„The Robby of Dingwerth“

Construction plan for a baby seal – 3.5 meters (11.5 ft)

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Due to the intricacy of the subject, published construction plans or specifications of inflatable kites are few, so far. Many experienced kite-builder therefore come up against inflatebles with due respect and many questions:

• how can I transform a two-dimensional picture into a three-dimensional figure ?

• or: how can I get a two-dimensional template from my three-dimensional figure ?

• can I use a stuffed or inflatable animal as a model ?

• how can I calculate the approximate amount of required fabric ?

• how do I have to construct the bridle, and which flying position do I want ?

• how can I be sure that my figure will be able to fly ?

These and other questions are asked by a lot of kite-friends in several workshops.

“Robby“ the seal (approx. 7m/23ft) and the Robby-Baby (approx. 3.5m/11.5ft) are particularly suitable projects for the introduction into the “mysteries“ of inflatable kites.

Since Robby is relatively simple to build, it seemed to be an ideal project for a workshop weekend. Out of the positive experiences of these workshops, and the great demand, the idea of publishing a construction plan for the Robby-Baby arose.

You should have some practical experience in sewing and construction of kites before starting this project.

Material requirements

For a small seal:

The Robby’s are three-colors, most of the time with shades of white, light blue and dark blue. But you can also use other color combinations like gray, brown and black or mint, green and turquoise.

Nylon fabric (Spinnaker):

- light color for the belly: 3m/10ft (by a solid center width of 1m/3.3ft)
- medium color for the side parts: 5m/16.4ft (by a solid center width of 1m/3.3ft)
- dark color for the back: 3m/10ft (by a solid center width of 1m/3.3ft)
- for the whiskers, eyes and nose: 1m/3.3ft black (by a solid center width of 1m/3.3ft)

For the bridle:

- 12m/39.4ft bridle line with a diameter of 0.5mm/0.02in (breaking load: 30kg/66lb)
- 10m/32.8ft bridle line with a diameter of 0.8mm/0.03in (breaking load: 50kg/110lb)
- 6m/19.7ft bridle line with a diameter of 1.0mm/0.04in (breaking load: 70kg/154lb)
- 0.5m/1.6ft bridle line with a diameter of 1.5mm/0.06in (breaking load: 100kg/220lb)

It’s a matter of taste if you use a bridle with black or white lines.

For the whiskers:

2m/6.6ft of black line (approx. 1.5–2.0 mm/ 0.06-0.08in diameter)

Reinforcements:

A few meters of a line which you can sew on the fabric easily and 3m/10ft of black slit nylon (the one you can use as edging material, instead of double folding the hems).

For the access opening in the tail: 40cm/16in zipper or Velcro.

Air inlet vent:

20cm/8in x 30cm/12in black gauze (mesh).

All segments are shown on the general layout drawing. You can enlarge this drawing on a photocopier (3 x 141%) and then enlarge the resulting drawing 1:10 by hand (1mm is equivalent to 1cm). If this seems to be too much work, you can download the 1:1 templates from the site www.kite-and-friends.de and also from the author's website: www.drachenbernhard.de .

This method is only suitable for the 3.5m-version. For larger seals some of the details are made differently, and the reinforcements have to be more sophisticated because of the greater forces.

Cut out each segment (side parts, belly, back, flippers and tail) with a sharp pair of scissors, adding approx. 0.5cm/0.2in for the hems (this is the allowance I prefer. You can increase this if needed, just look after the proper width while sewing). The smaller parts (eyes, nose and gauze) can be cut more cleanly with a hot cutter.

Specifications

All seams are made on the wrong side –later on the inside- and executed with a lap-felled seam (plain seam, flipped over to one side and sewn down). Lines for reinforcements are to be sewed on the inside in heavily used areas. They should cross at all places where the bridle and the lines for the drogue will be fixed to later on. This avoids the risk of tearing apart the fabric. The positions of this reinforcement lines are marked in red on the plans.

