UP MOSQUITO

OWNER'S MANUAL

SERIAL NUMBER 166103

NOTE: This manual contains a record of all inspections and maintenance done on this glider. If the glider is sold, this manual should be forwarded to the new owner.

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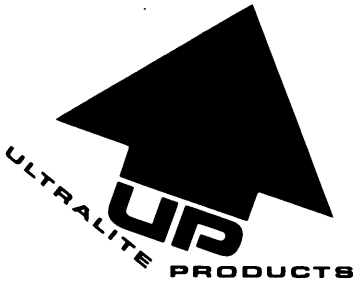


UP MOSQUITO OWNER'S MANUAL

INTRODUCTION

Congratulations! You are now the owner of one of the world's finest high-performance hangliders, the UP Mosquito. The Mosquito was designed by Roy Haggard, chief designer for Ultralite Products since 1974. The UP Mosquito, like most Roy Haggard designs, is a total departure in design concept from other contemporary gliders. With its ultraflat sail and truncated tips, the Mosquito is a direct descendent of UP's famous Spyder, the design that ruled the skies over three continents in 1977-78.

The Mosquito is the result of ten intensive months of research, design, and testing: Five basic prototypes with approximately four variations each to define the right combinations of flight characteristics that make the UP Mosquito the current state of the art in hangliding. Twenty preproduction prototypes were built for top U.S. competition pilots to evaluate in the world's most demanding cross country event, the XC "Classic" and "Open" Competition in Owens Valley. The result? First place: Rich Pfeiffer -- UP Mosquito. In addition, UP Mosquitos placed four in the top eight places, won every speed task, and set three new world's records for hangliding.

We at UP are extremely proud of the Mosquito. It was designed specifically for the advanced pilot and takes skill to fly; properly flown, it will give such a pilot the satisfaction of knowing that the machine meets his expectations in every way. Unexcelled speed and matchless thermal capabilities extract confidence on every flight in every type of condition.

You'll find that the more you fly your UP Mosquito, the more you'll learn about its full capabilities. You'll get more than you expected. It's a glider you can trust and fly with confidence whether it's an afternoon of cruising in thermals or working for every difficult point in competition. You'll find the Mosquito will respond to your every desire. We know you'll enjoy it. This manual is a basic introduction to the Mosquito, its use, maintenance, tuning and flying characteristics. Tuned and flown properly, your Mosquito will provide you with hours of airborne delight.

WARNING!

Hangliding, practiced under even ideal circumstances, can result in serious injury or death. Product liability insurance is unavailable to manufacturers of ultralight aircraft. You are reminded that you fly any hanglider at your own risk. Your acceptance and/or use of this product implies your agreement and understanding of this stipulation. UP, Inc. (dba Ultralite Products, Inc.), its officers, employees, heirs or assignees have no control over a pilot's use of his hanglider either in transit, storage or flight. UP, Inc. (dba Ultralite Products, Inc.), accepts no responsibility whatsoever for any mishap that may occur during the use of its products, regardless of the results.

UP MOSQUITO

GENERAL OPERATION LIMITATIONS

The Mosquito is H.G.M.A. certified as a utility class hanglider and therefore has the following flight limitations. This glider must not:

1) *Be towed.*
2) *Be flown by more than one person at a time.*
3) *Exceed 30° nose up or down to horizon.*
4) *Exceed 60° bank angle left or right to horizon.*
5) *Be flown inverted or backwards.*
6) *Be flown with auxiliary power unless designed, installed, and tested by the factory.*

Flight operation must be limited to non-aerobatic maneuvers. This glider is characteristically incapable of spinning.

This glider requires a U.S.H.G.A. Hang 4 qualified pilot.

The recommended pilot weight range is as follows. The figures given below include harness, helmet, clothing, vario, etc.:

Mosquito 146	*124-182 lbs.*
Mosquito 166	*142-207 lbs.*
Mosquito 196	*171-249 lbs.*

For this glider, the stall speed with maxium pilot weight is 22 mph. The top speed with minimum pilot weight is 42 mph.

PRIOR TO FLYING THIS GLIDER, THE PILOT SHOULD THOROUGHLY READ THE APPROPRIATE OWNER'S MANUAL FOR COMPLETE OPERATING AND TUNING INSTRUCTIONS.

UP MOSQUITO

SPECIFICATION SHEET

	146	166	196
AREA	145 sq. ft. (13.4 m^2)	163 sq. ft. (15.1 m^2)	194 sq. ft. (18.02 m^2)
LEADING EDGE	17' 5 5/8" (5.37 m)	18' 8 1/2" (5.702 m)	20' 4 7/8" (6.22 m)
ROOT CHORD	5' 10" (1.78 m)	6' 3" (1.91 m)	6' 10" (2.08 m)
NOSE ANGLE	136.4°	Same	Same
BILLOW	.2°	Same	Same
WEIGHT	50 lb (22.67 kg)	54 lb (24.5 kg)	64 lb (29.0 kg)
WING SPAN	32.8' (10.0 m)	34.8' (10.61 m)	37.9' (11.55 m)
ASPECT RATIO	7.4	Same	Same
PILOT WEIGHT RANGE*	124-182 (56-83 kg)	142-207 (64-94 kg)	171-249.6 (78-113 kg)
GLIDE RATIO	10/1 +	Same	Same
MINIMUM SINK	180 ft/min (.91 m/sec)	Same	Same
SPEED RANGE (Indicated Airspeeds)	15-45 mph (24-72.4 kph)	Same Same	Same Same
STALL SPEED (Indicated)**	15 mph (24 kph)	Same Same	Same Same
MAX L/D SPEED (Indicated)	23 mph (37 kph)	Same Same	Same Same

*This weight includes all flying gear: harness, helmet, vario, parachute, etc.

**Actual stall speed is approximately 5 mph faster.

MOSQUITO GENERAL INFORMATION

THE POLYCYLINDRICAL WING:

Once you have your new Mosquito assembled, it will be obvious that the side wires from the control bar are very loose. This is normal (at least for a Mosquito). It allows the leading edge to bow upwards when the glider is positively loaded and flying in the "normal" angle of attack range; that is, above 10° positive angle of attack. In normal flight, this accomplishes two things: (a) It reduces the profile drag of the glider by eliminating frontal area, and (b) it decreases midspan washout by allowing the leading edge to more closely follow the contour of the trailing edge of the sail. This eliminates much of the induced drag caused by excessive washout.

The most important function of the polycylindrical wing shape, however, is as a pitch stability system. When the angle of attack of the Mosquito gets below approximately +10°, the leading edges start moving downward toward their lower position. As this occurs, the positive pitch stability gets stronger and stronger. This occurs because the wing has far more washout when the leading edges are in their full down position. When flying in smooth air, the leading edges will never leave their normal flight position. This is because the extra stability force isn't needed. In very turbulent conditions they might cycle several times a minute, but only as a result of the angle of attack going below the normal range several times. This may be a little noisy, but you will get used to it quickly. In short, the polycylindrical wing of the Mosquito is an excellent solution to provide high performance, low drag, and high pitch stability in a sailwing glider.

