INTRODUCTION

"Parachute Rigging is an interesting and demanding aspect of our sport."

If you are still reading then this guide may be for you, as it is intended for the person who is beginning their Rigger Training.

It is vital that all trainee Riggers work closely with a qualified supervisor and gain a wide knowledge of the equipment used in Sport parachuting.

The requirements to begin training as a Basic Rigger will be found on BPA form 199.

This manual provides a framework for the new rigger and their supervisor, there are many alternatives to the examples given and these should be explored with an open mind.

It aims to give a broad introduction to the basics of rigging and set the new rigger on the road to their PR rating.

ACKNOWLEDGEMENTS

The creation of this guide was only possible as the result of many peoples efforts and experience. Amongst those I must thank are; Katie Boyce, Dave Chapman, John Curtis, Alan Hewitt, TSE Ltd and, not least, Dan Poynter, without whose efforts I could not have even begun this project.

Peter A Sizer

The BPA Rigging Training Manual is updated periodically and bears its date of publication. As BPA’s rules are continually evolving, the BPA’s primary operational document, the BPA Operations Manual, is regularly updated at meetings of BPA’s Safety & Training Committee which are held every two months. Therefore, in the case of any conflict between rules or requirements set out in the Operations Manual and any other BPA manual, the provisions in the Operations Manual shall always have primacy as the definitive statement of the current position.

Updated April 2014

© 2014 British Parachute Association Ltd. Material in this publication may be freely reproduced providing the source is acknowledged.
# CONTENTS

<table>
<thead>
<tr>
<th>Background Information and study</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to:</td>
<td></td>
</tr>
<tr>
<td>Dan Poynters books</td>
<td>4</td>
</tr>
<tr>
<td>Parachute Rigger Handbook (FAA)</td>
<td></td>
</tr>
<tr>
<td>BPA Rigging Manuals</td>
<td></td>
</tr>
<tr>
<td>BPA Operations Manual</td>
<td></td>
</tr>
<tr>
<td>BPA Safety Notices and Information</td>
<td></td>
</tr>
<tr>
<td>Riggers / STC minutes</td>
<td></td>
</tr>
</tbody>
</table>

| Introduction to Straight Stitch Sewing Machine                                                  | 5    |
| Threading of Machine                                                                           |      |
| Sewing Box Spiral                                                                              |      |
| Adjusting tension                                                                             |      |

| Materials recognition                                                                          | 6    |
| Webbing                                                                                        |      |
| tapes                                                                                          |      |
| lines                                                                                          |      |

| Introduction to Sewing F111                                                                    | 7    |
| Simple seams                                                                                   |      |
| Simple Patch                                                                                   |      |

| Canopy Design and Construction                                                                 | 9    |

| Introduction to Binding                                                                        | 10   |
| Twin needle machine                                                                            |      |
| Make packing mat / log book holder / wallet                                                    |      |

| Hand Sewing and Hand tools                                                                     | 11   |

| Contamination of Materials                                                                     | 12   |

| Line replacement                                                                                | 14   |
| Use of Zig zag machine                                                                         |      |
| Brake line exercise (Finger Trap)                                                              |      |
| cascade line; dacron / spectra / kevlar                                                        |      |
| Knots                                                                                          |      |

| AADs                                                                                           | 15   |
| FXC                                                                                           |      |
| Cypres                                                                                         |      |

| Introduction to Sewing Zero P                                                                  | 16   |
| Simple seam construction                                                                       |      |
| Simple Patch                                                                                   |      |
Manufacture of Pilot chutes

Manufacture of Main deployment bags
    square static line
    square freefall (including setting of grommets)

Manufacture of bridle lines & static lines
    Throwaway bridle
    Collapsible bridle
    Static line

Replacement of velcro

Advanced work on Ram Air Canopies
    Patch into seam
    Patch into tail
    Patch into nose
    Patch around cross port vent
    replace flare / line attachment

Manufacture of BOC Pocket

Manufacture of Small Items
    BOC / toggles / pull out pads / AFF Secondary Handles
    Cutaway pad / Safety Stow

Manufacture of Slider

Manufacture of Big ring Type 8 Risers

Quiz
BACKGROUND INFORMATION AND STUDY

There are many things that a rigger needs to know, and a good all round knowledge of the technical side of sport parachuting is important. In this section we are going to find and familiarize ourselves with some of the written material of particular relevance to riggers.

