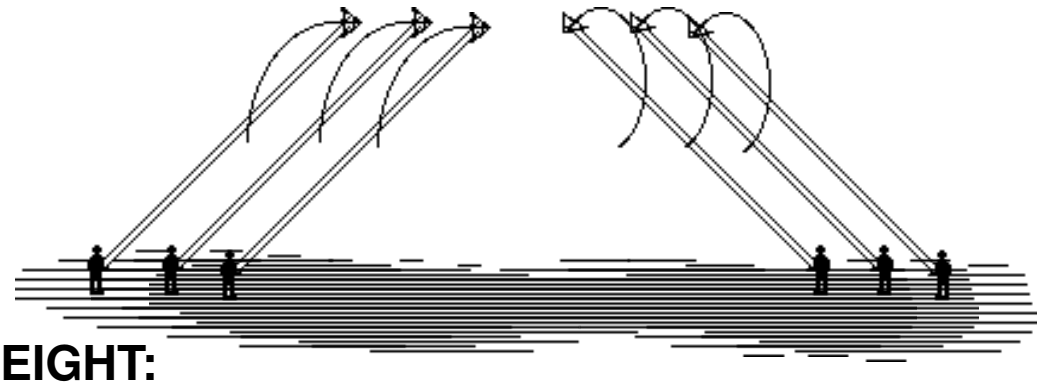


# CHAPTER EIGHT:
# HIGH PERFORMANCE FLYING

High performance flying involves all of the different innovations and variations that stunt kites allow. Before the ink is dry on this page, someone will have concocted something new. But that being said, let's talk about some of the things that are being done today.

## LARGE STACKS

Almost any stunt kite can be stacked by attaching multiple kites together at the bridle point. Stacking kites will increase pull by increasing total surface area. It will also slow the kite down a bit because of the additional drag.

> *No matter how large your set gets, it will only require additional support on the base kite. Stunt kites are designed so that stresses are distributed linearly through the stack. In English, that means that each kite except the Base Kite only has to worry about flying itself, and doesn't get stresses from any of the other kites.*
>
> ***Rick Bell***
> ***San Diego, California***

If you plan to experiment with stacked kites, here are a few things to keep in mind:

1. The most common problem with kite trains is lines wrapped around wings. Before each launch, check the train lines between each kite. If you are flying and notice the stack leaning, land and check the lines again.

2. Try experimenting with different length train lines. Depending on the kite you are flying, shorter lines may increase your control or decrease tangles. Shorter spacing on long trains also reduces pull.

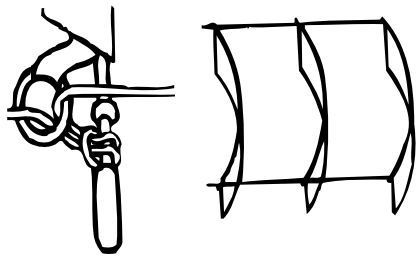
3. Reinforce the lead kite and train lines on longer stacks.

4. Check your tuning regularly. Train lines should be of equal length and should be inspected periodically for stretch.

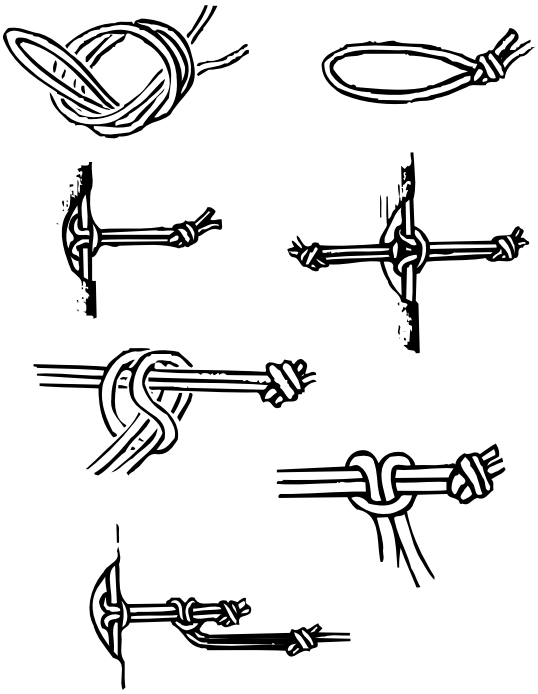
> *As a general rule, the best length for train lines on a large stack is the length of the kite's leading edge.*
>
> ***Lee Sedgwick***
> ***Erie, Pennsylvania***
>
> *Sedge lies! None of his train lines are that long!*
>
> ***Al Hargus III***
> ***Chicago, Illinois***

