MAINTENANCE MANUAL

Version: 20190603

Disclaimer

The information contained in this Maintenance Manual is presented in good faith with the intention of:

(a) promoting safety in the sports of hang gliding, paragliding and weightshift microlighting;
(b) providing a clear understanding of the responsibilities and privileges of participants in these sports; and
(c) providing a framework upon which these sports can be administered and allowed to grow in harmony with other airspace users.

As far as possible, this manual represents the best information available at the time of publication.

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1 Introduction

1.1 The Hang Gliding Federation of Australia Incorporated (HGFA)

The HGFA is a body constituted to administer the sports of hang gliding, paragliding and weightshift microlighting, including all derivations of these disciplines. HGFA members fly under exemption provisions contained in Civil Aviation Orders (CAO's) 95.8, 95.10, and 95.32.

1.1.1 HGFA Maintenance Manual

This manual is agreed and approved by CASA and governs and limits our operations under the exemptions of the CAO's.

The Civil Aviation Regulations and Orders require that a pilot undergo training and is subject to the privileges and limitations specified within the HGFA Operations Manual. This manual is empowered by the CAO's, therefore non-compliance with the Operations manual, means the pilot is not covered by the CAO exemptions and full aviation regulations apply.

To effectively control the safety of the sport, the HGFA has established standards for operations, pilot certification and pilot training. Operations that are not in accordance with these standards and procedures may result in breaches of the Civil Aviation Act or Regulations. The standards and any amendments are prepared by the Hang Gliding Federation of Australia and submitted for approval by the Civil Aviation Safety Authority.

HGFA members operating in breach of these standards may be disciplined in accordance with the HGFA Constitution and this Manual. Persons who breach the requirements of the CAO's or the HGFA Operations Manual may face prosecution by the Civil Aviation Safety Authority.

1.2 Civil Aviation Safety Authority (CASA)

CASA is the government body established to control and regulate all aviation within Australia in accordance with the Civil Aviation Act, the Civil Aviation Regulations (CAR), and the Civil Aviation Safety Regulations (CASR). In regard to sport aviation, CASA makes the rules and the organisations apply the rules to their members. See www.casa.gov.au for more information.

The HGFA is a self-administered Recreational Aviation Administration Organisation (RAAO) approved by CASA and operates under CAO 95.8, 95.10, and 95.32. The HGFA has the responsibility of setting and applying safety and operating standards applicable to hang gliders, paragliders and weightshift microlights. The HGFA also has the responsibility to ensure that all HGFA aircraft are operated in accordance with the HGFA Operations and Maintenance Manuals and all applicable Aviation Regulations and Orders.

1.3 CASA – Regulations & Civil Aviation Orders (CAOs)

All flying activities in Australia are regulated by CASA under the Civil Aviation Act 1988 and pursuant to the Civil Aviation Regulations (CAR 1988) and the Civil Aviation Safety Regulations (CASR 1998). HGFA aircraft are required to operate in accordance with the applicable CAR and CASR, but 3 Civil Aviation Orders exempt them from certain requirements of the CAR.

Three Civil Aviation Orders (CAO's) provide the exemptions from specific sections of the CARs / CASRs for hang gliding, paragliding and microlight operations.

HGFA Pilots operate under one or more of the following CAO's:

(a) CAO 95.8 – "Hang gliders" (which includes Paragliders),
(b) CAO 95.10 – "Low-Momentum Ultralight Aeroplanes", and or
(c) CAO 95.32 – "Weightshift controlled aeroplanes and Powered Parachutes"

These CAO's establish:

(d) The aircraft class applicable to that CAO;
(e) The specific exclusions from the CARs applicable to that CAO;
(f) Registration of aircraft;

(g) General conditions, and;
(h) Flight conditions;

These CAO's are updated and or changed from time to time by CASA.

HGFA Pilots MUST remain current and familiar with;

(i) their applicable CAO, and
(j) releveant legislation eg. CAR 166 "Operations in the Vicinity of Non-Controlled Aerodromes"

1.3.1 Civil Aviation Order 95.8

CAO 95.8 is the exemption from the CAR under which the following list of (under 70Kg) aircraft types are flown.

(a) a hang-glider; or
(b) a powered hang-glider; or
(c) a paraglider; or
(d) a powered paraglider.

Relevant HGFA Pilots MUST remain familiar with CAO 95.8 and any future revisions thereof.

Failure to comply with this Civil Aviation Order is a breach of Federal Law and can attract significant penalties.

Stay current by visiting www.casa.gov.au

1.3.2 Civil Aviation Order 95.10

Relevant HGFA Pilots MUST remain familiar with CAO 95.10 and any future revisions thereof.

Failure to comply with this Civil Aviation Order is a breach of Federal Law and can attract significant penalties.