Dan Poynter
The books by Dan Poynter are a fountain of knowledge, every rigger should have access to copies of the Parachute Manual Volumes 1 & 2, ideally you should have your own copy of at least Volume 1.
Much of this manual will refer to Poynters for further study.

Parachute Rigger Handbook
Written by Sandy Reid and published by the FAA

BPA Rigging Technical Manual & Reserve Packing Guide
These are fairly slim publications so get hold of copies

BPA Operations Manual
Every Rigging Room should have an up to date copy of this and every Rigger should be familiar with Section 6 and Section 14

BPA Safety Notices and Safety Information
Every Rigger and Reserve Packer should be on familiar terms with the collection of Safety Notices and Safety Information issued by the BPA.
It is not practical to read all of them, so get used to using the Index, and keep it up to date by checking:

STC and Riggers Committee Minutes
Find where these are kept and have a look through them

1. Who may repair a Reserve Parachute?
2. Describe a Span wise constructed canopy
3. What is meant by Warp and Weft?
4. Which are the shortest lines on a Ram Air Parachute?
5. What is a chafing strip?
6. What is meant by the Term "Aspect Ratio"?
7. Some Large Rings on 3 Ring Release systems were defective, when was this and what was done about it?
USE OF THE STRAIGHT STITCH MACHINE
Read Poynters Vol 1 para 3.600 - 3.910

Sit at the machine and learn the names of the component parts
Learn to adjust the upper tension
Learn to change the stitch length
Learn how to change the bobbin
Wind a new bobbin while working
Change the upper thread, and learn the way most riggers take a short cut.
Change the Needle

Take two pieces of medium fabric, something a bit heavier than F111, and stitch a square spiral pattern, keeping the lines parallel and turning the corner by stopping with the needle down, lift the foot and turn the work, then continue.

Repeat this exercise until smooth and controlled.

1. When removing work from the machine what should we consider?
2. If the threads loop under the material what should you do?
3. Where should the knot be made in relation to the plies of material?
4. What SPI is recommended for patching F111
5. How do you adjust the pressure applied by the presser foot?
6. On a straight stitch machine the long slot on the needle faces which way?
7. How do you increase needle thread tension?
8. How do you adjust bobbin thread tension?
MATERIALS RECOGNITION

Using Dan Poynters books, Parachute Rigger Handbook and the Paragear catalogue;

1. Describe Type 7 webbing
2. What is the official name for binding tape?
3. What webbing has a red line down each edge?
4. What size of dacron line is used for brake lines?
5. What do we use for static lines?
6. What thread do we use for machine sewing canopies?
7. Describe Type 4 Webbing
8. Describe Type 4 Tape
9. What is Type 8 Webbing used for?
10. What line is used on Manta canopies?
11. What webbing is used on mini risers?
12. What is the smallest Maillon Rapide link allowed to be used on canopies?
13. What is the SWL on the adjusters used on leg straps?
14. What is the SWL on a light weight quick fit adapter (chest strap)?
15. Describe Type 5 tape
16. What advantages does kevlar line have over dacron?
17. What disadvantages are associated with Spectra / Optima line?
18. What do we use Type 4 webbing for?
19. Name three materials used for making risers?
20. What material is used for modern containers?
SEWING F111

New F111 material is quite easy to work with, and it is this material that you will make patches out of, however you will be sewing onto older more flexible material, and this difference is particularly noticeable when remaking seams after repair.

Read Poynters Vol 1 7.01 and 7.11 - 7.14
Vol 2 7.10 - 7.14 (note comments on ripstop tape)
Parachute Rigger Handbook 7.1.3

Exercises;

Sew the paper patch attached to get into the idea of patching.