Due to the fact that the body of the seal is relatively round and the tractive forces are moderate, we do not need internal lines. In other cases this internal lines would be used to keep the body in shape (above all flat) or transmit the tractive forces from the bridle to the whole body. As soon as all pieces are ready, we can start sewing.

The whiskers

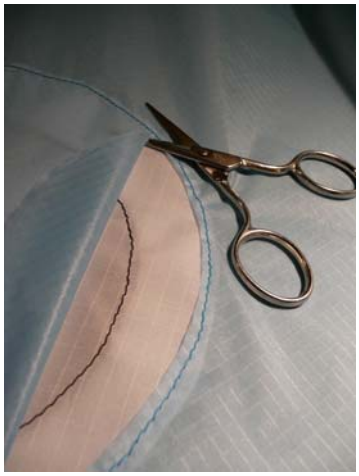
The whiskers are not filled with air in the small model, but are made of black ribbons which pass into lines.

Either you cut some stripes of nylon fabric and fold them lengthwise or you can use slit nylon (the one you can buy as edging material, instead of double folding your hems) and fold it lengthwise. These ribbons should be approximately 30cm/12in long.

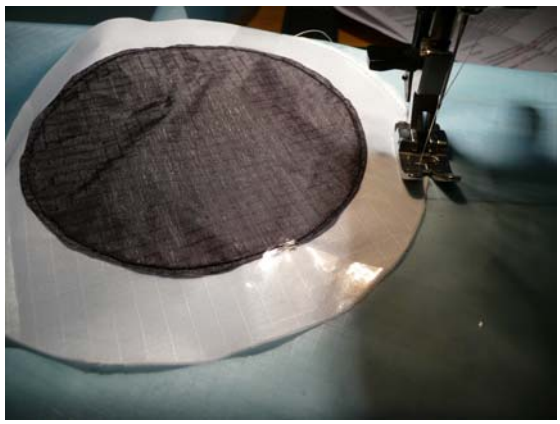
On each of these ribbons you sew a piece of black line, approx. 25cm/9.8in long. Cut the ribbons diagonally towards the lines and sew those completely prepared whiskers on the side parts, in the position indicated on the pattern. Make a knot or a welding bead at the end of each line. Later on the bridle will be fixed to these lines with larkshead knots.

The eyes

The eyes of the baby seals are not three-dimensional; the pupil is simply appliquéd on the white eyeball. Gaze seems more vivid if the pupil is placed a little bit off-center. In this way you can specify the line of sight.



Sew the finished eyes on the side parts, in the appropriate positions.



A lap seam is sufficient for this, but you should not get to close to the seam while cutting clear.

The fore flippers

Take a dark and a light part of the fore flippers, put them on each other and sew them together from the front edge to the tip.

Stitch on a reinforcement line while closing this seam. Add two more reinforcement lines diagonally to the first one for the bridle points.

After this close the rear side of the flipper with a plain seam.

When you turn the flipper inside out, it is ready to be sewn into the side part of the seal.

To make sure everything fits, measure the circumference of the flipper and compare the result with the mark on the side part. Inaccuracies of the cut or the seam can be adjusted this way.

If the measurement is correct, the hole in the side part can be cut out along the mark and you can sew in the flipper.

The ears

In nature it depends on the subspecies if a seal has some externally visible ears or not. In our case it's a matter of taste !

If you like to have some ears on you seal, sew the first half of each ear to the appropriate positions on the side parts.

The second half will be sewed on the back part afterwards.

Everything o.k. so far ?
So we ended with the side parts and we will continue with the belly.

The belly

First connect the two light parts of the belly with a plain seam. By closing this seam, stitch a reinforcement line on it all along the midline of the belly. After this stitch on the diagonal reinforcement lines, according to the plan, leaving about 1cm at both ends of the lines. As soon as the belly is completed, you can sew it to the side parts.

Start at the tip of the nose with the first side part, thereafter sew the second side part to the belly in the same way. The side parts are a little longer than the belly, this is normal.

By closing the seams, a reinforcement line has to be sewn on where indicated on the plan. Where this reinforcement line crosses the overlapping ends of the diagonal reinforcement lines of the belly, we will attach some bridle points later on.

