Words & pictures: Bernhard Dingwerth
Drawings: Jan Nelkenbrecher

Construction Plan for the 3.5m Frog

FROGGY - THE FROG

When the kite fever really has a grip on me I am allways searching for new ideas, looking out for airworthy objects. Since not all ideas can be put into shape at a single blow, some things just lag behind. So happened to a small fluffy frog, that sat in my workshop for years, patiently awaiting its 'dissection'.

Froggy the fluffy model

After I had built some small frogs of 3.5m and the enlarged version of approx. 7m had successfully flown, workshops were held. Due to the positive experiences of the workshops and the great demand it seemed quite obvious to follow up with a release of the plan for this kite.

Whoever read the "Robby" plan (see **KITE & friends** 1/2008) or the parrot plan in **KITE & friends** 1/2009 or even did build one of the kites, will find similarities and repetitions in some passages and procedures of this plan. That is indeed meant, since the earlier construction plans were vowed for their easybility and replicability. Why change the style while it provides easy access to inflatable kites even to newcomers?

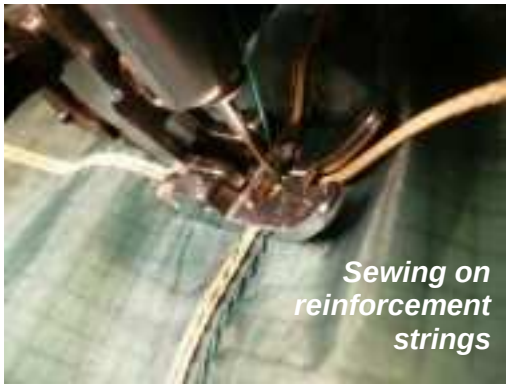
The manual skills asked here are comparable to the "Robby" seal kite, maybe even less. Those who found the parrot kite to be too awkward will find a construction plan that is a lot easier to handle for building a rewarding kite. Of course basic sewing and kite building experiences should be given.

This plan shows the small 3.5meter version of the frog. The size can be doubled without problems. For these larger frogs some details should be worked out differently, i.e. three-dimensional eyes, and bridle lines need to be stronger.

Hot-cutting of eyes, lip and palm patterns

List of Materials

Ripstop-Nylon:	• bright belly color, 5 linear meters x 1.0m width • dark back color, 9 linear meters • eyes and valve flap, approx. 1.5 meters white • eyes, lip and palms, leftovers in red and black
Bridle lines:	• 20m dia. 0.8mm, approx. 100# strength • 12m dia. 1.0mm, approx. 150# strength • 5m dia. 1.5mm, approx. 220# strength The color of the bridle (black or white) is up to you.
Reinforcements:	• approx. 6m of simple string, that can be sewn on easily
Miscalleneous:	• A repair opening is not needed this time since the mouth is left open. But if inflation with a blower is intended, a zipper of approx. 25cm should be sewn in at the very back of the frog.


Sewing on reinforcement strings

String crossing for lifterpoints

Required Materials

Body and belly of the frogs are made of two basic colors. The classic model usually is green with a yellow belly, but other color combinations make a good picture in the sky, too. A darker outline or complementary color in the eyes, palms and lip give a nice contrast. The following quantities are based upon the best possible economic cutting you can achieve. Some pictures later on will illustrate that.

The overview shows all templates (see **overview_de&en.pdf**). If you dare you may enlarge the scale drawing to your needs. The precise conversion factor is 10.6. To keep it simple we recommend a scale of 1:10, that we used for the A4-plot version.

For your convenience we offer the templates as downloadable pdf-files on the **KITE & friends** homepage (*www.kite-and-friends.de*) and right here on *www.drachenbernhard.de*. The pdf-files are to scale and can be printed in a ratio of 1:1.

Our templates don't include any seam allowance. This should work fine if you sew tight. Those who prefer wider seams need to add seam allowance prior to cutting. The individual panels (side pieces, back, belly, legs and palms) are cut out using sharp scissors. Small parts (eyes, lip and palm patterns) are better cut with a so-called hot knife.

Sewing and Building

All stitching is done with a plain seam on the wrong side that at the end will be inside. In areas with particular strain folded seams are used and reinforcement strings are sewn on.

At bridle points and the drogue attachment points the reinforcement strings should cross to avoid fabric tearing during flight.

The plan shows the positions for the reinforcement strings as red lines. Lifterpoints are indicated by star symbols.

