“The 55” Caterpillar Tunnel Installation and Maintenance Manual

Customer Name:

Date:

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Congratulations with the purchase of your new GrowHoops caterpillar tunnel!

The addition of a caterpillar tunnel to your market garden, homestead, or backyard is exciting!

Table of Contents

Step 1: Site Selection and Tunnel Orientation

The site where you intend to install your tunnel should be mostly level, although a slight slope will aid in drainage. If your growing region is prone to heavy rains, consider landscaping around the exterior of your tunnel to prevent sudden flooding. Ray Tyler, the master gardener at Rose Creek Farms, has some excellent resources on how to landscape around tunnels to create a successful growing environment, despite wet conditions. Additionally, if you anticipate the need to clear snow around the edges of your tunnel during the winter, leave enough room for your equipment to complete this job.

A major environmental condition to consider for tunnel orientation is wind. Wind is one of the main stressors on the structure, so proper orientation is important. What is the direction of your prevailing winds? Typically, it is best to orient a tunnel so that the end is facing the direction of the prevailing winds. For example, face the end of your tunnel west if your prevailing winds are from the west. This consideration will be less important if your growing environment is calmer. Proper orientation will impact the success of your tunnel.

Step 2: Layout and Installation of Rebar Anchor Pins

Parts needed:

- 24 x rebar anchor pins

Refer to Diagram 1, as it provides an overview of the layout for the rebar anchor pins. Each circle in the diagram represents a rebar anchor pin. There are two rows of anchors which are 16 feet apart. Within each row, the anchors are spaced 5 feet apart. Take sufficient time to ensure that the layout is square, as this will make the rest of the installation process easier.

The rebar anchor pins are 48 inches long and should be driven into the ground until 16 inches is remaining above the ground. A manual post pounder or a sledgehammer works well to drive the anchors in but be creative with whatever resources you have available. There are 12 rebar anchor pins in each row. There will be 4 extra rebar anchor pins, but these will be used later when installing the end walls.