Stay current by visiting www.casa.gov.au

1.3.3 Civil Aviation Order 95.32

Relevant HGFA Pilots MUST remain familiar with CAO 95.32 and any future revisions thereof.

Failure to comply with this Civil Aviation Order is a breach of Federal Law and can attract significant penalties.

Stay current by visiting www.casa.gov.au

1.4 Maintenance

1.4.1 Hang Glider Maintenance Standards

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

Note: The following Maintenance Schedules are generalised for use with varying construction details and operating conditions and as such represent minimum maintenance standards.

Within the following schedules the meaning of the codes are as follows:

Hang Glider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by:	
		Private Operations	Training Operations
1	Clean, service and check as directed.	Owner or Operator	Instructor or Operator
2	Check for security, cracks, wear and faulty operation.	Owner or Operator	Chief Flight Instructor
3	Remove, inspect and replace if necessary.	Owner or Operator in conjunction with independent observer.	Manufacturer or their accredited service agent.
Keeping of certified Maintenance record		Recommended	Mandatory

1.4.1.1 Other Inspections

It is necessary to do a detailed inspection following any unusual stressing of the Hang Glider. This full inspection should include all details listed for six monthly maintenance.

The inspection should be noted in the log book, and any replacement of parts to be recorded.

Log Book

For private operations, when maintenance is performed, always check appropriate square and make an entry in your log book. It is highly recommended that a separate maintenance log book for the glider be maintained. For training flights, maintaining an aircraft logbook is mandatory.

1.4.2 Hang Glider Maintenance Schedule - Private Operations

1. Clean, service and check as directed 2. Check for security, cracks, wear and faulty operation					3. Remove, inspect and replace if necessary 4. Recommend replacement or overhaul			
MAINTENANCE REQUIREMENT	Maintenance – By Period or number of flying days (whichever is sooner)							
	Period>	Daily	Every month	Three months	Six monthly	Every year	Every 2 years	Every 4 years
	Flying Days>	1	10	30	50	100	200	400
Wing Fabric deterioration and tears		1	2	2	2	2	3	4
Wing Fabric attachment points		1	2	2	2	2	3	4
Batten Elastics		1	2	2	2	2	2	3
Check Battens against template supplied			1	2	2	2	2	2
Wing wires and attachment fittings.		2	2	2	3	3	4	4
Check leading edges, keel & A Frame for straightness, dents and corrosion, check for fatigue cracks radiating from drilled holes.		2	2	2	2	3	3	3
Check reflex bridle luff lines for kinks.		2	2	2	2	2	2	4
Check Inspection Zips.		1	2	2	2	2	2	2
Check Variable Geometry and compensator ropes, pulleys and cleats.		2	2	2	2	3	3	4
All bolts, nuts, washers & safety pins. Washers under each nut & at least one thread showing outside each nut.		1	2	2	2	2	3	3
Check hang straps and karabiners for wear or damage.		2	2	2	2	3	3	4
Check saddles and fittings for cracks.			2	2	2	3	3	4
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.		2	2	2	3	3	3	4
Emergency parachute (repack six monthly).		1	1	1	3	3	3	3
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.		1	1	2	2	2	2	2
Helmet check for cracks, wear and security of fasteners.		1	2	2	2	3	3	3

1.4.3 Hang Glider Maintenance Schedule – Aircraft used for Training or Tandem operations.

1. Clean, service and check as directed 2. Check for security, cracks, wear and faulty operation								3. Remove, inspect and replace if necessary 4. Recommend replacement or overhaul as specified by the manufacturer.
MAINTENANCE REQUIREMENT	Maintenance – By period or number of flying days (whichever is sooner)							
	Period>	Daily	Every month	Three Months	Six monthly	Every Year	Every 2 Years	Every 4 Years
	Flying Days>	1	10	30	50	100	200	400
Wing Fabric deterioration and tears		2	2	2	2	2	3	4
Wing Fabric attachment points		1	2	2	3	3	3	4
Batten Elastics		1	2	2	2	3	3	3
Check Battens against template supplied			2	2	2	2	3	3
Side Wires		2	2	2	3	4	4	4
All wing wires and attachment fittings.		2	2	2	2	3	3	4
Check leading edges, keel & A Frame for straightness, dents and corrosion, check for fatigue cracks radiating from drilled holes.		2	2	2	2	3	3	4
Check reflex bridle luff lines for kinks.		2	2	2	2	2	3	4
Check Inspection Zips.		1	2	2	2	2	2	2
Check Variable Geometry and compensator ropes, pulleys and cleats.		2	2	2	2	3	3	4
All bolts, nuts, washers & safety pins. Washers under each nut & at least one thread showing outside each nut.		1	2	2	2	2	3	3
Check hang straps and karabiners for wear or damage.		2	2	3	3	3	3	4
Check saddles and fittings for cracks.		2	2	2	3	3	3	3
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.		2	3	3	3	3	3	3
Emergency parachute (repack six monthly).		1	1	1	3	3	3	3
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.		1	2	2	2	2	2	3
Helmet check for cracks, wear and security of fasteners.		2	2	2	3	3	3	3

**** Usage figures refer to: Training Days for Training Gliders, and Flying Hours for Gliders.***

Log Book

When maintenance is performed make an entry in the maintenance log book for the glider.