SUMMARY OF SELECTED FLIGHT CHARACTERISTICS:

1) Stalling speed is 22 mph with maximum pilot weight.
2) L/D is 10 at 22 mph.
3) Maximum speed is 43 mph with minimum pilot weight.
4) Acceleration from 10% over stall to 30 mph is 1.0 seconds.
5) Time of roll from 45° to 45° is 2.9 seconds.
6) Approved aerobatic maneuvers: NONE.
7) This glider is characteristically incapable of spinning.
8) Positive ultimate load factor is 5.4 G's at maximum wing loading.
9) Negative ultimate load factor is 3.0 G's at maximum wing loading.
10) This glider may not be towed.

GENERAL FLIGHT CHARACTERISTICS & SUGGESTED TECHNIQUES

(1) Takeoff: Hold the glider where it balances statically, approximately 15° nose up, and give a good run. You'll be off! This nose-up angle of attack might seem a little high at first, but after a few takeoffs, it will seem normal (See photo at right). As to takeoffs in high wind, have your wire man stand almost underneath your noseplate and hold the nose up for you. Both wings should be "inflated" prior to takeoff. If the nose of the Mosquito is held too low for takeoff, one wing may blow down and seem to glue itslef to the ground. Should this occur, set the glider down, level the wings and start over, holding the nose a little higher.

(2) Landing: Set up a long final glide directly into the wind. Fly down to three feet or so at at least 25 mph, concentrating on keeping the wings level. Next, slowly bleed off your speed staying at about three feet until you are about 2 mph above minimum sink speed. Then, using the control bar uprights, give a full flair and stay flaired. Using this technique, the Mosquito lands beautifully with no tendency to drop the nose.

Bad landings may result because of:

- *(a) Down or crosswind landings.*
- *(b) Flairing too early or late or not holding the bar out during any runout.*
- *(c) Trying to mush down or parachute to the ground.*
- *(d) Landing in a turn.*
- *(e) Any combination of the above.*

Avoid these errors, and you will enjoy perfect landings.

(3) Thermaling: The Mosquito's best glide speed is probably faster than your old glider. This is great for cruising from thermal to thermal or crossing that gap that seemed just a little too wide for your old glider. The quicker cruise speed requires a different technique for thermaling, however. Basically, everything happens a little faster, and this requires that you make your decisions accordingly quicker. Generally, the Mosquito needs to be thermaled in a steeper banked turn than a slower glider. We have found that 19-22 mph indicated airspeed offers the best rate of climb when thermaling. We strongly recommend that you use an airspeed indicator for your first few flights in your Mosquito. This will help give you an idea of the speed/angle of attack relationship. It will also give you an indication of how fast you are really going, and help you fly the glider more efficiently. Several first-time Mosquito pilots have flown exceedingly fast, but those using an airspeed indicator slowed down to the proper speed.

GENERAL FLIGHT CHARACTERISTICS (Cont'd)

(4) High winds: In winds over 15 mph, be sure that the Mosquito is left flat on the ground until ready to fly. This is very important. In gusty winds over 20 mph, an asymmetrical loading condition can develop on the ground if the glider is left in flight-ready position. One wing might have full wind force on it while the other has no such force. When this happens, the loaded wing pulls the unloaded wing back and can actually bend it. This situation can't happen in the air, only on the ground.

H.G.M.A. CERTIFICATION SUMMARY

The Mosquito is HGMA certified; but just what does that mean? It means that the glider has gone through a rigorous testing program and passed all the HGMA's requirements. Here is a brief summary of the test program and the Mosquito's performance therein.

First there are four basic load tests. Positive load: The HGMA requirement for the Mosquito is 60 mph at stall angle of attack or greater. The Mosquito was taken up to 80 mph with no failure occurring (the force exerted on the glider increases at the square of the velocity, therefore the Mosquito exceeded the HGMA requirement by 77%!). Negative load: The requirement for the Mosquito is 42 mph at -30° angle of attack on the test vehicle. The Mosquito went to 47 mph before failure. -150° load test: This tests the glider's ability to handle a tail slide situation. The requirement is 30 mph (this is with the glider 30° tail down moving backwards through the air). The Mosquito went to 32 mph. Flight tests: These are simple documentation procedures, i.e., takeoffs, landings, transitions from one flight attitude to the next, all without needing exceptional skill. There is a roll rate requirement of 4 seconds from 45° to 45° bank in the opposite direction. The Mosquito's average time was 2.9 seconds. A steep dive is also required, at least 75° to the horizon. This was accomplished by doing consecutive wingovers, ending with a 140° banked turn and a dive exceeding 90°. This maneuver should not be duplicated!

The glider must also be longitudinally stable. This means, basically, that at speeds above "hands off" cruise the glider should slow down on its own and at speeds below "hands off" cruise the glider should speed up on its own. Also included in longitudinal stability is a pitching moment test. Pitching moment can be described as the rotational force exerted by the glider at a given angle of attack. The HGMA requires a .05 pitching moment at a zero angle of attack. For the Mosquito, this computes to 9 lbs. nose-up force at the bottom of the control bar. The Mosquito pulled 25 lbs. at zero angle of attack, which computes to a pitching moment of .14, nearly three times above the requirement.

All of this is fairly straightforward, but consider that it is all documented on film! At UP we are becoming quite adept at making home movies. There is also a written report required, complete with three drawings, a film transcript, and even an explanation of all equipment used including airspeed indicators, dynomometers, the test vehicle, right down to the make of the movie camera! So that's the HGMA certification program in a nut shell. We hope that this information renders HGMA certification more understandable, and that it generates appreciation for our continued success in surpassing these tests with pilot safety our utmost concern.

MOSQUITO TUNING INSTRUCTIONS

Tuning your Mosquito is very easy; 90% of all tuning is accomplished by varying the tension of the outboard sweep cables. These cables run from the twin tang on the bowsprit around the pullies and attach to the front of the trunctips.

The Mosquito handles beautifully when tuned properly, but can be quite tiring if it has developed a turn. Turns are tuned out by altering the relative tensions of the outboard sweep cables. REMEMBER: The glider will turn toward the loose side, and conversely will turn away from the tight side. Therefore, for example, if your glider is turning very noticeably to the left, the remedy would be to tighten the left outboard sweep cable approximately two turns and loosen the right outboard sweep cable approximately two turns. Severe turns require more adjustment, subtle turns less adjustment. One turn on these cables can make a difference, so fly attentively and be sure your Mosquito doesn't have a subtle turn.

Pitch trim is accomplished by placing the top of the control bar in whichever of the 3 holes in the control bar mount box providing the "hands off" trim speed you desire. Pitch trim is also affected by the simultaneous tightening or loosening of the outboard sweep cables. This tension is preset at the factory using a tensiometer, but if you must make an adjustment, they can be loosened as much as 4 turns to provide a slower trim speed (and a slight degradation of high speed glide). They can also be tightened as much as 4 turns to provide a faster trim speed.

Roll stability is ideal for the Mosquito when the glider will stay in a 20° to 30° bank without any tendency to either roll steeper or any shallower. This is controlled by the outboard flying cables and outboard landing cables. These run from the control bar to the pulley location and from the kingpost to the pulley location respectively. Let the wings up and the glider becomes more roll stable. Pull the wings down (by tightening the outboard flying cable and loosening the outboard landing cable correspondingly) and the Mosquito will show a greater tendency to stay in a bank. If the outboard flying cables are too tight, the glider will overbank in turns and require more force to roll it out of turns. This is too tight!

