



**Parachute Equipment
Manufacturing, Sales, Service**

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A Letter from the President

Dear Customer,

We'd like to thank you for your purchase of your new Performance Design canopy. We're confident you'll be pleased with it in every way. You'll like how it opens, flies and lands, and how very durable it is.

We urge you and your rigger to carefully inspect your new canopy to completely familiarize yourself with its features and the quality workmanship. Should you find anything that does not seem right to you or your rigger, please contact us immediately.

Again, thank you for choosing a Performance Designs canopy. With proper care it should last many years and hundreds of jumps.

Sincerely,

Performance Designs, Inc.

William Coe
President

Performance Designs Ram-Air Parachute Owner's Manual

Owner's Introduction

Read this manual completely before assembling, packing or using your Performance Designs canopy.

This manual pertains only to this canopy:

Serial Number:

Date of manufacture:

Line trim differentials of this canopy:

A-B

A-C

A-D

A-Tail, brakes set

These differentials may vary plus or minus up to 0.5 inches from the above dimensions. Other canopies of the same size may have different trims, and this manual may not be applicable to them.

Performance Designs, Inc may revise this manual at any time. The only way to be sure this manual is current for your canopy is to check periodically with Performance Designs.

Performance Designs welcomes suggestions of ways to improve this publication. If you feel parts are incorrect or hard to understand, please let us know in writing.

Illustrations: Sandra Williams and Troy White
Design: Lynne Polley

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Disclaimer - No Warranty

Because of the unavoidable danger associated with the use of this parachute, the manufacturer makes no warranty, either express or implied. It is sold with all faults and without any warranty of fitness for any purpose. The manufacturer also disclaims any liability in tort for damages, direct or consequential, including personal injuries resulting from a defect in design, material or workmanship or manufacturing whether caused by negligence on the part of the manufacturer or otherwise. By using this parachute assembly, or allowing it to be used by others, the user waives any liability of the manufacturer for personal injuries or other damages arising from such use.

If the buyer declines to waive liability on the part of the manufacturer. The buyer may obtain a full refund of the purchase price by returning the parachute before it is used to the manufacturer within 15 days from the date of the original purchase with a letter stating why it was returned.

WARNING!

Each time you use this parachute you risk serious bodily injury or death.

You can substantially reduce this risk by:

- 1) assuring that every component of the parachute system has been assembled and packed in strict compliance with the manufacturer's instructions,
- 2) by obtaining proper instruction in the use of this canopy and the rest of your equipment,
- 3) and by operating each component of the system in strict compliance with the owner's manual and safe parachuting practices.

However, parachute systems sometimes fail to operate properly - even when properly assembled, packed and operated - so you risk serious injury or death each time you use the system.

About This Manual

It is beyond the scope of this manual to teach you how to deploy, fly, land or maintain parachute.

The U.S. Parachute Association publishes recommended procedures on learning to jump and using skydiving equipment. We urge you to learn and follow these procedures. We also recommend you obtain instruction from a competent USPA-rated instructor before using this parachute for the first time.

Other countries have similar organizations for instruction. If you are not in the U.S.A. get instruction from a competent instructor that is rated by your country's organization.

Read Before Assembly or Use

Since parachutes are manufactured and inspected by people, there is always a possibility this parachute contains defects as a result of human error. Therefore, the entire parachute system - main and reserve canopies, harness, container, and other components - must be thoroughly inspected before their first use and before each subsequent use.

Parachutes get weaker through time for a number of reasons. They receive wear during packing, deployment and landing. Exposure to many agents, including sunlight, heat and household chemicals, significantly weakens parachutes. The damage may or may not be obvious.

To help minimize the risk of parachute failure and possible serious injury or death, the entire parachute

Jumping this parachute without first receiving thorough and personal instruction increases the serious injury or death.

Sport parachuting technology and procedures continue to advance rapidly. Although reasonable care has been made in the preparation of this manual, Performance Designs cautions that it may contain information that may be incorrect or behind the current state-of-the-art parachute use.

For these reasons, we urge you to work closely with qualified experts - riggers and instructors - to help you inspect, assemble, pack, use and maintain this parachute.

We also welcome your comments, good or bad, about our products.

system should be thoroughly inspected at least every 120 days or 50 jumps, whichever comes first. It should be immediately inspected if at any time it is exposed to a degrading element, unusually hard opening, or any time damage may be suspected.

Remember that some chemicals will continue to degrade the parachute long after initial exposure. Regular and thorough inspections are necessary to insure the structural integrity, reliability, and flight characteristics of the system are maintained.

Always know the entire life history of every part of your parachute system. That way you'll know no part has been exposed to an element that may seriously weaken or damage it.

Picking The Right Canopy

It is important for your safety and enjoyment that you match your canopy with your ability and weight. Performance Designs canopies are built in several models that span a wide range of canopy surface area. Any canopy's descent rate and forward speed increases as the weight it is carrying - the so-called suspended weight - increases. The canopy also becomes more responsive as forward speed increases. It also reacts more radically when it is stalled or tuned.

Because of these aerodynamic facts, it is unsafe to put too much weight under any particular canopy. Safe and comfortable landings will be difficult to obtain, even for experienced jumpers under ideal conditions. Less experienced jumpers will have even a harder time and be at greater risk.

Determining the Awing loading of the parachute you intent to jump or buy is a good guide to matching your weight to a particular canopy.

Wing loading is easily calculated by dividing the total suspended weight in pounds by the surface area of the canopy in square feet. Total suspended weight is the weight of the jumper plus all his clothing and gear- including the main parachute itself.

The surface area of Performance Designs canopies is printed on the data panel, on the center cell rib, or on the center cell top surface near the tail. (Be sure to actually check the data panel - canopies of different sizes may look the same.)

A typical ready-to-jump sport piggyback (rig and both canopies) weighs 20 to 30 lb. Add this, plus the weight of your jumpsuit, clothing and accessories to your bodyweight to get the total suspended weight.

For example, a jumper who weighs 165 lb. with his jumpsuit on and who jumps a packed rig that weighs 25 lb. Would have a suspended weight of 190 lb.

Here's an example of how to calculate wing loading of a 210 sq. ft. canopy and the jumper used in the example above:

$$190 \text{ lb.}/210 \text{ sq.ft} \approx 0.9 \text{ lb./sq.ft.}$$

Calculate the wing loading now for the canopy you intend to jump.

If this figure is below 0.7 and 1.0 it will turn fast and go fast. It will require skill to land well in many weather conditions or at high altitudes. Be sure your skill level is up to the demands of this situation.

If the wing loading is greater than 1.0 lb./sq.ft. you are exposing your self to a dangerous situation. Turn rates, forward speed and

rate of descent will all be very high. Control range may be short with stalls happening very abruptly with little warning. Normal landing techniques may not work. Extra speed on approach to landing may be required to get enough flare to stop your rate of descent. Therefore, a front riser approach to hook turn may be required, either of which are very dangerous.

Performance Designs does not recommend that anyone jump a canopy that will result in the wing loading exceeding 1.0 lb./sq.ft.

It also is useful to compare the wing loading of a canopy you intent to jump with the wing loading values of parachutes you've been jumping. If the different is great, you should expect the new canopy to perform very differently than the ones you've jumped before.

Introductory Jumps

Even if you are familiar with ram-air parachutes, including Performance Designs canopies, your new parachute may handle differently.

Therefore, always make several jumps with the sole purpose of getting to know your new parachute. Pick a day with favorable wind conditions and jump by yourself.

Open high and find out how the canopy flies. Try slow turns and fast turns from no brakes, quarter-brakes, half-brakes, three-quarter-brakes, and full brakes. Determine if the canopy helicopter turns (stall turns) and, if so, under what conditions. Find out how the canopy recovers from various types of stalls.

Stall the canopy several times and see how this happens both from full flight and minimum air speed. Turn the canopy by pulling on the front or rear risers rather than the toggles.

Fly some practice approaches and flare the canopy as you would when you land it. Notice how far you must depress the toggles to get a landing stall and how quickly this stall occurs.

Swoop Landings

At most drop zones there are some jumpers who like to do high approach speed (swoop) landings. These landings look impressive, traveling long distances inches off the ground and then going back up before landing. The problem is that these landings can be very dangerous for the jumper and anyone else around the jumper.

Many of these swoop landings are started by a low turn. If timed incorrectly the jumper can hit the ground hard enough to be fatal. Many jumpers have been hurt by having another turn into them.

To minimize the danger involved in skydiving you should avoid all turns close to the ground, and turns that could bring you close to another jumper in the air. Performance Designs recommends that all jumpers limit their turns to only minor course corrections below 500 feet. If you insist on performing a swoop landing make sure you are alone in the air. Do not attempt a swoop landing if there are other jumpers in the air or the landing area.

The following advice is not intended to recommend that you try swoop landings, rather, they are only included because we recognize the fact that some people will try to do some swoop landings, even though Performance Designs Inc. recommends not to. We have included this section to minimize the risk to those that are going to attempt swoop landings.

Keep track of your location relative to your intended landing area as you Awring out≡ your canopy so you won=t drift too far away. Discontinue your experimenting when you=ve descended to 1000 ft. above the ground.