Since the body of the frog is pretty voluminous and line traction will be moderate we can abandon inner tensioning lines. They would have to keep the kites shape (mainly flat) or to distribute bridle forces.

When all segments are cut the sewing may begin.

The sewing sequence is indicated by letters within the text. To simplify things, for parts needed twice only the left side(s) are shown with letters. Read and sew from mouth to back.

Example: The left eye with the letters D + C will be sewn to the back piece meeting the line D to C.

Simple variant of the eye

Mirroring the back template

Insertion of the eye

So logically for the mirrored side it has to be vice versa, therefore C to D. Looking at the attachment of the left palms and their right sides it is similar.

Mouth with bridlepoints

Throat with hem and bridlepoint

Hotcut lip with bridlepoints

Palm bridlepoints

The Eyes

At the small frog the eyes are not three-dimensional. The pupils simply are appliquéd onto the white eye. Differently colored contoures make the eyes look vivid and are more than just playful. Sew the pupils on top of the contrasting eye circles and these again onto the white eye segments. Dark applications on a bright color don't even need to be backcut. Since a single seam is fully acceptable the eyes are done quickly and you can continue with the back.

The Back

Bad enough the segment for the back is not really a winner when it comes to economic fabric usage. That's why the template is drawn only as one half side at the plan and in the pdf-files. It needs to be mirrored. The above picture shows a possible cut. Depending on the fabric width the most useful cut should be given some thought. A seam running along the middle as well as some transverse seams are concievable. They will barely be seen because they are at the back.

At one go at the respective marks sew on strings for the later needed lifterpoints.

Side Segments

The side segments should be of the same color as the back and are sewed to the back segment at points A to B. Proceed with the eyes sewing a straight line from C to D.

To avoid nasty wrinkles please align fabrics really tight at point C. From here sew the arc-shaped line beyond D, thus joining the back and side segment. It is not critical if fabrics don't line up exactly here. When joining to the belly segment this area can be corrected. In the corner at point C the eye should be closed with a second seam to better distribute load at this somewhat critical spot.

The Lip

It should be of nicely contrasting color to the body. The lower edge will flap freely in the wind and therefor should be hotcut. Start sewing right in the middle at R joining the lip to the front curve of the assembled back piece; first sew to one side, than to the other. Close the seam with a felled seam and include a reinforcement string over the entire length. At the appropriate marks apply short lengths of string across, thereby establishing the first bridle points.

The Valve Flap

The fabric of the valve flap needs to be as soft and smooth as possible since it then snuggles nicely into the opening and keeps it tight-closed. If at hand parachute fabric can be used. Because of the visual appearance white fabric is recommended. Starting at point R first sew to one side up to point M at the lip, then sew to the other side. Leave the protruding straight edge as is. It will close the valve at the throat during flights. Depending on fabric color and softness the valve flap may be shortened at the lower edge. Again for visual reason it should line up with the throat attachment line.

