Teakdeckrenovation Vagabond 47

The situation before the start of work

Shipbuilding 1981

The teak deck was glued to a 47-foot ketch (Vagabond 47 by Bluewater Yacht Builders, Taiwan) during the construction of the ship in 1981 and screwed every 45 cm. 15 mm strips were laid where the curves were previously cut. The strips were laid with a 1 mm spacer. A 4 mm groove was milled on one side beforehand.

Phillips countersunk screws 4 x 25 mm were used as screws. These were glued in with epoxy and closed with 8 mm teak plugs.

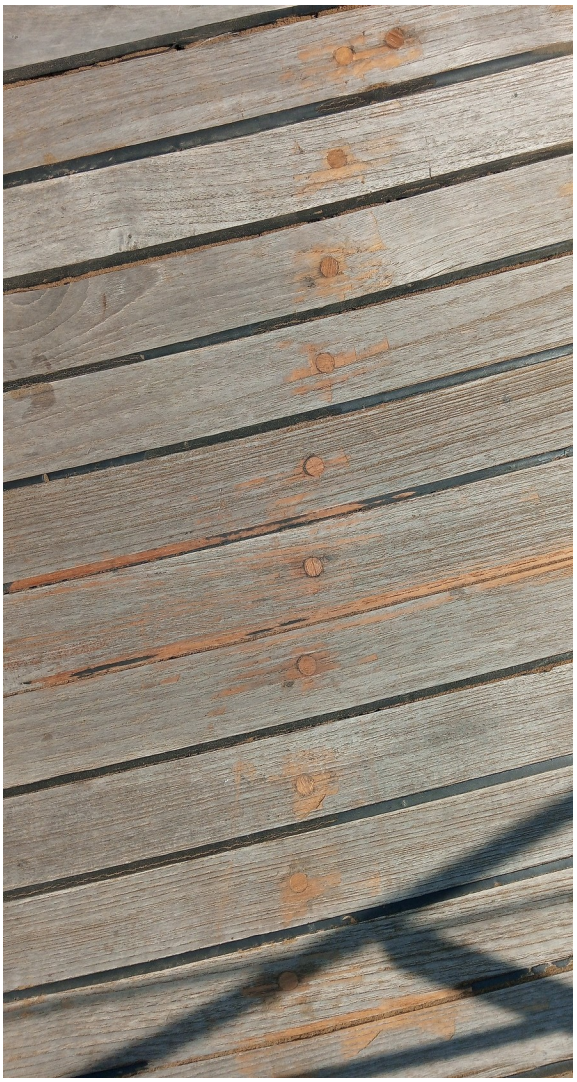
Polyurethane or polysulfite was used as casting compound.

40 years later

A measurement showed that the deck should still be 10 mm thick. Now afterwards it was clear that some parts were ground down to 7 mm.

The screws or the epoxy over the screws were exposed to a good half.

The strips that were glued to the right wood side had mostly bent up on the sides and "formed a channel" in the middle. The adhesion of the planks to the gelcoat was largely gone.



The casting compound had come loose on some "side edges" of the joints and was brittle in some places. The joints were often only <1mm deep.

First evaluation

It was obvious that all screws (1830) would have to be set deeper. Then the deck should be sanded smooth so that the joints could be milled again with a router. (Only through trials could a method be found to rework the joints) It was also clear that the grouting was only possible with the help of a compressor, since a total of approx. 450 m of joints and 36 m² of teak deck were measured.

After validating Sikaflex, teak decking and Pantera products, I decided on the silicone-based Pantera Sealine 1000DC because, according to Pantera, this product should have a service life of 30+ years and is said to be better suited for long stays in the tropics.

The working environment

Well I had no choice. The ship is docked at two moorings and two shorelines. To get on board, you layback with the dinghy from a small jetty along a stern line to which the power cable is attached. The berth is largely sheltered from storms in a very deep bay. There is practically no sun protection. It was also not possible to attach a tarpaulin to cover the ship due to the extreme heat from mid-June to early September and thermic wind gusts of up to 30 knots.

I was able to work from 7:00 a.m. to 12:00 p.m. and from 5:00 p.m. to 8:00 p.m. So that was 8 hours a day. At noon, temperatures often rose to 36°C. Wind was occasionally present and made the work a little more bearable.

