

KITE DESIGN

I am not sure what the attraction is in flying a kite. The subject seems to appeal to those with an interest in energy conservation and natural resources. The wind is with us nearly every day of the year, it costs nothing so why not make use of it. There also seems to be satisfaction in launching a manmade article into a hostile environment and witnessing its good behaviour. Finally there seems to be a pleasure in having control of this distant thing way up in the sky. Perhaps a combination of all these feelings. One thing is certain however, and that is that if you have made the kite yourself, the satisfaction is even greater.

I am quite convinced that the best "first kite" to start on is the "sled" not just because of its simplicity in construction but because it is a first class kite in every way. Its main features are listed here.

1. It is cheap and easy to make. The materials for this one are a black dustbin liner and two wooden dowel rods 1/4" in diameter. These can be obtained from any hardware or D.I.Y. shop in the country at a cost of less than £1.00. It can be made in a hour or so with only the simplest of tools.

2. Portability. Today it is most important that a kite is easily transportable. Most of us have to travel to a flying area and a kite that cannot be dismantled is quite frankly a nuisance. Some of the designs from early kite books where the construction is of paper and string are of this type. Apart from the inconvenience of transporting a kite in the assembled state it is also vulnerable and easily damaged. The situation is almost as ludicrous as towing a sailing dinghy to the coast with the sail up!

3. No assembly drill on site. Trying to assemble a complicated kite in the field with a wind blowing can be a frustrating experience. With the sled, all you do is unroll it, attach the flying line and you are in business.

4. Flying characteristics. This is of course the most important point of all, and this design of sled will be found to be the most stable flier. It will sit up in the sky practically motionless with just a slight amount of oscillation to left and right. I have a considerable number of kites, some of great complexity, but in the light to moderate wind range none fly any better and many not as well as this simple sled.

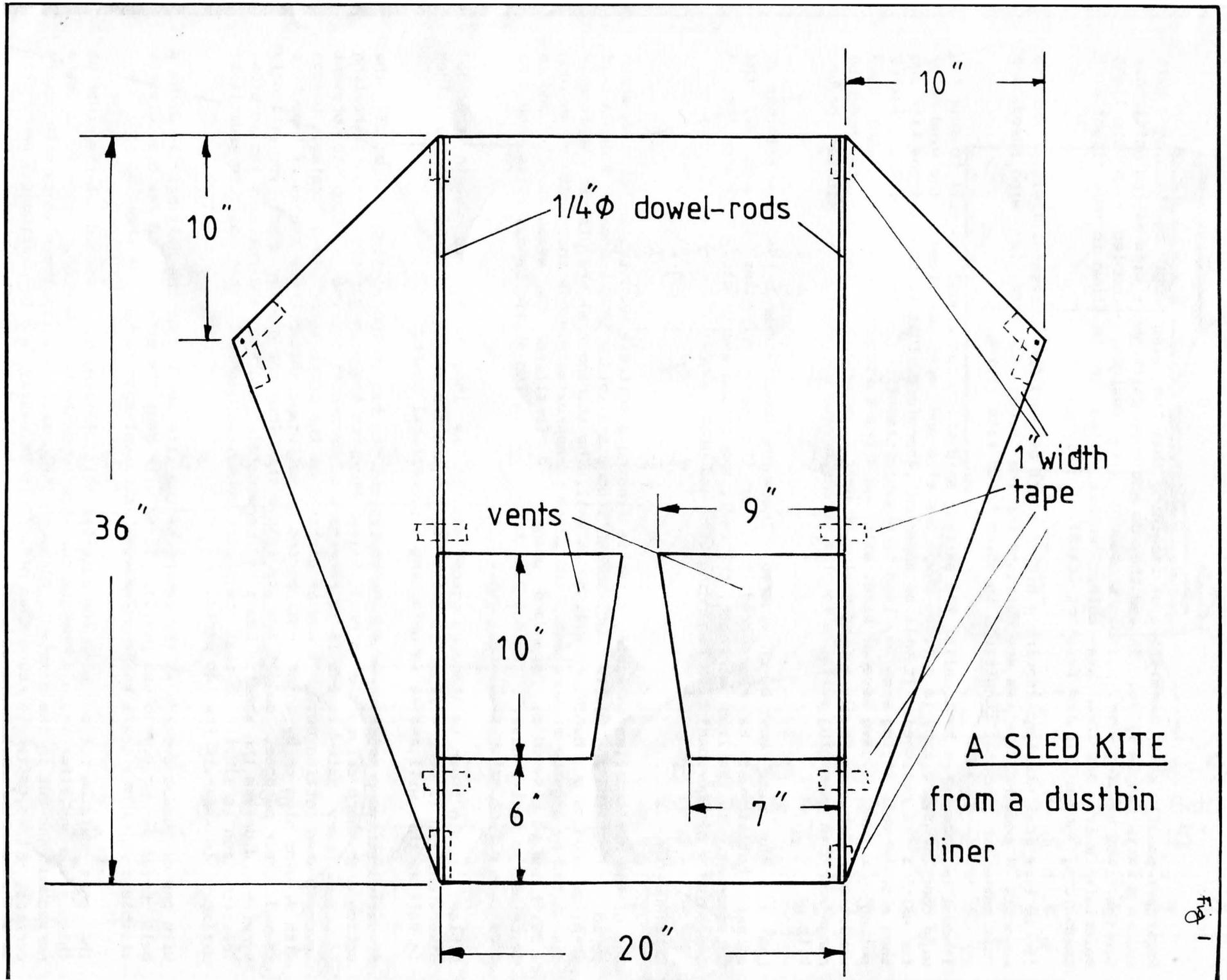
Finally in the event of damage such as tears to the cover, these are easily repaired with P.V.C. tape, and in the event of total destruction, the financial loss is not very serious.