Plan and execute a conservative landing approach into a large unobstructed landing area. Steer, flare and land the canopy as your instructor taught you. Since you might misjudge your early landings, be prepared to do a safe parachute landing fall rather than a stand-up. Most jumpers underestimate how far they will travel over the ground during the landing flare. Make sure you have enough open area ahead of your intended touchdown point.

Such introductory jumps will help you discover what makes your canopy respond violently. The canopy will let you know that it is about to do something violent by its feel. You must be experienced in these flight modes to know what it is telling you. Knowing

this will help you avoid these situations close to the ground when they can be quite dangerous.

Do not try any swoop landings until you are very familiar with your canopy and the landing area. Even people who are very skilled occasionally hurt themselves. Start out slowly. You do not need any more speed than full glide when first learning. Never try a swoop landing unless the weather conditions are suitable. As you become more familiar with your canopy, you may want to start using a faster approach.

If so, increase your speed in small increments over many jumps. Most people get hurt by trying too much too soon. Try several practice approaches while at a high altitude, going through everything up to landing. Do not attempt a high speed landing until you are sure you can deal with the high initial sink rate.

The best weather for practicing is a smooth, calm, low wind day. On such days, the canopy will be relatively stable and will be responding only to pilot control. It is important to avoid any possibility of the canopy being influenced by changes in wind direction or speed.

The idea in a swoop landing is to skim your feet across the ground or to make the canopy go back up. There is a very small section of the control range of the canopy where this is possible. If you pull the toggle down just a little beyond what is necessary to skim across the ground the canopy may start to climb. However, just a little more toggle may cause the canopy to do a high speed stall. In other words, if you pull your toggle down any more than is necessary you will pass right through the control range you want. The result of this could be dangerous. The exact position of this small area of the control range of the canopy is different on almost every jump.

You must have a complete and intrinsic understanding of your canopy to know exactly what to do for every approach.

Remember that the last thing you do in a swoop landing is land. If you let yourself get in a position where the canopy does not have enough air speed to fly, you drop from that altitude. If that happens to be ten feet high, you fall ten feet!

Once you have mastered the canopy, you may decide to try approaches at high air speeds. It's logical that the faster you go, the harder you will hit, so be careful. There are three methods to gain extra airspeed on approach: front risers, front riser hook turns and toggle hook turns.

Pulling down both front risers on a straight in approach is the last dangerous method. A minimal pull down on the front risers (less than two inches) will result a very large increase in airspeed (increasing the flare power on almost any landing). The flare then begins with a smooth release of the front risers, and is continued by smoothly pulling the toggles down as much as necessary. The altitude to begin the flare varies with each approach and how fast the flare is executed. It takes practice to determine these factors. This practice can be hazardous to your health! When using front risers to gain extra speed, never let go of the toggles for any reason. Also, be sure not to use front risers in gusty or turbulent winds. Pulling on front risers in these conditions could cause your canopy to collapse.

Front riser turns are very dangerous. The forward speed gained with this maneuver is much more dramatic than with a straight front riser approach. The big disadvantage is that it is much more difficult to judge correctly. If you misjudge this type of approach, you could seriously hurt yourself. Performance Designs recommends that you do not try this.

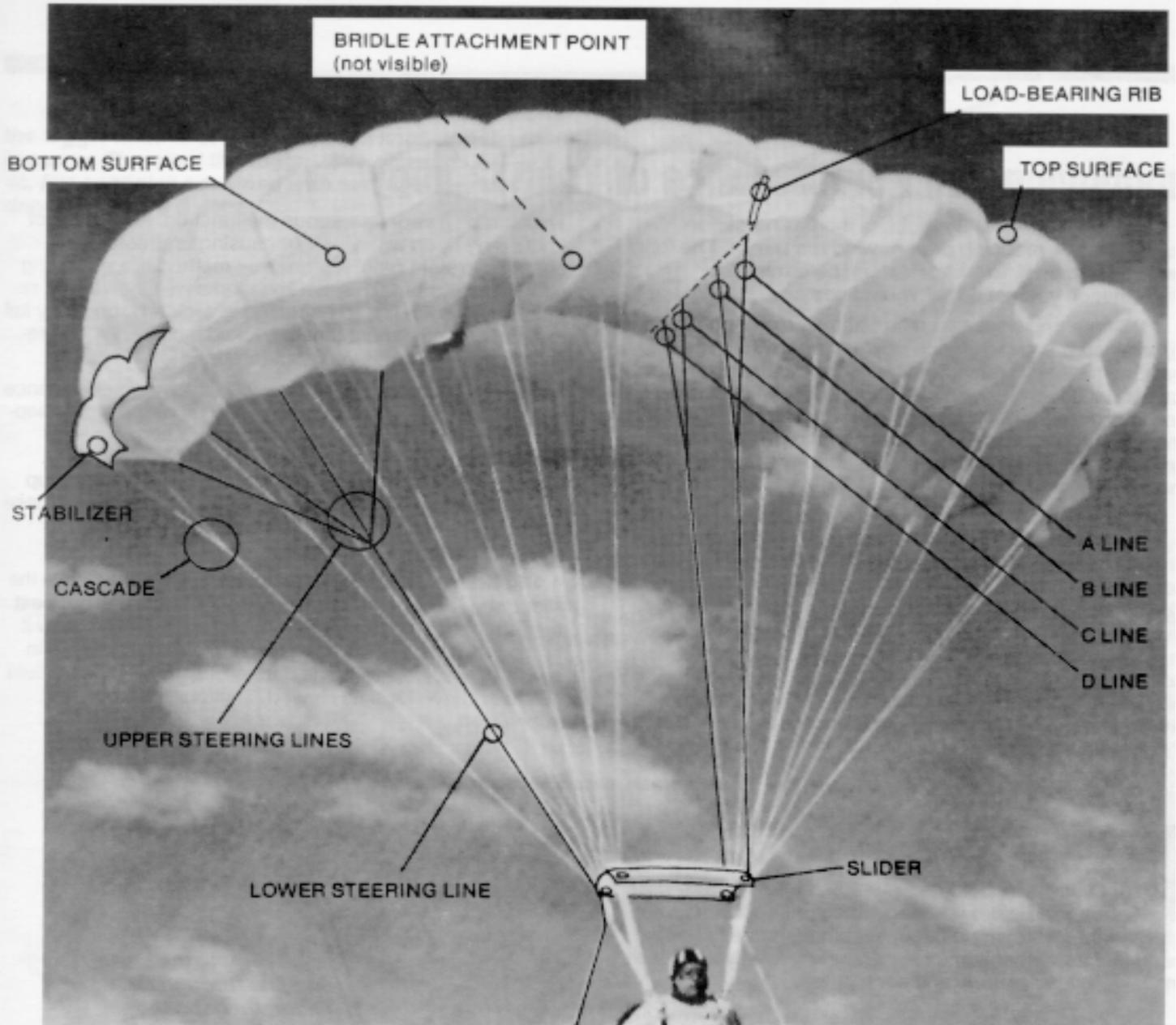
Toggle hook turns are the most dangerous of the three options and offers no advantage in performance. Because both the bank angle and the altitude at the start of the turn must be exact, toggle hook turns are very difficult to perform correctly. They are also very unpredictable in turbulence. **Do not try a toggle hook turn under any circumstances.**

A Note About Slope Soaring

Parachutes are frequently used for slope soaring or paragliding. While this is an acceptable use, it can be very dangerous. The following guidelines will reduce the danger:

- 1) Obtain competent instruction before attempting any slope soaring. Many countries have organizations that certify instructors. In the U.S.A. the American Paragliding Association or the United States Hang Gliding Association can direct you to competent, rated instructors.
- 2) Know the site. Never be the first one to launch at a site. Talk to several people who have used the site before under similar weather conditions. Make sure the site is free of turbulence. Turbulence may collapse your canopy and you may fall all the way to the ground, causing severe injury or death.

- 3) Know the limitations of your canopy. Glide ratios, minimum sink rate, launch speed, flight speed, tolerance to turbulence and recovery characteristics are just some of the things you need to know. These all vary according to wing loading, jumper weight, and canopy type. You must be very familiar with this canopy before attempting any paragliding. Canopies designed specifically for paragliding may perform much better than this canopy. Therefore, do not judge the suitability of a site based on the performance of a paraglider.
- 4) Make sure that you can make the landing area before you launch. Check the flight path for obstacles. Don't launch if there are any dangerous obstacles along your flight path.
- 5) Inspect your parachute frequently and thoroughly. In skydiving the jumper structurally tests his parachute every time he deploys it. If there is any structural deficiency the opening shock will normally cause failure at an altitude where he can safely deploy his reserve. A slope soaring pilot is not so fortunate. Turbulence can collapse a canopy and the subsequent opening shock can be hard enough to cause a failure. This could happen at an altitude that is too low for the reserve to work.
- 6) We recommend you use a ballistic or rocket deployed reserve designed specifically for paragliding. Because paragliding reserves are frequently required to work at very low altitudes, a skydiving reserve is not adequate.



A ram-air canopy is built by joining top and bottom surfaces with airfoil-shaped ribs. Suspension lines attach to every other rib; those ribs with suspension lines are called load-bearing ribs. A 9-cell canopy has 10 load-bearing ribs.