Notes on Periodic Inspections of Hang Gliders

(a) Airframe Tubing

(i) Installation & Removal

(ii) When removing tubing do not bend or force tubes. When installing do not distort tubing from its original shape.

(b) Inspection

Inspect tubing for cracks, damage from abrasion, elongated holes or distortion in tube surface. Never attempt to repair tubing, always replace with new part. Inspect tubing for corrosion in and out

(c) Replacement

(i) Aluminium tube comes in many different sizes and grades. Only manufacturer approved tubing is be used.

(d) Bolts - Installation & Removal

(i) After tightening, all bolts should have at least 2 threads showing.
(ii) All self-locking nuts should not be installed more than 2 times.
(iii) If grip length is too long, washers may be added. No more than 3 washers should be used.
(iv) A washer should always be installed under the nut.
(v) Be sure not to over-torque bolts when installing.
(vi) Check assembly instructions for correct bolt placement.
(vii) Inspection - Check bolts for worn shanks, bad threads or corrosion.

(e) Sails

(i) Installation & Removal
(ii) When installing or removing the sail make sure there are no sharp edges or burrs that will tear the sail. See the Flight Manual or Parts Manual for complete instructions. **Do not attempt this yourself unless you are confident in what you are doing.**

(f) Inspection

(i) Check for tears in the sail cloth or any loose or unravelled seams.
(ii) Check all inspection zippers to see if they function smoothly and close completely.
(iii) Inspect velcro strips on inboard panels for wear or frayed edges.
(iv) Check undersurface support tabs.
(v) Sail may be repaired with appropriate sail tape or a sewn on patch. Keep the sail clean of oil and dirt by washing the sail with soap and water. Keep the sail covered when not in use.

CONTINUED EXPOSURE TO SUN DRAMATICALLY SHORTENS THE LIFE OF SAILS - possibly to as little as six months.

1.4.4 Paraglider Maintenance Standards

Paragliders deteriorate with both use and time. The attention they receive affects their performance, safety, life span, and the re-sale value if you decide to sell it.

1.4.4.1 Periodic Inspections

Paragliders shall be maintained in accordance with the Manufacturers Manual. Where no manufacturer's Manual exists, the aircraft shall be maintained to the Schedules contained in this Manual.

Regular porosity testing for UV degradation is advised, particularly when purchasing a 2nd hand glider.

To set a frequency for routine maintenance and checks depends on both the time since the last check, and/or the amount of use the paraglider has had.

More frequent checks should be carried out under the following conditions:

(a) Prolonged exposure to sun light. Even when in the bag. If you are getting sun burnt so is the paraglider.

(b) Flying in salty air. Especially if the paraglider is left laid out on the ground the moist salty air will settle on it allowing sharp salt crystals to enter the threads. And the metal fittings will corrode faster.

(c) Towing operations.

(d) Operations that increase wing and lines loads. For example; Acrobatic flight, SIV training etc.

(e) Any unusual rough treatment which should be examined immediately, for example:

- (i) Snags on takeoff or landing.
- (ii) An accident or hard landing.
- (iii) A water landing.
- (iv) Standing on the lines, which can damage the internal core.
- (v) Allowing the canopy to crash forwards onto the ground with force which pressurizes the cells possibly ripping the ribs.
- (vi) Other incidents including solvent or chemical spills on the canopy, lines or risers.

(f) Bad storage conditions.

- (i) A glider stored while damp can cause mildew and / or mould to form on the sail and will accelerate corrosion of metal parts.
- (i) Leaving the glider in its bag in the boot of the car can also cause deterioration due to excess heat and humid conditions.

1.4.5 Paraglider Maintenance Standards - Private Operations

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

Note: *The following Maintenance Schedule is generalised for use with varying construction details and operating conditions and as such represent minimum maintenance standards.*

The meaning of the codes within the following schedule are as follows:

Paraglider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by
1	**a.** Thorough and detailed inspection for security and any signs of wear and faulty operation. **b.** Replace or repair as necessary.	Owner or Operator
2	**a.** Thorough and detailed inspection for security and any signs of wear and faulty operation. **b.** Replace or repair as necessary. **c.** Test flight to check characteristics and integrity of canopy.	Owner or Operator in conjunction with a PG Flight Instructor or SSO.

