JAVA COMP 150

Owner's Manual

BHPA certificate of airworthiness
numbers:
Java Comp 150 Dacron: 9804145
Java Comp 150 Race (Mylar / Matrix): 9804146

Serial Number

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Before flying your glider please read this manual completely, check all your battens against the batten profile (adjusting them if necessary) and do a thorough pre-flight check.

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INTRODUCTION

Congratulations on your purchase of an Avian Java Comp. The Java Comp represents the state of the art in high performance, kingpost-less design. We hope that you will experience many hours of safe and enjoyable flying on your new hang glider.

This manual is designed to help you get the most out of your Java Comp. Please read this manual completely before flying, check all your battens against the batten profile (adjusting them if necessary) and do a thorough pre-flight check including checking the operation of the VB. This is especially important if instruments are attached to the right hand (VB.) upright. (See page 12 'VB' and page 21 'Trouble Shooting.')

Please make sure your first flight on your new glider is in perfect conditions from a site that you are familiar with. If you are uncertain, or have any problems with your glider, **DO NOT FLY**. We have a section on trouble shooting in this manual that features some of the more common problems that pilots have encountered, and our recommended solutions. If you are still not sure contact your local dealer or the Avian factory.

PLEASE NOTE

Avian Ltd does not have commercial product liability insurance.

Avian hang gliders are built using materials and fittings to the industry standard or better. Avian hang gliders are subject to Avian quality control and testing prior to delivery to the customer.

Once possession of the glider passes to the customer, its maintenance and condition becomes the responsibility of the owner or pilot. Any concerns or queries about the glider's subsequent airworthiness MUST be referred back to the local dealer or the Avian factory.

Hang gliders must be:

- stored correctly
- treated with respect
- checked before take off and after heavy landings
- flown within their flight envelopes
- regularly maintained

Failure to do any of these courts disaster.

Look after your aircraft!!

OPERATING LIMITS

1. Minimum pilot rating: Advanced pilot.

2 Manoeuvres:

1. Aerobatic manoeuvres are not permitted.
2. Pitching the nose up or down more than 30 degrees from the horizontal is not allowed.
3. Do not exceed more than 60 degrees of bank
4. Do not fly the glider inverted or backwards.
5. Do not fly with auxiliary power without factory approval.
6. Do not fly with more than one pilot

3. Hang Glider Payloads:

Pilot Clip in Weight range	Min	Max.
	11 Stone	15 ½ Stone
	154 lbs.	218lbs
	70Kg	100Kg

4. Hang Point Position Range (Pitch trim)

The hang loop is attached straight to the keel and should be within the following range: (Distances measured from the front of the keel *without* plastic bung)

Max. forward position	1570 mm
Maximum rearwards position.	1640 mm

SPECIFICATIONS

Wing span	32' 9"	10 m
Wing area	150sq.ft	14 m^2
Aspect ratio	7	
Min sink rate	170ft/min	0.86m/s
(wing loading = 1.4 lbs./ft^2	6.8 kg/m^2)	
Max. L/D ratio	14	
Speed range*	15 - 70 mph.	24 - 113 km/h
Max. speed (VNE turbulent air)	45mph	72km/h
Max speed (VNE smooth air)	70mph	113km/h
Normal packed length	19' 4"	5.9m
Breakdown length	15' 2"	4.6m
Glider weight rigged	67 ½ lbs.	31 Kg
Glider weight in bag	74 lbs.	34 Kg

*Speeds measured using Davron 808 vario-ASI system.
VNE Velocity Never Exceed.

RIGGING THE JAVA COMP

The glider can either be rigged flat on the ground, or with the glider supported on its control frame. The latter should only be attempted in light wind conditions but is useful in confined spaces or where the terrain is likely to cause soiling or damage to the sail.

Flat rigging

Lay the glider on the ground with the nose pointing into wind. Unzip the bag and roll the glider so it is the right way up. Take the bag off. (If you tread on the inside of the bag any dirt that you get on it will be transferred to the glider when you put the bag on later.)

Take the glider ties off and take the battens out from on top of the sail.

Making sure that you do not lift the tip high above the ground (to ensure that you do not bend the nose plates), move one wing out a little then the other. Then move the other out a little. It is important to move both wings out slightly (the tip less than 1m) before moving through larger arcs. (The reason for this is that the geometry of the cross tubes does not allow one wing to be pulled out far without the other moving. If you do this when the wings are nearly parallel leverage you exert is very high. It is possible to put very high loads where you might not at first imagine, bending the nose plates and worse.) Continue until both wings are about three quarters of their maximum travel. If there is any resistance check to see what is causing it and free the problem before continuing. Do not attempt to force the wings apart. Lift the wing preferably by the wing tip but if you must use the sail hold it by the batten pocket ends on the trailing edge.

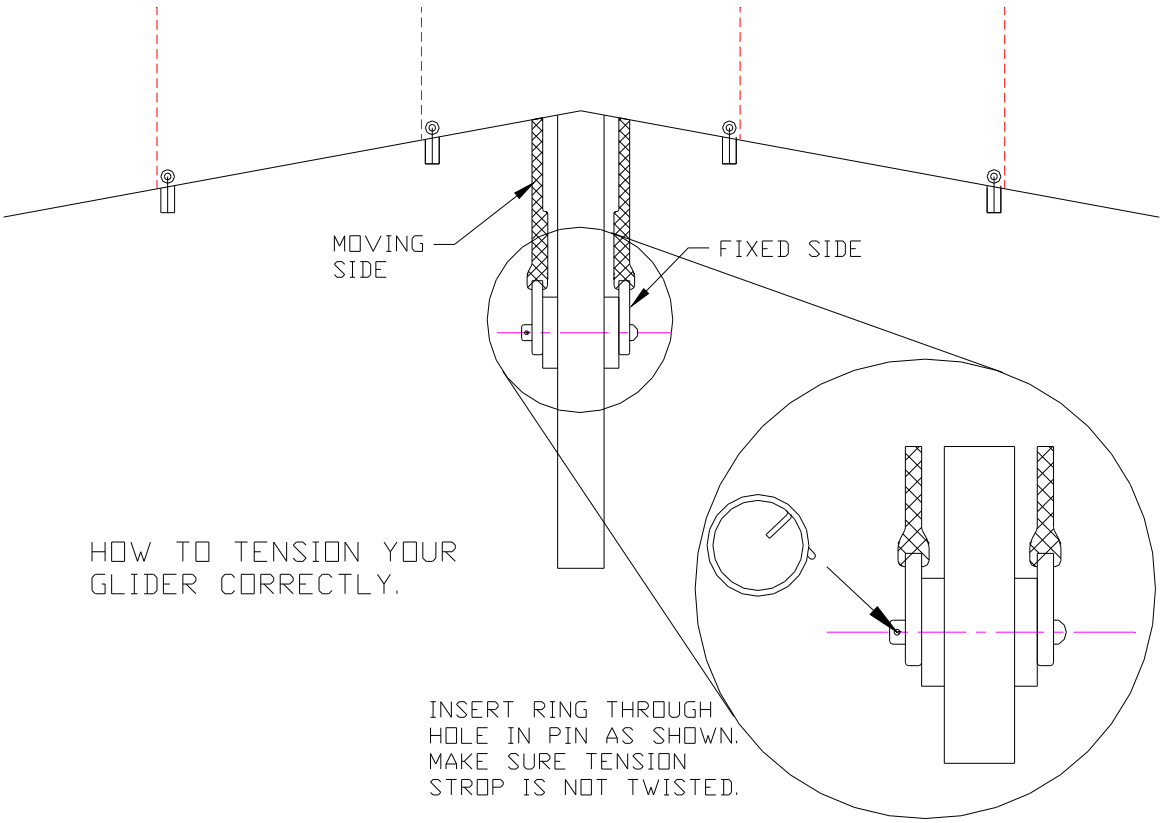
As you open out the wings, carefully open the area with the inner washout rods. Lift the rods from alongside the leading edge over the cross tubes. Make sure that their ends are aligned under the span-wise batten.

Put the bottom bar on and insert the two stainless pins from the back of the base bar and fit the safety rings. PUT THE RINGS IN IMMEDIATELY. DO NOT LEAVE IT UNTIL LATER. Thread the VB. cord through the cleat on the base bar. Tie a knot in the end of the cord.

Lay the battens on the ground and pair them up, red with green, and check that corresponding batten pairs have the same profile. This is a good habit to get into as it will reduce the chances of taking off on a glider with a turn caused by asymmetric shaped battens. (Periodically the battens should be checked against the batten profile.)

Insert the battens smoothly starting with the first 'normal' batten in from the wing tip and working from the tip towards the centre chord. Insert the batten in the second from the tip batten pocket. (The compression strut is inserted later in the rigging sequence.) (On a new glider a little silicon spray on the batten ends will help them slide in smoothly. Once again make sure the washout rods pass under the span-wise battens.
Keeping the trailing edge low and slowly easing the battens into their respective pockets will help increase sail life.

The glider can now be tensioned. Remove the split ring from the special bolt located through the rear of the keel tube. Using the attached elastic cords, pull the cross tube restraint webbing back. Check that the elastics are not twisted. Locate the stainless tang over the stub of the bolt and replace the split ring. If the tension feels too tight stop and see what is causing the problem. DO NOT JUST FORCE IT. (Consult the trouble shooting area of this manual for possible causes.)



