Junkrig for a Jeanneau 6.6m, Love_Love

By Arne Kverneland, 3.5.2014

When a JRA member searched for advice on how to design a JR for his 6.6m Jeanneau, I found it to be a good, practical exercise and test since I recently had finished chapter 3 and 4 of my write-up "***The Cambered Panel Junk Rig***". I wanted to see how those chapters worked in practice.

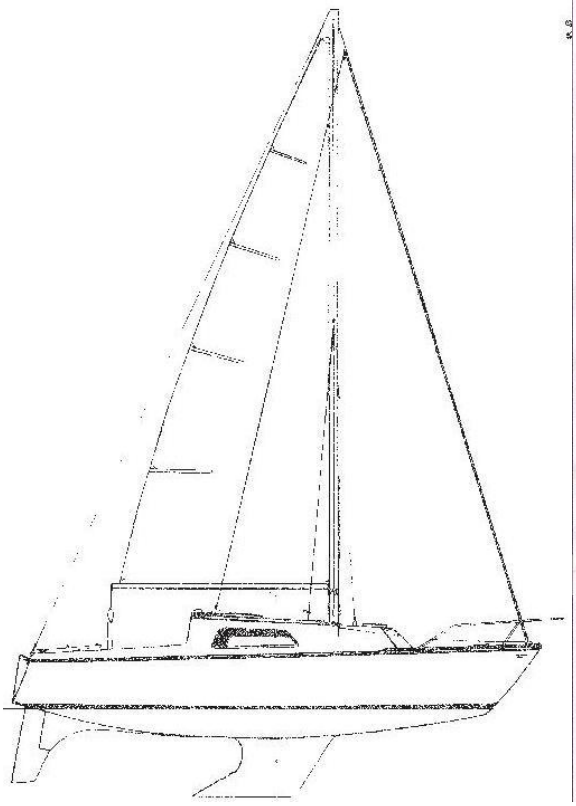

Fig 1a. The original Bermuda rig

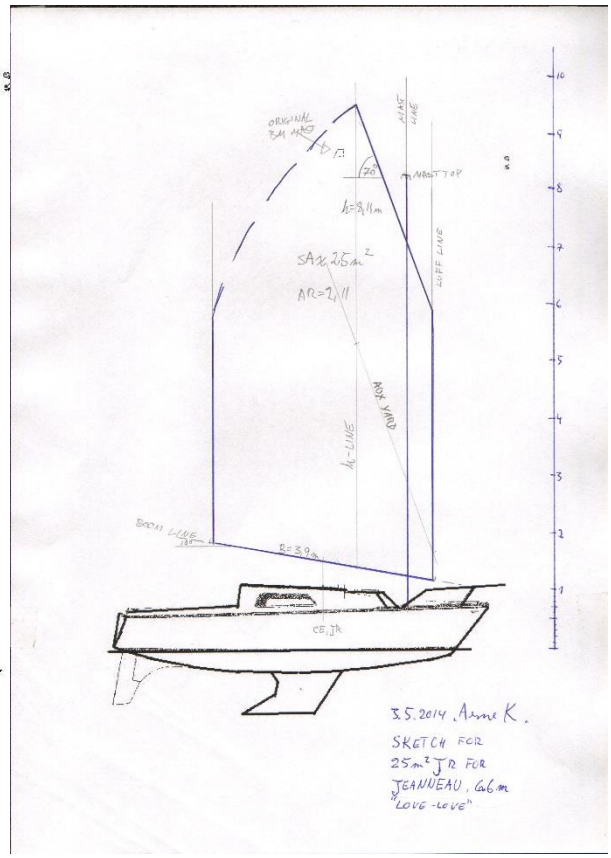

Fig 1b the sketched JR.

Sketching up a junkrig, using chapter 3.

The low-resolution sailplan was printed out to 1:50 scale, after the Bermuda rig had been removed (using Paint).
The sketch (fig. 1b and fig 2) of the JR was done directly on that printout.

With the Chapter 3, page 4 – 6 I just went ahead:

- A CE was decided for, a bit behind that of the Bm rig.
- A vertical mast line was drawn first, near the aft end of the foredeck. This will land forward of the WC in the fore-peak, just as I had it in my 7.1m Albin Viggen, *Malena*.
- A boom line was then drawn with 10° rise and just high enough above deck for the tack end to clear the rail.
- Knowing that the CE of these sails ends roughly above the middle of the boom (see chapter 3), a suitable boom, 3.9m long, was drawn with about 11.5% balance at the mast. On the boat one is free to vary the balance between 5 and 15 – 20%.
- Now the luff and vertical leech lines could be drawn.

