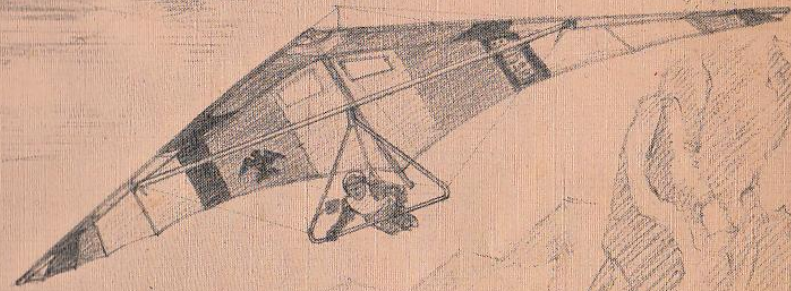
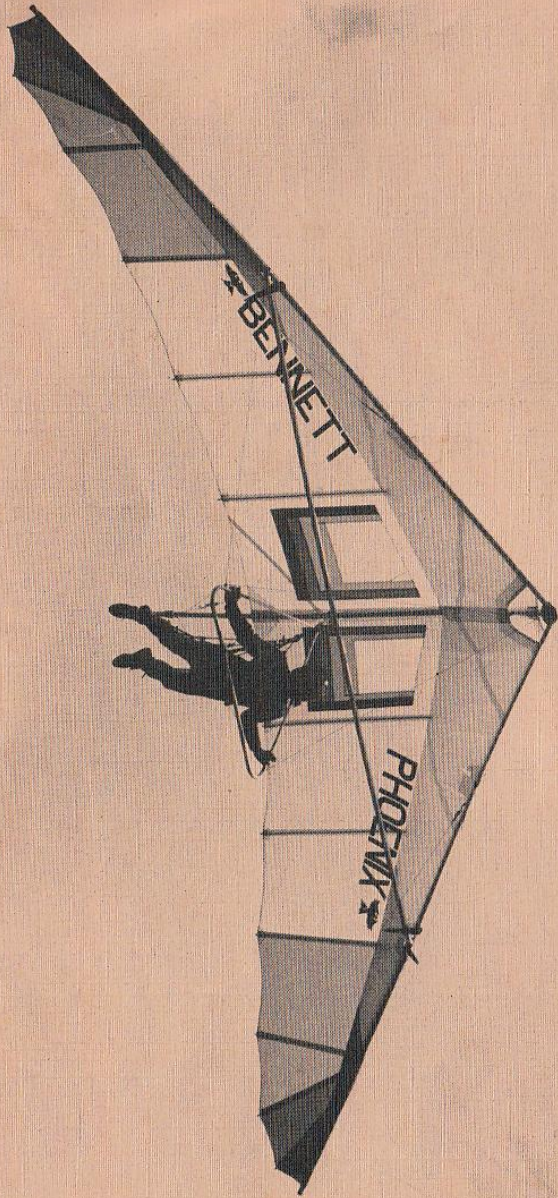


FLIGHT MANUAL



**PHOENIX VI.B
VI.C
VIII**



P.O. BOX 483 • VAN NUYS, CALIFORNIA 91408 • PHONE (213) 785-2474 / 787-6600

Dear Pilot,

Congratulations, you have chosen the finest single surfaced airfoil hang glider on the market. A new realm of soaring and cross country experiences will unfold before you as you become accustomed to the high performance and handling capabilities of your new Phoenix.

Please thoroughly read this manual before taking to the skies in the glider. Keep in mind, that sailplane pilots find that at least 25 hours are required to master a new aircraft. We feel that at least 12 hours or more of flying in your new Phoenix will be needed to become completely proficient, even though the glider is one of the easiest to fly high performance gliders on the market. So gradually and carefully learn the new performance and control responses of the Phoenix. Analyze each flight and soon the glider will be an extension of your mind as you soar along in nature's air currents.

We at Delta Wing wish you the best of flights and if you need any assistance in your flying experience, do not hesitate to write or call.

Best of Lift,

Delta Wing Kites & Gliders, Inc.

