



**30 FAQ for parachute technicians,  
owners and operators of parachute  
equipment related to the modification,  
maintenance and repair of parachute  
equipment.**

## **Disclaimer**

This information has been put together to assist Parachute Technicians, owners and operators of parachute equipment in the field to answer some of the questions raised.

The writer has endeavored to answer the questions raised but makes no guarantee as to the accuracy of the information contained within.

The rules and requirements listed here are current only as of time of publication November 2006 and therefore this information should be used as a guide only.

Current rules regulation and information should be checked at the time and all liability is on the individuals involved at the time and not in any way on the writer, the NZPIA, CAA or any other entity that is referred to within.

## **Questions**

The questions listed have been raised within the industry over a period of both time and requested information, they in no way imply that these are the only or most important questions, but merely the requested ones.

## **Prior Knowledge and Experience**

A certain amount of prior knowledge and experience is expected when reading these guides. It would be expected that the reader would have a broad knowledge of parachute equipment, operation and maintenance to a level of a NZPIA Parachute Technician. Advice should be sort if the reader is not able to understand any of the terminology or language included within.

## **Suggestions and examples**

The advice or examples in this document relate to the New Zealand rule requirements only, and in no way suggest that the approvals, authorities or examples relate to any other countries rules or approvals for parachuting or repairs on parachute equipment.

## **Parachute Rigger Handbook**

The Parachute Rigger Handbook included with this document refers to the USA rule requirements and in New Zealand the FAA rules have no jurisdiction. The systems and instructions for repair of any parachute component suggested in the handbook are useful for explaining and giving instructions on industry standards for repairs to equipment. The handbook should be used for this purpose and not as compliance.

# Contents

Definitions: .....	4
NZPIA Rules.....	6
CAA Rules.....	11
30 Frequently Asked Questions .....	13
What is a major repair?	14
What is a minor repair?	15
What is a modification?	15
What is a rebuild?	16
What is a new product?	16
Does it need certification or approval?	18
Can I fit this AAD to this container?	19
Can I repair this canopy?	19
Can a Parachute Technician sign out this repair?	20
Does this repair need noting on the packing card?	20
What does the manufacturer say?	21
Do I need to pack a reserve the exact way the manufacturer says in the manual.	21
Can I not follow the manufacturer's instructions?	22
Does fitting an AAD alter the TSO or other approval?	23
What CAR rules cover parachute repairs?	23
What NZPIA rules cover parachute repairs?	24
What standards are approved by the NZPIA?	24
What constitutes a plan or instruction from the manufacturer?	25
Do Service Bulletins or Safety Directives need to be followed?	25
As a Parachute Technician, can I carry out major repairs?	26
As a Parachute Technician, can I carry out minor repairs?	26
Where do I find information on equipment?	26
What needs to be recorded in my Parachute Technician log book?	26
What needs to be recorded on the packing card or equipment log book?	27
Does equipment need to have a separate log book separate to the packing card?	27
Who's responsible for keeping the equipment log books up to date?	28
How do I know if a particular piece of equipment has passed its service life?	28
Does the manufacturer have a mandatory service life or is there any Parachute Organisation recommendation on service life on equipment?	29
Can I use equipment that is past its manufacturer's maximum life?	29
What do I do if the manufacturer is no longer in business?	29

## Definitions:

<b>AAD</b>	Automatic Activation Device as in an automatic altitude and descent rate sensor designed to self activate a parachute.
<b>Airworthiness Directive</b>	An instruction issued by the Director of CAA in accordance with CAR part 39, for the inspection, alteration, modification or alteration of airworthy status of a component or assembly.
<b>CAR</b>	New Zealand Civil Aviation Rule
<b>Component</b>	Means any equipment, part or accessory including a complete parachute assembly that is used or intended to be used in the activity of parachuting by a person or persons.
<b>Emergency Parachute</b>	A parachute intended to be used in an emergency only.
<b>Equipment log book</b>	Written record of items, work or relevant information containing information related to a component.
<b>Main Parachute</b>	The parachute intended to be used as the primary parachute.
<b>Major Repair</b>	Means a repair that could potentially affect the safety of the component, equipment or users, as a result of its embodiment, one or more of the following may occur: <ol style="list-style-type: none"> <li>1. Structural collapse</li> <li>2. Loss of control</li> <li>3. Unintentional operation of, or inability to operate, any systems or equipment essential to the safe operational function of the equipment.</li> <li>4. incapacitating injury to its user or any occupant</li> <li>5. Unacceptable survivability or maintainability.</li> </ol>
<b>Manufacturer</b>	The person, company or entity that manufactures equipment or parts of equipment.
<b>Minor Repair</b>	Means any repair that is not a major repair.
<b>Modification</b>	Means any work or design change from the original or approved configuration that could potentially affect the safety of the component, equipment or users, as a result of its embodiment, the following may occur: <ol style="list-style-type: none"> <li>1. any change that will alter the component from its original, or properly approved configuration.</li> </ol>
<b>New Product</b>	Means any product that has never been put into service since manufacturer.
<b>NZPIA</b>	New Zealand Parachute Industry Association Ltd
<b>Packing Card</b>	A card kept with the equipment that records the packing details of the reserve parachute
<b>Parachute Organisation</b>	The holder of CAR Part 149 Organisation Recreation Certificate.
<b>Parachute Technician</b>	The holder of a Parachute Technician rating issued by the holder of a CAR Part 149 Organisation Recreation Certificate
<b>Plans,</b>	Means the drawings, instructions or other data required to be used

<b>Instructions or Technical Data</b>	for the product certification, approvals, and authorizations or for the maintenance, modification, and repair of products their components and accessories.
<b>PT log book</b>	A written record of work and reserve packing data related to a specific PT or loft.
<b>Rebuild</b>	Means a major repair where the component or components are repaired and in the process the repair requires the complete disassembly and reassembly of the component or components.
<b>Repair</b>	Means any work performed on any component that will return that component to its original, or properly approved modified configuration.
<b>Reserve Parachute</b>	Means a parachute assembly designed and intended to be used as a secondary parachute in the event of failure of the main parachute or system.
<b>Safety Directive</b>	An instruction issued by the NZPIA for the inspection, alteration, modification or alteration of airworthy status of a component or assembly.
<b>Service Bulletin</b>	An instruction issued by a component manufacturer requiring an inspection, change or alteration to a component.
<b>Service life</b>	A maximum life given to a piece of equipment or components by the manufacturer
<b>TSO</b>	Technical Standard Order that is issued by the Federal Aviation Administration of the United States of America.

