Junk Rig for Ingeborg

Another day, another boat

by Arne Kverneland

I didn’t have to do this - converting yet another boat to junk rig. I already have a good boat for my kind of sailing, that is, pottering around within a 10-20 mile radius from my harbour. Frøken Sørensen, a 6.5m dinghy with a cuddy, has served me fine since 2013, and could still do so. However, Ingeborg, or rather, the Marieholm International Folkboat (IF) has always been on my to-do list. I simply had to do it. The reason is not that the IF is such a rare bird. Quite the contrary, the fact that over 3,400 of them have been built is a reason in itself. Besides, the IF is the loveliest of all the boats in the Folkboat category.

The design.

When Tord Sundén designed the IF, back in 1967, he based it very much on his Nordic Folkboat design (NF) from the forties. The original NF was clinker-built, mostly from pine on oak, and when measured, came in at a LOA of 7.68m, a displacement of 1,930kg, with 1,000kg ballast in her long keel. It was given a very simple yet ingenious Bermuda rig, which still lets one trim the mainsail as with modern yachts. The cockpit is nice and deep - and self-filling if one pushes her way too hard. The original cabin is small and dark - and sometimes damp.

With the IF, Sundén switched to GRP, and made the cockpit self-bailing. The length grew to 7.87m, the displacement to 2,150kg and the ballast to 1,250kg, giving a ballast ratio of no less than 58%. The IF is still a trim boat with a rather small and low cabin, but at least it is much brighter inside, and it keeps one warm and dry. Many boatbuilders have tried to copy or improve the Nordic Folkboat, but unlike other NF-derivatives, the IF did not end up as “the big fat sister”. Indeed, she appears longer and sleeker, if anything, and she is slightly faster. Still, by modern standards, I wouldn’t call the IF a really fast boat. Her theoretical hull speed is just about 6.0kts, and if one pushes her up to 7kts, she will dig up an impressive stern wave, so you can forget any dreams about surfing at 10 or 12 knots in her. The Folkboats’ forte is to sail to windward and keep going in conditions when lighter fin-keel designs will struggle. The key to this is the combination of slim lines, heavy keel and big keel area. The long keel may look old-fashioned, but for such a small boat, which is to sail along a rocky coastline, this is a blessing: An IF lets one reef, and then reef more, and will still sail to windward, thanks to her trim under-water lines, her low-windage deck profile, and that big, heavy keel. One can thus deliberately reef conservatively to make life bearable on board, and still keep clear of a lee shore, while on a small fin-keeler one must press on to keep the keel from stalling.

As can be seen, the IF has a big rudder on the stern, and the keel has a cut-away profile at the forward end. This ensures both quick manoeuvring and lets one get away without a bowsprit. In other words, this keel profile combines the best aspects of long keels and fin keels.

The forward rake of the rudder is not accidental. It keeps the rudder from lifting the stern when the boat’s sailing on her ear - which these babies love to do. All an IF needs to be complete, is a large junk rig. That cures the general problem of the Folkboats - that they are a bit under-rigged for light-wind summer conditions.

Enter Ingeborg (June 2014).

When seeing Ingeborg for the first time, she stood out clearly from most of her sisters. I have been on board a number of IFs. Now, around 40 years after they were new, their state of repair varies greatly. Ingeborg was close to the end of a total refurbishment job when I bought her. Her inner lining had been completely renewed, absolutely everywhere, with new window frames and mattresses. All the inner woodwork appears to have been removed, then re-varnished and reinstalled, etc, etc. Same with the outside, including new sails, running and standing rigging. And, nota bene - She was and she still is dust-dry in her bilges, my first boat ever to be that.

The problem was that it took a while before I dared to touch her. Ingeborg actually looked too smart. Any carpentry to her inside, done by me, would ruin her I felt.

So I started on what I thought I knew something about.

Designing the sail

First job was to design a sail plan. As with all my boats, I try to find a place for the mast which results in minimal work and alterations to the interior. I also prefer to step the mast through the flat foredeck if I can. As the deck is strong, little structural work is needed. This thinking inevitably forces the sails to be quite broad, to shift the CE aft, but on the other hand, it lets me set a healthy sail area on a moderately short mast. Such a slop JR calls for a big and efficient rudder - just what Ingeborg has. (See diagram on page opposite). This setup also means that the mast is stepped right through the forward double bunk, but I have decided I can live with that. The thick wooden masts I have had on former boats certainly took up

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some space, but they were warm to the touch, so did no harm. The aluminium mast for Ingeborg takes up less space, but feels very cold and hard, so I guess I will make a sort for jacket for it, some day.

The resulting sail plan shows a sail of 35.2sqm, which gives a sail area to displacement ratio of 21.5 or 16.4sqm/metric ton. Perfect for coastal summer cruising. Ingeborg’s sailplan is the first I have made which is based on one from my range of master sailplans; the one with AR= 1.90. I simply followed my own instruction in Chapter 4 of The Cambered Panel Junk Rig (TCPJR), and scaled the master sail down until the batten length was crimped to 4.90m. Apart from using the standard Johanna style sailplan, based on the work of Hasler and McLeod, I used my barrel method to achieve around 8% camber in the horizontal panels. The top panels were as usual cut much flatter, but still with a bit of camber in them. This ensures that the loads are on the luff and leech, which keeps them from fluttering.