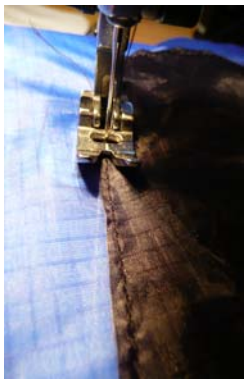
Air inlet vent (mesh)

For the air inlet vent, a soft black window screen out of a DIY store has proved its worth.

Take the two triangular pieces of window screen and put them with the curved sides against each other. Sew them together on a stripe of nylon fabric (the outcome of this is a kind of molded deltoid) and frame the whole air inlet vent with some more stripes of nylon fabric.

Sew some reinforcement lines on the first sew (the one with which you connected both curved edges) as well as on the whole framing around the air inlet vent.

The back



At first sew the nose parts on their particular position on the back part, by using a plain seam.

After this, connect the both back parts to each other. By closing this sew, stitch on reinforcement line in the nose part only.

At the beginning, and the end of the nose, short reinforcement lines are sewn on at a right angle to the other reinforcement line in the nose part.

At these two cross-over points the connection lines to the lifter line will be fixed.

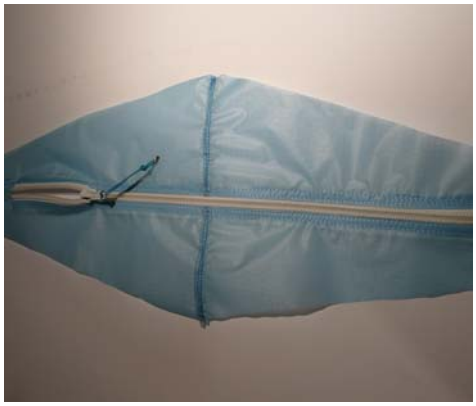
As soon as the back part is completed so far, you can sew the air inlet vent on the appropriate mark.

Very important: sew the air inlet vent with the short sides of the deltoid on the marking line of the back part (green mark on the plan) and fix it at the tip of the nose.

Do not fix the sides of the air inlet vent, because here are the air entrance and the valve flap.

Hind flippers

The hind flippers are assembled separately and then sewn to the body at last.



First sew the zipper (40cm/16in long) centered on the rear profile (the rhomboid one) of the hind flippers.

Then sew on a reinforcement line perpendicular to the zipper, according to the plan. You have to do this in two parts, because the line has to be disconnected at the level of the zipper.

Take the two lateral profile parts and sew them with their curved sides to the lower part (the heart-shaped one) of the hind flippers.

To visualize the correct order of sewing, the vertices are marked with letters. Start sewing at point A to point B. Repeat the same on the opposite site. With the rear profile (the rhomboid one with the zipper) start in the middle at point D and sew to point B. Then resume on the other side.

Do not close the seam until all the profile parts are sewn on the lower hind flippers. Then close it with one seam around.

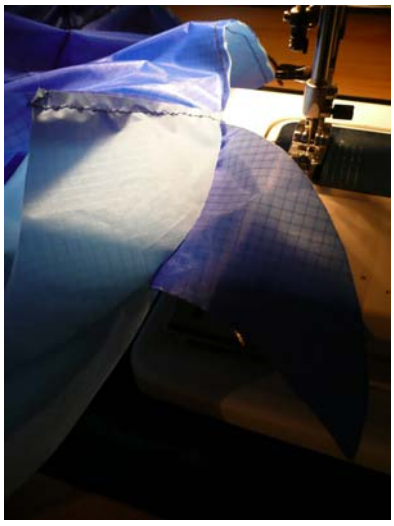
Stitch on a short piece of reinforcement line in the middle at point D. Later on here will be the attachment point for he drogue.

With the upper part of the hind flippers start sewing in the middle, at point C. Sew first to the left, then to the right side.

To simplify the completion of the sewing, a part can be sewn through the open zipper.

Stitch on a short piece of reinforcement line in the middle again, at point C. It will form the second attachment point for the drogue. Now the hind flippers are ready.