## NZPIA Rules

<b>OP.21.1</b> <b>TECHNICAL</b> <b>STANDARDS</b> <b>FOR</b> <b>RESERVE</b> <b>PARACHUTES</b>	<p>a) The reserve parachute and harness/container shall:</p> <ol style="list-style-type: none"><li>1) Meet one of the standards listed or identified in OP.21.1(b) or comply with the minimum performance standards set forth in (SAE) specifications (Aerospace Standards AS) document No AS8015 or any earlier or subsequent standard and;</li><li>2) Be inspected and repacked at least once every six months by a Parachute Technician, and a record kept of the work carried out or;</li><li>3) NZ Defence Force Parachute equipment used by Defence Force personnel under the auspices of the NZPIA shall be inspected and repacked at least once every six months by a Defence Force equivalent Parachute Technician.</li><li>4) Equipment packed outside NZ by an overseas equivalent of the NZPIA PT rating in the preceding six months may be accepted as meeting OP.21.1(a)(2) by the CSO.</li><li>5) Have the Packing Data Card available for inspection and remaining with the assembly at all times.</li><li>6) Seals may be fitted to reserve parachutes.</li></ol> <p>b) <b>NOTES:</b> To meet the requirements of OP.21.1(a)(1), Reserve Parachutes and harnesses/containers must be labelled and identified with one of the following:</p> <ol style="list-style-type: none"><li>1) A TSO Approval i.e. TSO C23b, C23c or C23d.</li><li>2) A NZ Certificate of Type Approval i.e. CTA No C-30.</li><li>3) <i>Deleted June 2006</i></li><li>4) TSE for equipment manufactured in UK by Thomas Sports Equipment.</li><li>5) Certificat de Parachute IAW EQ530-30 for equipment manufactured in France.</li><li>6) Invader harness/container manufactured in Southern Africa, by (P. 1. S.A) Parachute Industries Southern Africa.</li><li>7) Ultra Next Tandem/Twin 340R-Reserve manufactured by Paratec GmbH (Germany).</li><li>8) Manufacturers and Importers of Reserve Parachutes, and harnesses/containers seeking to show compliance with the minimum performance standards must provide documentation and or evidence as applicable to the Safety Director.</li></ol>
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<p><b>OP.21.3</b> TECHNICAL STANDARDS FOR TANDEM PASSENGER HARNESSES</p>	<p>a) A Tandem passenger harness shall either</p> <ol style="list-style-type: none"> <li>1) be supplied by the tandem/harness container system manufacturer for use with a particular tandem system; or</li> <li>2) be approved by the Safety Director and listed in OP.21.3(c).</li> </ol> <p>b) Any tandem passenger harness approved under OP.21.3(a)(2) shall;</p> <ol style="list-style-type: none"> <li>1) be clearly labelled as to the manufacturer, manufacture date and serial number, and</li> <li>2) be clearly labelled as to what tandem system the harness may be used with.</li> </ol> <p>c) Approved passenger harnesses:</p> <ol style="list-style-type: none"> <li>1) Mac's PAX harness, for use with Relative Workshop Vector II and Sigma Tandem systems.</li> </ol>
<p><b>OP.21.5</b> AADS</p>	<p>a) All parachutists shall have an AAD fitted to the reserve parachute unless an exemption is obtained from the Safety Director.</p> <p>b) Holders of C and D certificates shall be exempt from requiring an AAD, except for display descents until 1 January 2007.</p> <p>c) As of Jan 2006 the following are the AADs available and approved for use, their current life and service intervals. <i>(see OP.21.5 in the NZPIA Certification and Quality Assurance Manual.)</i></p>
<p><b>OP.21.11</b> VARIATION FROM MANUFACTURERS INSTRUCTIONS</p>	<p>a) A request to vary from manufacturers instructions or modifications to equipment shall be put to the Safety Director in writing. This request shall contain:</p> <ol style="list-style-type: none"> <li>1) A copy of the manufacturers instruction.</li> <li>2) A detailed explanation of any safety concerns should the instruction be followed or benefits in allowing variation to this instruction.</li> <li>3) Details of the reason for not wishing to follow this instruction.</li> </ol> <p>b) Any request shall then be put to the NZPIA Board with either approval for or against the request by the Safety Director.</p>

	<ul style="list-style-type: none"> <li>c) The NZPIA Board shall have final say on whether the request shall be rejected.</li> <li>d) Whenever a request is approved the NZPIA Board shall comply with 3.11.</li> <li>e) All documentation shall be kept at the NZPIA office under a separate file relating to this exemption.</li> <li>f) Any documentation shall be made available on request to any equipment owner, operator or Parachute Technician.</li> <li>g) All Operators shall be sent a copy of any decision made by the Board in allowing any variation from CAR 105.103.</li> <li>h) All notifications variation to CAR 105.103 shall be clearly marked as either: <ul style="list-style-type: none"> <li>1) Mandatory</li> <li>2) Recommended</li> <li>3) Optional for equipment owners.</li> <li>4) Parachute Technician discretion.</li> </ul> </li> </ul>
<p><b>2.11.27</b> PARACHUTE TECHNICIAN</p>	<ul style="list-style-type: none"> <li>a) To maintain the safety standard of parachuting equipment by inspecting, packing and certifying parachute assemblies as fit for service.</li> <li>b) To ascertain the compatibility and the correct installation of the AAD on a harness/container system, including the inspection and serviceability checks of an AAD to ensure the AAD is maintained to the appropriate standards.</li> <li>c) To ensure all component parts of a reserve parachute harness/container system are compatible and the system is packed in accordance with the instructions issued by the manufacturer in the form of packing instructions, and ensure that any updates are carried out on any reserve parachute assembly as required by Part 105.103.</li> <li>d) To ensure the reserve parachute and harness/container complies with an approved standard as specified in the equipment section of these manuals.</li> <li>e) To help train parachute technicians by supervising persons fulfilling the practical requirements for the rating.</li> <li>f) Maintain records of Parachute assemblies and AAD's in accordance with section 3.01.</li> </ul>
<p><b>3.01.5</b> PARACHUTE MAINTENANCE LOG</p>	<ul style="list-style-type: none"> <li>a) <b>Parachute Technicians</b> shall keep a record of all packing, inspections, maintenance or repair, modification or alterations, performed or supervised by them.</li> </ul>