*Foil stunters, flown in stacks, can develop tremendous power and lift. Remember to reinforce them with stronger train lines.*

*Kites should be secured at four foot intervals. Mark the lines to keep tether points even. One method for stacking is to form a loop at each mark, pass it through the ring at the edge of the sail, and attach it to the spar with a larkshead knot.*



There are many methods for attaching kites together in stacks. For larger or heavier pulling kites, a line-to-line connection is stronger and also makes it easy to add and remove kites.



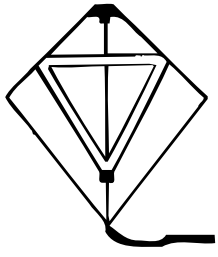
Use small loops or "nooses" at each bridle point. The loops are created using a simple overhand knot.

The loops are wrapped around the kite's frame with a larkshead. Push the knotted end through the loop and pull it snug. One loop is needed on the back kite. The front and intermediate kites take two. You may need to tape the loops in place to avoid slippage.

A second larkshead can be used to attach the ends of the train or bridle lines to the loops. Slip the larkshead over the overhand knot and pull it snug. Then slide the larkshead up to the overhand "stopper" knot.

*The stress created by longer trains may "warp" or "compress" the frame of your lead kite. You can eliminate this problem by flying a "phantom frame" at the front end of the stack.*

*A phantom frame is usually constructed of welded aluminum tubing and is shaped to match the bridle points of the lead kite. Eyelet connectors are located at each corner so that the bridle lines can attach to the frame, and then the frame is "trained" to the lead kite.*



*Compression stresses transfer to the frame and the lead kite flies as it was intended.*

## POWERFLYING

When you can feel the pressure of the wind on your kite, you are involved in what we call Powerflying. This means, of course, that virtually everytime you step onto the flying field, you're doing powerflying to some degree. What we're talking about here, however, is adding additional sail, or flying in much higher wind than normal to PURPOSELY LIFT OR PULL YOURSELF with your kites.

Powerflying can be DANGEROUS. People who do it are usually experienced flyers who know exactly what to expect from their equipment and themselves. If you are new to Powerflying, DON'T DO IT ALONE. Take a helper.

> *Some people power fly with 300 pound flylines but only 200 pound bridles. You have to always be careful about bridles. They really take a beating and need to be checked regularly.*
>
> ***Lee Sedgwick***
> ***Erie, Pennsylvania***

Kites used for powerflying usually fall into two categories; smaller, faster kites which are usually flown in long stacks, and larger, slower kites flown singly or in groups of up to six. A faster kite will reach and pass through the "power zone" at the center of the wind much more quickly than a larger slower one. The smaller kite will also give a very strong pull that will tend to diminish quickly. For a sustained pull, a slower kite is better because it stays in the power zone longer. You can also use longer lines to get up into fresher and more constant breezes.

When kites are flown in large stacks, or when the wind comes up, skilled flyers can do some amazing things. Sleds, wagons, or small boats can be pulled; flyers can "ski" across the ground; leaps of better than ten feet into the air can be attained! But remember, **POWERFLYING CAN BE DANGEROUS**.

1. Kites and train lines must be in good repair. Train lines in particular need to be reinforced to stand the strain of your additional weight.

2. Any harness or handles used must have a quick release system in case of an emergency.

3. Make sure that no one is downfield. The concern about hitting someone with a large or fast kite is obvious. Remember also, that if you need to use your harness release, a "flying" harness, handles, or control bar can be more dangerous than the kite. If you have to let go, be careful!

4. Lines are particularly important. In no case should you attempt to powerfly on lines with less than 300 pounds of strength. Lines and connections should also be checked regularly for stress and weakening.

ALWAYS DOUBLE CHECK YOUR EQUIPMENT. If you use common sense and good safety procedures, you can powerfly at a significantly reduced risk.