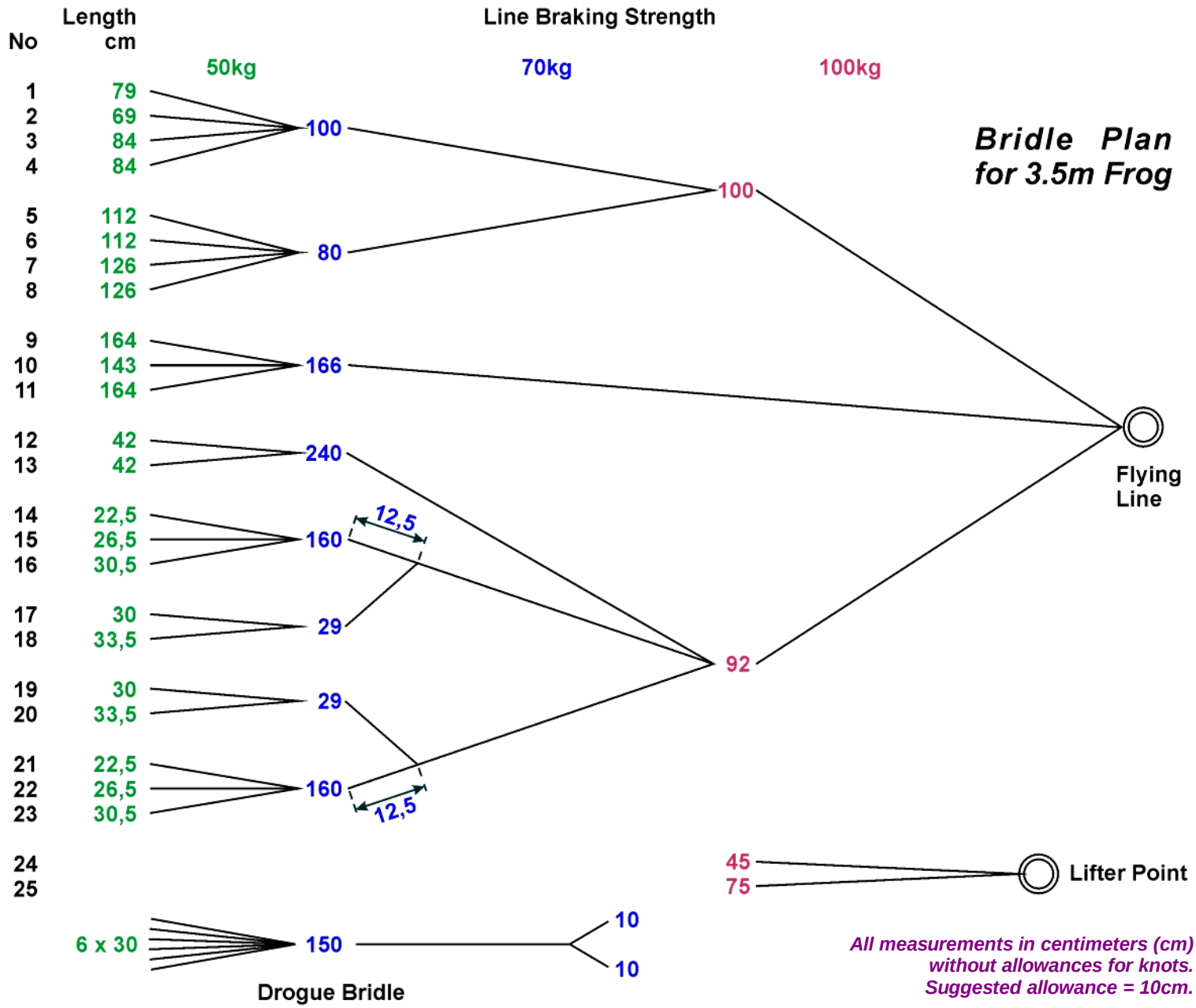
Belly and Throat

Join belly and throat from points O to P. In the middle and at O and P crosswise sew on lengths of string to build bridlepoints. The forefront of the mouth will act as air-intake during flight and therefor is left open over a length of approx. 40cm. This part is hemmed, and in the middle section a string is sewn in again.

Additional string crossings need to be placed at the hind leg attachment position.

This plan is for private use only! Commercial use is strictly prohibited!

R
lifter point
Lifteraufhängung
M
C
D
Rückenhälfte
half of back
2 x grün
green
A
B
K
leg attachment line
Ansatz Bein
L
Seitenteil
side panel
2 x grün
green
G
arm attachment line
Ansatz Arm
H
B
Lifteraufhängung
lifter point
I
Ansatz Pfote
palm attachment line
J
Bein (hinten)
leg (hind)
4 x grün
green
K
body attachment line
Ansatz Körper
L
O
P
Hals / *throat*
1 x gelb
yellow
seam approx. 40cm for mouth opening
ca. 40 cm Saum für Maulöffnung
Auge
eye
2 x weiss / *white*
Augenrand farbig
coloured eye border
D
C
Ventilklappe
valve flap
1 x weiss
white
M
M
R
G
Ansatz Körper
body attachment line
H
Arm (vorn)
leg (front)
4 x grün
green
E
F
K
B
K
Schlepp-
sack
drogue
6 x
Augenrand
eye border
2 x farbig
coloured
Pupille / *pupil*
2 x schwarz
black
Hinterpfote links
hind palm, left
4 x gelb
yellow
2 x mit Zehen / *with toes*
I
J
Zehe Hinterpfote
toe hind palm
6 x rot / *red*
1 x Boden / *bottom*
L
L
Zehe Vorderpfote
toe front palm
8 x rot / *red*
Packsack 1x
storage bag
50x35cm
3 Waagepunkte
bridle points
Vorderpfote
front palm
4 x gelb
yellow
2 x mit Waagepunkten und Zehen
with bridle points and toes
F
E
Bauchteil
belly piece
1 x gelb
yellow
G
G
H
O
H
P
A
Lippe / *lip* 1 x rot / *red*
R



Front Legs and Palms

The panels of the front legs and front palms are needed four times each; that means two rights and two lefts. At first the legs are sewn from F to H, then closed from E to G. The inner sides of the palms [*editorial note:* The side seen during flight.] each receive four circular spots, whereof the three upper [frontmost] also are bridle-points. Appliqué the spots to the panels [here: outside = right side] and then centrically apply string crossings [here: inside = wrong side]. Then the appropriate palm panels can be joined all around. Remember: You need a left and a right palm! The shorter outer edge is the inner side of the palm.

