

Everything You Always Needed to Know About Emergency Parachutes

(but never knew enough to ask)

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PART 1 - What, When & Why

INTRODUCTION

This article is a general, non-technical introduction to emergency parachutes. Part I outlines the requirements that your parachute must meet in order to be legal for use in the United States and provides some guidance in selecting a parachute rigger. Part II covers general use and care procedures that are applicable to all emergency parachute systems. The Appendix to Part II deals with specific systems by manufacturer and model and includes information on servicing, inspecting and applicable Airworthiness Directives (AD's) or Service Bulletins (SB's). Further information on the technical criteria for selecting an emergency parachute for a particular application can be obtained from the author.

By the Way, Why and When Do You Need A Parachute Anyway?

The following excerpt from the Federal Aviation Regulations (FAR's) outlines the legal guidelines for use of a parachute. In addition to these requirements, there are obviously other times when a chute is appropriate but not required by law. For example, most aircraft type organizations (T-34 Association, North American Trainer Association, etc.) require the use of a parachute for formation flying; the Soaring Society of America and the International Aerobatic Club require parachutes for contest flying and so forth.

91.307 Parachutes and Parachuting

(a) No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type and -

(1) If a chair type (canopy in back), it has been packed by a certificated and appropriately rated parachute rigger within the preceding 120 days; or

(2) If any other type, it has been packed by a certificated and appropriately rated parachute rigger-

Within the preceding 120 days, if its canopy, shrouds, and harness are composed exclusively of nylon, rayon or other similar synthetic fiber or materials that are substantially resistant to damage from mold, mildew, or other fungi and rotting agents propagated in a moist environment; or

Within the preceding 60 days, if any part of the parachute is composed of silk, pongee, or other natural fiber or materials not specified in paragraph (a)(2)(i) of this section.

(b) Except in an emergency, no pilot in command may allow, and no person may make, a parachute jump from an aircraft within the United States except in accordance

with Part 105.

(c) Unless each occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft carrying any person (other than a crew member) may execute any intentional maneuver that exceeds-

(1) A bank of 60 degrees relative to the horizon; or

(2) A nose-up or nose-down attitude of 30 degrees relative to the horizon.

(d) Paragraph (c) of this section does not apply to-

(1) Flight tests for pilot certification or rating; or

(2) Spins and other flight maneuvers required by the regulations for any certificate or rating when given by-

(i) A certificated flight instructor; or

(ii) An airline transport pilot instructing in accordance with Part 61.169 of this chapter.

(e) For the purposes of this section, approved parachute means-

(1) A parachute manufactured under a type certificate or a technical standard order (C-23 series); or

(2) A personnel carrying military parachute identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number.

PART I - WHAT IS A LEGAL AND SAFE PARACHUTE?

As the preceding excerpt from the Federal Aviation Regulations (FAR's) indicate, it is **the pilot's responsibility** to ensure that every parachute on the aircraft is legal for use (including, incidentally, the parachutes of all those skydivers sitting on the floor in back if you're hauling jumpers). This means that each parachute must have been inspected and packed within the preceding 120 days (by a properly certificate and appropriately rated parachute rigger) **and** that it is an "**approved type**." An approved type is one produced under Technical Standard Order (TSO) C23, **or** a personnel carrying military parachute produced in the United States to a US military drawing or contract as per FAR 91.307e.

So what does that mean to your average pilot? The short answer is to choose your parachute supplier and rigger with care; ask a lot of knowledgeable people for recommendations and talk to all the manufacturers you can find; and above all, **shop for the best value, not the lowest price**. The long answer is to ask your parachute supplier for evidence of FAA authorization to mark the product with TSO C23 and compliance with the requirements of TSO C23 - **and** ask to see your rigger's certificate and verify that his ratings (back, seat, chest) are appropriate for your parachute - **and** pull the ripcord yourself when you take it in for repack so that you're sure that it wasn't just "pencil packed."

How You Can Tell If Your Parachute Is An Approved Type

Each parachute (or component, if separately approved) produced under TSO C23 must have a label affixed

which states that it is approved under TSO C23; the label may also contain other language relating to other components or operating limits. Military parachutes will have a drawing number or part number and a date of manufacture on **all** components. Beware of items that look like military chutes but really consist of recycled junk put together to look like a military chute. If you are considering buying a surplus military chute (not a very good idea but that's another story), ask a rigger you trust to examine the parachute for you and to provide a list of the major components (canopy, pilot chute, risers, harness, pack, bridle cord, ripcord, etc.) with their dates of manufacture, part number, drawing number or contract number and a statement of their origin.