> *Some current "powerflying" records:*
> *Largest Stunt Kite: 718 square feet*
> *Longest Stunt Kite Train: 253 kites*
> *Fastest Kite: 120 m.p.h. (verified by police radar gun).*
> *Most Consecutive Spins in one direction: 250*

## FORMATION or "TEAM" FLYING

One of the best ways to share your flying space is to fly together in a team or formation. Although team flying is more difficult than flying alone, it's great fun and the results are spectacular. Besides, it's not as hard as most people think if you take the right approach.

Taking the right approach means two things — organizing your equipment and then organizing the team.

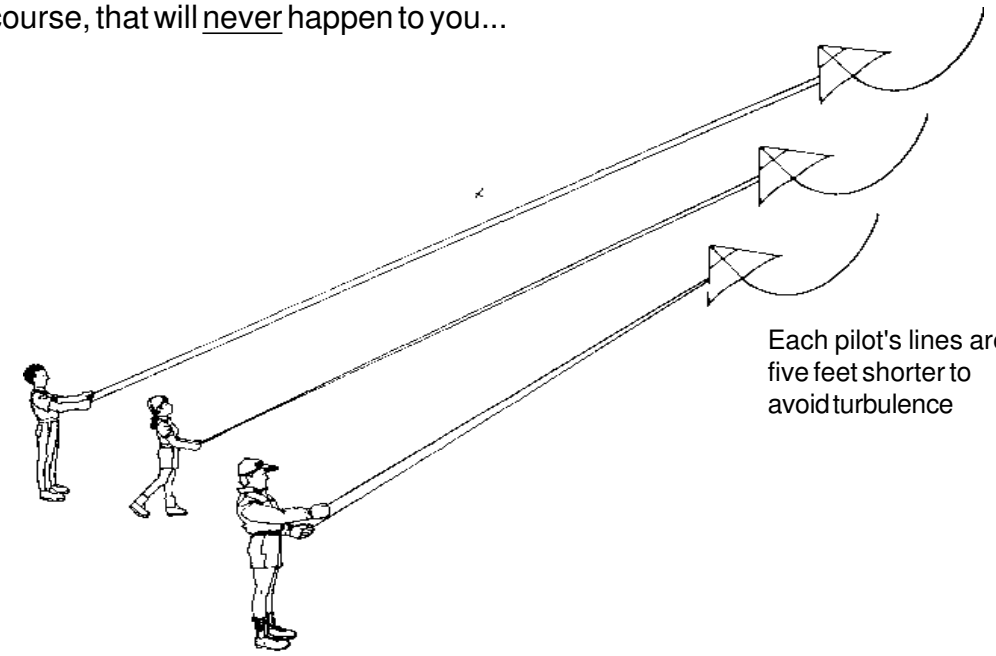
> *Want to put together a great flying team? Be prepared to practice for hundreds of hours - and possibly lose friends or even get a divorce because of it. Team flying can be fun, but it takes commitment and all of your free time if you want to be good.*
>
> ***Al Hargus III***
> ***Chicago, Illinois***

**LINE ADJUSTMENTS for TEAM FLYING** — Back when we talked about wind, we mentioned that kites, like other obstacles, create turbulence. When you're flying in formation, you quickly notice that turbulence from other kites makes smooth performance very difficult. To solve that problem, EACH FLYER SHOULD FLY ON DIFFERENT LENGTH LINES.

First decide who is going to be the leader. This person's lines are the longest. Then each successive flyer's lines should be three to five feet shorter than the person who will be flying in front of them.

One hundred and fifty feet is usually a good length to start with. The line lengths will then be 150', 145', and 140' for a three person team. Not only does this eliminate turbulence, it also keeps the kites from colliding in the air if someone makes a mistake.

Of course, that will <u>never</u> happen to you...



Each pilot's lines are five feet shorter to avoid turbulence

Now that your lines are all set, you need to tune your kites.
**TUNING** — Because your lines are set at different lengths, each kite will appear to travel at a different speed. Actually, as we said earlier, the kites aren't moving at different speeds, but are traveling different distances. The result from the flyer's point of view is that they look like they are flying different speeds.

On a three person team, the lead kite will have to travel four percent further than the last kite to get from one side of the field to the other. By changing bridle settings, you can adjust the speed of each kite so they stay together in maneuvers.

Bridle settings were discussed in detail in the Chapter on Tuning. Generally, you move the bridle clips toward the nose for more speed and away from the nose for less speed. Trial and testing are the only ways to get all team kites moving together.

