

# A *white* sail for Edmond Dantes

Making a new junk sail, then rigging and test-sailing it in the summer of 2012

## Part one

### The construction of the sail



..ED in June 2011...

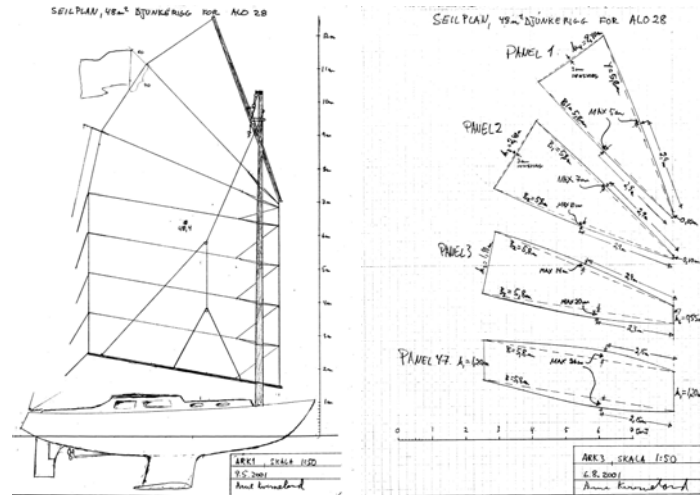
*Edmond Dantes* is a 9.47m /4-ton Mikkel 32. As early as in 2006 she received a new junk rig. Recently the boat changed hands, and since the blue sail was needed on another boat, *ED* simply had to have a new one made. Unlike when the old sail was made, the new owner, Håvard Hjertvik, and I decided to do the job ourselves, this time. We constructed the sail in their living room, over 5½ days in early June. All the following photos are from that job.

#### Sail plan

This rig is a copy of my Johanna's 48.4sqm sloop rig ( see diagrams later), so the new white sail should be very similar to the blue one on the photo above. The only difference is that we decided to increase the camber in the 4 lowest panels from 8 to 9%. This is because *ED* is nearly a ton heavier than Johanna so could need a bit more muscle in light winds. Since we have plenty of experience on how Edmond compares with Johanna on the fjord, this little change will hopefully give us some answers about speed and pointing ability.

## Setting to work

Those who have read about how the sail of my 5.5m Oslo-dinghy, *Broremann*, was made in the “*Small is Beautiful*” write-up from 2009, will find that we stuck fairly closely to the same procedure, even though this sail is almost 5 times the area. In other words we used the methods as described in the “*The Cambered Panel Junk Rig, Chapter 5, Making the Sail*”.



..sheets 1 and 3 of Johanna's sail plan. You'll find the complete sail plan in full size in the appendix...

## Day one. Getting started.



.. Håvard working at the template for the lower panels...

With the sail plan in hand, we started with making a template from which to cut panels 4 – 7. A 20 by 20mm wooden spline was used to construct the needed *round* (see note below). To achieve the desired 9% camber, the max round was increased from 26 to 30cm. The max camber point is 37% from the luff. Care was taken to let the aft 40% of the round run as a straight line.

**(Note: The *round* is defined as a convex curve at the edge of a sail - or here at the edge of a batten panel. The *hollow* is a concave curve...)**

(.. as can be seen, the floor has been covered with a layer of plywood to let us use nails and staples...)



.. making use of the template...

(above) We cut out the batten panels with the canvas running parallel to the lowest batten in each panel (in all the panels, in fact). Since the lower batten panels were 184cm high, including hems and rounds, and since the canvas only was about 164cm wide, we added a little half-lens shaped piece, slightly over-size, before putting the template on top of it to draw and cut out each panel. There will be some waste of cloth by using this method, but canvas is cheap while time was precious.

(.. the canvas we used was the 6.5US-ounce, Odyssey III, a coated polyester, rip-stop, woven stuff, meant for awnings etc. The coated side is a bit shinier than the other one and is also difficult to write on. We took care to make all the panels (and pockets too) with the un-coated side facing up on the floor. This is the mast side and also the starboard side in this case...)



.. the end of the beginning - only 6 panels left to do, plus a lot of details...