Parachute Performance Standards and Other Considerations

TSO C23b (issued in 1949) refers to National Aerospace Standard (NAS) 804 for its performance standards and had Standard and Low Speed (under 150 MPH) category parachutes (there is no such category as "High Speed" although the language is quite common). NAS 804 was really a design standard (rather than performance standard) and because of the vagueness of the language regarding structural tests there were a number of parachutes of marginal strength certificated in Standard Category by using "creative testing methods" to pass the structural tests. A number of these canopies wouldn't have a prayer of passing the newer tests under C23c. It has also been reported that a 5,000 lb. shock load can be exceeded with small, very low porosity canopies at under 100 knots with less than 400 lb. suspended weight.

TSO C23c (issued 1984) refers to SAE Aerospace Standard (AS) 8015A for the minimum performance standards and has Categories A (130 KIAS at 225 lb.), B (150 KIAS at 254 lb.) and C (175 KIAS at 254 lb.). AS 8015A is a performance standard and as such, a much more relevant test program was implemented. Under C23c, approximately 64 drop tests are required as well as some human factors tests and other items. Other related regulations stipulate quality control system and facility requirements that must be met prior to the issuance of a TSO. For a new company without any existing TSO products, starting from scratch can be a daunting task and can be quite expensive and time consuming. And, as one might expect, the FAA takes a dim view of labeling products as TSO'd without going through all the hoops and this is a clear violation of the FAR's. Despite this, it has actually happened recently in Southern California.

TSO C23d was issued June 1, 1994 with SAE 8015b as the performance standard incorporated by reference. C23d allows for certification of an emergency parachute at any selected weight and airspeed combination as long as it exceeds the minimum of 220 lb. at 150 KEAS. The structural overload tests will be conducted at 120% of the maximum certificated operating weight and 120% of the maximum certificated pack opening speed. The minimum structural test will be 264 lb. at 180 KEAS.

To further complicate matters, the regulations (as interpreted under Advisory Circular (AC) 105-2c) allow a parachute rigger to mix and match separately approved components and the regulations leave the determination of airworthiness of the resulting combination up to the rigger. This is quite a latitude to allow a rigger in the field who often has no real basis for determining the compatibility of the components. In addition, there are no regulations governing the service life of parachute components and in effect your parachute can remain in service as long as you can find a rigger willing to put his name on it. However, in my opinion, any parachute component over 20 years old should be replaced because most of the degradation mechanisms of nylon textile products are not readily measurable in the field.

All parachutes approved under any version of TSO C23 can still be manufactured and sold under that approval, even though some parachutes on the market cannot meet the requirements of the latest revision of the TSO. There are some very good reasons that the TSO reference documents have been updated from time-to-time and I advise you to look for canopies (in particular) that were certificated under TSO C23c or later. Most harness and container systems have adequate strength under any of the C23 versions. Shop for value, not price.

Parachute Riggers:

Licenses, Ratings, Attitude, Currency & Competency

Parachute riggers are certificated under FAR Part 65, Subpart F with Senior and Master Parachute Rigger Licenses and back, seat and chest type parachute ratings. A senior rigger must have packed (under the supervision of a certificated and appropriately rated parachute rigger) at least 20 parachutes of each type that he wishes to be certificated for and must also pass written, oral and practical exams. The practical and oral exams are usually given by a Designated Parachute Rigger Examiner (DPRE). A master parachute rigger must meet the above requirements plus have at least three years of experience and pack at least 100 parachutes of each of two types for which he wishes to be certificated. In addition, there are some minor requirements for currency and vague requirements concerning equipment and facilities needed to perform the duties of the certificate.

A senior parachute rigger may maintain parachutes (including minor repairs), and a master parachute rigger may maintain (including major repair) and **alter** parachutes. Alterations of major components and assembly of altered components is definitely a gray area; and alterations may or may not require authorization from the FAA Administrator. I personally consider that anything that does not change the "**salient functional and structural characteristics**" (my wording) to be a minor repair or modification; anything that does change these characteristics is a major repair or modification.

Parachute riggers come in all varieties of competence, attitude, facilities and experience. One quick check on your rigger's attitude toward his competence, professional training and standing in the community is to find out if he has gone to the Parachute Industry Association (PIA) International Parachute Symposium or Rigger's Conference. This symposium is the most important technical conference on parachutes in the civilian parachute industry and is an invaluable contribution to dissemination of knowledge in the field. The 1993 Symposium is the second year that the former PIA Rigger's Conference has been held in the Symposium format and the thirteenth event to cover similar materials. If your rigger has never been or hasn't been in the last three to five years, there is a very good possibility that he is not up to date on modern parachutes and technology. And he definitely needs an attitude adjustment.

