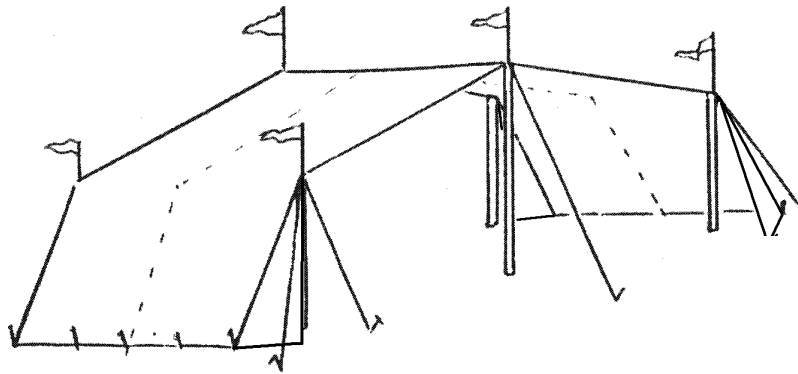
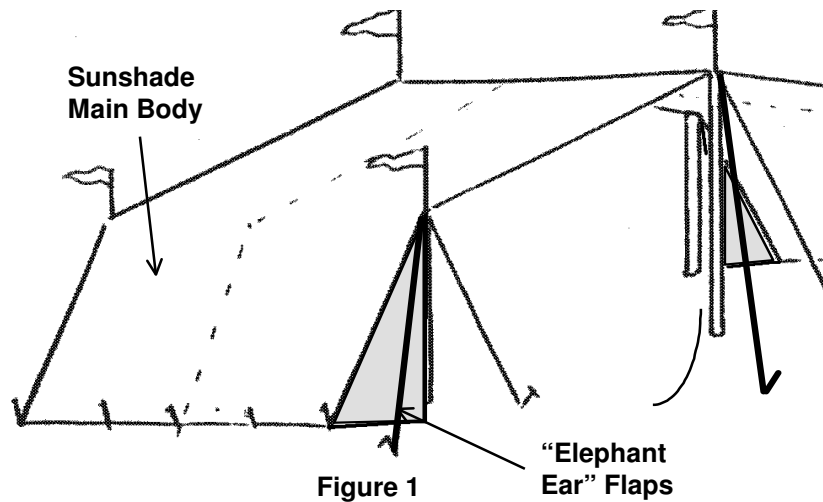




P. O. Box 13322
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Thank you for your selection of the DRAGONWING Sunshade. We are sure that your pavilion will weather many years of service, if you care for it properly. In this manual, you will find details on devising a framework for your sunshade, how to assemble and erect it, and how to care for it.



Your sunshade consists of two or three long panels of cloth forming the main body of the sunshade. It also has four “elephant ear” flaps that project out from the sides. (See figure 1.) These flaps, when staked out, can help regulate the amount of breeze coming under the sunshade. If you prefer, you may roll these up or fold them out of the way when not in use.

Base Dimensions (depth times frontage)	# of Center Poles req.	Length of Center Poles
10' x 20'	2	10
15' x 20'	3	10
15' x 25'	3	11
15' x 30'	3	11

CONSTRUCTING THE FRAMEWORK

For your sunshade, you’ll need four side poles, each seven feet long. (The dimensions are not very critical.) You’ll also need about 180’ of rope. In addition, you’ll need the center poles in the table above, depending on which sunshade you have:

In any of the designs, you can use 2” x 2” “dimensional” lumber (actually 1 ½” x 1 ½”) or 1 5/8” “closet round” dowel for

the side poles. For the center poles, I would go with something heavier, like a hardwood of equivalent cross section or (if you're stuck with softwood) something like 2" x 4" "dimensional" lumber (actually 3 1/2" x 1 1/2").

