



How To Build: Low-Cost Hoophouse Video Transcripts

English Transcripts by Kelly Maynard



English Transcript of How To Videos

Hmong: <https://www.youtube.com/watch?v=5GR0tpTJsGo>

Spanish: https://www.youtube.com/watch?v=00_aZpCvTqw

This transcript accompanies a video that demonstrates the process of building a low-cost hoophouse. This video was produced by the Spring Rose Growers Cooperative based in Madison, Wisconsin with funds from the USDA Small Socially Disadvantaged Producer Grant and was filmed at a workshop hosted by the Farley Center Farm Incubator in Verona, Wisconsin. Jay Salinas of the Wormfarm Institute contributed the materials list and the hoophouse structure is the design of Cornelius Toole of Mound Bayou, Mississippi.

Materials List (for 20'x48' Hoophouse)

Steel

- 28 pc. 21', 1 3/8" dia. 16-18 gab steel pipe w/ one swaged end (top rail for residential chain link fence)
- 3 pc. 21', 1 5/8 dia. steel pipe (line post...)

Lumber

- 150' 2"x8" spf
- 250' 2"x4" (including at least 6- 10" pieces)
- 1 sheet 1/2" plywood (4"x 8')
- 3 bundles wood lath (batten strips)

Hardware

- 5# 1 5/8" deck screws
- 1# 3" deck screws
- 75 pieces #10x 1/2" self-drilling hex head metal screws
- Waterproof wood glue
- 30' perforated metal strap

Greenhouse Supplies

- 35'x 70' 6 mil greenhouse film
- 39 pc. 1.315"x 1.315" cross connectors (Lock-Up is the best version available at Waldo & Associates www.waldoinc.com/)

Other

- 2 aluminum storm doors for pedestrian entrances

Script

0:00

A hoophouse, or high tunnel, is a structure used in farming that allows farmers to grow crops in the ground both earlier and later in the season than outside weather conditions allow. They are very commonly used in states like Wisconsin that have short growing seasons. The clear or translucent plastic covering protects plants from harsh weather conditions and frost. There are also crops like tomatoes that like heat and are sensitive to rain that can be grown very successfully during the summer in a hoophouse.

0:37

You can buy a hoophouse kit from a farm- or greenhouse supply store, but these are usually very expensive. The following video will demonstrate the process of constructing a sturdy, lower-cost hoophouse using materials that can be purchased at most hardware or building supply stores. The construction method was developed by Cornelius Toole, a farmer from Mound Bayou, MS and the current president of Mississippian Engaged in Greener Agriculture. The video was shot at a construction workshop at the Farley Center for Peace Justice and Sustainability led by Jay Salinas, of the Wormfarm in Reedsburg, Wisconsin. The supplementary material for the video includes a materials list for constructing this type of hoophouse.

1: 25

The first step we show here is the construction of a wooden jig. This is used to bend the straight pipe into hoops. We made this jig from an 8 foot by 2 foot piece of plywood. We drew an arc on the plywood with a radius of 7 feet. We then drilled and glued 4-inch long blocks into place every 6 inches along the arc.

3:00

At one end of the jig we attached another block to hold the pipe in place while it was being bent. We screwed our jig to the top of a picnic table so that it was stable and stationary when the pipe was bent.

3:16

The hoops are about 31.5 feet long and are bent from the 1 3/8 inch pipes. 13 hoops at a 4 foot spacing make a 48 foot long hoophouse. We cut 7 pieces of the top rail pipe in half. The tapered end of a full length piece was inserted into the open end of a cut piece and joined with 2 hex screws on opposite sides of the joint.

3:42

We placed a joined piece of pipe in the jig, beginning with a full length pipe at the block, and slowly bent the pipe across the jig to begin forming the hoops.

3:58

When the length of pipe touches the other end of the jig the pipe was repositioned by sliding that part to the beginning block and bending the next section. We bent the pipe in about 6 foot increments. We made sure that the hoop remained level to the ground and did not have S curves along its length. We were very careful when bending the tapered joint in the piece to avoid kinking the pipes at this point. As we bent the pipe, the screws that join the pipe pieces faced up, so they end up on the sides of the hoop. This is very important because if the screws touch the plastic, they will wear through it more quickly.

4:45

We flipped the hoops to bend the last section. It is helpful to have a group so that there are enough pairs of hands to bend the hoops firmly along the jig and support the joints in the pipes.

5:10

We stood up each hoop after bending it to be sure the curve looked smooth. In total we made 13 hoops.

6:13

The hoops must be anchored into the ground. We cut 18 inch pieces from the 1 5/8 inch pipe to make the anchor posts. There are two anchor posts for each hoop.

6:30

It is important to locate and lay out the hoophouse on a piece of fairly level ground. There are many other factors to consider such as orientation, ease of access, access to water, possible shade, and drainage.

6:51

After we determined where to locate our hoophouse, we placed and set the anchor posts. We used the string to help us create square corners and straight lines for the anchor posts. The most important step in building our hoophouse was taking the time and the care to set the anchor posts in a perfect rectangle. We spaced the posts every 4 feet along one side of the hoophouse and pounded each one 1 foot into the ground, so that 6 inches of pipe remained above ground. The hoop-bending method that we used makes a hoophouse between 18 and 20 feet wide.

7:40

To determine exactly how wide our hoophouse would be, we held up a few of our hoops and pushed them closer together so the ends entered the ground vertically. We measured the distance between the ends and that was the width of our structure. Once we determined the width, we set the two anchor posts that would hold the first hoop. When driving in the anchor posts we kept them as vertical as possible and made sure to sink them a full foot.