	<p>b) <b>Parachute Technicians</b> will keep a record of all Parachute Assemblies and AAD's inspected and passed as serviceable by him/her in a suitable logbook. The minimum details to be recorded are: Date of Servicing, Equipment Type (Parachute, Harness/Container and AAD), Owners Name. Other relevant comments should also be included.</p> <p>c) Each <b>parachutist</b> shall carry with them or their equipment a reserve-packing card stating type and serial number, date of last repack and signature of the parachute technician who carried out the service. The record shall be made available for inspection by the Director or NZPIA Safety Director, Auditor or Investigator. (CAR 105.111(c)).</p> <p>d) The reserve card format issued by equipment manufacturers is deemed to meet the requirement of <b>3.01.5(c)</b>.</p>
<p><b>3.11.01</b> ISSUE OF SAFETY DIRECTIVES</p>	<p>Safety Directives (SD) may be issued whenever the NZPIA Safety Director deems necessary. SD shall be issued by the Safety Director in accordance with the following procedure:</p> <p>b) A copy of any Safety Directive issued shall be sent to all holders of a NZPIA Operators Certificate in electronic format and a hard copy sent to the last notified address.</p> <p>b) Originals of all Safety Directive shall be kept at the NZPIA office under a separate file, and copies of all Safety Directive shall be kept with the Safety Director in both electronic and hard form.</p> <p>c) All Documentation in relation to the issue of the Safety Directive shall be made available to any equipment owner, parachutist, operator or parachute technician on request.</p> <p>d) All Safety Directives shall be clearly marked as:</p> <ol style="list-style-type: none"> <li>1) Mandatory , and</li> <li>2) Shall have a date of compliance.</li> </ol>
<p><b>3.11.03</b> ISSUE OF SAFETY DIRECTIVE, RECOMMENDED VARIATION, ACCEPTABLE ALTERNATIVE.</p>	<p>Whenever there is a request to vary a manufacturers instruction to issue a SD or to issue a variation or alternative means of compliance, the process to be followed by the Safety Director shall be as set out in the flow diagram in the NZPIA Certification and Quality Assurance Manual.</p>
<p><b>5.03.85</b> PARACHUTE TECHNICIAN RATING</p>	<p><b>PRIVILEGES</b></p> <p>a) This rating authorises the holder to:</p> <ol style="list-style-type: none"> <li>1) Inspect, assemble, pack and certify reserve and main parachute assemblies as serviceable and</li> </ol>

	2) To inspect, install and ascertain serviceability of AAD's on harness/container assemblies.
<b>5.03.89</b> PT LIMITATIONS	<p>a) Alteration/repairs affecting the serviceability of the parachute equipment shall only be carried out by a PT in accordance with the manufacturers specifications.</p> <p><b>b) All major alterations/repairs must be carried out by a qualified person authorised in writing by the NZPIA Safety Director.</b></p> <p>c) The retrofit of the Cypres AAD component parts into a reserve container can only be carried out by the AAD manufacturer (Airtec Safety Systems) or authorised installers who also hold an NZPIA PT rating.</p>

## CAA Rules

<p><b>105.51 Parachutes</b></p>	<p>a) Each person or tandem pair making a parachute descent shall be equipped with a main parachute that complies with the technical standards of a parachute organisation.</p> <p>b) Each person or tandem pair making a parachute descent shall be equipped with a reserve parachute assembly which –</p> <ol style="list-style-type: none"> <li>1. complies with the technical standards of a parachute organisation; and</li> <li>2. has been inspected, repacked and certified as airworthy within the previous 7 months by a parachute technician in accordance with the technical standards of a parachute organisation.</li> </ol> <p>c) Each tandem rider making a descent shall wear a harness which-</p> <ol style="list-style-type: none"> <li>1. complies with the technical standards of a parachute organisation; and</li> <li>2. is properly secured to a matching tandem master harness.</li> </ol>
<p><b>105.55 Automatic Activation devices</b></p>	<p>Each student parachutist or tandem pair making a parachute descent shall be equipped with an AAD on the reserve parachute that has been-</p> <ol style="list-style-type: none"> <li>1. certified as compatible with the parachute assembly on the parachute assembly packing record, required by 105.111, by a parachute technician; and</li> <li>2. Maintained and calibrated in accordance with the manufacturer’s operating instructions; and</li> <li>3. set to operate the reserve parachute at at minimum height above the PLA of –             <ol style="list-style-type: none"> <li>i. for a student parachutist descent, 1000 feet; or</li> <li>ii. for a tandem parachute descent , 2000 feet; or</li> <li>iii. such a height as predetermined and set within the AAD by the AAD manufacturer for the category of use and zeroed to the PLA; and</li> </ol> </li> <li>4. inspected by the parachute technician in accordance with the manufacturer’s instructions.</li> </ol>
<p><b>105.103 Airworthiness and safety directives</b></p>	<p>A person must not make a parachute descent unless that parachute assembly complies with-</p> <ol style="list-style-type: none"> <li>1. Any applicable airworthiness directive issued by the Director and in accordance with Part</li> </ol>