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Due to design changes that may occur to the Phoenix after the printing of this manual, some parts may vary slightly from the description herein. Consult the factory or your nearest dealer if you have any questions.

DESCRIPTION OF DESIGN

The Phoenix VI-B is a high performance single surface airfoil glider. It is designed to accommodate both foot launching or towing (with towing control bar). The Phoenix VI-B features: inflatable leading edge pockets, adjustable cambered leading edges, cambered keel, easy prone to seat conversion, negative G stressing, break down cross bar, fully battened radial tipped sail made by Flow Sails, Inc., special offset king post to aid in fixed keel camber shape, quick change upper rigging, double positive G and single negative G wing posts on each wing.

The two most outstanding features of the VI-B, that give it the most superior design on the market, are the inflatable leading edge pockets and the radial tipped sail. The inflatable pockets not only increase the lift of the airfoil and improve stalling characteristics, but promote an extremely fast dive recovery.

The radial tip sail, like the tip feathers of birds, allows for: improved 1/4 chord sweep design, less sail billow (1/2°) permitting high penetration characteristics, reduced induced drag, a better washout curve and also aids in the prevention of tip stalls and flat spins.

SPECIFICATIONS

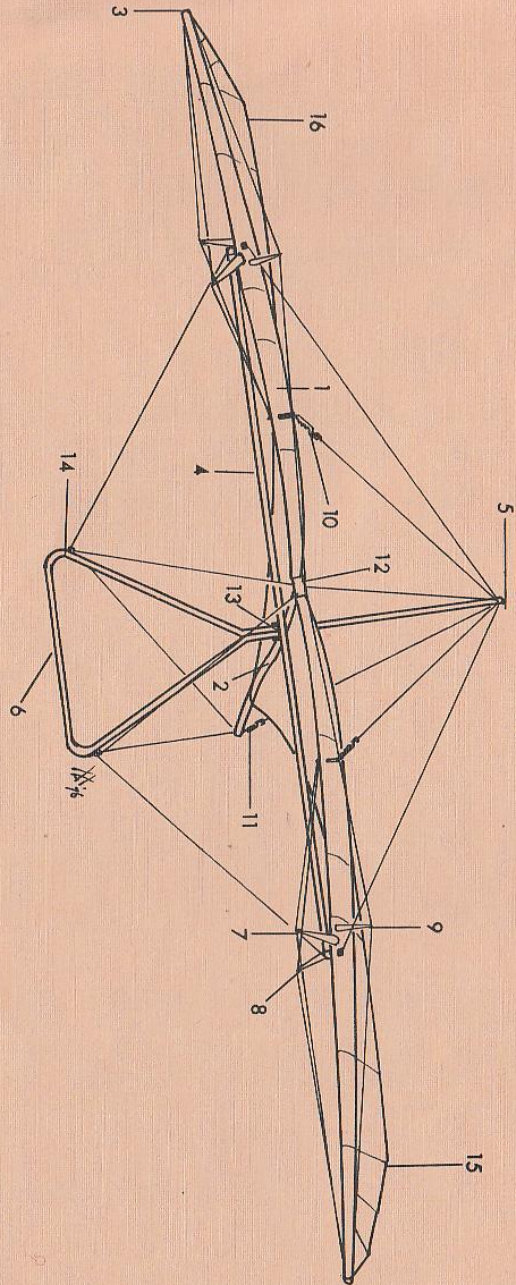
	VI B Jr.	VI B	VI B Senior
Nose Angle	105°	100°	105°
Leading Edge	18' 6"	20.5'	21'
Keel	9"	11.5'	12'
Sail Billow	1/2°	1/2°	1/2°
Sail Area	165 Sq. Ft.	185 Sq. Ft.	215 Sq. Ft.
Aspect Ratio	5.3	5.25	5.25
Glide Angle	8:1	8:1	8:1
Sink Rate	200 F. P. M.	200 F. P. M.	200 F. P. M.