Sew a simple patch on a piece of F111 (adjust tension as necessary)
(repeat this exercise until proficient)

Sew a French Fell seam attaching another piece to the patched piece of F111

1. How many stitches per inch when sewing F111?
2. How much overstitch should there be?
3. How close to a seam can we patch without going into/onto the seam?
4. What is the minimum 'turn under' of material?
5. What is the strength of the thread we use on canopies?
6. Which side of the material do we fix the patch?
It is important that riggers understand the differences in design and construction in the canopies and related components that they may be called upon to repair. Therefore you will look at the construction of both round and ram-air parachutes.

1. What is meant by the term "glide ratio"?
2. Which has the steepest angle of attack  Fury (7 cell) or PD 210 (9 cell)?
3. Why do some modern reserves have single suspension lines whilst most mains have their lines cascaded?
4. What is the purpose of cross port vents?
5. Describe a “cross braced" canopy?
6. What is the "chord" of a parachute?
7. Will an accuracy canopy have a thick or thin aerofoil and why?
8. What is the purpose of stabiliser panels?
9. What is the advantage of “eliptical” canopies?
10. What is meant by "Span wise" construction ?
HAND SEWING AND HAND TOOLS

In the past riggers have needed to sew on cones, grommets, hooks and eyes, AAD mounting plates as well as attaching metal housings for ripcords and cutaways. Have a good look at equipment and see where hand stitching is used.

Exercises

Sew a piece of 1" Type 4 tape around one end of a metal housing, with the excess ends making a flag.
Fix the other end of the housing to a flat piece of cordura or canvas

The other hand tools in common usage are those for cutting holes and setting grommets and popstuds.
On later exercises you will be setting grommets so take the opportunity to practice.
Check with your supervisor which tools, grommets and cutting surface you can use!
Study equipment to see which grommets are used where and which way round they go.
Note that grommets should be 'rolled over' not split and there should be no rough edges

1. What thread would you use for attaching a ripcord housing to the container?
2. What thread would you use to attach toggles to reserve risers?
3. How close to the end of the housing should a cutaway housing be fixed?
4. What knot is usually used to tie off hand tackings?
5. What grommets are most commonly used on modern containers?
6. When would you use "long shank" grommets?
7. On a freefall deployment bag what grommets would you use?
INTRODUCTION TO BINDING

A large number of items manufactured by riggers have type 3 binding tape around them. You must therefore become proficient at binding by hand and single straight stitch machine and where possible by using a tape folder and twin needle machine.

Exercises

Take a length of type 3 tape and a small piece of parapack or cordura (6” Square)
Fold the tape length ways and crease it, (use the back of your scissors)
Now bind one edge of the material and trim off.
Bind another edge and trim etc.
Having bound four sides, sew a parallel line of stitching all the way round.

If you have access to a twin needle machine repeat the exercise binding and trimming all four sides.

Learn how your coaching rigger turns corners and practice this technique whenever possible
Use contrasting thread to show any faults.

Manufacture a Packing mat, with a bound pocket and bound edges
or Manufacture a log book holder
or Manufacture a simple wallet
or Make a needle case

Practice binding inside and outside corners using a castellated piece of cordura

1. What sizes does type 3 tape come in?
2. What is the strength of binding tape?
3. Why do we regularly use binding?
4. What is the purpose of hot-knifing the end?
5. What is the draw back to hot-knifing the end?
CONTAMINATION OF MATERIALS

There are many things that can affect canopies and harnesses and this section will consider some of them.

**Ultraviolet light**
Probably the main cause of damage and deterioration to parachuting equipment, in particular canopies.
Tests have shown that a canopy left outside for a week in the summer will lose as much as 50% of its strength.
Sunlight is probably the major factor in "ageing" parachutes, which would explain why Tandem and CRW canopies age faster, they are exposed longer on every jump.

Never leave a canopy out in the sun, cover equipment when not using it.