You'll also need 26 stakes. For the four ropes going down from the center pole, you'll want stakes at least fifteen inches long, as these ropes get a lot of stress. To make these, you could use lengths of "rebar" or 1/2" square or round stock with one end bent over to retain the rope. Grind the other end to a point, and you're in business. For the rest, I recommend using 12" wire spikes with 3/8" fender washers. To keep the two together, buy a couple of feet of 1/2" vinyl hose (with a 3/8" inner diameter) or, even better, 1/2" "high-pressure" hose (with a 5/16" inner diameter) and cut it up into segments about 3/4" long. Put the washers onto the spike, then slide the hose segment on after it. This stake will last a very long time.

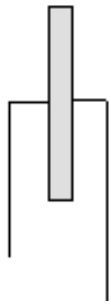


Figure 2.
The pole spike

You'll also need some 3/8" rod stock to finish the poles. Each pole will need a six-inch piece. Wrap the end of each pole with filament tape and drill a hole in the top end that's three inches deep. Cut the rod stock to length, round off the ends, and insert the stud into the pole. (See figure 2). At our shop, we glue the rod in with epoxy or a urethane glue. Finally, apply the finish of your choice.

The poles that came with your sunshade (if you ordered the complete package) are unfinished poplar or alder. We have left the finishing of the poles to you, since it reduces your costs and it gives you the opportunity to stain or paint the pieces as you desire. Whatever your preference, it's worth it to buy the very best finishing medium you can afford. Scrimping on the cost here is always false economy, not only because it gets unsightly a lot quicker, but also because a pole unprotected from the elements will warp and deteriorate very quickly. The friendly attendant at your neighborhood hardware store will be happy to advise you on what you need for the conditions you'll face in your part of the world. I usually use a

good marine "spar varnish" or a polyurethane varnish on the poles I use for my own tents. You may wish to go for a more "period" effect with linseed or tung oils. Whatever you decide to do, do it now, right away, while the wood is still fresh and new. Remember to sand the poles first, to remove any collected grime and give the finish a good surface to stick to.

Find the rope, and a knife. Cut two lengths, each 40' long. Find the midpoint of each length and tie a loop there. We'll call this the "fixed" loop because it doesn't adjust. At each end of the rope segment, install a rope slider or tie a slip knot into each end, and slide the knot so the distance from the fixed loop to each end of the rope is about 15' long. Figure 3 shows you how to tie a slip knot, if you don't know how. These ropes are your center pole guy ropes.

Slip-knots work very well on most synthetic ropes, but not as well on natural ropes such as sisal or manila. On these ropes, it's

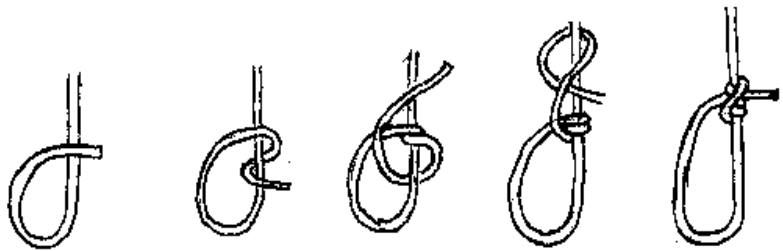


Figure 3. How to tie a slip knot

easier to use a rope slider. Figure 4, on the next page, is a diagram of the kind of slider that Dragonwing uses on its tents. The length is really not critical; the greater the length, the more leverage you can put on them but the more slack they put into the rope when released. Our sliders are made from 1" x 2" (actually 1 1/2" by 3/4") red oak, available at most large lumber centers. Don't use plywood or softwood. The holes are 1/8" larger than the diameter of your rope. Note that the holes are drilled at an angle. The slider should be threaded so that the holes are parallel to the rope when the rope is slack. This increases the "bite" on the rope when the slider is tightened. Be sure to "chamfer" or bevel the edges of the hole so they won't eat into the rope.