- Then it was time for finding where the h-line should go to find the fore and aft position of the peak of the yard. This was done via the tentative (AUX) yard, at the same length as the boom, and with 70° peaking.

Now the little bit of maths was needed. I had decided for a sail area, SA=25m^2 (main + genoa1 of the Bm rig). The question was how tall must the sail be to reach that area (h=?) ?

By using my "Johanna Sail Area Factor"=0.79, one gets:

$$SA = Boom \times h \times 0.79 \text{ and then ...}$$

$$\boldsymbol{h = \frac{SA}{Boom \times 0.79} = \frac{25sqm}{3.9m \times 0.79} = 8.11m}$$

- With this number in hand, the point of the peak could be drawn on the h-line and the 70° yard would find its place.
- The next-to final step was to freehand-sketch the upper part of the leech.

Finally I found the Aspect Ratio...

$$\boldsymbol{AR = \frac{h}{Chord} = \frac{h}{Boom \times cos10°} = \frac{8.11m}{3.90m \times 0.9848} = 2.11}$$

This sketch gives us a clue about how the sail will look like, but gives us no info about each panel and other dimensions than the boom length, and the rise and peaking of the boom and the yard.

Drawing a detailed sail, using Chapter 4.

To get a detailed sail, I went to Chapter 4 to find a master sail with the closest AR to 2.11. This master sail needed to be scaled down so that the boom crimped from 5.077m to 3.90m.

The method (Chapter 4, p.3) was to first find the *Linear Scale Factor*...

$$\boldsymbol{F_l = \frac{Wanted\ boom\ length}{Master\ sail's\ boom\ length} = \frac{3.90m}{5.077m} = 0.7882}$$

..and then the *Area Scale Factor*...

$$\boldsymbol{F_A = F_l^{\,2} = 0.7882^2 = 0.5901}$$

I tried the master sail with AR= 2.10 and its sail area, SA=42.75m^2. Scaling it down with the found SA Scale Factor gave the sail area:

$$\boldsymbol{SA_{(AR=2.10)} = Master\ Sail's\ SA_{(AR=2.10)} \times F_A = 42.75m^2 \times 0.5901 = 25.23m^2}$$

Close enough.

The procedure from here is to calculate all the scaled down lengths and use the new numbers for lofting a new sail.

Since I had the master sails in CAD, I just scaled it down and printed it out. One was printed on a transparent and could be used as an overlay on the first sketch. See figures 2, 3 and 4.

I didn't bother with the matter of camber as this is dealt with in Chapter 4. The needed ***Round*** to get camber (6, 8 or 10%), is just scaled to the right dimension, using the linear scale factor