Summary - Part I

As far as I can tell, the FAA is not officially concerned that someone might sell you a parachute that is not an approved type, nor even that it is safe, as long as you don't use it in an airplane. Of course, **most** people would consider it unethical to sell something to an uninformed customer that cannot be legally used. Further, as I interpret Part 65, Subpart F, it is not illegal for a certificated rigger to pack a parachute that is not an approved type (although it is illegal for the pilot to use it in the airplane); the rigger must not, however, pack a parachute that it is not safe for use (which again leaves a wide range for interpretation). Of course, one would think that a parachute rigger has a moral obligation to inform the owner that his parachute is not an approved type and therefore not legal for use. So, in the end, unless you have sufficient knowledge to evaluate the situation, you are stuck between the ethics of your rigger and the FAR's. And once again, the FAA has placed the ultimate responsibility on the pilot.

PART II

GENERAL USE & CARE OF EMERGENCY PARACHUTES

Your parachute is fairly rugged but it is not indestructible and we recommend the following basic steps as the minimum care that it should be given. Remember that your parachute is an important piece of survival equipment that may be called upon to save your life:

Avoid exposing your parachute to the sun unnecessarily. If you have a stowage bag, keep your parachute in the bag when not in the aircraft. Do not leave your parachute in the aircraft, even if it has a canopy cover or is stored in a trailer. High temperatures such as found in car trunks and trailers can cause the rubber bands holding the suspension lines in place to melt and fuse to the lines.

Check your aircraft cockpit for sharp objects, exposed nuts and bolts, levers and any other items that could tear or puncture your parachute. Be especially aware of things that could cause you to hang up during an emergency egress. Remove or cover these items with tape to protect your parachute.

Avoid letting your parachute come in contact with acid; car trunks with traces of battery acid are particularly hazardous areas for a parachute. One drop of acid can turn your entire parachute into dust if left unchecked.

Store your parachute in a cool, dry place when not in use.

Have your parachute inspected, and repacked more often in extremely dusty areas as fine dust can seep into the pack and damage the fabric much like sandpaper.

Keep your parachute away from grease, oil and fuels which can attract and hold dirt and grit.

Although nylon parachutes are not harmed by moisture itself, a damp, dark environment such as the packed parachute will allow mildew to form, which will eventually harm the parachute fabric. Therefore, avoid excessive moisture; if your parachute becomes wet it should be aired and repacked.

When in doubt about the condition of your parachute or its care, contact a competent parachute rigger, a competent parachute loft or the manufacturer.

Preflight Inspection

Before each flight your parachute must be inspected as follows:

Check for any obvious damage, tampering or disturbance to the pack or harness.

Check your packing data card for legal repack date. The FAA requires that parachutes used in civil aircraft be repacked every 120 days by an FAA rated parachute rigger.

Check the ripcord pins to see that the pins are securely inserted through the loops with the tips exposed at least .75" and that the lead seal and red seal thread are intact on the lower ripcord pin.

Check that the ripcord cable moves freely in the housing and that the ripcord handle is securely seated in the pocket.

Check all the hardware for corrosion, bent or missing parts and damage.

Check that the harness is not twisted or misrouted.

Fitting and Wearing an Emergency Parachute

After completing the above preflight you are ready to don your parachute for use:

Loosen the leg straps sufficiently to allow you to snap them into position and stand erect. If your parachute is equipped with "Quick Ejector" snaps on the leg straps make sure that the release lever is firmly seated against the body of the snap. You should feel a click as the release lever passes over the detent balls that hold it in place. Unless firmly seated, the Quick Ejector release lever can be easily snagged on the aircraft or seat belt and inadvertently opened.

Fasten the chest strap buckle (or thread the chest strap through the friction adapter) and tighten it only enough to prevent the harness from falling off of your shoulders or shifting around excessively. Do not over-tighten the chest strap. The main lift web of the harness (the vertical part of the harness running down your chest) is designed to take the opening shock of the parachute. The chest strap is designed only to help keep you in the harness; if you tighten the chest strap excessively you will transfer some of the opening load into the chest strap, which is not designed to accept a load in that manner. Stow the excess chest strap webbing under the elastic keeper provided.

Tighten the leg straps until they are snug while standing erect and stow the excess under the elastic keeper. This adjustment will feel slightly looser after you sit down in the aircraft and the leg straps may be further tightened in the cockpit if desired.

If present, tighten the diagonal and/or horizontal back straps so that the pack is snug against the back.

Mentally review your egress procedures.

Mentally review your emergency egress decision criteria.

Make a mental note of the location of the ripcord handle and the leg and chest strap release hardware.

You are now ready for flight.

USING THE PARACHUTE IN THE AIRCRAFT AND IN FLIGHT

When entering the aircraft remember that you are wearing your parachute and adjust your movements accordingly. When buckling into the seat - **fasten seat belts and shoulder harness over the parachute harness!** You must be able to release from the aircraft restraint system without unfastening any part of your parachute harness. Remember the following points:

If your aircraft has a manufacturer's recommended emergency egress procedure - memorize it and be able to do it in the dark, upside down, and inside out. Go over your emergency procedures until you can do them automatically! Remember that there may not be time to stop and think what you must do to get out of the aircraft in an emergency.

