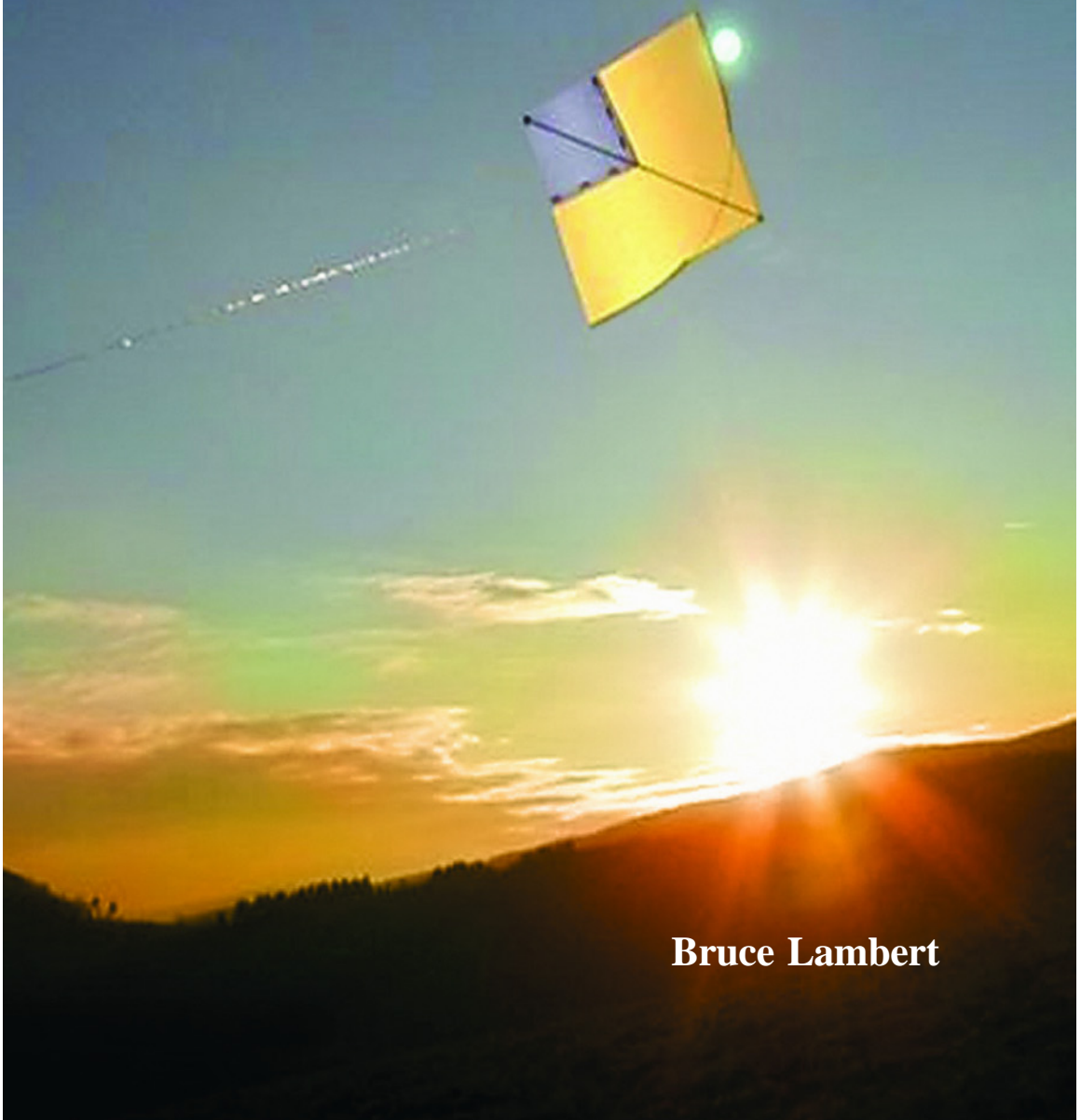


NORTH AMERICAN FIGHTER KITES



Bruce Lambert

About the cover

Gerhard Zitzmann took the photograph on the front cover as the sun was setting behind the mountains of Vienna, Austria a short distance from his home. The kite he's flying is a 'Donna'sDog' kite Gerhard made using a multipanel Icarex skin. The plan for the kite is available at www.fighterkites.org It is the kite plan I used to win the 2001 Line-Touch World Cup Championship, it's called 'Donna'sDog'.

