

4.5Meter Crocodile Workshop

**Bernhard Dingwerth's
fifth plan of inflatables**

**HAUNTED BY
CROCODILES**

Words & photographs by Bernhard Dingwerth
Drawings by Jan Nelkenbrecher
Translation by Karsten Schneyermann

Impressed by the vividness of large Lynn kites like the *Octopus* and the *Gecko*, I ventured to build my first inflatable, the 13 meter crocodile, in 1993. The basic cut was a modified template for a plushie. When I started planning no one could tell if this monster ever would fly. A hundred square meters of spinnaker fabric in yellow and in different shades of green were ordered. And if my endeavor had failed, half of Kassel's citizens could have been furnished with green kitebags.

This plan provides a slightly smaller flight-tested version. However, the small crocodile is rather meant to be flown as line-laundry. Due to its low angle of attack it would need smooth, steady winds and plenty of space for solo flights.

If you've read or even built a kite on basis of one of the former plans, you may come upon repetitions and similarities in some work stages and passages. Again this is intended, as the earlier plans have been found to be plain and easy to comprehend. Since the writing style most certainly provides easy access to build inflatable kites even for beginners, there was no reason to change it.

The crocodile takes about as much material as "Froggy", the frog-kite, but it is considerably more difficult to build. You should have some experience with sewing and kite building.

This plan is free for private use only!

Colors

Crocodile's common colors are dark green with a lighter green on their sides and yellow bellies. But in the sky other colors look great, too, i.e. blue combined with green, violet with red or red and orange.

Depending on how you want it to appear, friendly or sinister, colors and details of the eyes and snout can be changed. Unlike the earlier plans the crocodile needs inner tension lines to keep its shape. The plan shows the measurements of the tension lines in green color.

Cutting

The general drawing shows the individual segments. Confident builders may enlarge the drawing to scale (see [**crocodile_overview.pdf**](#)). If this is too much work just turn to the patterns provided for download as PDF files on my homepage.

The four pages plotted in their original size easily serve as templates. As the outlines show through the fabric, shapes can be drawn along the lines or be cut right away.

The patterns don't include any seam allowance (except for the teeth, claws and spikes), this works with tightly sewn hems. If you prefer wider hems you need to add allowance prior to cutting.

The large segments may be cut with sharp scissors. For the smaller parts like the eyes, spikes, claws and teeth it is easier to use a hot knife. When all fabric pieces are prepared you can start sewing.

Please note: This construction plan is suitable for the small 4.5 meter crocodile only. For a larger version details have to be changed and more extensive reinforcements are needed.

Reinforcements

All sewing is done with plain seams on the wrong side, which after construction will be on the inside of the kite. In areas with particular strain, reinforcement strings are sewn *on* or *into* the seam, respectively.

At all bridle-points and where the inner brace lines will be attached later on, the reinforcement strings should cross to avoid fabric tearing. The plan shows the positions for the reinforcement strings as green lines. In addition the spots for the brace lines are indicated by green circles.

The bridle-points are numbered consecutively and placed in yellow circles, and the lifter attachment points are shown in blue. Red marks show the exact positions of the spikes and claws.

List of Materials:

Ripstop nylon:

- bright color for the belly (yellow): 4.5m
- dark color for the back (dark green): 5.0m
- medium color for sides (light green): 5.0m
- for eyes, teeth and valve flap (white): 1.0m
- for spikes and claws (blue): 1.0m

Measurements based on fabric width of 1.0 meter (approx. 39 3/8 inches).