If your aircraft has no published emergency egress procedure, devise one of your own and practice it until you can do it automatically.

Never loosen or remove your parachute in the aircraft while in flight.

If you must make an emergency exit, get completely clear of the aircraft before pulling the ripcord.

Know your procedures and practice them often.

Mentally review your emergency egress criteria.

Always remember the three most useless things to a pilot:

*** Airspeed you don't have * Altitude above you * Runway behind you ***

ACT ACCORDINGLY!

OPERATION OF A TYPICAL EMERGENCY PARACHUTE SYSTEM

After jumping clear of the aircraft, put your legs together, look down at the ripcord handle, reach in with both hands and pull the handle sharply out away from your body. Your parachute should be fully open within 2 to 3 seconds after you pull the ripcord. After your parachute opens you should look around and get your bearings; if possible, locate the nearest road or shelter and fix its location in your mind. If you fly regularly in remote areas you should obtain formal survival training from someone familiar with the areas you fly in and you should consider incorporating some basic survival items into your parachute.

All canopies installed in an emergency parachute system should be steerable; however, you may have one of several steering methods on your parachute. When you have your parachute assembled or repacked ask your rigger to explain the steering system that is installed on your parachute. The basic principle to remember when steering your parachute is that turns are made by pulling down on the rear riser (or control line) on the side to which you wish to turn; i.e. pull down on the left rear riser for a left turn and the right rear riser for a right turn. Turns should be made by pulling the riser down 12 to 18"; when you are facing the desired direction, release the riser to stop the turn. Some parachutes do not necessarily turn faster with increased control deflection - you may find that only 6 to 12" of control deflection is necessary for the fastest turn rate.

If your parachute is equipped with a 4-line release steering modification, there will be a red (or yellow) lanyard safety tied to the connector link on each rear riser. To activate the release, reach up and grab the tail of the lanyard and pull down sharply. This will release the center four lines in the rear of the canopy, allowing air to vent out of the canopy in an orderly manner. The air venting out of the canopy to the rear causes the canopy to move forward, reduces its oscillations, and allows you to steer the parachute using the rear risers or the control lines. Some canopies have separate steering lines made from a contrasting color of suspension line. These will be readily apparent when under the canopy - use them to steer the canopy. Other canopies may have yet another type of control toggle or mechanism; if you are not sure what is installed in your parachute, ask your rigger.

Most canopies installed in emergency parachutes have a forward speed of approximately 5 to 8 MPH. This allows you to maneuver slightly to avoid obstacles on the ground and to face into the wind for landing. Turning the parachute causes it to oscillate slightly and should be avoided near the ground because the oscillations will increase your rate of descent (in some cases significantly) and raise the risk of injury during landing.

LANDINGS

Landings should be made facing quartering slightly into the wind, which will minimize your ground speed and

reduce the chances of injury upon landing. To prepare for landing, you should have your feet and knees together, toes pointed slightly down, knees slightly bent (not locked!) with legs tensed (about the same tension as needed to bounce up and down on the balls of your feet just slightly off the ground).

Before touchdown, you should be looking at the horizon (not at the ground) and steering the canopy with small corrections to maintain your heading until your feet touch the ground. At touchdown, tuck your chin down on your shoulder and bring your elbows in against your side, then roll in the direction of your ground travel to spread the force evenly across your legs, hips and shoulders. Remember that the most important part of your landing preparation is **Feet and Knees Together!**

Dragging

If you land in high wind conditions and are dragged, reel in one or two suspension lines hand-over-hand until the canopy collapses. This can be done in a matter of seconds. After the canopy collapses, disengage yourself from the harness. A good quality hook knife, such as the military type (not the switchblade version) or the "Jack" safety knife, is an excellent idea. Get one and know how to use it if you expect to fly in high wind conditions.

If your parachute is equipped with riser releases (one of several different types), learn how to inspect, maintain and use them.

Water Landings

If you fly over water regularly, you should have proper flotation gear on board the aircraft. In general, personal flotation devices are worn under the parachute harness so that the parachute harness can be removed without removing the flotation device. In all cases, if you have any doubt about the operation of your flotation gear, obtain expert instruction relevant to the particular item you are using.

Some flotation devices cannot be safely inflated underneath the parachute harness. For these types, do not inflate your flotation device until after you are in the water and have gotten clear of the parachute. In general, before entering the water, face upwind and unfasten the chest strap (except for cross chest harness like the Security); however, **the leg straps should never be released in the air!** As your feet touch the water, take a deep breath but do not try to stay on the surface. As you enter the water, you will sink several feet below the surface - before surfacing, remove the parachute harness and swim, underwater, straight ahead as far as you can before surfacing. This should place you clear of the canopy and suspension lines, which will float on the surface for a few minutes.