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***THANKS FOR PURCHASING THIS CD;
PART OF ITS PURPOSE IS TO BE A FUND RAISER!***

As **fighter kite fans**, we all benefit from the hard work of each of the kiting groups listed below. So I decided to contribute to each of them from the proceeds of selling this CD. I donate an equal amount to each of the three listed kiting organizations from the sale of each CD.

Your purchase of this CD is not only adding to your fighter kite information, but is also financially contributing to the continuation of the fine work these three kiting organizations do.

Please increase your support of fighter kiting by buying more of these CD's as gifts for each fighter kite fan you know and as raffle prizes for your kite club auctions and for any other reason you can think of!

THANK YOU

***FOR SUPPORTING
THESE WONDERFUL
KITING ORGANIZATIONS:***

***North American Fighter Kite Association,
NAFKA***

***American Kitefliers Association,
AKA***

***The World Kite Museum,
WKM***

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**READING ABOUT FIGHTER KITE FLYING
IN THIS BOOK WILL GIVE YOU
AN UNDERSTANDING
ABOUT WHAT TO EXPECT
WHEN YOU ARE
FLYING A FIGHTER KITE.
IT WILL MAKE YOUR
LEARNING EASIER, MORE
ENJOYABLE AND QUICKER.**

**However,
to learn to fly
fighter kites,
you must **FLY**
fighter kites.**

delay before it responds. For some flyers, this is a benefit, for others, they prefer a more immediate and direct response from the kite when they pull on the line. This is a matter of personal choice and what you become used to.

5. The best line wouldn't twist or tangle. I've never found a line that won't twist. Some threads and lines seem to have much more tendency to twist and therefore get tangled more often. Some of the synthetic fishing lines I've tried claim the line has 'no memory' and these tend to twist less, but still twist and still get tangled.

MANY CHOICES OF FLYING LINE

There are many good choices for fighter kite flying line. The flying lines most commonly used are cotton threads of various sizes. Cotton is the safest line to use because it can be readily broken if it tangles in your hands. Some of the synthetic lines, including polyester threads and fishing lines, could cut your fingers to the bone before breaking!

Cotton thread is such a good line because it is the safest, it feels good in your hands, is easy to grip, it doesn't cut or burn your hands as badly as other line, doesn't stretch, is inexpensive and is readily available.

I think industrial 100% cotton glazed threads are the best cotton fighter kite flying lines. Check the Resource chapter for availability.

NOTE: Glaced is a thread industry term for polishing and smoothing the thread surface and removing the superfine fuzzy hairs common on non-glaced threads.

Most fabric stores carry glazed or polished 100% cotton quilting threads. These are a good choice for flying in winds up to about 4 mph. For flying in winds above 4 mph, a good alternative to industrial thread is 100% polished cotton crochet thread.

Crochet threads are available in several different sizes, I prefer the thinnest I can find, size 30. A crochet thread size 10 is larger in diameter than size 30. Most crochet thread I've seen isn't glazed so it has the fine hairs projecting from its surface which increases drag.

As with most flying line, waxing cotton line improves its grip-ability and reduces its tendency to twist.

Tuning & Adjusting

All fighter kites, regardless of their shape, are tuned using the same goals or objectives:

Tuning Goals

Adjust the kite so its flight characteristics are predictable and the kite is controllable.

Whether a fighter kite is a diamond shape, a square or a rectangular, the tuning procedures and adjustments are the same. However, rectangular and square shaped fighter kites have an additional adjustment to provide a bend in the leading edge spar.

Even though there are several pages here devoted to fighter kite tuning, it's really an easy and quick procedure to actually do. But to explain it in enough detail to assist those new to fighter kite flying takes lots of words and a few diagrams and photos.

The importance of having a correctly tuned fighter kite can not be over emphasized. Precise tuning makes an amazing difference in a fighter kite's flight characteristics! When correctly tuned the kite is actually in your control, it's predictable and you have confidence when flying it. When not correctly tuned, it behaves as though it has a mind of its own.

***AN IMPORTANT TRUTH:
A fighter kite NEVER makes
mistakes in flight.***

Strategies that **WORK** in line-touch competition

When I've flown in competitions, I have used all the following strategies to score points. I know each of them works. Some of these strategies I'm explaining for the first time. This is not to say other flyers don't already use these, it's just that I haven't discussed them before.