**Day 2.** During Day 2 we cut out all the lower panels and also joined panel 7 to panel 6. We were keen to get the lofting and cutting of the panels finished to get more room for handling the masses of canvas during sewing, so now we went ahead with lofting panel 3.



**.. template for panel 3, the transition panel. We were not planning to store the templates so now we re-cut the one we just had used to make the shape of panel 3...**



**.. panel 3 ready. Only a little triangle had to be added at its top corner. These added bits were all triple-seamed with just flat seams. Luckily not much canvas ever had to be put under the arm of the sewing machine...**

**Day 3.** During day 3 the two top panels were lofted and cut out. These too had a corner added. Since these panels start as triangles (see Sail Plan Sheet 4 with comments), it is easier simply to mark up the 3 corners with nails and then run a string around these nails. Then the very modest round could be added, as per Sheet 3 in the sail plan.



.. Håvard cutting out the top panel. No template needed...



.. here panels 1 – 3 have been assembled. This is step one in the *Amateur Method B* in the “...*Making the Sail*” chapter. Before that assembly job, the outer edges of each panel had been given a simple 20mm hem. Later the webbing boltrope was fitted...



.. the first webbing boltrope being sewn on. This webbing was much firmer than the one used on Johanna's blue sail so I hope that it will not stretch. If it does, I will hand-stitch on a stiff bolt-rope to the reverse side of the sail...

With all the major cutting done (not counting the pockets and the “*pocket-gap cover strips*”), we could start on the detailed work. The plywood floor was now removed.

**Half-finished. The procedure from here was like this:**

We worked with and finished the sail, in two sections to minimise man-handling the canvas. Only when the sections were completed, were they joined together along batten 3, and the last bits fitted.

**(BTW, I count battens and panels from top, PJR-style)**

- With the panels of the two sections assembled along the battens, the next thing were the “*pocket-gap cover strips*”. As can be seen on Sail Plan Sheet 6, the batten pockets terminate 20cm from the sail's edges, and there is also a 20cm gap between the fore and aft batten pocket at each batten. Unless covered these would show a raw edge and the critical panel-joining seam would stand unprotected against sun and chafe. We therefore fitted 30cm long strips over these sections before fitting batten pockets and webbing.
- Then the webbing boltrope was sewn along the edges (50mm seat belt webbing).
- After this the batten pockets were fitted as per step two in *Amateur Method B*.
- With the batten pockets in place the main webbing loops for the batten ends were fitted at luff and leech. By inserting a piece of 50mm tube into the pockets, it was possible to get the position of the loops just right.
- Then there were all the smaller white loops at each batten end and along the boom and yard, not forgetting the loops at the corners of the sail. No metal grommets were used anywhere.

Back to the photos...

**Day 4:** Fitting more details...



**..here an aft batten pocket is being stapled on before the whole lot is dragged to the sewing machine...**

Since we had no double-sided tape, we used staples for holding the seams together. This method worked well because we didn't have to work far from the edge of the sail at any time. Note that the *pocket-gap cover strip* is already in place here, protecting the panel joining seam.

Day 4 was definitely *the batten-pocket day*. This was a slow and tedious job as the pocket seam had to fit exactly (..well..) on top of the panel joining seam. This was one of the few places I needed the ripping needle a couple of times. The aft pockets were from the same material as the sail, so the black stitching below could just be discerned, which helped a bit. The forward batten pockets, those at the mast, were of thick PVC, so here we just had to hope for the best...

**Day 5.** Making and fitting more pieces - a sail is really just a big puzzle.



.. skipper Håvard and deck girl Silje busy with making the last batten pockets...



.. details at the luff of batten position 6...





**.. this *quadruple-stitched* loop was fitted to the peak...**

**Day 6, the final day**



**.. the first job this day was to join the completed upper and lower sections along batten 3...**

Even this job, sewing in the middle of the sail, required no cloth to be rolled up and passed under the arm of the sewing machine. Still, just hauling around the whole sail started to feel like *work*. I no doubt will stick to the method of finishing the sail in two sections first, and then finally joining them the last day.



.. here the upper and lower section have been sewn together.

The jobs left to do were: to fit three *pocket-gap cover strips*, two batten pockets, make a good joint of the overlapping boltrope webbing, fit two big and two small loops at luff and leech...

