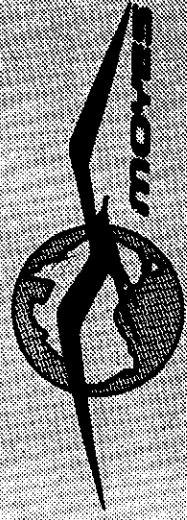
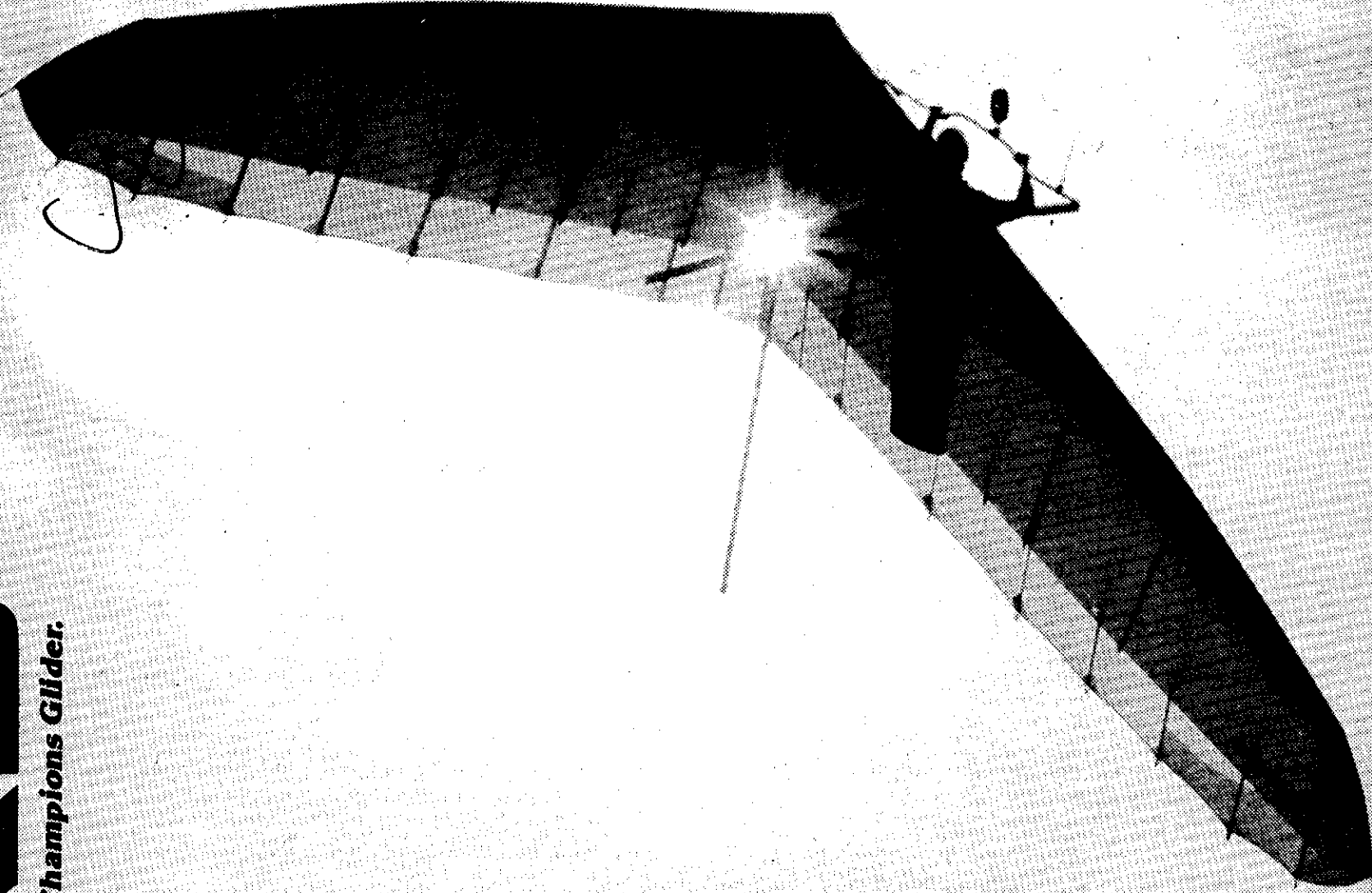


X5

The Champions Glider.



MOYES DELTA GLIDERS PTY LTD

XS 155

OWNER'S MANUAL

CONTENTS

Page No:

1. Introduction	1
2. Purchase Record/Moyes Dealerships	2
3. Description of Design	3
4. Operating Limitations	4
5. Assembly Procedures	5
6. Pre-Flight Check	11
7. Derigging the "XS"	13
8. Flying the Moyes "XS"	14
9. Tuning Hints	16
10. Glider Care and Maintenance Schedule	18
11. Specifications and Diagrams	22
12. Notes	29

"XS"The glider winning from the beginning!

"Not since the comet heralded a new generation of glider design, way back in the 1980 Owens Classic, has a new model performed so convincingly in its first competition."

Thank you for choosing the Moyes XS. You have just acquired the latest and best performing glider of the successful Moyes range of hang gliding equipment. Please read this manual carefully, fly safely within your capabilities and you too will be looking to new horizons in your flying endeavours.

"Mark Newland offered me the latest Moyes prototype (XS) to fly, just two days before the '89 National Championships. After a two year absence from serious competition, I was quite hesitant to be pushing myself and new equipment against pilots such as Mark Newland, Rick Duncan, Steve Moyes and the rest of the Australian World Champion Team as well as many overseas pilots."

"I was happy to just top out and follow but it became obvious on the first day after sitting at goal for nearly half an hour before another pilot arrived, that this glider was special. After winning 5 of the first 7 rounds the rest of the field also knew that they could not match the climb or glide of the XS in any conditions. Victory for myself and the XS after 11 rounds proved beyond doubt that this glider's debut was as devastating as the comet's introduction in the 1980 Classic (and that concept went on to dominate 4th generation glider design for the entire decade)."

Moyes gliders have consistently produced winners on winning gliders, but with such a powerful introduction, the "XS" looks set to lead the way into the next decade.

"I was immediately impressed by the gliders improved performance, but found the ease of handling to be the feature that gave me the confidence to press home the XS' many advantages. I am seriously considering coming out of retirement as a result of this exciting development.

I am sure that you too will find the new Moyes XS bringing a winning smile to your face."

Ian Jarman

Australian National Champion 1989.

PURCHASE RECORD

(Please complete this section for future reference.)

Glider model & Size:Purchase Date:

Glider Serial Number:

Moyes Dealer (Purchased from):

Dealer Address:

Local Dealer Stamp:

MOYES DEALERSHIP/CONTACTS

Australia: Moyes Delta Gliders Pty Ltd
173 Bronte Road
WAVERLEY NSW 2024
AUSTRALIA
PH: (02) 387 5622
(02) 387 5114
FAX: (02) 387 4472

U.S.A.: Moyes California Inc
22021 Covello Street
CANOGA PARK CA 91303
USA
PH: (818) 887 3361 Office
(818) 702 6532 Factory
FAX: (818) 702 0612

Europe: Air-base Moyes Europe
Nymphenburger Str 49 RGB
DW-8000 Munchen 2
GERMANY
PH: (089) 129 8595
FAX: (089) 129 7510

Japan: Japan Moyes
3-11-1,202 Minamidai
Ishioka-City Ibaraki-PRF 315
JAPAN
PH: (299) 26 8113
FAX: (299) 26 8114

DESCRIPTION OF DESIGN

The Moyes "XS" combines the successful design philosophy of the popular "GTR" series with the technology of the future. The "XS" has been developed to meet the demand for greater performance in combination with lighter bar pressures in both roll and pitch. This has been achieved without sacrificing the traditional Moyes qualities of stability, structural integrity and sleek finish.

The elliptical shape and thinner profile created by the fibreglass tip reduces wing tip vortices whilst the weight saving results in a lower moment of inertia thus reducing roll pressures.

The large mylar reinforced leading edge and closer batten spacing gives the "XS" a solid distortion free airfoil while a cunningly enclosed variable geometry system allows the keel pocketless high-tech composite sail to produce an amazing lift / drag performance throughout the entire and extensive speed range.

By the combination of stainless steel reflex bridles, composite alloy/fibreglass battens and internal fixed washout struts, the new Moyes XS displays excellent pitch stability and dive recovery. * The overall finish and structure of the "XS" is of the usual Moyes robust standard with the frame geometry allowing for both "on-frame" or "flat assembly".

BASIC SPECIFICATIONS:			
	XS 142	XS 155	XS 169
MODEL / SIZE			
AREA	13.2 m sq (142' sq)	14.4 m sq (155' sq)	15.7 m sq (169' sq)
SPAN	9.84 (32'4")	10.36 (34')	10.97 m (36')
NOSE ANGLE	130 DEGREES	130 DEGREES	130 DEGREES
ASPECT RATIO	7.34	7.5	7.67
GLIDER WEIGHT	31 KG (68 LB)	32.5 KG (72 LB)	36 KG (79 LB)
PILOT RANGE	54-91 KG (120-200 LB)	57-109 KG (125-240 LB)	72-127 KG (160-280 LB)
PILOT RATING	ADVANCED	ADVANCED	INTERMEDIATE
L/D	10:1 AT 30 MPH	10:1 AT 30 MPH	10:1 AT 30 MPH
VNE	46 MPH	46 MPH	46 MPH
SPEED RANGE	16-60 MPH	14-60 MPH	17-60 MPH

* Alteration of these devices, in any way, may reduce the glider's pitch stability or positiveness.

OPERATING LIMITATIONS

Your Moyes XS is a sophisticated, "state of the art high performance hang glider and if maintained correctly will give you years of safe enjoyable soaring. However, it is important that you display a healthy respect for all aspects of aviation and that you especially understand the increased risks of flying in dangerous conditions or in a manner that exceeds the gliders operating limitations.

Flight operation should be limited to non-aerobatic manoeuvres where the pitch angle does not exceed 30 degrees up or down of the horizon, or bank angles exceeding 60 degrees.

The XS has been designed for foot launched soaring flight and should not be flown by more than one person at a time, and should not be flown backwards or inverted.

The XS should not be flown with auxiliary power or in excess of the placarded V.N.E. of 46 mph.

The XS will resist spinning and will recover quickly if control pressures are relaxed. Recovery from a stalled turn can be achieved without extreme height loss or without extreme attitude change if the angle of attack is reduced. Recovery from such an incipient spin will be achieved within half a turn if this procedure is followed.

