Wood Post and Non-Climb Fencing Construction for Hoofstock Pasture

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This paper covers the planning, site clearing and construction of a new 7,100 square foot hoofstock pasture for the nonprofit group Conservation Ambassadors at their Northern campus in Weimar, California. The project involved planning the layout of the new pasture based on the owner's preferences for pasture size, material type and location as well as removing several old pre-existing posts to prepare for the new fence to be built. New two-foot deep post holes were dug and the four-inch diameter, eight-foot long wood posts were leveled and set in concrete. Horizontal H-braces and cross brace tension wire were added to the corners and either side of the gate to strengthen them. A four-foot wide gate was hung at the entrance of the pasture before tensioning and stapling approximately two hundred thirty linear feet of non-climb fencing. The non-climb type fencing is ideal for this application because it has a small grid pattern of horizontal and vertical wires, which prevents animals from getting their legs or heads stuck and injured in the fence. The sturdy new pasture will provide a large space for Conservation Ambassadors to house hoofstock for years to come.

Key Words: Fencing, Pasture, Wood Post, Non-Climb Fencing, Bracing

Introduction

My passion for the construction field stems from my love of building and repairing things, so finding a senior project that would allow me to physically construct something, while also expanding my knowledge was important to me. With environmental issues becoming an increasingly important topic, I investigated the mission of a nonprofit group called Conservation Ambassadors, to house displaced and permanently injured wildlife while using the animals to educate people about the importance of protecting them and their habitats. The prospect of adding a new pasture for hoofstock was discussed. It sounded like a great project for me because I had not done fencing work before and it would be a great way to expand my knowledge and experience. Details about the desired pasture size, type of materials to be used and timeline were discussed so that an official plan for the project could be developed. Luckily because the project was outdoors and not in a location where many other people were present, the project was still feasible during the coronavirus pandemic.

Planning

An initial site visit to the planned pasture location was necessary to gain a more in-depth breakdown of the project details. An existing fence made up the East side of the pasture, with 230 feet of new fencing being added to enclose the rest of the pasture (see figure 1). It was determined by the owner that four-inch diameter wood posts should be used, and the best fencing for hoof stock would be non-climb fencing, which has a small grid pattern of wire that prevents animals from getting their hooves and legs through the fence where they could potentially get stuck or injured. The facility has a variety of materials that have been donated including posts, staples and extra fencing. The facility also had a variety of tools that were borrowed to complete this project.

Materials Needed

Material	Quantity
4” diameter, 8’ long wood post	33
90lbs bag of ready-to-use concrete mix	16
8” lag screw	18
10-gauge wire	250 linear feet
Non-climb fencing	250 linear feet
1-1/2” fencing staples	5lbs box
Gate and hinges	1

Construction

Site Clearing

When preparing to commence work, the first thing that had to be done on site was the removal of vegetation that would conflict with the work being done. Several small stumps were interfering with the planned fence line, so they had to be removed along with several small logs. Although the logs were not interfering with the fence line it was important to move them to the outside of the pasture before building the fence, because moving them out of the pasture would be much more difficult once it was enclosed. There were also many star thistle plants on the site, which have long thorns that cause a long-lasting sting when they are brushed up against. The star thistle plants that were in the work area were pulled out so they would not cause irritation while working.

The next step to preparing the site was removing several existing posts from an old pasture that were not in line with the desired perimeter of the new pasture and some of the them had lost their structural integrity. The posts had been set in concrete which had to be excavated, so as not to be a tripping hazard in the new pasture. The 18-inch deep concrete proved difficult to remove, and it was necessary to wrap straps around the concrete and use a come-along tool to help leverage these concrete bases out of the ground (see figure 4). All posts and concrete that were removed were placed in a pile on the edge of the site to be taken offsite. While removing posts and remnants of old wire it was extremely important to collect all old staples, nails and pieces of wire and put them in a container so they would not be lost in the grass, where they could injure the animals.