The screws

2000 pieces of Torx 4.5 x 25 mm V4A were ordered as replacement screws. The advantage of Torx is that you can slip off without damaging the teeth. Screwing it in and out should always work without any problems.

To remove the teak plugs and the epoxy I used a 9mm wood drill and a cordless drill. The result is quite unsatisfactory. But it creates the base for using the Dremel and a cylindrical 3mm milling cutter with a flat bottomside to expose the screws so far that the screw does not damage the wood when unscrewed. The screws were somehow screwed into it. Many were set at an angle of up to 45°, the depth was arbitrary.

After all, the wood drill was centered in the middle of the cross slot and thus created the possibility of cleaning this hole from the epoxy with a 2 mm drill. Then the Phillips screw was "hammered in" with a strong screwdriver and the slots, mostly damaged by brutal screwing, were reworked. Then a very, very good bit and screwdriver was used to unscrew the screws far enough so that you could grab them with clamp pliers if necessary. If the screwdriver slips over it, you can possibly use a 3 mm drill to drill deeper into the middle of the screw and then hit the slots again.

Good advice so that they don't get cocky and screw up the screws. Lying on the deck, pinch the screwdriver under your chin, hold the base of the bit with one hand and twist gently with the other. What helped me was that I said to myself beforehand: "Dear wood screw god help" and afterwards "Thank you dear wood screw god".

Firstly, this keeps you from constantly swearing and secondly, it makes you so careful every time that only about 30 of 1830 screws could not be removed.

> For screws that could not be removed, I milled off the head with the 3 mm milling cutter and the Dremel and drilled out the screw with a hollow drill (6 mm inside and 8 mm outside) from Snoli Skiservice-Tools (approx. 27 €). Danger! Very carefully. The drill is excellent and quite hard. Never use force because it breaks when it jams. I destroyed one and ordered another one.
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> Then I drilled out the hole with 8 mm and used a dowel with Pantera Marine Sealant 2K MS-3000/60 V3, which was cut off at the top after drying. Then 4 mm was lowered with a 9.4 mm wood drill and the teak stopper was glued in with waterproof white glue.

I had divided the deck into the port and starboard side and always removed 2 rows of screws from the middle to the side wall. This has the advantage that strips that are no longer properly glued are recognized. I then unscrewed this to the next end or carefully bent it out, sucked it out and glued it in again with Pantera Marine Sealant 2K MS-3000/60 V3. Yes, I know that they should be completely removed, the old glue removed, sanded and degreased with isopropanol. Well, that's practically impossible.

Then I drilled with a 9.4 mm countersink as far as possible down to the gelcoat. Yes, this is highly problematic as there is not much wood left with the teak strips and countersunk heads. However, what should you do? The countersunk head itself is +2mm and the thickness of the teak remaining after subsequent grinding is unknown. Well, most of the screws still held.

Then the Torx screws were provided with a pin-sized drop of Pantera Marine Sealant 2K MS-3000/60 V3 and screwed in with the drill driver with non-slip device (1/2, Makita 8 of 16). Special care at the ends. The teak breaks easily if screwed too tight.

The adhesive is distributed by screwing on the threads and then forms a barrier in the groove of the countersunk head. The rest stays above the screw. Therefore, the teak plug should be glued in quickly with waterproof white glue so that the glue above the screw also presses in.

When inserting the 10 mm teak plugs, please make sure that they are round and straight on the end faces, otherwise they will hit crookedly. When I delivered the "Best in marine teak" 1000 plugs, I was able to throw away about 1/3 of the "worst in marine teak". I then used cutted plugs. That went quite well. So you can possibly fill two holes with one plug.

Why 9.4mm for 10mm wad? Well, I thought it would be better if the plug was stuck because with 10 mm to 10 mm the play when drilling is so large that only the glue connects the two wooden surfaces. If you are at one end with the teak strips, you should still drill 10 mm so that you do not burst the strips.

To be on the safe side, I didn't pry off the teak plugs, but cut them off with a plunge saw blade.