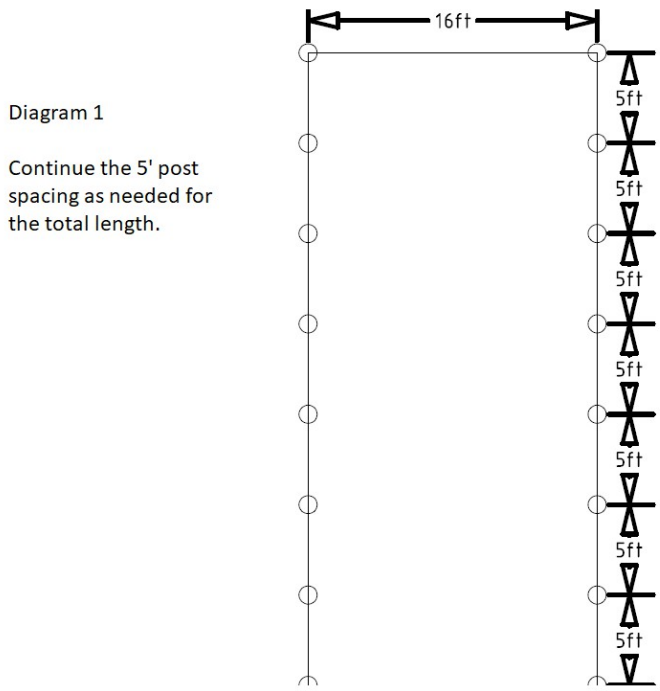


Diagram 1

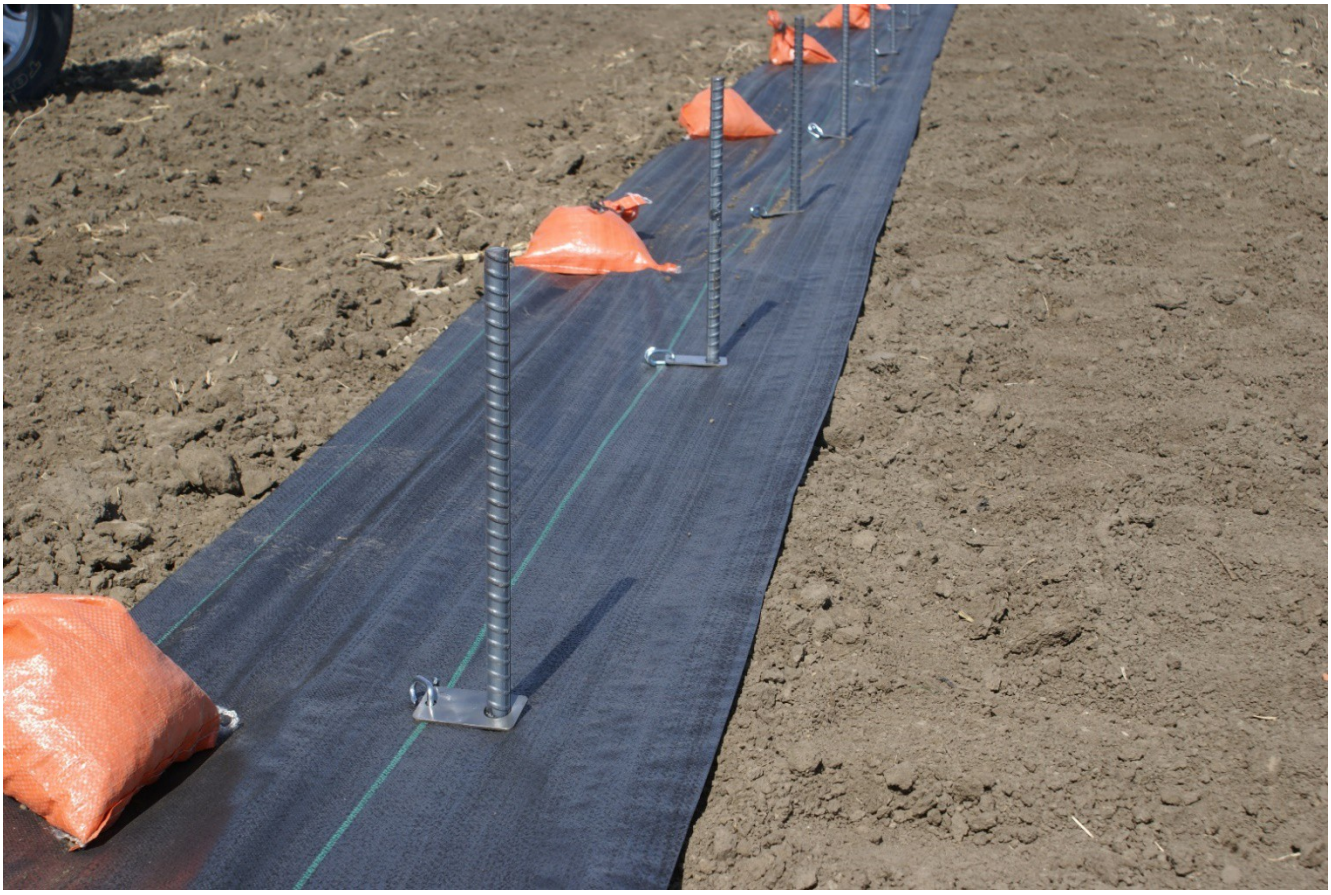
Continue the 5' post spacing as needed for the total length.

Step 3: Snap Clips and Anchor Plates

Parts needed:

- 24 x anchor plates
- 24 x snap links

Install the snap clips on the anchor plates. Then slip the anchor plates over the rebar anchor pins. Make sure the snap clip is facing the outside of the tunnel. Pictured below are the rebar anchor pins sticking up 16 inches above the ground with the anchor plates slipped over them.



Picture 1: rebar anchor pins spaced at 5 feet with anchor plates and snap links.

Step 4: Arch Assembly

Parts needed for each arch (12 arches to assemble in total):

- 2 x curved pipe
- 1 x peak pipe (L shaped)
- 1 x cross brace
- 2 x brace bands
- 2 x bolts with nuts
- 4 x large tek screws

In total, there are 12 arches to build, but build these one by one, and erect them as they are built. Choose a flat area to build your arches and use 2 rebar anchor pins to make sure the arch is 16 feet wide at the bottom. Picture 2 shows how the arch looks assembled on the ground.