	<p>39; and</p> <p>2. Any applicable safety directive issued by a parachute organisation; and</p> <p>3. any applicable mandatory modification or instruction issued by the manufacturer unless-</p> <p>i. the modification or instruction is the subject of a safety directive issued by a parachute organisation; or</p> <p>ii. a variation to the modification or instruction is approved by a parachute organisation.</p>
<b>105.105 Parachute serviceability</b>	<p>a) Each person who finds a parachute assembly to be unserviceable or unairworthy shall ensure that the assembly is clearly marked as unserviceable.</p> <p>b) No person shall return to service a parachute assembly that has been marked as unserviceable until it has been re-inspected and returned to a serviceable and airworthy state.</p>
<b>105.107 Modification and repair</b>	<p>A person shall not use a parachute, or harness and container system, that has been modified in a manner that may affect the airworthiness of the parachute assembly, unless it is re-inspected and re-assessed by a parachute technician in accordance with the technical standards of a parachute organisation.</p>
<b>105.111 Parachute records</b>	<p>a) Each owner of an emergency or reserve parachute assembly shall maintain an assembly packing record card that records the serviceability of that assembly. The packing record shall remain with the assembly at all times.</p> <p>b) Each owner of a student parachutist parachute assembly, or tandem parachute assembly, shall maintain a permanent record of the assembly in a format approved by a parachute organisation.</p> <p>c) The owner or user of an emergency or reserve parachute assembly, and the owner in paragraph b) shall make the record available for inspection when required by the Director, or in accordance with the procedures of a parachute organisation.</p>

## **30 Frequently Asked Questions**

- 1) What is a major repair?
- 2) What is a minor repair?
- 3) What is a modification?
- 4) What is a rebuild?
- 5) What is a new product?
- 6) Does it need certification or approval?
- 7) Can I fit this AAD to this container?
- 8) Can I repair this canopy?
- 9) Can a Parachute Technician sign out this repair?
- 10) Does this repair need noting on the packing card?
- 11) What does the manufacturer say?
- 12) Do I need to pack a reserve the exact way the manufacturer says in the manual?
- 13) Can I not follow the manufacturer's instructions?
- 14) Does fitting an AAD alter the TSO or other approval?
- 15) What CAR rules cover parachute repairs?
- 16) What NZPIA rules cover parachute repairs?
- 17) What standards are approved by the NZPIA?
- 18) What constitutes a plan or instruction from the manufacturer?
- 19) Does a Service Bulletin need to be followed?
- 20) As a Parachute Technician, can I carry out major repairs?
- 21) As a Parachute Technician, can I carry out minor repairs?
- 22) Where do I find information on equipment?
- 23) What needs to be recorded in my Parachute Technician log book?
- 24) What needs to be recorded on the packing card or equipment log book?
- 25) Does equipment need to have a separate log book separate to the packing card?
- 26) Who's responsible for keeping the equipment log books up to date?
- 27) How do I know if a particular piece of equipment has passed its service life?
- 28) Does the manufacturer have a mandatory service life or is there any Parachute Organisation recommendation on service life on equipment?
- 29) Can I use equipment that is past its manufacturer's maximum life?
- 30) What do I do if the manufacturer is no longer in business?

## **What is a major repair?**

Under the definitions a major repair is defined as:

*A repair that could potentially affect the safety of the component, equipment or users, as a result of its embodiment, one or more of the following may occur:*

- 1. Structural collapse*
- 2. Loss of control*
- 3. Unintentional operation of, or inability to operate, any systems or equipment essential to the safe operational function of the equipment.*
- 4. Incapacitating injury to its user or any occupant*

*Unacceptable survivability or maintainability*

It should be clear that under this definition things like replacing a harness leg strap, chest strap, or replacing an entire cell on a canopy, reserve or main would be classed as a major repair, but what about slightly more unobvious things?

### **Is changing a broken line on a main canopy a major repair?**

### **Is placing a patch on a main canopy a major repair?**

If the repair if done incorrectly or as a result will alter the configuration or safe use of the equipment then it is probably a major repair, examples would be:

- Replacing a number of suspension lines on a canopy,
- Patching a canopy that requires the removal or repair over a suspension rib of the canopy,
- Replacing the hip rings of a harness,
- Replacing a flap on a main container,
- Repairing the reserve pilot chute,
- Replacing confluence wrap on risers or a harness.
- Any repair that requires a component or part of a component to be rebuilt in the process, etc

One of the important things to consider here is a major repair can be related to a specific component. Apart from replacing the Velcro on a riser or steering toggle retainer many of the other repairs to a riser would be considered a major repair to that item.

On completion of any major repair you must be able to show that the item repaired is still compliant with the original approval or certification of that product. When the repair involves removal, rebuilding or disassembly of a component or part of a component, then measurements plans and specifications need to be checked to ensure continued compliance are within the original manufacturer's limitations. If these plans specifications or measurements are not available you may have modified the component rather than repaired the component. This is not the same.

**Remember repair implies that you are returning the item, component or assembly to the original specifications, not to the measurements of a worn or copied product. Ask, where are these specifications and how do I obtain them?**

If you are unsure ask.

## ***What is a minor repair?***

Under the definitions a minor repair is defined as:

*Any repair that is not a major repair.*

This should be clear, if it needs repair and it's not a major repair then it is a minor repair.

Examples would be:

- Replacing one canopy line,
- Patching a canopy that does not require the crossing of a suspension rib,
- Replacing a portion of binding tape.
- Replacing broken stitching on none load bearing items,
- Replacing stitching on a housings etc.

The easiest way to work out if what you are going to repair is a minor repair is to ensure that the repair could not be classed as a major repair.

## ***What is a modification?***

Under definitions a modification is defined as:

*Any work or design change from the original or approved configuration that could potentially affect the safety of the component, equipment or users, as a result of its embodiment, the following may occur:*

1. *any change that will alter the component from its original, or properly approved configuration.*

This one should be a no brainer, if you are changing a component from its original state of manufacture or approved configuration you are probably modifying the component. If this change related to a certified component, such as the harness or reserve that requires specific approval then another approval or certification will need to be obtained before the component can be returned to service. If the change relates to a non certified component then you will still need manufacturers or NZPIA approval.

**Why?** CAR rule 105.103 3) requires you to follow manufactures instructions. If the manufacturer does not specify the modification and that may be for commercial as

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well as safety reasons then you need to have this modification or variation approved as required by CAR 105.103 3). This deals with the airworthy state of equipment as well as safety directives.