If in doubt conduct a fabric tensile strength test.

**Acid**
Another major cause of damage, getting lifts back in Farm or Airfield vehicles, kit carried loose in car boots etc can lead to contamination with Battery Acid.

The Damage is progressive, the rate of which depends on the strength of the acid involved and the thickness of the material affected.

Acid has a bleaching effect on material dyes, black webbing will show red areas, lighter colours will bleach to grey or white.

Immediately remove from service any article thought to have been in contact with any acid and test it with litmus paper or Bromocresol indicator solution.
Washing in clean water will dilute the acid and prevent further deterioration, but it usually require that the affected area is replaced.

The Mesh areas on all round reserves must be checked for acid contamination at every repack, and if the canopy has undergone a neutralisation programme the must have a fabric strength test done at every repack - look up this subject in BPA Safety Notices and in Poynters.
Salt
Salt will usually affect a rig if it has been used on a water jump into the sea, or if it exposed to salty sea air for any length of time.
It presence is noted by white crystals or staining of the rig, or taste and smell.

Salt does not usually attack nylon although the presence of salt crystal creates an abrasive effect.
Its most pronounced effect is on the corrosion of metal components, here it attacks the surface and promotes rusting.

If salt contamination is suspected then separate the canopy from the harness and rinse in clean water several times, the bath is a good place for this, then hang the canopy up to dry, keep out of direct sunlight.
Soak the container and harness for a couple of hours then rinse and soak again, then rinse again.
Drying of modern container systems can take a day or two, do not use direct heat to speed this up!
Once dry carefully inspect all metal components for signs of rust and clean if necessary.
Check all hand tackings as the wax can be removed by washing and they will come loose.

Rust
Often metal components show signs of discolouration where the plating has become damaged, if the rusting is active there is the reddish brown powdery appearance, as well as affecting the metal components this can attack the material and needs to be cleaned off straight away.

Heat
Damage by heat is not easily detectable, apart from the telltale round holes of cigarette burns! Tensile strength testing will need to be done if suspicious.

Oil and Grease
These do not greatly affect parachute components, which is as well considering the proximity our kit gets to them at times, hanger floors, aircraft parts when floating exits etc.
Oil stains may be removed using isopropyl alcohol and pads of clean absorbent cloth on each side of the affected material. Where possible clean outwards.
Be aware of the dangers of using solvents near heat sources and always work in well ventilated areas.

Mildew
Damp packing sheds, car boots or storing damp kit can all lead to the spores of mildew leaving their mark. Not easily removed, though washing with mild soap may help, best avoided.
LINE REPLACEMENT

Replacing single lines on canopies is a common task for Riggers, but one that must not be treated lightly. The tolerances acceptable on docile canopies with dacron lines are generous compared with those needed on High Performance, microlined canopies.

Read Poynters Vol 1 7.24 - 7.26
Vol 2 7.26 - 7.36
Parachute Rigger Handbook 7.1.9 – 7.1.11

Exercises
Take lengths of various types and size of line, (dacron, kevlar, hma, vectran spectra) and finger trap and stitch a suitable size loop

Make a 'mini brake line' to the drawing below, remember that any end hot-knifed to take a fid will need to be scissor cut before leaving inside a finger trap.
Remember also that 3" of finger trap may shrink the host line by about ½”

Use zig zag or bartack to fix in place

Practice line replacement with as many different materials as possible, (Kevlar, Spectra, hma, dacron).
Remember to copy the line and connector link attachments from the original.

Finger trap closing loops from gutted type 3 line / type 2a

REMEMBER; Any repair to a serviceable canopy must be checked and endorsed by a qualified rigger before returning the canopy to service
**AADs**

Automatic activation devices are mandatory on student square equipment and since the development of the Cypres Unit they have become quite common on experienced jumpers kit. It is therefore important that Riggers are familiar with their operation.