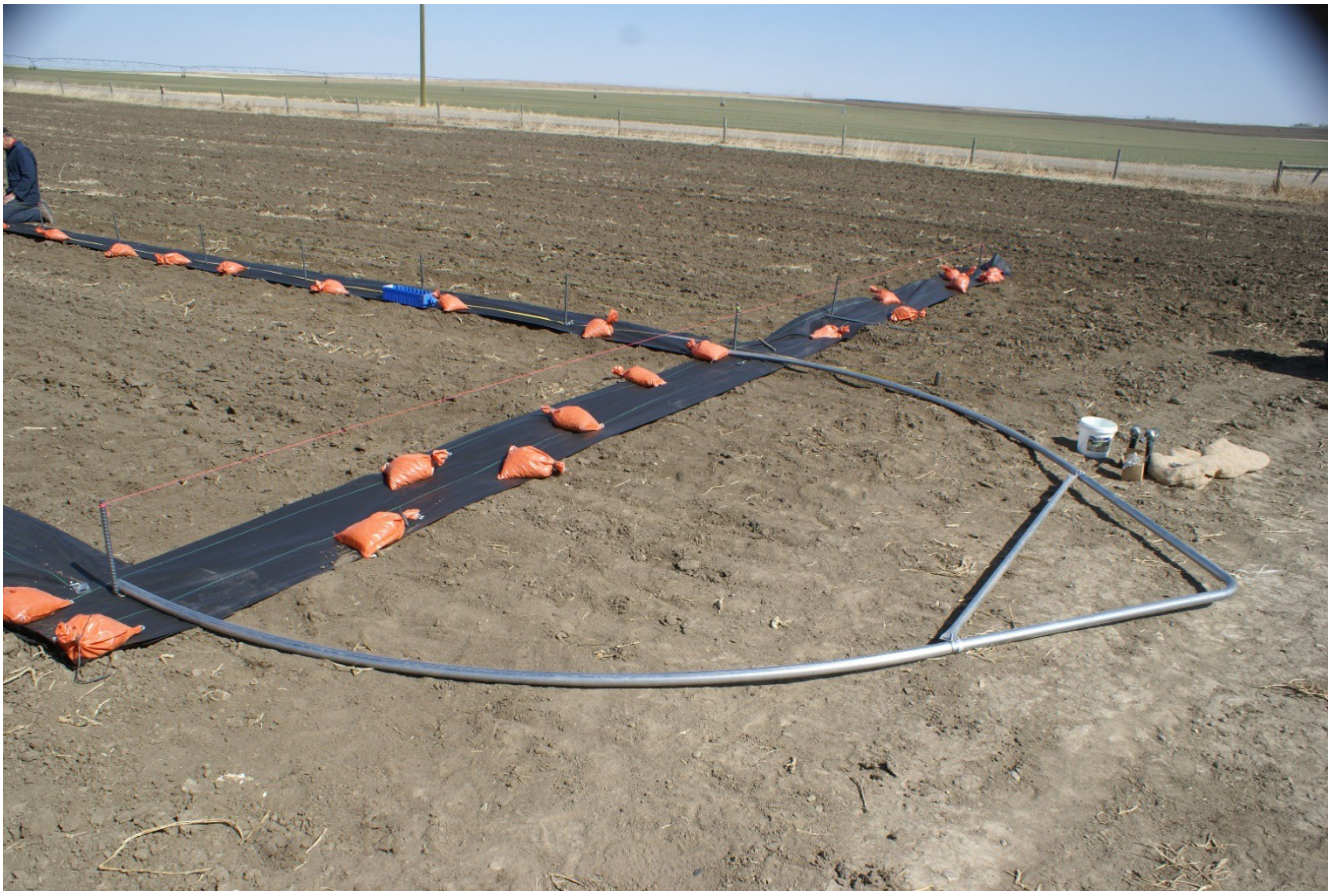
Start by sliding a brace band over each side of the peak pipe. Then you can slide a curved pipe on each side of the peak pipe. The curved pipes are symmetrical, so if the end does not slide into the peak pipe, flip it around, and that should solve the problem. The curved pipes and the peak pipe are swedged, meaning one end of the pipe will have a smaller diameter, so the pipe sections can slide into each other. As a result, there is only one way the arch can be assembled.

OOnce the 2 curved arches pipes and the peak pipe are slid together, install a large tek through the swedged connection to hold the pieces together. This screw should be installed from the top as the arch lays on the ground and approximately 1 inch up from the joint.