Once again if you don't have the specifications from original then you may be modifying a component rather than repairing it. How would you know and how would you prove otherwise?

### **When in doubt ask.**

Examples of modifications would be:

- Fitting tuck flaps where Velcro once was,
- Replacing canopy line sets with different trim to original,
- Replacing a pilot chute with a different make or construction to original.
- Changing a tandem passenger harness from original specifications,
- Altering the shape of container flaps, etc.

### **What is a rebuild?**

Under definitions a rebuild is defined as:

*A major repair where the component or components are repaired and in the process the repair requires the complete disassembly and reassembly of the component or components.*

The difference between rebuilding or a major repair is that a rebuild will reassemble the component with the same parts or materials rather than new parts.

Examples would be:

- Replacing a harness on a container is not a rebuild this would be classed as a major repair as the harness webbing is being replaced.
- Replacing all stitching in a harness after disassembly reusing the existing webbing would be a rebuild.

### **What is a new product?**

Under definitions a new product is defined as:

*Any product that has never been put into service since manufacturer.*

There shouldn't be too much confusion here, if I purchase a new product from a manufacturer be it a canopy or a container, risers etc these are clearly new products.

But what of that equipment that has been repaired around the TSO or name plate? Are these products new or just rebuilt or repaired?

If the new product has been rebuilt, repaired or modified and the specifications the product has been built to are not supplied by the original manufacturer, then these components are then new products. Copies of a component fall into this one. This comes down to the materials used and the specifications of the product, can you be sure the materials you are using are the same materials the manufacturer uses when building the product? Has the manufacturer changed the source of their supply since the original manufacture of the product? If you source the raw materials from the manufacturer of the product you are repairing you could be fairly confident that the materials meet the original manufacturers' specifications, you may still need to ask. If you are sourcing materials from elsewhere then in completing a major repair you may have inadvertently made a new product or a modification.

When any repairs or rebuilding is done you need to reference these repairs to the original manufacturers' specifications, this should include materials and standards of those materials. If you don't have these then most likely have either modified the product or now have a new product.

It is very important if you repair a component that has been deemed a new product that you understand the ramifications of rules like the Fair Trading Act and Consumer Guarantees Act as these rights of the customer will now fall on you as the manufacturer, the supplier of these goods and services.

These same rights fall on the New Zealand supplier of new equipment as well. However if you source your equipment direct from an overseas supplier you are not covered by these same rights. It is illegal to contract out of the Consumer Guarantees Act and by placing such a waiver in any document or agreement you have breached the Fair Trading Act and are liable for a fine under this act.

Products that you source from overseas and then use in repairs etc you will carry the liability to the customer not your supplier. If you are at all unsure on these NZ laws you should get advice from a suitable source.

Once again, ask if unsure.

Examples raised recently would be;

- Replacing the webbing on a set of risers, this on first glance looks like a repair or possibly a rebuild.

However if these risers are not rebuilt to the manufactures specifications, this would include not only the physical limits of manufacture but also the materials need to be of the exact same specifications. To do this you need to know these specifications. Usually the manufacturer would be reluctant to give out full information on such things, if you don't have these then this would most likely be classed as new product and not a repair, even if you have rebuilt around a original piece of metal work or name plate etc.

- Replacing the majority of any product, be it container, canopy etc.

Here to it will come down to using the same or approved products that the original manufacturer uses or is using. You need to get these issues not only confirmed from the original manufacturer but also ensure your product you source meets these same standards and that you can trace these. If you cannot trace the product and prove that the materials used are acceptable to the original manufacturer then you may create a new product when you think you are just repairing or rebuilding the product.

**This is a very important point when working on certified components like containers, reserves, some risers, etc.**

### ***Does it need certification or approval?***

Most parachutists at any level understand some basics related to the approval of their containers under a type certification, TSO etc.

The rules however are far more specific than this. **CAR 105.51** states:

- a) *Each person or tandem pair making a parachute descent shall be equipped with a main parachute that complies with the technical standards of a parachute organisation.*
- b) *Each person or tandem pair making a parachute descent shall be equipped with a reserve parachute assembly which –*
  1. *complies with the technical standards of a parachute organisation; and*
  2. ....
- d) *Each tandem rider making a descent shall wear a harness which-*
  1. *complies with the technical standards of a parachute organisation; and*

*is properly secured to a matching tandem master harness.*

**CAR 105.55** deals with AAD certification, **CAR 105.57** deals with helmet certification, as you can see it is more than just the reserve and container that need approval or certification.

Within the NZPIA Certification and Quality Assurance Manual are the details on what standards are approved for each of these items. Every Parachute Technician should be well aware of these standards, and how to obtain approval for any item that requires approval.

The short list looks like this:

- **The reserve canopy,**
- **The container,**
- **The passenger harness,**
- **The main canopy,**
- **The AAD,**
- **Student helmets,**
- **Tandem pair helmets,**

Items like drogues, main pilot chutes, main deployment bags, are not required to be approved or certified, however this does not mean that they can be made and fitted as this may well breach the manufactures instructions, they may also be classed as a modification, or even a new product. This may well breach a number of other rules. In some cases the main risers are also covered by an approval and also in some cases the

container and reserve canopy are approved together or approval for specific reserves only, making it a breach of that approval to fit a different reserve. You should refer to the manufacturer or the NZPIA if you find different components than what was in the original product if unsure.

Obtaining approval for these products is a process that is detailed within the NZPIA Certification and Quality Assurance Manual and you should reference this material if approval is required.

## ***Can I fit this AAD to this container?***

This one is asked all the time. For clarification this is the current state.

- The TSO or reserve parachute approval does not cover the AAD,
- The TSO or reserve parachute approval does cover the AAD installation,
- AADs do require approval through CAR 105.55,

Explanations:

- **If you purchase a container from a manufacture that has an AAD installation kit installed;**

this would be approved and you can then fit into that container any AAD that is approved under CAR 105.55 and that the AAD or installation kit needs no further modification to the container, unless, the container manufacturer specifically does not authorize such AAD installation.