When we make rope sets at our factory, we mark these center-pole rope assemblies with a little piece of ribbon in the fixed loop, so we can tell them apart from the other rope assemblies. We

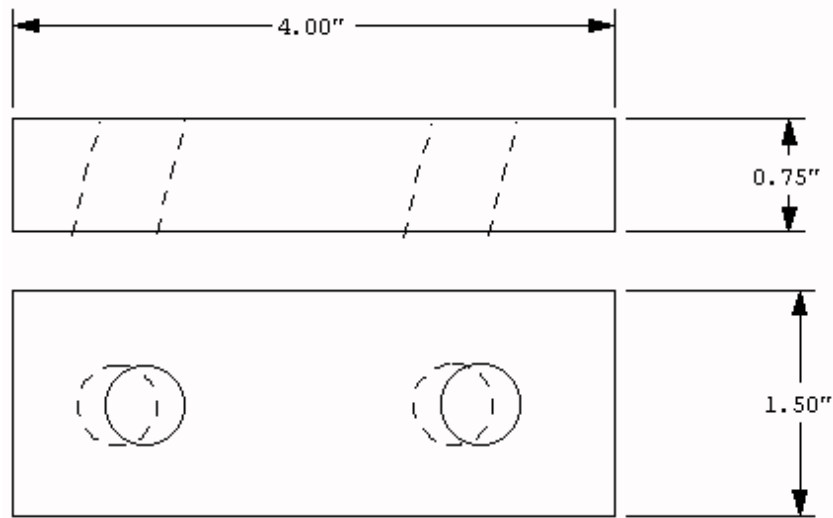


Figure 4. A rope slide

advise you to scrounge up some yarn or ribbon and do likewise.

Now cut four lengths, each 25' long. For each length, find the midpoint, and tie a fixed loop there. Finally, finish each end as you did the others, with a slip knot or a slider. Adjust the loops so that these rope segments are about 10' long. These ropes will be for your side poles.

The rope sets we make at our factory now include iron rings in the bottom loop for our square stakes to go into, resulting in less wear on the rope itself. We advise you to do the same, particularly if you're using a soft natural fiber like cotton or hemp.

Setting Up the Sunshade

There about as many ways to set up this sunshade as there are people setting them up. The methods described below are based on the "fast up" tent pitching method. It's the only method I use nowadays, because it reduces the time spent actually raising the fabric and therefore results in less possibility of damaging it (or

yourself!). The technique consists of laying the sunshade on the ground and then measuring where the stakes go, using either the tent poles or guide knots on your guy ropes to determine the appropriate distance. Then the rope ends are slipped on the stakes, the pole spikes are inserted into their respective holes in the sunshade, and the loop of the guy ropes slipped over the spike ... all while the sunshade is still on the ground. Then the poles are raised. This technique has two advantages: it's much easier for one person to do, and it reduces to an absolute minimum the interval from the time the sunshade is lying on the ground until the moment that it's up and guyed.

Decide where you want to pitch the sunshade, and lay out the fabric there. Remember that the guy ropes will project about five feet out from the sunshade, and be sure to allow for that if you need to leave a walkway clear out front. Your "frontage dimension" (from one side to the other) will be about ten feet less than the space the sunshade takes up when it's flat on the ground.

Keeping the sunshade on the ground, slip all the pole studs

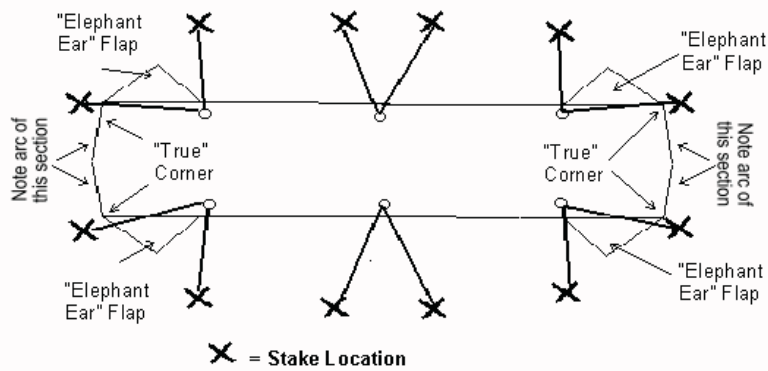


Figure 5. General location of stakes for the sunshade

through their respective grommets (except for the center-most center pole, if you have a three-panel sunshade) and put the loops of the ropes onto the studs (remember that the center pole ropes have little ribbons on the loops, right?). It is helpful, but not

absolutely necessary, to have some sort of retaining device on the tops of the studs to keep the loops on the studs.