Assembly



You are near the end of sewing and the back part can now be assembled to the side parts, start with the first side at the tip of the nose.

In preparing the nose, pay attention that you only sew the stripes of nylon fabric (from the air inlet vent) to the side parts. Do not fix the nylon fabric of the back part (dark color) to the side parts (medium color). The air entrance next to the valve flap has to remain open !

Now you can sew the second half of the ears to the indicated location.

As soon as you finished the first side, you should close this seam at once. The amount of material increases and the last seam is always the most difficult.

On the second side it is advisable to sew the first half of the seam, close it at once and finish the remaining part with a second seam. Thereafter you can close the second half of the seam by using the opening towards the hind flippers.

Finishing touches

Keep the body of the seal inside out but turn the hind flippers to its right side. If you now put the hind flippers in the opening of the body, all the individual segments should have the same width. This means that the back part fits to the upper part of the hind flippers and the side parts have the same width as the side profiles. If it doesn't fit, the body has enough fabric to make some adjustments. If needed add some fabric or make some small darts.

Everything o.k. by now ?

Now here comes the very last seam of the Robby-Baby: interlink the hind flippers to the body. The hind flippers are remaining inside the body like they are. Sew around in a circle. To close this seam you have to pull the hind flippers out of the body, open the zipper and sew through this opening.

Now you're up to the most exciting moment: pull the whole body through the open zipper and turn it to its right side. Before continuing with the bridle you can already inflate the Robby-Baby with a fan, ventilator or hair dryer as a trial.

The bridle

First you prepare the starting points for the bridle out of a 50kg/110lb line. Take a thick darning needle or a bodkin and puncture the fabric as near as possible to the crossings of the reinforcement lines. Pull the line through the fabric and knot a short piece of approx. 10cm/4in to a loop. Later on the bridle will be fixed to these loops with larkshead knots.

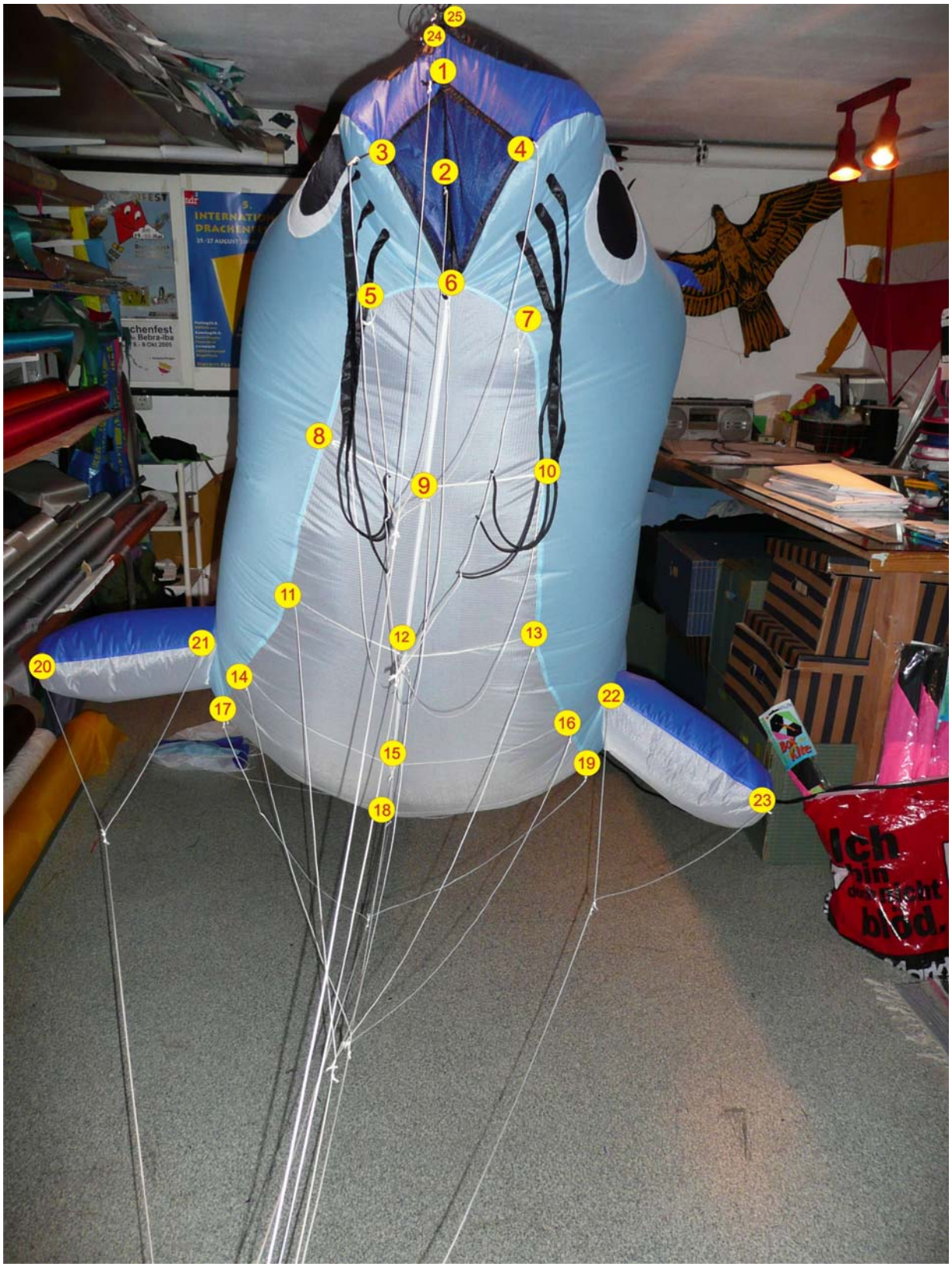
The compound bridle is staggered into lines with different breaking load. Near the body it starts with 23 lines of 30kg/66lb, followed by 7 lines of 50kg/110lb. Those lines are summarized by 3 lines of 70kg/154lb. Those three lines merge into a short piece of a 100kg/220lb line.