Working time:
5 weeks with 7 working days each = 280 hours

Material:
1 cartridge Pantera Marine Sealant 2K MS-3000/60 V3
2000 Torx 4.5 x 25 mm V4A
4 countersinks 9.4 mm
1 wood drill 9.4 mm
1 wood drill 10 mm
1 wood drill 11.4 mm

Tools:
2 cordless drills Makita LiIon
1 Makita multi-tool
1 plunge saw blade steel because of the finer cutting edge
1 angle grinder
1 dremel
4 end mills 3 mm
4 stainless steel drills 2 mm
4 stainless steel drill bits 3 mm
2 SNOLI hollow drills 75mm, Ø 8mm
1 professional hand press Pantera COX 310 ml

The first sanding

It was obvious that the deck had to be at least smooth before milling because there was no question of evenness. It looked like some of the planks needed replacing as they were so "twisted" that sanding seemed impossible. At one point, a plank was so weathered that there was a pattern for a 10x3 cm pool with a depth of 4-5 mm.

I decided to tape and leave such places when grouting. Surprisingly, the sanding went quite well and the transitions between the strips were quite smooth. However, I carried away an estimated 20 kg of sanding dust. Nevertheless, the deck is "humped". But since nobody sees this except with a ruler...

The first sanding was done with a belt sander and 40 grit because both the orbital sander and the disc sander removed too little. Areas that I couldn't get to with the belt sander were made with the oscillator and the triangular sanding disc.

The second sanding was done with 80 grit and was only there to smooth the surface so that the grout cannot penetrate too deeply when grouting.

Working time:
3 weeks with 7 working days each = 168 hours

Material:
6 sanding belts 40 grit
6 sanding belts 80 grit
2 sanding belts 120 grit
10 Multitool triangular sanding sheets, 40 grit
10 Multitool triangular sanding sheets, 80 grit

Tools:
1 Parkside belt sander
1 Makita multi-tool oscillator
1 triangular sanding plate

The grooves

The milling

Before that, we had to weigh up how the joints could be milled for months. In fact, it was only possible to find the best method by trying it out.

A first joint had to be milled so that the old Bosch milling machine with an adjustable side stop could be used. To do this, I cut up a metal spatula and screwed it with a depth of 5 mm onto a wooden block with the exact width for the milling machine without a side stop. The outermost possible strip on the ship's side served as a stop. However, the third joint was milled afterwards because the milling machine was quite large.

After the first "stop joints" had been carefully milled (a slight correction was possible by lifting the block), I doubled the support of the Bosch milling machine so that the stop sanded with the Flex had a depth of 5mm and knocking on the left and right of the joint was possible. That went quite well for most joints. Nevertheless, it is extremely tedious because you have to constantly check whether the milling machine is actually running within the old joint.

It was not possible to find the 5mm milling cutter for the Dremel and which is reasonably stable (after 40 cm the 4.7mm milling cutter from Proxxon and Dremel was already closing time) I ordered a small router. There were no annoying handles and the support plate had a diameter of just 90 mm. However, I could not find a milling machine where the stop was not obviously designed in kindergarten. So I was allowed to mill everything freehand with this milling machine because of the incompetence of the manufacturers. That was of course tedious and also very slow. It still worked halfway though.