Bridle lines:

- 30m, dia. 0.5mm, 30daN
- 5m, dia. 0.8mm, 50daN
- 4m, dia. 1.0mm, 70daN
- 2m, dia. 1.5mm, 100daN

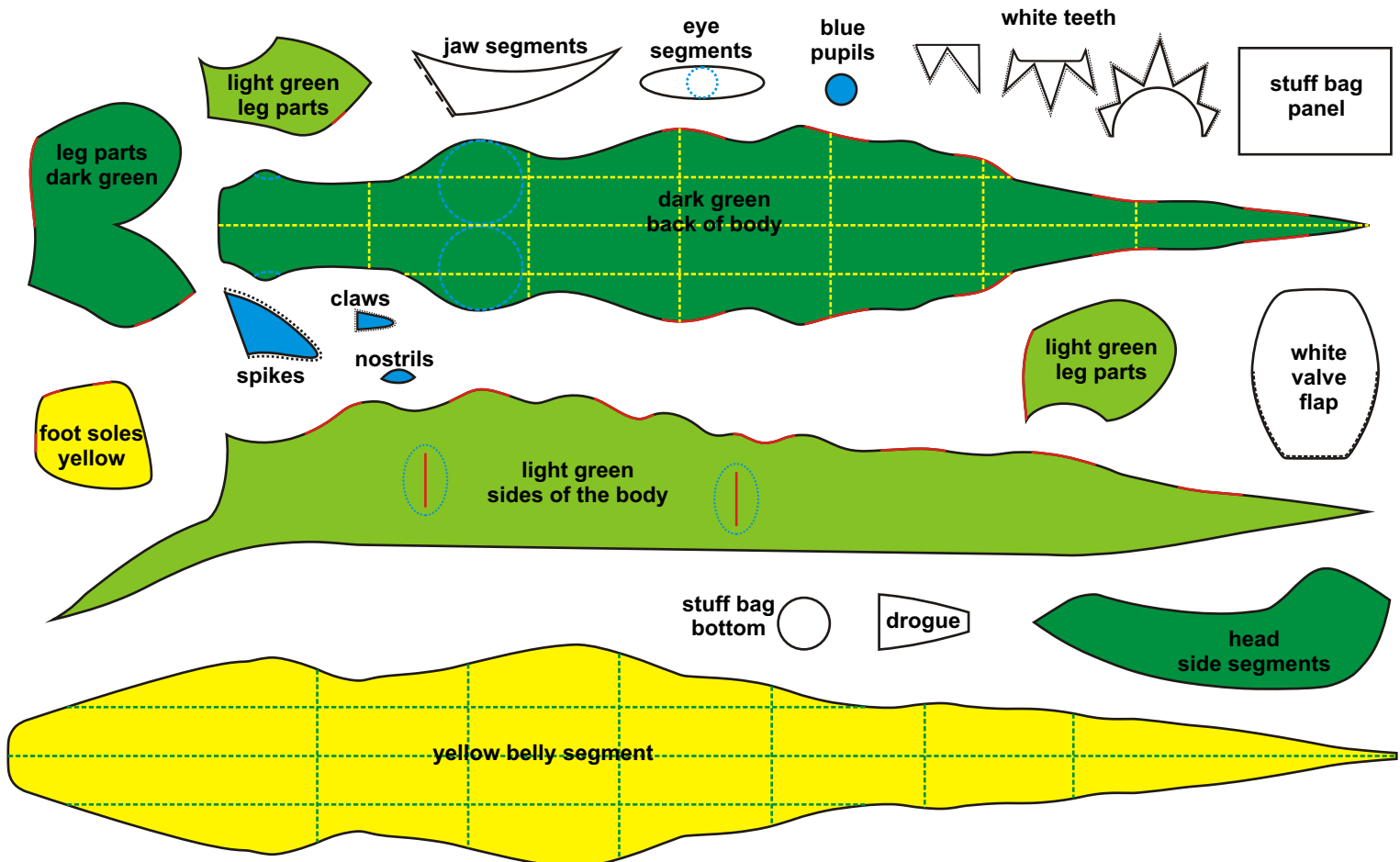
Whether the bridle lines are white or black purely is a matter of taste.

Reinforcements:

- approx. 30m of simple string, easy to sew on
- approx. 10m of non-stretching string for inside tensioning

Optional:

The snout is left open, so we don't need a maintenance opening. But if you would like to inflate your crocodile with a blower, you should sew in a zipper of approx. 25cm at the lower side close to the tail.