- **If you purchase a container that does not have an installation kit installed or the installation kit needs modifying or replacing;**

The fitment of an installation kit to this container would need approval from the container manufacturer and therefore the original approvals would remain, or the fitment of the installation kit would be a modification that would require the approval of the NZPIA. This **cannot be approved** by the manufactures of the AAD.

- **If you wish to fit an AAD to a container that the manufacturer does not authorize;**

Then under CAR 105.103 (3) ii, allows for the NZPIA to authorize you to **not follow** a manufactures instruction and you should follow the procedure for this under NZPIA Rule OP.21.11 to comply with current regulations.

## ***Can I repair this canopy?***

As a Parachute Technician you can carry out any repairs that are not major repairs. To repair a canopy you must ensure you do not cross over this line. If the repair involves

the removal or disassembly of a load bearing rib then this is a major repair and you will need specific authorization for this or send the canopy back to the manufacturer for repair.

If you are replacing a number of lines on a canopy then same thing as above. As a Parachute Technician you cannot perform major repairs. You can get approval to carry out major repairs on canopies without having approval to do harness work etc. If this is what you want then you should apply for this approval under NZPIA rules.

## ***Can a Parachute Technician sign out this repair?***

Not only can a parachute technician sign out a repair, they **must** sign it out before the repair is used if that repair or modification has affected the airworthiness of the assembly, why?

**CAR 105.107** dealing with modifications and repairs states:

*A person shall not use a parachute, or harness and container system, that has been modified in a manner that may affect the airworthiness of the parachute assembly, unless it is re-inspected and re-assessed by a parachute technician in accordance with the technical standards of a parachute organisation*

This means no matter who does the repair major, minor or modification that has affected the airworthiness of the equipment, before this equipment goes back into service it needs to be re-inspected and re-assessed by a parachute technician.

If as a Parachute Technician you are unable to prove that the repairs have been completed in accordance with the requirements of repairs, modifications, or major repairs you are unable to sign off or allow the equipment back into service.

Remember, once you have assessed or inspected the equipment the liability now moves from the person who did the repair to yourself as you are the person certifying the equipment as airworthy.

Ensure you understand what a modification, a major repair, a rebuild are and what is not.

When packing a reserve parachute when the main is included, are you certifying the entire assembly as airworthy? I would expect so. Do you detail in your log book all work you have inspected and assessed as airworthy or just your reserve packs?

## ***Does this repair need noting on the packing card?***

All repairs need to be recorded in the Parachute Technicians Log as required by **3.01.5**. This states:

- a) ***Parachute Technicians shall keep a record of all packing, inspections, maintenance or repair, modification or alterations, performed or supervised by them.***

- b) **Parachute Technicians** will keep a record of all Parachute Assemblies and AAD's inspected and passed as serviceable by him/her in a suitable logbook. The minimum details to be recorded are: Date of Servicing, Equipment Type (Parachute, Harness/Container and AAD), Owners Name. Other relevant comments should also be included.
- c) Each **parachutist** shall carry with them or their equipment a reserve-packing card stating type and serial number, date of last repack and signature of the parachute technician who carried out the service. The record shall be made available for inspection by the Director or NZPIA Safety Director, Auditor or Investigator. (CAR 105.111(c)).
- d) The reserve card format issued by equipment manufacturers is deemed to meet the requirement of **3.01.5(c)**.

While the repair does not need to be noted on the packing card, the repair does need to be recorded in the Parachute Technicians log. If your equipment has any repairs, modifications, or service bulletins completed, without any record a Parachute Technician that does not hold these records would be unable to, or unlikely to sign out the equipment as airworthy. Once any service bulletins, repairs or modifications are done on equipment it would be wise to then carry with the equipment or have ready for inspection an equipment log showing the details required.

### **What does the manufacturer say?**

Most manufacturers now have details and contact details on web sites that are easily accessible. You can normally either obtain instructions, packing instructions, and service bulletins through this or at least contact them to obtain these.

The NZPIA and CAA may have Safety Directives issued related to equipment and these are all sent out to all Operators upon issue.

You can usually obtain hard copies of any manufacturers information by contacting them directly and subscribing to an information notification system.

Remember if you are inspecting and packing a container, canopy and AAD these will usually all have different manufacturers and so you may need to obtain instructions from different places.

#### **Important:**

It is your responsibility to find and know this information not anybody else's responsibility to tell you. As a Parachute Technician you are taking responsibility for this.

### **Do I need to pack a reserve the exact way the manufacturer says in the manual.**

Short answer: **Yes**

**NZPIA OP.2.11.27 c) states:**

*To ensure all component parts of a reserve parachute harness/container*

*system are compatible and the system is packed in accordance with the instructions issued by the manufacturer in the form of packing instructions, and ensure that any updates are carried out on any reserve parachute assembly as required by Part 105.103.*

**However:**

CAR 105.103.3 ii states:

A person must not make a parachute descent unless that parachute assembly complies with-

1. ...
2. ...
3. ...
  - i. the modification or instruction is the subject of a safety directive issued by a parachute organisation; or*
  - ii. a variation to the modification or instruction is approved by a parachute organisation.*

If the instructions are the subject of a Safety Directive issued by the NZPIA or a variation or is approved by the NZPIA then this would take precedent over the manufacturers instruction.

Examples would be:

When the manufacturers' instruction requires the packing of the reserve parachute by flat packing and by following this the canopy cannot be fitted into the container, i.e. a Javelin container, or via versa, the container manufacturer requires a canopy to be packed in a specific way however the canopy manufacturer lists something different. For this an acceptable variation would need to be issued by the NZPIA for this to be legal. This can be completed by carrying out the process listed under NZPIA rule **OP.21.11.**

Once again, remember: **It is your responsibility to ensure compliance not ours to tell you.**

## ***Can I not follow the manufacturer's instructions?***

Short answer again: **No**, but;

CAR 105.103.3 ii states:

A person must not make a parachute descent unless that parachute assembly complies with-

1. ...
2. ...
3. any applicable mandatory modification or **instruction** issued by the manufacturer unless-
  - i. the modification or instruction is the subject of a safety directive issued by a parachute organisation; or*
  - ii. a variation to the modification or instruction is approved by a parachute organisation.*

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22

If the instructions are the subject of a Safety Directive issued by the NZPIA or a variation or is approved by the NZPIA then this would take precedent over the manufacturers instruction.