Paraglider Maintenance Schedule - Private Operations

MAINTENANCE INSPECTION REQUIREMENT:	**Pre-Flight**	**Yearly**
Wing Fabric strength, porosity, deterioration and tears	1	2
Wing Fabric stitching, line attachment points	1	2
Wing Fabric freedom from mould salt or dirt	1	2
Check integrity of ribs and crossports	1	2
Check all lines (including steering lines for correct routing, length and strength and freedom from salt or dirt)	1	2
Check line sheathing, diameter, knots joins and stitching and freedom from wear points.	1	2
Check riser stitching and freedom from wear points, steering line keepers, connector links.	1	2
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.	1	2
Emergency parachute (repack six monthly).	1	2
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.	1	2
Helmet check for cracks, wear and security of fasteners.	1	2

1.4.6 Paraglider Maintenance Standards - Gliders used for Training or Tandem Operations.

Where a manufacturer does not provide a maintenance regime, the following maintenance schedule must be followed.

The meaning of the codes within the following schedule is as follows:

Training/ Paraglider Maintenance Code Legend

Code	Maintenance Requirement	Carried out by:	
		Sports Tandem Operations	Training or Instructional Tandem Operations
1	**a.** Thorough and detailed inspection for security and any signs of wear and faulty operation. **b.** Replace or repair as necessary.	Owner or Operator	Instructor or Operator
2	**a.** Thorough and detailed inspection for security and any signs of wear and faulty operation. **b.** Replace or repair as necessary. **c.** Test flight to check flight characteristics and integrity of canopy.	Owner or Operator in conjunction with a PG Flight Instructor or SSO.	Manufacturer or their accredited service agent

Paraglider Maintenance Schedule - Training or Tandem Operations

MAINTENANCE INSPECTION REQUIREMENT:	Pre-Flight	Yearly
Wing Fabric strength, porosity, deterioration and tears	1	2
Wing Fabric stitching, line attachment points	1	2
Wing Fabric freedom from mould salt or dirt	1	2
Check integrity of ribs and crossports	1	2
Check all lines (including steering lines for correct routing, length and strength and freedom from salt or dirt)	1	2
Check line sheathing, diameter, knots joins and stitching and freedom from wear points.	1	2
Check riser stitching and freedom from wear points, steering line keepers, connector links.	1	2
Check harness stitching, webbing, ropes, pulleys, frame and Velcro fasteners.	1	2
Emergency parachute (repack six monthly).	1	2
Instruments and radio equipment, check correct operation and structural integrity of case and any connecting cables.	1	2
Helmet check for cracks, wear and security of fasteners.	1	2

Log Book

When maintenance is performed always make an entry in the maintenance log book for the glider.

1.4.7 Weightshift Microlight Maintenance Standards

The registration of weightshift microlights is only valid as long as all necessary Maintenance, Modification and Service requirements are fulfilled. These requirements include:

(a) Maintenance of aircraft as per either:
  (i) the Manufacturer's Maintenance Schedule, or
  (ii) the Maintenance Schedule included in this manual, adjusted as necessary, to suit the particular weightshift microlight. (This is only to be used in the non-existence of a Manufacturers Maintenance Schedule).

(b) Modification as detailed in any relevant Airworthiness Directives.

(c) Major Modification as approved by the manufacturer (or CASR 21M Engineer as appropriate).

(d) Repairs necessary to replace minor damage, wear or ageing.

(e) Servicing, replacement and overhaul, inspection and checking in compliance with the Maintenance Schedule.

Where a weightshift microlight is used for training operations, any maintenance requiring removal or replacement of any part which would affect the airworthiness of the aircraft must be conducted by the aircraft manufacturer or an approved delegate of the aircraft manufacturer or the holder of a WM Aircraft & Rotax Engine Maintenance Endorsement.

1.4.7.1 Airworthiness Inspections

All HGFA registered weightshift microlights must undergo an independent airworthiness inspection, after each two years of service. This independent Biennial Airworthiness Inspection (BAI) is to be conducted by a holder of an Aircraft Inspector (AI) rating or WM Aircraft & Engine Maintenance Endorsement and is a prerequisite for the renewal of WM registration.

Requests for an inspection to be carried out by a person with alternate qualifications will be assessed by the Operations Manager on a case by case basis. The alternate qualifications must be put forward in writing to the Operation Manager, for consideration. Acceptance of an alternate inspector by the Operations Manager, will be provided in writing and will only be applicable to that application.

The Biennial Airworthiness Inspection (BAI) is a safety check designed to provide periodical independent assessment of an aircraft's condition. It is however recognised that there are situations where this requirement maybe difficult to meet. Therefore an extension to the requirement can be made available, where there is justified reason to provide it. Extension of the requirement for a BAI will generally only be provided in situations where there are extenuating circumstances restricting an owner from access to an appropriate Aircraft Inspector or holder of a WM Airframe & Engine Maintenance Endorsement.