$$F_l = 0.7882.$$

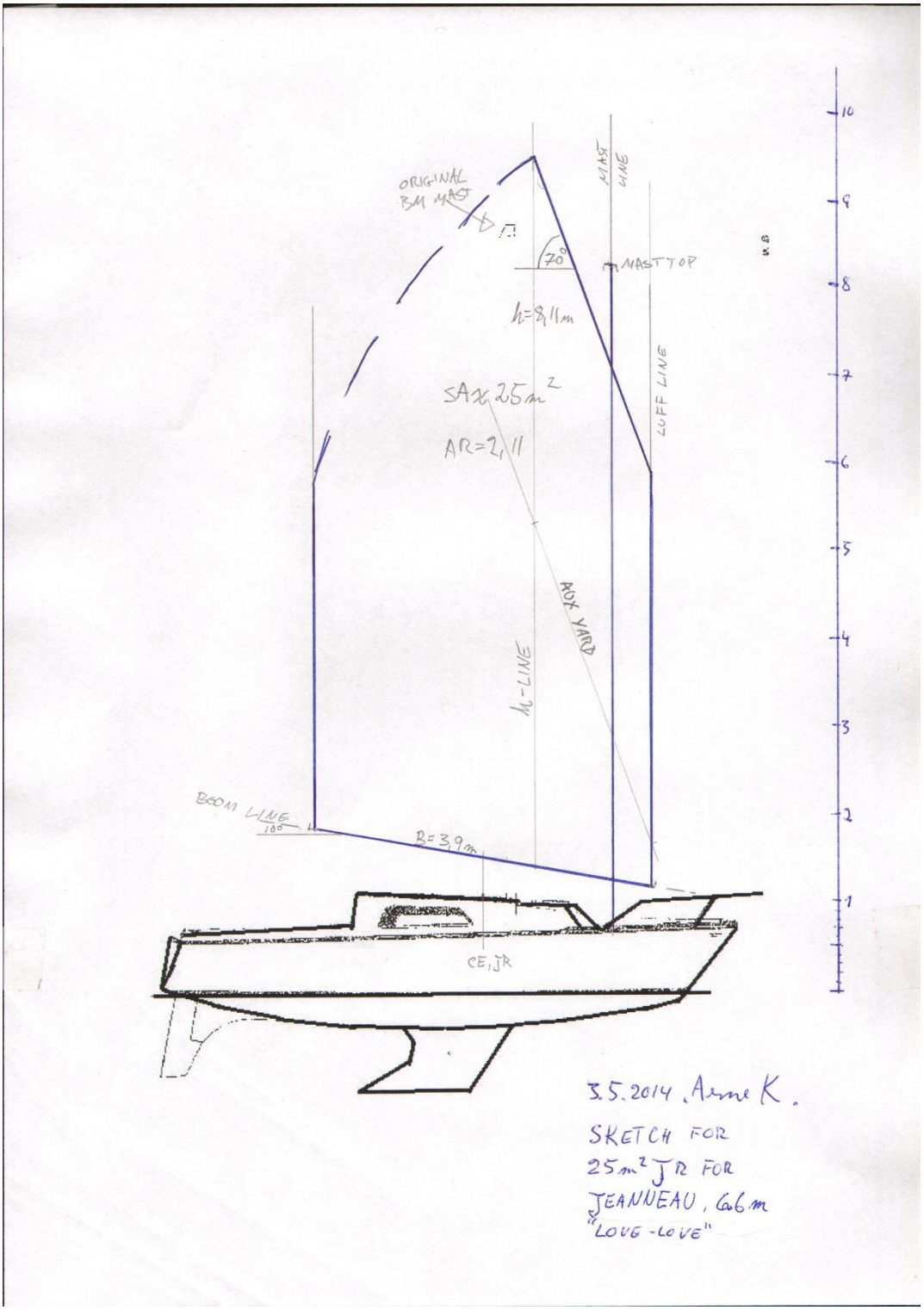

Fig 2. This sketch was made, using info from Chapter 3 of "The Cambered Panel Junk Rig"