Read Poynters Vol 2  9.5  and the Cypres Owners Manual

1. What rate of descent will trigger FXC 12000?
2. What rate of descent will trigger Student Cypres?
3. What is the default height at which an Experienced Cypres will fire?
4. When must an FXC be turned off
5. What is the minimum opening height when the FXC has been set for 1000'?
6. What is the service interval for a Cypres 2?
7. What is the service interval for a J mod FXC 12000?
8. How do you adjust the altitude setting of an FXC?
9. How do you adjust the altitude setting for a Cypres ie for a display jump?
10. Who may install a Cypres?
11. Should the thin cable be above or below the thick cable of a Cypres?
12. What rate of descent will trigger a Vigil 2 in Tandem mode?
INTRODUCTION TO SEWING Zero P

Many canopies are made from Zero P fabric with different finish to ‘Harris F111’. Whilst the construction of simple patches remains the same you may find handling the material and lining up the "grain" a bit different.

Find some material and make a french fell seam, and make a simple patch (repeat until proficient)

Note that at the edges of a bolt of material the square pattern may be distorted.
MANUFACTURE OF PILOTCHUTES

See Poynters Vol 2  6.12

There are many variations on the theme of pilotchutes, in size, in materials and in construction.
You are expected to make both pull out and throwaway pilot chutes to a suitable design, and take examples of both to your PR exam course.

In this exercise you will begin by building a simple throwaway pilot chute based on the RI design.

Materials:
- 36” square of F111
- 36” square of netting
- 9” of 1” Type 3 tape
- 5 yards of ½” Type 3 tape
- Suitable toggle

Pilot chutes come in different sizes,
what size would be suitable for a 282 Foil?
what size would be suitable for a Sabre 120?

What is the recommended range for setting the centre line?

What Safety Notices or Safety Information has the BPA written on pilotchutes?
MANUFACTURE OF MAIN DEPLOYMENT BAGS

FREEFALL SQUARE DEPLOYMENT BAG
There are many different designs and variations on the market today and in this exercise you can copy any existing design, ie make a new one for your own kit. The example given is one of the simplest around.
Deployment bags are made to fit the container so measure the internal dimensions of the main tray.
The top flap is 1” longer than the bottom to overlap.

1. cut out parapack – remember to allow for the bound seam
2. sew long piece type 12 with type 7 underneath to support lift point grommet
3. sew short piece type 12 to take mouth lock grommets
4. line stow loops
   sew 1” type 3 along outside edge
   insert 2 ½” lengths of ½” type 4 tape (or 9/16 herringbone)
   sew along inside edge to hold tapes
   Fold tapes over and sew outside edge to attach them
   bind outside edge and zigzag or bartack top and bottom of loops
5. turn inside out and sew into shape (A & C edges)
6. bind and zigzag/bartack where appropriate
   (dont leave hot-knifed ends inside bag)
7. sew extra line of stitching along inside row
8. fit grommets and inspect
STATIC LINE RAPS DEPLOYMENT BAG

Probably the most useful idea is to copy existing equipment that is in local use. Here is one example;

1. cut out parapack – remember to allow for the bound seam
2. Sew type 4 webbing on inside
3. Sew type 12 webbing doubled over, on the outside
4. Sew piece type 8 to make narrow, then sew onto parapack and zig zag / bartack onto type 12 (this is where you will attach the static line)

5. Soft Grommets
Mark out holes and scissor cut the crosses, fold back and sew the short pieces of type 4 tape onto the parapack trapping the foldback in between
Sew the long pieces of type 4 tape, trapping the fold backs as you go

6. Line stow loops
Sew 1” type 4 tape along outside edge
Insert 2 ½” lengths of type 5 (or ½” type 4) tape
Sew along inside edge to hold tapes
Fold tapes over and sew outside edge to attach them
Bind outside edge and zigzag or bartack top and bottom of loops

7. Turn inside out and sew into shape (A & C edges)
8. Bind, and zigzag where appropriate (don’t leave hot-knifed ends inside bag)
9. Sew extra line of stitching along inside row and inspect
MANUFACTURE OF BRIDLE LINES AND STATIC LINES

BRIDLE LINES
Pull out bridle lines must have a minimum effective length of 5'.
Throwaway bridle lines must have an effective length of at least 5' from pilot chute to pin, and there must be sufficient slack between the pin and lift point to allow the pin to pull in any direction.