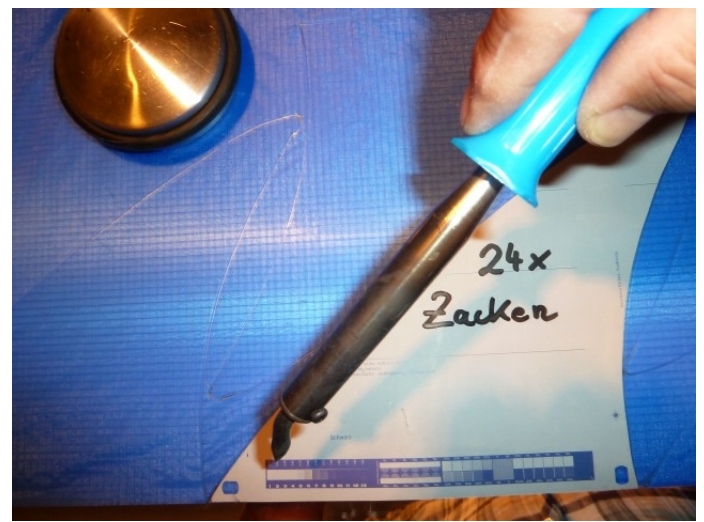


A quick overview of the fabric parts needed for the 4.5meter crocodile.

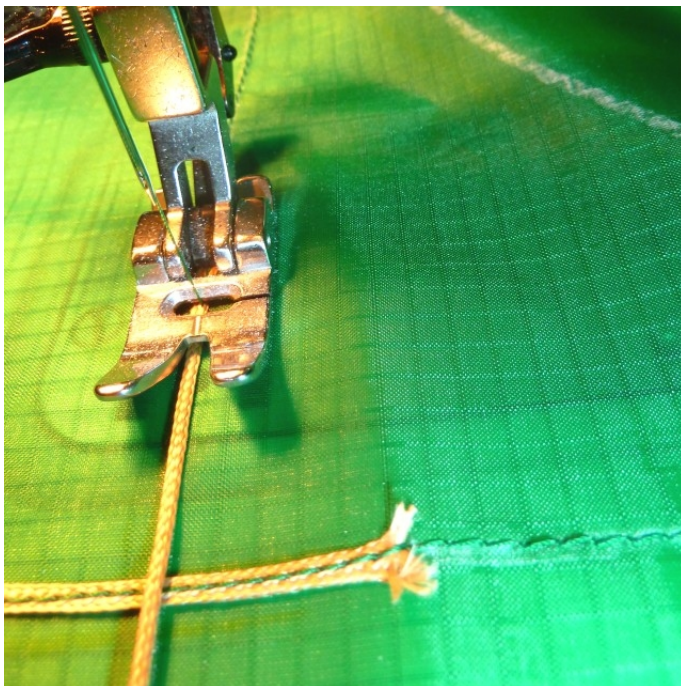
Exact numbers and measurements are shown in the separate file *crocodile_overview.pdf*.



Large segments are simply cut with scissors.



For accuracy hot-cut the small parts.
Caution! Ensure adequate fresh air ventilation!



Sewing on strings for reinforcement

(Reinforcements cont'd)

Belly and back side have a grid. Decide for yourself if a complete grid of strings or just string crosses will be applied. Later on the brace lines will be affixed at tagged string-crossings to keep the crocodile's flat shape.

To add clarity for the sewing the sequence is indicated by letters.



Simple eye design



Sewing the eyes

Eyes

Each eye consists of four ellipses, sewn to build a hemisphere. The pupils are simply appliquéd onto the white ellipses. Soon the eyes will be done and you can go on with the crocodile's back.

Back

Before cutting the back segment please mark the positions of the eyes, nostrils and the starting points of the spikes. Within the eye circle either cut a small hole or a vent (slit) for inflation.

Check the circumference of the eye hemispheres before sewing them onto the back segment. They should fit to the drawn circles as accurately as possible. Next sew on the eyes on the wrong side as far as you can. Finish the seam through the vent opening.