Now you can situate and place the stakes. There are two ways to determine the distance, as I mentioned earlier. Using the pole lengths as a guide is recommended for any sunshades that require three center poles, but the guide-knot method works well for the ones with only two center poles. We'll discuss the former method first.

Using the Poles to Position the Stakes

Unbundle the center pole ropes and lay them out so that they are at roughly a sixty degree angle from the sunshade. Lay one of the center poles alongside the rope, and use its length to determine where the stake goes. Drive the stake into the ground at that point. Set all four of these stakes, slip the guy rope loops over the stakes, and proceed to the corners.

The corner ropes go parallel and perpendicular to the front edge of the sunshade. You can use the length of the side poles to set the stakes, although you might want to subtract one foot (30 cm) from the length for those ropes that go parallel to the front edge of the sunshade. This is because when the sunshade is lifted, the tops of the side poles will be drawn closer to the center poles than they were on the ground, and all the stakes will end up the same distance from the poles. Set all eight stakes.

Be sure to lean the tops of the stakes away from the sunshade as you drive them in. The stakes should ideally form a 90° angle with the rope, not the ground, to give the stake maximum leverage against the rope's strain. Also, get as much of the entire stake into the ground as you can. If the ground is unusually hard but there is a good root structure to the sod, you can lean the stake over even more to get more of it into the ground, counting on the root system to help keep the sunshade anchored to the ground.

Now you can go the section on page 9 called "Raising the Poles and Staking Down the Sides."

Using Guide Knots to Position the Stakes

The method I've described above sets out the stakes at an optimum distance, and gives each guy rope a 45° angle to the

ground. However, the smaller sunshades can generally do with a steeper angle, since the loads they subject the guy ropes to aren't as

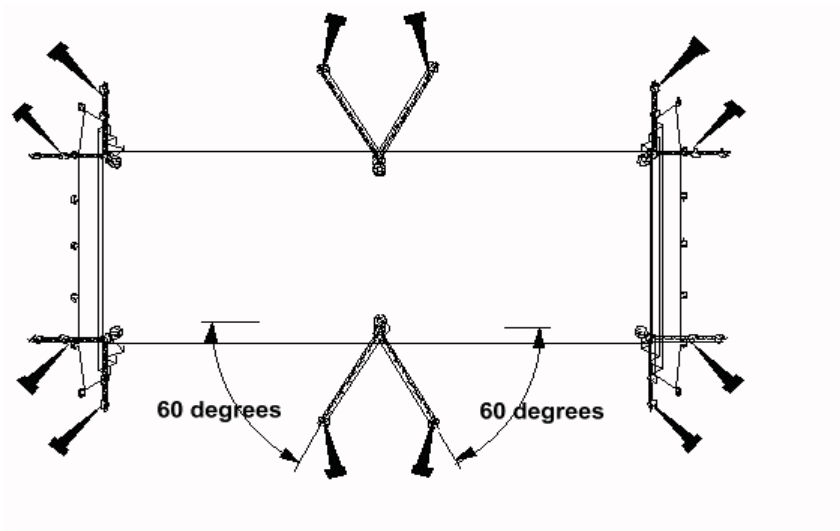


Figure 6. Locating the Stakes by Knots on the Guy Ropes

great. And the steeper ropes present less of a tripping hazard. I've found through experience that one can safely go with a distance of five feet out for the center poles, and four feet out for the side poles. The second method requires tying a few knots in the guy ropes at those intervals. For the center pole guys, measure down five feet from the loop and tie a knot there. That knot is where you're going to drive the center pole stakes. To set the stake, slip the center pole's spike through its corresponding grommet in the sunshade and loop the guy rope's loop onto the spike. Then stretch the ropes out at a 60° angle from each other and the sunshade's edge, as shown in the sketch below.