> *When you first set-up to team fly, set all bridles the same. In medium to high winds, subtle speed differences between the kites may be noticed. The last kite (on shortest lines) will probably be fastest. Take time to experiment with bridle settings to get all kites flying together. It will be worth it in the long run.*

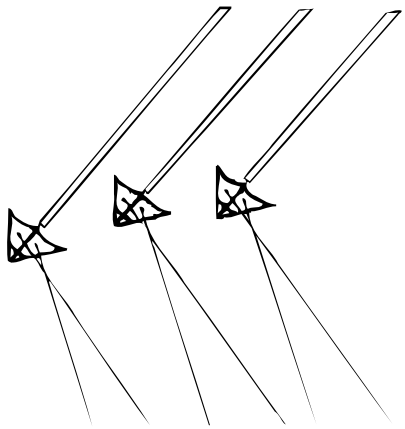
**TEAM ASSIGNMENTS** — Each team member has different responsibilities in organized team flight. The first or "lead" flyer announces maneuvers and calls out each turn. The leader is responsible for safety and must also make sure each team member is lined up and in position before a maneuver is called.

The middle or "intermediate" flyers are the pace setters. Locked in between the front and back, the intermediate flyers must try to balance speed and spacing. They use arms and body movements for throttle control.

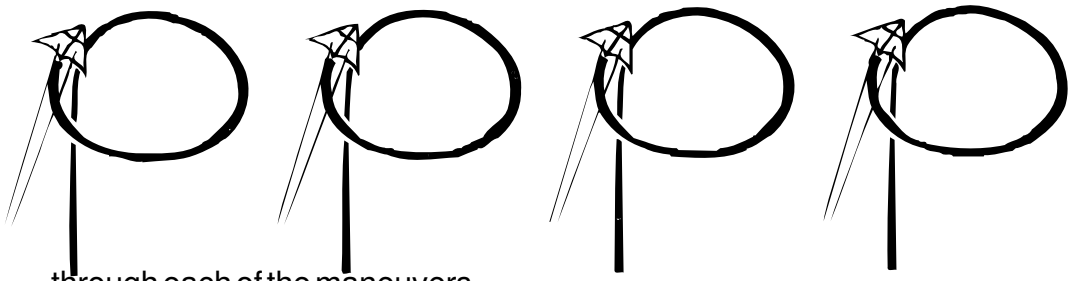
The last or "tail" flyer is also responsible for adjustments. Besides flying the called maneuvers, they must match the spacing between the other kites.

**TEAM MANEUVERS** — There are three basic kinds of maneuvers that can be flown by teams ...

**Follow the Leader** — Each flyer follows directly behind the one in front of them

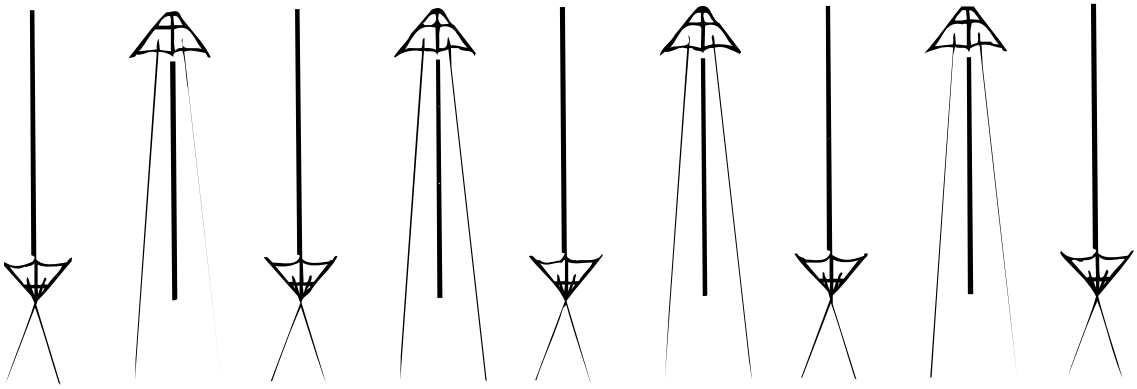


**Synchronized Flying** — All flyers turn at the same time when the command is given by the leader.



through each of the maneuvers.