The important rule here is 105.103.3. This separates mandatory modification from instruction. This would cover anything from, you should use our rubber bands, to you should load our canopies to only this level, and the list would be endless.

The responsibility however in this case may end up on the user and not necessarily the Parachute Technician. This one is a good case for noting if the main canopy was included when you signed out the equipment as airworthy.

## ***Does fitting an AAD alter the TSO or other approval?***

**No.**

As stated previously the AAD is not covered by the approval however the installation kit is.

TSOs come under FAA approval and this clearly states:

***The FAA does not approve AAD's. The do approve the installation which is submitted with the manufacturer's TSO paperwork.***

***The installation kit of an AAD to a TSO specification constitutes a major alteration to that parachute.***

If a container needs to be fitted with an installation kit this would be classed as a major alteration and would need to be completed by and authorized person.

## ***What CAR rules cover parachute repairs?***

Only a small number of CAA rules relate to parachute repairs:

### ***105.105 Parachute serviceability***

- a) *Each person who finds a parachute assembly to be unserviceable or unairworthy shall ensure that the assembly is clearly marked as unserviceable.*
- b) *No person shall return to service a parachute assembly that has been marked as unserviceable until it has been re-inspected and returned to a serviceable and airworthy state.*

### ***105.107 Modification and repair***

*A person shall not use a parachute, or harness and container system, that has been modified in a manner that mat affect the airworthiness of the parachute assembly, unless it is re-inspected and re-assessed by a parachute technician in accordance with the technical standards of a parachute organisation.*

The responsibility in each of these rules is quite different.

105.105 covers anybody, this may not only be the owner or user but also the operator, Parachute Technician, Pilot it is an all encompassing rule. 105.107 is specific in that it refers to the user.

### **What NZPIA rules cover parachute repairs?**

Once again, not many. Because the CAR 105.107 requires a Parachute Technician to inspect equipment prior to the equipment being put back into service the rules covering repair of any parachute have a point that can be easily monitored.

#### **5.03.89**

- a) *PT LIMITATIONS Alteration/repairs affecting the serviceability of the parachute equipment shall only be carried out by a PT in accordance with the manufacturers specifications.*
- b) *All major alterations/repairs must be carried out by a qualified person authorised in writing by the NZPIA Safety Director.*
- c) *The retrofit of the Cypres AAD component parts into a reserve container can only be carried out by the AAD manufacturer (Airtec Safety Systems) or authorised installers who also hold an NZPIA PT rating.*

The responsibility is on the Parachute Technician to ensure that all repairs are done by a qualified person and also that the repairs are done in line with current industry practice and standards.

### **What standards are approved by the NZPIA?**

Equipment standards are listed in NZPIA Rule **OP.21.1** which states:

#### **TECHNICAL STANDARDS FOR RESERVE PARACHUTES**

- a) *The reserve parachute and harness/container shall:*
  - 1) *Meet one of the standards listed or identified in OP.21.1(b) or comply with the minimum performance standards set forth in (SAE) specifications (Aerospace Standards AS) document No AS8015 or any earlier or subsequent standard and;*

OP.21.1 also lists specific standards and items approved from time to time regarding reserves, harnesses and AADs.

It is important to understand that the standard is approved and not necessarily specific items. Just because an item is built to what the manufacturer says is the same as TSO 23c for instance does not mean that it is approved. The item needs to have the actual standard compliance attached.

## ***What constitutes a plan or instruction from the manufacturer?***

A plan or instruction means;

***Means the drawings, instructions or other data required to be used for the product certification, approvals, and authorizations or for the maintenance, modification, and repair of products their components and accessories.***

When carrying out repairs or modifications and or alterations, you may be asked to supply plans or specifications. Usually if you are writing them these would be considered an alteration or modification. If the manufacturer requires you to complete them this would usually come with instructions.

If you are claiming you are rebuilding something, you would be expected to have these plans, specifications and instructions from the manufacturer of the equipment.

## ***Do Service Bulletins or Safety Directives need to be followed?***

When faced with service bulletin, or safety Directive compliance is the issue. Do you need to follow the bulletin or not?

That depends on who issues it.

If the service bulletin is issued by the **manufacturer** then the answer is;

**Yes**, unless you have complied with CAR 105.103 and obtained a variation form the manufacturers instruction by the NZPIA.

If the service bulletin is issued by the **NZPIA** as a Safety Directive then the answer is;

**Yes**, no outs on this one.

If the service bulletin is issued by a **third party** i.e. an overseas parachute organisation or the FAI for example then the answer is;

**No**, these have no authority in New Zealand. However you may wish to follow it and as long as it does not conflict with manufacturers instructions, NZPIA Safety Bulletins, Safety Directives and Airworthy Directives you are quite entitled to do so. However ensure that the service bulletin or Safety Directive does not constitute a modification or alteration of your equipment.

The most common breach of this is where an AAD manufacturer sends out instructions to modify a container. This invariably results in a modification or alteration to an approved standard. The TSO for instance. This type of instruction would need to come from the manufacturer not a third party or the container would be deemed to have been modified without approval and would need to be recertified or approved.

## **As a Parachute Technician, can I carry out major repairs?**

No.

However as a Parachute Technician you are required to inspect and recertify the equipment as airworthy prior to it being returned to service.

Major repairs can only be done by persons approved to complete them.

## **As a Parachute Technician, can I carry out minor repairs?**

Yes.