These standards require: ultimate load tests at:-

- * maximum lift angle of attack at a speed of 65 mph.
- * negative 30 degrees angle of attack at a speed of 46 mph.
- * negative 150 degrees angle of attack at a speed of 32 mph.

Pitching moment tests at 20, 30 and 40 mph to display the gliders inherent positive pitch stability through a broad range of angles of attack. It is recommended that the pilot hold a minimum intermediate standard rating or equivalent, with a recommended pilot weight of 130-230 lbs for the XS 155.

DISCLAIMER:

The owner and operator must understand that due to the inherent risk involved in flying such a unique vehicle, no warranty is made or implied of any kind against accidents, bodily injury or death. Operations such as aerobatic manoeuvres or erratic pilot technique may ultimately produce equipment failure and are specifically excluded from the warranty.

This glider is not covered by product liability insurance, nor has it been designed, manufactured or tested to any state or federal government airworthiness standards or regulations.

ASSEMBLY PROCEDURES

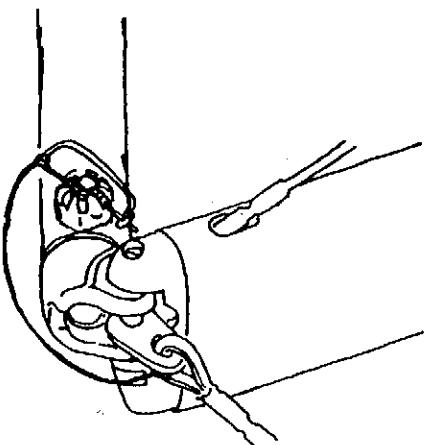
You have the choice between "On Frame" or "Flat Assembly" systems. The set-up terrain and the wind conditions will need to be considered in determining which is the most appropriate for the situation.

You should familiarize yourself with both, so that the glider does not sustain damage due to use of the wrong procedure for the situation.

1. Place the glider on the ground, nose into wind and zipper up. Open bag, undo ties, remove padding and battens and assemble control frame.

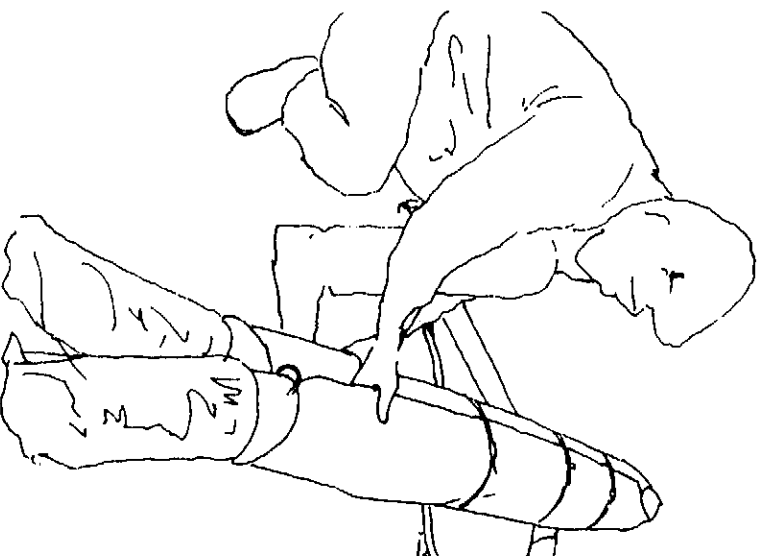
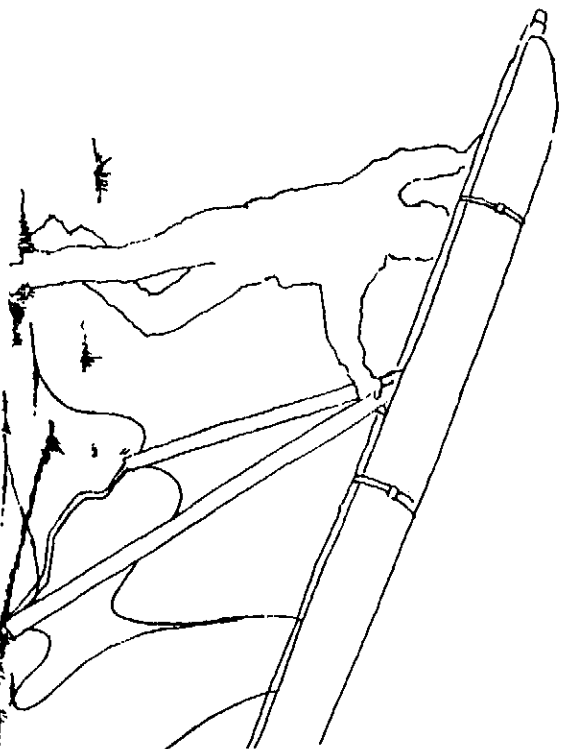
* Check that no wires pass inside the control frame.

* Check that assembly bolt has actually passed through the basebar and is held with castle nut and safety pin.



2. Roll the glider over so that it is either flat on the ground or standing on the control frame.

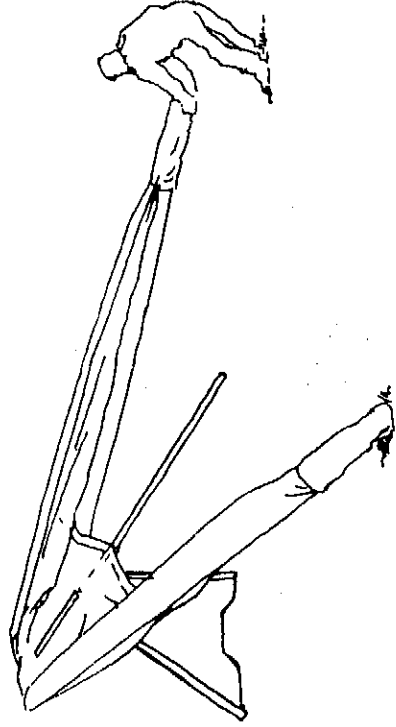
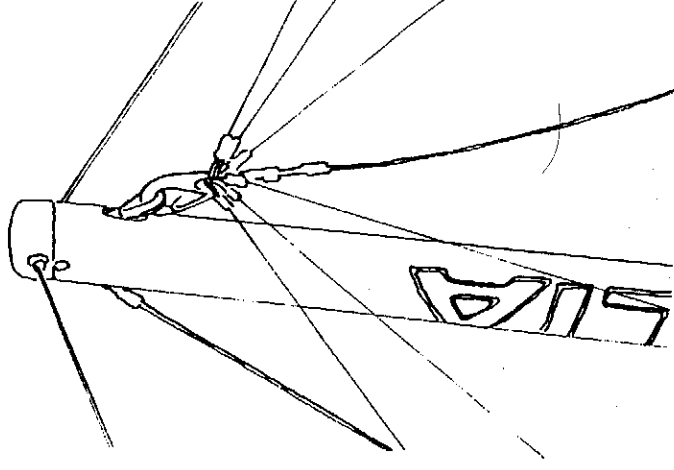
* Check that the control frame is central and that the wires are not kinked or twisted.



3. Remove glider bag and any remaining ties and padding. Carefully spread each wing making sure that you do not raise them above the keel and that bridles or rigging are not snagged around keel or kingpost.

4. Raise the kingpost and attach rear wire and reflex bridles.

* Check that bridles are not twisted on themselves and/or other top wires.

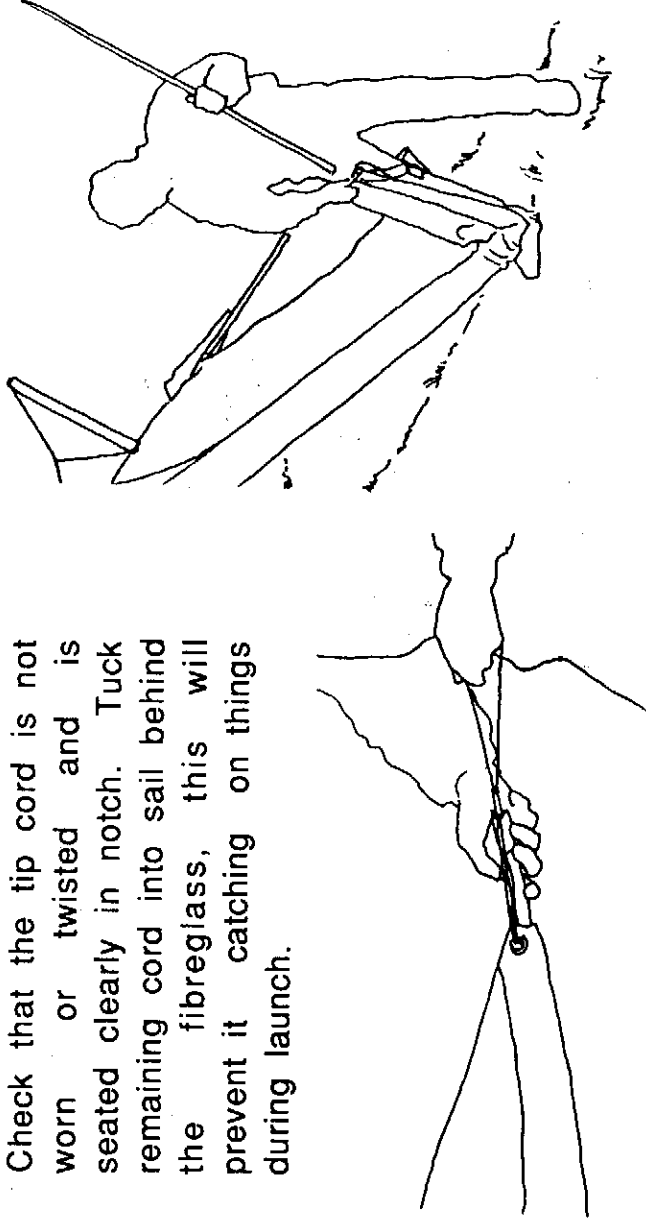


5. Remove tip covers and unroll sail. Slide fiberglass rod through end of sail and locate in the end of the leading edge. Ensure that the fiberglass rod is pushed hard against its stop.

Fit plastic cup to the rod and pull steadily on the tip cord until it can be fitted into the notch on the end of the tip cup.