Look at different manufacturers’ designs and compare the construction techniques.

Manufacture a throwaway bridle for a particular rig eg:

![Diagram of bridle lines]

COLLAPSIBLE BRIDLES
These have been around for many years but have become more popular with the smaller faster canopies as they reduce drag.

Some use shock cord to collapse the pilot chute, these can be difficult to calibrate and elastic that is too strong can prove exciting!!!

Most now use a centre line attached to the canopy lift point with the outer bridle lifting the bag.
Inspect as many variants as you can, and manufacture one for yourself.

STATIC LINES
These are made from 1" tubular and must be 'continuous' ie no joins or knots.
The static line length depends on the aircraft being used, as it should be as long as possible without any part of the bag being able to come in contact with the tail.

Metal components should be kept to a minimum as they will hit the side of the aircraft as the JM pulls the bag in.

Copy a static line in local use.
REPLACEMENT OF VELCRO

See Poynters Vol 1 4.152 or Vol 2 4.158
Parachute Rigger Handbook 7.2.3

There was a time when it was hard to imagine parachuting without velcro, now designers have moved towards tuck flaps in many areas, however velcro remains an important component in many rigs. Jumpers need to be encouraged to look after their velcro, ie mate their toggles after landing, (prolongs the life of velcro AND brake line!), and keeping it clean (removing grass and mud etc from the hooks)
Wet velcro remains effective, however wet velcro that freezes becomes very effective!

When packing reserves you will have come across examples of rigs in need of velcro replacement, therefore it is useful for you to get plenty of practice at what can be a simple job, ie replacing the pile on a bridle, or one that requires more thought and skill such as replacing the riser cover velcro on a Racer (Take the reserve out before you start!).

Roughly speaking pile wears out twice as quickly as the hook

Some velcro is much more important than in other areas
ie ROL throwaway bridles MUST be mated with effective velcro, or they can pose a serious risk to the user and those around them.
It could be argued that velcro on riser covers is less important, as rigs were at one time made without riser covers, but as riggers we must ask ourselves why the manufacturer designed it the way it is? If the velcro is there it should be effective.

Some velcro is positioned where it becomes an Advanced Riggers task, if in doubt; ask.

REMEMBER; Any repair to a serviceable rig must be checked and endorsed by a qualified rigger before returning the kit to service
ADVANCED WORK ON RAM AIR CANOPIES

Read Poynters Vol 2  7.15 -7.22
Parachute Rigger Handbook 7.1.5,  7.1.6,  7.1.12

Having mastered simple patches, you will now practice repairs in more awkward places.

**Patch into seams.**
If damage is within 2" of a seam it is usually better to open the seam and take the patch off the edge of material.
*Note* "Keyhole surgery" is not called for,
open up the seam so you can work easily
Carefully realign the seams and pin before re-sewing

**Patch into the Tail or nose**
There is often a reinforcing tape along the tail or nose, study how this has been made into the seam.

**Patch near Cross-port vent**
Treat as a simple patch, then recut the vent as necessary.

**Replacement of line attachment flare**
This is loads of fun!
Make the new flare, with sufficient excess support tapes
Position and sew carefully
Reattach line, checking for overall length against its clone

**REMEMBER ;** Any repair to a serviceable canopy must be checked and endorsed by a qualified rigger before returning the canopy to service
MANUFACTURE OF BOC POCKET

See Parachute Rigger Handbook 7.6.3

There are many versions of the spandex throw-away pocket mounted on the bottom of container, and it is a common task for riggers to convert ROL or pull-out rigs to BOC.

Spandex type material is not cheap so take advice from your supervisor before cutting up a roll!!

Some riggers prefer to make the pocket on a cordura backing and then sew the complete unit onto the container, but in this example we are using what is probably the simplest construction method.