A couple of these strategies require some 'set-up' of the opponent, some require you make 'fake' or 'false attacks', some require correct and precise timing and others are very straightforward. *They all work and are successful at scoring points, but they don't all work all the time!*

My suggestion is to practice and learn one or two, try them in competition several times to see how they work for you. You may find better success by modifying the strategies.

Then move to another couple and repeat the process. Collectively these are meant to be a starting point or guide for creating your own successful winning techniques.

One of the most exciting aspects of line-touch competition is the constant instantaneous shifting of being on the attack and then being forced into a defensive position, and in less than a blink being back on the attack. Knowing and understanding this aspect of line-touch is part of the success of some of the following strategies.

Before we discuss the various line-touch maneuvers it may be a good idea to review the issue of strategic offense and defense in line-touch competitions. The strategies are about recognizing what the risks are by attacking at a particular time and how to use defensive actions to lower your risks and increase your scoring.

You can also buy ready-to-use bamboo spines; see the resource chapter in the back of the book.

WHAT TO LOOK FOR WHEN BUYING A BAMBOO POLE

The variety of bamboo typically available at garden centers is Tonkin Cane, it's the variety used by fly-fishing rod makers. It has a yellowish-green exterior skin.

Look for bamboo poles with an outer diameter approximately 1-1/2", the distance between the nodes or rings, about 18"-19", the longer the better, and you want the pole to be as straight as possible. In addition, look at the grain between the nodes, the straighter the better. You also want a pole with a wall thickness that is about 3/16" - 1/4". Most finished spines are approximately 3/16" wide x 1/8" to 3/16" thick and most North American fighter kites have spines shorter than 18-1/2".

The distance between nodes of an ideal pole should be at least the length of the spine you plan to make or around 19". It is easier to split and shape a piece of bamboo into a spine when it has no nodes along its length; the nodes are much like a knot in a piece of wood, tough and irregular.

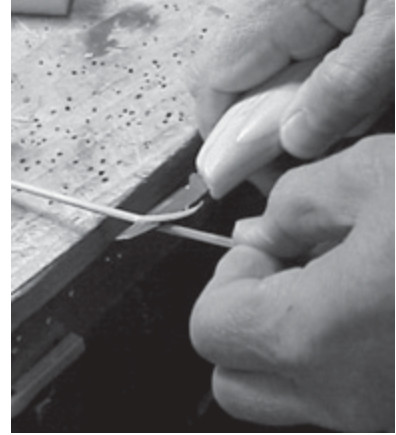
If you have a bamboo pole with nodes every 12" or so, which is common, you can make excellent spines, it just takes a little longer and a little more patience. Most bamboo poles have different spacing between each set of nodes; in a 10'-12' long pole, you will most likely get one or two sections that are approximately 17" between nodes and sometimes longer, with the rest of the pole having a shorter distance between the nodes. Even if a pole has 2 nodes or rings within a 19" length, you can still make excellent fighter kite spines with it.

TOOLS FOR WORKING WITH BAMBOO

- A hack saw or 'chop' saw for cutting the bamboo pole to the length you want.
- A bamboo splitting knife. You can buy an 'official' bamboo splitting knife on the Internet, but you can substitute many other knives that you may already own. It can be any knife with a very stiff blade. It doesn't need to be super sharp, but the width of the butt of the blade should be as thick as possible, 3/16" or more is best. The butt is the edge of the knife opposite



In the photo to the right, I am using my knife to shape the bamboo spine blank. I use a wooden block to press my hand against to securely hold the knife stationary. I pull the bamboo spine blank toward the knife, the knife is stationary. This method works very well and is quick. Some kite makers use a small plane or shaped scraper blade to develop a uniform cross sectional shape. These also provide a very smooth finish.

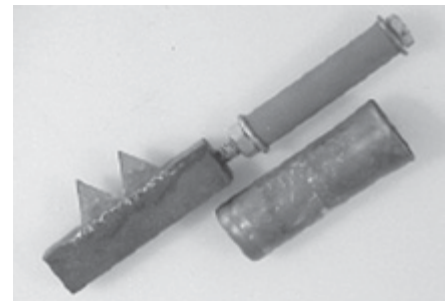


A common shaper is made by grinding or filing a 'U' or 'V' notch in the back edge of a hacksaw or knife blade. Size and shape the notches to produce the shape you want the back side of your finished spine to be.