NZPIA rule 5.03.89 states:

### **5.03.89**

- a) *PT LIMITATIONS Alteration/repairs affecting the serviceability of the parachute equipment shall only be carried out by a PT in accordance with the manufacturers specifications.*
- b) *All major alterations/repairs must be carried out by a qualified person authorised in writing by the NZPIA Safety Director.*
- c) *The retrofit of the Cypres AAD component parts into a reserve container can only be carried out by the AAD manufacturer (Airtec Safety Systems) or authorised installers who also hold an NZPIA PT rating.*

## **Where do I find information on equipment?**

Start with the manufacturer, look at skydiving publications, contact the NZPIA, the APF has a good list of rigging advisory information. You will get the best information by collecting as much as you can from as many sources you can and then ascertain what is relevant and required for New Zealand and what is not.

## **What needs to be recorded in my Parachute Technician log book?**

### **3.01.5**

#### *PARACHUTE MAINTENANCE LOG*

- a) *Parachute Technicians shall keep a record of all packing, inspections, maintenance or repair, modification or alterations, performed or supervised by them.*
- b) *Parachute Technicians will keep a record of all Parachute Assemblies and AAD's inspected and passed as serviceable by him/her in a suitable logbook. The minimum details to be recorded are: Date of Servicing, Equipment Type (Parachute, Harness/Container and AAD), Owners*

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26

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Name. Other relevant comments should also be included.

c) ...

## **What needs to be recorded on the packing card or equipment log book?**

### **3.01.5**

#### *PARACHUTE MAINTENANCE LOG*

a) ...

b) ...

c) Each **parachutist** shall carry with them or their equipment a reserve-packing card stating type and serial number, date of last repack and signature of the parachute technician who carried out the service. The record shall be made available for inspection by the Director or NZPIA Safety Director, Auditor or Investigator. (CAR 105.111(c))

d) The reserve card format issued by equipment manufacturers is deemed to meet the requirement of **3.01.5(c)**.

These are the minimum requirements and you may be well advised to detail more than just this.

## **Does equipment need to have a separate log book separate to the packing card?**

Here are the relevant rules.

### **NZPIA 3.01.5 c)**

c) Each **parachutist** shall carry with them or their equipment a reserve-packing card stating type and serial number, date of last repack and signature of the parachute technician who carried out the service. The record shall be made available for inspection by the Director or NZPIA Safety Director, Auditor or Investigator. (CAR 105.111(c)).

d) The reserve card format issued by equipment manufacturers is deemed to meet the requirement of **3.01.5(c)**.

### **CAR 105.111 Parachute records**

a) Each **owner** of an emergency or reserve parachute assembly shall maintain an assembly packing record card that records the serviceability of that assembly. The packing record shall remain with the assembly at all times.

- b) Each **owner** of a student parachutist parachute assembly, or tandem parachute assembly, shall maintain a permanent record of the assembly in a format approved by a parachute organisation.
- c) The **owner** or user of an emergency or reserve parachute assembly, and the owner in paragraph b) shall make the record available for inspection when required by the Director, or in accordance with the procedures of a parachute organisation.

In this case the requirements are actually different depending on what type of assembly you have. Student and Tandem assemblies have additional requirements to simple emergency or sport assemblies.

Each assembly must maintain a packing record that details the requirements of NZPIA 3.01.5 c). This is the packing card that remains with the container at all times.

However student and tandem assemblies must also have a permanent record of the assembly. While there is no specific detail to what is included in this record, it should include all maintenance, modifications, repacks etc for the assembly to be inspected, and certified as airworthy at any inspection or required time, including the signature of the Parachute Technician that signed out any equipment.

If a sport container has had any modifications, service bulletins or changes made to it from original manufacture it would be a good idea from this date to also keep a permanent record of these changes or bulletins in a format either in a log book or with the container.

This information would probably be best kept with a log book type format however there is no standard format at this time approved by the NZPIA.

You should therefore have the format that you are using approved by the NZPIA as required by Rule CAR 105.111 b).

### ***Who's responsible for keeping the equipment log books up to date?***

This should be easy, the owner of the equipment is responsible for maintaining all records with the equipment. Make sure that any log books reflect the current owner of the equipment.

### ***How do I know if a particular piece of equipment has passed its service life?***

If the equipment is worn it should be logical to determine that the piece of equipment is out of life and need replacement, repair or rebuilding as per the requirements.

If the equipment is out of life as per the manufacturers instructions then, this one is either the owner of the equipment when it comes to items being used each day such as main parachutes, risers, drogues etc. When it comes to items presented to a Parachute Technician for inspection or repack. It becomes the Parachute Technicians responsibility to know this information.

If a manufacturer puts life on the equipment, number of jumps etc and the equipment gets to that level without excessive wear then the equipment has become out of life and should be replaced.

It is your responsibility to know what the life of the equipment is, and you would normally find this information by contacting the manufacturer.

### ***Does the manufacturer have a mandatory service life or is there any Parachute Organisation recommendation on service life on equipment?***

Most manufactures out of the USA have service life limitations on equipment. Performance Designs Inc. have a service life on there reserve parachutes of 20years, 40 repacks or 20 uses.

Parachute Australia has a service life on all there equipment of 20 years from date manufacture.

Most reserve canopies have a service life of 25 years from date of manufacture.

You should now if the equipment you are using or certifying as airworthy has a fixed life or not. By certifying equipment as airworthy that is past its manufacturers use by date you are breaching CAA rule 105.103. that states:

#### **105.103 Airworthiness and safety directives**

- a) A person must not make a parachute descent unless that parachute assembly complies with-
  1. ...
  2. ...
  3. **any applicable** mandatory modification or **instruction issued by the manufacturer** unless-
    - i. ...
    - ii. ...

### ***Can I use equipment that is past its manufacturer's maximum life?***

**Yes**, but only if you have a variation issued by a Parachute Organisation as per CAR 105.103 a) 3) ii) that complies with NZPIA rule OP.21.11.

This needs to be done for each item although the Parachute Organisation may decide to issue a modification for your particular equipment that relates only to the equipment is question rather than all equipment.

### ***What do I do if the manufacturer is no longer in business?***

The biggest issue here is that no longer do you have the support of the manufacturer. When it comes to changes to any part of the equipment you will need to go through the modification process as no longer will instructions be issued from the

manufacturer. History will show that very quickly the equipment becomes often out of date and at times dangerous. In this case it is often better to replace the equipment.