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Hoop House Construction Plans

This document explains how to build a low-cost hoop house, of the design developed by Tod Hanley.

The Kerr Center has conducted several highly popular workshops on building these hoop houses, beginning in 2008.

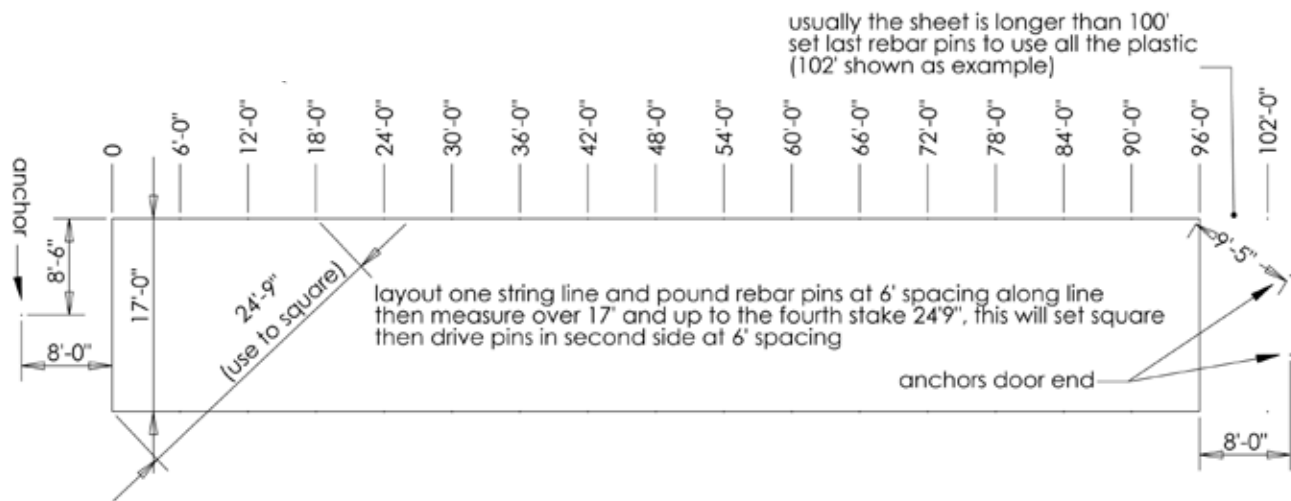
This design has several attractive features:

- Low cost (~\$1,400)
- Bend hoops from straight tubing.
- Use ropes instead of purlins.
- Ease of construction
- Two people can do it in a weekend.
- Ease of operation
- Ventilate by pulling up or down on plastic.
- Wiggle wire allows removal/re-use of plastic.

This document walks through the steps of hoop house construction in the following order:

- 1 Laying out the house
- 2 Bending the hoops
- 3 Attaching the ropes
- 4 Setting up the hoops
- 5 Attaching the plastic
- 6 Attaching the end walls
- 7 Resources
- 8 Materials

STEP 1: LAYING OUT THE HOOP HOUSE



Buy 5/8" steel rebar in 20-foot lengths, then saw it into pins. Make 17" pins for tight soils, 24" for looser soils.

Drive the first rebar pin at an east or west corner. Laying the house out east-to-west lengthwise allows it to capture more winter sun, and also orients it to prevailing breezes for ventilation.

Stretch a tape from the first pin to a point at least 100 feet away, and drive additional pins every 6 feet.