Secure the shaper blade in a vise, use a wooden or metal block or dowel to apply downward pressure on the skin side of the bamboo while you pull the back side of the bamboo through the scraper. Repeat the process until the shape, size and strength of the spine is what you want. You may have to make a couple of larger sized scraper 'U' or 'V' grooves in the blade. That way, if there is a significant difference in dimension of your bamboo spine blank compared with the finished size you want, you can start with the largest groove and progress downward in groove size to the finished size you want.

This photo is a bamboo 'V' shaper made by John McKenzie, Poulsbo, WA. You draw the bamboo spine through the 'V' several times. Each pass removes a small amount of bamboo. The tube to the right is a finger guard. You press down with it on the bamboo as you draw it through the 'V'.



Making a Template

Once you have selected a kite plan you want to make, the next step is making a template for the kite skin or sail. There are two styles of templates. A full plan template which is the full size of the kite and usually includes all hems and tabs needed in construction. The other style of template is the full sized 1/2 plan template, it usually includes all hems and tabs needed in construction also.

The 1/2 plan template requires you fold your skin material and align the spine line of the template on the fold then cut out the skin. You cut two layers of skin material at one time. The 1/2 template assures right to left symmetry of the kite skin. It also uses less template material and is quicker to make the template.

The full plan requires, you smooth out your skin material on your work surface, lay the template on the material and cut out the kite skin following the perimeter of the template. This is a good style especially if you are hot cutting the skin material. However, it requires more precise template making skills to make a symmetrical template.

One other advantage to the full plan template is you can locate key points on the kite skin. You do this by drilling or punching tiny holes in the template at the location of the spine, battens, reinforcements, bow tips and bridle points to name a few of the key points that you need to identify on the kite skin. While your template is on the skin material, you poke a fine tipped marker into each hole to mark the skin. This is a time saving way to have repeatability. This way, you don't need to measure each time you make the kite.

If you are planning to make only one kite of a particular plan, you could draw the kite shape onto the skin material directly and cut it out without the aid of a template.

I prefer making a template of a plan even if I intend to make only one of the particular kite. The reasons I prefer using a template are:

- Not all plans show accurate dimensions. Until you draw the plan, you don't know if the dimensions are correct. Drawing the plan on template material allows you to make sure the dimensions of the plan are workable. You can make any adjustments on the template instead of the kite's skin material.
- Most plans do not include hem allowances or other sail additions that are usually required for construction. Your template can include all hems and other additions that you want included. And you can make them to your preferences.