Next, mark the location for the brace bands which will be used to connect the cross brace to the arch. On the peak pipe, measure 2.5 inches up on the non swedged side. This is the point where the cross brace gets installed. The 2.5 inch mark is the top edge of the brace band. It is only necessary to measure on one side, as the brace band will naturally slide to the right spot on the other side. The cross brace installed with the pre-drilled holes towards the top of the arch section. Attach the brace bands to the cross brace with a bolt and nut. Once the bolts have been tightened, put a large tek screw through the top of the brace band as the arch lays on the ground. This will prevent the brace band from moving up or down the arch.

Install the finished arch over the rebar anchor pins.

NOTE: For the 2 end wall arches, the cross brace is installed at approximately 45 degrees by lifting on it before the bolts are tightened. This is so that there is room for the end wall posts. Refer to picture 3.



Picture 2: arch being assembled on a flat surface with rebar anchor pins used to measure correct width.

Picture 3: cross brace installed at 45 degrees to make room for the end wall posts

Step 5: Install the Top Purlin

Parts needed:

- 6 x purlins – one section of purlin is shorter, and this one gets used last
- 10 x cross-connector clamps
- 20 x bolts with nuts
- 2 x pipe straps
- Large tek screws

The top purlin is installed underneath the peak of the arches using the cross-connector clamps and bolts with nuts. Install the sections of purlin to the arches using the cross-connector clamps and bolts with nuts. Put a large tek screw through each swedged joint in the purlin. The arches are spaced 5 feet on-center, to match the spacing of the rebar anchor pins. The purlin ends are installed flush with the outside of the end arch.

The first arch and the last arch are attached to the purlin with a pipe strap. The pipe strap is designed to attach to a flat surface, so the ends will need to be bent a little to saddle properly. Attach the pipe straps to the arch with large tek screws. Also, drill a large tek screw through the strap into the purlin.

Picture 4: purlin has been secured to the arches with cross-connectors on all the arches, except for the first and last arch, where a pipe strap is used instead.

Step 6: Install the Wind Bracing

Parts needed:

- 8 x wind bracing
- 16 x brace bands
- 16 x bolts with nuts

Wind bracing is installed in all four corners of the structure. Starting by installing a wind brace between the third last arch and the second last arch – picture 5 provides a reference on how to position the wind bracing. The wind braces are attached to the arches using brace bands. Ensure the brace band on the third last arch is several inches from the ground and then tighten. Before tightening the second last arch, ensure that the arch is vertically plumb. Next, install a wind brace between the second last arch and the last arch. Again, ensure that the last arch is vertically plump before tightening. Install wind bracing in all four corners of the structure.

NOTE: the corners of the wind brace may protrude outwards. It is recommended that the brace bands are adjusted to minimize this. If needed, these corners can be bent inwards to ensure they do not puncture the plastic once it is installed or tape these sharp corners with 3M all weather flashing tape.

On the inside of the structure, put large tek screws through the brace bands into the arches. This will prevent the brace brands from moving.

Picture 5: wind bracing installed on the back, which looks the same on the front

Step 7: Peak Brace

Parts needed:

- 1 x peak brace
- 2 x brace bands
- 2 x bolts and nuts
- Large tek screws

On one corner install the peak brace. The peak brace is installed used brace bands. The peak brace goes from the last arch to the second last arch. Tighten when in place. Put a tek screw through each brace band into the arch to prevent it from moving.

Picture 6: above the wind bracing, the peak brace is installed. This is installed from the last arch to the second last arch

Step 8: Install the End Wall Posts

Parts needed:

- 4 x rebar anchor pins
- 4 x end wall posts (10' 2 1/2” in 1 5/8”)
- 3 x end wall plates
- 1 x end wall angle plate (for door)
- 4 x pipe straps
- Large tek screws

On each end wall, pound in two rebar anchor pins. On each end, the rebar anchor pins are spaced at 5’6” from the corners – there should be 5’ between the two rebar anchor pins. Place an end wall post over each rebar anchor pin and fasten to the end arch with the supplied end wall plates and large tek screws. An easy way to align these end wall posts is to mark the spacing on the horizontal cross brace of the end arch. The cross braces are 7’ long, so a mark at 1’ from each end is the center of each end wall post.