Two small fabric stabilizers extend down from each wing tip. As their name implies, stabilizers help reduce canopy oscillation.

Each load-bearing cell rib has four lines attached to it: the A line at the nose, followed by the B and then the C lines, ending with the D line near the tail.

The A and B lines join together into a single line several feet below the canopy. The line is called the A-B line. The junction is called a cascade. The C and D lines also are joined as a cascade: they form the C-D lines.

The A-B line passes through a front grommet in the slider, while the C-D line passes through a rear grommet.

Eight upper steering lines attach to the trailing edge of the canopy, four on each side. The four upper steering lines in each side join into a single lower control line or two lower control lines. Each lower steering line passes through a rear slider grommet.



At last! One before the world goes... and right a way you'll be with!

Improving The Performance of Your Canopy

The most effective methods of increasing performance involve reducing drag or wind resistance. The following factors will, to a large extent, determine the performance you get out of your canopy.

1. Three decisions you made at the time of purchase determined the performance of your canopy. (1) The size was the most important. Smaller canopies are faster, but have noticeably lower glide ratio. (2) The Microline option improves the performance over the standard Dacron line. (3) Large grommets will allow you to pull the slider down below the links, allowing the canopy to spread out more.

2. The performance of your canopy is greatly affected by how it is set up. The most effective thing that you can change is the pilot chute drag reduction. There are several systems available for collapsing the pilot chute. The cheapest and most reliable method is to remove the main bridle bag stop and have a large grommet installed in the main deployment bag. However this method causes components to wear faster. Another method used is a pilot chute with a bungee center line. This method usually works, however if the pilot chute fabric increases in porosity the pilot chute may fail to open at deployment time.

Assembly

Your canopy should be assembled by a properly FAA certified rigger. Before you begin, be sure the risers, toggles, bridle, deployment bag, pilot chute, harness, container and other items are compatible with your Performance Designs canopy and each other.

Some toggles, for example will not work properly on certain type of risers.

Assemble your system in accordance with the owner's manual for your rig.

The instructions below are for attaching toggles that have a grommet in the center to canopies with Microline. If another type of toggle is used consult the container manufacturer for proper installation. These instructions will work for Dacron-lined canopies, however the rig manufacturer's instructions may produce a better looking installation.

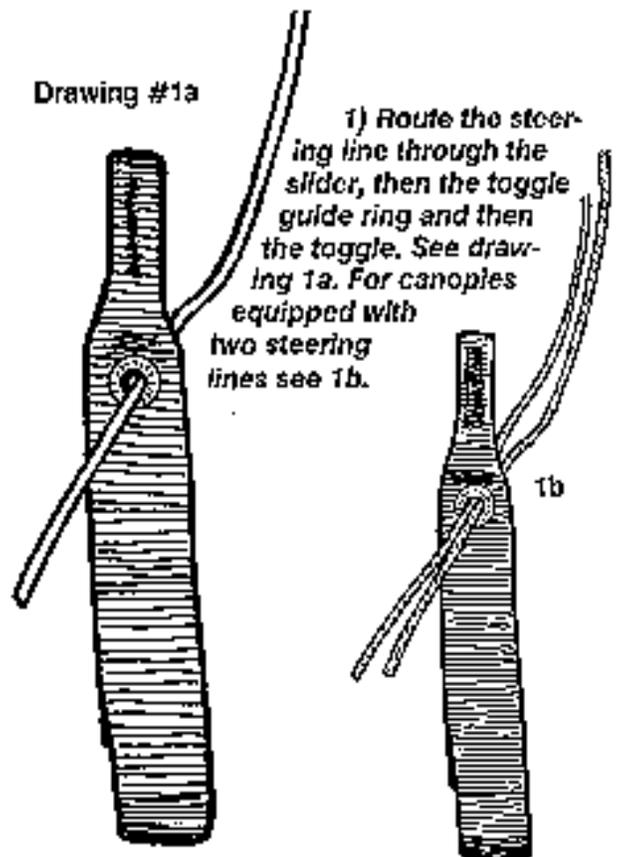
Two common problems that may happen if the toggles are installed improperly are, a) the toggle knot getting caught on the guide ring, and b) the knot slipping. Be sure that your installation is safe. The container manufacturer's instructions may not be compatible with this canopy.

Canopies with two steering lines are attached to the toggles in the same manner as canopies with a single steering line. The two steering lines are routed and tied together as if they were a single line.

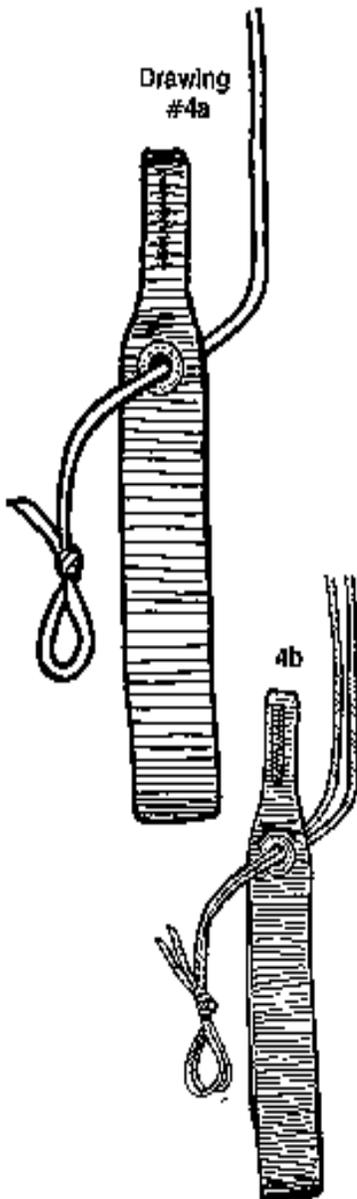
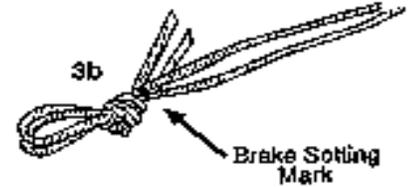
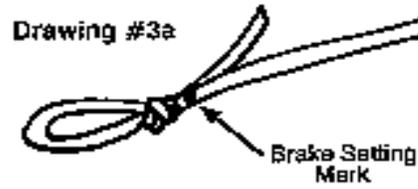
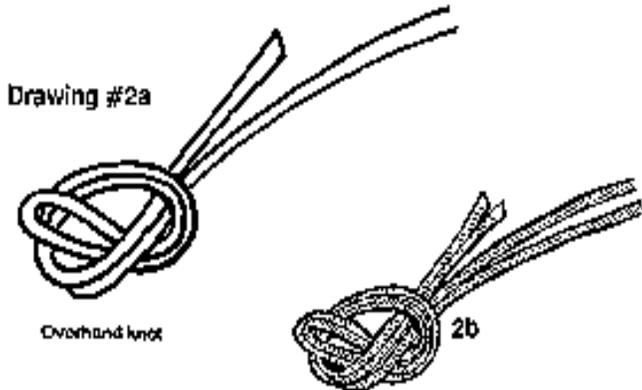
This can be very dangerous malfunction. Also the pilot chute may open while in flight causing unpredictable changes in flight path. Yet another method is a retracting center line system. This method works well, however it requires the center line to be replaced regularly, and may fail to open at deployment time if packed incorrectly. The resulting malfunction is very dangerous.

3. How you use the canopy will effect the performance you get out of it. The slider drag may be reduced by keeping it from fluttering. On some models, a tie strap is installed on the slider for this. On canopies without this feature, the slider flutter can be reduced by wrapping up the slider with a pair of goggles. If you do use one of these methods, be sure the slider is freed before you start to pack the canopy.

Performance Designs recommends that you leave the slider above the links. Some jumpers bring the slider past the toggles, down to the bottom of the risers, and stow it behind their neck. This does result in a slight increase in performance, however, it is dangerous. If the slider should inflate or move from its stowed position it can obstruct your vision.