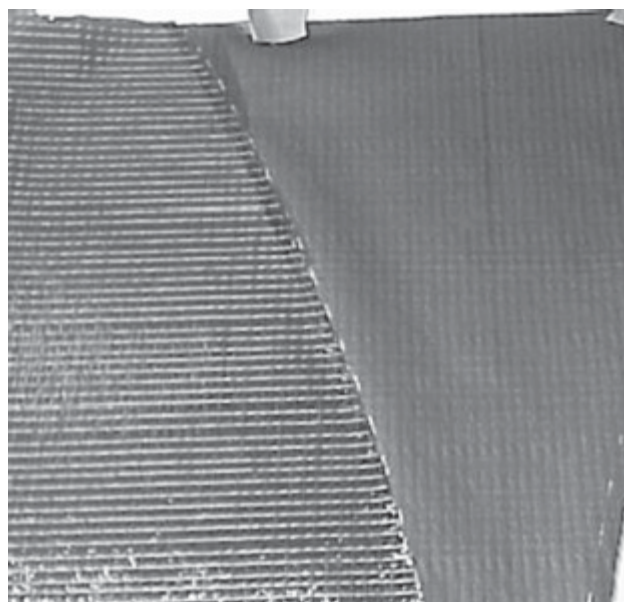
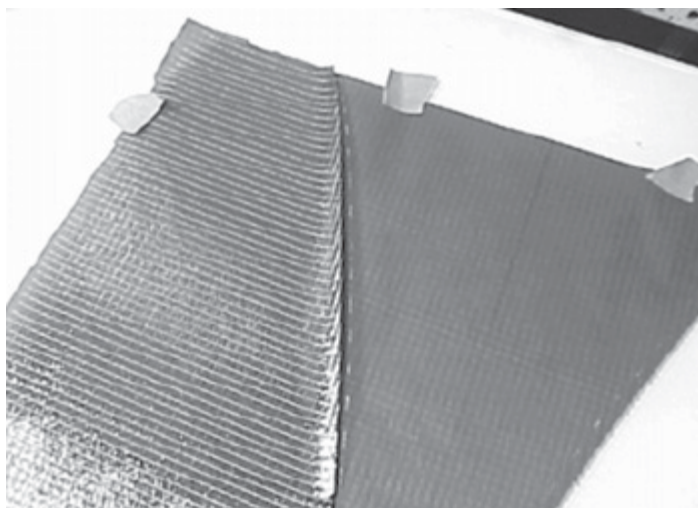
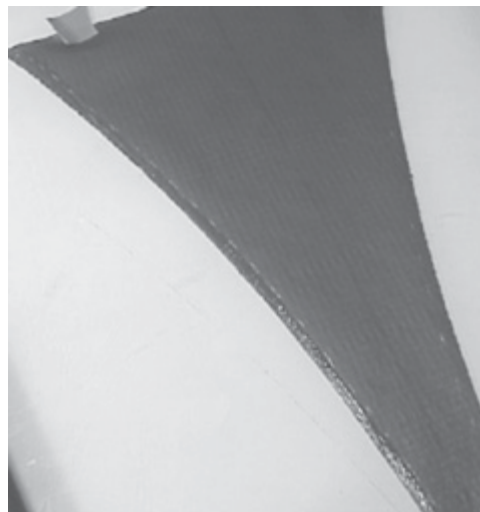
If the shape of the joint between the panels is curved, then each of the panels is cut using the same shaped curve. If the joint is straight, then all the panels have straight edges.

How the panels are layered together is important. The center portion should be on top of the two outer panels when viewed from the front face of the kite. This positioning prevents wind from entering into the seams and causing drag.

When preparing the panels to be bonded, remember how you want them layered relative to each other. This means that the trailing edge panels will have glue applied to the hem on the front face side of the panel. The center portion will have glue applied to its under or back side along the hem.

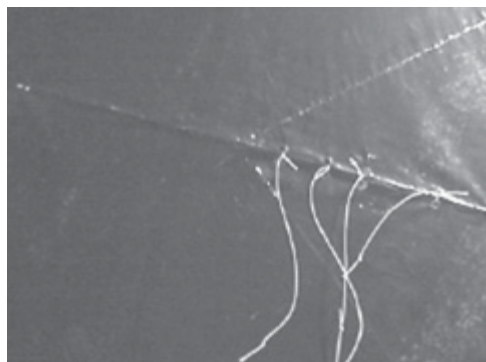
I used Orcon for the skin material in the photos. Orcon has a dull side and a shiny side. The center portion has the shiny side facing out and the trailing edge portions have the dull side facing the front. I used contact cement to bond the panels because the joining hem is curved. If the seam were straight, I would use 3M 9460 double-sided tape.

After you have the panels cut, align the center panel and one of the outer panels so there is about a 1/4" overlap along the entire seam. Tape them to your work surface to secure their relative positions. Do not place any tape along the overlap seam.



4 loops of bridle line about 3" long each. Or you can cut 5" long pieces of bridle line and tie a knot at one end of each.

Make holes in your kite skin at 4 different points along the lower portion of the spine. Larkshead one of the loops around the spine at each of the points where you made the holes. If you use short lengths of line, tie one line through each of the sets of holes. These are arbitrary locations you want to test.

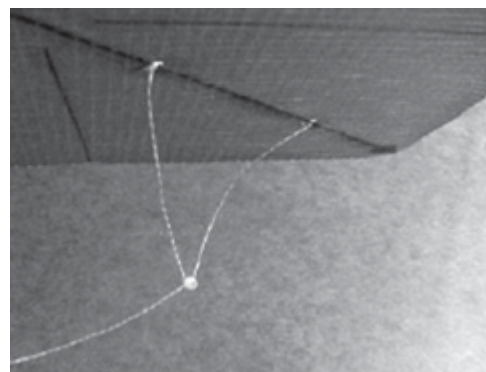


At the lower end of the lower bridle leg tie a large loop. You will larkshead this loop around the knot on one of the small loops or lines you tied to the lower spine. After you have flown the kite enough to get a feeling for its characteristics, untie the larkshead knot and tie it to a different loop or line and see what changes you notice. With each change of the lower bridle point, you may need to adjust the tow connection loop.

