare on the end.

7. Wrap the wire twice around the post 8 inches above the ground. Wrap the tail of the wire around the fence line wire at least three or four times.

8. Staple the wire to the wood post, pounding the staple in tightly enough to prevent slippage.

9. Unroll enough wire to reach the other brace post, cutting the wire so that there is enough to wrap around the post at least twice and an additional 2 feet.

10. Pull the wire as tight as possible by hand. Attach the fence stretchers to the wire.

11. Tighten the wire using the stretchers.

12. Repeat steps 7 and 8 at the other end post.

13. Attach the wire to the line posts at the desired height using wire clips.

14. For each additional wire, repeat steps 7 to 13. The top wire should be about 4 feet above the ground, and the two middle wires should be evenly spaced between the top and bottom wires.