MATERIAL AND CONSTRUCTION

The Phoenix VI-B leading edges are constructed of 6063 T832 1-1/2" x .049 from the nose plate to 17-3/4" past the cross bar. The remainder of the leading edge is 6063 T832 1-5/8" x .058 which slides over the 1-1/2" x .049 and forms a sleeve ending 12-1/4" past the cross bar toward the nose. Inside the leading edge, at the cross bar, is another sleeve combination forming an internal sleeve for the 1-1/2" x .049 and 1-5/8" x .058 leading edge.

The keel is precambered and is 6063 T832 1-1/2" x .049. At the heart bolt - King post area is an external sleeve of 1-5/8" x .058.

NOMENCLATURE DRAWING



1. Inflatable pocket
2. Cambered keel
3. Leading edge
4. Cross Bar (two piece)
5. King post (two piece)
6. Control Bar
7. Outside primary wing post
8. Inside secondary wing post

9. Negative and wing post
10. Camber leading edge tensioner
11. Keel tensioner
12. Nose plate
13. Control bar bracket
14. Lower rigging wire eye bolt
15. Batten pockets
16. Sail

The 1-5/8 x .058 cross bar is designed to break down with an internal sleeve of 1-1/2" x .049 at the heart bolt area.

The king post is two piece and made from 1-1/8" x .125 and 7/8" x .095 crown attachment. The control bar down tubes are 7/8" x .095 and the lower support frame is 1-1/8" x .125. All kites and gliders are bright dip anodized. Delta Wing saddles are bushed to the tubing and nuts and bolts are rubber cupped where they might interfere with the sail.

The sail is made of 3.8 oz. Bainbridge dacron. It is sewn with polyester dubond thread using two rows of zig zag for maximum strength and durability. Battens are preformed and made from 3/8" x .035 anodized aluminum.

All Delta Wing gliders are jig rigged with 7 x 7-3/32" stainless steel cable. Double nicos are used where there is no continuous rigging and covered with heat shrink. Stainless steel nuts and bolts are used on tow kites and aircraft quality on gliders.

ASSEMBLING KITE OUT OF SHIPPING CARTON

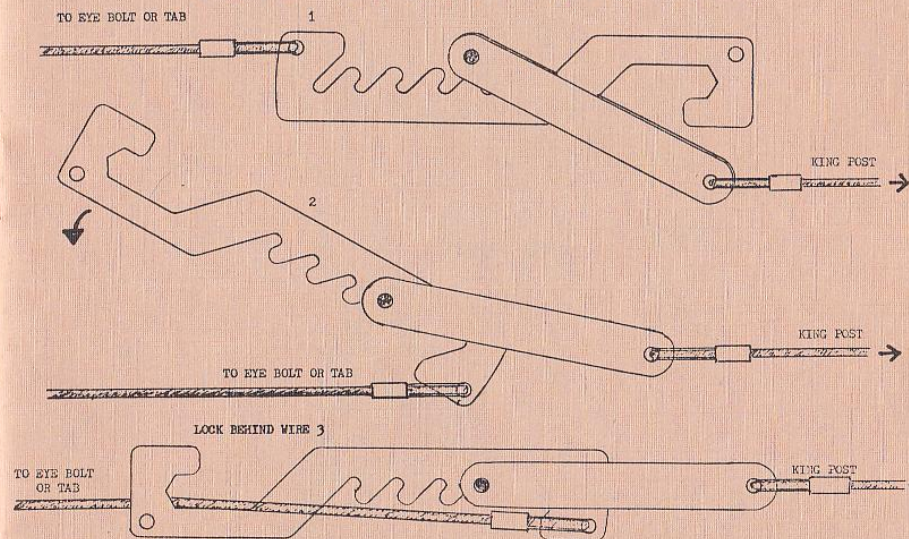
1. Remove glider from box.
2. To reduce your shipping expense, the glider has break down tips on the leading edges. Re-install these tips, making sure the numbers on each tip correspond to the numbers on the leading edges. Leave the nuts that hold the tips on loose for another assembly step.
3. Attach the sail to the tip extensioners, lining up the green and red grommets with their color coded screw holes in the extensioner.
4. Roll glider so that control bar bracket faces up and assemble break-down cross bar, lining up the dots on each piece. Make sure lower flying wires are on top of cross bar.
5. Untape and spread lower flying wires to either side of glider.
6. Your glider has four control bar positions which can be adjusted to suit your flying style. On the flying wires, there is a short and long section which can be determined by measuring from the tang to where the control bar eye bolts and side wires attach. Starting from the nose plate, there are four adjusting holes, two at the plate and two at the end of the keel. (See figure 1). Listed below are four settings you may use. They indicate whether to put the short wire to the front or to the rear.