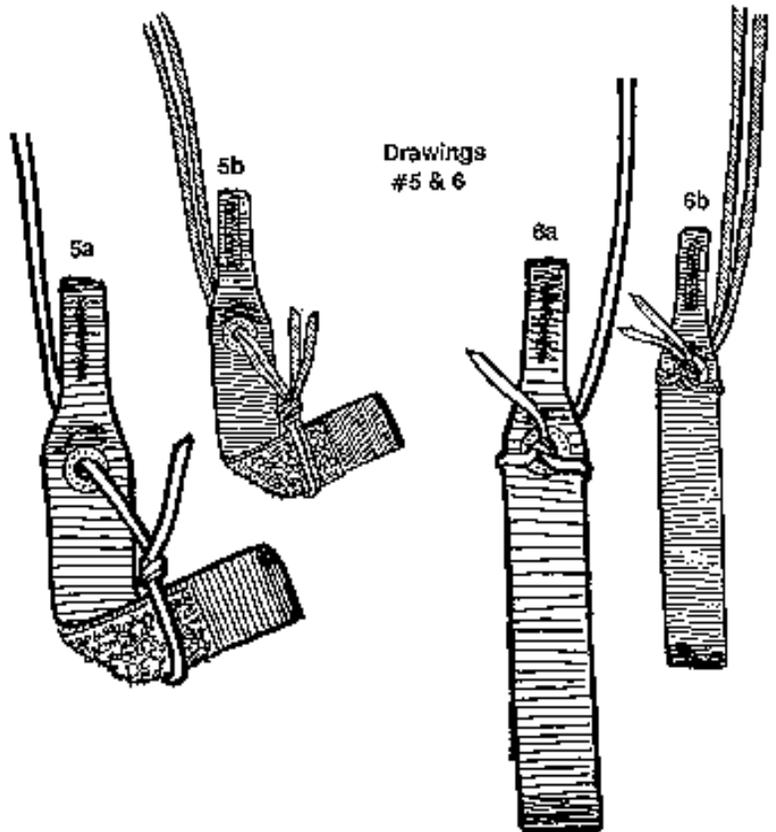


2) Tie an overhand knot in the steering line so that the toggle mark is at the start of the knot, and the loop is a snug fit around the toggle. See drawings 2a, 3a & 4a. For canopies equipped with two steering lines see drawings 2b, 3b, & 4b.



3) Thread the toggle through the loop in the steering line. See drawing 5a. For two lines see 5b.

4) Pull knot up to the toggle grommet. Note that the knot and the steering line guide ring are on opposite sides of the toggle grommet. This prevents the knot from getting caught on the toggle guide ring. See drawing 6a. For two lines see drawing 6b.



Periodic Inspection Procedure

(Performed at assembly and after every 50 jumps or 120 days, whichever comes first.)

As mentioned above, your Performance Designs canopy must be inspected thoroughly before it is jumped the first time and periodically thereafter. This procedure is more thorough than the inspection which should be completed each time the parachute is packed.

You or your rigger should inspect your parachute system in a clean, well-lighted area that will allow you to spread the main canopy out.

Here is one recommended procedure for inspecting your Performance Designs main canopy. Consult the owner's manual for your rig and other components for instructions on inspecting them.

It's best to inspect your canopy in a careful, systematic way. We recommend starting at the top of the canopy and working down to the risers. You should leave the canopy attached to the rig.

1. Bridle attachment. Check to be sure the bridle is correctly attached to the canopy. Check the integrity of the canopy fabric and reinforcement tapes in the area where the bridle ring is attached.

2. Top surface. Spread the canopy out on its bottom surface and inspect the top surface. Look for rips, stains, or failed seams. Check the fabric strength by grabbing a handful of fabric in each hand and trying to tear the canopy with a moderate tug.

3. Bottom surface. Turn the canopy over and spread it out to inspect the bottom surface. Check for rips, stains, and failed seams. Check the fabric strength (see #2 above). Check the line attachment points.

4. Inspect each rib from the leading edge to the tail by looking inside each cell. Pay extra attention to line and bridle attachment points.

5. Lay the canopy out neatly on one side, stacking each rib on top of the others. Check that all lines in each line group are the same length and that the trim differential between each line group is correct for this canopy. Check the condition of the stabilizers and slider stops.

6. Suspension lines. Check the full length of each line for damage and wear. Look for fraying at all cascades (the Y-shaped junction of two lines) and where each line attaches to the connector link.

7. Slider. Be sure the fabric isn't torn, that the grommets are undamaged and have no sharp edges, and that they are securely attached to the slider.

8. Risers. Be sure the barrels of the connector links are tightened and the slider stops are properly positioned.

The toggles must be installed correctly and must match the

guide ring and Velcro on the risers. Checking this installation must be done by a rigger. Be sure the riser release system is assembled correctly and that it will function when activated.

9. The rest of the assembly. Follow the instructions in the rig manufacturer's owner's manual to inspect the rest of your parachute system.

Cleaning Your Canopy

Standard F-1.11oz Materials

Avoid washing or cleaning your canopy if at all possible. Cleaning the material will increase the porosity, causing reduced performance. Only clean areas that are contaminated with a substance that will degrade the material. Mild soap and water will remove most contaminants. If necessary, mineral spirits may be used for grease or oil. Do not use any other cleansers. Do not use cleansers that contain bleach. Avoid agitating the canopy, especially when wet. Agitation will cause a reduction in canopy performance.

ZP3

The ZP3 fabric is not affected by water. However, the reinforcement tapes may be. All tapes used in these canopies are pre-shrunk at the factory to make them more dimensionally stable.

However, if they get wet this does not mean that they will come back to the exact same size when dry. Small changes in lengths may make a large difference in canopy performance. To maintain the best performance, avoid getting the canopy wet. Water jumps are not recommended.

If you need to clean your canopy, please wash only dirty or contaminated areas. Use a mild soap and water only. Oil and grease usually do not penetrate the coating surface so solvents are not normally necessary. Also, some solvents may affect the coating. Avoid getting tapes wet if possible. Do not machine wash.

Storage

Store your parachute in a cool, dry place in a container through which light will not pass. This will prevent the permanent and difficult-to-detect damage caused by ultraviolet light from sunlight and other sources.

Certain other agents - notably acids - will quickly cause great damage to your parachute. Do not store your parachute where it might come into contact with such substances. For example, automobile trunks contaminated long ago with battery acid have destroyed many parachutes.

Pre-Packing Instructions

Introduction

Today's ram-air canopies are very reliable parachutes. If a ram-air has straight lines - that is, if it is assembled correctly and untangled after the last time it was jumped - it will usually inflate even if folded in ways that are quite unusual.

In other words, it is difficult to pack a ram-air main canopy so it won't open.

We're not saying other packing methods won't work with your Performance Designs canopy. But the method shown here will probably help your canopy open more consistently.

Before You Begin

Where you pack your Performance Designs canopy is important.

Since sunlight irreversibly damages nylon parachutes, an indoor or shady area is best. Packing in the sunlight is unavoidable at most places, so try to reduce your canopy's exposure to direct sunlight as much as possible. Cover it with a packing mat or jumpsuit while you debrief a jump or critique a student.

Packing on concrete and asphalt should also be avoided because they will wear the fabric, lines and fittings that are used to build your parachute system. A dry lawn is best.

Packing behind a building or van will make packing easier because it blocks the wind.

U.S. FAA regulations require that a main parachute be packed by either an FAA-certified rigger or the person who will jump it. Other countries may have similar regulations.

A Word About Help

When you're learning to pack, never hesitate to ask a rigger or your instructor to help. They will show you tips that will make the process faster and easier. Be sure they refer to this manual, however, as they might not know our packing method.

Read The Manual First

Read these packing instructions completely before you begin. Doing so will give you a better idea of what you're doing, and it will help you go a little faster.

Packing Canopies Made of ZP3 Fabric

Canopies made from ZP3 can be packed just like any other similar canopy. If you prefer to flat pack, and have been getting good results with a similar canopy, this method should work with your new canopy. There are many different pack jobs currently being used. We recommend the pro-pack detailed in the owner's manual.

This pack method consistently results in soft, on-heading openings, with minimum risk of canopy damage. Others may not work as well. If you try a different pack method, you do so at your own risk. If you use a slide or book pack, start at the tail and work forward to squeeze the air out.

Packing a canopy made of ZP3 is a new skill that must be learned. At first, it will be more difficult to pack than canopies made out of conventional materials. However, with practice it will become just as easy. You can make the pack job considerably easier by getting a bag that is slightly larger than your main container. It is easier to squeeze a small amount of the air out after the canopy is in the bag. (Consult the container manufacturer about this.)

The key to making the job easy is to pack fast and accurately. Each fold or roll must be done quickly and correctly the first time. This will only come with practice. Packing does not hurt the canopy, so please practice until you are good at getting a neatly folded canopy into the bag before you start jumping the canopy.

The fabric has a memory and always tries to open back up. Once you start, you must continue until the canopy is in the bag and the first locking stows are secure. You can't waste time at any point in the packing procedure because this gives the canopy time to move around, form a big mess, and you will have to start over.

After the folding and organizing portion that is done while standing is complete, you should roll the tail as tightly and as far as possible. Be careful not to let the tail unroll while squeezing the air out. If you kneel on the canopy facing the pilot chute attachment just above the warning label you will be in a better position to control this. Slowly lay down on the canopy while still containing it with your hands. The only place for the air to leak out is the stitch holes, so go slowly. If you go too fast, the air will blow the pack job apart.

Sabre Note

Sabres are designed for a slow-to-medium speed opening when packed as described in the P.D. manual - with each side of the nose rolled four complete turns towards the center. Do not tuck the nose into the center cells. The new airfoil design causes the center cells to form a pocket that can hold the rolls there during opening. Additionally, tucking the end cells into the center cells will result in unreliable opening times, with some very long snivels. Repeat: Do not do this.

Inspection - (Performed before each packing)

You must inspect your parachute system each time you pack it. The inspection takes only a few moments and will help prevent the malfunctions and other problems. The inspection is best done when the rig and canopy are stretched out on the ground prior to packing. (The procedure outlined below is different than the thorough inspection that must be performed periodically and when the parachute is first assembled or if damage is suspected. The thorough procedure was presented earlier.)