Performance optimumization: The Mosquito can be tailored to suit your particular needs by adjusting the sail on the frame. The Mosquito comes from the factory in the minimum sink configuration. If a faster cruise speed is desired, the sail is pulled back slightly tighter on the frame: (1) Retie the keel pocket approximately 5/8" tighter. Now fly the glider. Notice the difference in the stall speed. The best glide speed is also faster. (2) Tightening the sail back on the trunctips will cause the glider to cruise (and stall) even faster. NOTE: These changes will also cause the handling to be stiffer, the stall speed higher, and the landing speed faster. They will cause a degradation of the sink rate also, but if you fly where there are strong thermals and high winds, this won't be a problem. This configuration offers the best penetration.

MOSQUITO ASSEMBLY PROCEDURES

(1) Place glider on ground with nose into wind and zipper facing upward (See Fig. 1 & 2). Open bag and assemble control bar. NOTE: The machined fittings at the top of the control bar have "flats" on the inner surfaces. When both downtubes are pulled out into flying position, these "flats" touch in the center, increasing the stiffness of the control bar. BE SURE THAT BOTH DOWNTUBES ARE PULLED OUT INTO FLYING POSITION SYMMETRICALLY. Also pull the pilot support loop down to prevent it from being pinched between the flats. If one downtube is pulled out before the other, a misalignment will occur inside the small stainless steel pivot box to which the downtubes are attached. This will cause the steel pivot box to be canted to one side or the other and prevent it from mating properly with the control bar mount box on the keel.

Fig. 1

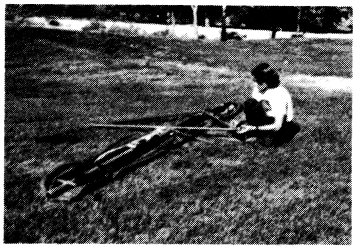


Fig. 2

(2) Move the assembled control bar as far forward as the attached flying wires will allow.

(3) Turn the control bar over and then set the glider on top of it (Fig. 3 & 4). Be sure to turn the glider over in the same direction as the control bar.

(4) Remove all remaining UP straps holding glider together.

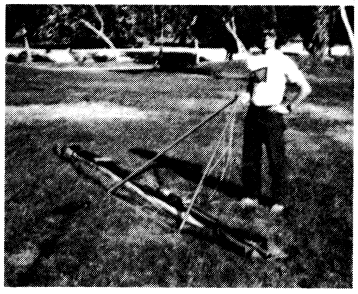


Fig. 3

Fig. 4

MOSQUITO ASSEMBLY PROCEDURES (Cont'd)

(5) Erect the winglets (See Fig. 5) on the top of each truncated wingtip tube. Pull each winglet tube up into position and secure with clevis pin through the winglet bracket underneath the winglet tube. Fasten safety pin in clevis pin to prevent loss. Pull the wings out slightly.

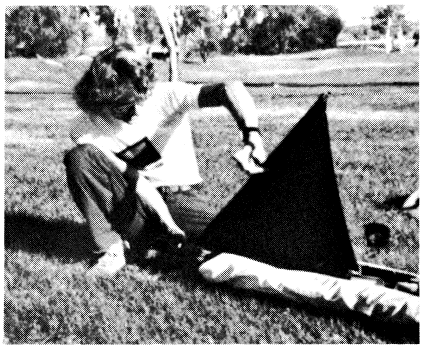


Fig. 5

(6) Rotate the wingtips into flying position. NOTE: The tips swing "inwards" toward the keel. Check to assure the proper routing of the outboard sweep cable. It should run from the front of the trunc tip directly to the pulley.

(7) Erect the kingpost, removing the sail tie (See Fig. 6). NOTE: The kingpost slants forward in normal flight position.

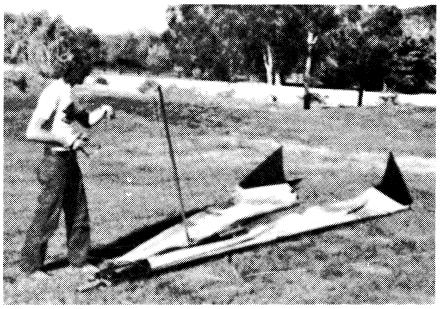


Fig. 6

(8) Carefully walk each wing out to its approximate flying position (See Fig. 7), holding the wing high enough to see that the cables are free from snags. If the wing resists while attempting to walk it out, something is snagged. Check underneath the wing, around the control bar mount box and around the corners of the control bar. Free any entanglements and proceed.

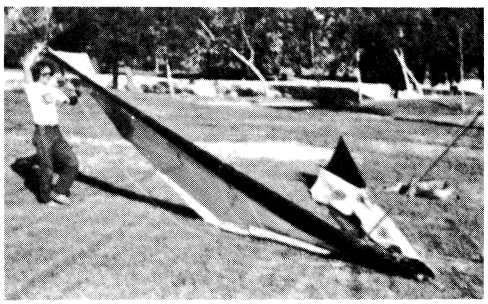


Fig. 7

(9) With both wings extended, insert the battens and secure with bungie elastic cords (See Fig. 8)

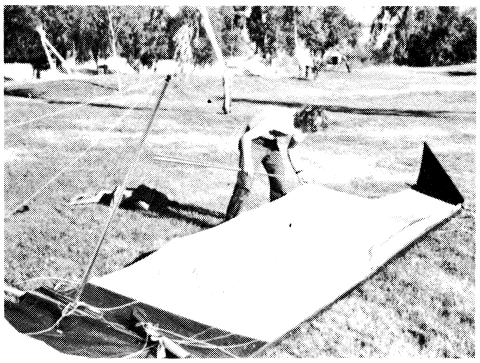


Fig. 8

MOSQUITO ASSEMBLY PROCEDURES (Cont'd)

(10) Rig the bowsprit extension as follows: (a) Pull the outboard sweep cables out from under the wings and free any snags (See Fig. 9). (b) Pull the special bowsprit bag off the tube and rotate the bowsprit extension forward 180° into flying position from its folded position on top of the keel. (c) Make sure both the heavy duty 5/32" inboard sweep cables and the outboard 3/32" sweep cables are free of snags and that all thimbles are in alignment. Make sure that the lower lead flying wires are not twisted and that each lower wire is not snagged or misaligned. (d) Very carefully place the top rear edge of the bowsprit tube on the top of the machined aluminum bowsprit fitting on the keel at approximately a 45° angle from the keel (See Fig. 10). (e) Step "inside" all the sweep cables attached to the nose of the bowsprit and place the instep of your left foot underneath the right leading edge near the keel plates (See Fig. 11). (This will keep the nose off the ground while the bowsprit extension is being rotated downward into flying position.