The eyes will be inflated through vent openings.



The author cutting fabric for a crocodile's back.

Also on the wrong side the spikes can be sewn on, and the nostrils can be appliquéd. At the respective marks affix strings for the bracing and lifter attachment points.



The attached side pieces already support the head's three-dimensional shape.



Attaching the spikes

Head Side Pieces

Sew on the nostrils at their marked positions. Starting at point **B**, join the head side piece with the back segment, sewing across the nostrils to point **A**.

Don't forget the line crosses for the lifter attachment points.

Body Side Segments

Mark the positions for the legs and spikes. For inflation of the legs a plain slit as vent opening proved best. It should be hot-cut to prevent the fabric from tearing.

When the legs are completed, you can sew them onto the side pieces right away.

If you've measured, marked and cut carefully, you can also attach the opposite spike pieces on the wrong side now. If you're not sure, you may want to insert them when joining the body side pieces with the back.



Exact work eases the assembly.



Inner leg pieces with cut-out



Soles with sewn on claws

Legs & Feet

The legs are made of the slightly bent light green inner parts and the dark green outer parts.

Start with the inner parts and connect them by sewing from points **G** to **L**. The bow-shaped cut-out causes a slight bend of the legs towards the body. When cutting and sewing keep in mind that there are two left and two right legs!

Now the leg parts are joined by sewing from point **H**, passing point **L** and up to **F**, then from **J** to **G**. Leave the legs open between points **F** and **G**.

At the feet the yellow soles fit in. They are sewn in just like circles. Note that there are two left and two right soles for the corresponding feet.

Comparable to the spikes the claws are inserted at their respective marks. Attach string crosses as bridle points at the right and left of the forefeet (inside!).



Inserting the claws





Inflation test of the finished leg



Above: Joining the precisely fitting back and side segments

Valve Flap

It's best to use soft bright fabric for the valve flap. Dark colored fabric would show through and spoil the appearance.

Along the dotted line sew it to the upper palate and leave the remaining half as is. This way it can move freely. Later the seam will be hidden by the upper teeth.

Belly

Already when cutting the bright belly segment you should mark all positions of the bridle points and brace lines. It is up to you, if just string crosses or lines in full length are applied. The tail tip is provided with a length of string just to prepare it for attachment of a drogue when needed. If you are planning to inflate your crocodile with a blower, sew in a zipper of approx. 25cm length at this point.

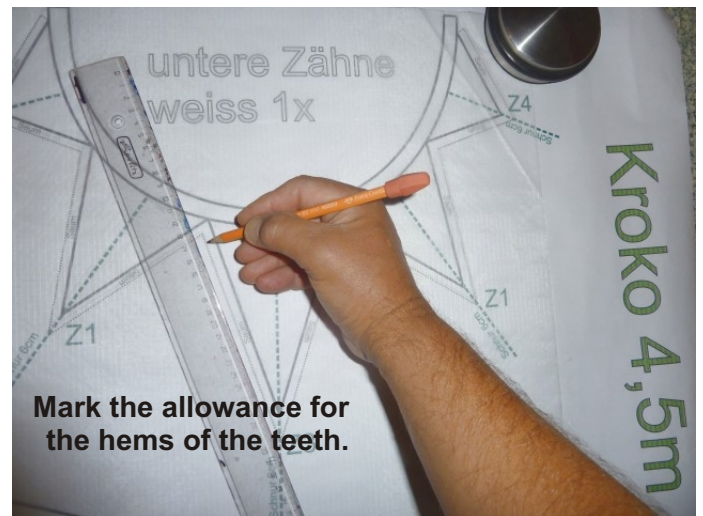
Teeth

Work on the teeth is a bit fiddling. Cut with sufficient fabric allowance and hem. For clarity the proper order of the teeth is labeled with "Z"-labels. Initially join the upper jaw between **Z1** and **Z2**. Upper and lower jaw are sewn on separately. Later on applied strings will connect them.