..and then...

**Job done!!!**

Phew, that took us 5 ½ days! Now let's have a walk around it on the lawn:



**.. they always look a bit like that on the floor, in particular when sewn with cambered panels - and this one is so WHITE!!**



**.. the head with its small loops for tying to the yard...**



.. the throat area. Compare it with the photo on page 5...



.. the tack. Small loads here so only light webbing is used for the loop...



.. the clew and lower leech. Here too I used a light webbing for the hoop...

**NOTE:** As with Johanna's and *ED*'s blue sails (see p.1) the foot of this sail has been shortened 25cm at the clew to avoid the sheet tangling when the sail is reefed.



.. viewing up along the leech of the upper section...



..until we are finally back at the peak...

The peak no doubt takes the hardest strain. However, because of the way the battens and boltropes make up the framework in a junk sail, there is no need for reinforcing patches even here. The forces are taken by the boltrope, while the sail cloth is only there to collect the wind and pass its force on to the battens, boom, yard and boltropes.

**Finally...** that was it for now. **Part Two** will cover the rigging and tuning up of the sail. I can already say that it looks good - so stay tuned!

Stavanger, 4<sup>th</sup> July 2012,  
*Arne Kverneland*

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**PS: Many thanks to Annie Hill for proof-reading this text for me.**



.. Cheers from two fussy amateurs...