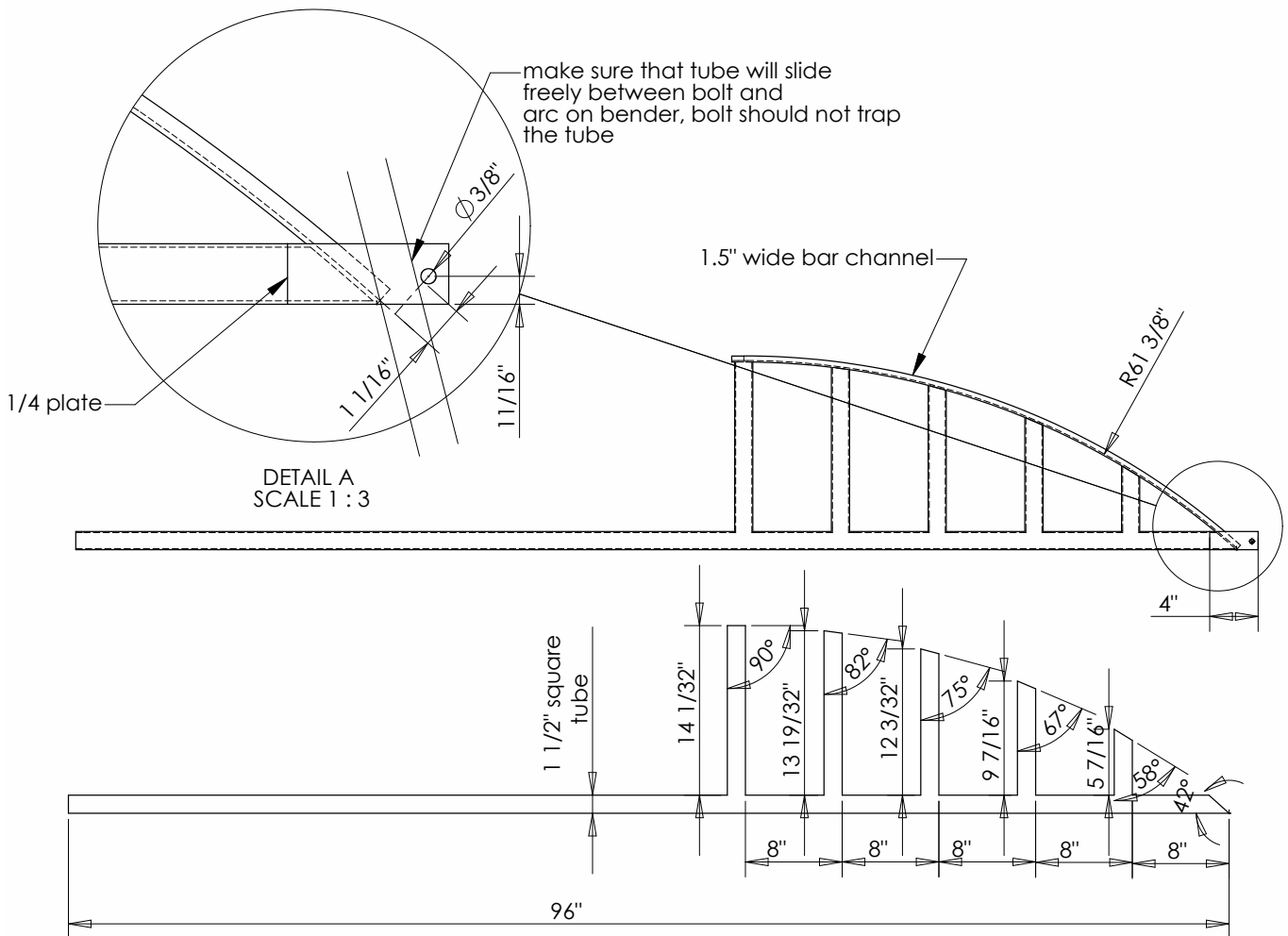
Stretch a tape from the first pin to a point at least 100 feet away, and drive additional pins every 6 feet. The pins should be angled slightly inward (about 15 degrees off the vertical, toward the center of the house), with about six inches left above the surface of the ground.

To locate the corner for the start of the second line of rebar pins:

- 1) From the first pin in the first line, measure 17 feet.
- 2) From the fourth pin in the first line, measure 24 feet, nine inches.
- 3) Where these two lines meet, drive the pin for the second corner.

Stretch a tape or string and lay out the second side of the hoop house, driving pins every 6 feet. Wait until later to drive the farthest pair of pins. (The roll of plastic is usually longer than 100 feet, but you need to see how much longer before establishing the location of the end hoop.)

STEP 2: BENDING THE HOOPS



Use straight 24-foot lengths of Allied galvanized one-inch square 16 gauge steel tubing, with a clear coat over the galvanizing.

Square tubing is used both because it is easier to attach the flat wiggle wire channel to square than to round tubing, and because it is easier to keep the tubing straight during bending. Steel is preferable to PVC because it is more durable, less expensive, does not leach toxins, and does not have to be painted to keep chemicals in the material from eating through the plastic sheeting that covers the house.