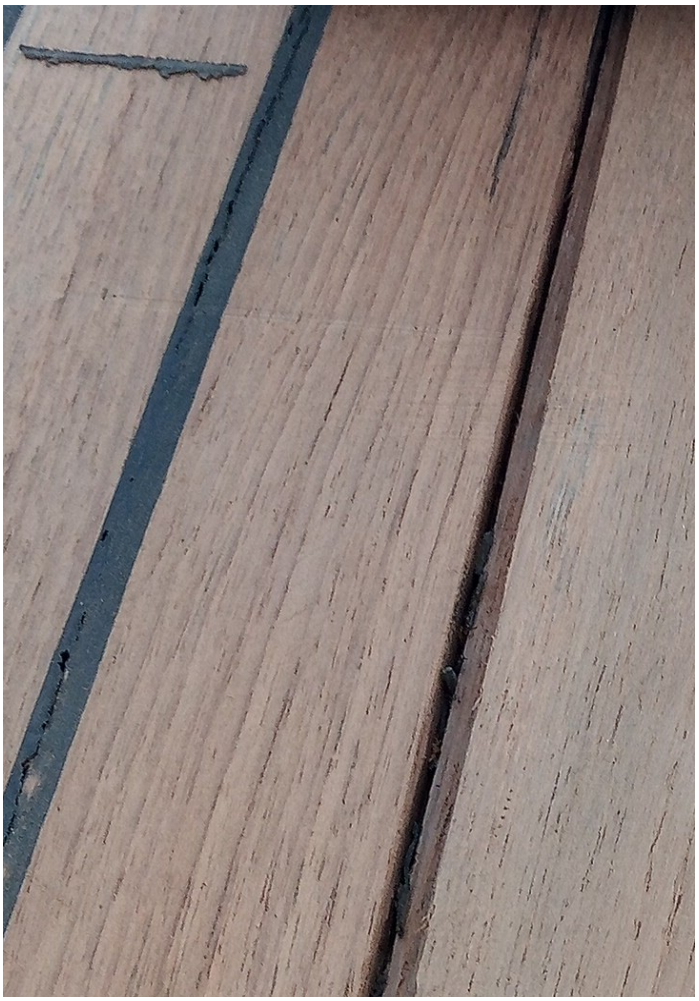
One problem was that the former joint width of 4mm was hardly noticeable over the length of the joints.

Once it was only 3mm then up to 7mm. I suspect that this already happened when the boards were laid in 1981 and that the planks were simply not laid exactly 1mm apart next to each other.

There was nothing left but to mill many joints several times or to take out the remaining old joint compound with the Vevor "free-hand milling machine".

Surprisingly, this is only noticeable if you look very closely.

The flanks were then freed from the remains of old joint compound with the multitool and the "rasp blade".



Joints that I absolutely could not reach with the milling machine, I cut with the Makita oscillator and saw blades and sanded with the rasp blade. Here, too, with a bit of practice, it was possible to create joints and not cut them completely down to the gelcoat.

Chaulking - the preparation

A few areas that could not be sanded completely due to a suspected lack of material were masked off. Holes and other damaged areas are either sealed with teak plugs or cast with epoxy.

The joints themselves were checked again and, if necessary, the remains of the old joint material were removed with the oscillator and the rasp blade.

Of course, there were also areas that were milled and where old grout was still present under the milling. After only flank binding was important to me, I left it at that and simply ignored it.

Working time:
3 weeks with 7 working days each = 168 hours

Tools:

Bosch router POF 400
With this milling machine it was possible
Plastic stop with the angle grinder
to fit

VEVOR one-hand router 33000 rpm
unfortunately the picture is wrong. I don't have a router with one
round plate found and the other accessories are also
to forget. But otherwise the thing is really good (83,-- €)

4 Bosch Professional slot cutters Standard for Wood (for wood, Ø 5 mm, working length 12.7 mm,
1 Makita multi-tool oscillator
1 half-round rasp for the Multiotool

The chaulking

The first delivery comprised 86 Pantera SEA LINE 1000 DC cartridges, the second 24. A total of 105 cartridges were used, with one cartridge filling approx. 4 m joint (5x5 mm). ATTENTION the 5x5 only open when repointing. So it should have been "only" 420 m joints.

With the help of the compressor, the introduction of the joint compound is basically easy because hardly any pressure has to be exerted on the lever of the cartridge press and the feed can be adjusted quite easily. Of course you first turn it completely off and then try to find the optimal flow of the material by turning it up. I used 3 "jets" for the whole deck. I cut them off about 1 cm from the end at about 45°. The nozzle was turned 90° to the handle so that you

could work from the side. The hose was pulled through the railing from the outside and slung over the shoulder.

> Many say to squeeze the tip and run the press along the bottom of the joint. Yes, I've tried. This works for sure when showing and a perfect joint in a youtube video. In any case, I got stuck so often that I finally let the wonderfully liquid material flow into the joints from above. It actually spread very, very well. As if honey would run into it.
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> In any case, it is worrying that the material should shrink 1-2 mm vertically during drying. This inevitably adds 3-4 mm. As a result, material felt for one fugue is cut away again for four fugues. Which really hurts at 4m per cartridge instead of 16m and 20€ per cartridge.