If you discover any worn or improperly rigged components, bring them to the attention of an FAA certificated rigger before jumping the system again.

During your inspection of the entire system, pay special attention to the items listed below.

Any damaged or worn parts must be repaired or replaced before jumping the system again.

Start with the harness and container and work up to the canopy and pilot chute. Although the owner's manual that came with the rig contains specific inspection procedures, be sure to check the items listed below.

Reserve. It must be sealed and in date. The ripcord pin(s) must be seated properly and not bent. The cable must move freely in its housing. The ripcord handle must be properly stowed in its pocket. If the rig is equipped with an automatic ripcord release, it must be installed and calibrated correctly.

Harness. Inspect the entire harness for broken stitches and excessive wear.

Main Container. The locking loop (or cones) must not be worn, as a problem with the locking device can result in a premature opening, or a locked container.

Risers. Check the riser releases carefully. They must be installed and assembled properly. If your harness has 3-Ring releases, be sure the white locking loop is not worn (it must pass only over the smallest rig). Be sure the release cables are inserted correctly in the white loops.

Check the steering lines and toggles. Look for damage, loose knots and slipping toggles. (Serious injuries could result if an incorrectly attached toggle detaches from the steering line during the landing flare - don't let it happen to you.)

Check Velcro for wear.

Check the connector links. The threaded barrels must be securely tightened and not cracked.

Slider. Be sure the slider isn't twisted, and that its grommets are free of nicks or burrs that can damage the suspension and steering lines.

Suspension and Steering Lines. Inspect these lines for wear. Be sure they are Acontinuous (not tangled). Each must go straight from its link to the canopy without wrapping around other lines. The risers must not be twisted, either.

A tip: Pick up your canopy neatly after each landing, and lay it down neatly when you reach the packing area. Doing this will make your packing go faster because the lines will most likely stay continuous (or not passed through each other, as can happen if you walk through some lines after landing).

If you find any incorrectly routed or twisted lines, it is usually better to leave the risers attached to the harness while you correct the problem (unless the risers were attached incorrectly to begin with). Disconnecting the risers usually makes it more difficult to straighten things.

Canopy. Be sure the canopy is not on backwards. Inspect it for tears, especially where the lines and pilot chute bridle attaches. (You should periodically look inside the center cell to inspect this junction.)

Deployment Bag, Bridle and Pilot Chute. The owner's manual for these items is the best source of inspection information. Tears or failing seams in the main pilot chute are especially hazardous. So is a worn bridle or one that is too short.

After packing your canopy a few times, you'll be able to combine the above inspection procedures with the packing procedures - you'll inspect it as you pack it.

Packing Procedures

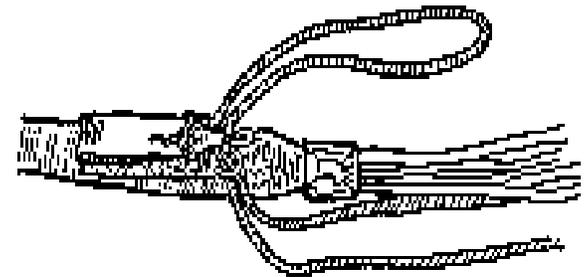
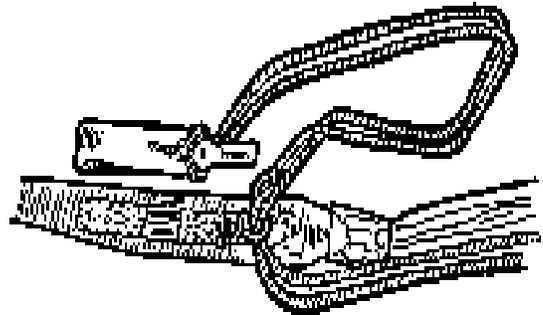
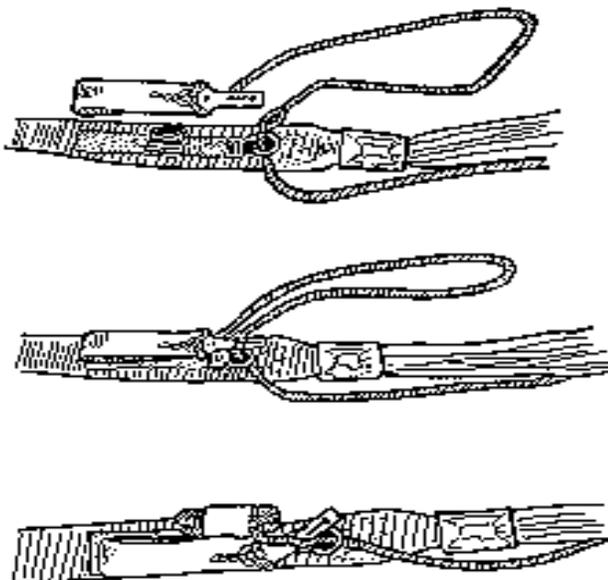
Stretch your parachute system out on the ground with the rig laying with the containers facing up. (If someone were wearing your rig at this point, he'd be lying face down with his head towards your canopy.) Pull the lines straight before setting the rig down.

Brake Setting Procedures

After the parachute system has been inspected, stow the brakes according to the instructions provided by the manufacturer of your rig. (Different rig manufacturers use slightly different methods to set the brakes.)

Canopies with dual steering lines (two lines per toggle) have brakes set on only the lines that contain brake loops. If two brake loops are present use them both.

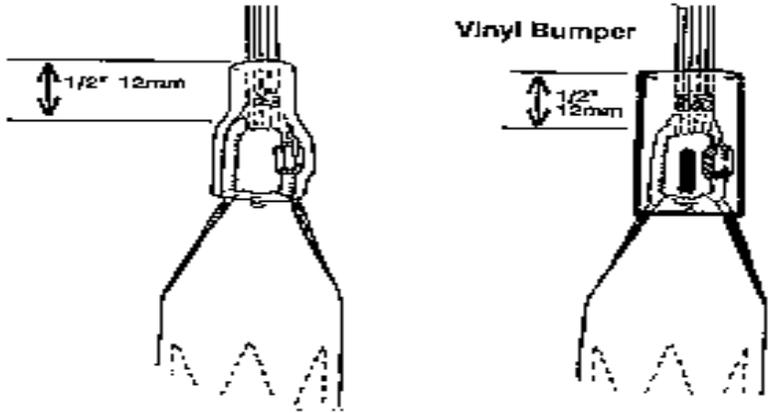
Set brakes as shown.



Set brakes as shown for two lines.

Link Bumpers

Check slider bumper position. It must be protect slider



grommet from link damage.

Slider bumper should grip the

link firmly so that it cannot slide off

bumper in the link during deployment position.

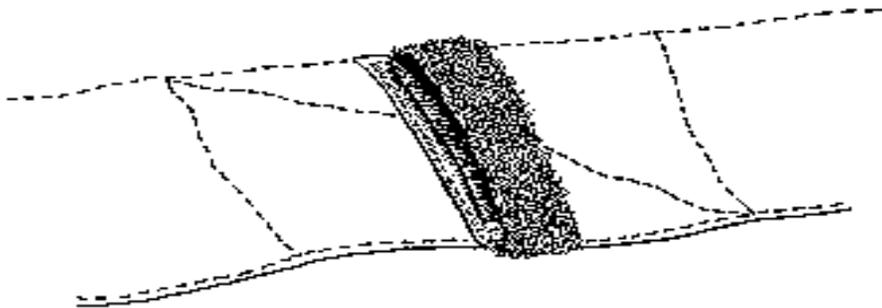
secures

correct

as shown below before packing. Failure to do so may result in an excessively hard opening, canopy damage, malfunction, and/or severe injuries to the pilot.

Slider Preparation

On some canopies there is a small piece of Velcro on the slider. This is to wrap up the slider during flight. It stops

