High Tunnel Design Considerations
1/7/2014

I. Deciding on how to <u>access</u> your tunnel

Before choosing an endwall design, you must first consider what type of access you will need to your tunnel. Will you need to drive a tractor into the tunnel? A walk behind tiller? How often? How big of an opening will that require? It is crucial to consider what kind of equipment will be going in and out of your tunnel, and how often this will happen.

Walk behind tractors like this require a lot less clearance when you are considering the size of your endwall opening.

We break access options into 4 categories

1. Curtain

Some high tunnel kits will include parts for a curtain endwall access. Most of these endwalls will be one of two styles: roll up or zippered. The widths on these can vary. These are straightforward to install and are typically low in cost.

Examples of Curtain Style Endwall Design
Source: http://anr.ext.wvu.edu

Key Consideration: Wind. If your site is very windy, you may experience problems with a curtain endwall closure holding up to strong gusts.

2. Person Door

As its name implies, this door is just big enough for a person (or perhaps a small tiller) to pass through. This may be a good option for a smaller operation that performs most tasks by hand. The small size of the opening means less space for air exchange when entering and exiting—this may be an advantage in the winter months when heat retention is important. Some use small person doors in addition to or in tandem with larger equipment access doors or removable panels.

An example of a repurposed screen door serving as an access door
Source: ipm.illinois.com

3. Equipment Door

These are larger doors that will accommodate bulkier pieces of equipment. These doors may be purchased or built to suit the needs of the operation. Some producers find that these large equipment doors are only necessary a few times per year, while others use them as their daily access doors. Large doors may be opened in the summer to supplement ventilation, but may be detrimental to heat retention during the winter.


A moderately sized equipment door designed for use with a walk behind tractor.

4. Moveable or Removable Panels

As indicated above, many producers only need to get large equipment into their tunnels a few times per year. In this case, some have constructed endwall panels that—for most of the year—are fixed in place. However, during those periods when large equipment access is needed (or during hot summer days) these panels may be removed or propped open to create a large endwall opening.

All of these wooden panels are removable, opening up the end of the tunnel considerably.

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Access *choices made in UK High Tunnel Research Facility (UKHTRF) Tunnels:*

After some initial wind-related problems with curtain-based endwalls, we opted for 8' x 8' wood-framed, polycarbonate-covered rolling doors. These roll on casters that sit in a track. All hardware for these doors are available through local agriculture supply companies. This door combines the equipment and person door considerations into one access point. Our primary piece of equipment is a walk-behind tractor—we might have a larger opening (or at least the ability to open the endwall wider—if we were planning on a bigger pieces of equipment.

II. Endwall Material

Once you have decided on what your access needs are, you will need to choose a material to construct your endwalls. We have broken your material choices into three general types

1. Wood

Constructing wooden endwalls will require basic construction skills. Namely, the assembler needs to be able to frame in a wall. If the builder has the skill to do this, wood allows for considerable flexibility in for the design considerations discussed above. It is important to note that treated wood should be used in wooden endwall construction as the humid environment inside the tunnel will rapidly degrade untreated wood.

Wood framed endwalls require some construction knowledge.

2. Metal

Generally speaking, metal endwalls are purchased directly from a manufacturer. Typically the tunnel style and model you choose will have a steel framed endwall available for it. These are the strongest option when it comes to wind resistance and durability over time, but they are also the most expensive option. As you are buying these from the manufacturer, the level of skill required to assemble these will be minimal. It is certainly possible that someone with the right equipment could fabricate metal endwalls to fit her or his need rather than purchasing parts from the manufacturer, but this clearly would require more construction skills.

Metal endwall kits are available from manufacturers.
Source: atlasgreenhouse.com

3. Plastic Curtain

Some producers have foregone endwall framing altogether and have opted for plastic curtain closures. (See pictures above)

These are the fastest construction option for closing up your tunnel endwall, and they also allow for considerable flexibility across different sites. Cost is variable based on materials used. One major consideration with a curtain endwall is wind resistance. On a windy site, curtains may not be the best option for closing your tunnel.

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Choices made in UK High Tunnel Research Facility (UKHTRF) Tunnels:

Based primarily on costs of materials (because this is intended to be a demonstration site in addition to research) we chose wood for our tunnel endwalls. It is a readily available, and inexpensive material that is easy to work with. It has given adequate resistance to heavy winds over the last few years.

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IV. Additional Considerations

1. Ventilation

Some producers prefer to install additional ventilation in their endwall structure. If you are not sure whether you want this feature or not, it is a good idea to build in the possibility of adding a vent later by framing in a space for it above the door.

V. Cost Comparisons

Coming Soon