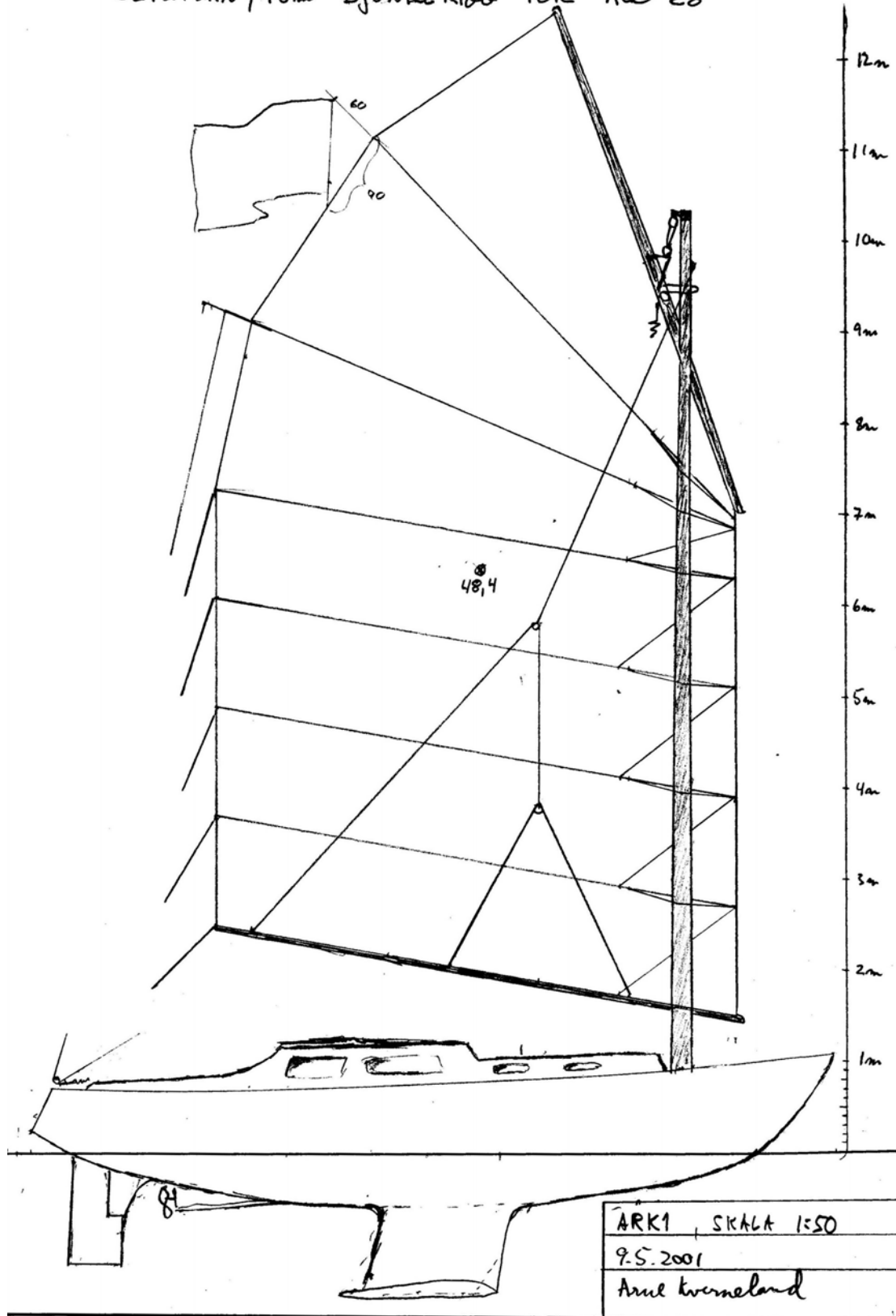


...and a dependable workhorse...

# Appendix; The Sail Plan (..with some comments...)

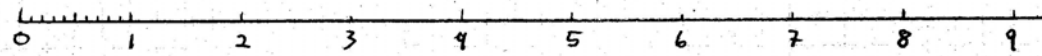
Sheet 1

SEILPLAN, 48m<sup>2</sup> BJUNKERIGG FOR ALO 28



SEILPLAN, 48 m<sup>2</sup> DJUNKERIGG FOR ALO 28.