Insert the teeth by starting in the middle. The upper jaw belongs to the dark body segment [Remember...? The valve flap!], the lower jaw goes to the belly part. As soon as the upper row of teeth is sewn on, the side pieces of the jaw follow with a seam from **Z5** to **Z6**.

Repeat the same process for the lower row of teeth and the belly segment. Here the jaw side pieces are sewn on starting at **Z7**.

Now upper and lower teeth are connected by strings. The tips of the middle teeth meet each other. Leave 1cm between the tips of the eyeteeth, and 3cm between the molar teeth.



Mark the allowance for the hems of the teeth.



The teeth need hems.



Sewn onto the 'wrong side' of the belly segment.

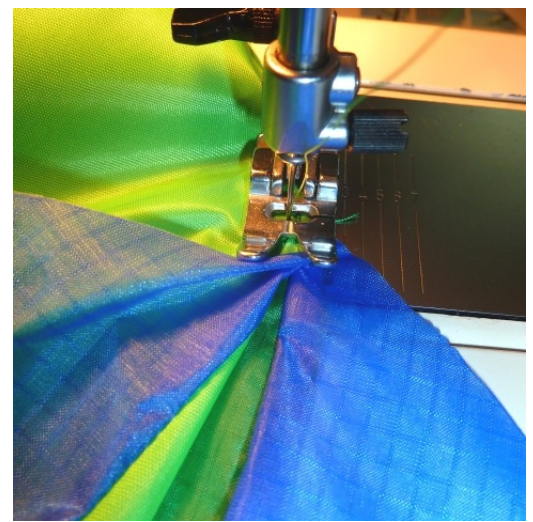


String connections
of the teeth

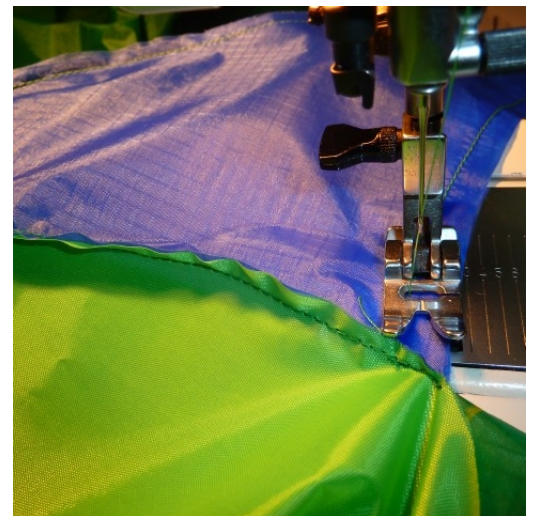
Seaming up

Now the back and side segments can be joined by sewing from point **A** to point **C**. If your work is precise and the spike halves are already sewn on, just lay wrong side on wrong side and sew. Else you have to sew from one spike to the next and to insert them one by one.

In point **C** the back segment ends. From there the upper edges of the side pieces are sewn on up to point **E**. Now the light green cheeks are sewn to the side jaws between points **A** and **D**.



Above and below:
Inserting and closing the spikes



Inner life of a crocodile

The last remaining part to sew on is the belly segment. At point **Z7** the molar tooth aligns with the side jaw, and beyond **D** this seam merges belly and side segment all the way to the tail tip.

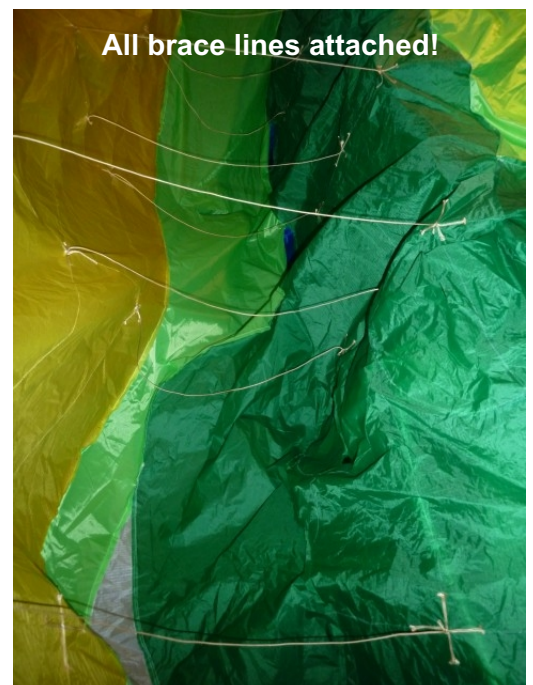
For the moment sew on only one side of the belly till point **E**. Before closing the second seam the brace lines are knotted.