**Opposing Maneuvers** — Team members separate, and then fly toward each other. They either recover at the last moment or “thread the needle” to avoid a collision.



*Many teams now prepare their maneuvers and routines on the ground before ever launching a kite. Often, they will use "practice sticks" - wooden dowels or spare rods with a small paper "kite" at one end and a loop of string at the other.*

*When "practicing", a team stands in normal flying position and moves each kite as it would normally be flown. This helps identify each flyer's position and timing. Flyers place their wrists through the loop of string, and "turn" the kites by rotating the dowels in their fingers. When each kite finishes a maneuver, the pilot can look at the loop and see if they would normally have any twists left in their flyline.*

*Practice sticks save a tremendous amount of time since they allow teams to "talk through" and prepare new maneuvers while still on the ground.*

In the next Chapter, we’ll discuss some of the maneuvers that are flown at stunt kite competitions. In the meanwhile, relax and use your imagination...

*The type of flyline you use makes a big difference in high performance flying. A tight, smooth weave is better for team flying so that the lines can slide when they twist around each other. In Power Flying, a looser weave is better. But use a loose weave line in Solo Flying, and you can really feel the abrasiveness as it slides through the dog stake.*

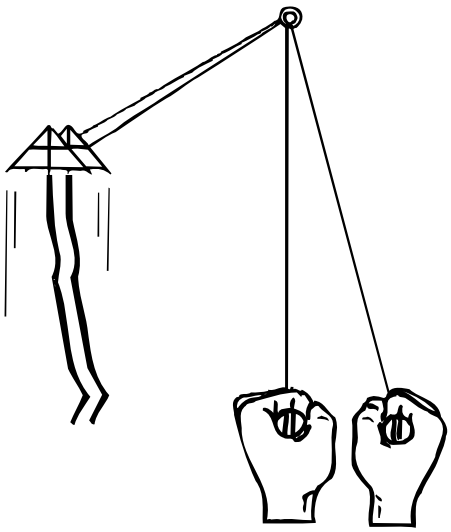
## "SOLO" FLYING

"Solo" or "Dog Stake" Flying is a term used to describe flying while DOWNWIND of your kite. Some people call it Reverse Flying. To do this, you thread your flylines through some stationary upwind "hook". Often, solo flyers use one of those corkscrew-type dog leash holders. That's how we got the term "Dog Stake" Flying.

*The best thing we can say about solo flying is that you have to go out by yourself -- you have to concentrate on what you're doing -- and eventually, you have to "feel" it. You can't think about it... If you can't feel it -- you can't do it.*

***Lee Sedgwick and Sue Taft***
***Erie, Pennsylvania***

If you want to try flying solo, here are a few things to remember:

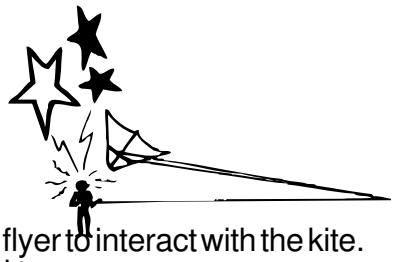


1. Practice by standing out on the edge of the wind. The kite will be moving slower there — giving you more time to adjust your thinking to this new perspective.

2. Use relatively long lines — at least 150 feet. When you "bend" your lines through the stake, the distance from the kite to this "pivot" point will only be 75 feet and the kite will move very fast.

3. Forget about thinking "left and right". Some flyers recommend switching handles so that pulling right will create a right turn. But the experts say that doesn't help. It just makes things <u>more</u> confusing.

4. Stand so that the lines between you and the stake are LONGER than the lines between the stake and the kite. Remember that basic safety rule: don't fly when someone is under your kite or lines -- even if that someone is you!



Solo Flying provides some spectacular opportunities for the flyer to interact with the kite. But be warned ... it takes a lot of practice and getting used to.