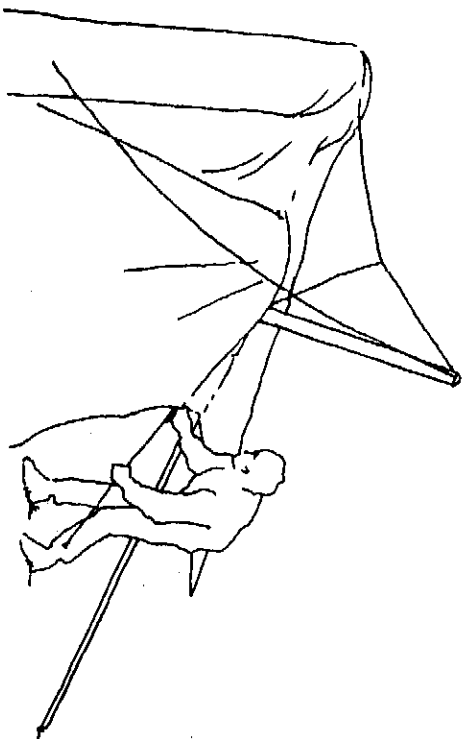
(It will help if the cord is located on the leading edge side and that you flex the fiberglass rod slightly whilst pulling.)

* Check that the tip cord is not worn or twisted and is seated clearly in notch. Tuck remaining cord into sail behind the fiberglass, this will prevent it catching on things during launch.



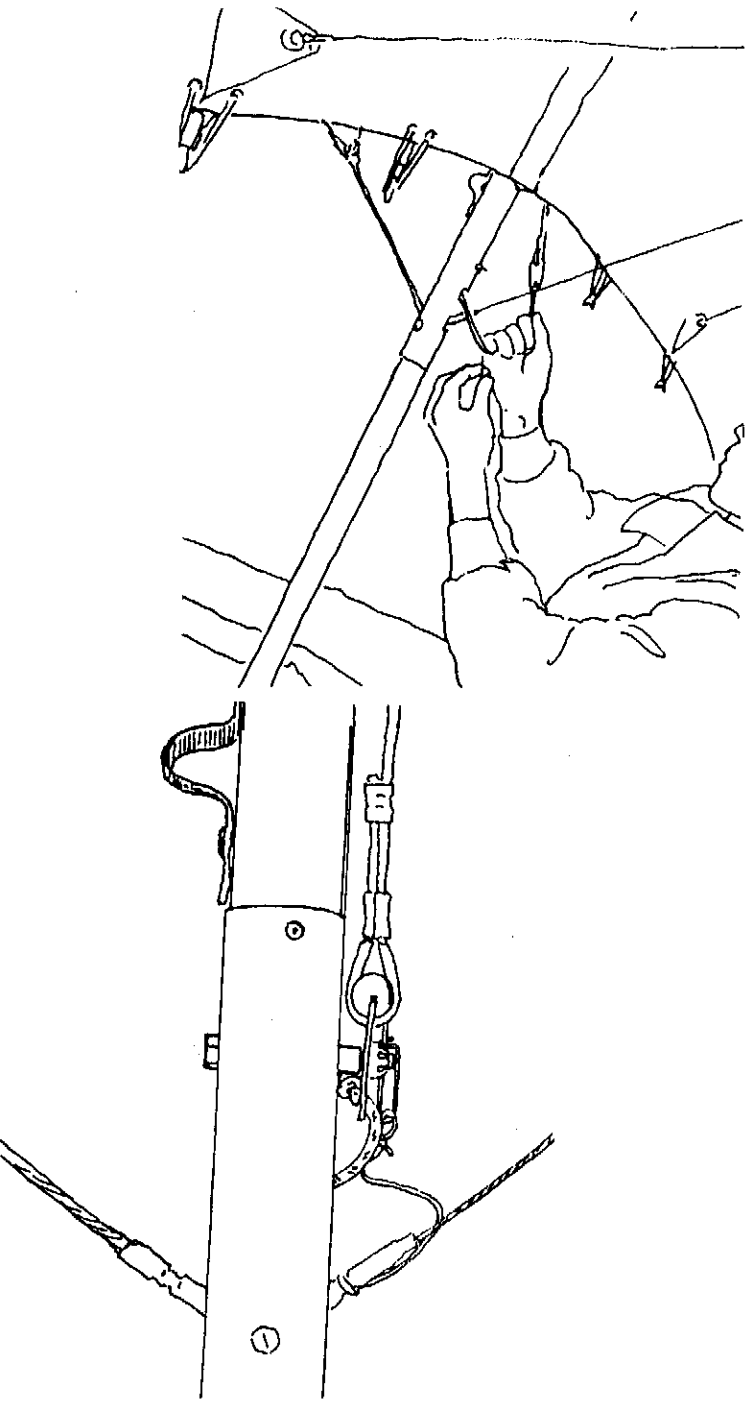
6. Check the battens for symmetry.

- * Red tipped battens are for the left wing, green for the right and blue the undersurface.
- * Insert battens from the root out towards the tip.
- * The tip battens are best done after tensioning the cross-bars to avoid catching the ground.
- * Use only gentle pressure when sliding in battens. If resistance is encountered, lift trailing edge and flick it up and down gently in order to billow the sail over the bar that is stopping the batten. Secure the battens with doubled elastic cords.

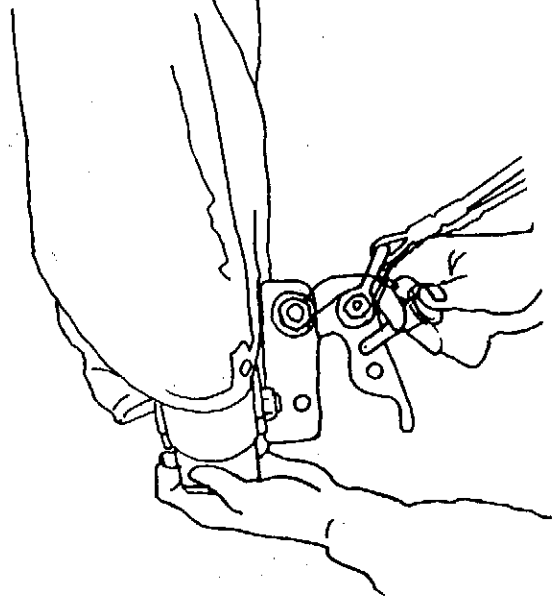


- * The #5 batten has little clearance over the top side wire and must be installed and removed without sail tension.

7. To tension the cross-bars pull the elastic cord, coming out of the keel behind the sail, until the three holed tang can be located on the bolt with castle nut and safety pin.



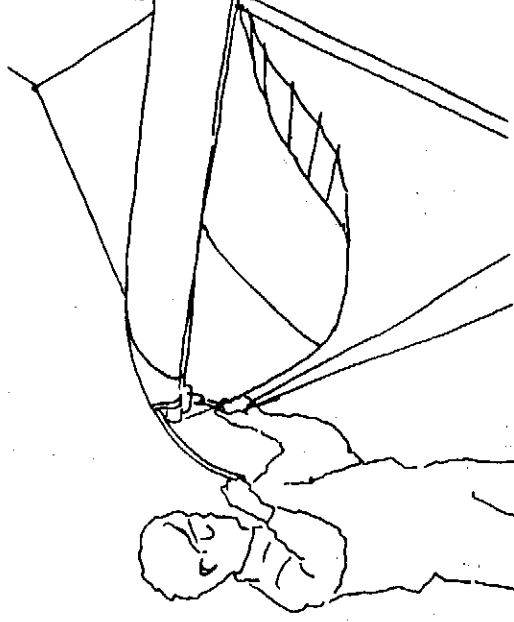
8. If the glider has been assembled flat on the ground, lift onto control frame and secure front wires with the nose catch.



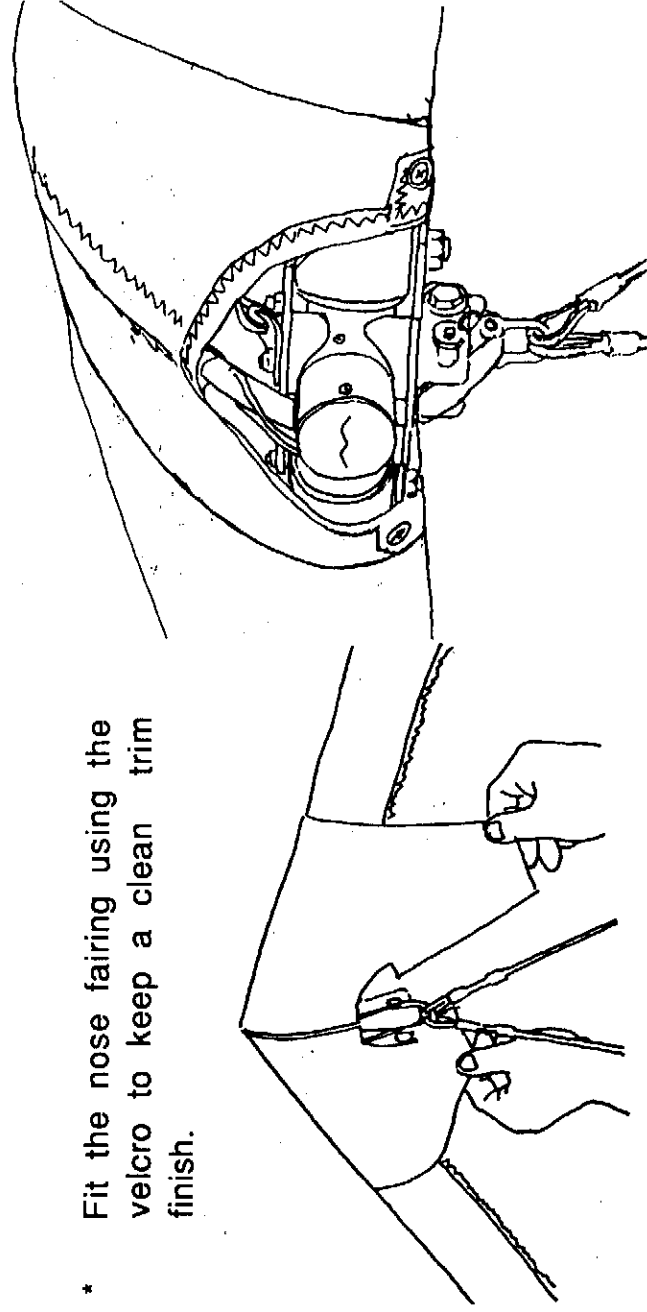
* Check that the bottom wires are not twisted or kinked.

* Check that nose catch is correctly fitted with the quick pin locked completely through nose channel.

9. Insert the nose batten. The batten may need some 'feeding' through the sail by pulling the sail forward to remove any wrinkles as the batten slides into its pocket.