In most circumstances an application for the extension of time to arrange the BAI is all that is required and will be considered by the HGFA Operations Manager, so long as commitment to set a date for the BAI is demonstrated and that date is not outside a 6 month period, starting from the initial date due. Subsequent 6 months extensions cannot be applied.

Regular Bettsometer testing for sail strength and UV degradation is advised, particularly when purchasing a 2nd hand glider.

Final responsibility & liability for a microlight's airworthiness always remains with the owner, not the inspector.

Note: *The following Maintenance Schedules are generalised for use with varying construction details.*

WM Maintenance Legend for Table 2.

Code	Maintenance Requirement
1	Oil, lubrication, clean and service
2	Check as directed
3	Check for insecurity, cracks, wear and faulty operation
4	Remove, inspect and replace if necessary
5	Replacement or overhaul

For information regarding who can carry out maintenance on these aircraft see section 1.4.9.3

1.4.7.2 WM Log Book

When maintenance is performed the appropriate square on the Maintenance Schedule should be checked off and an entry made in the appropriate log book

Table 1: WM Log Book Requirements

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
PROPELLER	Examine for nicks and abrasions	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Check security of blades			2		2		2		2	2	2		2		2		2
Check security and torque of mounting bolts, sandwich plates, nuts & cotter pins			2		2		2				2		2		2		2
Check minimum 25mm clearance between tip & airframe					2								2				2
Rotate propeller to check out of track conditions - 3mm maximum at tips					2								2				2
Thrust line to be within 3 degrees of manufacturers recommendations					2				2				2				2
Check hub section for cracks					4				4				4				4
Check balance					4				4				4				4
Gearbox	All welds		3		3		3		3		3		3		3		3
All bolts			3		3		3		3		3		3		3		3
Oil leaks			2		2		2		2		2		2		2		2
Drive V Belts		1	1	1	4	1	1	1	5	1	1	1	4	1	1	1	5
Reduction Pulleys									4								5
Drive Shaft Bearing			1		1				S		1		1		1		5
Drive Shaft									4								5
Propeller Shaft									4								5
Radial Bearing			1		1		1		5		1		1		1		5

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Thrust Bearing			1		1		1		4		1		1		1		5
ENGINE	Overhaul	For a Rotax 2-stroke, this should be 300hr/5yr and for current 4-stroke Rotax, 2000hr/15yr. Same applies to gearbox components above.															
Oil leaks which could indicate cracks or blown gaskets or seals			2		2		2		2		2		2		2		2
Cylinders, tins and bottles			3		3		3		3		3		3		3		3
All welds			3		3		3		3		3		3		3		3
Loose belts		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Engine Rubber Mounts			3		4		3		5		3		4		3		5
Spark plugs (2 stroke)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Spark plugs (4 stroke)					5				5				5				5
Spark Plugs and Ignition Harness Secure			2		2		2		2		2		2		2		2
Crankcase and mounting lugs free from cracks			2		2		2		2		2		2		2		2
Fuel Lines routed properly (free from abrasion. heat & sharp edges) – fittings tight		2	2	2	4	2	2	2	4	2	2	2	4	2	2	2	5
Fuel Tank secure			3		3		3		3		3		3		3		3
Fuel Filer			5		5		5		5		5		5		5		5
Fuel Pump		Fuel pump overhaul at 300hr/5yr 2-stroke. Fuel pump replaced at 5yr 4-stroke.															
Throttle Cable		1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	5
Air Cleaner		1	1	1	4	1	1	1	4	1	1	1	4	1	3	1	5
Check exhaust Ports for Carbon Build up			2		2		2		2		2		2		2		2
Muffler			4		4		4		5		4		4		4		5
Muffler Springs					5				5				5				5

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Ignition switch had ON/OFF identification			2		2		2		2		2		2				2
Engine earthing cable			2		2		2		2		2		2		2		2
Carburettor			3		3		3		3		3		3		3		3
Ground run as specified by manufacturer, note static rpm in log book. If rpm below that required consult manufacturers recommendations			2		2		2		2		2		2		2		2
Exhaust Gas Temperature operation checked			2		2		2		2		2		2		2		2
Cylinder Head Temperature operation checked			2		2		2		2		2		2		2		2
WING	Wing Fabric deterioration and tears		2		2		2		4		2		2		2		5
Wing Fabric Stitching			2		2		2		2		2		2		2		5
Wing Fabric attachment points			3		3		3		4		3		3		3		3
Batten Elastics			3		3		3		5		3		3		3		5
Check Battens against manufacturers profile		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Wing wires and attachment fittings			3		3		3		3		3		3		3		4
Check leading edges, keel & A Frame for straightness and dents			2		2		2		2		2		2		2		4
Check anti luff lines for kinks			2		2		2		2		2		2		2		4
TRIKE BASE	Check seats and attachments		2		2		2		2		2		2		2		4
Check seat safety harness & attachments for damage, deterioration & security, check latches for faulty operation			2		2		2		2		2		2		2		4