*Flylines have a tendency to wear out much more quickly when run around a dog stake. Make sure the anchor is smooth, and shorten the line occasionally to move the wear point where it rubs. You can also try treating the line with a Silicone-based spray which is available at many hardware stores.*

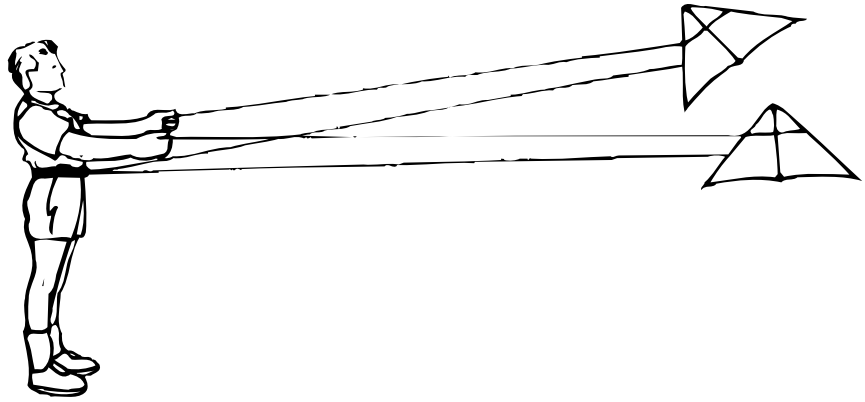
*Time spent preparing equipment will reduce repairs and replacement costs later.*

## DUAL FLIGHT

Usually, when we talk about flying multiple kites, we're referring to stacks. Dual Flight is a bit different. Here we're talking about one flyer controlling TWO INDEPENDENT KITES!

But if each kite has two lines and requires two hands to control, how does a flyer maneuver more than one kite??

Dual flyers generally tie two of the four lines to a harness. Some fly one kite with their hips and one with their hands. Others attach the inside line from each kite to their waist and control or maneuver each kite with just one hand. That's the method we'll describe here.



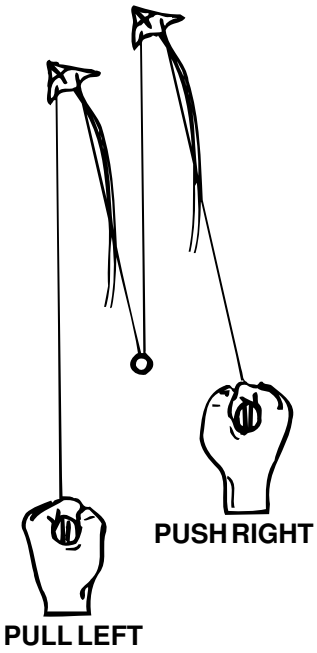
1. Identify one kite as the left kite and one as the right. Then when you set up, tie the two INSIDE lines to your harness. This means that both kites will TURN LEFT when you simultaneously PULL with your LEFT HAND and PUSH with your RIGHT.

2. Make sure the two inside lines are SLIGHTLY LONGER than those on the outside. This allows you some room to push and pull on either side. To fly straight, you cock both arms slightly forward.

3. Tune your kites as you would for a formation or team. This includes adjusting line lengths and moving the clips so both kites fly at the same speed. (See the section on Formation Flying.)

4. Self launches are tough since you have to balance both kites during lift-off. Practice with a helper by launching one kite first, stabilizing, and then launching the second.

5. Since your lines are attached to your waist, you can help your steering by MOVING YOUR HIPS. Try it! Eventually, you may get good enough to fly a third kite on your hips alone.




Dual flying takes a great deal of concentration. It's a lot like rubbing your stomach and patting your head — each hand needs to be doing something different while you "think" about both of them. Like everything else in stunting, improvement takes practice.

## "QUAD" FLYING

Most stunt kites operate on two lines which attach to the kite at the bridle clips. By adjusting the position of the clips on the bridle, speed, maneuverability, and responsiveness can be changed. (See the chapter on Tuning.)

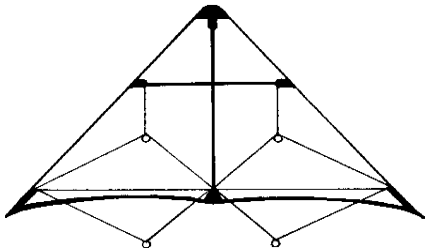
The problem, of course, is that once you adjust your clips to one setting, you can't change them until you land the kite again. Imagine what you could do if bridle settings could be changed while the kite is in the air.

"Quad" or four line flying allows you to do just that.

With four lines, you'll find that you can actually stop the kite in the center of the wind, land directly downwind, or even back up. Best of all, you can perform incredibly fast and tight spins. And of course, you can absolutely amaze anyone watching.