[m]



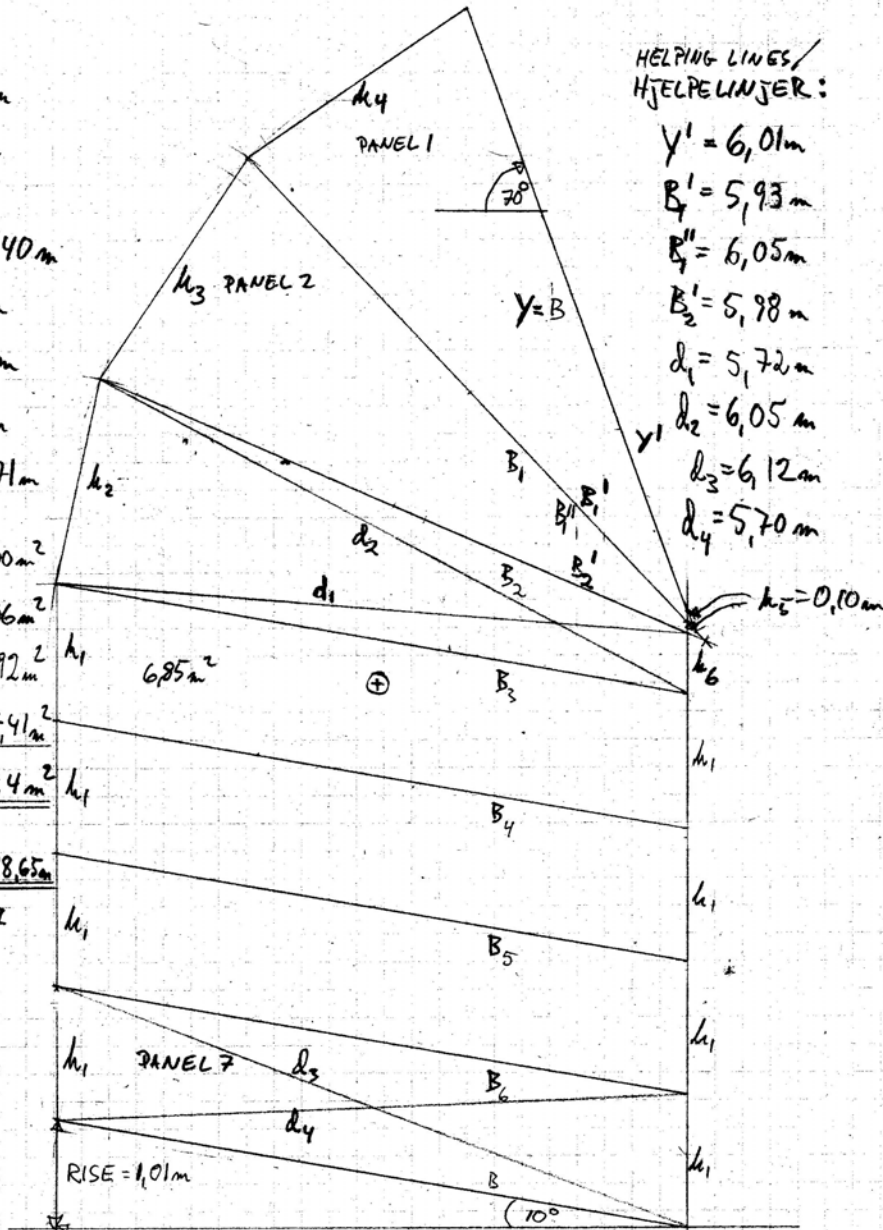
$B_1 - B_2 = B = 5,80 \text{ m}$   
 $h_1 = 1,20 \text{ m}$   
 $h_2 = 1,90$   
 $h_3 = h_4 = 2,40 \text{ m}$   
 $h_5 = 0,10 \text{ m}$   
 $h_6 = 0,55 \text{ m}$   
 RISE = 1,01 m  
 GR. LJ = 5,71 m