As can be seen, the sled has just about everything in its favour. Some may criticise it on aesthetic grounds, claiming that it lacks shape or decorative appeal. This may be true but it must be remembered that very often these attributes are lost when the kite is up at any great height.

THE VENTS

Small editions of the sled can be flown without these, although in this case they usually fly better with a couple of tails attached to the lower ends of the two longerons. In the larger sizes the vents have an important role to play in stabilising the kite. Both the area, the shape and their position on the cover must be considered. I have tried many different configurations, but the trapezoidal design suggested by Ed Grauel, and illustrated in David Pelham's book "Kites", has given the best results.

When William Allison invented the sled, he produced a remarkable kite combining a disarming simplicity with excellent flying characteristics.



Beginners usually make the mistake of imagining that the wind must be blowing a gale before a kite can be flown. Indeed they do not even think about kite flying until they see the trees bending over. Today's modern kite designs, coupled with the light materials which are now available, enable kites to be flown in only "light air" conditions, (grade 1 in the Beaufort scale).

It is true that stunters require a higher level of wind for successful flying, but the majority of commercial kites are designed for the "light to moderate" wind speeds and this makes for pleasant conditions in which to go kite flying.

It must be remembered that unlike the sailing ship which can adjust its sail to suit the wind conditions, a kite is a fixed shape and size and must be flown in the wind range for which it is designed. It will be apparent, therefore, that to buy just one kite and then proceed to a flying area may lead to disappointment. To be sure of a successful outing you need to have several kites with you. One suitable for a very light wind condition such as a double sailed roller or delta, something in the light to moderate range and then something suitable for the strong breeze situation, ie stunter or box kite.

Lastly, the size must be considered. There are those for whom the large kite has an appeal, but it must be remembered that as the size increases so must all the accessories, ie the line strength, the reel, the ground anchor etc. This sled lies in the "middle of the road" both regarding size and wind range.

CONSTRUCTION

One of the difficulties in making kites is finding a suitable work top or table on which to do the marking and cutting out. Wooden floors are seldom smooth enough. I use a half sheet of plywood but hardboard will do as well. The thickness of the plastic sheeting is designated by a guage measurement. 100 guage is approximately one thousandth of an inch (.001") and is classed as "standard guage". A fertiliser bag measures .008" and is described as "extra heavy". Do not use this, it is too stiff. Canopy kites should be made from pliant material.

A black dustbin liner is standard guage and it is long enough to obtain the 36" dimension, fig 1. Generally it is better to cut out the profile with the material folded in half as this will assist in obtaining a symmetrical cover.

A satisfactory procedure would be to lay out the bag on the worktop and cut off the bottom with sharp scissors or a craft knife. Push out the side gussets. Plastic sheeting is a slippery material and it is necessary to secure it to the worktop to prevent movement when cutting out. It may be anchored at the corners and other strategic places with drawing pins or by using small pieces of sellotape. After these pieces of tape have served their purpose, do not try and remove them from the plastic sheet, you will only stretch and deform the sheet. Leave it permanately stuck on and cut away the surplus. The situation is similar to that of impact adhesives, once contact has been made it is difficult to separate the two parts.

With one of the edge folds as the centre of the kite mark out the half profile using a ball point pen or soft blunt pencil. These will dent the material and leave a clearly visible mark. Use a craft knife and a metal straight edge to cut the sheet.

The vents could be cut out with the material still folded, but I opened out the cover at this stage and after again anchoring the kite cover to the worktop, the vents were marked out and cut in the same way. Although the drawing depicts these vents with square corners, it is better to round them off. This is easily done by placing a 2 pence coin at the corner and using this as a template to cut round the knife.