Brace Lines

Now unfold your almost finished crocodile and lay it out flat in front of you just like a sandwich. Including sufficient knot allowance cut the inner strings and using a cobbler's awl or a strong darning needle pierce through the fabric as close to the string crossings as possible. For each row there are three strings needed at a max, therefore they can easily be knotted from the crocodile's side.

When the bracing is completed, all the fabric can be rolled up and squeezed to form a long bundle. Now the last seam between side segment and belly can be sewn, again from the wrong side. Pull the string for the drogue to the right side before closing the tail tip.

It's a great moment when the completed crocodile is turned inside out by pulling it through its snout.



All brace lines attached!



Attaching the brace lines

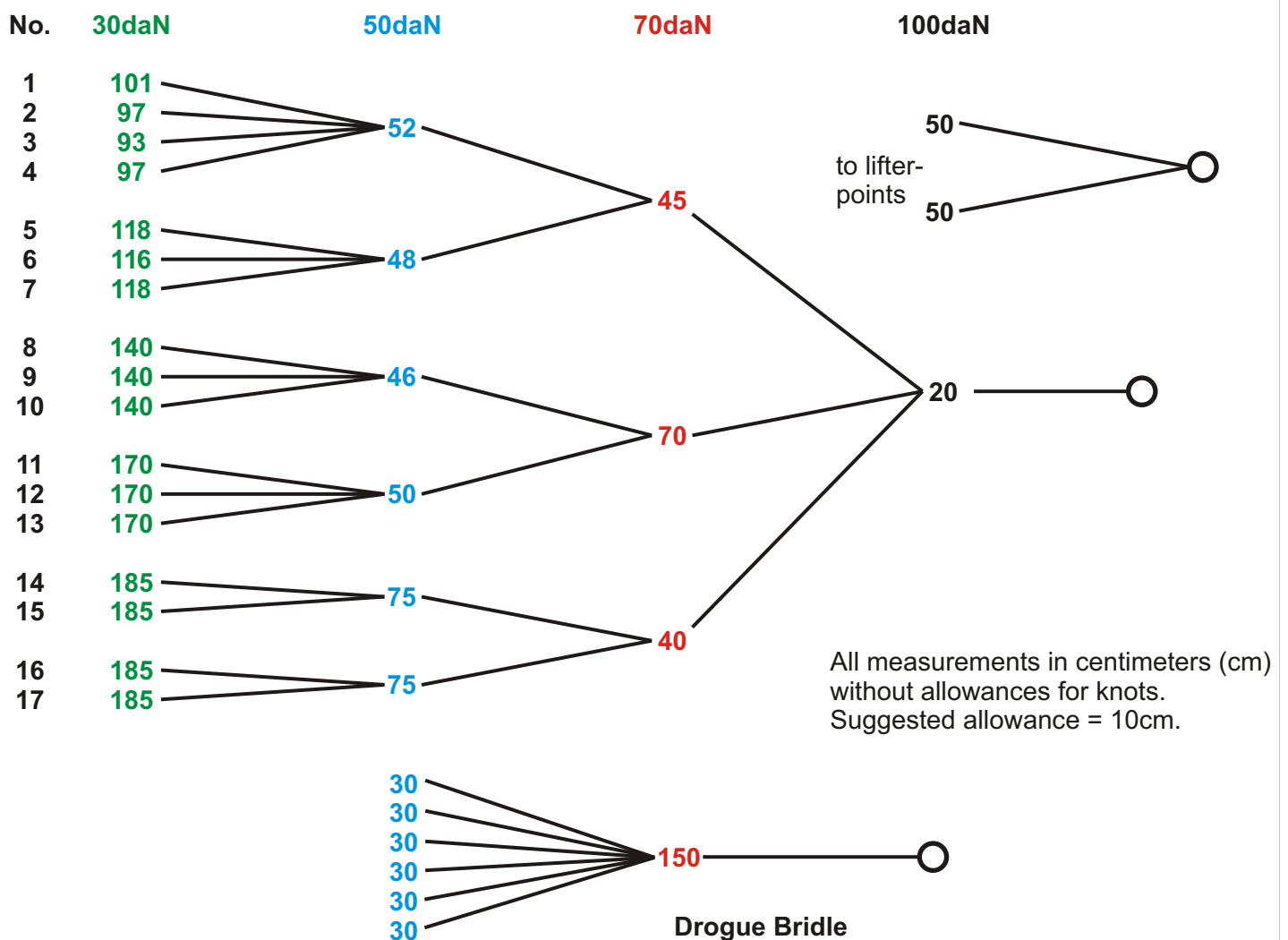
Additional Information

With the release of the crocodile workshop the **KITE & friends** series of inflatable kites from Bernhard Dingwerth ends for the time being. There is great demand for building these wonderful kites. With the construction plans for the seal (issue 1/2008), the parrot (issue 1/2009), the frog (issue 1/2010) and the clownfish (issue 1/2011) we received positive reactions most of the time. The author had a lot of fun and experienced a few surprises. And now, enjoy the tutorial.



Inflation test in the backyard.

Bridleplan



Commercial use of this plan is strictly prohibited!

Bridle

First prepare the bridle attachment points, using 50daN line. Again pierce through the fabric [of course this time from the outside] as close to the string crossings as possible. Drive the awl or needle around the reinforcement crossings and back out again. Now pull the line through the fabric and knot short lengths of approx. 10cm to build loops. Later the bridle lines will be attached to the loops by so-called larks head knots.

The compound bridle is built with lines of graded braking strengths. The initial lines next to the body have a strength of 30daN, followed by 50daN lines. These are connected to three 70daN lines, which finally are bundled by a short length of 100daN line or knotted to a snap hook right away.

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 at the snout, from there to the belly and to the legs. All measurements are given net, therefore add approx. 10cm for knots and loops.

Drogue and Storage Bag

A drogue is only necessary if the crocodile has to fly without a lifter kite. If you are using the reptile as line laundry you may want to save the extra work.

The six elements of the drogue may mirror your crocodile's colors. They should be hot-cut to save hemming. Join them in desired order and apply six short lines, each approx. 30cm long. A line of 150cm will attach the drogue to the tail tip.

Those who wish to may quickly sew a small storage bag. On a rectangular shaped piece of fabric (approx. 35cm by 50cm) sew a seam for a draw string at the long side, attach the circular bottom at the opposite edge and close the side seam.