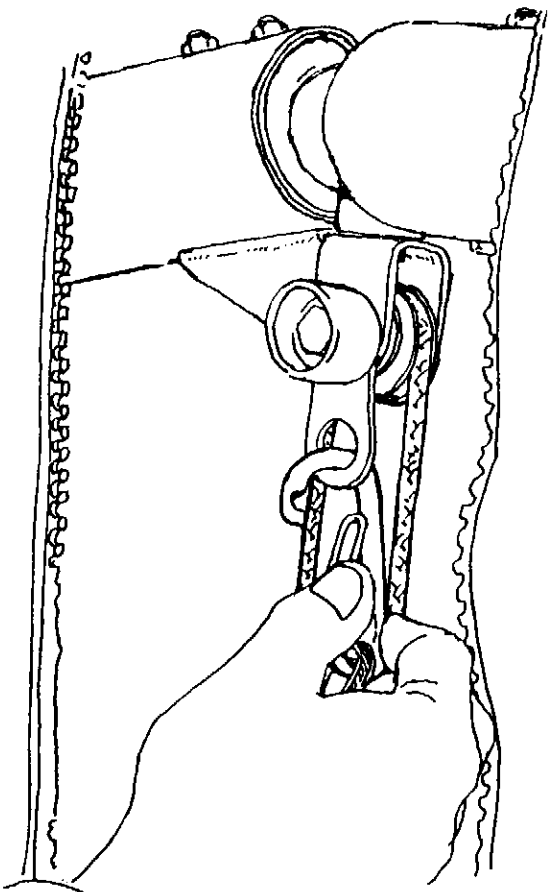
* Check that nose batten sits over the lug on the keel securely.



* Fit the nose fairing using the velcro to keep a clean trim finish.

10. Pull the V.G. rope on one metre, open undersurface and attach cross-bar safety wire to the tang on the cross-bar centre junction. The compensator cord is automatically attached when this safety wire is connected. Let off V.G. rope.
- * Check that variable geometry cord runs freely into top of faired upright.

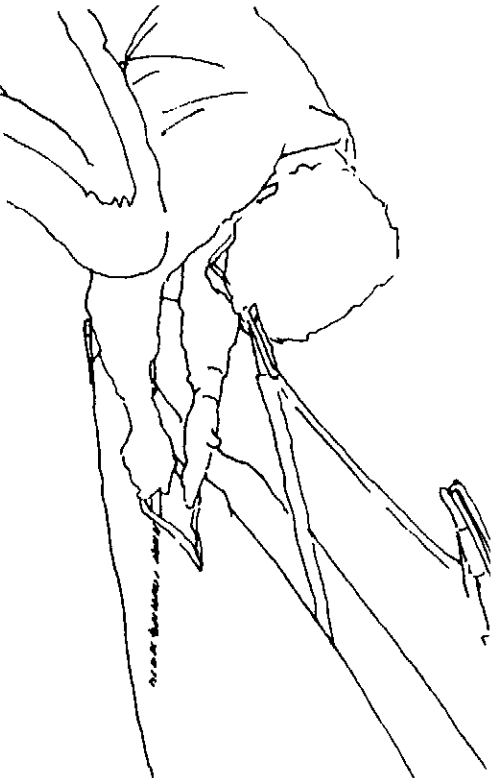
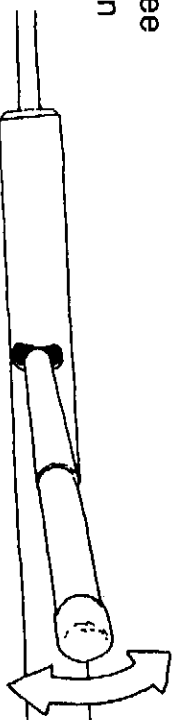
- * Check that V.G. runs freely and is held by cleat on base bar.



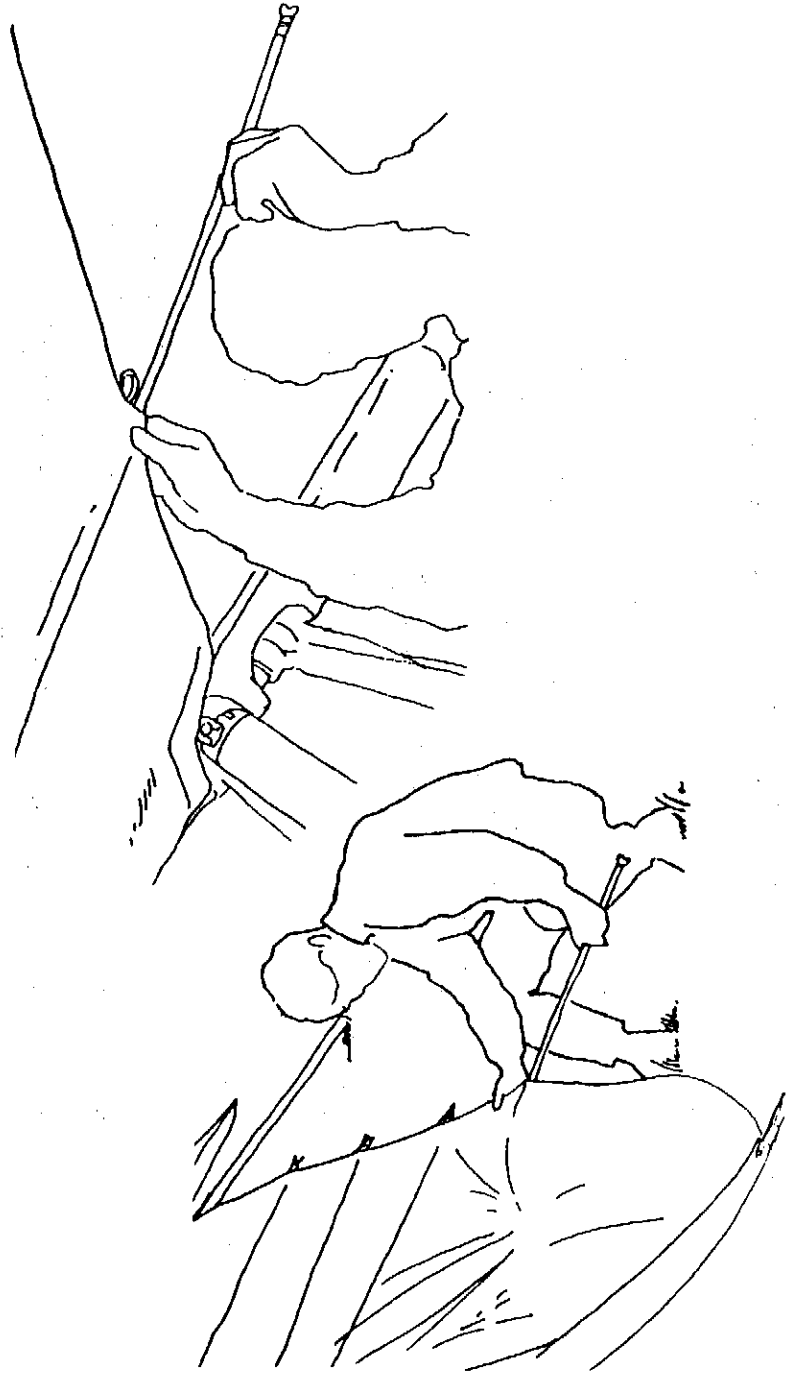
11. Open zipper in undersurface near wing tip and insert the washout strut into the nylon socket. The attached bungee will ensure that the strut is secure.

- * Check that the strut is free to rotate up and down in the slot.

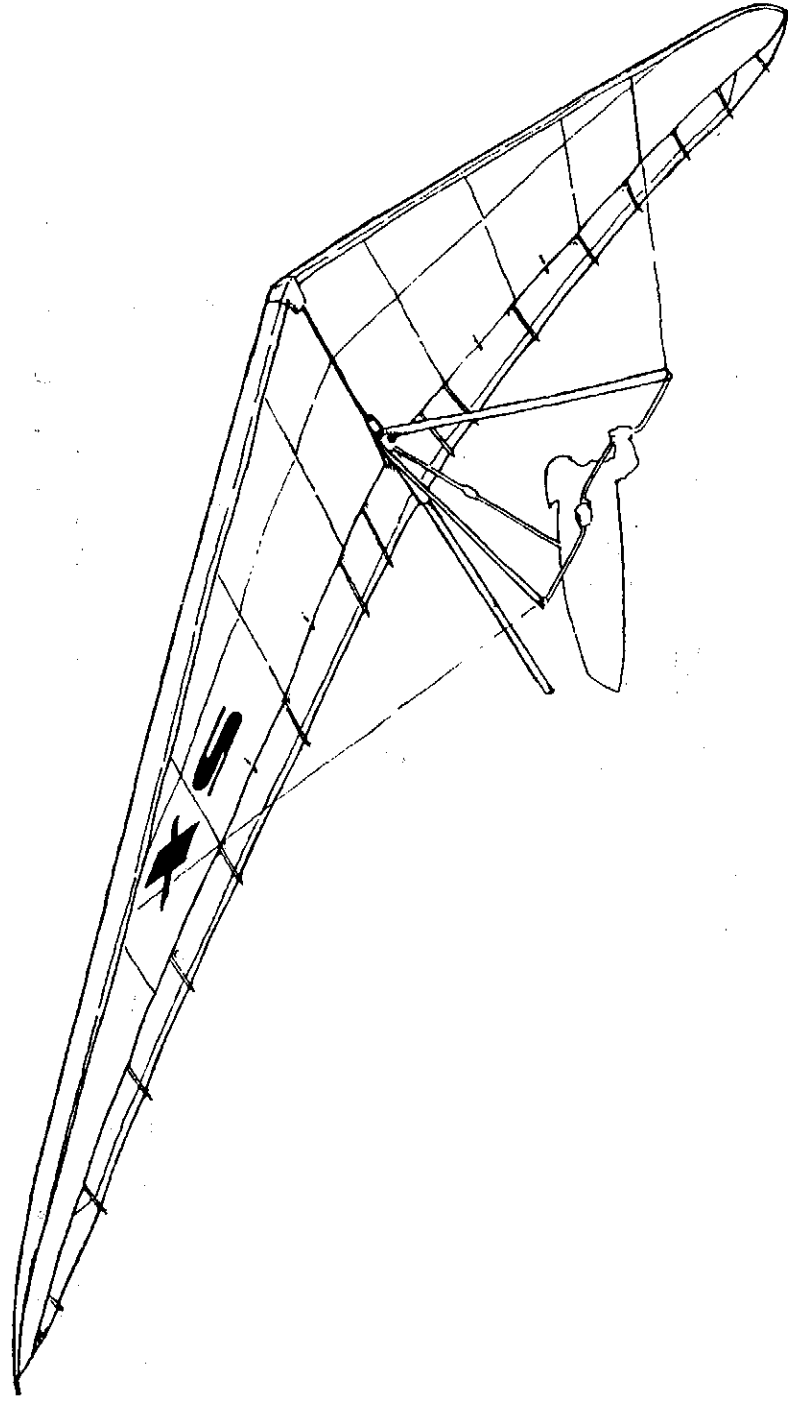
- * Close the zipper.