**DELTA WING QUAD FLYING** -- Almost any delta wing stunt kite can be altered for quad line flying. The changes are not permanent and can be made in just a few minutes. All you need are two extra bridle lines and an extra pair of clips.

The length of your new bridle depends on the size of your kite. Experiment! Attach one end at the lower vinyl connector on the leading edge and the other at the base of the Center Strut. All four lines have their own bridle clips and, of course, attach to four separate flylines.



Generally, the kite will handle better if the two upper flylines are slightly longer than the two lower ones. And remember to adjust the original or "old" bridles for a greater angle of attack by moving the clips up.

We learned earlier that small bridle adjustments change the kite's angle of attack — the angle at which the kite meets the wind.

Now by pulling on the two upper lines, we can make the kite move faster, climb higher and fly farther to the sides of the wind. The upper lines also provide more lift and improve light wind handling. By pulling the lower lines, we can stop, stall, or even move the kite backwards.

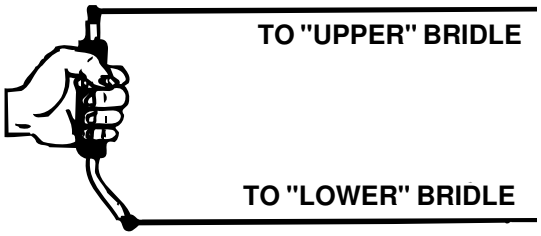

Left and right movements or turns are handled just like with a standard bridle. But now you have additional control for speed and sensitivity.

*Spend some time marking your flylines so you can tell the right from left and the top from the bottom. A little time spent on this can save a whole afternoon of untangling. Also, when you put your lines away, wrap them up in pairs instead of putting all four lines on one holder. Otherwise, you may suffer the curse of a million wraps ... but worse!*

***Lee Sedgwick***
***Erie, Pennsylvania***

**QUAD LINE HANDLES** -- At this point, you're probably saying to yourself, "This all sounds like great fun, but what the heck do I do with four flylines?" It's a reasonable question...

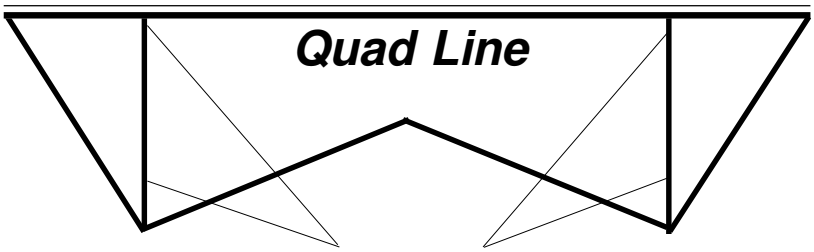
For Quad Line flying, you need a special kind of handle that allows you to attach two lines -- one at EACH END.




Remember that to tune a kite, you move the bridle clips only a few inches. Now you can make the same small changes on the upper and lower bridle lines by holding the handles in the palms of your hands and manipulating them by rotating your wrists up and down.

**"MADE FOR QUAD LINE" KITES** -- Because they were designed primarily for forward flight, most delta style stunt kites are a bit cumbersome when altered for quad flying. They turn faster and change speed easily, but handle backward flight awkwardly. More importantly, most delta wing kites don't have enough sail area to off-set the drag created by four lines.

The new quad liners -- kites specifically designed to utilize four lines -- overcome all of these problems.




The Made for Quad Line Kites move forward and backward with equal grace. They can hover directly downwind, stop suddenly at any point inside the wind window, and will rotate around their center much like a propeller. But try to fly them like a standard stunter and they will make you crazy.

The key to flying these new kites is to forget almost everything you've learned about "push" and "pull" maneuvering. Try to steer by pulling to the left or right and the air will spill out of the kite and it will flutter to the ground. Instead, you steer the kite by holding your hands together and rotating the handles back and forth with your wrists. Pretend you're wearing handcuffs. Better yet, do wear handcuffs until you get the hang of it. Then you can begin to integrate some very subtle push turns into your performance.

*Dual and Quad flying both require two sets of line of slightly different lengths. Rather than fill your kite bag with dozens of lines specifically cut and marked for different types of flying, pre-stretch your lines and cut them to identical lengths. Then when you need to adjust for Quad or Dual flying, simply add a short piece of "extender" line to your handles. It's much less confusing and uses a lot less line.*