Push the battens home the last little bit. With a new sail the battens may not go fully home unless pushed. The batten elastics should be put on double on each batten. The batten nearest the wing tip can only be inserted when the glider has been tensioned. It locates on a plastic cleat on the leading edge. This batten or compression strut is profiled on the Java Comp. Like all the other top surface battens the curve should be up. (The top surface of the wing should be convex, not concave).

11. The under surface battens should also be inserted when the glider is tensioned. They should be pushed home so that only the rope projects from the batten pocket. Put the most outboard U/S batten in first. The under surface battens can be pushed home with another under surface batten.

12. Put in the nose batten. This is easier with the VB. on full. Some people prefer to put the nose batten in before the wings are moved out at all or to leave the nose batten in the glider when packed. (If you do this don't forget to check its profile when you check the profile of the other battens.)
NB The VB. must not be pulled on if the glider is laid flat on the ground: doing so will twist the cross tubes. The glider should be stood on its control frame first.

13. Make sure that the wires are not twisted, then stand the glider on its control frame and attach the swan catch, pip pin and safety washer.

14. Make sure that the nose catch is correctly attached and then put the nose cone on.

15. The glider is now fully rigged. You should now make sure that you do a thorough pre-flight check before you fly.

We suggest that if there is significant wind that the glider is left flat on the ground, nose into wind and securely weighted or tied down at the nose until you are ready to fly. In light winds the Java Comp may be

left standing on its 'A' frame tail into wind- but be wary of gusts of wind, thermals and dust devils. Keep a close eye on it.

Rigging on the A-frame

This is useful in confined spaces or where the terrain is likely to cause soiling or damage to the sail.

1. Lay the glider on the ground. If there is any wind the nose should be pointing cross or down wind. Unzip the bag and take enough ties off to assemble the A frame. Assemble the A frame. Put the bottom bar on and insert the two stainless pins from the back of the base bar and fit the safety rings. Put the rings in immediately - do not leave it until later. Thread the VB. cord through cleat on the base bar. Tie a knot in the end of the cord.

2. If the nose batten was left in the sail move it onto its location and then stand the glider on its A-frame. Take the bag and remaining ties off and remove the battens from the top of the wing.

3. Open the wings slightly then walk the wings out to about three quarters of their full extension. As before the wings should ideally be walked out together. If you are rigging by yourself move one wing a bit and then move the other. NB: Whilst spreading the wings, particularly when the glider is standing on its A frame, it is essential that the leading edges and keel are kept in the same plane. (This is to avoid distortion to the nose plates or any other components.)

4. Take care to place the tips on a piece of ground that is not likely to cause them damage. Leave the tip socks on as this will protect them. The glider should now be standing on its A frame, wing tips and keel.

5. Make sure the inner washout rods are out and sitting under the span-wise battens. (The inner washout rods will automatically come out as they are attached to the sail but can be helped by lifting them. Never detach them from the sail as you may forget to re-attach them.) Now making sure that the wires are not kinked, attach the nose swan catch, pip pin and safety washer.

6. Lay the battens on the ground and pair them up, red with green, and check that corresponding batten pairs have the same profile. This is a good habit to get into as it will reduce the chances of taking off on a glider with a turn caused by asymmetric shaped battens. (Periodically the battens should be checked against the batten profile)

7. Put the curved battens in their pockets working from the centre chord towards the tip. Keep the trailing edge low and slowly ease the battens into their respective pockets. Check again that the inner washout rods are under the span-wise battens. Do not put the last three or four battens each side in. Leave the tip socks on.

8. Make sure you have opened the wing as far as possible. Check that the inner washout rods are under the span-wise battens. Tensioning the glider is made much easier with the help of a friend. Get him or her to lift a wing tip, thus opening the wings out further. Tensioning is then easy.

9. Take off the tip socks and put in the last battens near the tip. Push all the battens fully home. (With a new sail the battens may not go fully home unless pushed.) The batten elastics should be put on double on each batten.

10. Putting your arm in the tip of the sail fold out the outer washout rods and lift the rear of the sail to make sure they are correctly located.

11. Now insert the compression struts and locate them on their plastic cleat on the leading edge. (These compression struts, are bent and should be profiled correctly and put in the right way up. Like all the other battens the curve should be up. The top surface of the wing should be convex NOT concave.)

12. If not already in place, insert the nose batten and locate it on its seat just in front of the nose plate. This operation is easier if the VB. is pulled on first. When the batten is in release the VB. (Some pilots only remove the nose batten occasionally to check its profile.)

13. The under surface battens are more easily inserted once the glider has been tensioned. They should be pushed home so that only the rope projects from the batten pocket. Put the most outboard U/S batten in first. The under surface battens can be pushed home with another under surface batten.

14. Double check that the nose catch is correctly attached and put the nose cone on.

15. The glider is now fully rigged and you should now make sure that you do a thorough pre-flight check before you fly.

PRE-FLIGHT CHECK-LIST

Detailed pre-flight checks must be carried out during assembly. Always use the same assembly and packing procedure which will help to eliminate mistakes. After rigging a pre-flight check should always be carried out. The following must be checked:

1. All tubes are straight and not dented. Any damage to carbon spars should be very closely inspected. A small dent is very serious damage. (See section on carbon fibre.)

2. Cross-tube hinge, nose plates and A frame fittings OK. All bolts secure.

3. Check all washout rods are out and correctly positioned.

4. All sail seams intact with no frayed stitching, particularly
in high stress areas (e.g. wing tips, junction of keel pocket and sail etc.)

5. Battens correct shape and undamaged.

6. All nuts and bolts secure.

7. All quick release fittings secure:
(i) cross tube tensioner
(ii) nose catch (check the clevis pin and split ring as well)
(iii) tip battens correctly located on leading
(iv) quick pins and rings secure on bottom bar
(v) outboard leading edge section fully engaged. (Be especially vigilant if the L/E has been short packed recently.)

8. Cross tube tensioner strop not frayed and twist free.

9. All zips done up.

10. Batten elastics symmetrical on both sides of the glider. They should also be in good condition and engaged over the batten ends.

11. Hang loops in good condition.

12. The glider is symmetrical when viewed from the front.

13. Unzip the under surface and check the centre junction. Check that the cross tube centre bolts are secure and all webbing loops are in good condition. Sight down the cross tubes and check they are undamaged.

14. Check the four nose plate bolts are secure.

16. Walking along the length of the leading edges feel with your fingers to check that they are free from dents. Check that there is a similar leading edge curvature when looking down the inside of the wing from the nose to each wing tip.

17. Check through the sail inspection zip to ensure that the wing wire and cross tube leading edge bolts are secure.

18. Check that the keel is straight and then check that the tensioning strap is secure, correctly fitted and that the split ring is in place. As shown in the previous diagram.

19. Check that the wires are undamaged. Look out for corrosion and fraying. Pay particular attention to inspection of the wing wires as, in normal flight, these are the most heavily loaded. **INSPECT BOTH ENDS: THE BASE BAR END AND THE CROSS TUBE JUNCTION END. REMEMBER: IF IN DOUBT DO NOT FLY- RETURN YOUR GLIDER FOR A THOROUGH STRIP-DOWN.**

20. Check operation of the VB. Pull the VB. rope and check that it pulls on smoothly and releases. If it is jammed check and release if caught. If instruments are attached to the right hand upright it may interfere with the VB. operation. The VB. cord runs down the rubber back of the right hand upright. Crushing the rubber back impedes the movement of the cord. It may then be possible to pull the VB. but not to release it. This is easily cured by inserting a length (30cm) of batten material inside the rubber back of the upright. (This stops the rubber back from being crushed.)

22. Finally check that all the quick release fasteners are secure. Pay particular attention to the base bar quick pins. As the glider is moved and placed on the ground the safety rings in the base bar quick pins may contact the ground. Long grass seems most likely to cause the problem but it is possible to remove the safety ring from the pin. The problem is minimised if you put the pins in from the back of the base bar. (Thus when the glider is sitting on its keel the head of the pin will contact the ground rather than the safety ring.) Special attention should be given to checking quick release fasteners.

FLYING THE JAVA COMP

Please note the following is not meant to be an exhaustive flying manual but merely a brief note and should be read with that in mind.

Take off

Before take-off make sure you've pre-flighted the glider, that you are clipped in and that you have performed a hang check. On take-off the wings should be held level with the nose slightly raised. A strong and committed take off run is always recommended. Keep the angle of attack low until you are running fast. Once sufficient air speed has been achieved increase the angle of attack gradually to take off. Once settled in flight move your hands, one at a time, to a comfortable position on the base bar.

In Flight

The control in both pitch and roll is light and precise. Accordingly the glider should be flown with moderate and precise inputs. The glider should not be flown too slow or in a semi-stalled condition as the roll response becomes much slower.

Stall

The Java Comp recovers quickly from stalls but will lose height doing so. A wing close to the stall becomes difficult to control. For both these reasons the glider should be flown with sufficient airspeed close to the ground, hill or any other aircraft or obstacle.