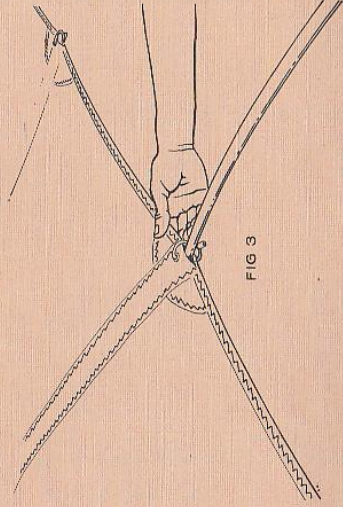
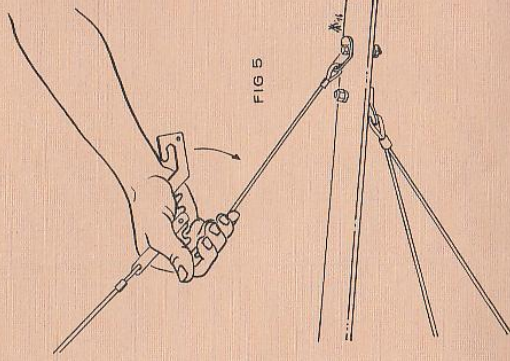
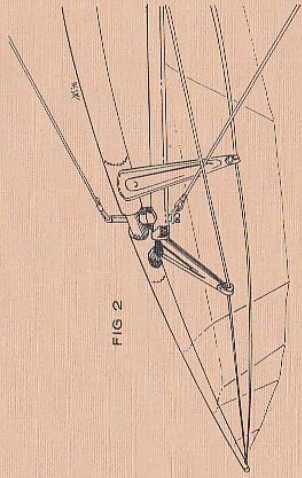
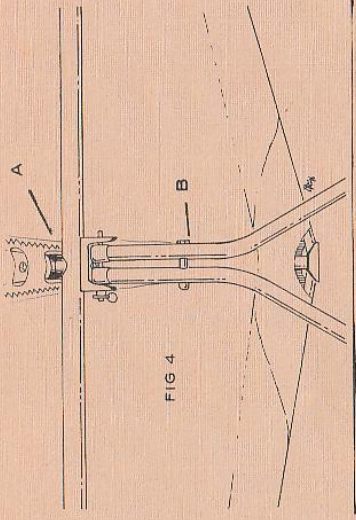
Supine	B & D	-	Short wire to rear
Seated	A & C	-	Short wire to rear
Prone Bar Forward	A & C	-	Short wire to front
Prone Bar Back	B & D	-	Short wire to front

NOTE: Always place the upper rigging king post wires in holes B & D. Also, we recommend A & C for prone and all VI-B's are shipped in this position. Never place lower rigging wires in holes B & C or A & D because this setting would make flying wires too loose or too tight.

7. Install control bar on channel bracket and attach flying wires.
8. Turn glider upright on control bar.
9. Swing out cross bar.
10. Untape leading edge camber cable tensioners.
11. Put king post upright to straighten out upper rigging wires. (NOTE: In normal assembly procedure, king post goes up last). Put down king post.
12. Spread wings and insert upper rigging eye bolt through hole in leading edge and cross bar and attach side lower rigging wires with nut. (Wing nuts and safety pins are shipped on nose plate).
13. Go to back of glider and pull up the king post with rear upper rigging wire. The king post is offset and cambers the keel when upright. It also puts tension on all the rigging. Adjust the cable tensioner so rigging wires are tight, about third from position or two notches showing. Be careful because the spring loaded king post may pull the wire from your hand as you attach cable tensioners.