12. Insert tip battens and undersurface battens ensuring that the undersurface batten tips rest beneath leading edge.



13. Check that hang loops are secure and attach harness.



PRE-FLIGHT CHECKS

As with most high performance hang gliders, much of the hardware and structure is well enclosed to give a streamlined finish to the wing. This means that you must look inside the sail to check many of the important structural components.

You should develop a consistent routine that incorporates all the necessary checks. If you are distracted during the routine, you should start again to ensure nothing has been missed.

1. As you should have already attached your harness to the glider, check that is set up correctly. Parachute is well maintained and stowed appropriately and the bridle runs cleanly to the carabiner(s) which is attached vertically to the hang loops. If harness height from basebar needs adjustment, it is best to acquire the correct length loop from your Moyes agent.
2. Move up hang loops and check they are secure and that no trim change can occur in flight.
3. Open undersurface zip and inspect the cross-bar safety wire and the compensator cord. Pull V.G. on and off a few times to check that cross-bars are moving freely and V.G. system is operating smoothly and is tied firmly to clip. Inspect interior of each wing, looking at the back side of the leading edges, the cross-bars and the cross-bar junctions.

Close undersurface zip.

4. Check the base of kingpost and apex of control frame ensuring all nuts are secure and thread is showing beyond nut on bolt end.
5. Sight along keel and move to the nose section where all nuts and bolts are checked. Test nose catch and ensure keel battens are located correctly. Re-attach nose fairing.
6. Inspect kingpost top, looking for twisted top rigging or snagged reflex bridles. Sight along each leading edge to confirm a similar amount of leading edge deflexion (curve). Uneven curve will indicate a bent and damaged leading edge.

7. Move out along the wing looking and feeling for any damage. Open the zip where the side wires enter the sail and check that both top and bottom wires are not kinked, twisted or damaged. Check the cross-bar/leading edge junction bolts and nuts. Close zip on inspection port.
8. Continue out to wing tip and make sure the tip cords are located correctly and are showing no signs of wear.
9. Open the zip in the undersurface and test the wash out strut for correct movement and security. Close zip.
10. Check all battens as you move along the trailing edge and make sure that the reflex bridles are not caught on any batten tips.
11. At the keel, check the cross-bar restraining cord and top and bottom wires.
12. Moving across to the other wing, repeat the process as you work your way back to the nose of the glider. Check the front bottom wires and nose catch before inspecting the base of the control bar.
13. Ensure that the assembly bolt passes through both base bar and corner attachment.
14. Check rigging and nuts and bolts are in good order and that V.G. rope is through cleat and secure.
15. Re-check harness, hang loops and carabiners.

When finally preparing to fly, please do a proper hang check ensuring that legs are through leg loops, that harness zippers work and that all buckles or clips etc. are closed and working. Look again at your hang loops and carabiner(s).

Take your time through these checks, an extra 30 seconds here is well worth a life time of flying enjoyment.

DERIGGING THE 'XS'

Disassembly of the XS is virtually an exact reversal of the set-up procedure, however a few important points must be remembered to avoid unnecessary damage.

1. Unclip cross-bar safety wire and remove the undersurface and tip battens.
- * The safety wire is easier to unclip with V.G. rope full on, but don't forget to release the V.G. rope once this is disconnected.
2. If the terrain is suitable you can unhook the nose catch and lay the glider flat before releasing the cross-bar tension. The cross-bars can be released with the glider standing and if the ground is extremely rocky or muddy the battens down to #4, washout struts and then the fibreglass tip may be removed and the sail rolled and covered before releasing the tension to avoid damage to the wing tips.
- * You should never attempt to remove the battens inboard of #4 without releasing tension as this will flatten the battens and probably damage the batten pockets in the sail.
3. Once tension is released remaining battens, struts and fibreglass tips should be removed and carefully packed into the batten bags provided.
- * The washout struts should be placed behind the leading edge but still within the sail.
4. When folding wings, ensure that leading edges and keel remain in the same plane and that no sail has caught between wing and keel.
Fold and roll the sail loosely but try to avoid folding the tip in the same place each time.
5. Lower kingpost, ensure all padding is in place and that the ties do not kink the mylar inserts.
Before turning the glider over make sure that the glider bag is on so as to keep the sail clean.
6. Unhook the nose catch (if still attached) and disassemble control frame. Lay the control bar flat using padding where appropriate and tuck wires and bars neatly inside the sail.
7. Place battens between leading edges with the camber to the tail end, then firm up all ties smoothing out the rolled sail before closing the zip.

FLYING THE MOYES "XS"

Take-off

The XS has a very slight tail heavy static balance and therefore is very easy to launch in calm or windy conditions. The nose should be held slightly above horizontal with the wings level. Your run should be smooth acceleration with appropriate pitch control for the situation and once a safe excess of minimum air speed is acquired a slight easing out of the bar will give a smooth lift-off. In winds in excess of 10-15 mph, some wire assistance may be required.

Using the Speed Range

Even at speeds very close to stall, the XS retains an unusual amount of controllability for a modern high-performance wing. This, when combined with the excellent sink rate gives some distinct advantages in light lift situations, although you should not fly your glider too slowly when scratching near hill. . . . leave a margin for error.

The stall characteristics are much the same as for all high performance wings, although the broad "mush" mode achieved by a gradual push out does end with a fairly crisp nose drop or wing drop if on a bank. Remember that sudden entry to a stall with an excessively high nose is one of the most dangerous and uncontrollable manoeuvres possible and can result in a tailslide and a possible severe tumble.

It is important that you develop skill in choosing the optimum speed to fly for any situation be it turning in lift or maximising your glide.

At the top of the speed range, the glider becomes quite sensitive to either pilot input or turbulence, but will track comfortably if you hold your weight steady.

Sudden pitch input is not desirable in any glider but the quickness of response and energy retention of the XS makes it important that your control is smooth and precise. The glider will reward you with accuracy and immediate response to your command.

Turning

Although very controllable at low speeds, the XS will return its most snappy performance at speeds between minimum sink and best L/D. The bank and radius desired will determine both entry speed and weight shift as well as the amount of pitch input required to co-ordinate the manoeuvre.

One of the distinct advantages of the XS is its ability to be "square"

turned, i.e. a constant turn in radius can be kicked through a further 90 degrees without bank angle increase. This is achieved by a combination of controlled yaw input and a quick push out. It is extremely handy when a thermal core is hard to follow and the normal turn radius would take you into sink. Once again be aware of incipient spin developing from too much pitch input in this situation.

If the glider does stall in the turn, quickest recovery is achieved by increasing air speed and rolling in slightly to follow the direction of the turn.

Landing

It is best to approach your landing at just above trim speed with only a slight increase in speed once on final dropping through the last of the wind gradient. This little extra air speed should give you positive control and a steady "bleed-off" until it is time to complete the flare. A good flare is best achieved by moving the hands up to about shoulder height and pushing out and up as soon as the glider fails to respond to the easing out of the bar during "bleed-off". Accurate air speed control and sensitivity are the keys to consistent good landings in any glider in any situation.

Variable Geometry.

Most modern high performance gliders are built with this system, however its value in "customising" the gliders performance and handling combinations to suit your particular requirements is often overlooked.

The V.G. should be off for both take-off and landing. This mellowes the stall and handling characteristics, although in light wind take-offs a little tension may be desirable to firm up the rigging.

To gain maximum straight line performance, the V.G. can be pulled on until you experience difficulty in controlling the glider through bumps and minor directional adjustments. This tends to be full-on for stronger/heavier pilots and something less for smaller pilots.

When thermalling, some experimentation with a variety of tensions will help you establish the optimum settings. For starters it is best to fly with the V.G. off and as you establish yourself in the lift try gradual increases in tension until the glider has the best combination of climb rate and bank stability. Somewhere around half tension gives an excellent marriage of climb and handling for average thermal strength and turbulence.

To get the most out of your XS take some time to feel and think your way through the differences. Allow for the fact that the new wing feels and flies differently and will require some adaptation of technique if you are to utilize fully the potential of the XS.

TUNING HINTS

PITCH

If you find it necessary to either continually hold in or push out on the control bar, then the pitch (speed) trim needs adjustment. To adjust for the trimmed too slow situation, move the main (shorter) hang strap forward one strap width. Approximately 3/4" or 2cm. Test fly and adjust again if required. If you find it necessary to move the hang strap more than 3" (7.5cm), then you should consult your Moyes dealer before flying the glider.

To trim the glider to fly slower, then the strap is simply moved toward the rear in the same manner as above.

The glider should fly "hands-off" (i.e. no pilot input) at about 3mph above stall speed and if correctly trimmed, it should produce bar pressures returning to trim position.

ROLL AND YAW

If the glider shows inequality in roll rate, i.e., the glider seems to fall into a bank on one wing easier than the other, or if the glider wants to yaw or turn off course when attempting to fly straight, then there is differential lift or drag forces between the wings.

Firstly check your battens against the template. Correct any out of shape battens and test the glider.

If the battens are not out of shape, then remove the leading edge from the side to which the glider deviates, i.e., remove right wing bar if the glider turns to the right.

Check to see if the leading edge is bent or damaged. Replace if this is the case.

If no bend or damage is obvious it may be either:

1. that the fibreglass tips are at differing angles or
2. the bar is stressed and therefore gives a different flexing characteristic when under load

Correction of problem:

1. To check tip angles, glider should be flat on the ground with no battens inserted. Open the zipper at wing tip and fold sail back over the ends of the leading edges. Bring leading edges together ensuring they are running parallel. Insert the fiberglass tips. The tips should sit at identical angles with their ends being side by side and at the same height.

If this is not the case, then the tip plugs in the end of the leading edges will need to be adjusted. Please consult your Moyes dealer for advice or assistance in carrying out this procedure.

2. To correct this inequality, we must take into account both the lift and drag coefficients of the wing.

First step is to adjust the lift by giving battens #5 and #6 approximately 1/2" (10mm) more camber. This will allow that wing to generate more lift especially when on a bank in that direction and will also increase induced drag.