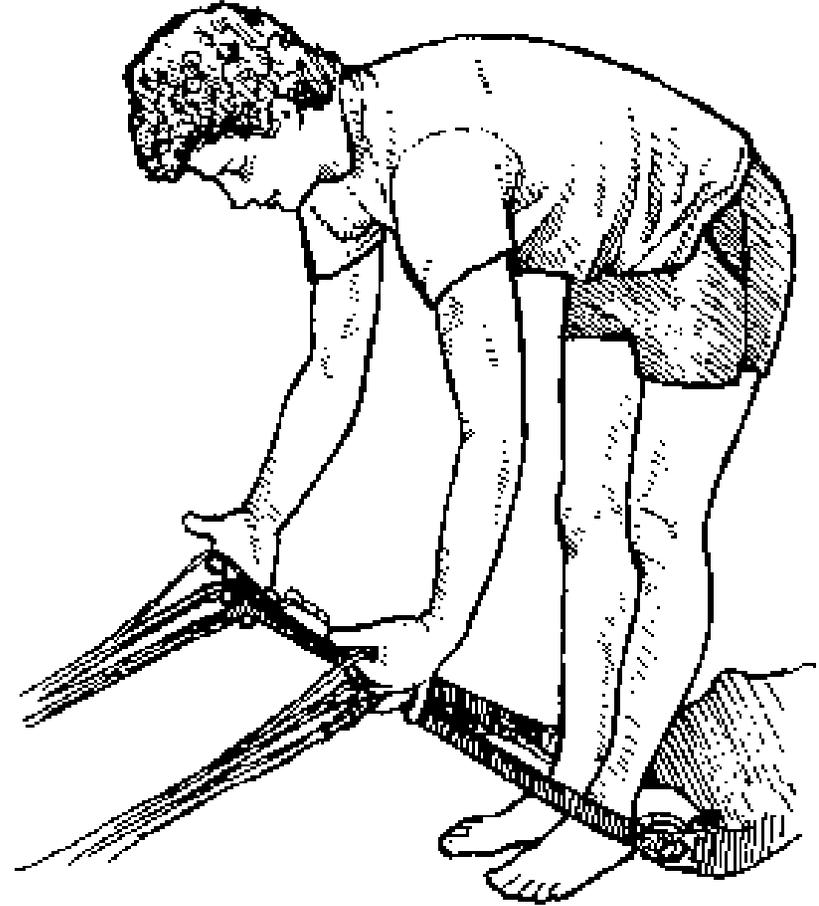


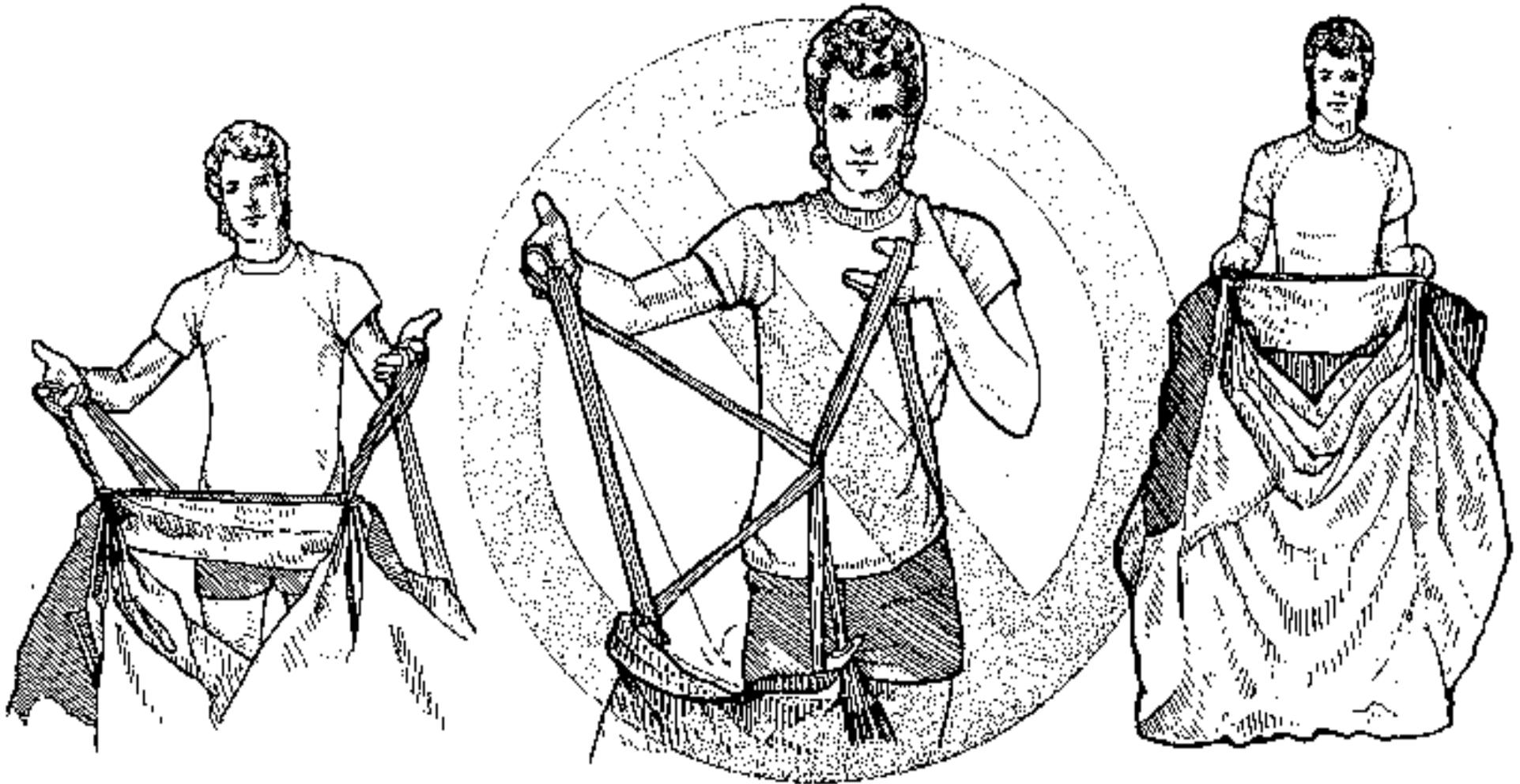
Folding the Canopy

1) Crouch next to the risers and face your canopy. Slip the fingers of your left hand between each left-hand riser and between the left-hand steering line and the risers. Do the same with your right hand. The idea is to have each line group and each steering line occupying a slot between two fingers. Stand between the right and left-hand riser groups and grasp the lines as shown. Be sure there are no twists in the risers. Start moving up the lines, allowing them to slide between your fingers. Push the slider ahead until you reach the

the slider from flapping, makes it quiet, and improves the glide slightly.

This Velcro must be stowed





bottom of the canopy.

2) At this point, it's possible to determine if your canopy and lines aren't straight. If there are twists in the lines as shown, this means your rig did a loop through your risers at some point. To fix this, drop the liens, stretch the canopy and lines out again, and straighten the entanglement out. Get help from a rigger if you have any questions. Do a line check again to make sure you have done it correctly.

3) If the lines look something like this, then a steering line or riser group passed around everything else.

A steering line that passes around everything else will result in a malfunction that will almost surely require a breakaway.

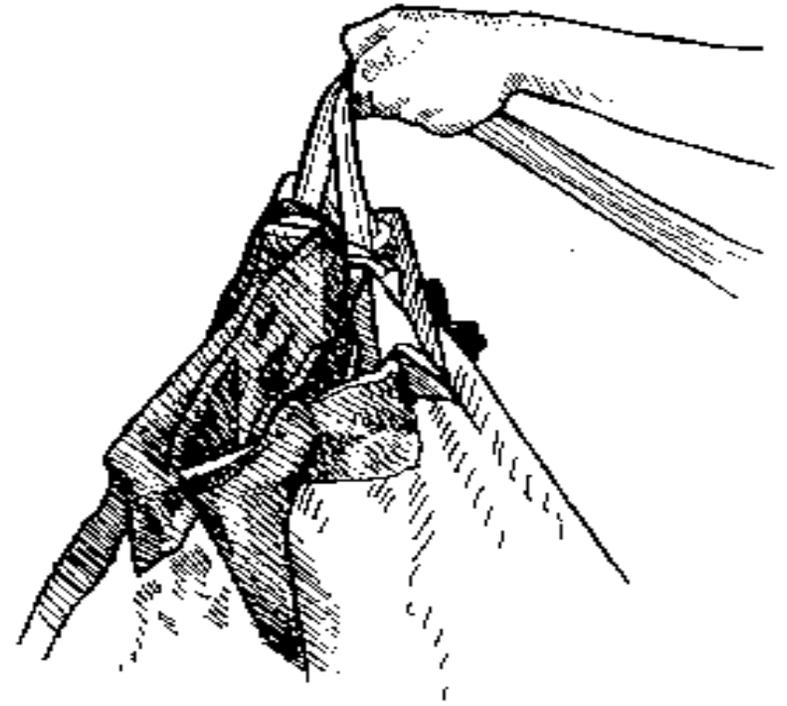
If you don't know how to fix this, get qualified assistance.

4) When you reach your canopy, pull both hands apart as far as the slider will allow. Shake the canopy a couple of times to settle everything.

If the canopy is clear there will be four distinct line groups going all the way to the stabilizers with no lines crossing each other and no twisted lines.



5) The nose openings should be facing the rig and the tail should be farthest from the rig. If the reverse is true, double check to be sure the rig is container-side up (the back pad is on the ground). If the rig is positioned correctly and the canopy is not oriented as described above, then the canopy was attached to the harness backwards!