Spin

Hang gliders are generally resistant to spin. It is very unlikely that you will ever experience a spin in normal flight. To recover from a spin pull the bar in and increase speed BEFORE applying opposite bank.

Flying when wet

DO NOT TEST YOUR NEW GLIDER IF IT IS WET. Wet gliders do not fly nearly as well as dry gliders. This is because the water droplets on the leading edges disturb the airflow over the wing. The result is that the glider does not perform so well and stalls at a much higher airspeed, so you will not be able to fly the glider as slowly as if it were dry. You may also find that the glider stalls more easily, takes longer to recover from a stall and is more prone to spinning.

If you get caught in the rain as the glider gets wetter you will notice the above effects increase. You will have to fly faster to avoid stalling and should be especially careful on landing. We advise that you fly with a lot of excess speed when doing any manoeuvres near the ground or other aircraft with a wet glider.

Landing the Java Comp

The secret of a good landing is good field selection followed by a precise approach with plenty of airspeed.

Always plan your landings from high up, check that the VB. is in the fully released position and make sure you can get your feet out of your harnesses well before landing. Check the surrounding air for other aircraft preparing to land. Look and check that your approach and over-shoot path have as few obstacles as possible. (Never choose to land immediately behind other gliders or obstacles but land to one side. You'll make a lot more friends on the hill!)

POST FLIGHT INSPECTION

After landing, especially if heavily, the glider should be inspected as outlined in the pre-flight inspection.

DE-RIGGING

De-rigging is largely the reverse of the assembly sequence:

De-rigging the glider flat

1. Lay the glider flat on the ground and into wind. Remove the under-surface battens and the tip battens (or compression struts). Remove the nose batten before releasing the cross tube tension. (If you intend to remove it from the sail.) Putting your arm into the wing release the tip washout rod and fold it alongside the leading edge attaching it to the Velcro. THIS OPERATION MUST BE DONE BEFORE RELEASING THE TENSION AS IT CAN NOT BE DONE LATER.
2. Release the cross tube tension and swing the wings in a few feet. Remove the other battens.

The wings can then be closed further.

3. Place the padding around the tension bolt. Bring the leading edges in further lifting the inner washout rods and helping them lie alongside the leading edges. Dismantle the 'A' frame. Attach the 'A' frame padding around the bottom of upright castings. When packed the side wires should come out of the top of this packing and should not be kinked.

4. The wing tips can then be brought together. Next the sail should be rolled and tucked inside the Mylar of the leading edge. One side can be rolled and retained with a tie and tip sock while the other is being done.

5. The battens can be stowed at the front of the glider between the leading edges with the curves over the nose section. The ties can then be placed round the glider holding the leading edges neatly together. Place the glider bag over the glider and then turn the glider on its back.

6. Put the speed bar in its bag and place it in the sail near the wing tip. Any remaining ties should be put around the glider. Tuck the nose cone under the tie near the nose of the glider.

7. Zip the bag up and store the glider dry in a cool dry and dark place.

De-rigging the glider upright on the keel

This is useful in confined spaces or where the terrain is likely to cause soiling or damage to the sail. It is essentially the reverse of rigging the glider on the keel:

1. Put the glider keel down and tail into wind. Remove the under-surface battens. Loosen all the batten elastics and remove the tip battens (or compression struts).

2. Put your arm in the sail tip and remove the outer washout rod lie it inboard against the leading edge and stick it to the leading edge using the Velcro. (This will keep it in place and stop it popping out again. NOTE THIS MUST BE DONE AT THIS STAGE AS IT CAN NOT BE DONE LATER IN THE DE-RIGGING SEQUENCE.)

3.With the glider still tensioned remove the outer battens, say 2 or 3 per side. Roll the wing tips and put on the tip socks before releasing the tension. (This keeps the tips covered and protects them.)

4. Release the X tube tension and move the wings in slightly. Attach the tension bolt packing. The keel remains on the ground.

5. Remove the rest of the battens except the nose batten.

6. Remove nose cone and release the lower nose wires.

8. Bring the wings closer together making sure to lift the inner washout rods to lie them alongside the leading edges. Pull the sail between the leading edge and keel so that it is all above the leading edge. Roll it carefully and tuck it inside the leading edge. One side can be rolled and retained with a tie and tip sock while the other is being done.

9. Remove the nose batten if you intend to. Put all the battens into their batten bag.

10. The battens can be stowed at the front of the glider between the leading edges with the curves over the nose section. The ties can then be placed round the glider holding the leading edges neatly together. Take off the ties holding the sail in place and put them around the whole glider in the normal way.

11. Place the glider bag over the glider and then turn the glider on its back.

12. Dismantle the 'A' frame. Attach the 'A' frame padding which is located around the bottom of upright castings. When packed the side wires should come smoothly out of the top of the packing.

13. Put the speed bar into its bag and store in the sail near the wing tip. Any remaining ties should be put around the glider. Tuck the nose cone under the tie near the nose of the glider.

14. Zip the bag up and store the glider dry in a cool dry dark place.

VB. (VARIABLE BILLOW)

The variable billow (VB. sometimes called variable geometry VG.) is used to change the flying characteristics of the glider while in flight.

As mentioned else where in this hand book, when the glider is rigged the VB. cord should be threaded through the cleat on the speed bar and knotted. (This is a good habit to get into. The knot will prevent the end of the VB. cord being lost.)

If anything is attached to the right hand upright (the one down which the VB. cord runs) it could adversely effect the operation of the VB. (See 'trouble shooting'.)

For take off it is recommended that the VB. is in the fully released position. (This is with very little cord sticking from the upright.) In this position the glider is easiest to turn. (You may find with experience, and especially if aero-towing, that you prefer to take off with a little VB. pulled on.)

In normal flight a little VB. (Say 70cm of cord) might be pulled on. This will give a better sink rate with little loss of handling.

For flying fast or for best glide performance (for example, flying between thermals) use full VB. With full VB. be aware that the roll rate of the glider is significantly reduced especially if flying slowly. **Do not use full VB.** near the ground, near other aircraft or near any other obstacle.

For flying near the ground, other aircraft, other obstacles, in rough air or landing it is recommended that the VB. is in the fully released position. This position will give the most effective roll control.

Release the VB. in a smooth manner. Do not just pull the rope out of the cleat and let go. This will give a needless shock loading to the airframe.

VB. MAINTENANCE

Due to the design of the Java Comp VB., its operation should be smooth and much easier than other hang gliders.

To keep it this way, make sure that the ropes not twisted and clean. Remove grit or dirt from the upright casting and replace the ropes if they show signs of wear. It is also important to keep the tension strop of the glider untwisted.

VB. Set-up

The VB. on your glider should be factory set. However the ropes do stretch a little and it may be necessary to adjust the ropes to retain full VB. Travel.

NEVER ALTER YOUR GLIDER OR VB. IN SUCH A WAY AS TO INCREASE THE MAXIMUM TENSION OR REDUCE THE MINIMUM TENSION.

TUNING INSTRUCTIONS

Trim speed

The trim speed is adjustable by moving the hang loop forwards or backwards along the keel. Forward movement will speed trim the glider faster, whilst rearward movement will slow it down. Only move the hang loops in small increments ½ inch maximum.

Turns

A turn in the Java Comp is unusual. If your glider previously flew straight then the most likely explanation is that you have damaged your glider. If a turn is detected first check the battens. Check them against each other (making sure that they are the same on both sides) and then against the profile. Next check that the batten elastic tension is the same on both sides of the glider. If there is still a turn check that the leading edges are straight and undamaged.

A slight turn may be tuned out using the tip adjusters: The black plastic caps have a small hole drilled as a reference. This reference is lined up with the self-tapping screw for initial assembly. (This is the datum) The self-tapping screw should be removed and the black plastic cap turned slightly. The wing that is lifting should have the washout increased (i.e. trailing edge lifted) while the wing dropping should have the washout reduced (i.e. trailing edge lowered). Mark the leading edge with a pen or pencil before removing the self-tapping screw and **ONLY ALTER THE WASHOUT AT THE TIP IN SMALL INCREMENTS**. (MAXIMUM 3mm at a time.) The total movement should **NOT** exceed 10mm each side of the datum (the hole for the self tapping screw. **DON'T FORGET TO REPLACE THE SELF-TAPPING SCREW.**

Washout at the tips

The washout at the tips can also be altered symmetrically, that is increase or reduce the washout on both wings. Only small changes are needed and large changes are counterproductive. A small reduction in the washout (2-3mm) will make the glider feel slightly lighter in pitch and show perhaps a slight increase in glide performance. In smooth air the glider handling will probably appear much the same but if a wing is lifted it will be more difficult to get down.

Movement in the opposite direction will have the opposite effect. However it should be emphasised that large movements are not beneficial.

To check the washout at the tips. The glider should be flown clear of the ground and all other aircraft with the VB. on. The under surface at the extreme tip of the sail should be just tight.

Batten Bungees

The tension of these bungees does make a difference to the handling of the glider. (See Appendix for batten numbering system.)

Battens number 1 and 2 can be relatively tight.
Batten number 9 can be relatively tight but increasing tightness reduces handling.
The compression strut should be tighter but increasing tightness reduces handling.
The rest should be of medium to light tension.