A lessening of the camber on the other wing in the same fashion can be tried if problem was not completely removed.

Secondly, a slight increase in leading edge tension by shortening the tip string on that wing by 1/4" (5mm) may assist if batten reshaping has not solved the problem.

A final adjustment to increase or decrease drag may be made by changing the tip angle as mentioned in 1. above.

These latter trimming techniques are best performed by an experienced and qualified test pilot.

GLIDER CARE AND MAINTENANCE SCHEDULE

Your XS will require very little in the way of maintenance if you take a little extra time and care with your day to day treatment and use.

Storage

Keep the glider in its bag in a cool dry place. Store the glider off the floor or ground and free from contact with oils, solvents or acidic substances.

Always dry the glider completely before storing. If this is not possible, ensure that the glider bag is off or open and that the sail is loose enough for air to circulate. Dry completely as soon as possible.

Sail Care

It is important to keep the sail clean and free from salt if you fly near the coast. Regular rinsing with fresh water will achieve this but for thorough washing a mild detergent may be used provided it is completely rinsed off the sail. For more serious stains consult your local sail-maker or Moyes dealer.

For small tears apply sail repair tape to prevent fraying. Unless the tear is at a stress point or along the trailing edge it will not tend to run or expand.

Sun and exposure to the elements will deteriorate the sail more rapidly than hours of flying. It is important to carry the glider in its bag on well padded roof bars with at least three points of support.

If you take just a little extra care when packing up and transporting the glider, it will maintain its condition and performance for many more enjoyable hours.

Battens

Never force the battens into their pockets. Insert them gently to avoid damage to the sail and wear to the batten ends. Sand in the sail or on the battens will cause abrasion in the pockets . . . batten pocket repairs are costly.

Always pack the highly cambered battens (nose to #5) into the batten bag as a unit, never one at a time. This will avoid flattening the camber. Store the two bags of battens securely between the leading edges with the camber to the very end so that the tie downs for transport do not pull across the camber.

If reshaping is required, take care to avoid over working the tube as this will soften the alloy causing the battens to lose shape more easily in the future.

Never insert or extract battens with the cross-bar tension on tip battens and undersurface battens excepted.

Wires and Attachments

At the first sign of frays or kinks the wire should be replaced. If the thimble has become elongated, then the thimble, nicopress and wire has been exposed to a force in excess of 300-400lbs (1400-1800N). It is advisable to replace the wire(s). Constant exposure and set-up on rough and rocky ground and salty sand and sea air will shorten the riggings life. Wires are not expensive and are simple to replace, they also hold your glider together.

Tubing and Bars

Once again contact or immersion in salt air or water is a major concern and will require removal of end caps and a thorough flushing and drying. Corrosion and electrolysis set in amazingly quickly and will dramatically reduce the strength and life of the parts involved. Follow the maintenance schedule conscientiously. Examine the bars for dents, bends, wear spots and corrosion every pre-flight check. If any damage is noticed, replace the bar, but also determine how that damage was caused and take steps to avoid repeat damage occurring.

Hardware and Bolts

Although the hardware on the XS is virtually indestructible in normal flight applications, it is still wise to check them periodically to be safe.

The bolts are of aircraft quality and can be bent in a crash or hard landing these should be replaced. All bolts should show exposed thread above the locknuts.

The fibreglass tip can be broken if you slip or stall onto the wing tip during landing check and replace if delamination of the fibreglass is evident.

Maintenance Schedule

Every 10 hours

- * Check all battens against airfoil template.

Every 50 Hours (or six monthly)

- * Inspect the sail. Check the stress areas and apply sail repair tape where necessary. Special attention should be directed to the wire slots, kingposts opening and reflex bridle attachments tabs.
- * Inspect all batten elastics and tip cords.
- * Inspect all cross-bar wires, fittings and hardware.
- * Check all bars/tubing for damage or possible wear caused by set-up, fold-up or transportation.
- * Inspect all rigging for frays and other signs of damage or deterioration such as rust.

Annual Inspection

Every 100 hours air time (or every 12 months) the glider should be completely stripped down for a thorough inspection.

This can be done by yourself or preferably by your Moyes dealer or agent.

Sail Removal

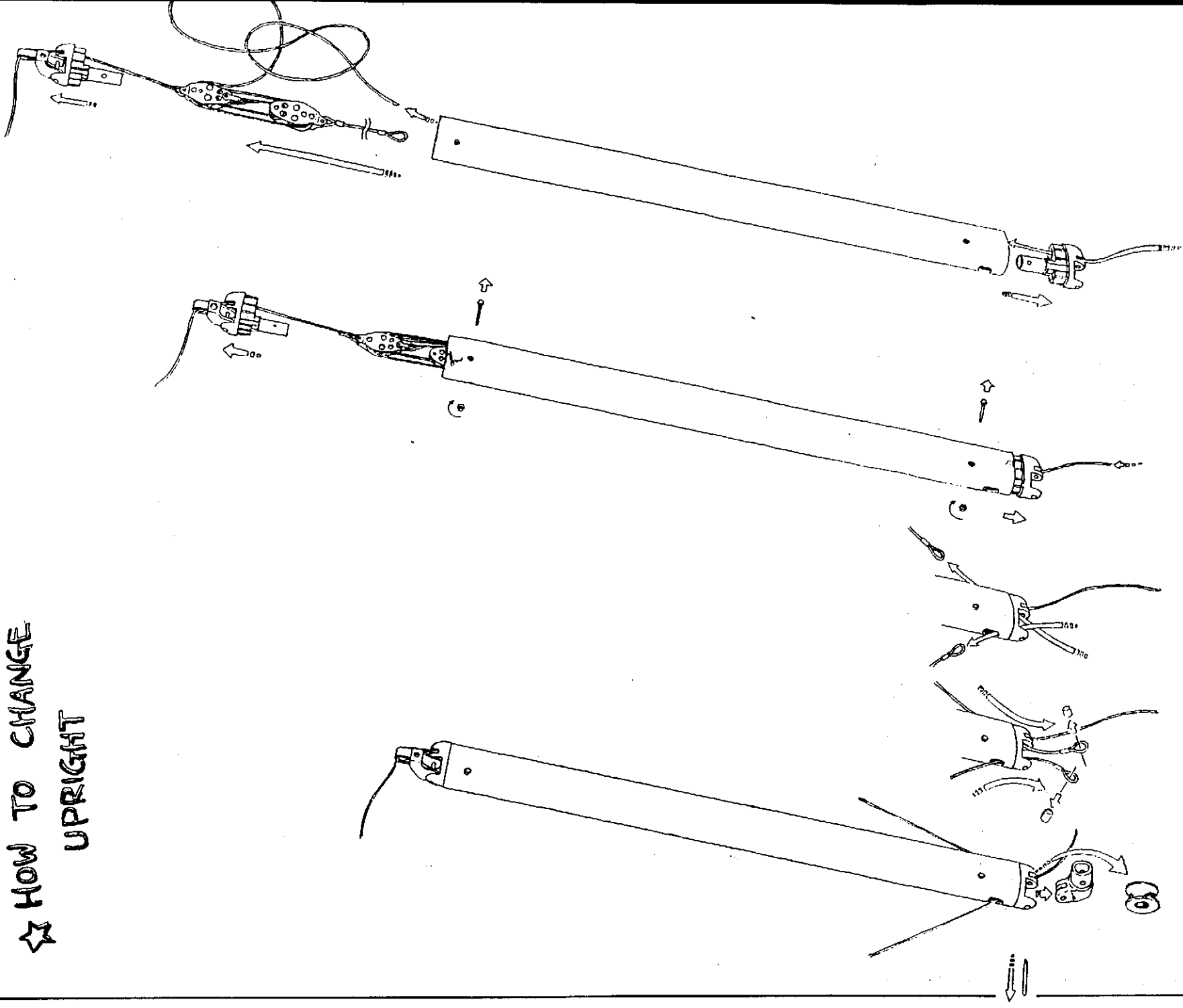
1. With the glider upside down and still folded, remove the control frame from the keel and the rigging wires from the control frame. Remove the sail screw from the keel sleeve and undo V.G. rope at keel.
2. Turn the glider over and undo the screws holding the sail at the nose.
3. Remove the top side wires from the cross-bars.
4. Remove the kingpost bolt at the keel bracket and remove nose plate bolts and rear rigging bolt on keel. Kingpost and top wires can be removed.
5. Carefully remove keel from sail.
6. The cross-bar and leading edges can now be eased out through the nose of the sail. Take care to ensure wires, cross-bar assemblies and washout pegs do not snag on the sail.
7. Remove the mylar from the leading edge pockets.

