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Teak & Aspen Sole Installation

The original teak plywood floor on our 1976 T34C needed an extreme makeover. The dark stained areas refused to go away after countless efforts to remove them. The choice was to live with it, cover it up or lay down a new floor. Our decision was made easier when a couple of years ago, our good friends, Steve & Kristi Hottinger, owners of the T34C HH Tremor, replaced their mahogany plywood floor with teak & aspen planks. The results were incredible. Steve made the offer to cut and plane the teak boards and even help us with the installation of a teak & aspen floor on Sin Sal. How could we refuse!

Following is a description of the installation process:

Preparing the Teak & Aspen Planks

The width of the bilge boards were measured and used as a basis for determining the dimensions for milling the teak planks. The width of the planks used allowed the plank joints to occur exactly at the edge of the bilge boards. (We did this for aesthetics, though not necessary). We chose a narrower width for the teak planks just for personal preference.

Steve prepared the strip planks by ripping 5/4”x 6”x 8’ teak planks into three 1 5/8” wide strips per board (size chosen from bilge board measurements) on a band saw or table saw.

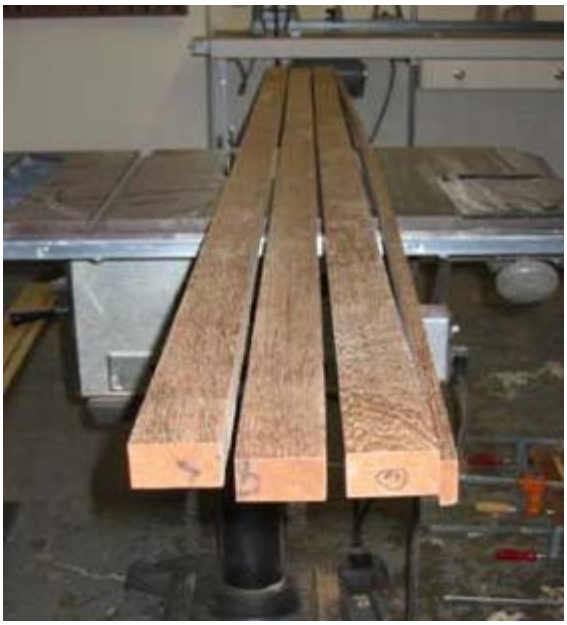


Figure 1 - Teak Board after first ripping

These were then turned on their side, and planned three or four strips at a time on a thickness planner—both edges, so that all four sides were smooth and square. Then, 3/16” strips of aspen were glued with Titebond II** to the narrow side of the ripped plank. (Holly or any other light wood of choice, such as maple or popular (holly is very difficult to come by) can be used.) Prior to gluing it is best to wipe the teak edge with acetone to remove the oil on surface of the teak.

Figure 2 - Aspen strips glued on teak ready for 2nd ripping

These 1 5/8" x 1" planks (with aspen glued to one side) were then ripped into ¼"+ thick planks on a band saw, and finally run through a thickness planner to smooth them out, leaving a finished product of approximately 1 3/4" x 3/16" teak & aspen planks (with a 3/16" strip of aspen already glued to one edge).

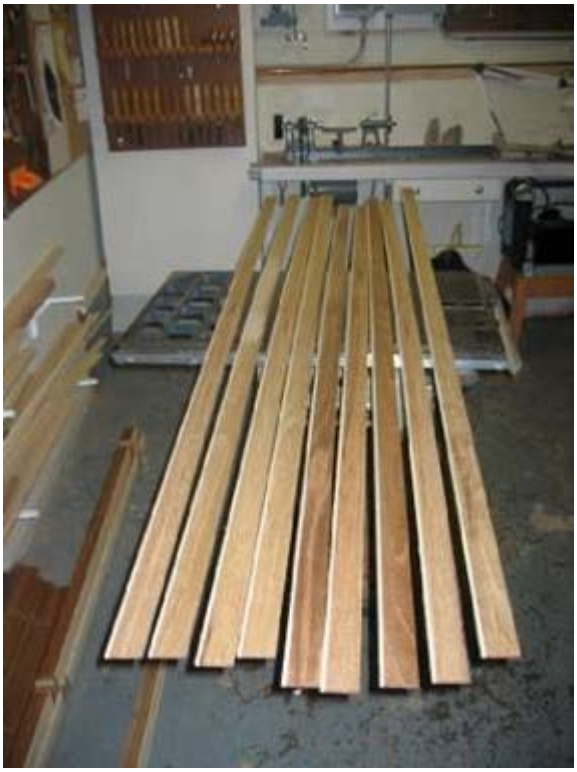


Figure 3 - Final product

3/16" was chose as the finished thickness so the planks would readily follow the curvature of the hull where necessary without the need to steam the planks. Thickness up to ¼" would probably work as well. The planks were generally 7' to 8' in length. There is not a great deal of waste in using strip planks, as the smaller, left over ends usually find a use at another location. For the amount of finished product required, figure the square footage of the sole, and add 15-20% for waste (for a T34C, about 35 square feet, not including the head, plus 15% for waste, for a total of about 40 square feet). Each 5/4" teak board yielded nine 1 ¾" x 3/16" teak & aspen planks.