Other tuning should NOT be carried out without reference to Avian Ltd., or an approved dealer.

Washout

This is factory set and should not be altered by the pilot. It can be checked with reference to the appendix. The batten profile should be checked then the glider should be rigged on a very flat surface without the speed bar. With the glider tensioned but the VB fully off the heights can then be measured from the top of the battens. The heights of the rods alone are for measurement without the sail. Damage to the leading edge can alter washout heights. If your washout heights are below those specified the glider should not be flown.

BATTENS AND BATTEN PROFILE

The Java Comp battens should be maintained in the correct profile. Failure to do this could result in adverse flying characteristics.

Batten Material

The nose batten and compression struts are made from 1/2" OD 6082 aluminium alloy tubing.

All other battens are made from 10.8mm OD 7075 aluminium alloy tubing.

6082 Alloy tubing is softer and easier to bend. 7075 alloy is harder, more difficult to bend and more brittle but it holds its shape much better.

How often should your battens be checked?

At first check your battens regularly. This will give you some idea of how fast they are changing profile. The Java Comp has 7075 battens which tend to hold their shape well. The nose and tip battens are made of a softer 6082 alloy. 6082 battens tend to get harder, and hold their shape better, once they have been re-profiled a few times. On the Java Comp the batten most likely to require re-profiling is the nose batten.

Don't forget: If you don't know how the glider has been treated while it is out of your care (for instance if it has been sent by carrier or on an aeroplane) check the battens against the profile and do a very thorough pre-flight check **BEFORE** flying.

Checking the profile

The best place to check the profile of your battens is at home on a flat surface. (It is very difficult to do on the hill with no flat surfaces and the wind blowing the paper profile away.)

The printed profile should be rolled out flat and a book placed at either end to hold it down.
The battens can then be compared to the profile:

Place green (right) number 1 batten against number 1 profile. Place the front end of the batten against the profile and check that it matches the profile along its whole length.

If it does not match the profile see where it deviates and adjust the batten accordingly in that area. (See below.) Continue this process until the batten matches the profile. Then do the same for red number 1 batten. Check that both number 1 battens are exactly the same shape. It is more important that the battens are symmetrical than that they are a perfect copy of the profile. Asymmetrical battens could cause a turn in your glider.

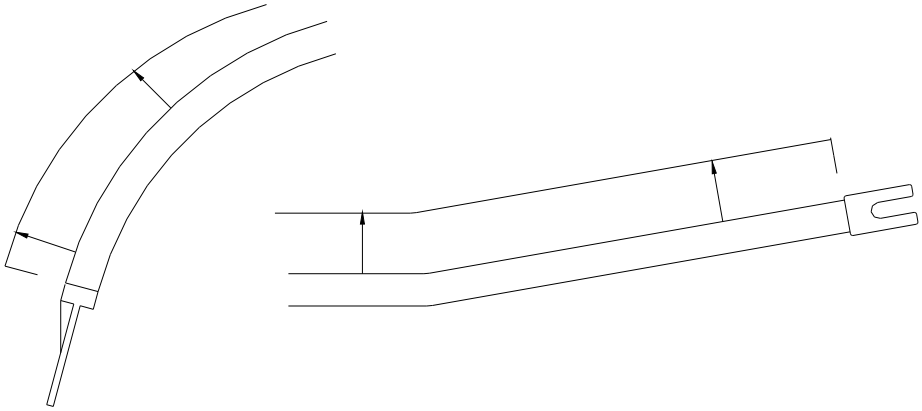
Then move onto batten number 2 and so on until you have checked all the battens. Do not forget to check the compression strut and that the under surface battens are straight.

Nose batten

The nose batten profile should not be under-cambered but can be a little over-cambered. This is because the cut of the sail will tend to flatten the batten if it is over-cambered. The objective with the nose batten is to get the sail to fit tightly around the nose area.

Batten Profile

The batten profile is printed with the profile or shape that the battens should match. The profile is printed with a photocopier so there may be a slight error in the length of the battens. (1-2%) Thus battens with shape at each end should be aligned with the nearest end when checking the shape.



Move the batten to the profile as shown above

How to alter the shape of the batten

The objective is to get a smoothly curved batten but it is not quite as easy as it looks. It is very difficult to bend the batten very close to its front end. Do not attempt to alter the profile over the first 3-5cm of the batten. If your battens need profiling do the 6082 battens first as they are much softer.

To increase the curve in the batten hold the batten either side of where you want to increase the curve and run the batten over your knee or leg exerting a gentle pressure. (It helps if you are wearing something slippery.) Compare with the profile and repeat if necessary. Try to avoid point bends and make sure that

the bends are all in the same plane. (7075 is a hard aluminium alloy and extra care must be taken while profiling to avoid broken battens.) To reduce the curve, do the opposite of the above either over your knee or preferably by pressing on a flat surface. If you have a point bend try and remove it.

MAINTENANCE

Annual strip down and factory inspection

Avian recommend that the Java Comp has a factory inspection every year or 100 flying hours which ever is the sooner. This is a sensible precaution to take and is offered by Avian at special prices in the months of January and February. An additional benefit of the strip down is that the latest upgrades can be fitted, often for free.

General

Careful attention to the rigging and de-rigging sequences will reduce the risk of accidental damage. Repairs should be undertaken by the Avian factory or an approved dealer using genuine Avian spares.

The correct storage of your glider will also greatly influence its life. The glider should always be stored:

- **well packed**
- **completely dry**
- **well supported**
- **in a dark, cool and dry place.**

Airframe Maintenance

Apart from damage caused by over stressing the glider i.e. crashing etc. the major wear and tear on the glider happens in transit.

Aluminium Tubing

Care and consideration in de-rigging and transportation will pay dividends in airframe life. Damage to any one of the structural members is serious and the only remedy is replacement. Insufficient care during ground handling or transportation can lead to tube abrasion or indentation. The former accelerates fatigue fracture and the latter reduces the strength of a component. Keep a regular watch for tell-tale hair-line cracks, which are most likely to occur in high stress areas such as around bolt holes. If you bend, dent or damage the tubular members in any way, seek immediate professional advice before flying again and have replacement parts fitted.

Carbon Spars

Carbon fibre spars must be looked after carefully. Damage to them is likely to be much less obvious than to a metal tube. Any visible damage could signify serious structural damage and should be inspected by Avian before flight.

Fasteners

Any fastener (i.e. nuts bolts etc.) which is bent or shows signs of wear or corrosion should be replaced immediately. Nyloc nuts should only be used ONCE. One clear thread of the bolt should stick out beyond the end of the nyloc. Nuts should be tightened only so that they are snug. In most applications on a hang glider the nut is only there to stop the bolt from falling out. DO NOT OVER-TIGHTEN NUTS AND BOLTS. Over-tightening them can crush the tubes and damage the hang glider.

Rigging Cables

The main danger with the rigging lies in kinking the cable. This is usually caused by careless rigging and de-rigging or by over tightening the bolts that attach the tangs to the airframe. (It should be possible to swivel the tangs with light thumb pressure.) Once a cable has a kink the strands are damaged and replacement is the only cure. The side cables are particularly important and should receive a frequent detailed inspection. Check for cable damage along the length but the main failure area lies immediately adjacent to the swaged fitting. Look carefully for signs of strand fracture at this position. Corrosion shows itself as a white powdery deposit. Corrosion cannot be cured and the only answer, again, is replacement. Even apparently undamaged rigging wires should be replaced every 200 hours.

Cross tube tensioner

The stitching on the cross tube tensioner is easy to see and should be inspected frequently. The rest of the tensioner strop is hidden in the sail and keel pocket so that any damage is more difficult to see. Thus do take time to inspect this thoroughly, particularly around the VB. Pulleys and the cross tube centre junction leveller. If any damage to the strop is found (fraying, abrasions, cuts or wear to the stitching) the strop should be changed before flying.

Wing fabric maintenance

Any cuts or tears at critical areas such as the trailing edge, sail fixing points or similar high load areas, must be repaired at either the Avian factory or an Avian approved workshop. Small damage to panels, leading edge covers etc., can be repaired with proprietary self adhesive tape. We define small damage as abraded holes no more than 10mm diameter and small cuts no longer than 15mm. Anything larger should be inspected by Avian approved personnel.

Stitching Damage

Thread damage never gets better and eventually runs. If you abrade a seam or damage the stitching in any way, have the damage repaired before it gets worse. Small, non load-bearing areas can often be repaired in situ by the tedious but effective method of hand sewing back through the original stitch holes. Use a needle and only the correct thread: available from Avian or a good sail maker.

Wing fabric cleaning

It is, without doubt, better to keep the wing clean than to try and clean it. Some dirt never comes off completely. With a new glider avoid getting it dirty in the first place by careful rigging and de-rigging. If you decide you do need to wash your wing, then select a dry day and have access to a good hose and clean water supply. Never use bleaches, strong soaps or detergents. The soap residue can react with ultra violet light and degrade the fabric. We recommend a very mild liquid soap (washing-up liquid) and a soft sponge. Gently wash the fully rigged wing, frequently hosing clean. Copious amounts of clean water will not harm the wing and can be very beneficial in removing sand and grit which may get trapped inside the sail. (Usually in the nose or wing tip areas.) Removing stains from stitching is difficult. Resist the temptation of scrubbing with a stiff brush as it might do more harm than good. Ensure that the wing is completely dry before de-rigging and storing.