Some riggers use a piece of type 3 between the two layer of spandex and hot-knife into shape, before inserting the elastic. This sandwiches the type 3 between the edges of spandex, as this sticks the spandex to the type 3 it prevents the spandex stretching out of shape as you bind it.

When attaching to the bottom of the main container, care should be taken with the alignment and sewing around the outer row of stitching. The open end needs to be over-stitched or a triangle pattern sewn on the binding to reinforce it.

The dimensions given above may need to be varied slightly to suit a particular container, remember the pocket should not be so deep that it is easy to push the pilot chute completely inside the pocket, nor should it be so narrow as to make for a difficult extraction.
MANUFACTURE OF SMALL ITEMS

Try to get experience at making a wide variety of items eg

STEERING TOGGLIES

- 24 -

APEX MOUNT PULL OUT PAD (TSE)

AFF SECONDARY HANDLE FOR TSE ZEROX
MANUFACTURE OF CUTAWAY PAD

Materials: Cordura 6 ½” x 5 ½”
          1” Square weave 2 ½”
          5” of binding tape
          3 ½” of hook velcro
          70” Cable (48 & 22) and swage (or as suitable for rig)

Padding

Cut out the Cordura and fold in half (inside-out)

Sew bottom seam
Sew top seam leaving ¼” gap in the middle
Attach folded over square weave (to hold cable) with 3 bar tacks or zigzag
Fit Cable and swage
Turn out – feeding cable through the hole
Pad around cable and swage
Bind open edge and fold ends under the hook velcro
MANUFACTURE OF SAFETY STOW

See BPA form 257

Materials: 1/8” Shock cord, nylon covered 17” length

Mark as follows 1 ½” – 2 ½” – 9” – 2 ½” – 1 ½”

Form a loop with the 2 ½” sections touching and zigzag together
The 1 ½” sections are for holding onto whilst sewing – these are then sissor cut off, at an angle, and the ends are seared.

2 1/2” zigzag
MANUFACTURE OF SLIDER

This can be an exercise in copying an existing component.

Take a slider on a common canopy, ie Fury or Manta, and take your measurements and construction notes from it.
Note where there has been shrinkage due to the different materials used, ie Type 4 tape and F111

Copy the design exactly, this is not an exercise in innovation.

It is not absolutely necessary to fit #8 grommets, as not all rigging rooms will have setting tools for these, but mark the centres and fit them if you can.

When finished check the dimensions against the original by lining the two up. Remember to take the original, or comparative photographs, when you present it for your PR exam.

An example of a simple slider can be found on a PD Silhouette 170:
24” x 34” Fabric
124” of Nylon 3” Tape

Remember to allow for shrinkage to end up with:
MANUFACTURE OF BIG RING TYPE 8 RISERS

Great care should be taken when making risers and where possible you should follow the construction drawings issued by Relative Workshop / UPT. Their effectiveness should also be tested before use.
Remember to allow for shrinkage when sewing the Binding tape channel for the cutaway cable, and the attachment for the control ring and velcro.
Ensure the pair of risers are matched exactly.
QUIZ

Get your supervisor to ask you lots of questions such as:

1. What load must a ripcord withstand?
2. Who may add toggle keeper rings to reserve risers?
3. How long is a reserve packed in the USA valid for when used in the UK?
4. What load must be applied when doing a fabric strength test?
5. What webbing has a black line down each edge?
6. What webbing has a black line down the centre?
7. Parachute hardware is usually made by what process?
8. Which lines take most of the opening shock on a Ram air canopy?
9. Why is it important to check the trim of spectra lines?
10. What is the strength of E thread?
11. If the thread loops under the material when machining what should you do?
12. What is the strength of 1" type 3 tape?
13. Describe type 4 tape. What is it used for?
14. What is the strength of a lightweight quick fit adapter?
15. What is the "mechanical advantage" on a set of mini rings?
16. What SPI should we use for canopy repairs?
17. Describe 3 uses for type 7 webbing.