

Information sheet for movable greenhouses and shelters

The intent of this sheet is to point out concepts rather than discuss specifics. There are simply too many possibilities to cover them all. It is our purpose here to make sure you realize the possible consequences of some of your ideas and to point out potential pitfalls. The idea of a moving structure allows a user, with a little creativity, to protect 2 or 3 times as much area with the same building and investment. It is a very simple concept as long as some basic guidelines are adhered to. If these guidelines are not followed, the building can easily sustain significant damage. The stress of pulling must be distributed evenly to eliminate or greatly minimize the risk of damage.

There are many ways you can prepare a building which you want to be able to move. The first question you must ask and answer is “How often and how far do I need to move this?” If once per year you are moving it north the length and once per year you are moving south (scenario #1), you will need to do much less to prepare and stiffen your building than if you are going 500 meters over uneven ground with a 90 degree turn (scenario #2). Most likely you are between the two.

The various choices for a **base** can be as simple as a 4x4 base beam for the small greenhouses or 6x6 for the bigger units. You should never use plain wood in contact for the dirt. Organically certified farms will need to use cedar or metal as your base rail. A metal base rail is also a good idea if the ground is quite wet or when the building is only moved once per year (more likely to stick to the soil with wood). Using multiple, offset layers of wood, your base beam will be one continuous rail which will not come apart with pulling. If you are moving a bigger structure over greater distances or uneven soil, you will be best to consider a 3”x3” structural beam since there is much more strength and durability. If you will be moving your building once per week, you should consider mounting wheels or casters and possibly using a track.

Anchoring your base is another area to give proper consideration. This is not a place to take short cuts. If there are not enough anchors, your building could blow away and if there are too many, it will take longer than necessary to move it. T-posts can easily be used over and over, even in rough conditions. Especially if the T-posts are not too long, they should be used in alternating directions so they work against each other. Screw in anchors, like those on big tents, are very effective but usually require a machine to install and uninstall. Be very careful if you are considering anchoring your building with weights. It usually requires a lot more than you realize. Get a second opinion! If you are going back and forth between the same two spots, you could consider permanent anchors in each location.

The next area of consideration is **ends**. Ends will have to allow the structure to move over uneven terrain since it is rarely smooth. You also have to remember that you will either be moving a structure off of a crop or on to a crop so the bottom of the ends must be able to open up according to the height of crops or obstacles. Your ends will have to be suspended with a movable bottom part cover. The structure can easily accommodate the weight of the end but you must make provision for the end to be braced. The quantity of vertical end frames will be determined by the width of a building... from 2 for a 12’ wide to 6 for a 30’ wide. The other variable is the amount of wind the end will typically be exposed to in your area. End framing can easily be stiffened with long T-posts but you need to remember is that the more that goes into the ground, the more that needs to come out of the ground at moving. If you need to get in and out with people or equipment

while it is sitting in that location, you must build doors of proper size and location. These doors should be easily removable or have a hinged bottom part. The covering for the bottom part can be as simple as a flap of plastic with dirt on it once the structure is parked. You can also make a horizontal window to flip up for moving and ventilation.

Moving the building is the biggest area of consideration. You need to remember that to get the building moving requires more than double the force than to keep it moving. A very important thing to remember is that unless you have 50% more time available than what you think the job will take ... **DON'T** get started. This is not a job you can complete the next day! A tractor is the most common equipment for moving the building and typically a tractor has power to spare for this job. An important thing you have to remember is that you will not likely hear the creaks and groans of stress over the sounds of the tractor until you **SEE** the stress related damage. The longer your pulling cables are, the more you minimize this risk. If you have roll up sidewalls on your building, you should always raise them for moving since this minimizes the risk of the wind getting hold of your building. Especially for your first move... the only good wind is **NO** wind! It is important that whatever your structure is sitting on, there should be a "ski" type of extension on the base so that it will not dig into the ground. If you put some cross pieces of steel under the base beam, it will help to break the bond with the soil it is sitting on.

If it is your intention to move this with a V shaped cable attachments from the front corners, you need to remember that you **MUST** pull on the beam... the arches are simply not strong enough! By pulling with a V, the front of your building will want to narrow and collapse, so a solid cross bar needs to be installed. This cross bar can not be at ground level since in most situations since it would uproot the crop it is moving over. The ends of the cross beam need to be strong enough so that they can curve down and attach at the beam.

Once you have released your beam from the anchors, you will make that initial pull much less stressful if you go along both sides with a pry bar and every 5' – 8' give it a lift.

As you are moving the structure, the rest of it will want to spread so provision must be made to tie the two sides together. These cross members are usually removable cables with hooks attached.

Once again, they should be attached very near to the beam. The higher you need to attach, the more cross cables you will need. Your minimum should be a cable for every 12' of length.

One variation to moving the building with a tractor is to use winches. This allows you to pull on both sides simultaneously and although it is likely to be slower than tractor, it is potentially much less stressful on the building and it is much easier to react to an impending problem. The best combination would be a winch being held by a tractor if you have to move it more than its own length.

If you are moving a structure often or over longer distances, please call to discuss wheel options. If your move is scenario #2 (long distance with 90 degree turn), this is going to be more like a 5 point turn. You can not pull this around a corner without inflicting stresses the structure was not built for.

A point I would like to make in conclusion is that although I have never physically moved a greenhouse myself, I have studied stresses on buildings for many years plus I have talked to many people who have moved them. If you are not sure about something, **ASK BEFORE** you start.