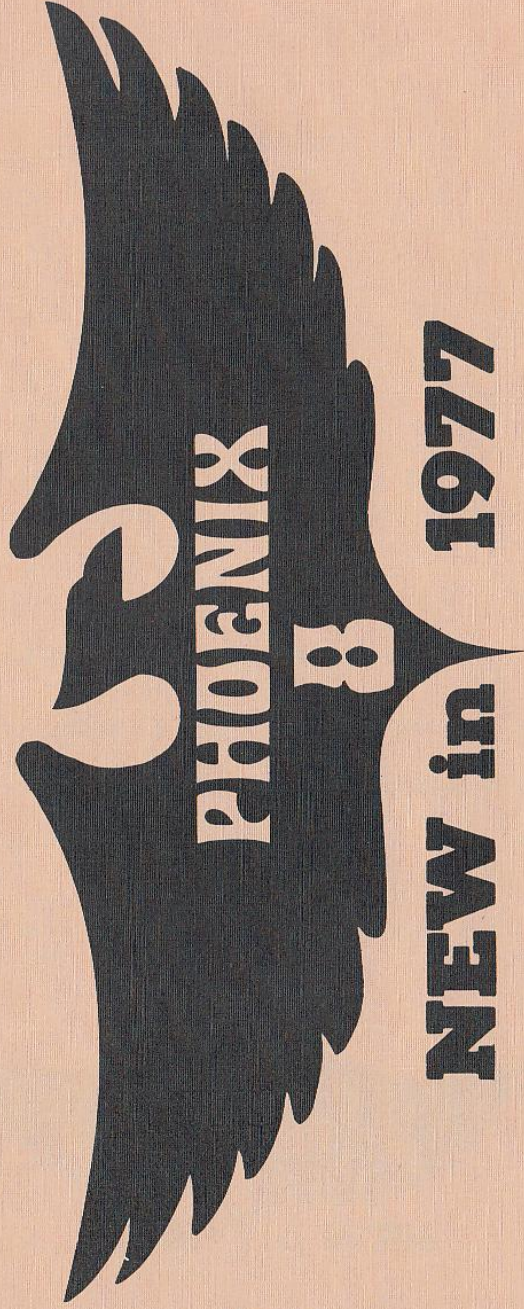
CABLE TENSIONER INSTRUCTIONS





8

1-B



1977 KITES AND GLIDERS

SPECIFICATIONS

	8 Jr.	8	8 Sr.	6C	TXB
Nose Angle	110°	110°	110°	100°	104°
Leading Edge	20'	22'	22'	20 1/2'	18 1/2'
Keel	9'	9'	10 1/2'	11'	11 1/2'
Sail Billow	0	0	0	1/4°	1/2°
Sail Area	170'	185'	220'	185'	167'
Aspect Ratio	6.3	7.02	5.9	5.7	5.09
Glide Angle	9.5:1	9.5:1	8.5:1	8:1	7.5:1
Sink Rate	190 fpm	190 fpm	195 fpm	200 fpm	220 fpm

MODIFICATION 14, PAGE 9 (Figure 2, folding instruction #2)

Primary wire extends straight out and secondary 90° to that straight down.

MODIFICATION 16, PAGE 9

On PHOENIX 8, PHOENIX 6C and TXB there are not camber wires from king post.



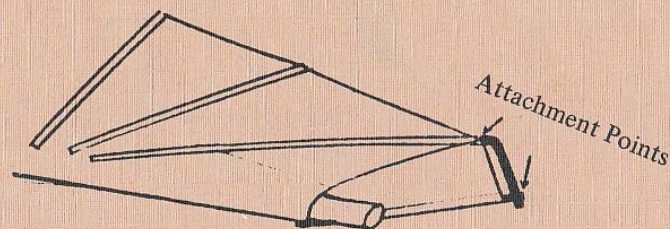
(2-B)

MATERIAL AND CONSTRUCTION

The Phoenix 8 series uses the same combinations of sizes of tubing as the Phoenix 6B series. The use of 1 5/8 x .058 and 1 1/2 x .049 on the wings has been reversed to provide small tubing on tip to reduce mass. Phoenix 8 and 8 Sr. also using 1 3/4 x .058 on leading edges and cross bars for extra loading due to increased sail flatness.