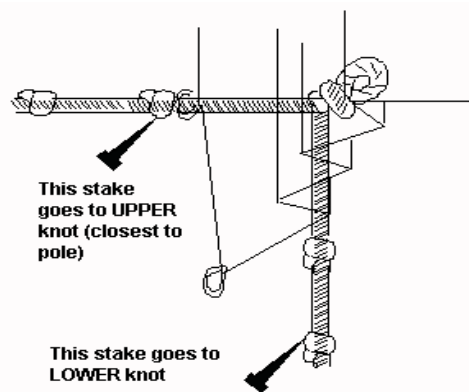


Figure 7. Detail showing corner pole guide knots

Drive the stakes into the ground next to the knot, and you'll know it's the right distance away. Set all four of these stakes and proceed to the corners.

Each of the corner ropes should have not one, but two guide knots: one at a three-foot interval, and one at a four-foot interval from the guy rope loop. This is because the stakes for the side ropes (the ones going parallel to the main body of the sunshade) have to be closer to the pole tops when the sunshade is on the ground. When the poles are raised, the peak in the roof will move the side poles about a foot closer to the center poles than they were on the ground, and all the stakes will end up the same distance from the poles. Having two knots will allow you to use the same rope for either a side rope or a front-to-back rope, depending on which knot you use. (See the detail for the corner ropes and stakes, which is Figure 7.)

Using the upper knots (the ones closest to the pole top) for the side ropes and the lower knots for the front-to-back ropes, locate where the stakes go. Drive the stakes in at these points.

Raising the Poles and Staking Down the Sides

At this point, you've set all your stakes into the ground using either of the methods described above. Now slip the tops of the ropes onto their corresponding studs on the poles, and slip the bottom loops (or, in the case of our rope sets, the ring on the end of the bottom loop) onto the stakes. Then raise all the poles, starting with the side poles and then the center poles (including that center-most center pole if you have one). If the wind is strong, you should raise the windward poles first, then the leeward poles. As each pole is raised, the guy ropes will help stabilize it. When all the poles are up, adjust the guy rope lengths for tension and lack of wrinkles. In particular, pay attention to any sag between the center poles, and remove as much as you can by tensioning the center pole ropes. Then you can stake down the sides as described below. Next, adjust your side ropes to eliminate any wrinkles in the roof that run diagonally from the center poles to the side poles. There should be good tension on all the ropes, including each of the side ropes, and

the roof should be as wrinkle-free as you can make it, before you start staking down the sides.

If you've ordered the sunshade with natural ropes, you're probably wondering what those little hooks on the slides are for. They help lock the rope into the slide, to keep it from loosening if the winds are strong or gusty. Just slip the lower part of the rope into the hook. It's true that these hooks are a little bit of a hassle sometimes, but they really help keep the ropes tensioned.

When you stake down the sides, start with the stake rings (or stake loop, if you have an older sunshade) at the "true" corners (not the loops at the elephant ears), as shown in Figure 5. Next, stake down the "elephant-ear" flaps if you wish. At the central stake ring at the base of the sunshade, pull the ring out (that is, away from the sunshade) as far as you can to impart maximum tension to the shade at that that point; this arc is also shown in Figure 5. ***This step is important!*** If you don't do this, there will be a sag in the roof that will allow rainwater to pool and drip through the fabric. Yes, the rings will no longer be in a straight line with the corner rings; the resulting arc is what you want. Then put the stake in there. Do the same with the remaining stake rings. By pulling out on the ring this way, you greatly increase the fabric's tension and, consequently, its ability to shed water and resist luffing. On sunshades with three center poles, this step is especially crucial, because it's the resulting tension on the sunshade roof that keeps it from lifting off the spikes when the wind picks up. (Under most wind conditions, you'll probably only have to use every other stake ring, but the ones in the center of the arc are critical, so never fail to use them.)