PAN 1 = 7,00 m<sup>2</sup>  
 PAN 2 = 7,06 m<sup>2</sup>  
 PAN 3 = 6,92 m<sup>2</sup>  
 PAN 4-7 = 27,41 m<sup>2</sup>  
TOTAL = 48,4 m<sup>2</sup>

OMKRETS = 28,65 m  
 AR = 1,87

HELPING LINES/  
HJELPELINJER:

$Y' = 6,01 \text{ m}$   
 $B_1' = 5,93 \text{ m}$   
 $B_1'' = 6,05 \text{ m}$   
 $B_2' = 5,98 \text{ m}$   
 $d_1 = 5,72 \text{ m}$   
 $d_2 = 6,05 \text{ m}$   
 $d_3 = 6,12 \text{ m}$   
 $d_4 = 5,70 \text{ m}$



GRUNNLINJE = 5,71 m  
(BASELINE)

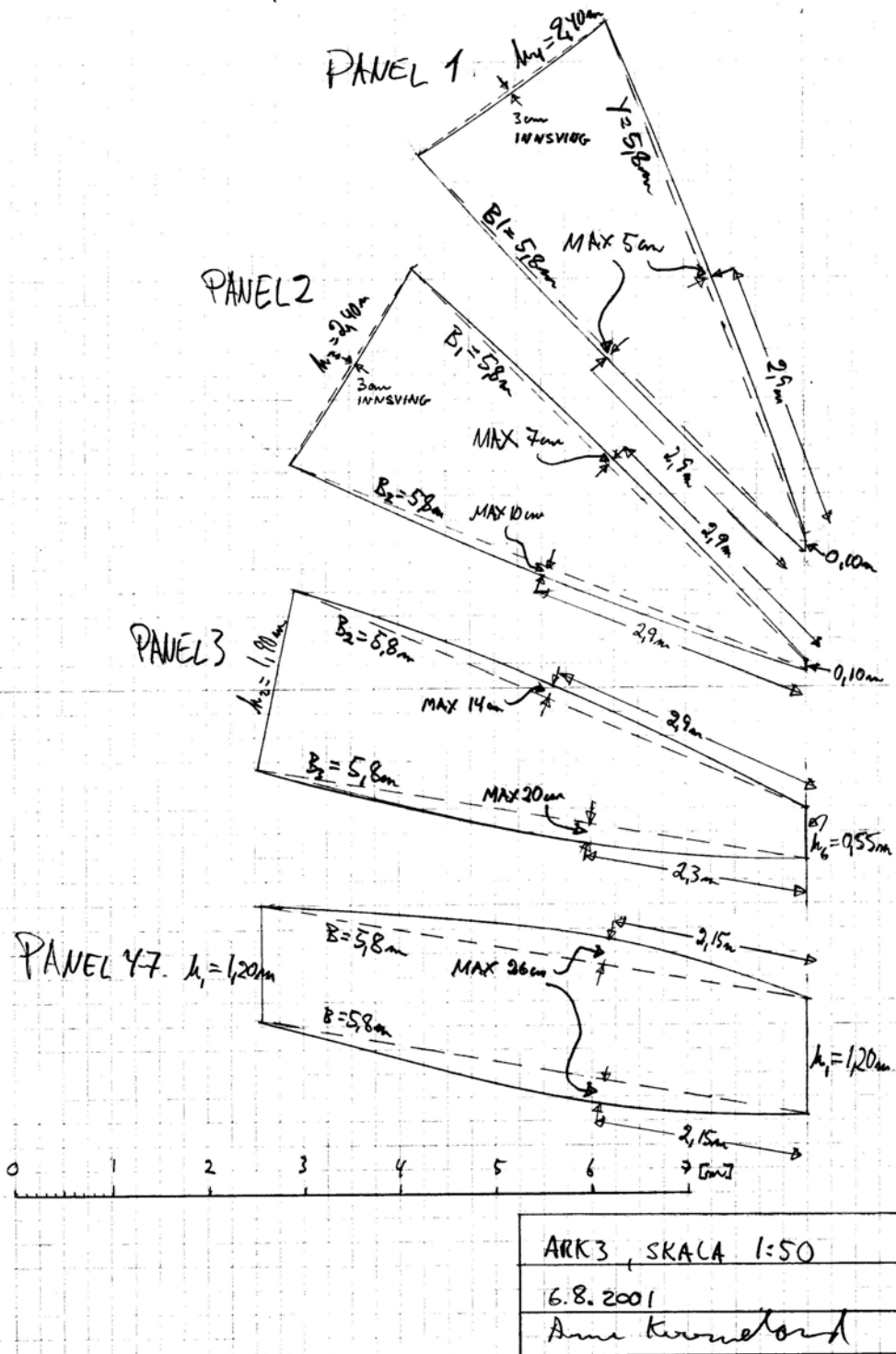
ARK 2, SKALA 1:50

9.5.2001

Aune Kverneland



SEILPLAN, 48m<sup>2</sup> JUNKERIGG FOR ALO 28



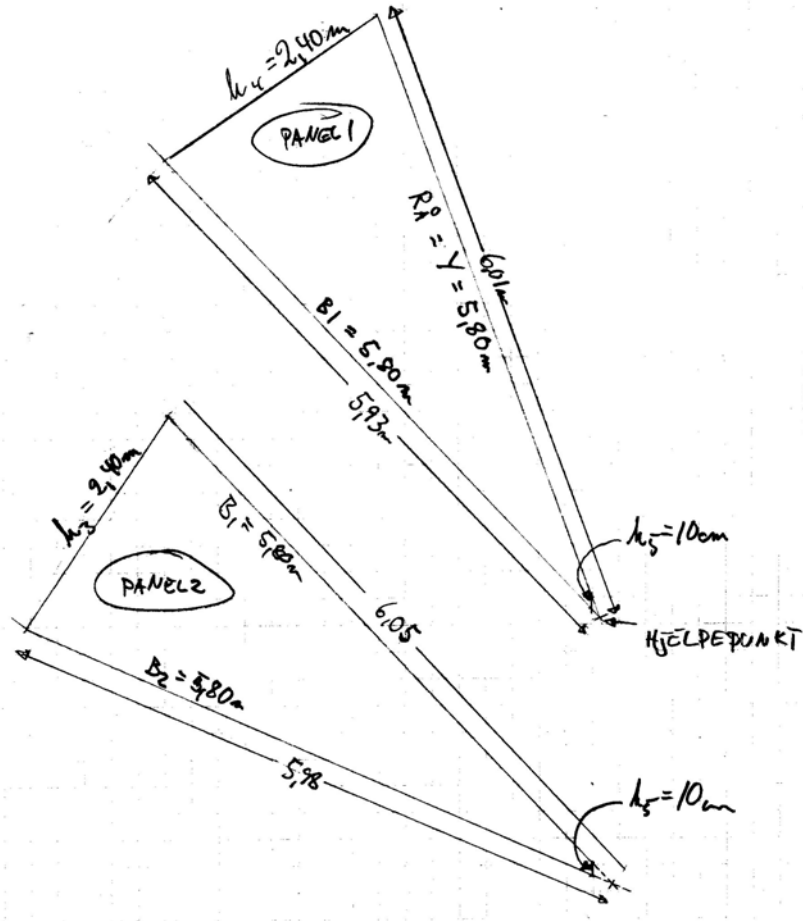
**NOTE:** On Edmond Dantes the 4 lower panels had the round increased from 26 to 30cm to achieve 9% camber instead of the 8% in Johanna's sail.