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
All aircraft bolts, nuts, washers & safety pins. Washers under each nut & at least two threads showing outside each nut			2		2		2		2		2		2		2		2
Check universal joint for wear or damage			2		2		2		2		2		2		2		2
Main Hang Bolt		2	5	2	5	2	5	2	5	2	5	2	5	2	5	2	5
Check all instruments secure and functioning			3		3		3		3		3		3		3		3
TRIKE BASE AND LANDING GEAR	All structural members & attachments		3		4		3		4		3		a		3		4
	Pivot Points	1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
	Shock absorbing devices		3		4		3		4		3		4		3		4
	Main and nose wheels		3		4		3		4		3		4		3		4
	Wheel Bearings	1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
	Brakes -linings	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
	Brakes - Drums or discs				4				4				4				4
	Brakes - Hose and lines				3				3				3				3
	Brakes - Check for correct operation		2		2		2		2		2		2		2		2
	Tyres		2		2		2		2		2		2		2		2
SEAPLANES or AMPHIBIANS	External coverings and internal structure or hull and floats		3		3		3		3		3		3		3		4
	Check for signs of internal damage, winking or buckling, or evidence of leaks. Check drain plugs		2		2		2		2		2		2		2		2

	MAINTENANCE REQUIREMENT	AIRCRAFT or ITEM - HOURS OF OPERATION															
		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
	Boat struts, bracing and fittings		3		4		3		4		3		4		3		4
	Water rudder and attachments	1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	4
	Check for corrosion in all aircraft components	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

1.4.8 Aircraft Log Book

It is recommended that a log book be kept for Hang Gliding & Paragliding aircraft.

Where an aircraft is used for training operations or the aircraft is a weightshift microlight, **separate** log books **must be kept for the aircrafts base, engine and wing (or wings),** and the following information entered:

(a) Date and hours flown;
(b) Maintenance carried out;
(c) Name of the person who conducted the maintenance, their signature and HGFA number, if applicable.
(d) Modifications;
(e) Components changed; and
(f) Special inspections.
(g) Maintenance conducted by:

If a weightshift microlight, engine or wing is sold the relevant log book must be handed to the new owner. No lien can be held against the log book.

The log book must be produced on the request of the HGFA Operations Manager or a person authorised in writing by the HGFA Operations Manager to carry out Log Book inspections.

WM Aircraft Log books may be downloaded from the HGFA website (www.hgfa.asn.au)

1.4.9 Defects, Repairs and Modifications (HG/PG/PPG/WM)

NOTE: For any LSA, all repairs and modifications including who can conduct those repairs and modifications, must be approved by the LSA manufacturer.

1.4.9.1 Defect Reports

Details of any defect which develops in service and which if kept uncorrected would compromise the continued safe operation of the hang glider, paraglider or weightshift microlight shall be reported as soon as practicable to HGFA Operations Manager.

The Operations Manager shall initially investigate the defect and report the facts of the matter to the Safety and Operations Committee who will be responsible for determining any corrective action that is required, including the notification of owners of similar aircraft.

Defect Report forms are available online on the HGFA Website

1.4.9.2 Airworthiness Directives

Airworthiness Directives requiring mandatory compliance may be issued by the aircraft manufacturer, Operations Manager as faults or defects become evident.

1.4.9.3 Repairs -Weightshift Microlights

ANY MAJOR REPAIR - AIRCRAFT must be carried out in accordance with the manufacturer's specifications and recommended procedures.

Where a weightshift microlight is used for training operations, any major repair must be conducted by the aircraft manufacturer or authorised agent.

ANY MAJOR REPAIR -ENGINES must be carried out in accordance with the manufacturer's specifications and recommended procedures. In the absence of the manufacturer's specifications then the major repair shall be carried out by, or under the supervision of, a specialist in that type of engine.

ALL OTHER REPAIRS may be carried out by the owner in accordance with the manufacturer's specifications.

Details of all repairs must be entered into the appropriate logbook.

1.4.9.4 Modifications

Details of all modifications must be entered into the appropriate logbook, and must be conspicuously available to all operators of the aircraft and include all:

(a) MAJOR MODIFICATIONS must be approved in writing by the manufacturer or in some instances, by a CASR 21M engineer. The approval must subsequently be kept with the relevant logbook.

(b) MINOR MODIFICATIONS may be made by the owner.

1.4.9.5 AIRCRAFT OWNED BY MORE THAN ONE PERSON

Where an aircraft is owned by more than one person, or by a company, then the person it is registered to (the Principal Registered Owner) will be responsible for ensuring that all maintenance, repairs and modifications are properly carried out and recorded into the appropriate logbook.