Inspection

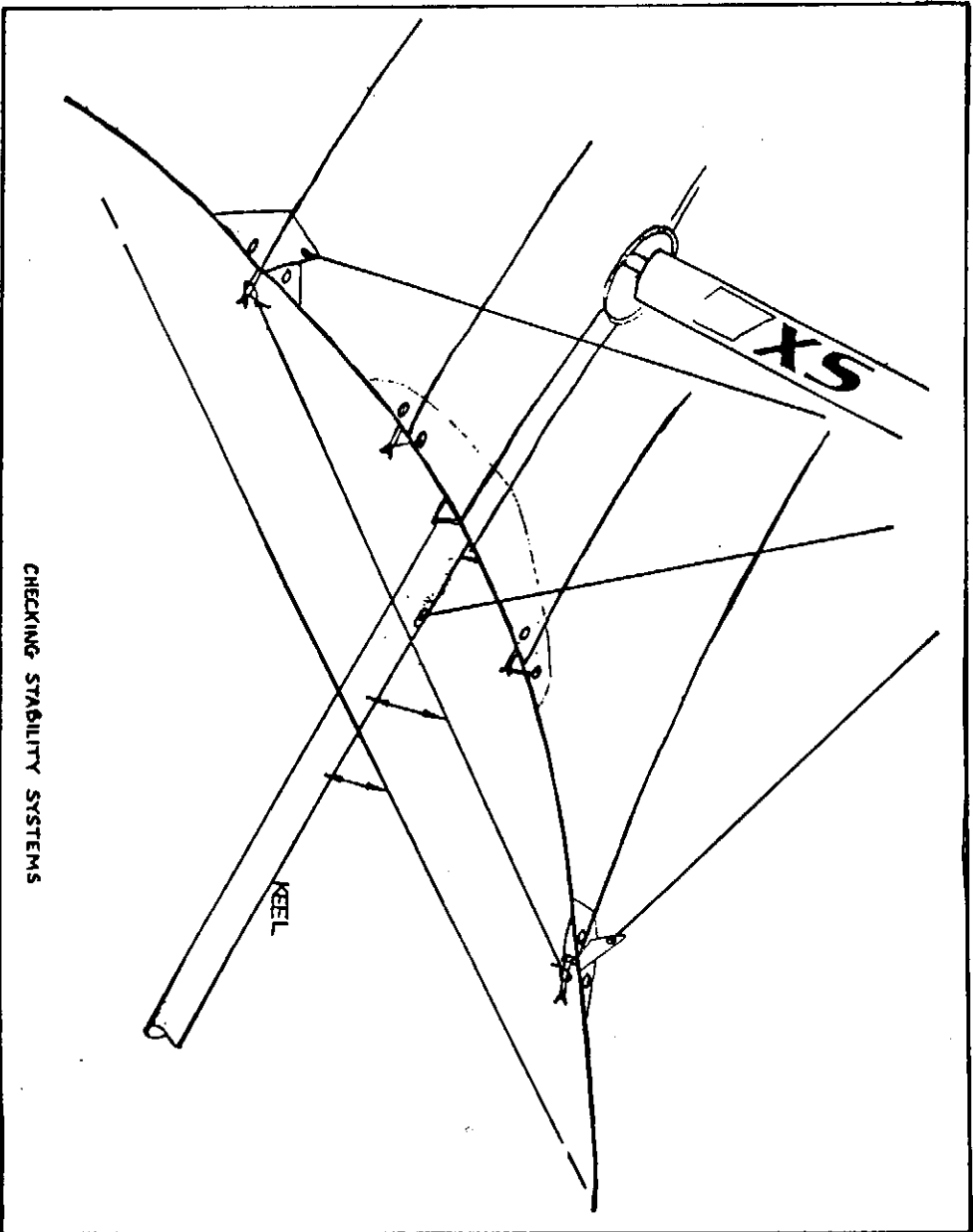
- * Check the sail for abrasion and tears. Check all stitching and have any repairs done by a professional sail maker.
- * Replace batten elastics and tip cords.
- * Closely inspect all other glider components and replace any part that is damaged or worn. Pay special attention to reflex bridles, hang loops and rigging. Replace these even if they show only minor wear. (Some pilots replace bottom rigging every year (75-100 hours) regardless of wear. Coastal flyers should consider this due to increased contact with salt and corrosive agents.)

MOVES DELTA GLIDERS PTY. LTD.,										
173 BRONTE ROAD, WAVERLEY, SYDNEY, NSW, AUSTRALIA, 2024										
PH (02) 3875622 FAX (02) 2874472										
XS MANUAL 19TH FEBRUARY, 1991										
XS 142, 155, 169 BOLT LIST										
DESCRIPTION	PART NO.	Q	INS	LGTH	INS	MM	LGTH	MM	NUT	WASHER
NOSE PLATE / LEADING EDGE	AN4-25A	2	1/4"	2 5/8"	6.25	68	68	THIN	3M	PL/2S PL
NOSE PLATE / KEEL (FRONT)	AN4-26 A	1	1/4"	2 3/4"	6.25	71	71	THIN		
NOSE PLATE / KEEL (BACK)	AN4-25A	1	1/4"	2 5/8"	6.25	68	68	THIN		
NOSE CHANNEL	AN4-12A	1	1/4"	1 1/4"	6.25	33	33	THIN		1
NOSE CATCH	AN4-12A	1	1/4"	1 1/4"	6.25	33	33	THIN		1
KEEL / CONTROL BAR	AN5-30A	1	5/16"	3"	8	77	77	THIN		1
KEEL / KINGPOST	AN4-23A	1	1/4"	2 3/8"	6.25	61	61	REG		1
KINGPOST BASE	AN4-12A	1	1/4"	1 1/4"	6.25	33	33	THIN		1
KEEL / PULLBACK	AN4-24A	1	1/4"	2 1/2"	6.25	64	64	CSTL	SAFETY PIN	
KEEL / BACK WIRES	MS20392-3C57	1	1/4"	1 3/4"	6.25	45	45	SAFETY RING		
X-BAR / CENTRE R/H	AN4-30A	1	1/4"	3"	6.25	77	77	THIN		1
X-BAR / CENTRE R/H	AN4-30A	1	1/4"	3"	6.25	77	77	REG		2 M PL
X-BAR / CENTRE L/H	AN4-30A	1	1/4"	3"	6.25	77	77	THIN		2
X-BAR / CENTRE / BALL	AN4-25A	1	1/4"	2 5/8"	6.25	67	67	REG		
X-BAR / CENTRE / HINGE	AN4-13A	1	1/4"	1 3/8"	6.25	35	35	THIN		2
X-BAR / L-E (PLATE) (155)	AN4-12A	2	1/4"	1 1/4"	6.25	33	33	REG		1
X-BAR / L-E (PLATE) (155)	AN4-10A	2	1/4"	1"	6.25	25	25	THIN		1
L-E / X-BAR (155)	AN5-30A	2	5/16"	3"	8	77	77	REG		1
X-BAR / L-E (PLATE)(142&169)	AN5-27A	2	5/16"	2 7/8"	8	74	74	THIN		2
L-E /X-BAR (SADDLE)(142&169	AN4-26A	2	1/4"	2 3/4"	6.25	71	71	THIN		
L-E / X-BAR (WIRES) (142&169	AN4-27A	2	1/4"	2 7/8"	6.25	74	74	THIN		2 L PL
L-E / BREAKDOWN (R)	MS20392-3C69	1	1/4"	2"	6.25	50.8	50.8	SAFETY RING		
L-E / BREAKDOWN (L)	MS20392-2C69	1	3/16"	2"	4.8	50.8	50.8	SAFETY RING		
L-E / SAIL TENSION	MS20392-3C69 PIN	2	1/4"	2"	6.25	50.8	50.8	SAFETY RING		
SPEED BAR	AN4-13A	3	1/4"	1 3/8"	6.25	35	35			2
SPEED BAR	AN4-14	1	1/4"	1 1/2"	6.25	39	39	SAFETY PIN		
AIRFOIL DOWNTUBES	SF AEP PIN	4	1/4"	2 3/8"	6.25	62	62	NT A125 066		
AIRFOIL DOWNTUBES / VG	MS20392-2C35 PIN	4	3/16"	1 3/32"	4.8	28	28	SAFETY RING		
AIRFOIL DOWNTUBES / VG	MS20392-3C15 PIN	1	1/4"	15/32"	6.25	12	12	SAFETY RING		