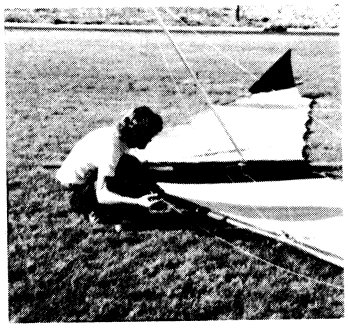


Fig. 9

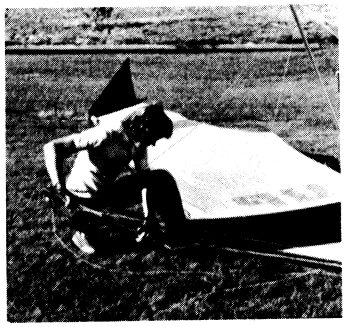


Fig. 10

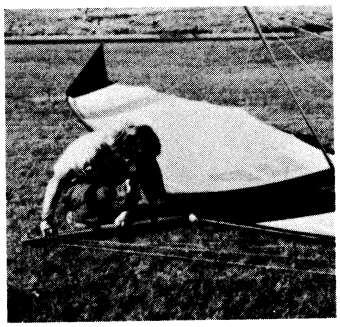


Fig. 11

(f) Carefully rotate the bowsprit downward into flight position until it is fully matched with the machined fitting on the keel and in line with the keel. (g) Wipe all dust and dirt particles off the bowsprit and keel, then very carefully slide the oversleeve over the junction of the bowsprit and keel. DO NOT TWIST THE SLEEVE as it is being moved rearward! The sleeve should slide easily and cleanly into position without undue effort. Maintain a slight pressure downward on the bowsprit and counter pressure with your ankle underneath the nose to get the right "feel" to slide the sleeve rearward into position. NOTE: If the sleeve is twisted, there is a possibility of gouging the sleeve internally, making it difficult to slide on or off. If it won't slide on without twisting, stop and carefully inspect all matching surfaces. Cleanliness is important! Align the clevis pin holes in the keel and bowsprit and sleeve and install the clevis pins and secure with the safety pins.

MOSQUITO ASSEMBLY PROCEDURES (Cont'd)

(11) Attach the forward landing wire from the top of the kingpost to the tang on the bowsprit. NOTE: This cable also supports the trailing edge bridles. Be sure that the loop on the bridle is over the top of the forward landing wire next to the kingpost head. BE SURE THAT THE BALL LOCKS ON THE QUICK PIN ARE ALL THE WAY THROUGH THE QUICKAM TENSIONING DEVICE and cannot pull back through. Check this by pulling on the quick pin. Leave the quickam untensioned until the control bar is fitted into place.

(12) Fitting the control bar is the next step. In winds over 15 m.p.h., UP recommends that the glider be left on the ground until ready to fly. This will eliminate any possibility of damage to the glider from blowing over, etc. It only takes a few seconds to lift the Mosquito up and insert the top of the control bar into the mounting box, so leave the glider safely on the ground until you are ready to fly. To fit the bar, lift the glider by the bowsprit and step under it. Pull the control bar forward until the rear flying wire cables are taut from control bar to keel. Then rotate the control bar upward until the pivot box at the top of the control bar mates with the mounting box on the keel. Use one foot on the control bar base and a shoulder on the keel (See Fig. 12). Insert the quick pin, fastening the two assemblies together.

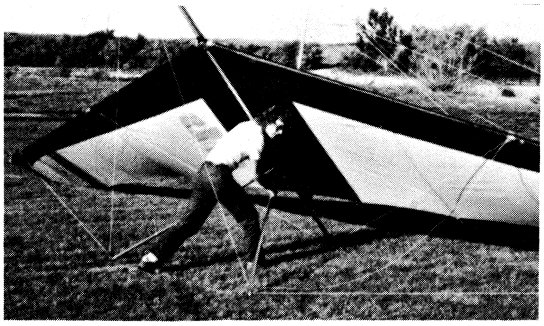


Fig. 12

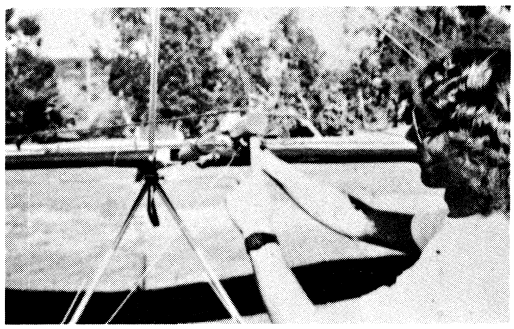


Fig. 13

(13) Sight the front bowsprit bolt to assure its vertical alignment (See Fig. 13). Actuate the "quickam" tensioning device on the bowsprit to tighten the flying wire assemblies into flight position. NOTE: The side flying wires will remain loose due to the unique design of the Mosquito polycylindrical wing.

PREFLIGHT PROCEDURE

The best preflight technique is a circular walk around the glider: Start at one location and check each assembly point of the Mosquito. Feel the tubes along the way, ending back at the starting point. For example, start at the forward bolt on the bowsprit. Check the nut for proper tightness. Check that the quickam is tensioned and the quick pin secure. Check the twin tang/turnbuckle outboard sweep cable assembly. Check turnbuckle clevis pins and safety rings; ensure that the turnbuckle lanyards are through the large safety rings on the turnbuckle barrels. Check all cables for irregularities.

Move to the noseplate. Check the bowsprit oversleeve clevis pin and safety pin. Check the noseplate slots for excessive wear. Check all bolts and nuts. Move to the wingbolt location, feeling the leading edge for dents on the way. Inspect all cables and the bolt and nut for proper tightness (not too tight). Make sure that the lower tang is pointed toward the control bar. Check the breakdown clevis pin and safety ring. Move to the outboard cable attachment point on the leading edge, feeling the leading edge tube for dents on the way. Check the bolt for proper tension (snug but not too tight). Check the cable retainer on the pulley for proper alignment (not touching the cable (See Fig. 14). Check the cables for irregularities. Check the safety rings on the turnbuckle clevis pins. Also check the turnbuckle lanyards to see that they are through the large safety ring on the turnbuckle barrels.

Fig. 14

Move to the wingtip. Inspect the forward bolt and cable attachment, the winglet tube/trunctip junction bolt, and the sail tension. The tip is marked at the factory and the edge of the sail should line up with the mark. Be sure that the Dacron line between the jam cleat and the grommet is tied properly and not worn or frayed. Check the winglet clevis pin and safety pin. Check the winglet sail tension. The winglet should be wrinkle free and slightly taut at the trailing edge. This can be adjusted by removing the bottom of the winglet, retensioning the winglet sail, then reattaching the Velcro along the bottom of the trunctip tube.

Move to the trailing edge. Check the tension on the batten bungies. NOTE: There is no advantage to having the batten bungies overtightened. It will only wear out the sail more rapidly. Check the trailing edge bridle for wear at its attachment point. There is no wear allowed at this point; if it is worn, replace before your next flight.

MOSQUITO PREFLIGHT PROCEDURE (Cont'd)

Move to the rear of the keel. Check the bolt and cables for irregularities. Check the sail attachment to the jam cleat. Repeat the same process in the reverse order on the other wing.

Start with the trailing edge, move to the wingtip, then to the outboard sweep cable location, then the wingbolt, and then back to the noseplate. Now check the kingpost head and especially the trailing edge bridle loop for proper location and wear. If worn, replace before your next flight. The trailing edge bridle on the Mosquito is an integral part of its stability system and under no circumstances should it be flown with a damaged bridle.

Now move to the control bar. Check at the bottom corners of the control bar for twisted cables on the flying wire shackles. Be sure that the desnagglers of the flying wire shackles are in good condition. If not, the thimbles can slide up the shackle and be pinched against the bottom of the downtube, causing damage to the cables. Now check the quick pin that attaches to the control bar mount box on the keel. Inspect the bearing area on the pilot support loop by pulling down on one side to expose the part hidden from view. If it doesn't slide easily it could be pinched between the flats of the control bar and could be damaged. Pull harder, and if it still doesn't slide, disassemble the control bar to inspect it. Never, ever fly with a damaged pilot support loop.