Wood Posts

The starting point for the first side of the pasture was a post from the existing fence and the first new corner of the pasture, marked by a temporary stake. A string was tied from the existing fence post to the new corner stake to create a reference line that ensured holes being dug for the new posts were located in a straight line (see figure 5). An adequate post spacing was determined to be ten feet on center, but each corner of the pasture needed additional bracing, so a post was set four feet from the corner post along each side of the fence (see figure 2). Post hole diggers were used to make holes approximately two feet deep, to give the posts a solid foundation in the ground. Each post was then leveled, and bags of ready-to-use concrete mix were prepared in a wheelbarrow then shoveled into the post holes, surrounding the posts and increasing their strength and longevity. The concrete was then left to dry for several weeks so that it sufficiently strengthened before continuing work.

Once the concrete had strengthened, the pasture gate was hung. The gate to be used was provided by Conservation Ambassadors from one of their previous pastures. Holes were predrilled to hold the gate hinges, which were then twisted into the post. The hinges were then bolted onto the gate and it was checked to ensure that it was level and freely swung without colliding with the posts or wire.

H-Bracing and Cross Brace Wire

Reinforcement was needed at each corner of the pasture so that the corner posts can better withstand the force of animals leaning on the fence as well as the force of tensioning the fence during construction. To create horizontal H-braces, four-inch diameter wood posts were cut to four-foot lengths and placed between each corner post and the next post along each side of the pasture (see figure 6). The H-braces were located approximately four feet above the ground. Eight-inch lag screws were driven through the post and into the brace member to secure it at each end.

To further reinforce the corner posts, cross bracing wire was added to each H-braced section of the fence. The wire was stapled to the bottom of one post and then wrapped above the H-brace on the other post, then twisted around each other as tightly as possible. When released they hold their form and act as a tension cross brace (see figure 7).

Fencing

With the posts set in concrete and braced, the fencing can now be attached and tensioned. A four-foot tall, non-climb fencing was used, which is made up of horizontal and vertical wires which are tied together at each intersection. By removing several vertical wires at the starting end on the fencing, the horizontal strands are made longer and can be wrapped around the first post and tied back onto the fencing, so it is secured. For this application, the fencing is placed on the inside of the pasture posts so that it will be stronger if the hoofstock lean on it. This also prevents the animals from chewing the posts, which is a common behavior for them. Running the fencing along sloped ground proved to be more difficult than expected because in order for the fencing to run parallel to the ground it crosses the posts at an angle. This makes wrapping and tying the first end to the post much more difficult and time consuming. However, once secured to the first post, the fencing was unrolled down the length of the pasture, but if the fencing remained on the interior side of the posts at the corners it would be extremely difficult to tension and secure it to the corner post while making a turn. Due to this, at the H-braced posts which are four feet from the corner, the fencing is brought to the outside of the pasture so that it can wrap around the outside of corner posts and be tensioned as tightly as possible (see figure 2).

To tension the fencing, two rachet straps were looped around the corner post to pull the fencing taught in that direction, but to avoid stretching the fencing at locations where the rachet straps would be placed on the wire, a makeshift clamp was made. A 2x4 was placed on either side of the fencing and tightened together with bolts. This way the rachet straps could be tied around the 2x4s which would spread the forces over the entire height of the fencing instead of just two points (see figure 8). The rachet straps tightened the fence, making it as taught as possible and several staples were hammered into each post to hold the fencing tightly to the post. Once all the staples were in for the first side of the pasture the rachet straps were released and moved to the next corner, where the same process would be repeated, pulling the fencing tight to the corner and the next side of the pasture. When a roll of fencing runs out and a new one needs to be started, the two must be spliced together. Several vertical wires are removed from the end of each length of fencing, creating longer horizontal strands at the ends. The lengths of fencing are brought together, and the horizontal wires are joined with a figure eight fencing knot (see figure 9).