If dragged in the water, use the same technique described earlier to deflate the canopy. Remember - do not try to fight the water or your parachute; take a deep breath as your feet hit the water, remove the parachute underwater and swim away from the canopy before surfacing. If you become entangled with the parachute lines or fabric, disengage yourself very carefully and slowly as flailing about will only increase the extent of your problem. After you are clear of the parachute use normal water survival techniques. **Panic and fatigue cause drowning - stay calm and conserve your energy.**

Tree Landings

Put your feet and knees together and prepare for a ground landing as you will probably go all the way through the tree to the ground. Cross your arms in front of your face with your hands placed in opposite armpits with the palms facing outward. Turn your face to one side and bury it in your arms to protect it. Put your feet and knees **FIRMLY** together to avoid straddling a branch. If suspended in a tree, wait for help if at all possible, otherwise use extreme caution in releasing from the harness to avoid falling or choking yourself on part of the parachute.

Power Line Landings

Power lines are an extremely hazardous place to land and should be avoided if at all possible. If a power line landing is unavoidable, throw away the ripcord if you are still holding it, face into the wind and prepare for a ground landing. Put your arms above your head to make yourself as thin as possible and turn your head sideways to protect your face as much as possible. Avoid touching more than one wire at a time and do not grab at the wires as you pass by (it takes two wires or one wire plus a ground to get zapped so avoid all contact with any of the wires if possible). If you do get hung up, do not attempt to get down and do not allow anyone to help you until the power has been cut off in the lines. Nylon will conduct electricity at very high voltages so don't become part of a grounding path in your haste to get down. **Tree landings and downwind landings are generally less hazardous than power line landings.**

NOTES:

- The above information is provided as a brief, and very general, guide, for the use and care of your parachute. It can not and does not cover every possible situation you may find yourself in. It should not be considered a substitute for formal survival training and parachute jumping instruction.
- The primary cause of unsuccessful emergency bailouts and ejections is waiting too long to make the decision that you must leave the aircraft! By nature, aviation is an activity that is very unforgiving of mistakes in judgment and human or mechanical failure. Each individual must recognize that he is ultimately responsible for his own fate when he takes to the air; enjoy yourself but remember that indecision and complacency can kill.
- Emergency parachute systems must be inspected and repacked by an FAA licensed parachute rigger every 120 days. This is the maximum time limit allowed by law; if your parachute is subjected to conditions of excessive dust, dirt or moisture, or chemical contamination, you should have it inspected and repacked more frequently. Consult your parachute rigger or a competent parachute loft for advise concerning your parachute.
- Select your parachute rigger with care - your life is in his hands. Ask around the local airports and skydiving areas to find a rigger with an excellent reputation. If in doubt concerning a parachute rigger's qualifications, ask to see his FAA Parachute Rigger's Certificate. Parachute riggers are licensed by the FAA under FAR Part 65; Master and Senior Licenses are issued with Seat, Back and Chest type ratings. The parachute rigger has a moral responsibility to the user of a parachute to aid that person in understanding his parachute and its use. Have your rigger review the basic procedures contained here and answer any questions you may have. You should actually pull the ripcord yourself before each repack. You are entitled to be comfortable in your own parachute; however, a sloppy repack (while safe) may be very uncomfortable. If you notice a significant change in the way the chute looks or feels and you don't like it, ask the rigger to try again. There should usually be no charge for this rework (your pack date won't change either since this is only a partial repack).
- After any use, your parachute must be thoroughly inspected for damage and repaired as necessary. In addition, the manufacturer would appreciate notification of any emergency use of its products.

Appendix

PREFLIGHT PROCEDURES AND SERVICE INFORMATION

FOR EMERGENCY PARACHUTES BY

MANUFACTURER AND MODEL

This appendix provides limited information about many different emergency parachute assemblies. One should always consult the appropriate owner's manual for further details. In addition, each manufacturer would appreciate having your name, address, phone number and the type/serial number of your parachute system. This will enable the manufacturer to contact you in the event a recall or advisory notice is necessary. **Remember that owner's manuals, packing instructions and service bulletins are provided your benefit and you should use them.**

Butler Parachute Systems, Inc.

1820 Loudon Avenue NW info@butlerparachutes.com
PO Box 6098
Roanoke, Virginia 24017-0098
540-342-2501
540-4037 (FAX)

Owned and operated by Manley C. Butler, Jr. Other key personnel are Tom Fowler, Bruce Fulcher, Laura Butler. Manufactures the most extensive line of emergency parachute systems and related components in the world including deployment diapers, 4-line release kits, carrying bags, restraint systems, etc. Many different variations on the BETA Back, Seat, Chair and Chest type emergency parachutes. Options available include static lines, riser releases, automatic ripcord releases, oxygen bottles, survival and flotation equipment and numerous other items. Write or FAX for catalog.