If there are several wrinkles in the top part of the sunshade, between the poles, then here's a troubleshooting guide:

First, be sure that the stakes are where they're supposed to be. If they're too close to the sunshade, you won't be able to get the guy ropes tight enough to properly tension the fabric.

If the poles on the "BC" sunshades are out of line with each other, or if the bottoms are staked out asymmetrically, you'll get a lot of funny diagonal wrinkles. The solution is to pull up one side of the sunshade's bottom, diddle with the adjustments on the ropes

until the poles are all vertical and in line not only with each other but also with the staked-down bottom side. The wrinkles are always in the direction of the greatest tension, so you loosen the guy ropes attached to the poles on either end of the wrinkle, and tighten the other ropes attached to that section. Then stake down the last side. You can avoid a lot of this by raising all the poles first, adjusting the ropes so the “roof” part is all pretty and tight, and staking down the bottom last – first one side, then the other. For maximum tension, remember to stake down each side first at the corners – not at the flap but at the stake ring on the seam that runs from the top of the side pole to the ground. Then stake down the center, pulling outward as much as possible before you drive the stake in. Finally, stake down the remaining stake rings and the flaps.

On the very largest sunshades, it's sometimes difficult to get enough tension on the roof to keep it from lifting off the central center pole in a high wind. If this is happening to you, it helps to take the pole out and re-stake the sides, increasing the arc of the line of stakes on each side. Then replace the pole.

Breaking down the sunshade is pretty much the reverse of the above procedure, with one exception. I drop the poles first, starting with the center poles and finishing with the side poles, to get the fabric on the ground and out of the wind. Then I remove the guy rope stakes, using the still-attached ropes to tell me where they are. Finally, I pull the remaining stakes up.

My favorite way to store the guy ropes is to fold them into wide loops, like a lasso, and then tie the loop in a loose overhand knot to keep the loops together.

One more thing: if you have natural ropes made of sisal or manila fibers, be aware that they have probably been treated with some sort of oil as a preservative. If these ropes come into contact with the fabric of the sunshade, the oil will migrate from the rope to the fabric, causing unsightly spots. That's why we usually store the ropes separately from the fabric, or put them into a plastic bag before stuffing them into the sunshade bag.

Some people like to fold the sunshade neatly, but I prefer to stuff it back into the bag. According to sailing lore, this method

keeps the cloth from getting creased in the same places all the time and therefore extends the life of the sunshade. It's also much easier for one person to do.

CARING FOR YOUR SUNSHADE

The first rule is: make sure that the fabric parts are free from being abraded by anything, particularly when being transported. Keep the stakes in their own canvas bag when you're not using them.

The second rule is: don't store the sunshade wet. Find a dry, large area to air the sunshade if you bring it home wet, and make sure it's dry before you put it into storage. Also, remember that if you use ropes that are made of a natural fiber, they may take longer to dry than the fabric, and will certainly rot if given half a chance. If you must store the pavilion before the ropes are dry, take them off the canopy and dry them separately.

The third rule is: don't clean the pavilion with anything harsher than warm water and a mild soap or detergent. My rule of thumb is that if it's mild enough for your hands to be in (like dish soap or shampoo), it's mild enough for the pavilion. Using anything stronger may shorten the life of the fabric. Also, be sure to rinse the fabric well. And then rinse it again. (This is because sunlight and soap combined will weaken the fabric far worse than either would by itself.)

We wish you many years of happiness in your Dragonwing sunshade. If you have any questions or comments, or if you would like to know more about our products, feel free to call us at (916) 451-6275 or write us at **Dragonwing, P. O. Box 13322, Sacramento, CA 95813-3322**. If we're not in, we'll have a voice-mail/fax machine ready to take your message.

Or you can email us at **dragonwing@midtown.net** or contact us via our web site at **<http://midtown.net/dragonwing/>**