Battens

Battens form the wing shape and substantially influence the performance of the wing. They need treating with care and, since they are subject to constant stress both during flight and rigging, they may lose their shape. It is essential that they are checked against the template at frequent intervals and re-profiled if necessary. (See Section: Battens and Batten profile.)

REPAIR

The Java Comp airframe is deceptively simple, but like all aircraft requires skilled and qualified attention. We do not recommend self repair or re-assembly by other than Avian or Avian nominated repair agents. No replacement parts should be fitted unless they are factory supplied and identified as such. When ordering spares always quote your glider serial number (make a note of it if you have to replace your keel. It should be recorded on the front of this manual). Bent aluminium tubes must never be straightened, always replaced. Frayed cables and cables with damaged or twisted thimbles must always be replaced.

To help you identify components some of the main assemblies are shown in the appendix of this manual.

RECOMMENDED COMPONENT LIFE

The safe working life of the structural components of the Java Comp is dictated by the environment in which the aircraft is used and the care taken during day to day operations. Inspection, therefore, is an essential tool in deciding the continued use of most components, particularly the sail. UV exposure shortens the life of the sail, which is why it should not be left needlessly exposed to sunlight or any other source of UV radiation.. Due to the nature of their material, construction and position within the structure, certain components have a critical fatigue life and it is mandatory that these components are replaced within the time stated below.

Cross Tubes	2000 hours
Leading Edges	1000 hours
Control frame / fittings	1000 hours
Keel	1000 hours
Rigging wires / Tension strop	200 hours
Factory inspection	100 hours or 1 year (See maintenance)

TRANSPORTATION

The wing must always be transported inside its bag, well packed and with all the protective padding in place. The zip on the bag can be placed down to prevent entry of rainwater. During transportation, or when stored on slings, the wing must be supported at its centre and at two points not more than one metre from each end. Supports should be padded and relative movement between glider and supports must be avoided at all times. (If travelling abroad pay attention to the legal requirements for both glider overhang and coloured flags etc.)

SHORT PACKING

It is sometimes useful to short pack your glider especially for transportation by air. It is unusual to be able to take the glider full length on an aeroplane and is always best to short pack it.

Tools:

You will need a large Philips (posi drive) screw driver and two 4mm Allen keys.

The Java Comp leading edge has been specially designed in two main sections, the inner (nose to out board of the cross tube - leading edge junction) and the outer (tip section of the leading edge). These sections can be separated for short packing- useful for transport overseas or storage.

Removal of the outer leading edge

The outer leading edge section slides inside the inner leading edge. It locates on a clevis pin which stops it rotating. The outer section can be removed without removing the clevis pin. (THE CLEVIS PIN SHOULD NOT BE REMOVED ON ANY ACCOUNT). To take the outer section off:

1. Unzip the glider bag and remove the sail ties. Release the leading edge tension at the nose by unscrewing the Philips self tapping screws at the nose. The sail can then be disconnected from the end plugs using the two 4mm Allen keys.

2. The leading edge outer can now be pulled out. Before removing them mark them 'left' and 'right' with a felt pen.

3. Remove the leading edges. Place a padded bag over the end of the inner leading edge. (To prevent damage to the sail cause by the end of the inner leading edge.

4. Place a cylindrical object (Cardboard roll 4" diameter, roll of bubble wrap or plastic bottle etc.) along side the sail and bend the tips round. (Take care not to crease the Mylar or damage the sail on the end of the inner leading edge or by bending it round too sharply.)

5. Wrap and pack the leading edge outers so that they will not damage your sail.

Re-assembly of the glider

This is basically the reverse of removal of the leading edges:

1. Open the sail out and remove padding from the end of the inner leading edge.

2. Check the 5" lines on the inner ends of the outer leading edges. (These are marked with felt tip and give visual confirmation that the leading edge is fully engaged.)

3. IMPORTANT: Check that you have your outer leading edges in the correct sides. (CHECK THE MARKS THAT YOU PUT ON THEM) When the glider is rigged the location for the tip batten should be on the top front of the leading edge, the washout rod should point up to the top surface of the sail and the Philips self tapping screw should be facing backwards towards the trailing edge.

4. Slide the outer into the inner leading edge. When almost home the leading edge should be twisted slightly until the slot engages with the clevis pin. They should then be pushed fully home. Light tapping with a mallet or something soft might be needed to slide the outer home completely. THIS IS VERY IMPORTANT AND VISUAL CONFIRMATION THAT THE LEADING EDGE OUTER IS FULLY HOME UP TO THE 5" LINE IS ESSENTIAL

5. Remove the self tapping screws at the nose and replace the Allen bolts at the tips only finger tight.

6. Rig the glider. TAKE GREAT CARE TO PULL THE SAIL TOWARDS THE NOSE WHEN OPENING THE WINGS OUT. THIS IS ESSENTIAL FAILURE TO DO SO COULD RESULT IN VERY SERIOUS SAIL DAMAGE.

7. When the glider is fully rigged the tapping screws at the nose can be replaced. The holes should line up.

8. Tighten the Allen bolts at the wing tips slightly. These should only be tightened slightly so that they are not loose. Do not over tighten. You will slightly crush the leading edge or schim.

9. Check all fasteners especially those that have been replaced in your pre-flight check.

TRANSPORTATION BY AIR

Remember, your glider has to be loaded on and off the plane and get past the baggage handlers at both airports. (Don't forget, it also has to make the return journey.)

The object is to:

- Make the glider as short as possible.
- Protect the glider so that it will not get damaged in transit.
- Make the package as light as possible with handles so it is easy for the baggage handlers to move. (If they can't lift it they'll probably use a fork lift.)
- Minimise the damage to the sail caused by packing the glider.
- Make the whole operation simple, so that you can easily repeat the procedure for your trip home.

The type of damage you are trying to protect against:

Damage through dragging the glider with one end dragging across the floor. Protect the ends with thick cardboard or something that will not wear through too quickly.
Damage due to the glider being dropped on to an edge like a railing or the edge of a container truck. (If the whole package has some padding this a helps. Bubble wrap seems to be pretty good but difficult to unpack and re-pack. You will need lots of sticky tape. Pack some for the return journey as well.
Dirt: Airports and aeroplane holds seem to be dirty places. If you've got a nice clean glider bag it won't be after a trip on the plane. Hence the use an old glider bag etc. if possible.

Finally a cover that shows damage is quite useful. i.e. if you use a cardboard box and somebody drives a 747 over it you will be able to see the tyre marks on the box.

If you are lucky you may have a purpose made box or bag. (Avian make an armoured short pack glider bag. It speeds up the process of short packing and provides good protection.)

STORAGE

The correct storage of your glider will also greatly influence its life. The glider should always be stored:

- **well packed**
- **completely dry**
- **well supported**
- **in a dark, cool and dry place.**

The glider should always be stored dry. The sail is made from anti-mould treated cloth but extended storage wet might never-the-less encourage mildew. Wet storage will greatly encourage corrosion of the airframe wires and fasteners. Salt water will of course be many times more damaging. After flying on the coast the glider should be washed with fresh water. Always try and store your glider inside. If it is wet leave the bag open and try and open the glider out to dry properly as soon as possible. It is important to keep the glider out of the sun when not in use as exposure to UV radiation damages the sail. Use the thick bag supplied and if at all possible store in the dark.

TROUBLE SHOOTING

The tension strop gets caught

When rigging the glider and spreading the wings the tension strop should appear through the keel-pocket. If it does not, stop and check to see where it is caught rather than force it. Check for any damage to the tension strop before flying. To stop this getting caught again, make sure that the elastic attached to the strop is tight enough so that it disappears into the keel when fully rigged. Also check that the strop has no twists in it and that the elastic loop is on the outside of the stainless tang (i.e. not next to the keel) when the tension is released.

The tension strop is difficult to pull on

1. The tension strop might be twisted around the cross tube centre junction. When freed, inspect the strop for damage and replace if necessary. Try and keep the strop twist free.

2. The side wire is caught:

a) The side wire is caught behind a batten end or wrapped around the control frame: Release the wire, check for damage and replace if necessary.
b) The side wire is twisted at the junction with the leading edge. (The wire kinked over the tang): Release the wire, check for damage and replace if necessary. (This kinking is more likely if the tang is very loose. The tang should offer some resistance to movement with light thumb pressure .)

The VB. is difficult to pull on or fails to release

If instruments are attached to the right hand upright it may interfere with the VB. operation. The VB. cord runs down the rubber back of the right hand upright. Crushing the rubber back impedes the movement of the cord. It may then be possible to pull the VB. on but not to release it. This is easily cured by inserting a length (30cm) of batten material inside the rubber back of the right hand upright. (This stops the rubber back from being crushed.)

The VB. may not release fully on the ground because of the weight of the cross tubes on the keel. (See appendix for further explanation.)

Other problems with the VB.

The VB. may also be difficult to pull if mud or stones get into the lower casting. Remove the obstruction.

Other problems are unusual but are most easily cured by following the VB. cord until you find an obstruction.