It isn't really necessary to follow this procedure exactly; however, all of the points mentioned should be checked. Whatever the order of the preflight inspection, it should be followed precisely the same way before each flight.

MOSQUITO DISASSEMBLY PROCEDURES

NOTE: The assembly photo sequence nicely illustrates the disassembly. Simply start at Fig. 12 and work in reverse to Fig. 1.

(1) Open the quickam tensioner on the front bowsprit, but leave attached to tang. Rest glider on tail.

(2) Remove the control bar mount box quick pin. Lay the control bar back flat on the ground while still holding the glider up by the keel, then step out from underneath and lay the entire glider down on the ground.

(3) Next remove small quick pin from quickam tensioner, close lever arm of tensioner, and slide bridle down wire at top kingpost.

(4) Place the instep of the left foot underneath the right leading edge near the noseplate. Remove the safety pin from the clevis pin on the bowsprit and remove clevis pin from tube. With the right hand hold the front bowsprit near the wires, then with the left hand slide the bowsprit oversleeve toward the front until it is clear past the metal pivot plug. Carefully raise the bowsprit extension with the right hand until the cables are slack. Replace clevis pin. NOTE: Be careful not to rotate the oversleeve in any way as this could cause the inner and outer surfaces of the tubes involved to become gouged if any dirt particles have become lodged in between the tubes. Take special care to always keep this area clean.) Put the protective bag over the front bowsprit and rotate it on a horizontal axis 180° so that its position becomes reversed. In this position, it will be upside down, the bag end towards the rear. Lay this extension on the sail in line with the keel from the noseplate back. Try to make sure each side's wires of this extension are separated and not tangled.

(5) Remove the battens from both sides.

(6) Pick up right rear leading edge and move wing slightly aft to relieve tension on outboard landing wire. Rotate outboard landing wire tang 90° outward. (This prevents the turnbuckle fork from becoming bent.) Collapse the trunctip inward, pulling sail out over the top of the leading edge.

(7) Remove safety pin from winglet bracket clevis pin, remove clevis pin and stow it and safety pin through small grommet in winglet which is provided for this purpose. Collapse winglet. NOTE: The winglet is collapsed at this time because it is easier to remove the clevis pin from the winglet bracket when the wingtip is folded in, thus reducing pressure and providing a better pivot point for clevis removal.

MOSQUITO DISASSEMBLY PROCEDURES (Cont'd)

Fold the right wing in by grasping the trailing edge of the sail halfway between the keel and the tip and lifting the leading edge completely off the ground. (See Fig. 15)

(8) Put the battens in between the layers of the sail near the crease, front of the battens forward, and begin rolling up the sail. As the thick ends of the battens start to become covered, slide them rearward a bit at a time to allow the rear of the rolling sail to be supported, thus making a neater roll. Make sure bridle line gets rolled up in the sail also.

Fig. 15

(9) With the kingpost still pointing forward, take the quickam of the front main landing wire and tuck it beneath the apex of the control bar on the right side where the downtube meets the base bar. This will help to prevent the kingpost from falling over as you fold the left wing in.

(10) Repeat steps 6, 7 and 8 for the left wing.

(11) Secure one UP strap around the rear leading edges, truncs and winglets, making sure sail is tucked under truncs and winglets are on top.

(12) Take quickam from under the control bar, raise kingpost so it stands vertically, slide protective kingpost cover bag over the top of the kingpost, then tie a dacron strip around the post and all wires and slide this tie downward as you fold the kingpost rearward. Tuck the quickam into the sail roll.

(13) Temporarily wrap an UP strap around the folded up glider near the top area of the kingpost, including all wires. (This strap will later be relocated.)

(14) Wrap another UP strap around the front of the glider, including the bowsprit, but exclude the bowsprit's coated cables, leaving them free for now. With the uncoated cables inside the UP strap, pull forward on them, taking out any slack. Put the cover bag over the entire glider, zipper down, but leave the bag unzipped.

(15) Standing at the nose, turn glider over 180° and rest on ground next to control bar. Do not try to rotate the control bar in this movement, but leave as it is.

MOSQUITO DISASSEMBLY PROCEDURES (Cont'd)

(16) Pick up control bar, rotate 180°, and keep bar lifted so you can see the flying wires separate (See Fig. 16). Then move bar rearward and lay on top of glider so that control bar base bar is just behind the rear keel tube (See Fig. 17).

Fig. 16

(17) Grab both anti-sweep cables (running from the end of the keel to the wing bolt), pulling forward on them, and tuck them into the control bar mount box. Then put quick pin into mount box, trapping these anti-sweep cables inside the mount box (See Figs. 18 and 19).

Fig. 17

(18) Remove safety pin and wingnut from slip bolt on control bar; remove slip bolt and disengage base bar from downtube. Replace slip bolt, wingnut and safety pin into the U-bracket, with wingnut facing up, and collapse control bar so that the U-brackets are just aft of the rear keel with the base bar above downtube. Pull protective pad sewn to inside of cover bag and place under rear keel and control bar U-brackets. Slide the temporary UP strap forward to about one foot rearward of the U-brackets, open it, then fold or coil each side's flying wires separately and stow. Secure the UP strap to include both the control bar and the flying wires (See Fig. 20)

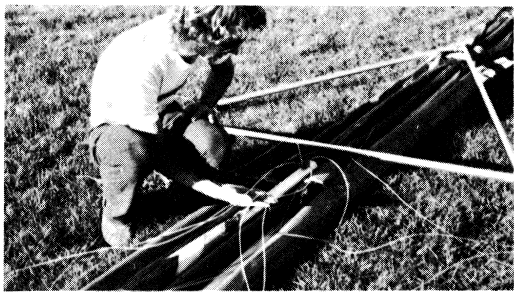


Fig. 18

(19) At location of top control bar, take protective pad sewn to inside of bag and place under top control bar pivot box. Wrap the remaining UP strap around this area. Zip up the bag.

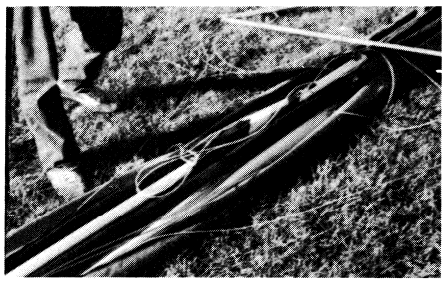


Fig. 19

Fig. 20

MOSQUITO ASSEMBLY AFTER SHIPPING

When shipped via airfreight, the Mosquito is sent in a "broken down" state within a durable orange shipping tube. This means that the leading edges are disassembled, and that the outboard wing cables are removed. In order to reassemble your Mosquito, follow the simple procedures listed below:

(1) First read both the Assembly and Disassembly Instructions and look at all the pictures in order to become familiar with the glider.

(2) Untie rear leading edges and stretch out the sail to its full length. Set the rear leading edges behind the loose sail.

(3) Remove the plastic bag with the clevis pins and the battens from the inside of the rear leading edge.

(4) Slide the rear leading edges in their respective sides, making sure that the trunctips are inserted into their sleeves also. Now align the front and rear leading edges and insert the clevis pins, washers and safety rings to lock the rear leading edge into position.