Each time you change the location of the lower connection point; try to determine what characteristics have changed in the kite's performance. Based on your personal preferences, use the lower bridle attachment point you like best.

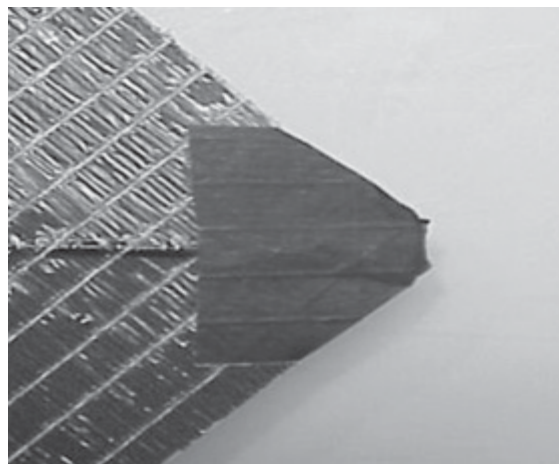
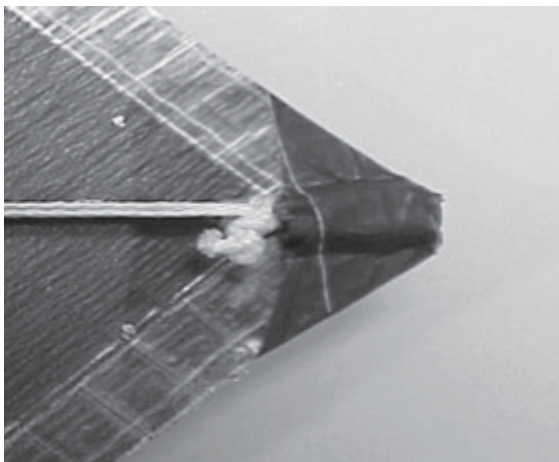
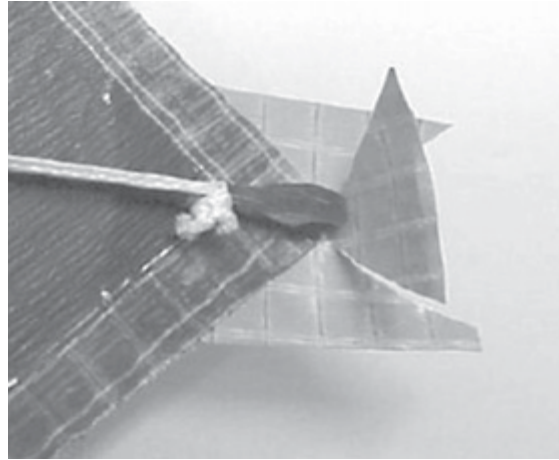
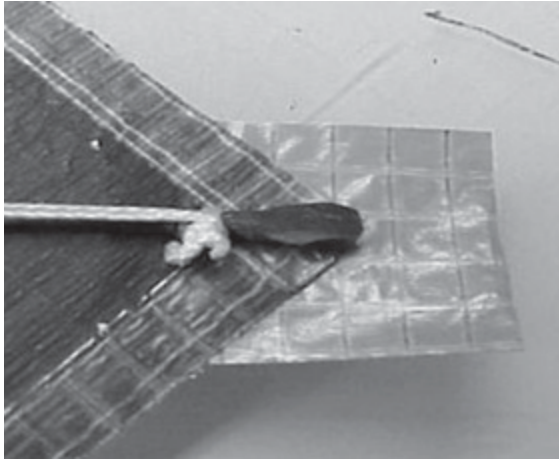
GLASS BEADS IN THE BRIDLE

Glass beads offer an alternative to using a loop in a 4-point bridle. You slide the bead on the lower yoke before you tie both ends to the spine. Then tie the end of the lower bridle line to the bead. The bead slides easily and I think has less tendency to wear out the line because it has less friction than the bridle line sliding on the lower yoke or loop. However, if you used Spectra as the bridle material, it would be slippery enough and not have any friction to speak of.