The wings are difficult to close when de-rigging the glider

If de-rigging on the keel the weight of the wings is transferred to the keel. This stops the cross tube junction from sliding so easily on the keel so easily when the tension is released. (See above.) The easy remedy is to unzip the under surface and pull the cross tube junction forwards. The wings can then easily be moved inwards.

When the tension strop is released it should be pushed towards the keel pocket to feed some slack into it. This allows the wings to move together more easily. It is possible for the tension strop to get caught. Find the obstruction and release the tension strop and continue to move the wings inboard.

The glider has a turn

Check for crash damage then see tuning instructions.

The glider has become more difficult to turn

1. This can be caused by an incorrect but symmetrical batten profile. (Asymmetrical battens tend to cause turns.) The glider handling does deteriorate significantly if battens are out of profile. Check the battens (don't forget the nose batten) against the profile more regularly.

2. This may also be caused by an incorrect trim position. (The position of the hang loop.) The glider might be trimmed too slow "hands off" and be flying in a semi-stalled condition. See tuning instructions.

3. This can also be caused by foreign bodies in the cross tube junction area. Remove.

The glider is heavy or "strange" in pitch

The glider is heavy or handling badly despite the hang point apparently being in the correct position. The backup hang loop might caught in such a way that it interferes with the main loop when moving the bar (in or out depending on the position of the backup loop relative to the main loop.) Free the backup loop so that it is loose at any flying speed. Always fly with a backup loop.

The glider appears to be trimmed too fast despite having the hang loop at its furthest rearward position

1. If you are new to the glider and have previously flown a glider which has a heavier pitch response you may actually be pulling the bar in with out realising. On a smooth day, when you have a safe ground clearance and are clear of all other aircraft, slowly release your grip on the base bar and check the bar position and trim speed without putting any load on the speed bar.

2. As above this might be caused by a backup loop that is caught and interfering with the main loop when flying. Free the loop so that you are sure it is loose in flight.

The short under surface batten has been put in the long under surface batten pocket

You can sometimes do this accidentally if rigging quickly. If you have pushed the batten in a long way, you may have to totally de-rig to remove it.

In future always work in from the tip with the under surface battens i.e. put the shorter battens in first. In this way if you get the wrong batten it will be too long and easy to remove from the pocket.

The nose cone is lost

YOU SHOULD NEVER FLY WITHOUT A NOSE CONE. Check that the nose cone is not down the leading edge pocket of the glider. Hold the leading edge up to the light and look for the silhouette of the nose cone.

The leading edge pocket appears to have black marks or other dirt on the inside

This is usually grass or other debris which has got down the leading edge pocket. Try and get is out as best you can. The problem is usually caused by the storage of the battens in the leading edge pocket which tends to fill the pockets with debris and encourages mildew. DO NOT STORE YOUR BATTENS IN THE LEADING EDGE POCKET.

The under surface appears to have black marks around the keel and centre junction

This could be caused by some leakage of lubricant from the cross tube centre junction. Clean around the area with a dry rag. Wipe marks off the inside of the sail.

OWNERSHIP

Please notify Avian Ltd. of change of ownership and change of address. This is important so we can let you know about upgrades or in the unlikely event, recall components or gliders.

- Please keep a record of all work done on your hang glider.
- Please let us know of any ideas for changes that you think would improve our hand book, hang gliders or service. We are interested and would also like to hear if you have any complaints about the gliders or our service.
- We would be most grateful to receive any interesting photographs of our gliders.
- Finally we hope that you have many hours of safe and very enjoyable flying.

Appendix

LOSING THE KINGPOST- WHAT IT MEANS TO YOU

The 'topless glider' has been developed to reduce parasitic drag and thus increase performance by removing the top rigging. This has resulted in one of the largest changes in hang glider design for some time.

The old style top rigging provided two things:

1.The top rigging braced the airframe when on the ground or when the glider was subjected to negative 'g'.
2.The kingpost provided an attachment point for the anti-luff lines which contributed to the glider's pitch stability.

These two jobs are now done by the new structure without the aid of a kingpost. This has resulted in the use of new materials such as carbon fibre reinforced plastic (CFRP), more usually seen in racing cars. CFRP is used because it provides better stiffness and strength to weight ratios than aluminium. This results in a 'kingpost less' airframe that is only slightly heavier than a standard airframe. In fact the expert design of the Java Comp results in a 'topless' glider lighter than most other topless gliders and even some kingposted gliders.

Strength

The most obvious requirement is the need for strong cross tubes. These carry the weight of the wings when on the ground. This load is transferred to the keel via the leveller (or cross tube centre junction).

The keel has also lost its top wire bracing so it needs to be stronger to support the loads from the cross tubes and resist downwards bending of the keel. e.g. When pulling the nose to lift the keel off the ground prior to flight.

When rigging or de-rigging on the keel the wings are held up by the cross tubes. The load exerted by the cross tubes on the keel and resultant extra friction mean that the tension is more difficult to pull on or let off. Hence the preference for help lifting a wing when rigging or the need to pull the cross tube centre junction forwards when de rigging prior to folding the wings in. Of course neither of these are necessary when rigging or de-rigging flat.

Pitch Stability

The glider pitch stability is now provided by washout alone thus the rods for maintaining washout are very important. On the Java Comp there are two washout rods each side. The inner rod swings out automatically when rigging the outer must be positioned when the glider is tensioned. Thus do not be tempted to disconnect the inner rod from the sail in an attempt to make the sail easier to pack. (It could result in incorrect rigging next time.)

The nature of Carbon Fibre

Carbon Fibre Reinforced Plastic (CFRP) or carbon fibre as it is sometimes shortened to is a composite material. It is made up of a matrix and filaments of fibre. The matrix (epoxy resin) is the material used to bind the filaments used in the composite material. The filaments used are carbon fibre. In 'hybrid' composites a mixture of fibres or filaments are used.

The idea of composites has been around for some time. Combing the properties two or more materials can result in a composite material exhibiting 'superior' properties than either of its constituent parts.

Filaments or fibres are used as they exhibit superior mechanical properties than large expanses of the material. The two main reasons are that fine filaments can be bent around a much smaller radius than larger pieces. (Consider a fine filament of fibre glass and a sheet of glass.) The other reason is that carefully extruded filaments contain many fewer imperfections per unit length than a larger object. In materials such a glass the imperfections seriously reduce the strength.

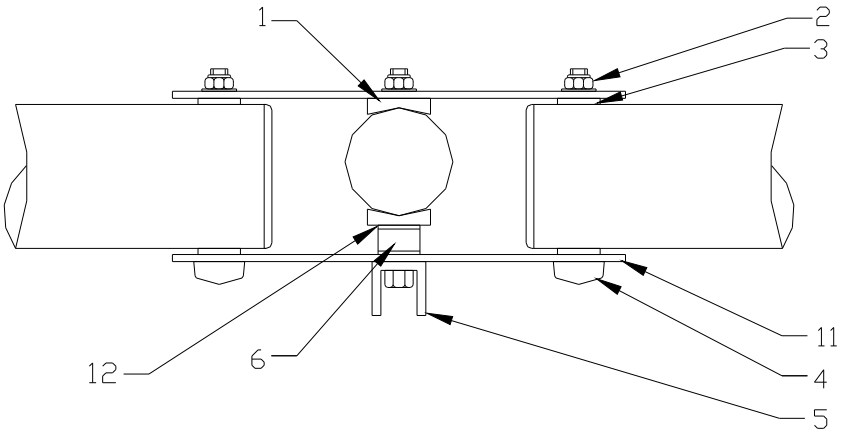
Another property of composite materials is their *Anisotropy*. That is they exhibit different mechanical properties such as strength and stiffness along different axes. In CFRP the majority of the strength is in the direction of the fibres. This is different to metal alloys which are generally described as *Orthotropic* which means they exhibit the same mechanical properties in all directions. CFRP can be made *Quasi-orthotropic* (similar to orthotropic) by running fibres in all directions. There is sometimes little reason to replace a metal with a quasi-orthotropic composite.