(5) Unfasten the control bar from the front of the glider. Note that the top part of the control bar is toward the front of the glider. Pick up the bar by the top and, without twisting the cables, rotate it 180° longitudinally; set it down just behind the rear of the keel. The U-brackets on the bottom of the bar should be toward the front of the glider. (Refer to Fig. 20 in the Disassembly Instructions)

(6) Assemble the control bar as per Step #1 in the standard set-up.

(7) Turn the control bar and glider over right-side up and spread the wings as per standard set-up procedure.

(8) Install the outboard sweep cable bolt in the front end of the trunc-tip. (This cable runs from the front of the bowsprit to the tip)

(9) Tie the sail to the jam cleat on the end of the trunctip, using a two-half hitch knot (See drawing on following page)

(10) Insert the outboard flying cable attachment bolt through the leading edge hole (See drawing)

NOTE: The outboard sweep cable routes around the aft side of the pulley and is held in position by the cable retainer tang as this bolt is tightened.

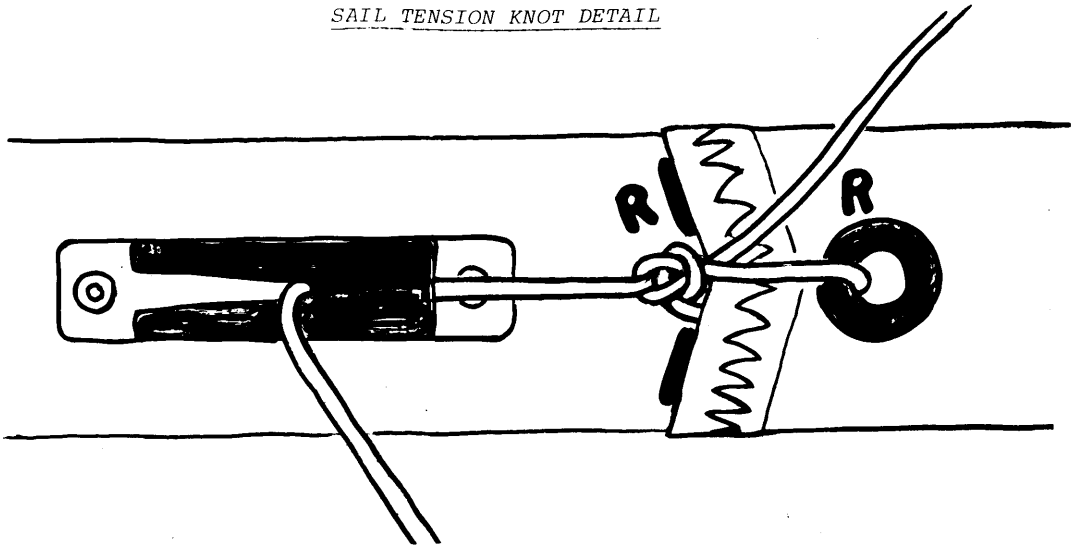
(11) Repeat steps 8, 9 and 10 on the other wing.

(12) Follow standard set-up procedure, and completely assemble the glider.

(13) Now tension the winglets by pulling down on the trailing edge and forward on the winglet sleeve; mate the velcro. There shouldn't be any wrinkles if done properly. Do a pre-flight to become familiar with procedure.

SAIL TENSION KNOT DETAIL

1.



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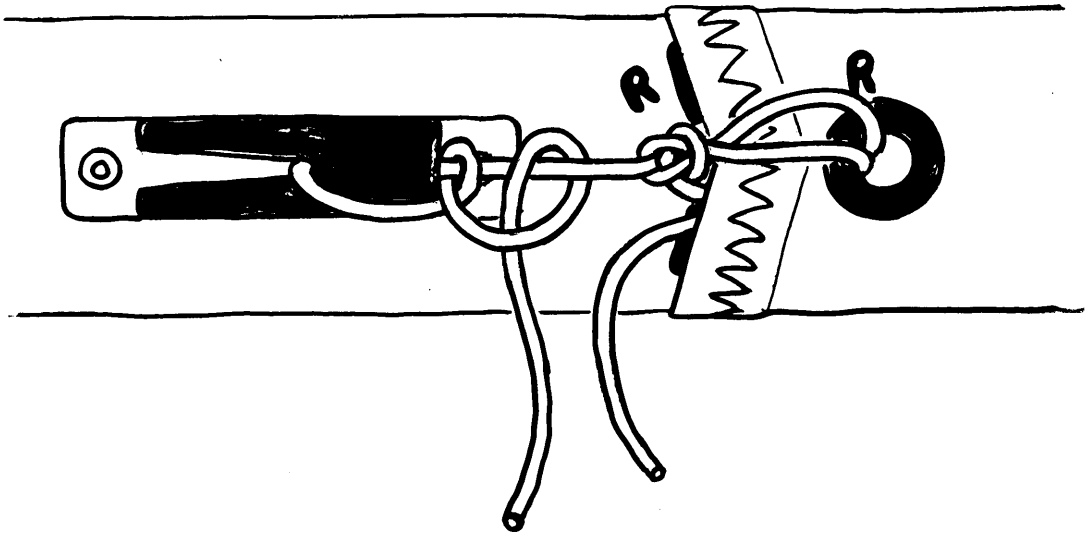

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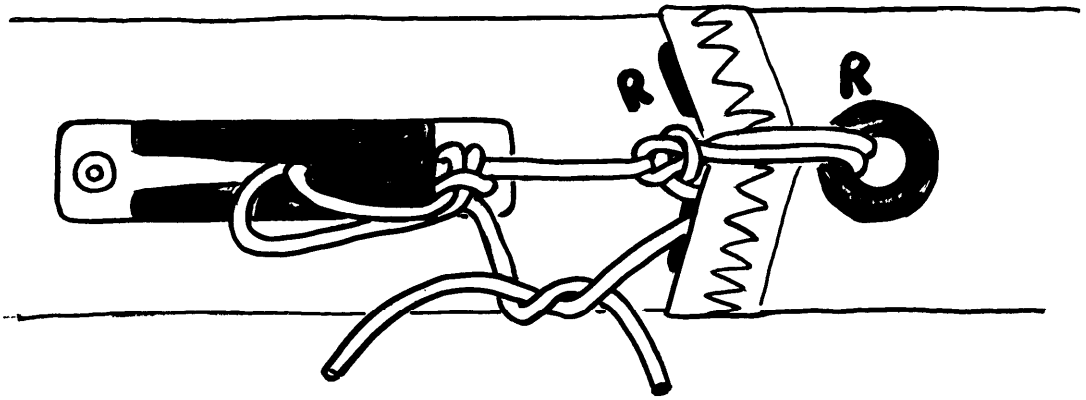