A glass bead instead of a larkshead knot

There are several methods of using a bead instead of a larkshead knot. This is a derivative



◆ Apply the nose protection tape and a piece of tape at tail to secure the tail of the spine to the kite skin. This is done the same for a bamboo or carbon fiber spine.

Making a 3-point bridle

- ◆ The bridles are made the same whether you are using a bamboo or carbon fiber spine.
- ◆ Check the chapter on bridles for additional bridle options and additional details.

Plans of Proven Kites

DIMENSIONS FOR TWO STYLES OF KITES

There are two styles of plan dimensions in this chapter. The first are those with straight leading edges from nose to wingtip. Following these are the line-touch competition kites with multi-shaped leading edges. All the dimensions are of kites I've designed, made and have flown for many hours. They are proven and successful.

The straight leading edge kites are great flying kites. They are precise, forgiving of pilot error and are quicker to build than the multi-shaped leading edge line-touch competition kites. You may like to know, the kites with the straight leading edges are not as fast as the line-touch competition style of kite.

The diagram for the straight leading edge kites doesn't show a tab or hem for securing the bow at the wingtip. You can add wingtip tab hems if you plan to use them. Usually the length of a wingtip tab hem is 4-1/2"-5" long and about 3/8"-1/2" wide. The bow hems begin at the wingtip and extend along the leading edge toward the nose the length you need to secure the bow. You can add a leading edge hem the entire length of the leading edge and use the hem for both securing the bow and for reinforcing the portion of the leading edge from the nose to the bow.

The kite plan diagram represents each kite in the table of dimensions on the page facing the plan. The letters on the plan diagram correlate to the letters in the top row of the chart.

All bows are carbon fiber rods, spines can be of bamboo, carbon fiber or Tamboo. Battens are shown but are optional. Battens are 0.030" or 0.040" diameter carbon fiber rod.

Specific construction details are in the Building Techniques chapter. Also you may find useful construction information in the step by step kite building chapters.

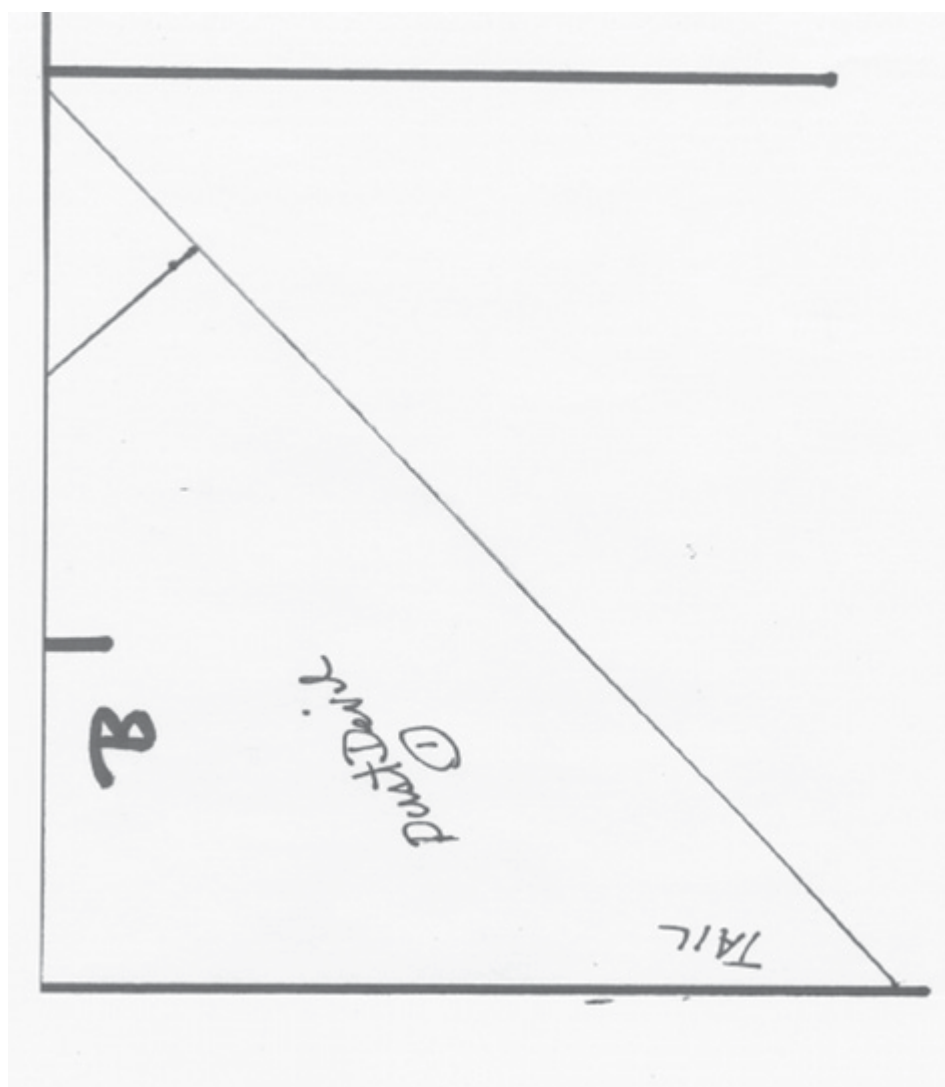
For any of the plans, if you want a more active kite, shorten the tail of the spine 1/2", if you want a more stable kite, add 1/2" -3/4" to the tail of the spine. With either change redraw the trailing edge line from the wingtip point to the new position of the tail of the spine.