Butler Parachute Systems Preflight Procedures:

BETA Back/Chair - Three-pin ripcord with pin protector flap down the back of the parachute pack that closes with Velcro; packing data card located in a pocket formed by the TSO tag on the inside of the pin protector flap. All versions have adjustable leg/chest straps; some have adjustable main lift web, adjustable horizontal back strap, canopy releases, etc. All significant variations have serialized packing/user's instructions that should be adhered to.

BETA Seat - Two pin ripcord with pin protector flap on the bottom of the parachute pack that closes with Velcro; packing data card located in a pocket formed by the TSO tag on the inside of the pin protector flap. All versions have adjustable leg/chest straps and adjustable main lift web; some have adjustable horizontal back strap, canopy releases, etc. Some variations have serialized packing/user's instructions that should be adhered to.

BETA Quick Attachable Chest (QAC) - Two pin ripcord with pin protector flap on the front side of the chest pack. Pin protector flap closes with Velcro; packing data card located in a pocket formed by the TSO tag on the inside of the pin protector flap. All versions have adjustable leg/chest straps; some have adjustable horizontal back strap, canopy releases, etc. All significant variations have serialized packing/user's instructions that should be adhered to.

Butler Parachute Systems, Inc. Service Notes:

1979- Harness updated on first 25 assemblies. All affected assemblies modified by factory. Total cost paid by BPS

1992- A production lot of 25 XTC500 canopies were recalled for a minor update on skirt and apex band reinforcing. All affected canopies were modified at factory or under direction. No canopies outstanding are affected. Total cost paid by BPS.

No other service notes except for canopies that may have been installed such as the Phantoms from National Parachute (see below). Owner's manual has been updated several times. Write for latest version - free to registered owners, \$10 ppd. for others.

National Parachute Industries, Inc.

47 East Main St.
Box 1000
Flemington, NJ 08822
908-782-1675
908-782-5638 FAX

Owned by Larry Krueger. Manufactures skydiving and emergency parachute equipment including the National 360/425/490 emergency back, seat and chair parachutes. Also manufactures the Phantom-22/24/26/28 round reserve canopies that are used in National's emergency parachute systems, as well as the emergency parachute systems of several other manufacturers. National claims to have over 10,000 emergency parachutes in use- this is really more like 9,000 skydiving reserves and 1,000 emergency parachute systems.

National Parachute Preflight Procedures:

Emergency Backpack & Chairpack Models - All have adjustable leg/chest straps. Some have a "floating" leg strap junction (see owner's manual for details) which can be dangerous if not properly fitted. Two pin ripcord under large pin protector flap on the back of the rig. Packing Data Card in pocket inside the pin protector flap.

Emergency Seatpack Models - All have adjustable leg/chest straps. Some have a "floating" leg strap junction (see owner's manual for details) which can be dangerous if not properly fitted. Two pin ripcord under large pin protector flap on the bottom of the rig. Packing Data Card in pocket inside the pin protector flap.

National Parachute Service Notes:

National is the charter member of the Service Bulletin of Year Club - the bad news is that they expect you to pay for their mistakes and problems:

1977 - In the late 70's National had a 26' bias constructed LoPo built for them by Security Parachute; this canopy is not covered by the Security AD's nor is it affected by any National SB's other than a recommendation to install the canopy with four connector links to aid in steering. This is actually a pretty good canopy and is much stronger than the Phantom series introduced in 1981.

1986 - Service notice affecting all Phantom series reserve canopies (including 360/425/490 emergency parachutes) requires the installation of a new, tighter fitting deployment diaper. Cost is usually about \$20 and is no longer covered by National . **Required at next repack.**

1987 - National came out with smaller rubber bands for line stows when using the very small lines common to this class of canopy. Not required, but highly recommended. No charge when done with normal repack - ask your rigger to use the recommended size. Bands are available from National at the above address.

1988 - National service notice affecting all Phantom series reserves (including 360/425/490) requires the installation of additional reinforcing bands on the canopy using Kevlar tape. Resulted from several significant structural failures in routine skydiving use. Usual cost is about \$35 and is not covered by National. **Required at the next repack -or- no later than August 1, 1988.**

1990 - National service bulletin related to acid mesh problem. **Some canopies were found with sub-strength fabric.** This service bulletin should be strictly adhered too. Costs vary and not covered by National. Bulletin updated in early 1992 - no significant changes.