8:03

After we set and pounded in all the anchor posts, we placed the hoops into them. Once all the hoops were in place we made sure they were all the same height by raising or lowering the hoop end in the anchor post.

8:32

We connected the hoops with horizontal pipes called purlins. For this structure we used 3 purlins, one at the peak and others about halfway between the peak and ground on each side. The purlins are connected pieces of the same 1 3/8 inch pipe that we used to make the hoops.

9:00

We attached the purlins to the hoops with things called cross connectors. Cross connectors are specialized pieces of hardware that join pipe at right angles. If you cannot get cross connectors it is possible to use U-bolts for the same purpose. We did not tighten the cross connectors all the way at first so that we could make adjustments between the hoops. We made sure that the distance between each hoop at the peak was 4 feet before we tightened the cross connectors all the way.

As with setting the anchor posts, we took the time to make sure the hoops were perfectly aligned and the purlins straight so that our structure had maximum stability. After we finished adjusting the purlins we cut the ends to be flush with the end hoops.

9:59

Our next step was to lay the wooden frame on the outside of the anchor posts. This is what we attach the plastic to. We laid the 2 by 8s along the base of the length of the hoophouse, making sure that their ends touched. We attached the base boards to the anchor posts with a short piece of perforated strap that we wrapped around the post and screwed into the wood.

10:38

We joined the ends of the boards with 6 inch square pieces of ½ inch plywood that we screwed to the inside of the boards to make a plate. It is very important all these and other plywood plates are on the inside of the hoophouse.

10:56

Next we constructed the end walls of the hoophouse. We established an 8 foot wide opening centered under the end of the hoop. At each end of the opening we stood a 10 foot tall 2 by 4 straight up, cut it at an angle so it fit under the hoop, and secured the vertical boards with two pieces of perforated strap. We used plywood plates to attach horizontal 2 by 4s at the base and at 8 feet.

We placed horizontal cross pieces between the tall vertical supports and the hoop and connected them to the hoop with perforated straps. We always used a level to make sure these supports were completely vertical or horizontal. Additional vertical supports run between the horizontal cross pieces and the baseboard.

12:28

Diagonal supports run between the two points where the vertical supports meet the hoop. We used plywood plates to connect all the supports in the end wall.

12:51

We then built 8 foot square frames from 2x4s that we fit into the openings built into the endwalls and secured them with plywood plates. The frame holds the door, and can be removed for ventilation or even to bring in small tillage equipment.

13:16

Once the frame was complete, it was time to pull the plastic over the hoophouse. This next step should be attempted only when winds are low or it will be very difficult to accomplish. We used a 35 foot by 70 foot 6 mil greenhouse film. Greenhouse plastic often has a special coating and is usually printed to indicate which side faces down. We rolled it out the length of one side of the hoophouse, carefully making sure the plastic extended 10 feet past both ends of the hoophouse and that we had the right side facing down. We very carefully pulled the plastic over the hoops. It is very important to make sure the plastic doesn't catch on anything or tear.

14:19

Using a team of people, we pulled the plastic as tightly as possible across the top and sides. We first secured the top middle ends using pieces of wooden lath (48 inch by 1 ½ inch by ¼ inch thick) that we place on the outside of the plastic and screwed into the wooden supports of the end walls.

14:58

Once the top was taught and secure, we started from the middle of the sides and worked our way to the corners. We used approximately one screw per foot on the lath strips to hold the plastic securely. Before attaching each new strip of lath we pulled the plastic taught again so that the fit over the hoops was as tight as possible. If the plastic is loose it will blow in the wind, be more likely to get holes, and will wear out faster.

16:02

Once the plastic was completely secure along both sides and at the ends, we slid 2 by 4s in between the plastic and the hoops at the base on the inside. We made sure they were touching end to end along the length of both sides of the hoophouse. As with the baseboards, we used plywood plates to join the 2 by 4s, with three screws going into each end. We were extremely careful not to poke holes in the plastic.

16:34

Once the length was completely joined, we used several people to gently slide it up about 4 to 4.5 feet high. We used pieces of perforated strap to attach it to the hoops at this height.

16:50

We secured the plastic to the diagonal and vertical supports and cross pieces in the end walls with more lath.

17:18

The final step was to put doors in the ends of the hoophouse. We used aluminum screen doors because they are easy to find used, they are lightweight, and they usually have moveable windows and a hinged side. We attached the hinged side of the door to the removeable 2x4 frame. We then placed another 2x4 at the appropriate spacing so that the door closed tightly. We framed the top of the door with another piece of 2 by 4 cut to the right width and secured it to the vertical supports with plywood plates. We used more of the wooden lath to secure the plastic to the frame around the door, being sure to pull as tightly as possible.

Finally we trimmed the remaining plastic over the door with a sharp knife. Depending on the door you find and decide to use, it may have a different closing mechanism than ours. We inserted a screen in ours, a coiled closing mechanism and a chain specific to our door. The key is to make sure that the doors open and close easily for ventilation when needed.

17:55

At last the hoophouse was ready for in ground planting! We monitor the temperature carefully as it can heat up very fast inside on a sunny day. We also pay close attention to watering our plants daily as they get no rain and dry out faster than those outside. But when it is frosty outside, our plants are safe inside!

Happy planting!

For Questions or to Obtain a DVD please contact Kelly Maynard
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Links of Interest

Spring Rose Growers Cooperative: www.springrosegrowerscoop.com

Farley Center: www.farleycenter.org