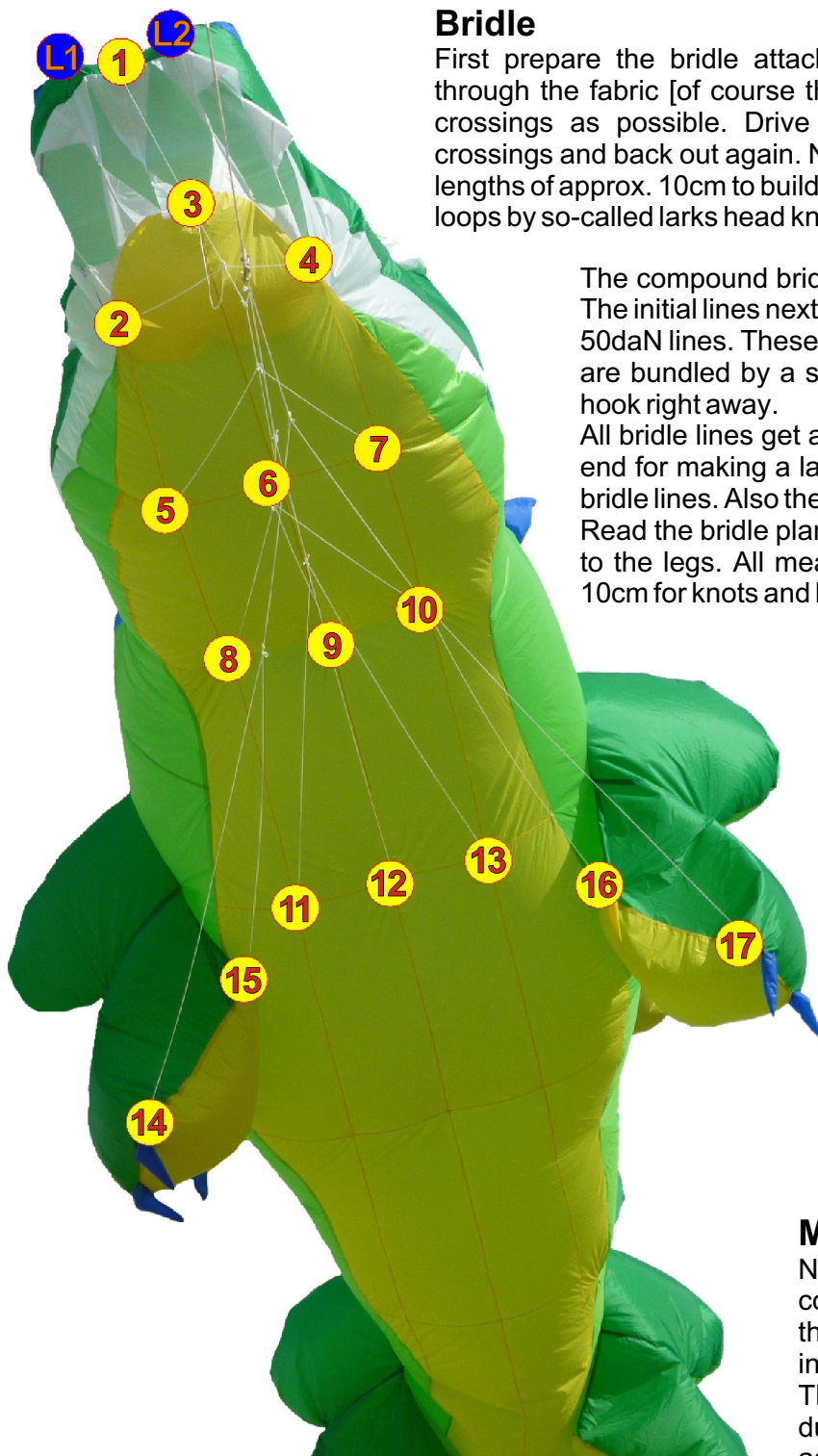
Maiden Flight

Now your crocodile is ready for its maiden flight. Of course to attach it to the line of a lifter kite will make the first flight a lot easier. It is quite normal that the inflation through the snout takes a while.

The bridle should actually be quite accurate, but due to individual differences in sewing and knotting adjustment may be necessary. After the little one has been flying for some time all fabrics and lines will be stretched. Depending on the lines and strings used some knots have the tendency to unravel at the beginning. Once the bridle has been under high tension that will not happen any more.

Use a flying line that is not too heavy. Depending on the wind speed a breaking strength varying from 70daN to 100daN should be sufficient.

Enjoy building and flying your crocodiles in the countryside. Comments on this plan would be appreciated, and of course we would love to see pictures taken while flying your new crocodiles!



Positions of the bridle lines

Acknowledgements

I would particularly like to thank Jan Nelkenbrecher of the "Burgenland-Kiter" for the excellent adaptation of the drawings, my kite friend Karl-Ulrich Körtel for his continuous advice and Andreas Napravnik for the realization on my homepage.

More pictures can be found on my homepage (<http://www.drachenbernhard.de>).

Please note: Do not use this plan commercially!