ParaInnovators Parachute Company, Inc. (apparently defunct)

601 East Matthew Place, Unit C
PO Box 1850
Pahrump, NV 89041
702-727-6100

Owned and operated by Hank Ascutto. Formerly located in Perris, California. Manufactures skydiving and emergency parachute equipment including the "Wedge" series back and seat packs. Also manufactures the R1, R2(-1/-2), R4(-1/-3) round reserve canopies that are used in their emergency parachute systems, as well as the emergency parachute systems of several other manufacturers. In my opinion, the only acceptable canopies for these parachutes are the R4 series which are a reasonable size. The R2 and R1 are also used but are very small parachutes. There are some undocumented variations in these systems; if you can't figure it out, find someone who can.

ParaInnovators Preflight Procedures:

Wedge Back Pack - All versions have adjustable leg straps and adjustable chest straps. **Beware: Some versions of the harness make it very easy to trap the ripcord handle with the harness webbing.** Two pin ripcord located between the back pad and the pack tray, accessed by peeling up the Velcro holding the lower corners in place, then opening another panel that covers the pins proper. Packing data card in a pocket inside the Velcro flap in the center back of the pack. The S-hooks (or bungee with hooks) should be firmly seated in the loops. Also seem to be a few back packs with a three pin ripcord on the outside of the pack.

Wedge Seat Pack - All versions have adjustable leg straps and adjustable chest straps. **Beware: Some versions of the harness make it very easy to trap the ripcord handle with the harness webbing.** Single pin ripcord located on the bottom of the pack under Velcro pin protector flap. Packing data card in a pocket on the pin protector flap.

ParaInnovators Service Notes:

Update required on Wedge backpacks, involving the change to a stainless steel stiffener plate on some versions that originally had a plastic stiffener, which was not stiff enough.

ParaPhernalia, Inc.

19124 59th Dr. NE
PO Box 3468

Arlington, WA 98223
206-435-7200
FAX 206-435-7272

Owned and operated by Dan Tarasevich. Manufactures the "**Softie**" series of emergency parachute systems. Currently uses canopies manufactured by FFE but in the past has also used National Phantom series, Pioneer K-series, Strong Enterprises LoPo's, Security LoPo and Security SAC.

ParaPhernalia Preflight Procedures:

Packing data card behind backpad at the neck cutout in a small pocket - you must reach down between the pad and pack to pull the pocket up. Two-pin ripcord located behind a pin protector flap on the back of the parachute; peel back the Velcro to inspect the pins.

ParaPhernalia Service Notes:

None mandatory except for canopies that may have been installed. See Strong, Security, National and Pioneer sections. Call the factory for information on a recommended (but not mandatory) modification to lower flap for pilot chute positioning.

Pioneer Parachute Company/Pioneer Aerospace Corp.

45 S. Satellite Road
PO Box 207
South Windsor, CT 06074
203-644-1581
203-528-7984 FAX

Now owned by Zodiac Group, a French conglomerate. One of the largest parachute companies in the world but no longer manufacturing any parachute items for civilian use. In the past, Pioneer has manufactured skydiving and emergency parachute equipment including the Thinpack (with several different canopies) and several military style backpacks for the civilian market. Manufactured the Pioneer 23' & 26' TriConical canopies, the 26' Conical and the "K" series round reserve canopies which are used in the Thinpack emergency parachute systems, as well as the emergency parachute systems of several other manufacturers. You will also see large numbers of military parachutes made by Pioneer.

Pioneer Preflight Procedures:

Thinpack - Adjustable leg and chest straps and adjustable main lift web. Four-pin ripcord under pin protector flap on the back of the pack; pin protector flap is held down with snaps. The Thinpack has a very small stiff pilot chute spring that does not, in my opinion, provide adequate launch for reliable deployment. Stay away from the Thinpack if you can find something else. Several canopy models installed in the Thinpack series were equipped with a "hesitation loop" to partially stage the deployment of the canopy. I personally recommend that the hesitation loops be replaced with a deployment diaper, which is approved by Pioneer for all of the canopies. Last manufactured in about 1975. Butler Parachute Systems, Inc. will not service the Thinpack (most are nearly 20 years old anyway).

Pioneer Service Notices:

1986 - FAA issued an Airworthiness Directive grounding approximately 220 parachutes in the "K" series round reserves. This is a mandatory AD and must be complied with. The AD concerns degradation of the fabric due to chemical contamination by residue on the mesh used in the steering vents. Call Pioneer for the serial numbers that are affected if your rigger does not know. The K-series were installed in some ParaPhernalia Softies and quite a lot of skydiving gear. Very few, if any, were installed in the Thinpacks.

Security Parachute Company (GQ Security Parachute/GQ Defense Limited, UK)

Formerly located in San Leandro, California (defunct as a US Corporation). Started by John Maggi in 1948; sold to GQ Defense Limited of England in 1979; they got tired of being sued for skydiving related accidents and closed it down in 1985. In the past, Security manufactured skydiving and emergency parachute equipment including the Model 150/250/350 chair style parachutes, the Model 450/550 seat pack parachutes, and the 850 back parachute.