Assembling Kite out of Shipping Carton 18

Insert large Bent Batton into last batton slot. Make sure they are correctly inserted and in appropriate side of glider. Attach at grommet on sail and to the loose straight droop tip batton that extends from under the leading edge. (Fig. 6)



(3-B)



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BE READY FOR THE FLYING OF TOMORROW WITH A PHOENIX 8. EXPERIENCE THE FLYING DREAM.



4-B

14. Attach wing deflector wires to the tip of the leading edges by doing the following: there are two deflector wires on each leading edge, primary and secondary.* The primary wire attaches to the wing post that swings down and to the outside of the glider. The secondary wire goes between the cross bar and the lower flying wire and attaches to the wing post that swings down and to the inside of the glider. If there is no ball swedge on the deflector wire, the wing posts are to rest against the cross bar. (See figure 2)

A. Untape wires and attach them to the wing posts as described above.

B. Attach wing post wire tangs to bolt on tip of leading edge. Primary wire tang goes on last (on top of secondary tang). Be sure there is no twist in the wing wires. It helps to have the wing posts in the folded position when bolting tangs to tip of leading edge.

15. Install battens. Note that the different sizes go in their respective pockets and the camber curve in the battens goes to the front and down. (See figure 3). Try not to pull on the sail too hard when installing battens because you might unevenly stretch the sail. Battens are color coded for your convenience.

16. Adjust the leading edge camber wires. Usually the third from tightest or two notches showing is the correct adjustment. Always use same tension on each wing.

17. Double check all points of assembly and make sure all nuts and bolts are properly secured.

* Latter models have negative wing posts. Attach these wires to same bolt on top of leading edge.

FOLDING INSTRUCTIONS

The care and consistency you use in folding your glider will greatly increase the life of the sail. When taking your glider apart, reverse the set up procedure.

1. Remove battens.
2. Unhook leading edge camber wire adjustment.
3. Collapse wing posts.
4. Put down king post.
5. Fold in wings.
6. Roll up sail and tie together.
7. Fold in cross bar and tie glider securely to avoid parts rubbing against sail.

9

At this point, the cover should be put on the glider (of course the control bar will have to be removed if you have a sleeve type cover). Set the glider on its side and remove control bar and fasten bag. Never let your sail touch the ground or ride on a rack without the cover on it.

ADJUSTMENTS

Your suspension point on the glider can be one of two places (See figure 4). A will be more tail heavy than B, so experiment off a small hill first to find the one best for your weight and harness position. Never use ski line as your primary support and always fly with a secondary suspension system.

If after at least three flights you have determined that your glider is pulling to one side or the other during flight and all rigging is set properly, the following adjustments can be made to the sail. All sail adjustments are made at the tip of the leading edge by tightening or loosening the sail. This is done by drilling new holes at 1/4" increments either in front or back of the original screw holes that hold the sail to the tip of the leading edge.

Glider pulls to the left at cruising speed -
1. Tighten left sail 1/4" at a time.

Glider pulls to the right at cruising speed -
1. Tighten right sail 1/4" at a time.

Glider drops left wing on landing or stall -
1. Loosen left wing 1/4" at a time.

Glider drops right wing on landing or stall -
1. Loosen right wing 1/4" at a time.

There is a margin where both wings will be at equilibrium with each other and sometimes adjustments will have to be made to the wing so it falls within this margin. It is best to consult the factory before making the adjustment.

The reason you tighten a wing is because there is too much washout and sail billow causing a glider to turn in the direction of the loose wing. You loosen a wing because it is stalling faster than the other wing and dropping off first.

Alternate adjustments to leading edge wires to tighten or loosen a wing, may be accomplished by removing tang from bolt on tip of leading edge and twisting the tang to tighten or loosen the wire. Replace tang on bolt making sure it does not untwist.

