

# Renovation of Mälär 30 bottom – part 2 of 2.

Linseed oil

Outboard butt blocks

**Splines in glued seams**

**Epoxy primer**

# Cutting the seams open



If you only have a few meters of seam to retrofit, the cost of a special blade for your circular saw will maybe not be justified. With more time (4-6 times) available, you can use a router to get the job done.



Due to the magnitude of this project, we ordered a special blade, made for our 1100 Watt Circular saw. At EUR 670 it was expensive, but worked just perfect. It produce a tapered cut, 5 mm. wide at the tips (bottom of groove) and 6 mm wide 25,4 mm from tip.

# Cutting the seams open

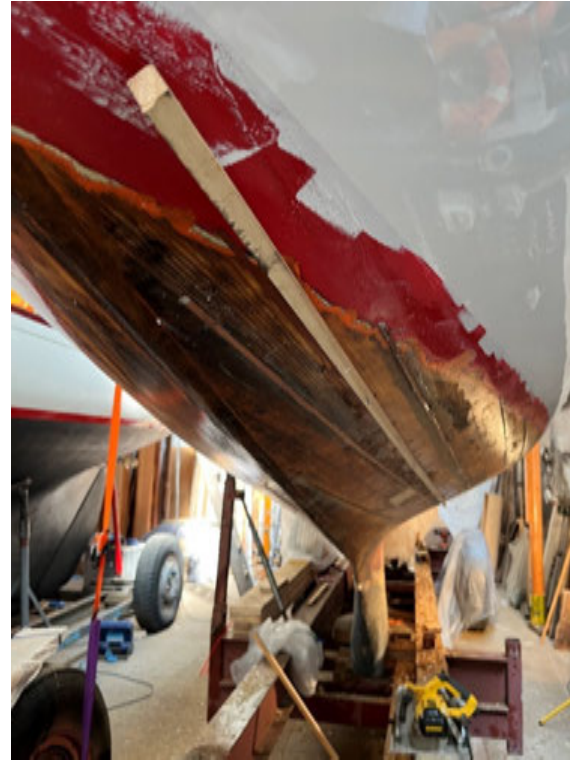


160 running meters of mahogany splines was machined by an external supplier. The spline profile matched the special blade for circular saw.

At delivery, the splines had 9% moisture. To make moisture level match hull planking, I soaked them in fresh water for 4 hours, this got them up to 15-16 %.

We kept them in plastic to keep moisture in - and dirt out.

Before facilitate glue bond, we gently sanded each spline with grit 60 just before gluing.



We started by using a 25x16 mm. battern to guide the saw. This works well the higher up you are on the planking. For work below waterline, we gave it up to save time and accepted a not-so-perfect cut. Consequently we cut all by free hand.

Some seams in the blige sweep, was cut by a small router with OD 6 mm. bit.

# Cutting the seams open

Our planking was 17 mm thick, so we cut 15 mm deep to have 2 mm. planking left as support for the glue.

To cut without support requires a steady hand - and a lot of breaks inbetween 😊.

After some training the cutting speed is app. 1 meter/minute.

We did a total of 112 meter = app. 2 hours of cutting.

If we had to do this by router, we would have spend app. 8-10 hours.

To glue only on fresh wood, we cut only what we could glue on same day.



# Preparation of splines

Each spline was marked as an individual (notice the number on the splines)  
We used masking tape to keep track of how long each spline was and where it shall go.

This is usefull as you are in a hurry, once you have mixed the glue.

To match the rounded end of the groove, splines (2 and 4 on pic.) was given a rounded end where they meet the outer rabbet, and a butt joint where they meet the extention spline that continues forward.



# Glue of splines

Sorry, no good pictures of this stage. This is procedure for one (1) man fitting 1 pc. of 2,4 meter spline in 30 minutes:

1. Mix of 3 pumps of WEST 105 Resin & 3 pumps of 205 fast hardner - stir for minimum 2 minutes
2. Apply glue on spline – reativly quick and easy
3. Apply glue in groove – most time consuming job
4. Mix of 403 filler into the rest of glue, stir for minimum 2 minutes
5. Fill a string of filler mixture into groove. Use a putty knife and be quick so it does not float out before you insert spline.
6. When spline is inserted, tap it gently by a large wooden mallet, and press by hand until filler mix float out.
7. Drill a OD 2mm hole through spline at 45 dg. angle into below plank (see red arrows in picture), then fit a temporery nail to keep spline from sliding out.
8. You need a minimum of one nail in each end.
9. Remove as much excess glue as possible



Remark: You need to be quick to handle 2.4 meter spline in less than 30 minutes.  
If working slower or in higher temperatures, I will recommend hardner 206 slow.