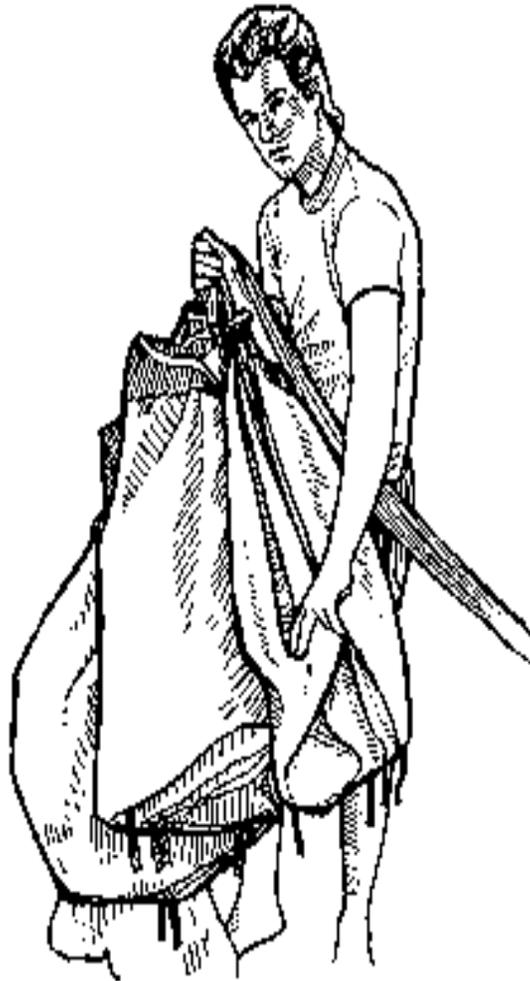


6) Now step to one step outside the lines and transfer the lines to one hand so that the left and right sides of the canopy hang at the same height. It isn't necessary to keep the line groups separated by the fingers of your hand because you've already determined the lines and canopy are straight. Your canopy should look like the above illustration.

All lines should be kept taut and the nose should still be facing the rig. The slider should be against the slider stops on the stabilizers.



7) Starting with the end cell nearest your legs, flake the entire nose with one hand as shown.



8) Pull each cell completely out, and keep it in your hand.



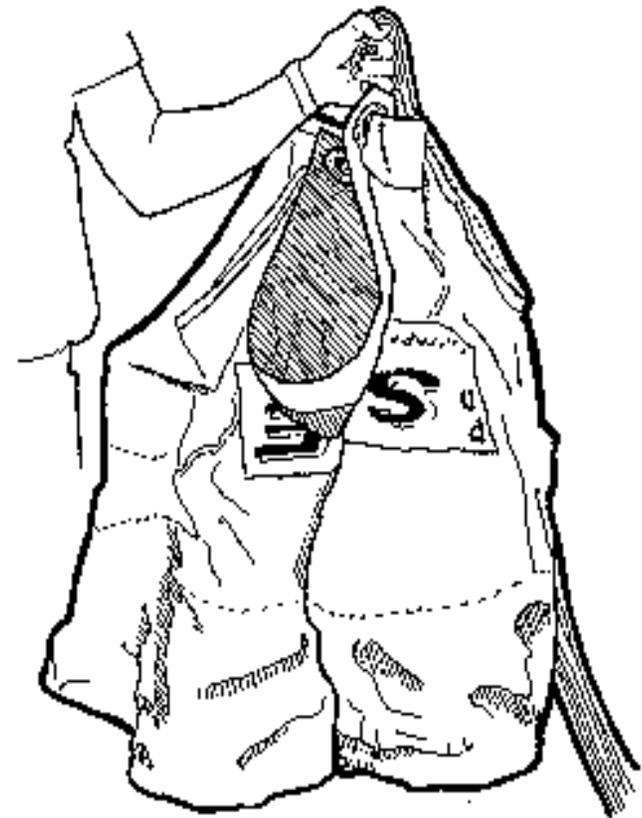
9) Then pick up the next, taking care not to miss any until all of them are in your hand.



10 & 11) When you have the entire nose flaked, tuck it between your knees and hold it there.



If your canopy is new, or it tends to open comfortably fast, then follow your steps 12 through 15. If it tends to open too slowly, skip to step 16.



12 & 13) Loosen your knee grip on the nose of the canopy. Find the very middle of it (by running your hand down between the front two slider grommets; exactly half the lines will be on one side and half on the other). While leaving the very middle cell hanging, pick up all the others on one side and roll them in towards the middle.

14) Pull the front portion of the slider out past the nose of the canopy as shown.



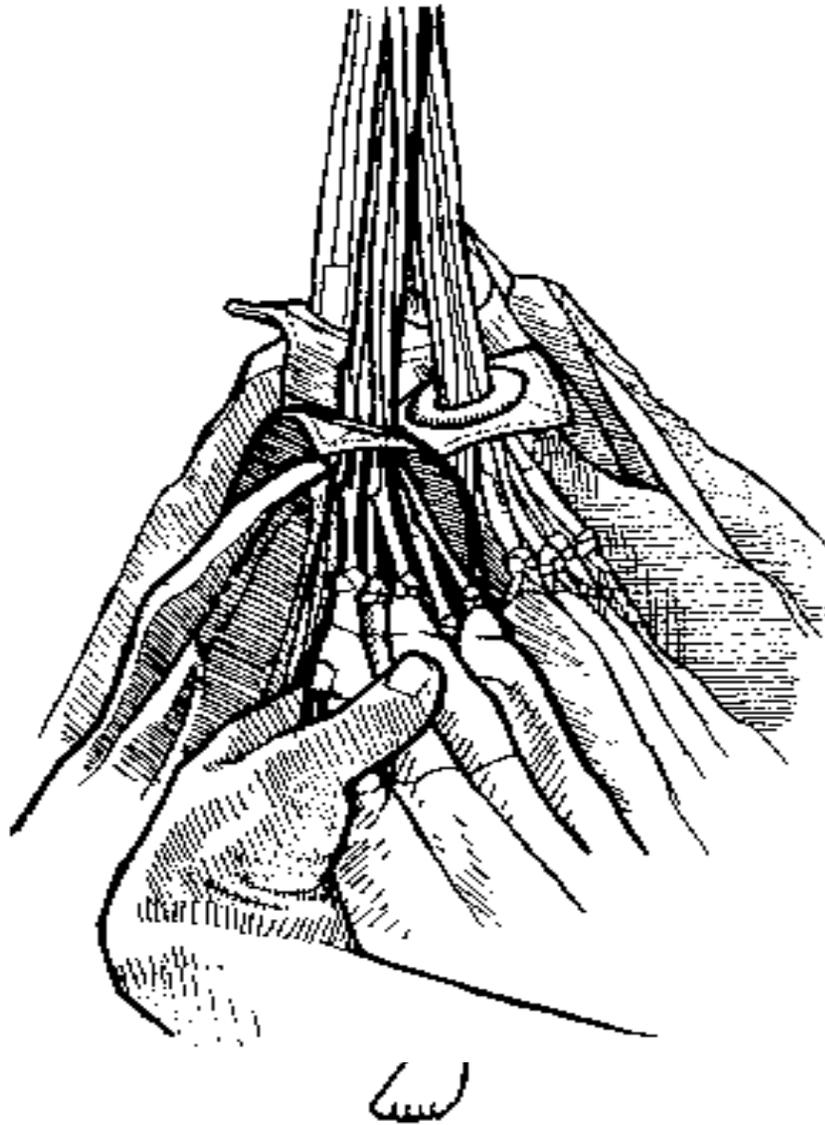
15) Do the same on the other side. When you're finished rolling the nose, it should look like the above illustration.

Put the rolled nose between your legs and grip it with your knees to prevent it from unrolling during the rest of the packing procedure.



FOR ILLUSTRATION ONLY
Do not unroll the nose as shown here.

16) This illustration shows how this packing method helps slow down canopy inflation. As the canopy opens (remember, this shows the canopy upside down), the center cell inflates and the sides are slowed somewhat by the fact that they are rolled separately. The result is controlled, symmetrical inflation.

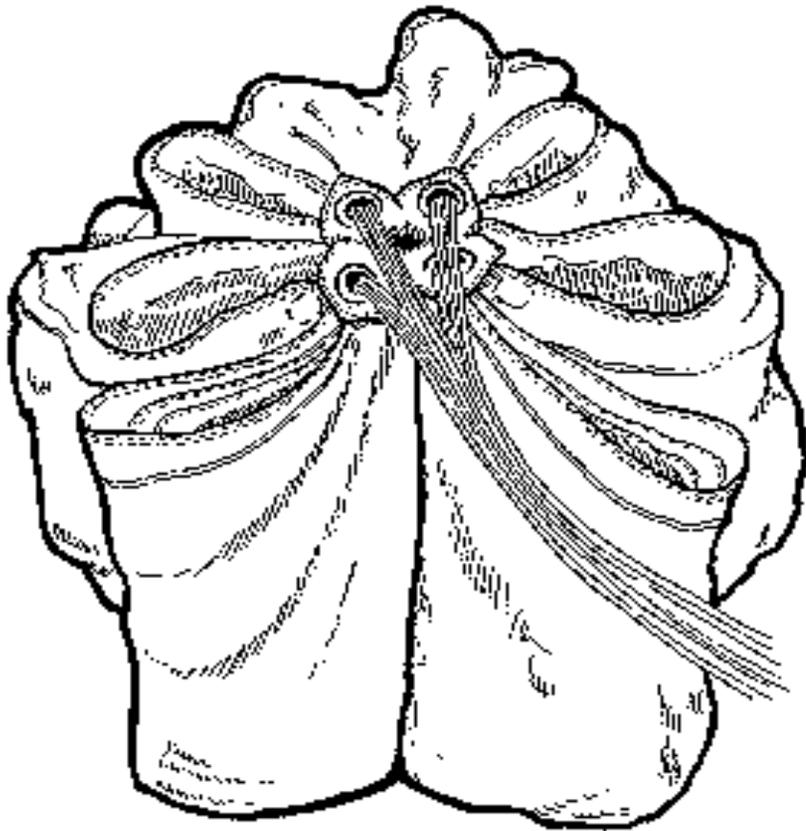


17) If your canopy opens too slowly, then leave the nose hanging neatly flaked; don't roll it at all. This leaves it exposed to the airstream and will help the canopy inflate faster.