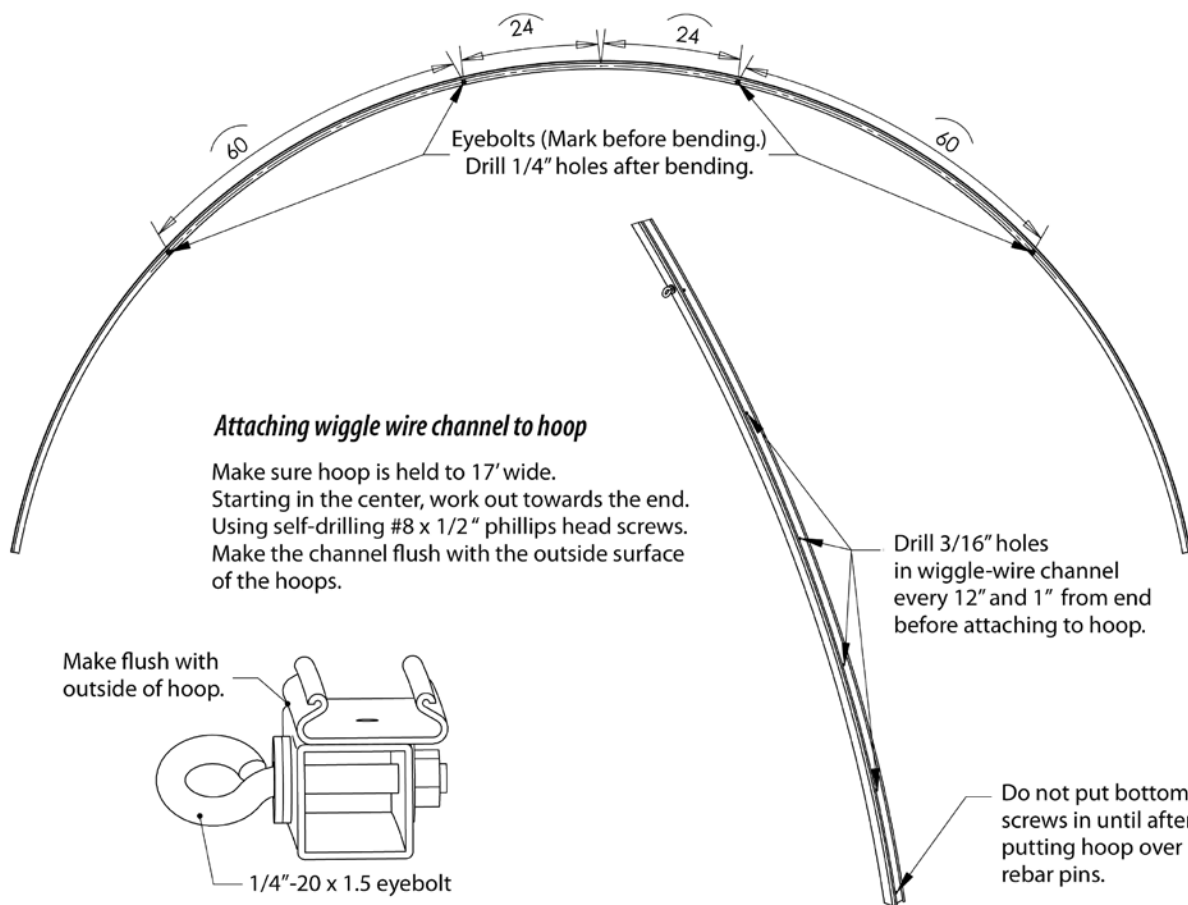
It takes 18 hoops to make a 100-foot-long hoop house (with hoops placed every six feet). After bending, the hoops are 17 feet wide and 7-1/2 feet tall.

Benders for the tubing can be built according to the design above.

Completed hoop benders are also available for sale from Tod Hanley; his contact information is available at www.kerrcenter.com/organic-farm/hoop-house/

To bend the hoops, slide the bender along a piece of square one-inch tubing, pushing down on the handle of the bender to form the correct curve.

Bend each tube halfway, then turn around and start from the other end. (This minimizes the amount of bent tube sticking up in the air, and makes it easier to control.)