# Glue hardning, nail plugging and fairing

When we glued splines we were at end of april and ambient temperature in HAL16 was 10 dg. Celcius. Therefore the glue with 205 fast hardner would cure without other heat added.

We exchanged the temporary nail with wooden pegs (set in glue) as soon as the glue had set.

We let splines sit and cure for minimum 4 days before we trimmed them flush with planking.

After fairing the splines, we filled the few gaps our not-so-perfect free hand cut had left open, with WEST 403 filler mix.

Note: We ran out of time to remove the glue that had passed to the inside of the planking. We left this job for winter of 2023-24.

It took about 8 hours to clean off the inside.

# Finishing bottom

We sanded the hardened linseed oil bottom with grit 80.

One coat of International VC 2 TAR epoxy coating.

Fairing with mixture of Epoxy from Biltema and WEST 410 microlight (see picture).

Scraping with very sharp skarsten scraper (use a milling file to sharpen)

Sanding with grit 80

Three layers of International VC 2 TAR applied wet in wet.

Let cure for some days

Three layers of International VC 17 applied wet in wet.

Painted the waterline





# Launch day 26-5-2023



26-5-2023 it was finally launch day. It was so late in year that the freeboard had begun to crack open. This will be glued next winter as well as ballast keel will be faired off.



The bottom of the boat was 100% tight. This picture is taken after 2 hours in the water.

# The numbers

Bottom of a Mälars 30 has a surface of app. 15-16m<sup>2</sup>

Length of all seams below waterline is 165 meter.

Stockholms båtsnickeri had previously done 53 meter of seams, this left 112 meter of seams for this project.

# The numbers

	DKK incl. VAT		EUR incl. VAT	
<b>Materials for seams</b>				
Blade for circular saw	5.337		716	
Mahogany splines 2,4 m. 160 m. total	8.789		1.180	
WEST 105 + 205 kits 1 x 6 Kg.	2.526		339	
West 403 Filler 2 x 800 gram	576		77	
	17.228	17.228	2.313	2.313
<b>Materials for butt joints</b>				
WEST 105 + 205 kits 2 x 1 Kg.	960		129	
West 403 Filler 1 x 800 gram	288		39	
Pine wood	250		34	
	1.498	1.498	201	201
<b>Surface treatment of bottom</b>				
Sanding discs and mich. tooling costs	1.500		201	
SELDER Grund olie 8 liter	2.000		268	
WEST 410 2 x 200 gram	756		101	
Epoxy BILTEMA	858		115	
International VC 17M antifoul 3x 2Liter	3.900		523	
International VC Tar 2 3x 2,5 Liter	3.990		536	
	13.004	13.004	1.746	1.746
<b>Grand total</b>		<b>31.730</b>		<b>4.259</b>

# The numbers

Remark: The hours mentioned below is the work of my boat partner Dan and myself. Dan is a very skilled handyman and in good physical condition. I am educated boatbuilder and in OK shape for this job. DO NOT underestimate the phycological effort it takes to keep on going, day after day. I normally worked 1,5 hour at workdays and 6-8 hours during weekends, in the period from october 2022 to may 2023.

	Actual work hours	
<b>Time for work on seams</b>		
30 minutes each 2.4 meter X 112 meter	24	
Seams at blige sweep opened by router	16	
Associated work	24	
	64	64
<b>Time for work on joints</b>		
Remove plugs, rivets, old backing plates	14	
Modify old plugholes, make and glue plugs	8	
90 minutes for each x 14 butt joints	21	
60 minutes for each x 6 mitre joints	6	
Associated work	6	
	33	33
<b>Time for surface treatment of bottom</b>		
Stripping paint	20	
Sanding	20	
Linseed oil heated into wood	16	
Fairing with WEST filler	5	
Scraping and Sanding of WEST filler	6	
Apply 4 layer epoxy primer	6	
Apply 3 layer antifouling	5	
Cleanup, waterline etc.	5	
	83	83
<b>Grand total</b>		<b>180</b>

# End

- Thank you for your attention, and getting this far.
- I hope you will use some of this to preserve our classic yachts.

