Construction Aspects

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The Penn State University 2003 High tunnel Production Manual is an excellent reference for all aspects of high tunnel production (The Center for Plasticulture: http://plasticulture.cas.psu.edu). It is particularly good for high tunnel construction and maintenance. The aspects discussed below are a few hints that we have found useful during the two years that we have used our high tunnels at NCROC.

Upon completion of the high tunnels, particularly when there needs to be any soil preparation work done, the area surrounding the high tunnel can be muddy. Sand spread on the ground at both gable ends can help reduce mud being carried in and out of the tunnel or into vehicles during rainy periods. Over time, sanding any roadways near the high tunnels helps keep the area cleaner until more permanent grass can become established.

After applying the plastic to the high tunnel frame, a small piece of duct tape was applied wherever there was a connection or wherever an exposed screw from the frame was in contact with the plastic. This practice has reduced plastic damage from rubbing and should allow for the longer use of plastic on the tunnel.

Shortly after construction, it was noticed that when even a slight wind would blow through the corners of the roll-up sides of the high tunnel the plastic would stretch and eventually create an open area that never was fully closed. This opening allowed cold air into the tunnel at night. While visiting the Penn State High Tunnel Facility, it was found that their solution to the problem was to put a second sheet of plastic over each corner on the inside for a distance of five to eight feet. This completely eliminated the problem and made the roll-up sides more airtight (see Figures 1 and 2 before and after plastic was attached).

![Figure 1. Before corner plastic was attached.](image1)

![Figure 2. Plastic corner attached, Lamberton, MN (K. Bellina, University of Minnesota)](image2)

During the first few months of use with a hook and latch door device, it became apparent that some other system was needed. Slight door warping sometimes prevented easy latching. Hooks were sometimes latched from the outside, and this required having to walk to the other end of the tunnel to get out. A better system needed be found. Devising a
simple door latch system that worked from either side and yet kept the doors from opening on their own was very helpful in getting in and out of the high tunnels without a lot of difficulty. Penn State has a good system, and NCROC adapted an easy solution for this purpose too (see Figures 3 and 4 door latch systems).

![Figure 3. Minnesota Door Latch.](image1)
![Figure 4. Penn State Door Latch.](image2)

For the two high tunnels that NCROC built in 2003, the end wall construction suggestions provided in the Penn State high tunnel manual were used. We also used overhead trellis wires that were fastened into these end walls. By mid-August of 2003, the end walls of both tunnels were being pulled inward by the heavy plant load on the trellis wires. While this problem should have been anticipated, it was not noticed until it was almost too late. Before the 2004 growing season, a 2x6 board and angle iron reinforcing were added above the doors at each end of the tunnel (see Figures 5 and 6 for end wall before and after reinforcement).

![Figure 5. End wall before reinforcement.](image3)
![Figure 6. End wall after reinforcement.](image4)

This additional reinforcement solved the problem and allowed our trellis system to resist sagging from the additional weight of the plants on the end walls.

Over the years we have made vast improvements to our high tunnels, in turn making the construction of new high tunnels much easier.
Figures 7-16. The images below show a step-by-step construction of a high tunnel in Lamberton, MN (photos courtesy of K. Belina, University of Minnesota).