FULL SIZED HALF PLAN FOR **'DustDevil'**

'DustDevil' is described in the chapter Making the 'DustDevil' in about 2 Hours. It is a well behaved kite and is very competitive in precision competitions. 'DustDevil' isn't as fast as most line-touch fighter kites, but it is precise and controllable. It is also quite forgiving of flyer error.

It uses a 0.05" diameter carbon fiber bow 22-3/4" long, or a 0.06 diameter carbon fiber bow for winds above 9mph. The actual length of the bow may vary slightly if you use photo corners or other pockets at the wingtips. Also, if using photo corners, you can glue the 'bow hem tab' over the bow and photo corner or use double sided tape or delete the tab and tape the bow to the skin.

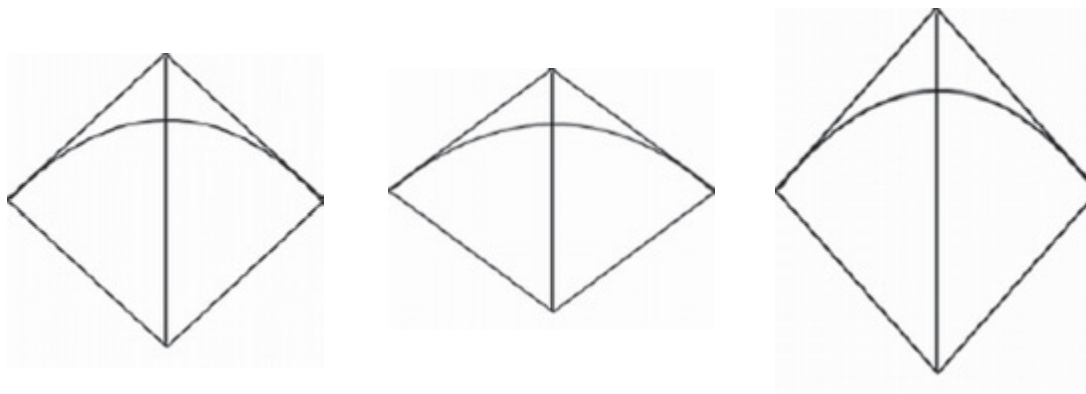
Assemble the parts to the 'DustDevil' plan in this way:
A to A, B to B and C to C



Design Your Own Straight Leading Edge North American Fighter kite

The shape of kites using a straight leading edge can vary quite a bit. As the shape changes, so do the flight characteristics. Generally, the longer narrower kites are more stable, the short squat shaped ones will be more active. Some of the very short and wide kites spin like a dentist's drill.

Here are some typical shapes of straight edged fighter kites to give you some ideas. You can adjust the shape to suit your preferences when you design your own.



With a straight leading edge from the nose to the wingtip, the bow does not extend beyond the line drawn between the wingtip and the nose. It is always contained within the leading edge lines. This feature makes a straight leading edge fighter kite easier to build.

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