Before bending the two end hoops, pre-mark them for the centerline and for the eyebolts. After the end hoops are bent, drill 1/4" holes for the eyebolts.

Drill 3/16" holes in the wiggly-wire channel at one-foot intervals.

Attach wigglywire channel to the end hoops by drilling through the holes in the channel with self-tapping sheet metal screws.

Make sure that the hoop ends are kept exactly 17 feet

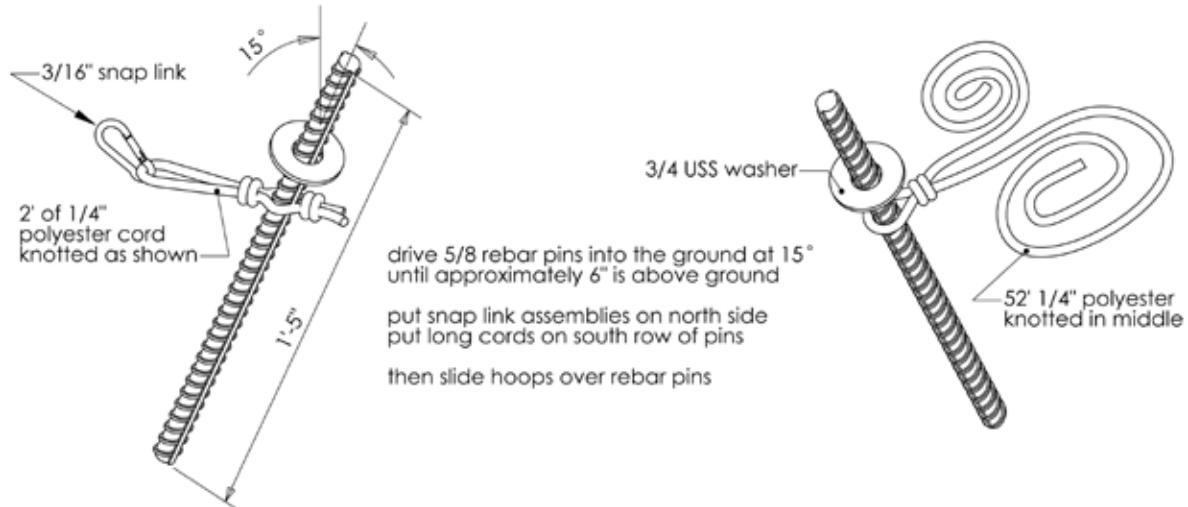
apart while attaching the wiggly wire channel. Once the channel is attached, the hoop will be very difficult to bend.

Use pan-head screws; hex-head screws will cut the plastic when it is attached.

Leave the last (lowest) hole on each side of the end hoops without a screw until after the hoop is placed on its pins. (This way, the screw end will not block the hoop from sliding down over the pin.



STEP 3: ATTACHING THE ROPES



One small loop of rope, with a 3/16" metal snap link attached, goes over each rebar pin on the north side of the hoop house. A washer slides over each rebar pin on top of the loop of rope.

After the rebar pins are driven, the ropes that will anchor the plastic roof can be attached to the pins.

Use 1/4" polyester rope in 1,000-foot rolls. (Polypropylene wears out too quickly, and nylon parachute cord stretches too much.)

Over every rebar pin on one side of the house, place a short rope loop, then slide a 3/4" USS washer onto the pin above the rope loop. The rope loops are two-foot pieces of rope that have been tied with a 3/16" snap link.

On the opposite side, over every rebar pin, place a loop tied in the center of a 52-foot piece of rope, again with a 3/4" USS washer sliding onto the pin after the rope loop. Stretch both ends of these ropes out on the ground, toward the outside of the house.

STEP 4: SETTING UP THE HOOPS

Attach the anchor eyebolts to the end hoops and place the first end hoop on its rebar pins. (The second end hoop will be erected later, after the plastic is unrolled.)

When the end hoop is in place on its rebar pins, screw the ends of the wiggewire channel to the ends of the hoop.

Place the remaining hoops on their rebar pins.



STEP 5: ATTACHING THE PLASTIC

Unroll the full length of the plastic sheet and spread it on top of the long set of ropes that are attached to the rebar pins, down the outside of one side of the house.