In the following the palms and the front legs are joined and the sections E to F are stitched up. Sew from the wrong side as far as possible. At some point you'll have to turn inside out and close the remains of the seam through the still open 'sleeves'. Please don't forget the bridlepoints at the 'wrists' and the lower edges of the palms.

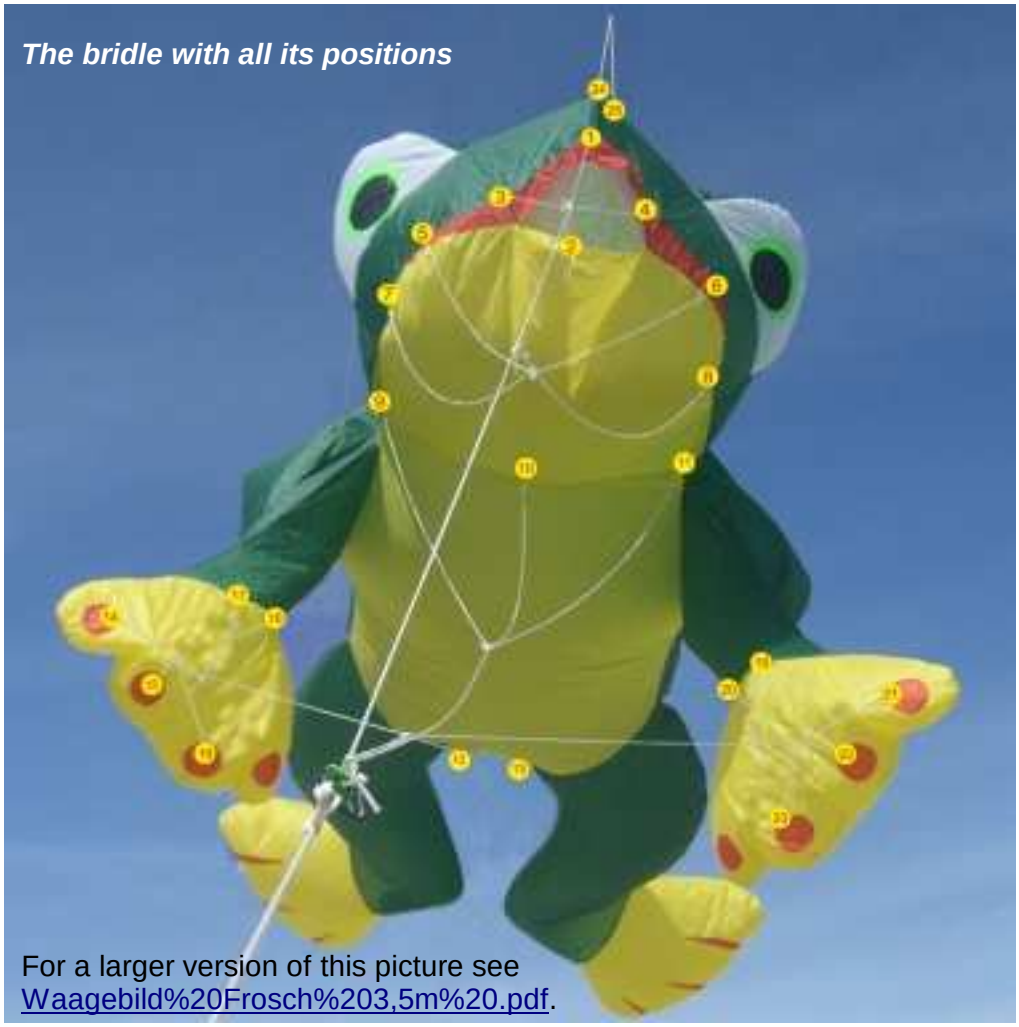
Hind Legs and Palms

The work steps for the hind legs and palms are a lot like the previous. Again four pieces of each panel are needed. When closing the legs all around leave open the section between points I and J for palm attachment. Appliqué the bowlined stripes onto the front panels [seen during flight] of the palms to indicate toes. As before keep in mind to build a left and a right one. The joining of the hind palms is done just like the front palms. Then they are inserted between points I and J of the legs. These receive string crossings at the back of their heels for later connecting the legs to each other and for drogue attachement.