18) Clear the stabilizers. Since all the lines are bunched up in the middle, pull each stabilizer panel out one by one until they form an irregular shape resembling the petals of a flower when viewed from the top. Be sure none of the liens are wrapped around a slider stop on a stabilizer.

19) Find the group of A lines on one side of the canopy. With the canopy held



in front of you as you have it now, the A lines are the front part of the line group that go through the front slider grommets, the ones that should be closest to you.



is easy to separate the two line groups: Look down inside the first small S fold of the stabilizer and find the Aextra bunch of fabric.

Now make the rest of the canopy into S folds like the stabilizers: Put your hand in between the A and B lines on one side (near where they pass their own grommet) and pull them out to the side. This will give the cells on one side the correct type of flaking. Now repeat the process with the other A and B groups, pulling the fold out to the other side. (If you rolled the nose a lot in steps 12-15, you may skip this A-B S-fold since most of the fabric is probably rolled up in the nose.)

20) Since there is a lot of fabric between the A and B line attachment points, it

21) Now that you've pulled you the canopy between A and B line groups, do the same thing between B and C lines. Pull the fold of fabric between the two groups out to each side. When you look down in between the stabilizer folds after you've done your Aflaking, the folds should look neat like this.

22) Now find the D line group, the group of lines nearest the tail. (Not the steering lines, they are attached at the trailing edge.)

Pull the left-hand steering lines off to the left (to get them out of the way). Follow the stabilizer down to the D lines and pick up all the D lines on the left side. If you have a 9-cell canopy, you should have five lines; if you have a 7-cell, then you should have four lines.

All lines in your hand should go through the same grommet. If they don't you've picked up a wrong line.



23) Now that you are holding only the correct D lines, you may let go of the steering lines. Take the whole D-line group on one side and pull it out gently.



24) Fold the D-line group in with one motion to put a real fold in the fabric between the C and D lines. Do the same thing on the other side.

IMPORTANT:

As part of Step 26, be sure the stabilizers and their slider stops are correctly lying outside the suspension lines as described in Step 17 on page 23. Canopy damage is likely if a stabilizer (or its slider stop) lies under a line.



25) Now grasp the steering lines where they attach to the tail, pull the entire tail out and drop it straight down.



26) Now organize the steering lines and tail so the canopy looks like this.

(Even though it might seem like you've got a disorganized wad of canopy hanging down in front of you, it should actually be a neat pack job.)



27) Canopies with dual steering lines will look like this. All other canopies will look like Fig. 26.



CAUTION:

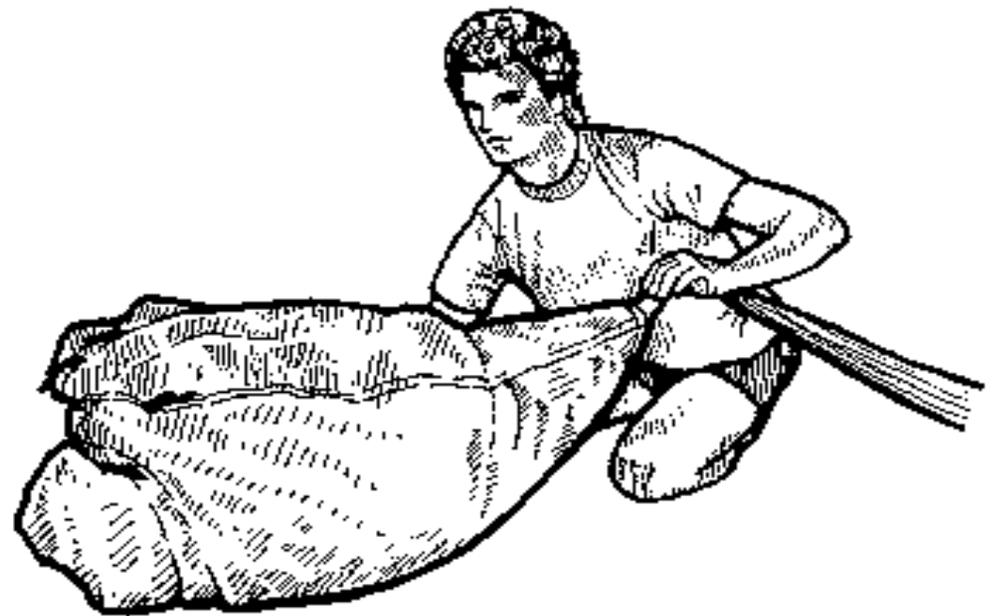
The steering lines must stay positioned at the back of the canopy as shown in Fig. 26. If the steering lines are moved to the nose of the canopy (rather than being kept at the back), a line-over malfunction and canopy damage may result.

28) Reach down and pick up the very middle point of the trailing edge; an identification marker is sewn at the middle point to help you. Raise the tail a couple inches above the slider and hold it in place with the same hand that is holding the lines.

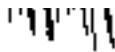
29) On one side, start with the middle of the tail being held under your thumb and pull the excess material straight out. You're pulling out the trailing edge of the canopy that extends from the inside steering line to the very center of the trailing edge.

30) Wrap that part of the tail half way around the canopy. Hold in place with your knees. Fold the tail on the other side of the canopy the same way.

31 & 32) Release your knee grip on the nose and tail. Take both tail pieces in one hand and roll them together in to the middle so they completely encase the rest of the canopy.



33 & 34) Place your free hand carefully under the bundle. Swing it out slightly so that the lines stay taught and gently lay it on the floor.



35) As it lies on the floor, the bundle should be triangular in shape, as shown. Note: The slider should be wrapped up in the tail and should stay that way as you stuff the canopy into the deployment bag.



26) Dress canopy to a width slightly wider than the width of the bag.

All the slider should stay inside the rolled tail. The slider must not be allowed to move down the lines - even the smallest downward movement the slider may increase opening shock and decrease reliability. Pay extra attention to the position of the slider until the bag is closed.

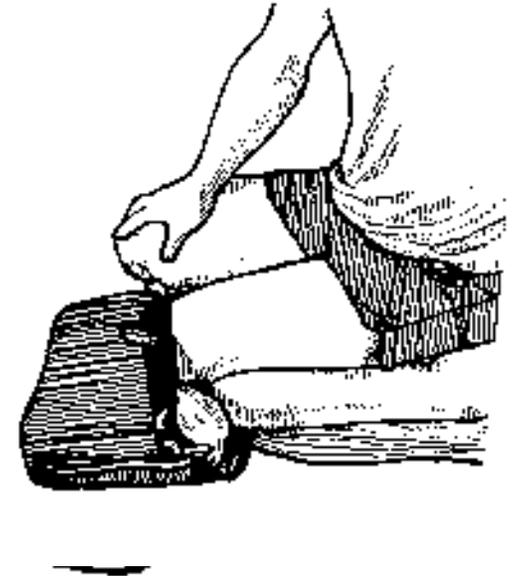
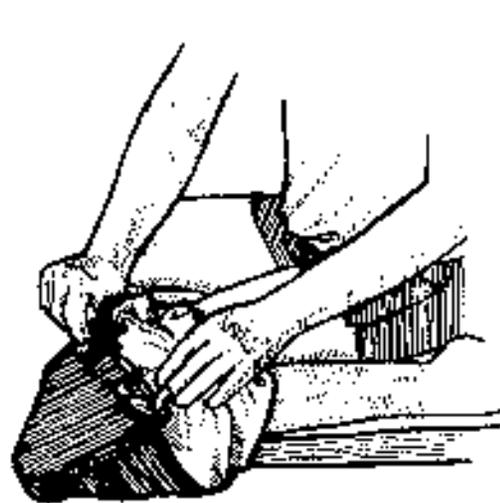
37 & 38) Move to the side of the canopy and put one hand right under the slider edge of the bundle. Place the other hand on top a little farther up and make a small S fold as shown.

Be sure the slider stays up against the stabilizers; don't let it move down the lines.

39) Now put one hand under the top of the bundle and make an S fold in the opposite direction as shown. The remaining material can be rolled under the fold.



40) You should now have a neat compact bundle. Try to make the folds so that the bundle is only a little wider than the bag.



41) Place your knee in the middle of the canopy to keep it together while you pull the bag over it.

42 & 43) With your knee still in place, pull the bag over the canopy one side at a time. Hold the corner of the canopy bundle up while you pull the bag over it, then roll the canopy into the corner of the bag. This helps get the canopy firmly into the corners, making a neater pack job. The whole canopy should be in the bag before you remove your knee. This helps completely fill

the corners of the bag by keeping the middle compressed.

Follow your rig manufacturer's instructions for closing the bag, stowing the lines, placing it in the pack tray, and closing container.

It takes practice to pack quickly and neatly. Every jumper has his own system to make the job easier, and you'll quickly develop one of your own.