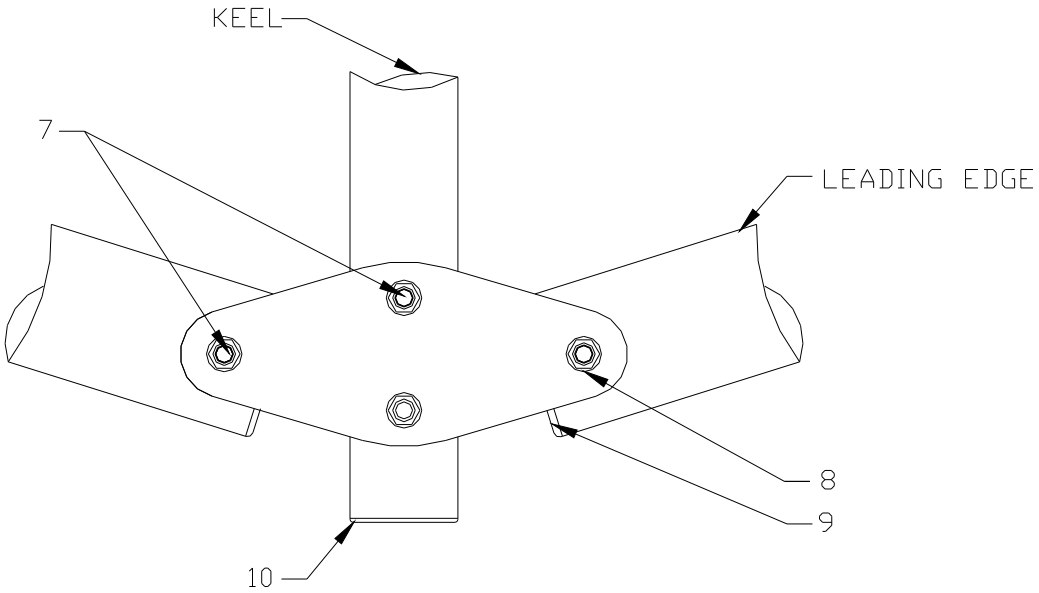
The salient point is that carbon fibre is not like metal and must be treated differently. It is much less resistant to high temperatures than metals but more corrosion resistant. However the main area of concern is the ability to detect damage in carbon fibre: a sharp blow to a metal tube is likely to result in an easily detectable dent. The same blow to a carbon fibre tube may leave a barely visible mark while significantly reducing its strength.

As a result of this commercial composite aircraft parts are designed to have sufficient strength with Barely Visible Impact Damage (BVID) and thus 'perfect' parts have enormous safety margins. Of course Avian cross tube spars are designed to the same criteria. However a small dent in a carbon fibre cross tube should be considered as <u>much more</u> serious damage than a similar sized dent in an aluminium cross tube. Damage such as this should be examined professionally, by Avian, before flying.

Appendix
ASSEMBLY DRAWINGS

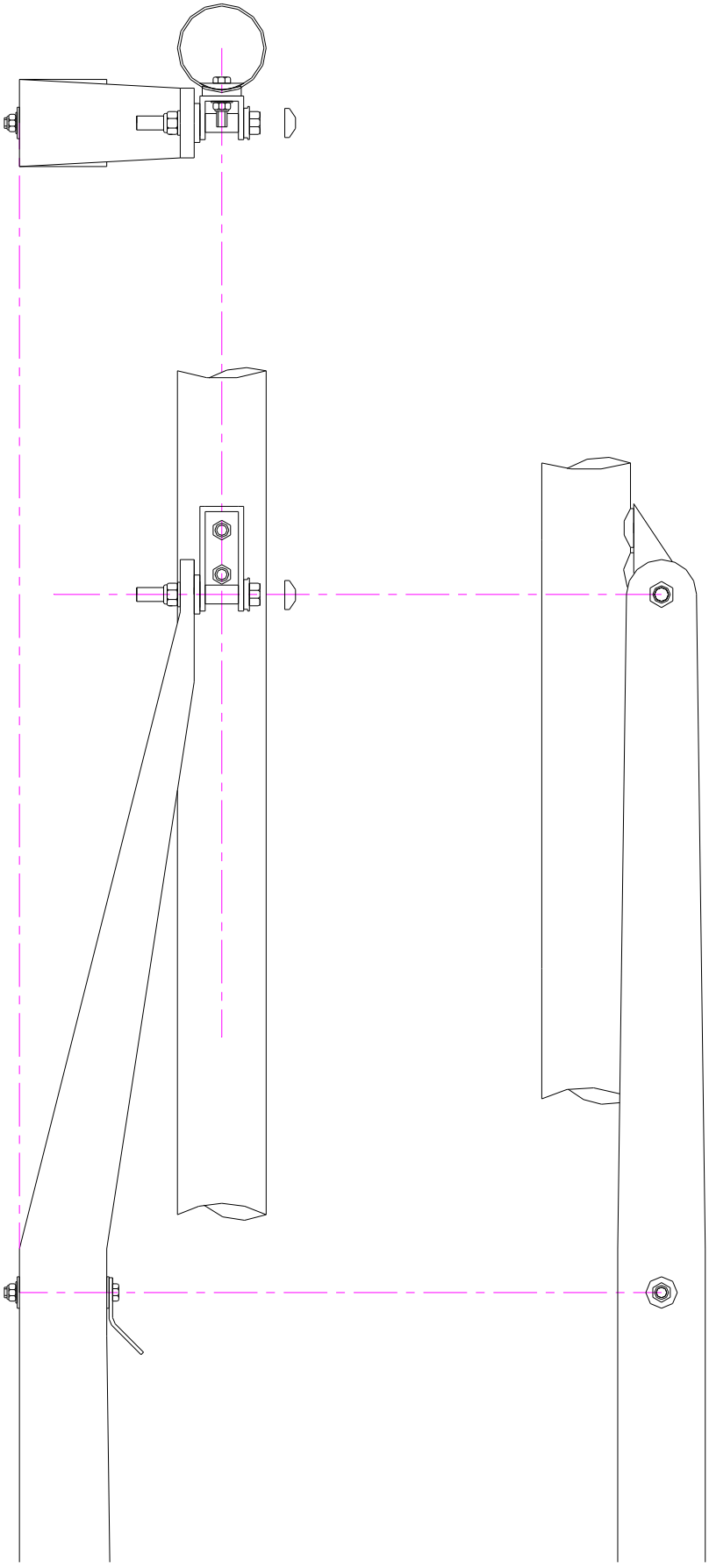
NOSE ASSEMBLY



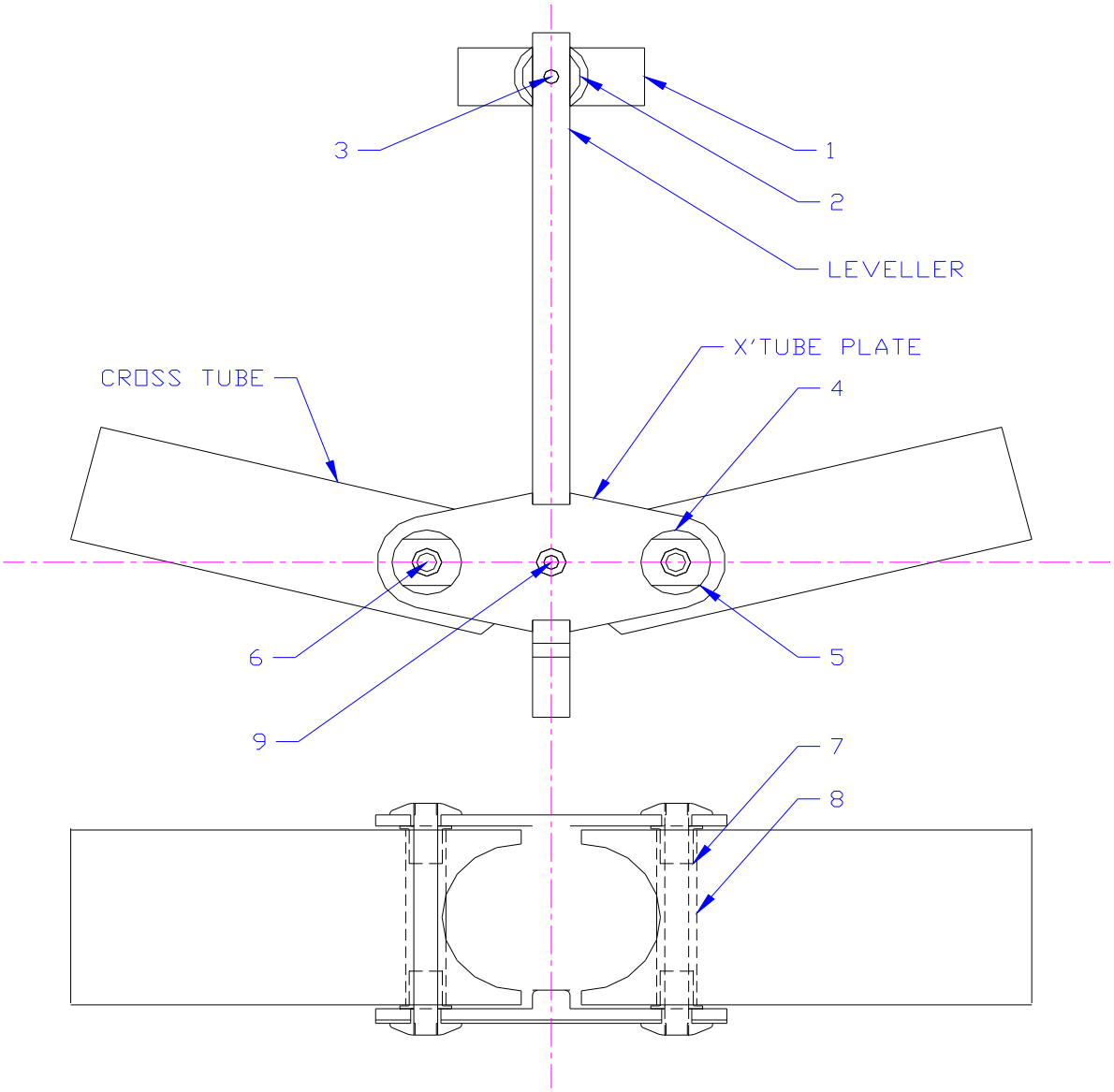


	PARTS LIST
1	6mm SADDLE
2	M6 NYLOCK NUT
3	NYLON INSERT
4	6mm NUT CAP
5	NOSE CHANNEL
6	SPACER
7	NOSE BOLTS
8	6mm STAINLESS WASHER
9	2" BUNG
10	1 1/2" BUNG
11	NOSE PLATE
12	NYLON WASHER