★ HOW TO CHANGE UPRIGHT



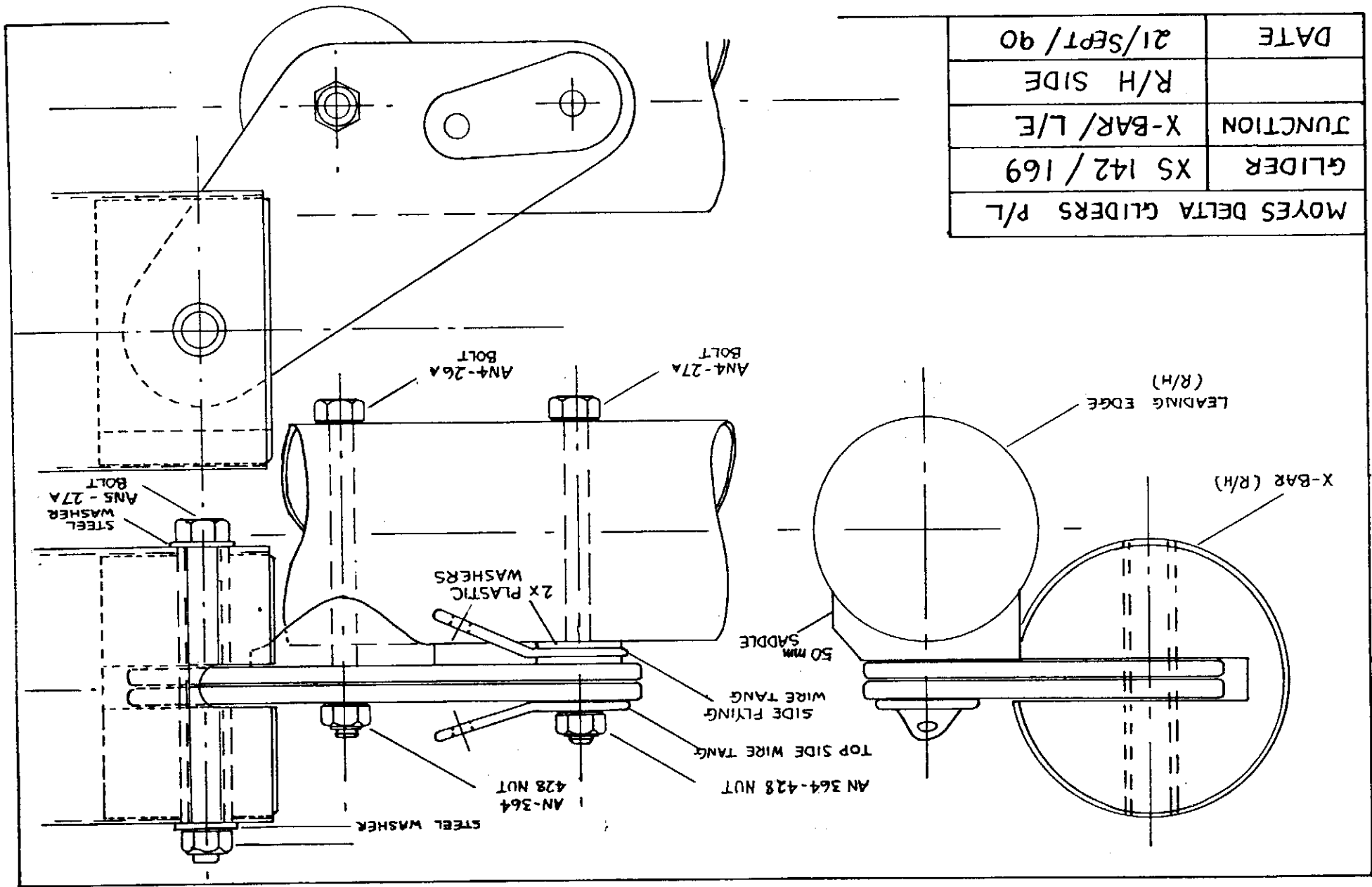
CHECKING STABILITY SYSTEMS

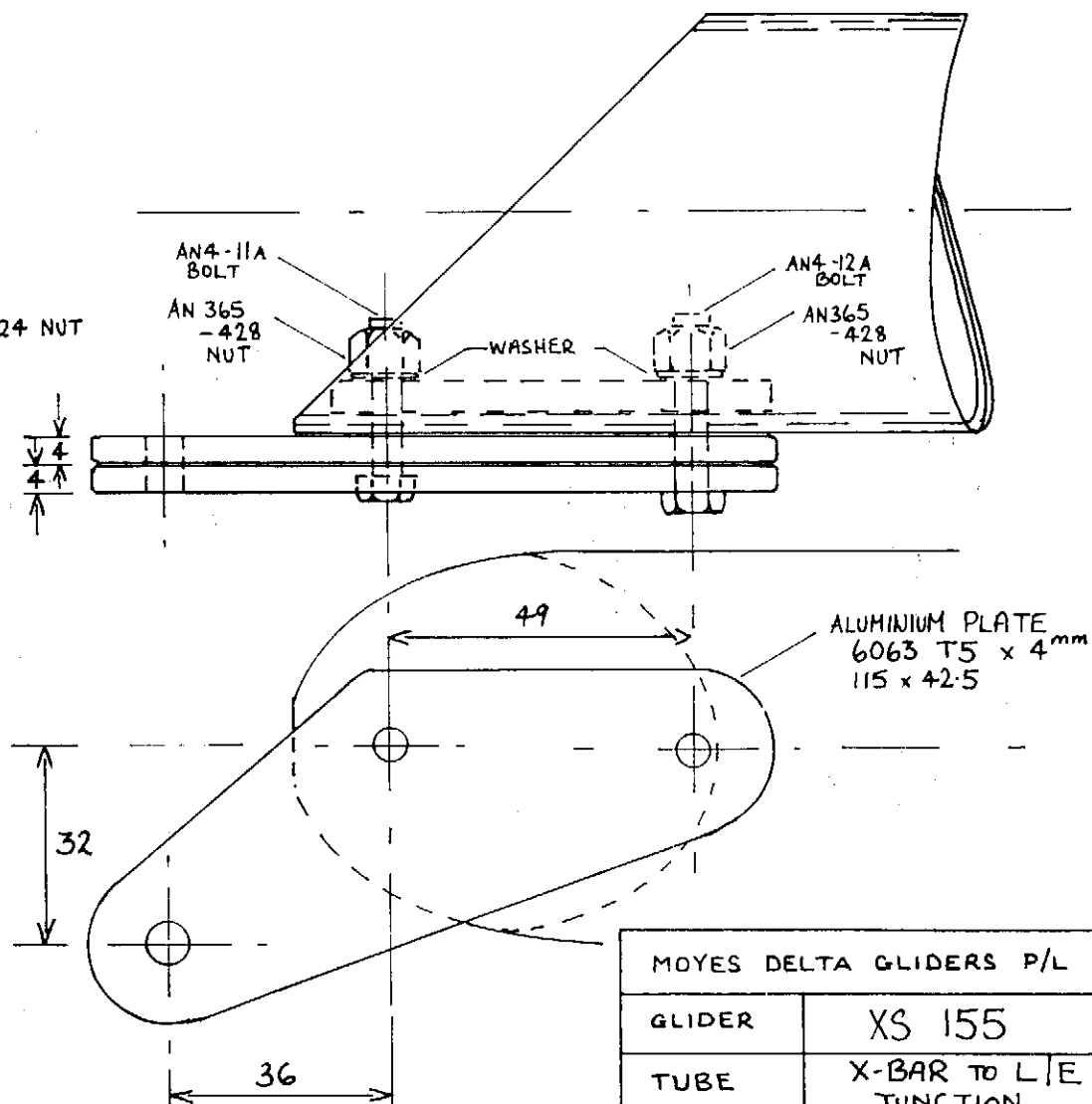
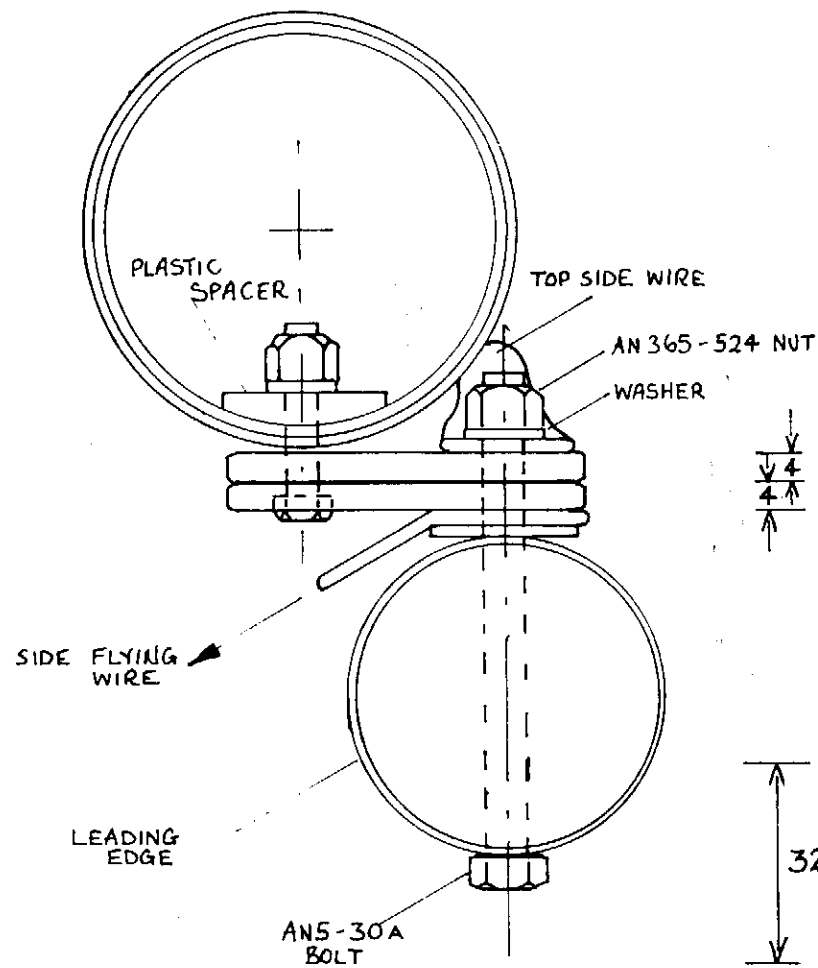


CHECKING STABILITY SYSTEMS

SIZE	SETTING	BATTEN NO.				
		1	2	3	4	5
142	LOOSE	XXXXXX	54	XXXXXX	42	XXXXXX
142	TIGHT	XXXXXX	89	XXXXXX	76	XXXXXX
155	LOOSE	XXXXXX	89	140	184	XXXXXX
155	TIGHT	XXXXXX	51	85	117	XXXXXX
169	LOOSE	XXXXXX	XXXXXX	80	XXXXXX	51
169	TIGHT	XXXXXX	XXXXXX	54	XXXXXX	22

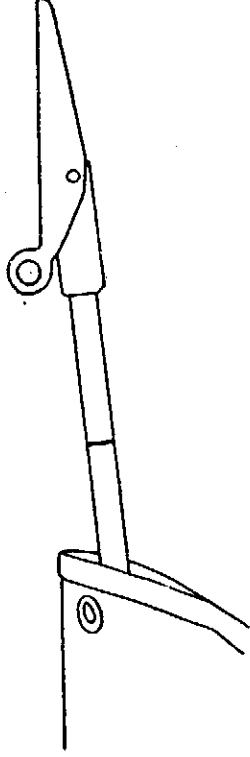
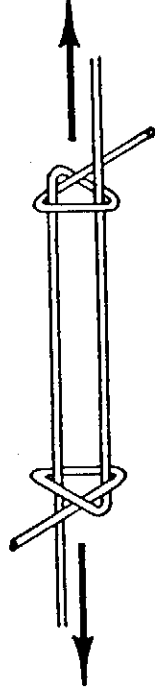
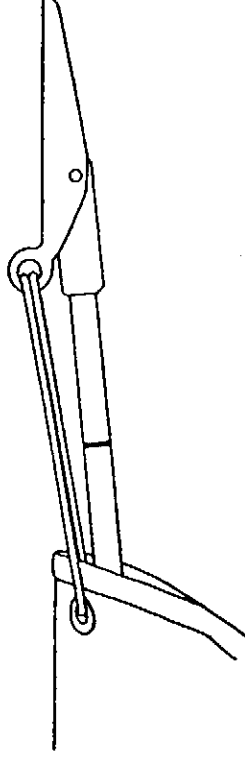
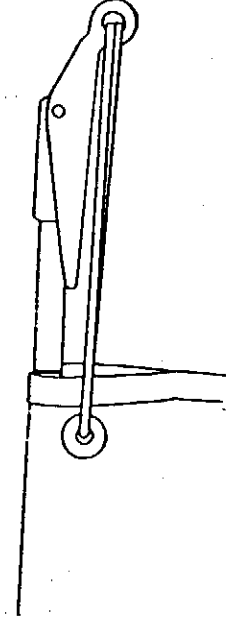
MOYES DELTA GLIDERS P/L	GLIDER	XS 142 / 169	JUNCTION	X-BAR / L/E	R / H SIDE	DATE	21 / SEPT / 90
-------------------------	--------	--------------	----------	-------------	------------	------	----------------





MOYES DELTA GLIDERS P/L

GLIDER	XS 155
TUBE	X-BAR TO L/E JUNCTION
DATE	5-AUG-89

CHANGING TIP STRINGSFIG. 1FIG. 2FIG. 3FIG. 4FIG. 5

- 1/ POSITION LEVER AS IN FIG. 1
- 2/ FEED TIP STRING THROUGH SAIL EYELETS AND LEVER, FIG 2.
- 3/ USING TWO THUMB KNOTS TIE TIP STRING, FIGS. 3 & 4.
- 4/ AFTER KNOT IS TIED SWING THE LEVER TOWARDS THE KEEL WITH PALM OF HAND. LEVER WILL SNAP "ON" WHEN OVER CENTERED, FIG. 5. THE SAIL SHOULD COME TO MARK ON FIBREGLASS TIP. TRIM ANY EXCESS STRING
- 5/ TO RELEASE, PLACE HAND ON LEVER AND PUSH TOWARDS LEADING EDGE. WHEN OVERCENTERED THE LEVER WILL SNAP "OFF".

We've come a long way.

*Bill Moves Flying His Fall Kite
At Santa Barbara 1971*