Security Preflight Procedures:

Model 150/250/350 Chairpacks - 150 is Low Speed Category; 250 and 350 are Standard Category although the 350 should probably be Low Speed. Two types of harnesses: first and most common is the cross chest strap system, which is well documented in the manuals. Also made a version with more conventional layout of leg straps and chest strap (both adjustable). All types (except with Capewell canopy releases installed) have adjustable main lift web; the excess can be stowed in elastic keepers on the shoulder panels. Two pin ripcord (separate cable for each pin) is inspected by peeling back the velcro on the back pad, then on the smaller inner panel to expose the pins. Packing data card is stowed on the inside of the right side "wing panel" in a small panel with a snap closure.

Model 450/550 Seatpack - Low-Speed and Standard Category versions. Basically looks like a military surplus chute in fancy colors. Terrible ergonomics with pretty good canopies. No hope for the pack/harness.

Model 850 Backpack - Standard Category uses the SAC (see AD below). Adjustable leg, chest, and horizontal back straps. Adjustable main lift web. Two-pin ripcord under the pin protector flap on the back side of the pack. Extremely difficult to pack comfortably and so short it doesn't fit many airplanes comfortably.

Security Parachute Co. AD's/Service Notes

AD 88-05-08 - March 10, 1988 - FAA issued an **emergency AD grounding all Security canopies with P/N 79A1684 (the 22' SAC) which is used in the 350 and 850.** This is a mandatory AD and takes effect immediately. The AD concerns degradation of the fabric due to chemical contamination by residue on the mesh used in the steering vents. This is the same problem that caused the AD to be issued for the Pioneer reserves in 1986. This is a very serious problem - canopies that are affected tear like wet newspaper.

AD 91-02-05 - Jan. 14, 1991 - FAA issued an update to AD 88-05-08 that requires all alternate means of compliance to utilize a parachute canopy strength test such a Parachute Industry Association, Technical Standard 108. Deletes all references to alternate means of compliance that do not use TS108 strength test. Alternate means of compliance has been issued to Butler Parachute Systems, Inc. and some other companies.

AD 89-13-03 - June 1989 - FAA issued this AD for the same problem for parachutes manufactured by GQ Parachutes in England. Same basic procedures apply except that there is an alternate means of compliance specified in a GQ service bulletin. Alternate means of compliance has been issued to Butler Parachute Systems and some other companies.

SE Inc., d.b.a. Strong Enterprises

11236 Satellite Blvd.
Orlando, FL 32837
407-859-9317
407-850-6978 FAX

Owned and operated by Ted Strong. General manager is Gerald Kopp. Manufactures skydiving and emergency parachute equipment including the ParaCushion back, chair and seat pack parachutes. Also manufactures the Strong LoPo series of round reserve canopies that are used in the emergency parachute systems, as well as by several other manufacturers in their emergency parachute systems.

Strong Enterprises Preflight Procedures:

ParaCushion Back/Chair - Adjustable leg and chest straps. Three pin ripcord inspected by peeling the Velcro on the back pad away from the pack to expose the pins. Packing data card in either in a clear plastic pocket on the inside of the back pad flap (original version) or tucked in behind the TSO label on the lower right part of the pack tray as you see it opened up.

ParaCushion Seat - Adjustable leg and chest straps. Two pin ripcord inspected by unzipping the seat pad away from the pack to expose the pins. Packing data card in a clear plastic pocket on the inside of the seat pad or pack tray.

Strong Enterprises Service Notes:

1979 - Strong issued a service bulletin requiring the return for inspection and service of all Strong LoPo canopies from serial number 3000 to 4000, approximate date of manufacture from Dec. 78 to August 79. Voluntary but highly recommended. Total cost covered by Strong.

Handbury Parachutes (see also Free Flight Enterprises)

Formerly located in Elsinore and Banning California. Closed down in 1984 after Jim Handbury's death in an airplane crash. Manufactured hang glider and ultralight recovery parachutes as well as several emergency back parachute systems of dubious parentage. Many of the "Enterprise" emergency back parachutes were equipped with the "Preserve 1" canopy that is of reasonable size and construction. However, some were equipped with a "Preserve 4" canopy that is extremely small and very lightly built; highly recommended as a car cover for very small cars. The Enterprise pack design and construction are very crude with lots of plastic stiffeners and very poor service history. Butler Parachute Systems, Inc. will not service any version of Handbury emergency parachute packs/harness.

Free Flight Enterprises, Inc.

17665 Grand Ave.
Elsinore, CA
714-245-1734
714-678-7061 FAX

Owned and operated by Gary Douris. Originally started with Jim Handbury (see above), split in about 1980. FFE now makes canopies for ParaPhernalia and other users. Makes the Preserve series of canopies. The Preserve I and III are pretty solid but stay away from the Preserve 4.