The tensioners on the keel should be adjusted so that the rigging is tight. This will probably be much tighter than any glider you are used to. The reason for this is that the king post is off centered and aids in the cambering of the keel. Be careful when you release the tensioner because it could pull out of your hand and smash against the keel. (Fig. 5)

FLYING THE PHOENIX

by Trip Mellinger

YOU HAVE PURCHASED the finest foot launched glider on the market. We have experienced many cross country flights on the Phoenix which have been made possible by the high penetration speed, excellent glide angle and low sink rate the glider produces.

As of the date of printing of this flight manual, Gene Blythe and I have flown the glider 47 miles cross country using thermal lift at altitudes of 13,000 - 14,500 MSL. On this flight, a world distance record and altitude gain of 6500' were recorded and the Delta Wing Team is looking forward to many more miles.

You too will be experiencing new flying thrills, just as we have, flying the Phoenix. In learning to fly the glider, develop a flight plan for each flight so that you will maximize your learning process and adapt to the glider much quicker. Don't let a flight go by without testing and studying some aspect of the glider.

The Phoenix will fly extremely slow and parachute quite well, so practice finding out just where your stall speed and best sink rate lies. Make the glider stall and practice your recovery. (Have plenty of altitude for this). Considering that stall speed increases with angle of bank, find out what your minimum sink is for each degree of bank in a turn for thermaling. Remember that if you are having trouble turning the glider, you might be flying too slow for the roll and will have to speed up slightly to initiate the turn.

When you have mastered your slow speed flying, move to your mid speed range where best L/D occurs. Make many flights, concentrating on your best glide angle. Pick out a point ahead of you on the ground in still air and find out what air speed will get you the farthest.

The Phoenix VI-B has excellent penetration and some time should be devoted to learning how it handles at high speeds. Take off and fly the glider as fast as you can. You will find that the more your airspeed increases, the more the bar pressure increases and the glider will want to slow down. This occurs because of the built-in dive recovery and positive pitch systems of the glider. At these high speeds, try mild turns and become comfortable with the high speed bar position because you might have to fly out in high winds some day and it's safer to have practiced for it under controlled conditions.

Happy flying!