Connection between hind palms

Seaming up

When all parts are prepared in a first step join body and belly. Start at the mouth, leaving it open at bridle points 3 and 4. From there, that is to say approx. 20cm to each side from the middle, sew the throat to the lip. And, by all means, secure it with a second seam! Up to where the belly starts the seam can be closed at both sides until you reach point H of the front leg attachement line.



The bridle with all its positions

For a larger version of this picture see Waagebild%20Frosch%203,5m%20.pdf.

Turn the finished front legs right side out. Next between H and G first sew them to the back, then to the belly. Be advised that the fabric around point H is exposed to permanent movement during flights, so secure this area with a second seam.

The section up to point L can be closed. Then the hind legs are inserted the same way it was done with the front legs. If all pieces match then only an opening between B and K should be left. Those who also would like to use their frog as an aero sculpture should sew in a zipper or velcro tape here. Otherwise this last seam may be pulled outside through the mouth and be sewn up. The mouth will act as a service opening since it is left open.

The Bridle

At first prepare the bridle attachment points made from short lengths of 50kg bridle line, each approx. 10cm long. Using a gobbler's awl or a strong darning needle pierce through the fabric from the outside and as close to the string cossings as possible. Inside drive the awl or needle around the reinforcement crossings and back out again.

Piercing through the fabric

Finally tie tight knots to the loops. Later the bridle lines will be attached to the loops by so-called larks heads.

Knotted bridle point

The compound bridle is built with lines of graded braking strengths. At the kite body it starts with 50kg lines, followed by 70kg lines. These are collected by two 100kg lines, and together with one single 70kg line the bridle is completed with a sturdy keyring. For the separate two-legged bridle that provides the lifter point, use 100kg line again.

All bridle lines get a stopper knot at one end and a loop at the other end for making a larks head. This is the easiest way to connect the bridle lines. Also the bridle can be adjusted anytime.

Read the bridle plan starting topmost at the lip, next go to the belly, then to the front palms. There the bridle is devided into a main line for the palms and a link to the 'wrists'.

All bridle measurements are given net. That means you will have to add approx. 10cm for knots and loops.

The Drogue

The six elements of the drogue, mirroring the frog's colors, should be hotcut to save the extra work of hemming. Join them in the order you desire and apply six short lines, each approx. 30cm long. A line of 150cm will attach the drogue to the legs.

Those who care may quickly sew a small storage bag. At the rectangle-shaped piece of fabric (approx. 35 by 50cm) sew a seam for a draw string at the long side, join the circular bottom at the opposite and close the side seam.

Finished drogue

Now Froggy is ready for its maiden flight. Of course with a little help of a lifter kite this is done a lot easier. The inflation through the mouth will take its time, and that is quite normal.

The bridle should actually be quite accurate, but due to individual differences in sewing and knotting adjustment may be necessary. After a while of flying all fabrics and lines will be stretched. Depending on the lines some knots have the tendency to unravel in the beginning. Once the bridle has been under high tension the unravelling will not happen any more.

If everything went right in smooth steady winds Froggy will enjoy you flying even without a lifter kite! Use a flying line that is not too heavy. Depending on the wind speed a breaking strength varying from 70kg to 100kg is recommended.

Have lots of fun building and flying your new soft kite! We would appreciate your comments to this plan. And of course we would love to see pictures of your Froggy!

Acknowlegdements:

My special thanks go out to Jan Nelkenbrecher of http://www.burgenlandkiter.de for the excellent adaptation of the drawings; for continuous advice to my kite friend Karl-Ulrich Körtel, http://www.raberudi.com; and for the realization on my homepage to Andreas Napravnik, http://www.drachenbaendiger.de. This time the translation was done by Karsten Schneymann, kamas@arcor.de.

Further Information:

If you would like to read more about the origin of this kite and see some pictures you can find them here; www.drachenbernhard.de/dra_froggy.html.

Please note:

Do not use this plan commercially!

Proudly presented output of a workshop held in Naumburg/Germany

Bernhard Dingwerth
February 2010