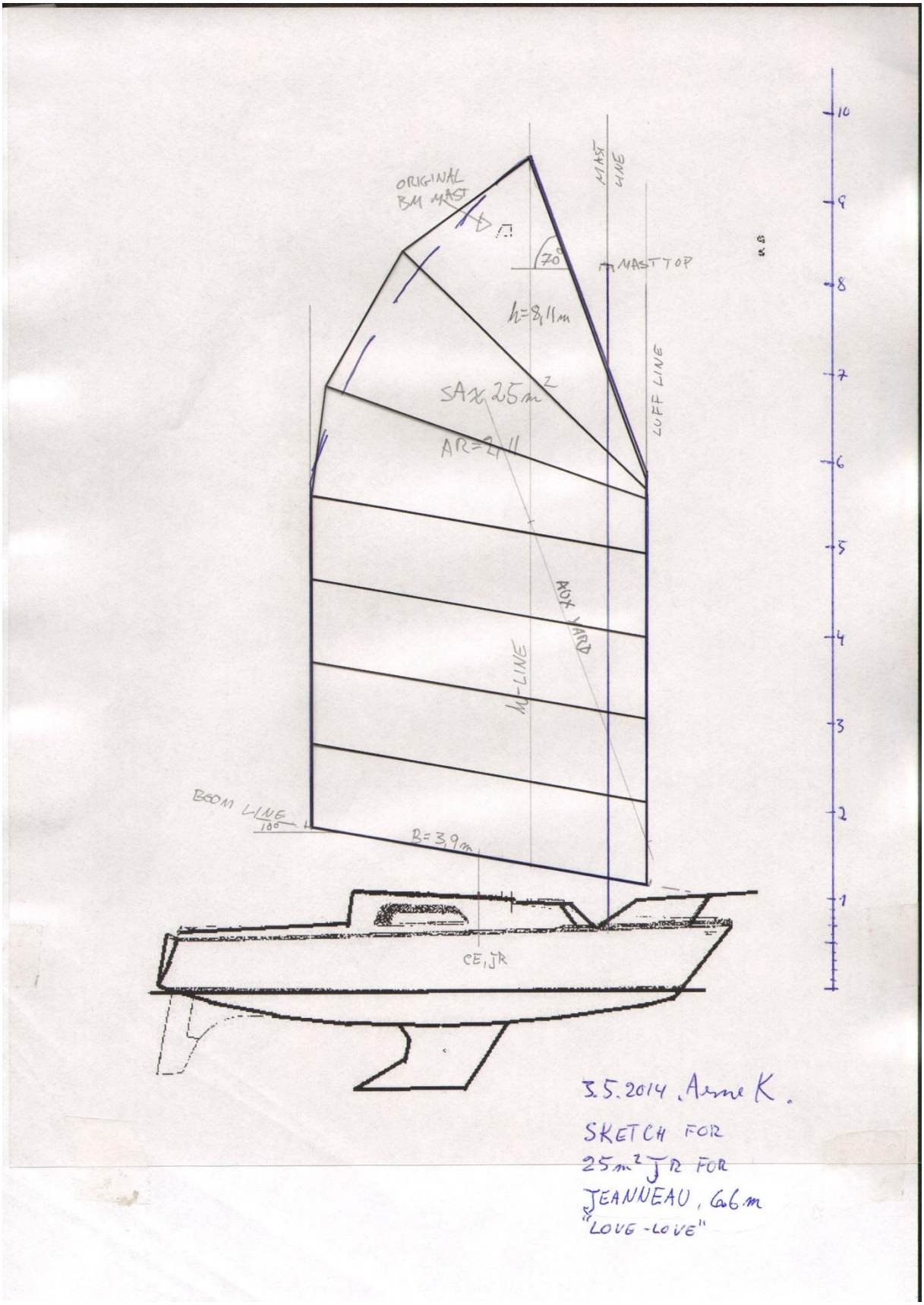

Fig 3. Here a printed out transparent of the scaled down, CAD-generated, master sail (AR=2.10), picked from the Appendix of Chapter 4, has been placed on top of the sketch. As can be seen, they match well.

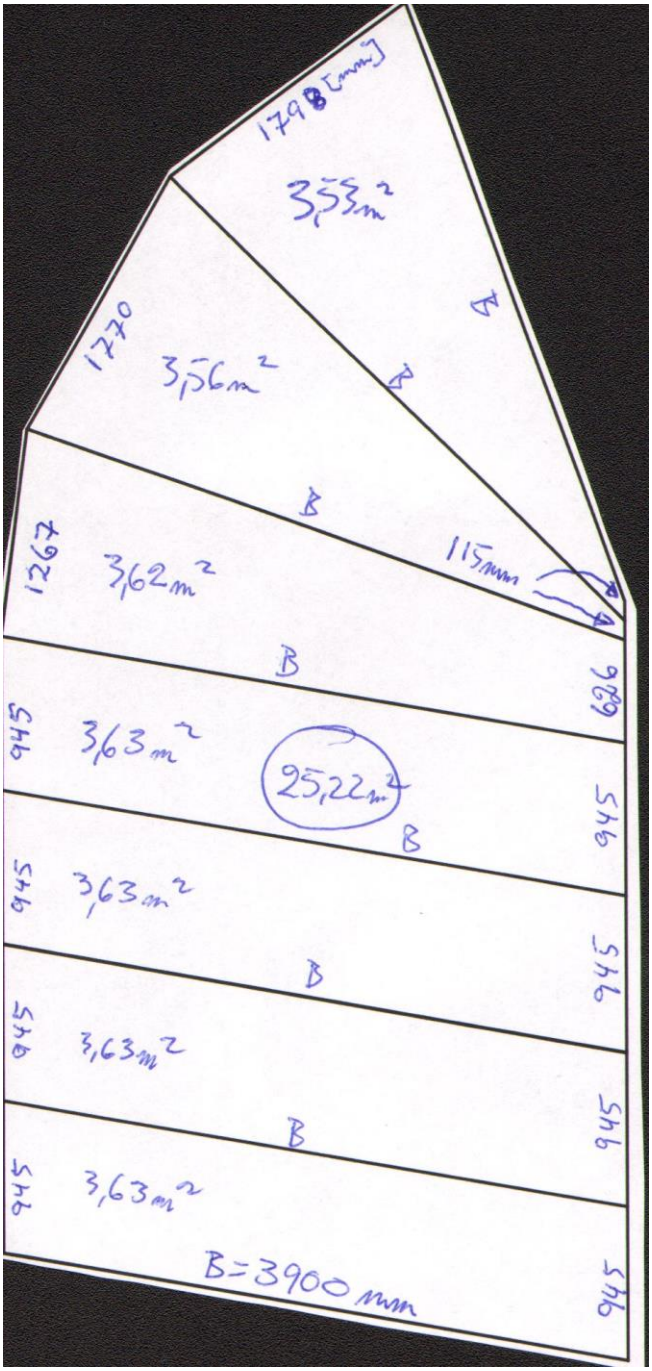

Fig 4. This shows the same 25.2m^2 CAD sail with some basic numbers on it. They have not been double-checked. One will also need to calculate the helping lines as shown on Sheet 2 of all the master sails (Appendix, Chapter 4), in addition to the already mentioned dimensions, needed to create camber. Then one is ready to start lofting the sail.

Stavanger, in haste

Arne Kverneland