FITTING THE LONGERONS.

These are specified at 1/4" diameter, but it will be apparent that in this design there is very little strain on these items as the bridle is attached to the corner itself and the function of the longerons is only to maintain the shape of the kite. They could be 3/16" in diameter which would make the kite a little lighter, however 1/4" is the smallest size of dowel rod that is stocked in most D.I.Y. shops. Of course the smaller size of dowelling can be obtained without difficulty at any of the kite stores.

The longerons are secured to the cover at each end with strips of P.V.C. tape not less than 1" in width. Cut a 4" length of the tape and secure 2" of this to the back of the cover; place the rod in position and fold the tape down over, pressing it well down round the rod and onto the cover. The other taping positions are shown on the drawing. Try and make the tape hug the stick over the greater part of its circumference. Overlapping strips of tape are applied at the bridle attachment points on the side panels to reinforce the corner, and holes about 3/16" in diameter are punched out. A tool for punching holes can be used, but in this size of kite the holes should be reinforced with metal eyelets. These can be obtained from any haberdashery and included in the packet will be the tool required to fix them. At one end of the metal strip is a punch for forming the hole and at the other end, a shaped former for rivetting the eyelet over.

THE BRIDLE.

It will be realised that the canopy in this design of kite is held open by the wind pressure, so the bridle should be made long. A short bridle will tend to collapse the canopy. The total length of the line can be 12' and each end of this is secured to the bridle points using the bowline knot. The centre of the loop is then found and a 1" diameter curtain ring attached using a larkshead knot. This is a commonly used knot in kite bridles as it is easily loosened for adjustment purposes. However, in this application no adjustment will be required so a simple knot can be made close up to the ring to prevent inadvertant movement of the ring.

THE WINDER.

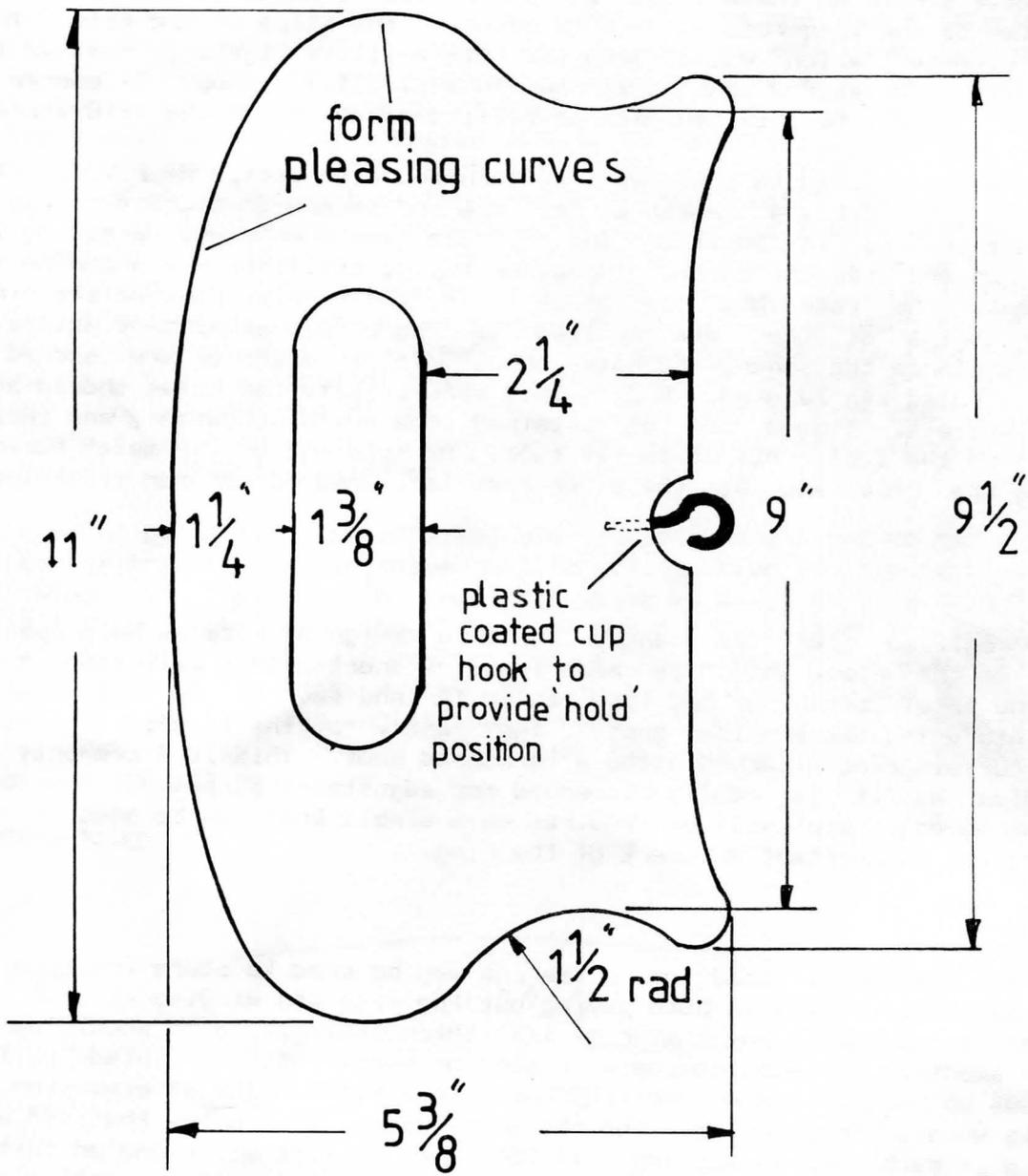
Although any piece of wood or a tin can may be used to store the line, a properly designed shape will assist in both paying out the line and winding it in. That shown in fig. 2 can be cut out of any timber of 1/2" thickness. All edges should be well rounded and sanded smooth. The wood can be varnished or better still painted yellow as this colour shows up well if the winder is dropped in a field. The 9" dimension round which the line is wound, together with the thickness of the wood means that 19" of line will be taken in as each turn is applied. If 250 turns of line are wound on initially, this will give a length of some 400 ft. which will be adequate for first trails.