Deliverables

The project deliverable is a new 7,100 square foot pasture constructed with wood posts, bracing and non-climb fencing for the Conservation Ambassadors nonprofit to house hoofstock. This new, sturdy pasture provides additional space for them to house animals that can be used for many years to come. The pasture includes an open area as well as an area that has plenty of tree cover where the animals can stay cool in the shade or take cover from the weather.

Lessons Learned

Over the course of this project, I obtained firsthand experience scheduling a project and seeing it out to completion on time. From the beginning of the project I made sure to add extra time to each task so that I had a buffer of several days in case I ran into an issue or things took longer than expected. This proved to be helpful because there were several times that additional tasks presented themselves, such as during the removal of the old pre-existing posts. It was discovered that the concrete around the pre-existing posts was deeper than expected and took longer to remove each of them, as well as the discovery that sections of old fencing were still connecting several of the posts below grade and had to be excavated and cut off of the posts. Tying the fencing to the first post also took up much more time than expected because the angle of the fencing required the ends to be tapered so that they would wrap around the post and tie back onto itself properly. These lessons in budgeting extra time will come in handy in the future because with any project there will be tasks that take longer than expected, or unaccounted for delays. It is important to have those possible delays worked into your schedule from the beginning, so you have a more realistic project completion date.

I also learned several new techniques for constructing fences through trial and error that can be applied to future projects and may come in handy in various other applications. Finding a way to tension the fencing without damaging it helped me put my problem-solving skills to the test by devising a technique to distribute the load of the ratchet straps over the whole fence height. I was also able to utilize a figure eight fencing knot, which I had seen before but never executed myself. This project allowed me to put my learned skills to the test in real applications.

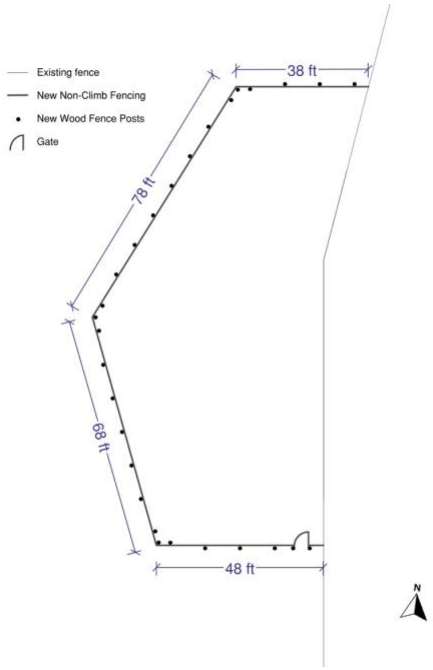

Figure 1. Pasture layout plan drawing

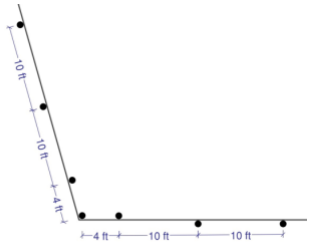

Figure 2. Post spacing and fencing placement detail

Figure 3. Existing site conditions

Figure 4. Removing existing concrete using a come-along

Figure 5. String line to ensure posts are placed flush to each other

Figure 6. Corner H-bracing

Figure 7. Corner H-bracing and cross brace wire

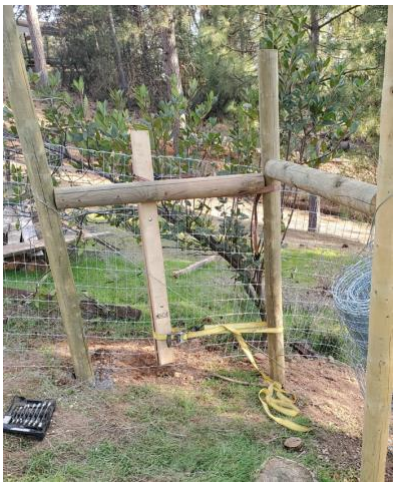

Figure 8. Fence tensioning with 2x4 clamp and rachet straps

Figure 9. Fence splicing detail

Figure 10. Completed pasture

Figure 11. Completed pasture

Figure 12. Completed pasture