1.4.9.6 Inspection after an Unusual Occurrence

Hard landing, high load in-flight, roll-over, etc are considered unusual occurrences and the following applies:

(a) As with hang gliders, it will be necessary to do a detailed inspection for any unusual stressing of the microlight.
(b) A full inspection of bolts, wire bolt holes, sail and trike carried out before the microlight is flown.
(c) The inspection shall be noted in the log book, and any replacement to be recorded.
(d) Inspections should be carried out in line with the manufacturers recommendations.

1.4.10 PPG/PPC Wheel Base Maintenance Standards (Engine Included)

PPG Wheel Bases operated in accordance with this Manual shall be maintained in accordance with the Manufacturers Manual. Where no manufacturers Manual exists, the aircraft shall be maintained to the Schedules contained in this Manual.

These requirements include:

(a) Maintenance of aircraft as per either:
  (i) the manufacturer's Maintenance Schedule, or
  (i) the Maintenance Schedule included in this manual, adjusted as necessary, to suit the particular wheel base. (This is only to be used in the non-existence of a Manufacturers Maintenance Schedule).

(b) Modification as detailed in any relevant Airworthiness Directives.

(c) Major Modification to approved details, obtained from the manufacturer .

(d) Repairs necessary to replace minor damage, wear or ageing.

(e) Servicing, replacement and overhaul, inspection and checking in compliance with the Maintenance Schedule.

Where a wheel base is used for training or operations, any maintenance requiring removal or replacement of an integral part must be conducted by the aircraft manufacturer or approved agent of the manufacturer.

1.4.10.1 Periodic Inspections

After each two years of service, a wheelbase being used for Tandem Flights or training, must undergo an independent airworthiness inspection, conducted in accordance with guidelines specified by the aircraft's manufacturer or HGFA inspection guidelines (Form REG-07 - HGFA Documents Register in the member's area, online).

This is to be completed by the aircraft manufacturer or approved agent of the manufacturer or the holder of a HGFA Maintenance Endorsement. A report on maintenance carried out to rectify any problems, must be kept with the wheel base log book, which is to be made available for inspection during a Flight Training Facility audit.

Note: *The following Maintenance Schedules are generalised for use with varying construction details.*

Figure 9-1-2 – PPG/PPC Wheel Base & Engine Maintenance Legend for Table 3;

Code	Maintenance Requirement
1	Oil, lubrication, clean and service
2	Check as directed
3	Check for insecurity, cracks, wear and faulty operation
4	Remove, inspect and replace if necessary
5	Replacement or overhaul

For information regarding who can carry out maintenance on these aircraft see 1.4.10.2 and 1.4.10.3

Table 3: PPG/PPC Wheel Base & Engine Checklist

Cross out checks that are not applicable to the Wheel Base & Engine being inspected.		WHEEL BASE & ENGINE - HOURS OF OPERATION															
MAINTENANCE REQUIREMENT CONT.		25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Check balance					4				4				4				4
Gearbox	All welds		3		3		3		3		3		3		3		3
All bolts			3		3		3		3		3		3		3		3
Oil leaks			2		2		2		2		2		2		2		2
Drive V Belts		1	1	1	4	1	1	1	5	1	1	1	4	1	1	1	5
Reduction Pulleys									4								5
Reduction Bearings			1		1				5		1		1		1		5
Drive Shaft									4								5
Propeller Shaft									4								5
Radial Bearing			1		1		1		5		1		1		1		5
Thrust Bearing			1		1		1		4		1		1		1		5
ENGINE	Check & Overhaul																5
Leaks which could indicate cracks or blown gaskets or seals			2		2		2		2		2		2		2		2
Cylinders and Manifolds			3		3		3		3		3		3		3		3
All welds			3		3		3		3		3		3		3		3
Loose belts		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Engine Rubber Mounts			3		4		3		5		3		4		3		5
Spark plugs (CLEAN EVERY TEN HOURS)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Spark Plugs and Ignition Harness Secure			2		2		2		2		2		2		2		2
Crankcase and mounting lugs free from cracks			2		2		2		2		2		2		2		2
Fuel Lines routed properly (free from abrasion. heat & sharp edges) – fittings tight		2	2	2	4	2	2	2	4	2	2	2	4	2	2	2	5
Fuel Tank secure			3		3		3		3		3		3		3		3
Fuel Filer			5		5		5		5		5		5		5		5