It is important not to make the winder any smaller than this as it becomes very tedious bringing a kite down with some of the small winders which are often sold with commercial kites. In a recent article in K.O.N. a writer advocates a winder of 4 ft length! A good idea, although perhaps a little inconvenient to carry around.

When paying out the line from this winder, the latter can be allowed to slip through the fingers of a gloved hand and with a little practice the line will pay off in a continuous looping motion.

THE LINE.

Almost any string can be used for this purpose. However a thick line such as that from a ball of domestic string will offer considerable resistance to the wind and increase the catenary curve.



A KITE WINDER
from $\frac{1}{2}$ " plywood

Kite lines need to be thin so that they "cut the wind". Monofilament or braided nylon line is the usual choice and a breaking strength of 50 lbs. will be sufficient for this kite. It may be purchased in spools of 400 ft from any kite store.

FLYING THE KITE.

We are now ready for action. Usually this kite can be flown equally well either way round, i.e. with the longerons inside or outside the canopy. If the tape has been applied to hug the rods closely, the cover will be in a more natural position with the sticks inside. Try and find an open space for your first attempt. Avoid trees, high buildings which cause turbulence, and never fly a kite near electricity cables, airports, motorways or during a thunder storm.

Although the line can be tied to the bridle ring, it is more convenient to use one of the swivel clips readily available from kite stores. Open out the kite and allow the wind to fill the canopy. If there is sufficient wind the kite will rise from your hand. Allow the line to slip through your gloved hand. The kite cannot fly unless there is tension on the line, so if this goes slack, the line must be wound in or you must step back to reimpose this tension. Remember that there is more wind higher up and also wind conditions become more stable as you gain height, so try and get the kite up the first 50 ft. or so as quickly as possible.

WALKING A KITE DOWN.

In the event of an error of judgment in the strength of the wind, one can sometimes be in the embarrassing position of having a kite up and lacking the strength to bring it down with the winder or reel. In a case like this you should tie off the line to a ground anchor or fencing post etc. and "walk the kite down". Simply put the line under your arm pit and walk towards the kite. This procedure can only be adopted if there is a reasonable area available. If you have walked as far as space will allow and the kite is still not down then tie off the line to another ground anchor and walk back to the starting point in the same way.

I am sure that the performance of this simple sled will stimulate your interest in kites and you can proceed to more advanced designs or some of the ancilliary equipment such as "messengers" and parachutes which can be used in conjunction with single line kites. Also you will probably want an efficient deep sky reel. All of these items can be purchased at any of the kite stores but they may also be made with relatively simple tools and modest workshop facilities.

This kite can be made equally well in ripstop nylon using precisely the same method of construction i.e. P.V.C. tape. The material will be less likely to fray if the cutting out is done with a soldering iron (hot cutting) which will seal the edges. You cannot really get very far in the subject of kite making without using the sewing machine and the best method, if using ripstop, would be to hem the edges and to sew casings for the longerons. An extra inch must be allowed for these casings when marking out the fabric.

JOHN WILDING