All the bridle lines get a knot at one end and a loop to form the larkshead knot at the other end. This is the easiest way to connect one part of the bridle to the next and in addition you are able to adjust the settings thereafter at any time if needed.

The plan shows the bridle from top to bottom, starting with the bridle points attached to the head, then the lower ones of the belly and the flippers. All measurements of the bridle are net, which means that you have to add approx. 10cm for the knot and the loop in each case.

Attach a piece of line (1 piece of 40cm/16in or 2 pieces of 20cm/8in) to the 2 bridle points on the nose, to hook onto the lifter line.

Attach two short lines at the hind flippers on which the drogue will be fixed.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The drogue

All three colors of our seal can be found in the six parts composing the drogue.

You should cut the parts with a hot cutter to save yourself the trouble of seaming.

Stitch the parts together in the preferred order (colors) and attach six lines of approx. 30cm/12in to it.

Connect the drogue with a 2m/6.6ft line to the attachment point at the hind flippers.

If you want, you can sew a small storage bag. Sew a rectangle of 30cm/12in x 50cm/20in on a circular base (the template of the eye matches), close the side and make a seam for the cord to tighten the bag.

Now your baby seal is ready for its first flight. Of course it makes it much easier if you hook Robby into a lifter line.

It takes some time till the small Robby is completely inflated.

Normally the bridle should be o.k., but because of the tolerances of sewing and knotting it may be necessary to adjust it a little bit. After peewee has been hanging into the wind for a season, the fabric, and the lines will be distended. Depending on the line, the larkshead knots of the bridle tend to loosen in the beginning. As soon as they have been under pressure the first time, this won't happen any more.

If everything is o.k., you will take much pleasure in flying your Robby-Baby without a lifter in steady winds. Depending on the wind strength a flying line with a breaking load of 70-100 daN will be sufficient.

Enjoy the pleasure to build it and let it fly at the beaches and fields.

We appreciate your comments on the plan and we'd love to get some pictures of your Robby.

Questions and contact to the author: info@drachenbernhard.de.
For more pictures and details have a look at the homepage: www.drachenbernhard.de

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