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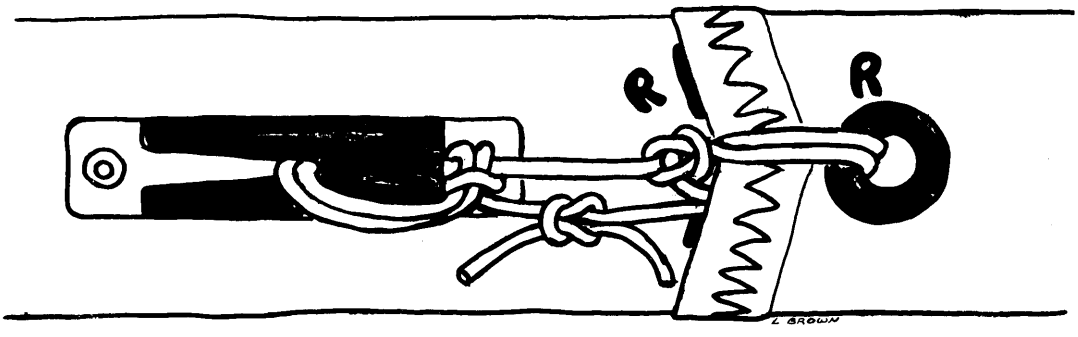
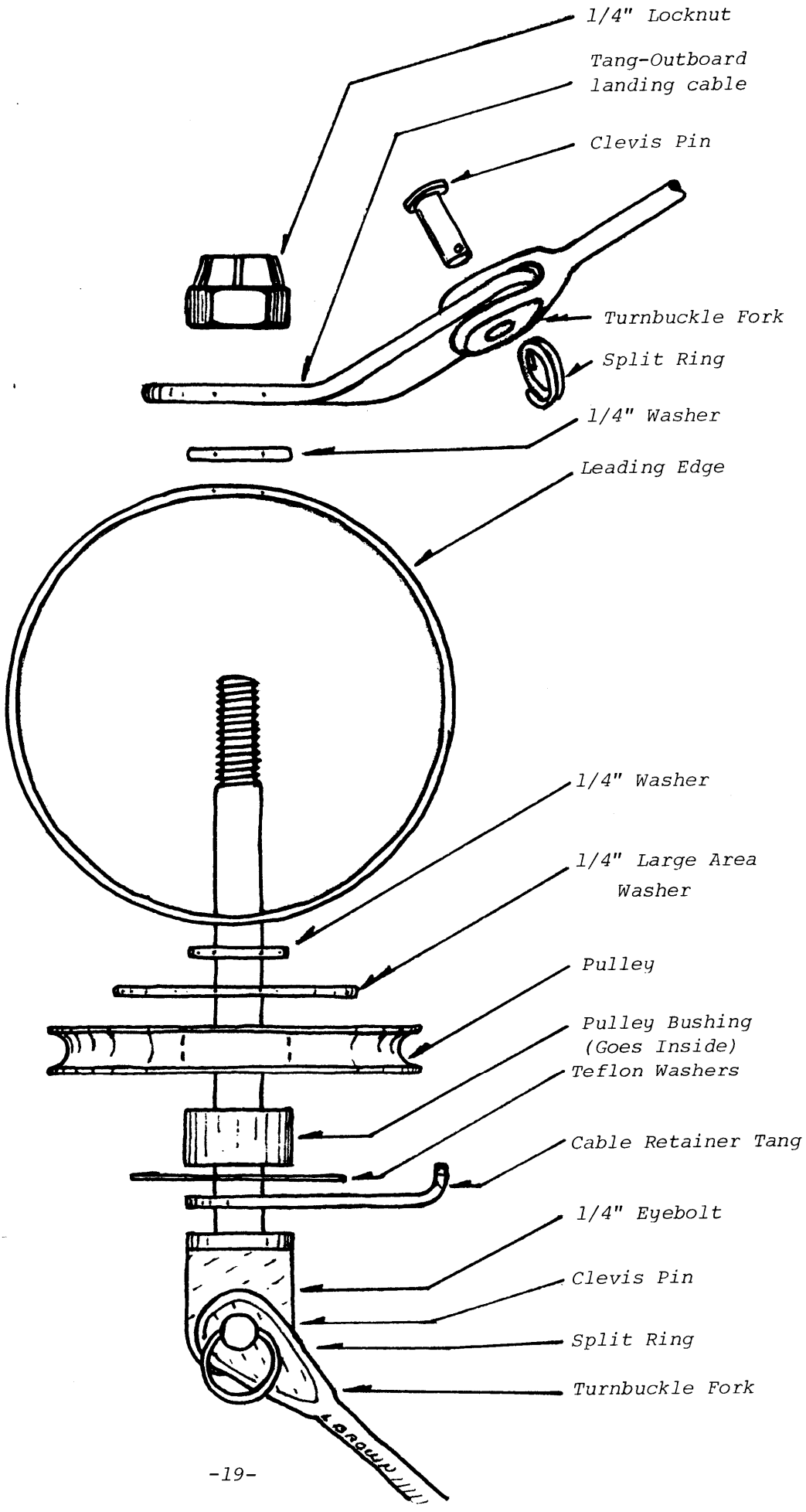


OUTBOARD WING CABLE ATTACHMENT ASSEMBLY



MAINTENANCE -- CARE AND FEEDING OF THE MOSQUITO

Your new Mosquito will require very little in the way of maintenance if you care for it properly in your day-to-day use. Here are some general points to follow in maintaining your new Mosquito.

SAIL

(1) If you must wash it, wash it with a light detergent only. Better yet, wipe the sail down frequently with a soft, damp cloth and that will keep detergent washing to a minimum.
(2) Rinse very thoroughly after cleaning with any detergent.
(3) Acetone can be used to remove stubborn stains without harming the sail.
(4) To renew the luster of Dacron, you can use a product called "Sail Bright" available from Marine hardware stores, or a product known as "White Gas" for exceptionally tough stains.
(5) Apply sail repair tape to any rips or tears in your sail. This will prevent fraying on the edges where the tear is located. However, do not worry about small tears continuing unless they are located at stress points.
(6) Keep an eye on all the grommets and all areas of the sail that take extra special abuse.
(7) The best thing that you can do for your sail is to always use the bag. Do not transport your glider atop an auto even for short distances without one. Sun and weather cause more deterioration than hours of flying. Keep your Mosquito covered when not in use.
(8) Be careful and precise when you repack your glider after each flight. Keep all the little foam padding that arrived with the glider when it was new; tie everything off the same way. A few extra moments when you take down the glider will give you untold extra hours of noiseless flight.

CABLES

(1) Naturally, any frays or kinks in your cables should be examined with great care and any frayed cables should be replaced immediately.
(2) Watch the cable ends. Are your thimbles elongated from over-stressing? If so, replace them. An elongated thimble will throw the glider out of trim as the cable will be longer than its designed length. Elongated thimbles on the flying wires are usually caused by hard landings.
(3) Use a light lubricant like WD-40 or silicone spray on all moving parts such as the quickam and bowsprit oversleeve, but be sure to wipe off any excess lubricant.
(4) Many expert pilots replace their flying wires every 75 hours regardless of wear. It's not a bad idea. Each cable has a breaking strength in excess of 800 lbs. Actual non-aerobatic in-flight loads seldom exceed 100 lbs. Inspect the thimbles. If elongation is evident, 300-400 lbs. load has been applied to the cable, usually resulting from a crash landing. If you fly around salt air or water, look very carefully at the cable, nicos, and thimbles. If you must constantly set your glider up and break it down in rough, rocky areas, you will need to replace your cables more frequently than someone who flies the dunes. Use your best judgment. Those cables hold your frame together.

MAINTENANCE (Cont'd)

SPARS

Examine your spars for dents, wear spots, corrosion, and bends during every pre-flight check. To maintain the structural integrity of the spars on your glider, always use a well-padded glider rack on your support vehicle. Ideally, the rack should support the glider in three places over the entire length. If a glider has been cared for poorly, the spars should be replaced.