Cross out checks that are not applicable to the Wheel Base & Engine being inspected.	WHEEL BASE & ENGINE - HOURS OF OPERATION															
MAINTENANCE REQUIREMENT CONT.	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Fuel Pump																5
Throttle Cable	1	3	1	4	1	3	1	4	1	3	1	4	1	3	1	5
Air Cleaner	1	1	1	4	1	1	1	4	1	1	1	4	1	3	1	5
Check exhaust Ports for Carbon Build up		2		2		2		2		2		2		2		2
Muffler		4		4		4		5		4		4		4		5
Muffler Springs				5				5				5				5
Ignition switch ON/OFF identification		2		2		2		2		2		2				2
Engine earthing cable		2		2		2		2		2		2		2		2
Carburettor		3		3		3		3		3		3		3		3
Ground run as specified by manufacturer, note static rpm in log book. If rpm below that required consult manufacturers recommendations		2		2		2		2		2		2		2		2
Exhaust Gas Temperature operation checked		2		2		2		2		2		2		2		2
Cylinder Head Temperature operation checked		2		2		2		2		2		2		2		2
WHEEL BASE Check seats and attachments		2		2		2		2		2		2		2		4
Check seat safety harness & attachments for damage, deterioration & security, check latches for faulty operation		2		2		2		2		2		2		2		4
All aircraft bolts, nuts, washers & safety pins. Washers under each nut & at least two threads showing outside each nut		2		2		2		2		2		2		2		2
Shock absorbing devices		3		4		3		4		3		4		3		4
Main and nose wheels		3		4		3		4		3		4		3		4
Wheel Bearings	1	1	1	4	1	1	1	4	1	1	1	4	1	1	1	4
Brakes -linings	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Brakes - Drums or discs				4				4				4				4

Cross out checks that are not applicable to the Wheel Base & Engine being inspected.	WHEEL BASE & ENGINE - HOURS OF OPERATION															
MAINTENANCE REQUIREMENT CONT.	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
Brakes - Hose and lines				3				3				3				3
Brakes - Check for correct operation		2		2		2		2		2		2		2		2
Tyres		2		2		2		2		2		2		2		2
WING	As specified under Paraglider Maintenance Standards - Sections 4.1.4, 4.1.5 & 4.1.6															

1.4.10.2 Repair of Wheel Base Aircraft Utilised for Training Operations.

ANY MAJOR REPAIR:

(a) must be carried out in accordance with the manufacturer's specifications and recommended procedures, and
(b) must be conducted by the aircraft manufacturer or approved agent of the manufacturer.

ANY MAJOR REPAIR – ENGINES: Must be carried out in accordance with the manufacturer's specifications and recommended procedures.

ALL OTHER REPAIRS: May be carried out by the owner in accordance with the manufacturer's specifications.

Details of all repairs must be entered into the Wheel Base logbook.

1.4.10.3 Repair of Wheel Base Aircraft Utilised for Recreational Operations.

It is highly recommended that repairs be carried out by personnel as stipulated in section 1.4.10.2 or persons who hold an appropriate HGFA Maintenance endorsement.

1.4.10.4 Modifications of Wheel Base Craft Utilised for Training Operations.

Details of all modifications must be entered into the wheel-base logbook and must be conspicuously available to all operators of the aircraft.

MAJOR MODIFICATIONS - Must be approved in writing by the manufacturer and the approval must subsequently be kept with the wheel base logbook.

MINOR MODIFICATIONS - May be made by the owner.

1.4.10.5 Wheel Base Owned By More Than One Person.

Where a wheel Base is being used for training or operations and is owned by more than one person, or by a company, then the person it is registered to (the Principal Registered Owner) will be responsible for seeing that all maintenance, repairs and modifications are properly carried out and recorded into the wheelbase logbook.

1.4.10.6 Inspection after an Unusual Occurrence

(e.g. Hard landing, high load in-flight, roll-over, etc.)

It will be necessary to do a detailed inspection for any unusual stressing of the wheel base.

A full inspection must be carried out before the wheel base is flown.

The inspection shall be noted in the log book, and any replacement to be recorded.

1.4.10.7 Wheel Base Log Book

Where a wheel base is used for Instructional Tandem or training operations, a log book must be kept for the aircraft with the following information entered:

(a) Date and hours flown;
(b) Maintenance carried out;
(c) Name of the person who conducted the maintenance, their signature and HGFA number, if applicable.
(d) Modifications and their approvals;

(e) Components changed; and

(f) Special inspections.

(g) Date of completed Biennial Inspections, if required, and reports attached.

If a wheel base used for training or tandem flights is sold, the relevant log book must be handed to the new owner.

No lien can be held against the log book.

NOTE: In law, a **lien** is a form of security interest granted over an item of property to secure the payment of a debt or performance of some other obligation. Not to be confused with, “he was lien about the aircraft”!

The log book must be produced on the request of the HGFA Operations Manager or a person authorised in writing by the HGFA Operations Manager to carry out Log Book inspections.

A Wheelbase Log book template may be downloaded from the HGFA website.

[End of the HGFA Maintenance Manual]