Also, in Panel 3 the upper round was adjusted to 10cm and the lower to 24cm in order to make the panels easier to join. When we finally assembled the whole sail along batten 3, it was easy to make the adjoining sides (30cm versus 24cm round) fit.

Sheet 4

SEILPLAN, 48 m<sup>2</sup> DJUNKERIGG FOR ALO 28

[m]



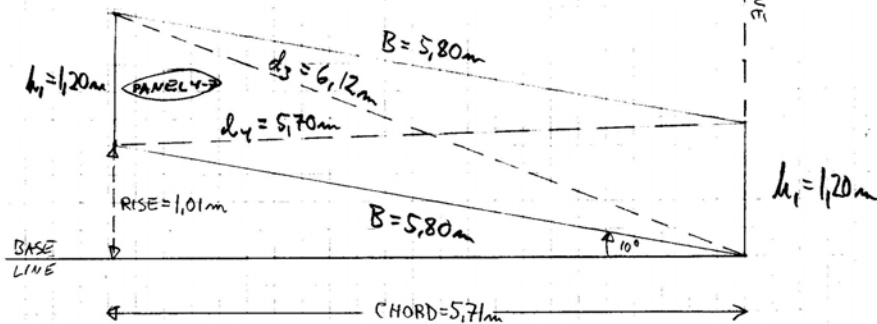
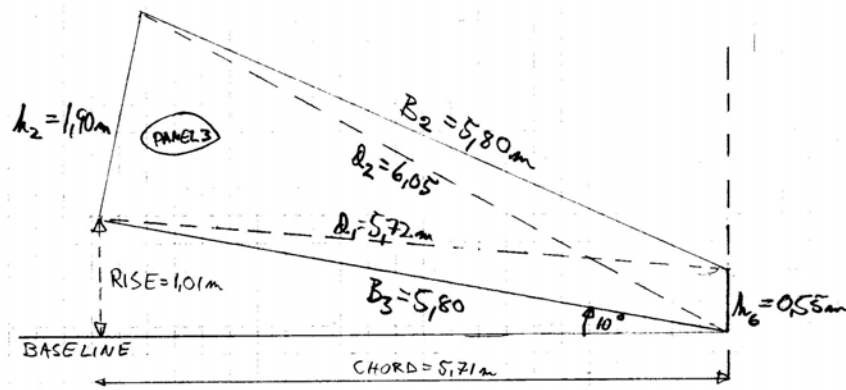
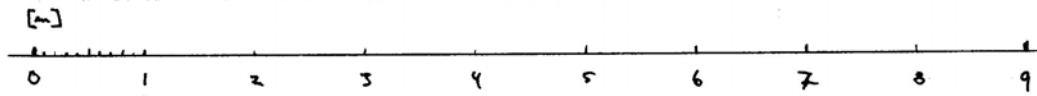
ARK 4	MÅLSKISSE PANEL 1-2
6.8. 2001	
Anne Kvamland	

These almost triangular panels are lofted in 3 stages.

- 1) First loft a triangle, using the illustrated guide lines ( 6.01m and 5.93m in panel 1).
- 2) Then mark up the actual length of the yard and batten 1 (5.80m), and cut off that little triangle.
- 3) Finally the designed round (see sh. 3) is added, using a bendy batten ("spline").

This method can be used either to make a template or by drawing directly on the cloth.