NOTE: for the corner with the scissor door, the end wall angle plate is used, as this plate is the hinge for the door.

Picture 7: end wall plates are used to connect the vertical end wall posts to the end arch

Picture 8: pipe straps are used to fasten the vertical end wall post to the horizontal cross brace of the end arch

Picture 9: the end wall angle plate is used on the corner where the door is to be installed. The door can be installed in any corner of the tunnel

Step 9: Install the Door Post

Parts needed:

- 1 x door post (9’ 6” in 1 5/8”)
- 5/16” bolt with lock nut

The door post is installed with the 5/16” bolt through the end wall angle plate. Let the post hang and then snug up the nut, but do not go too tight, as the door should swing freely.

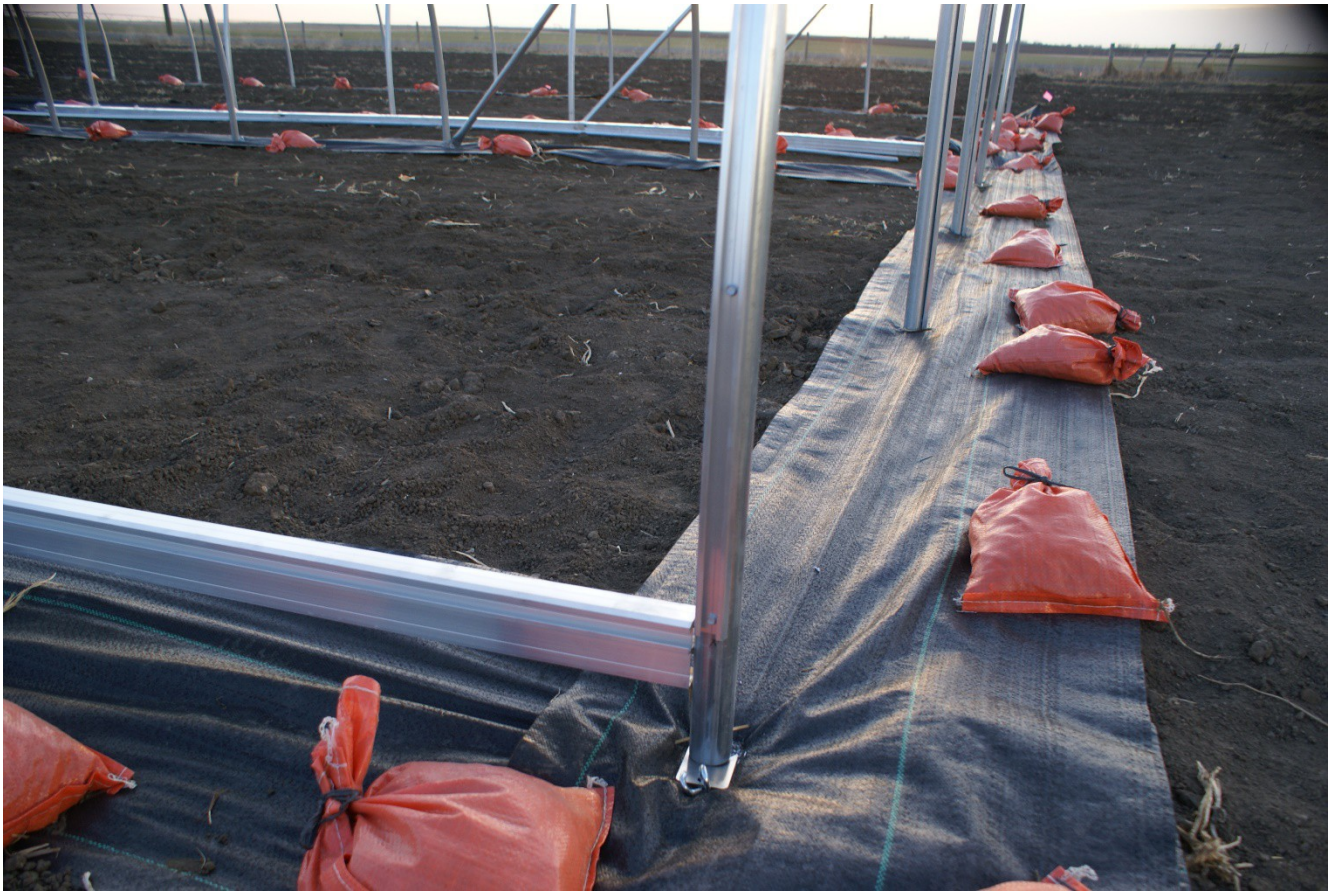
Picture 10: washer and lock nut showing on this interior side of the end wall angle plate