Now that the length of the plastic sheet is known, drive the final two rebar pins for the end hoop in a position that will use the full length of the plastic. Set the final end hoop over the pins, and screw the ends of the wiggle-wire channel to the ends of the hoop.



In the end of one of the ropes that is now covered by the plastic, tie a bowline knot to make a loop at the end of the rope. Carry that end of the rope over the top of the plastic to the opposite end of the hoop, and attach it to the snap-link there. Do this once for each hoop.



Pull the edge of the plastic up over the hoops and down to the ground on the other side. The plastic moves in between the hoops and the ropes, which help to trap and guide the plastic – an advantage on windy days.



After the plastic is stretched over the hoops, attach it to the end hoops by inserting wiggle wire into the wiggle wire channel over the ends of the plastic.

Once the wiggle wire has attached both ends of the plastic sheet to the end hoops, take any loose rope ends that still remain on the ground, and throw them over the top of the hoop house to the other side. Detach rope from the metal snap ring.

Feed the end of one rope through the metal snap ring. Then feed the other rope through the loop.



STEP 6: ATTACHING THE END WALLS



Several different end wall designs are possible. They range from plastic sheets with zipper doors, to storm doors or wide doors framed with plastic, wood, or metal.

For details on different end wall designs, see the “Resources” section at right.

RESOURCES

“**Hoop House How-to,**” an illustrated set of written instructions for building the hoop house design shown in this document, is available at <http://kerrcenter.com/hoop-house-plans-instructions>



The Kerr Center also has a list of other hoop house resources, available at <http://kerrcenter.com/hoop-house-resources>

For additional information on hoop houses, as well as other season extension techniques, visit: <http://kerrcenter.com/organic-farm/season-extension>

The Noble Foundation website contains extensive resources on hoop house construction, including end wall designs, and also has cultural information for different crops in a hoop house setting: www.noble.org

MATERIALS

HOOP HOUSE PARTS AND SUPPLIERS *(as of June 2017)*

QTY	DESCRIPTION	PRICE	SUPPLIER	PHONE	NOTES	LINE TOTAL
1	100' x 24' Tufflite 6-mil 4-year greenhouse film	\$297	American Plant OKC (wholesale)	800-522-3376	Also available from FarmTek	\$297.00
.33	100' x 12' Tufflite 6-mil 4-year greenhouse film*	\$116	American Plant OKC (wholesale)	800-522-3376	Also available from FarmTek only need 33'	\$38.00
18	1" square x 16ga galv. 24' long	\$30	U.S. Wholesale Pipe & Tube, Inc.	800-318-8823	Price includes shipping	\$540.00
3	5/8" rebar x 20'	@ \$12	Local metal yard		Cut into 2' sections	\$36.00
36	3/4" USS Flat washer	@ \$0.59	Hardware store			\$21.00
8	1/4" x 11/2" eye bolt	@ \$0.70	Hardware store			\$6.00
24	1/4" flat washers	@ \$0.034	Hardware store			\$1.00
8	1/2"-20 hex nuts	@ \$0.06	Hardware store			\$0.50
56	8x1/2" self-drilling screws	@ \$0.04	Hardware store			\$2.00
1	1000' polyester cord #8 1/4"	\$110	FarmTek #C5525	800-327-6835	Do not use polypropylene	\$110.00
6	12' Aluminum poly latch deep channel	@ \$13.91	American Plant OKC (wholesale)	800-522-3376	Also available from FarmTek	\$83.00
12	6' wiggle wire coated	@ \$2.17	American Plant OKC (wholesale)	800-522-3376	Also available from FarmTek	\$26.00
8	1" Square tube 5" long	\$0.6415/ft	Local metal yard			\$3.00
12	Smooth round rods for anchors-30" pieces	\$0.7717/ft	Local metal yard			\$23.00
18	3/16" SS snap links	\$2.69/each	Hardware Store			\$48.00
12	Endwall #2 2x4x8	@ \$3.87	Lumber yard			\$46.00
1	36" storm door	\$100	Lumber yard			\$100.00
					Total	\$1,380.50

*Endwalls may also be constructed using Polymax 5.2 oz. clear all-purpose fabric (ripstop). It is more resistant to tearing than the plastic and will last beyond 4 years. However, the cost is higher. You will need a 10' wide piece 36 ft. long @ \$.46 square ft. (FarmTek)= \$165.60