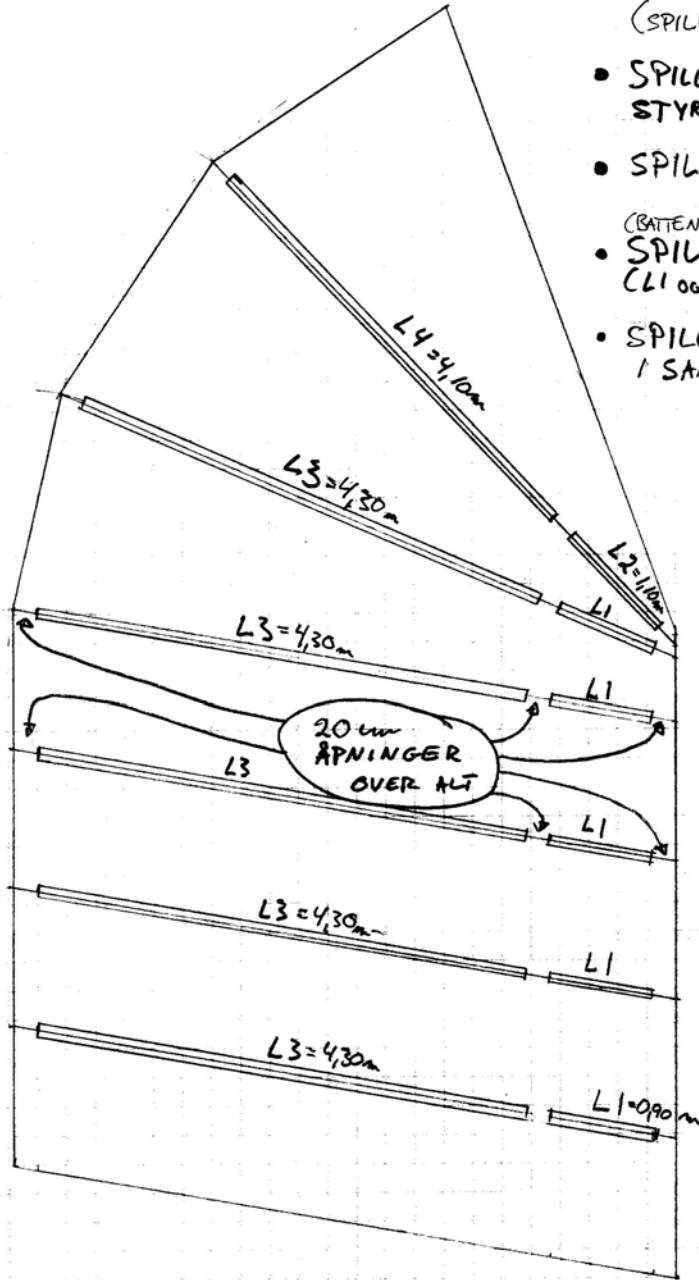
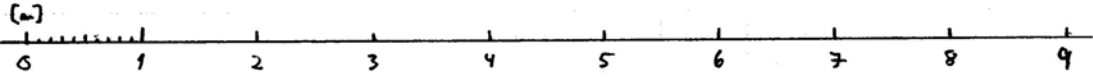
SEIL PLAN, 48 m<sup>2</sup> DJONKERIGG FOR ALO28



ARKS	MÅLSKISSE PAVEL 3-7
6.8.2001	
Anne Kromland	

**Note:** To make the patterns for these panels I used the luff, baseline(chord) and rise to find three of the corners. I never used those diagonals as I didn't trust their accuracy: If CAD is used, they will be much more accurate and then useful. On the other hand, the shown rise and chord were calculated using *sine* and *cosine* of 10° so they are reliable.

SEILPLAN, 48 m<sup>2</sup> DJUNKERIGG FOR ALO 28



(SPILE = BATTEN)

- SPILELOMMER PÅ STYRBORD SIDE AV SEIL
- SPILEDIAMETER: 50 mm

(BATTEN POCKETS)

- SPILELOMMER 1/MAST (L1 og L2) I TYKK PVC-DUK (THICK PVC-CANVAS)
- SPILELOMMENE L3 og L4 I SAMME DUK SOM SEILET

LENGDER:

- L1: 0,90 m
- L2: 1,10 m
- L3: 4,30 m
- L4: 4,10 m

(BATTEN POCKETS)
ARK6 SPILELOMMER
6.8.2001
Arne Kverneland