Step 10: Install the Wirelock Extrusion on the Gables

Parts needed:

- Wirelock extrusions
- Small tek screws

The wirelock extrusions are installed using small tek screws. Use a small tek screw at each end and then every 12”. Start the extrusion 12” up from the bottom of the arch. The wirelock extrusion is flexed into position as it is screwed into place. Work from one side up the arch, over the top, and then down to the other side. Keep the end 12” up from the bottom of the arch.



Picture 11: wirelock extrusion installed on the end gable, starting 12” up. Also shown here is the horizontal aluminum wirelock extrusion, but this is not part of the standard tunnel package

Step 11: Install the Wirelock Extrusion on the End Wall Posts and Door Post

Parts needed:

- Wirelock extrusion
- Small tek screws

Starting at the top of the end wall post, the wirelock extrusion can be installed to 12”up from the bottom of the post. Use a small tek screw at each end and then every 12”. On the door post, the extrusion starts from just below the hinge bolt at the top to flush with the bottom.

Picture 12: wirelock extrusion installed on the end gable, end wall posts, and the door post

Step 12: Install the End Wall Poly

Parts needed:

- Plastic (cut from the roll)
- Wirelocks

A 20’ length of poly from the 32’ wide roll is sufficient for **BOTH** end walls. Unroll the roll of poly far enough to cut a 20’ length of poly off of the roll. Ensure you are working on a surface where the poly will not be damaged or punctured. Unroll the 20’ length of poly that was cut off from the roll and cut in half – you should now have two pieces of poly that are 16’ by 20’. The 16’ is for the height and the 20’ is for the width.

Start installing the poly on the end wall without the door. Using the wirelock wires, install the poly starting centered at the peak and working down the end of the arch. Ensure the poly remains taut while the wirelocks are installed to prevent wrinkles and folds. Also, ensure there is enough extra poly at the bottom. Once the arch has been locked into place, the end wall post wirelocks can be installed. Doing this after the arch is done will get the poly tighter.

Repeat the procedure on the door side, but do not install the arch wirelock past the door. First, install the wirelock on the end wall post adjacent to the door post – hold the poly to keep it taut. Next, install the wirelock on the other end wall post. Then, install the wirelock on the door post. Once these wirelocks are finished, the wirelock on the arch from the top of the door down to the bottom can be installed. Something to note on this is that it is usually desirable to have the plastic taut, but for the door, this will interfere with proper closing later, so do not pull too taut.

The excess plastic on the bottom can be secured with sandbags or something heavy that will not damage the plastic.

Step 13: Install the Main Poly

Parts needed:

- Poly (remainder of the roll which is 32’ wide by 60’ long) and Wirelocks

NOTE: install the main poly on the calmest day possible, as this will make it much easier.

Roll the poly out along the tunnel. Start at one end and use a ladder to take one corner up and over the tunnel arches. Work the poly over the tunnel in this way. Once the poly is all the way over the tunnel, centered as best as possible. There should be approximately 6” of poly on the ground on both sides. Secure the poly by installing one or two wirelocks at the top of one of the end wall gables. Then go over to the opposite gable and pull the poly snug. Before installing one or two wirelocks on this end, ensure the poly is centered as best as possible. If the poly is centered and snug, the rest of the wirelocks can be installed down the arches. It is a good idea to have an extra set of hands pulling the poly tight as the wirelocks are being installed. Once all the wirelock is installed, the tunnel is ready for rope.

Picture 13: poly on the end walls and the main structure of the tunnel. Sandbags are used to secure the excess plastic on the bottom

Step 14: Install the Rope

Parts needed:

- Rope

Tie the rope to the snap link at one of the end arch anchor plates. Any of the four corners works fine as a starting point. Then toss enough rope over to connect to the next arch snap link on the other side. For example, if the rope is started at the front right corner, then to the second snap link on the left-hand side, then to the third snap link on the right-hand side again, then to the fourth snap link on the left-hand side, and so on. Tie the rope once you come to the last snap link.