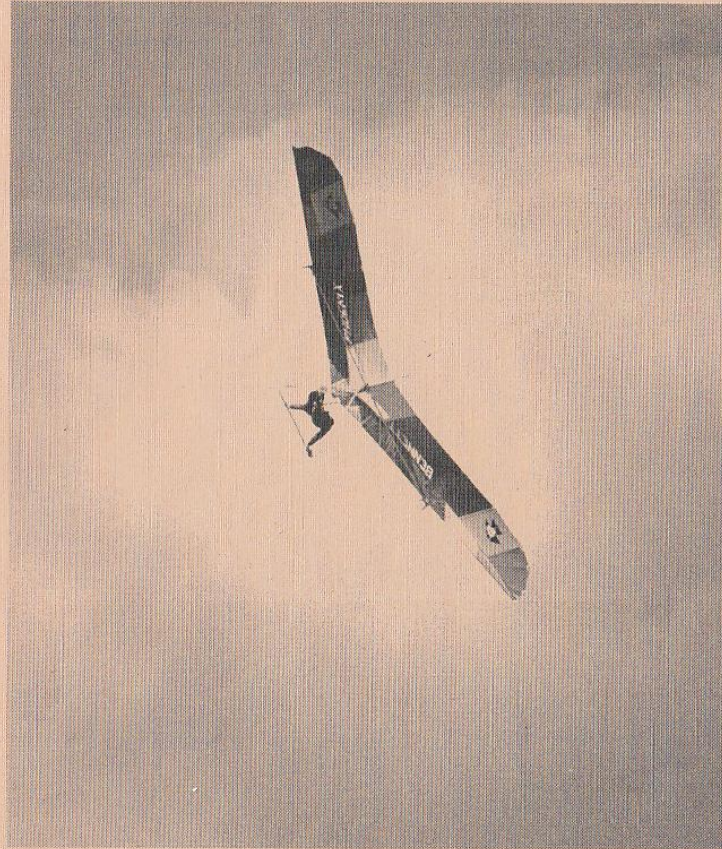
HYDRO LAUNCHED - MANNED KITES

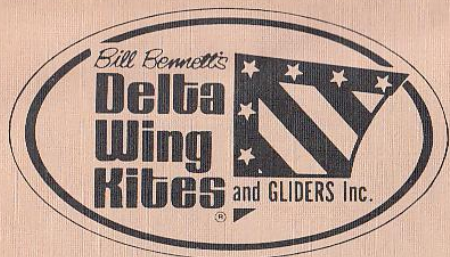
1. Boat driver and equipment must comply with all existing boating laws.
2. Any boat used to tow a kite must be equipped with a suitable mechanical device to facilitate the quick release of the kite from the boat by the observer.
3. In addition to a competent driver, the towing boat must be manned by at least one other person, 16 years of age or older, to act as observer at all times.
4. A generally clockwise (or counter-clockwise) flight pattern of the main body of the water shall be used at all times, maintaining at least 300' from shoreline.
5. Immediately after the kite is released and tow rope comes in contact with the water, the boat driver will return to the free end, reducing the amount of line exposed and immediately retrieve the line into the boat. (Rope retrieves to be made by turning toward the center of the lake).
6. Boats not equipped with electric tow line retrieving devices shall not exceed a tow line length of 400 feet. All flights exceeding 150' must conform to Federal Aviation Regulation Part 101. (Manned kites).
7. If the patrolling authority determines that the flying area is too congested, the tow line must be reduced to 150 feet in length.
8. The patrolling authority may revoke permission to fly if all regulations are not complied with, or at any time he deems the kite is being flown in a reckless or dangerous manner.
9. Exhibition flights made for the benefit of the public must have special authorization from the patrolling authority. At no time must the kite pilot fly above spectators or personal property.
10. Each kite pilot must be prepared to sign a waiver releasing the patrolling authority from any legal liability due to any accidents or injuries arising from the flying of a kite on state controlled lakes or waterways.
11. Each kite owner should possess evidence of insurance covering personal property and public liability. (i. e. , 10-20-10,000 PL & PD).

12. The recommended start method is the deep water start. Sliding shore starts from the sitting position are acceptable if the kite can maintain a clear path 50 feet from the nearest spectator and the boat can navigate safely. Foot launched starts are not recommended but must maintain a clearance of at least 100 feet from the nearest spectator, boat or protruding object.

13. Shore or hard surface landings are to be discouraged due to the high risk of injury. Such landing sites must consist of at least four inches of soft sand surface and be barricaded from spectators for at least 200' in length and 50' in width.

14. Kite pilots and boat crews must wear approved vest type floatation during towing operations. Pilot head protection and rubber wet-suits are highly recommended.





PRODUCT LIABILITY

WARRANTY and
LIMITATIONS

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Dear Pilot,

We take great pride in this beautiful and magnificent flying, DELTA WING KITE. It has been manufactured with your complete satisfaction in mind; constructed of the best materials available, to the most exacting aircraft specifications feasible by our production facilities and engineering staff. All models have been extensively test flown to see that its performance and handling characteristics render it airworthy for the average person, in normal use.

All of our Standard Model kites carry a guarantee of production workmanship with our complete confidence, and we know you will be proud to display it. Like any aircraft, however, it must be thoroughly inspected before each flight, to assure that worn or damaged parts are replaced only with bonafide parts produced by DELTA WING. Any substitution, improperly replaced or secured parts, of course, invalidates all warranty and further use of the kite must be discontinued.

The owner and operator must also 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 or bodily injury that may result from its use. Each kite model has specific limits to its safe use based on a ratio of sail area vs. pilot weight, as well as the flying speed. Operation outside these limits, including acrobatic maneuver or unusual erratic pilot technique may ultimately produce equipment failure, and is specifically excluded from the warranty.

When learning to fly, obtain quality instruction from qualified instructors who will be glad to explain its magnificent features as well as its flight limitations. At no time do we recommend flying over land using a mechanical launch with unskilled boat drivers or observers and NEVER, repeat NEVER tow a hang glider without proper towing equipment or instruction.

DELTA WING KITES

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