Before grouting, the deck was of course swept several times and the joints were vacuumed. Just before grouting, isopropanol was applied to the joints with a brush. Due to the high temperature, the alcohol evaporated after about ten minutes. After about twenty minutes it was grouted.

I always cut open four cartridges and put them in the sun so that they become even more liquid. I then always grouted two cartridges and then pressed the grout with a narrow spatula (3 cm wide) to just those approx. 2 mm (rather 3-4 mm) flat.

This should be done promptly, as the joint compound can no longer be spread after half an hour at the latest.

A recommendation would be to cover the deck with wet cloths so that the joints - whether silicone or not - dry better because they all absorb moisture when drying.

Picture above: Pressing is only possible with a narrow spatula, unfortunately the overhang is considerable.

Picture aside: Possibly too little joint compound was used here. Unfortunately, you can only see this exactly after it has been sanded.

After that I waited sixty hours before using the oscillator and the cutting knife to cut away the excess at the joints. Joint scrapers or the kitchen scrapers for the electric stove proved to be much too tedious. The oscillator worked fine.

The "joining" or grouting again in the event of errors - there were about 10m that had to be redone because the joint compound bubbled or did not bond on the side surfaces - proved to be problem-free. The beginnings were no longer visible.

After cutting and ultimately throwing away a good 25 kilos of joint compound, I sanded away the remaining protruding joint compound again with the belt sander with 40 grit and then sanded the entire deck again with 120 grit.

Working time:

The grouting, cutting and final sanding took time
4 weeks with 7 working days each = 224 hours

Thus, the total working time can be given as 840 hours, i.e. 15 weeks. My wife and brother-in-law each helped me for two weeks, so the entire campaign from June 20, 2022 to September 12, 2022 lasted 11 weeks.

Materials:

105 cartridges of joint compound Pantera SEA LINE 1000 DC

2 liters of isopropanol 99.9% IPA, isopropyl alcohol
Belt sandpaper 40/80/120 from previous stock
3 rolls of weatherproof masking tape.

Tools:
1 flat brush
1 compressed air press Pantera COX 310 ml
1 Makita multi-tool with cutting blade
1 Parkside belt sander

Conclusion

The planned five weeks of work turned into fifteen weeks. The work turned out to be extremely tedious because I mostly lay on my stomach or on my side on the deck. To relieve pain, I put an old, folded ceiling cap under me.

I expect that the lateral adhesion of the joint compound largely prevents the strips from twisting. Well I'll see that next year.

I can sand this deck again - as long as it doesn't twist beyond all measure. That would be a huge plus if the ship is to be sold.

I am really enthusiastic about the exemplary advice and service from Pantera and their products. Both the joint compound Pantera SEA LINE 1000 DC and the construction adhesive Pantera Marine Sealant 2K MS-3000/60 V3 last for several days by turning a screw in the spray nozzle. In contrast to the widely used competition, the material can be very easily removed from the tool and the skin within an hour. Detergent and workshop washing sand remove it completely. Completely in contrast to what is otherwise on everyone's lips. I will definitely only use Pantera products again.

In retrospect, however, I would not do this job again, remove the teak and simply rebuild the gelcoat because this work could certainly have been done in three weeks.

On the other hand, the lines of the Vagabond 47 could already be called a traditional ship, and the teak deck is an essential part of this tradition.

Furthermore, I accidentally found a piece of a new old teak deck plate. The material was 8mm thick, but only 2mm is teak and the rest is cross-glued plywood. The joints milled into the panel are just 1 mm deep. So grinding this material was bound to fail. I give this teak deck a maximum of ten years and I bet that the cost of a teak deck of this type is at least 15,000 euros. And it can't be worth it.

Addendum

It is to be hoped that, as technology advances, we will have equipment available in the future that we can say: "Sand it flat or smooth". That there will be cutters that drive half an hour across the deck to collect data and then mill the joints in half a day.

It is to be hoped that we will get computer-controlled compressed air presses that will joint the material independently, immediately pull it down to 2 mm and record the "overhang" and process it immediately. That would have saved me at least 50% of the material, which also ended up in the garbage.

This document was translated with google’s translator. I do apologise for the faults in this translation. I’m sure I could written it down better but on the other hand thi copy, paste and formatting took only 3 hrs.