I decided to make and finish the sail in two separate sections. The lower section consisted of all the parallelogram panels (4-7) and then there was the top section (panels 1-3). I started with the lower section.

Job number one was to move away some furniture to give room for lofting. I have found that making paper templates for the panels makes sense, even in the top panels, where they can only be used once. As photo above shows, the canvas (Odyssey III) was wide enough to cover the lower panels. I always cut the templates to the net size of the panels, and allowance for hems etc. is then drawn onto the cloth before cutting.

When panel 7 had been cut out, I could re-use the pattern for the three others. Actually, I prefer to sew any new batten panel onto the previous one before I cut out the next, although it may be more efficient to do all the cutting in one run. Thanks to the use of my Amateur Method B; a simple tailor’s seam, the heavily rounded panel edges are easy to sew together (photo below).

![Diagram showing Ingeborg’s original rig and the new sail plan](image1)

![Template made and rolled out to mark up the lowest panel. The cloth was by chance just wide enough.](image2)

**Constructing the sail.** (I suggest you look up TCPJR, Chapter 5)

Just as for the sail of Broremann and Frøken Sørensen, I made Ingeborg’s sail in my living room. It surely was a squeeze, this time.

![Joining two panels along the batten, Using an ordinary tailor’s seam. This, being a part of the “Amateur Method B” saves pushing lots of cloth under the arm of the sewing machine.](image3)
I just have to use a stapler for basting those edges together first (Photo above). And, yes, I fit a simple 20mm hem along the outer edges before joining the panels along the battens.

With the lower section assembled, but with no finishing details added yet, I wrapped it up and put it aside (photo below).

Before starting on the top section, I had a go at producing batten pockets (photo below).

The procedure for making the top section was much the same as for the lower one, with two exceptions. Since each panel differed from the next, I had to make three different patterns. In addition, I had to add some cloth to the upper corner of each panel (photo below). For this, I found it very useful to have the template ready. That let me add a slightly oversized patch to the cloth, before putting on the template again, marking up the panel, adding for hems etc. and then cutting it out. Note that these little corners were the only cloth that had to be passed inside the arm of the sewing machine. I find this to be the main advantage with my primitive amateur’s method of sail construction.

The after pockets were of the original sail canvas, while the foreward pockets at the mast were of thick, white PVC. The pockets came in two sizes as the two upper battens were of thicker section than the lower ones. There was also another set of canvas strips produced - the pocket gap cover strips (photo below). These protect the raw edges of the panel joining seams where there are no batten pockets.
Soon the top section was assembled (photo below).

Before racing through the fun and easy job; triple-stitching on the webbing type boltrope, the pocket gap cover strips were carefully positioned and sewed on. I try to get that seam right over the panel joining seam. Then the webbing boltrope is added, and the peak loop (photo below).

Luckily, there was still a lot left on the webbing roll... (photo below)

As the more serious loops were to go on, I again erected my temporary table, to cut out and fuse all the big and small loops (photo below).

The batten pockets also had to come on before the batten end loops could be fitted. This is a quite critical job: A minor error can result in a tight spot where the batten will not pass through, so all pockets were checked with a piece of tube of the right size. With the pockets in place and with a batten stub inserted, it was easy to get the big batten loops aligned (photo below).

The very first loop fitted to the sail, at the peak.

The still quite big roll of 2” webbing, ready to make bolt rope and loops from.

Details at the luff, using a stub of dummy batten to align the loops with the battens.

Loops in the process of production.
In addition to the big loops at each batten end, I fitted a smaller, black one which later was to be tied to the batten (photo below). I also fitted such small black batten pockets, cover strips and loops had shrunk - to just the number I needed. The webbing boltropes had been cut with some overlap, so they were stitched up as soon as the pocket gap cover strips had come on. Then - with the last loops fitted - JOB DONE! Needless to say, that is a real hurray moment.

The construction of this 35sqm sail only lasted from 29.12.14 to 13.1.15. I guess I may have spent anything between 40 and 60 hours on it.

So far, so good. Next time I’ll tell you about the mast, about rigging details and how Ingeborg likes her new dress.

Ingeborg’s full sailplan can be found on this page: http://www.junkrigassociation.org/ arne ..where six chapters of TCPJR also may be found useful.

You can also find more photos from the making of Ingeborg’s sail in my JRA member’s album. Be my guest!

loops along the head (and later the foot) of the sail. With these jobs done on the top section, I could bring out the lower section and finish it in much the same way. Then, finally it was time to staple the two sections together along batten 3 (next photo) and sew the two halves together. Now my store of prefab

Detail at the leech, a big and little loop at each batten end.

Stapling together the upper and lower section along batten 3 from top.

The finished sail, all 35.2m² of it, weighing in at 12.4kg

Mission accomplished! (..the easy part of it...)