With the first rope, only half of the snap links are used, as the remaining half will be used with the second rope. We find it best to unroll the string or have the spool rolling on a pipe and to have some weight clipped to the rope for throwing it over. Keep the rope snug as it is being installed, a final tightening will be done later.

The rope procedure is repeated for the opposite set of snap links. If the first rope was started on the front right corner, the second rope should be started on the front left corner, then to the second snap link on the right-hand side, then to the third snap link on the left-hand side, then to the fourth snap link on the right-hand side, and so on. Tie the rope once you come to the last snap link.

Once the ropes are in place, a team of two people can tighten each rope. Working from the starting point of the rope, pull through the snap links as tight as possible. Hold this tension while the team member on the opposite side of the tunnel pulls the excess rope and gets it tensioned as tight as possible. Work your way down the tunnel until you reach the end. Tie the rope again as a significant amount of slack will have been removed from the rope. Repeat this procedure for the other rope.

Step 15: Door Hardware

Parts needed:

- door handles
- door fasteners
- bungee cord

The poly between the door post and the end wall post can be cut, stopping the cut at the top of the door post. The door tubes (short pieces of pipe used to secure the door shut) are installed over the wirelock and are fasted with the 1/4” hex bolts. We have found a good height to be 32” from the bottom of the door post. Drill a hole all the way through the posts and fasten the door tubes. This is where the main door “lock” is dropped into. Approximately 12” higher on the door post, install the D handle with large tek screws through the wire lock extrusion. On the inside of the door, several inches below the outside door tubes, install the inside door tubes with large tek screws.

Use the large washer and a large tek screw to fasten one side of the bungee cord to the inside of the arch approximately 5’ above ground level. When the door is open, this bungee cord can be wrapped around the door post and hooked into the wire lock.

NOTE: the fork shaped lock can come out in more severe weather, so we have found it best to hold it in place with a small sandbag.

Step 16: Start Growing!

Your tunnel is now ready to use!

Whether you plan to direct seed carrots, or transplant lettuce, this tunnel will provide you with a unique climate to help your crops thrive. The growing experience using a tunnel deviates from the outdoor experience, so there will be a learning curve involved. Your unique tunnel experience largely depends on your unique context. Some growers use tunnels for wind protection, while other growers use tunnels for rain protection. However, you will soon learn how your tunnel functions in your unique context.

If you have any questions, comments, ideas to share, feedback to provide, or awesome pictures you like our team to see, please send them to mail@growhoops.ca

Maintenance

Just like every other piece of equipment or infrastructure that you own, a tunnel needs maintenance. The three key areas of maintenance are poly, rope, and fasteners/bolts.

Poly

Properly caring for the poly will increase its useful life, given reasonable circumstances. The amount of attention needed to care for the poly really depends on your context. In windy climates, the poly should be given a quick inspection before and after each severe windstorm. The wind will rock your tunnel, which can cause wear on the plastic. If holes are noticed in the plastic, try to patch them as soon as possible. We use 3M All Weather Flashing Tape to repair holes on our poly as we have found it to be a superior product for poly repair. While checking the poly, also ensure that all the wirelock wires are still laying properly in the wirelock extrusions.

Removing the poly during the winter can also help prevent premature wear if you do not intend to use your tunnel for winter growing. Store your plastic as clean and dry as possible.

Rope

The main purpose of the rope is to keep the plastic tight, so it does not flap in the wind. Over time, the rope will stretch, so it is good to check it periodically. Especially consider checking the tension on the rope before any major storm is expected.

It is possible that the rope starts to fray. This can merely be due to the age of your rope, or from a point of infliction. If it is due to some point of infliction, ensure that that problem is solved before you repair the rope, because otherwise you will have a recurring problem. Replace the damaged rope or repair it by removing the section of damaged rope. If the rope is being replaced, ensure that the new rope is of equivalent or superior quality.

Fasteners

It is a good idea to double check all the tek screws and bolts once your structure is complete. Additionally, check the screws and bolts periodically to ensure they are still holding everything securely in place. Replace or tighten the screws and bolts as needed. Severe weather events can damage the fasteners and also damage screws and bolts, so also check your tunnel after such events. Over time, rust can weaken screws and bolts, in which case they should also be replaced.