CROSS TUBE / LEADING EDGE JUNCTION



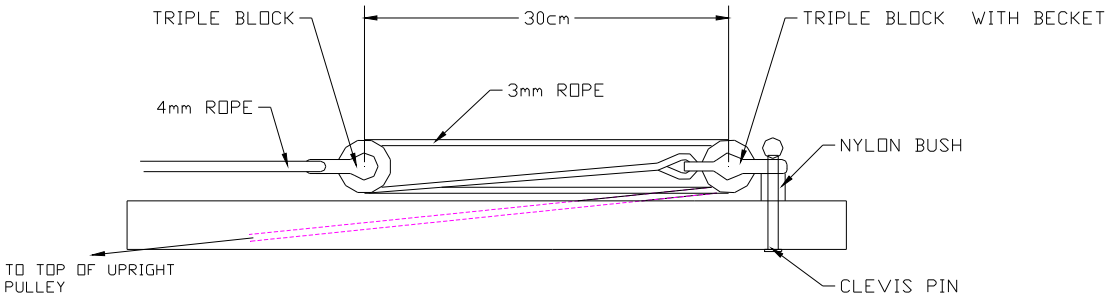
CROSS TUBE CENTRE JUNCTION

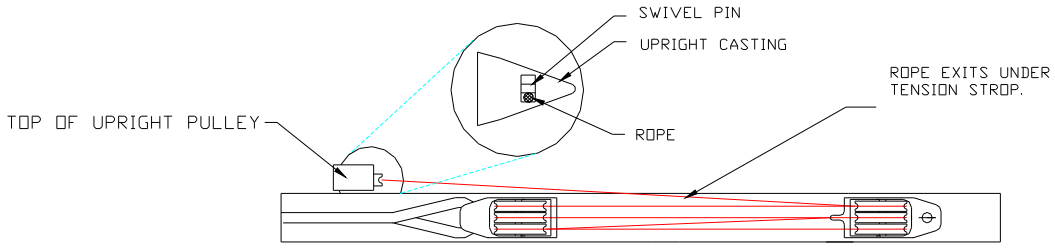


PARTS LIST

1	NYLON FOOT
2	V.B. PULLEY
3	M6 CENTRE BOLT
4	MYLAR WASHER
5	TIE BAR NUT
6	TIE BAR
7	STAINLESS STEEL BUSH FITTING
8	ALUMINIUM BUSH
9	M6 STUD

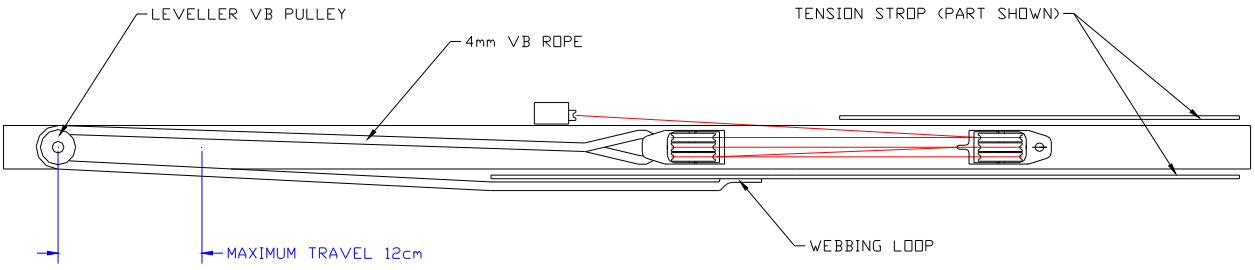
VARIABLE BILLOW VB. (OR VARIABLE GEOMETRY VG.)





3mm DIAMETER ROPE LENGTH 5.2M

4mm DIAMETER ROPE LENGTH 2M

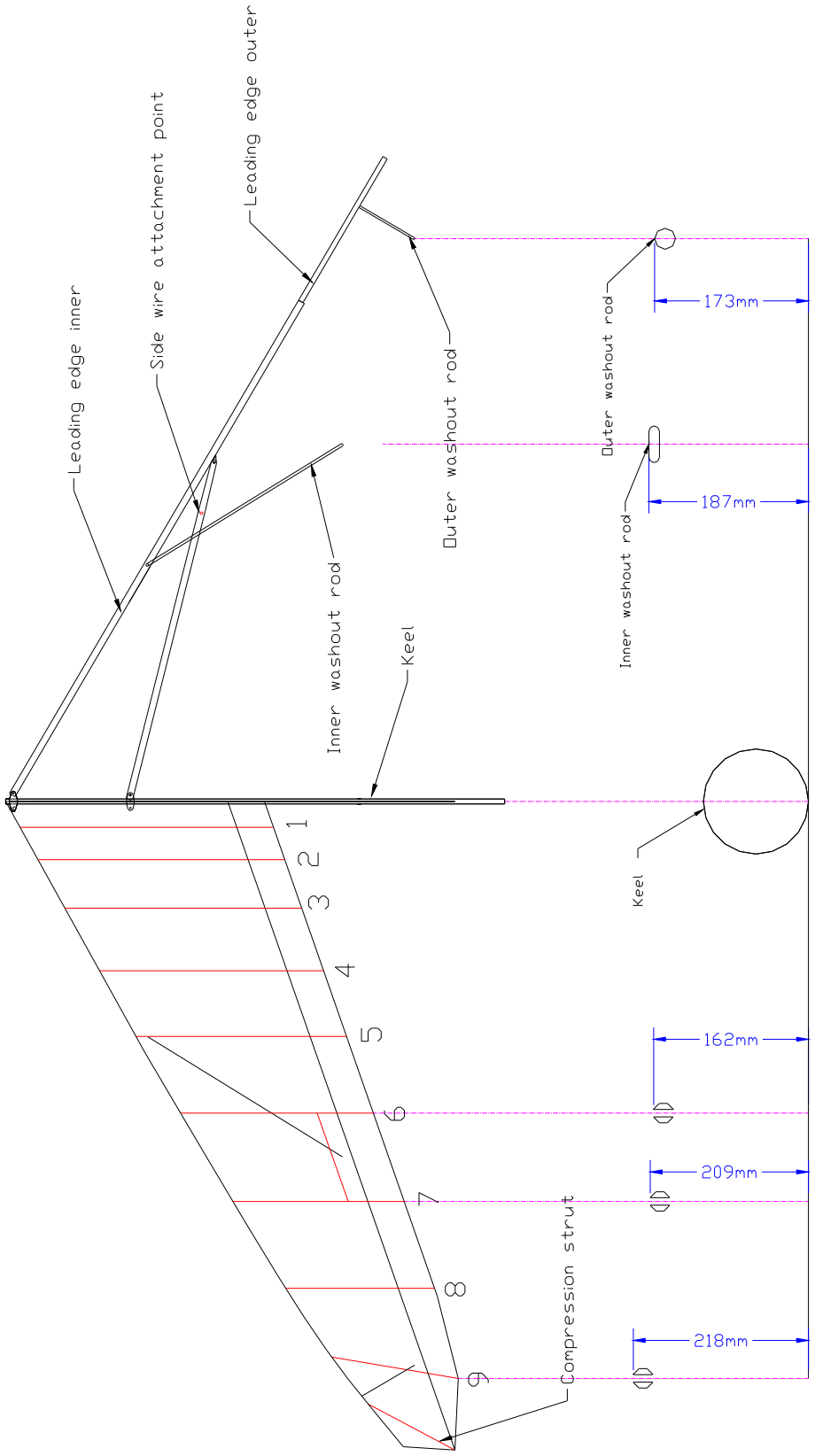


3mm DIAMETER ROPE LENGTH 5.2M

4mm DIAMETER ROPD LENGTH 2M

Appendix

CHECKING WASHOUT; GLIDER MINIMUM REQUIREMENTS:



Appendix

THIN LOWER RIGGING FOR COMPETITION GLIDERS ONLY.

Rigging Cables: Thin Fore and Aft Lower Rigging

These wires are significantly thinner than standard and their use is recommended only for competition flying. The main danger with these rigging wire lies in their thinness and thus sharpness. It is highly recommended that a pilot using these wires flies with suitable face protection (i.e. Full Face helmet) and gloves. Gloves will also be required for ground handling.

Strength and Life

These wire are approximately 1/3 of the strength of normal wires when new. Thus it is even more important that kinked cables should be immediately replaced. Once a cable has a kink the strands are damaged and replacement is the only cure. Before every flight check for cable damage along the entire wire length. The most likely failure area lies immediately adjacent to the swaged fitting. Look carefully for signs of strand fracture at this position. These wires are stainless and will not show corrosion or other signs of ageing. In addition these wires have much less redundant strength. Thus it is especially important to replace, even apparently undamaged rigging wires, every 100 hours of flying or more frequently.