HARDWARE & BOLTS

(1) For all practical purposes, Ultralite Products' hardware is indestructible in hangliding (flight) applications. "AN" bolts, however, are not indestructible and bending them even in light crashes is common. Check them periodically to be safe. Discard and replace any bent bolts. Check the wingtip bolts often. If bent, replace them!
(2) All bolts, of course, should show exposed threads above the locknut during pre-flight.

BATTENS

When inserting battens, place them in their pockets smoothly and gently to avoid wear on the sail and on the batten ties. Pushing them rapidly into the pockets on an angle will wear out the stitching on the edge of the pockets.

TRANSPORTATION

(1) Supporting the glider with sturdy well-padded racks will really pay off. As stated earlier, a three-point support system is ideal.
(2) Use the travel bag. Take the extra minute to roll your sail carefully. The battens should be rolled in the sail when the glider is broken down in order to protect them from nicks or gouges.

SEMIANNUAL INSPECTION

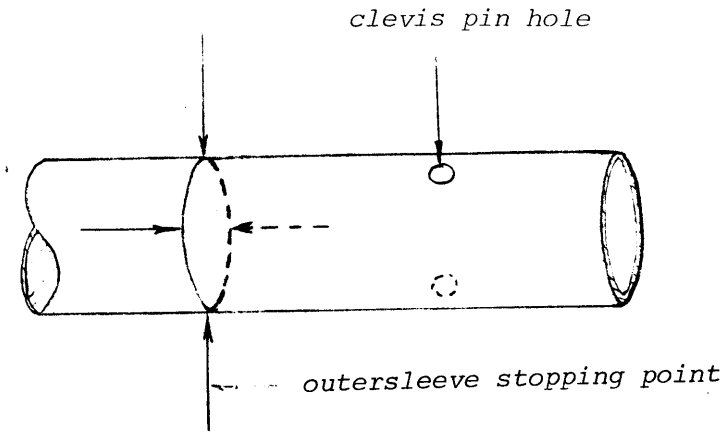
Performed every six months or every 75 hours of flying time, or after any hard landing. If you don't want to do this yourself, your UP dealer will be happy to perform this inspection for you.

(1) Remove outboard leading edges.
   a) Set up glider as far as Step #4 in the Assembly Instructions. Then spread the wings about 5 feet on each side. Do one leading leading edge at a time.
   b) Remove the winglet by unfastening the velcro from the bottom of the trunctip
   c) Untie the sail from the jam cleat on the trunctip
   d) Remove the outboard sweep cable bolt from the front of the trunctip
   e) Remove the outboard sweep cable pulley bolt from the leading edge. Put the nut back on the bolt to keep all the pulley parts in their proper positions. (Refer to drawing in "Assembly After Shipping Instructions)

MAINTENANCE (Cont'd)

SEMIANNUAL INSPECTION (Cont'd)

f) Remove the breakdown clevis pin from the leading edge
g) Slide the rear leading edge out of the sail. Now inspect the bearing point on the rear leading edge where the forward leading edge outersleeve stops (See drawing below)



h) Look for excessive wear, pitting and corrosion. Very slight pitting or wear is acceptable. Any pit or wear point deeper than .012" would be cause for rejection of that tube. Several wear points close to .012" would also be cause for rejection.
i) Sight the rear leading edge for straightness. Any bend over 1/2 the tube diameter would be cause for rejection, or straightening if you have a proper jig.
j) Inspect for dents. Any dent forward of the outboard cable attachment hole deeper than .050" would be cause for rejection of the tube. Dents between the tip and the outboard cable attachment hole are less critical.

(2) Check for bent wingtip bolts. This can be accomplished without removing the tip bolt as follows:

a) Remove the winglet bolt from the bracket on top of the wingtip tube.
b) Align the wing tube so it is parallel to the leading edge and overlapping it.
c) Now use a 1/2" socket to turn the wingtip bolt several revolutions. If the bolt is bent, the end of the wingtip tube will move up and down in relation to the leading edge tube. If the movement is more than 1/2", the bolt should be replaced or straightened. Slight bends in AN bolts can be straightened with no loss of structural integrity.
d) Reassemble the winglet.

(3) Reassemble the leading edge by following the disassembly instructions in reverse order. If you are unsure of something, use the other leading edge (which should still be assembled) and the "Assembly After Shipping Instructions" for reference.

(4) Repeat steps 1 through 3 on the other wing.

MAINTENANCE (Cont'd)

SEMIANNUAL INSPECTION (Cont'd)

(5) Inspect the control bar mount box assembly:

a) Remove the heartbolt from the keel and inspect the bolt for wear or a bend. Inspect the keel for hole elongation. If the bolt is bent or worn, replace it. If the hole in the keel is elongated, either have the keel repaired or replaced by UP, Inc. This hole will elongate only during a crash (nose-in style landing or impact).

b) Inspect the control bar mount box for deformation. Replace if necessary.

c) Reinstall the control bar mount box assembly. The heartbolt should be tightened enough to prevent the kingpost bracket from pivoting on the top of the keel.

(6) Slide the bowsprit oversleeve off and clean both the bowsprit tube and the inside of the oversleeve. The easiest way we've found to clean the oversleeve is to use a dowel (such as a broomstick handle) to push an acetone soaked rag through the sleeve several times. Repeat until the inside of the sleeve is visually clean. Spray a light coat of WD-40 inside the sleeve and on the bowsprit tube and reassemble. Wipe off any excess lubricant as it will only collect dirt.

(7) Assemble the glider to flight-ready condition. Now do the most thorough pre-flight that can be done.

a) Feel and examine the tubes for dents, wear and corrosion. Replace if necessary.

b) Examine every inch of cable for frays, kinks or other irregularities.

c) Inspect every stitch in the sail. Pay close attention to the forward portion of the keel pocket. This area has the highest stress concentration on the entire sail. Check the corner of the "V" cut in the keel pocket where it wraps underneath the keel just behind the control bar mount box. Now reread the pre-flight section in the owner's manual and do it step by step. Now record the date of the inspection and any notes of interest in the airframe inspection page of the manual.

This might seem like a great deal of unnecessary effort, but please remember that this glider is an aircraft and should be treated as such: with care and respect. Take care of it and it will take care of you.

(8) If you have any question about anything at all, please don't hesitate to call or write us. We are always willing to help.

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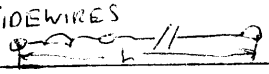
MOSQUITO INSPECTION & MAINTENANCE RECORD

DATE	WORK PERFORMED	REMARKS (Note Person Performing Maintenance)
1/83	Replace both outer L.E.'s	MEASUREMENTS: KEEL TO TRUNCTIP ANGLE
		ORIG: 17-18° NEW: 17-17½
	NOSE PLATE BOLT TO:	ORIG / NEW TOP / NEW BOT
	L. MID WIRES	19' 15/16" - 7/16" / ✓ / ✓
	L. OUTER WIRES	16'-4¼" / ≈1/64" UNDER / ✓
	L. TRUNCTIP	18'-6" / ✓ / ✓
	R. MID WIRES	/ ✓ / ✓
loosened locks T.B. I Turn on assembly	R. OUTER WIRES	/ ≈1/64" over / ≈1/64" over
	R. TRUNCTIP	/ ✓ / ≈1/64" under
BENCH MARK –	OUTER SIDEWIRES 	L – 13' 10 3/16" R – 13' 10"
4/84	REPLACE R. OUTER L.E.	(18'-6") R. TRUNCTIP MEASUREMENT ≈1/32" OVER, ALL OTHERS O.K.