Preparing the Bilge Boards

The existing bilge boards were planed and shimmed with teak for a good fit into the bilge opening. The bilge opening was also shimmed to prevent the bilge boards from wobbling when stepped on. There was no exact science, just plane a little here, add a little here, etc., whatever to make the boards fit and lay properly.

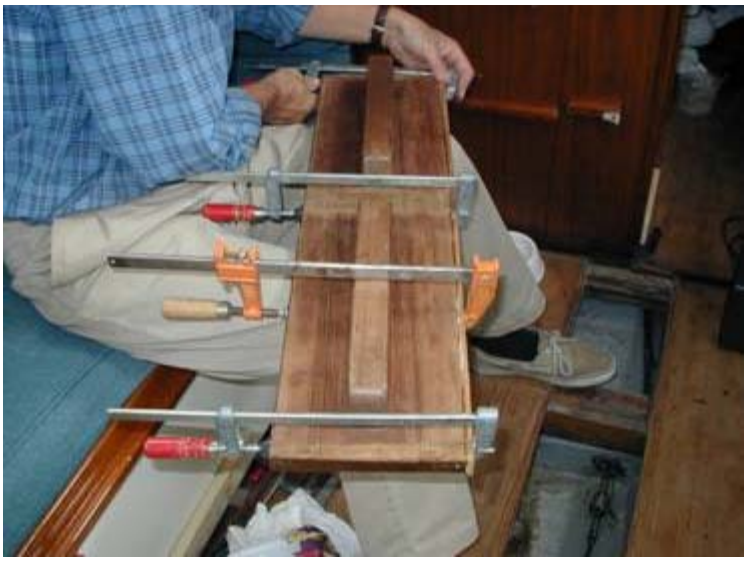


Figure 4 – Shims are placed on bilge board and clamped

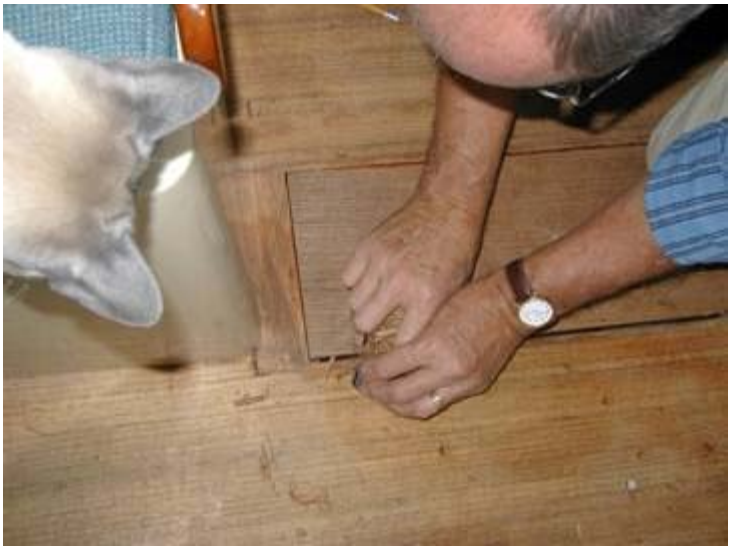


Figure 5 - Trimming the frame for a good fit while Julio the cat watches

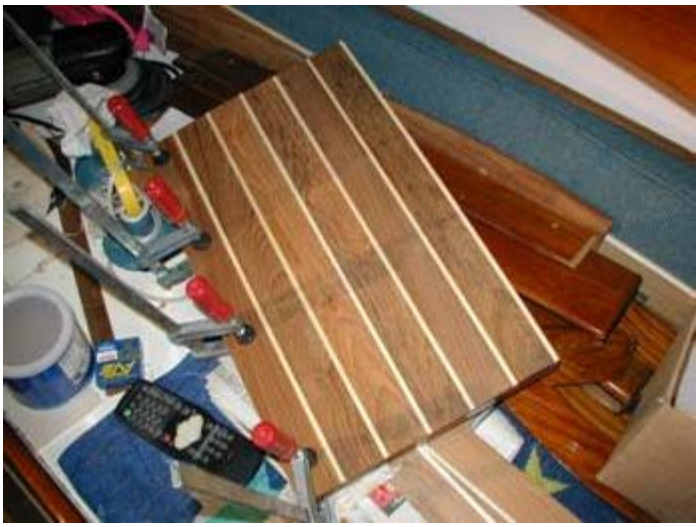


Figure 6 - A bilge board being clamped

Figure 7 - Trimming excess from the boards around the engine

Preparing the Sole

All the trim molding was removed and then the old finish was sanded down to bare wood. The glue requires having bare wood glued to bare wood. Since the new planks will be laid on top of the existing floor we made sure any delaminated areas were repaired and filled with epoxy. Furring strips were added along the side bulkheads to facilitate clamping boards and the use of wedges.... thin ones and thicker ones. Of course, the furring strips were screwed in below the upper area where the teak baseboards are screwed in so as not to leave a visible screw hole.
All dust and debris was vacuumed from the area.

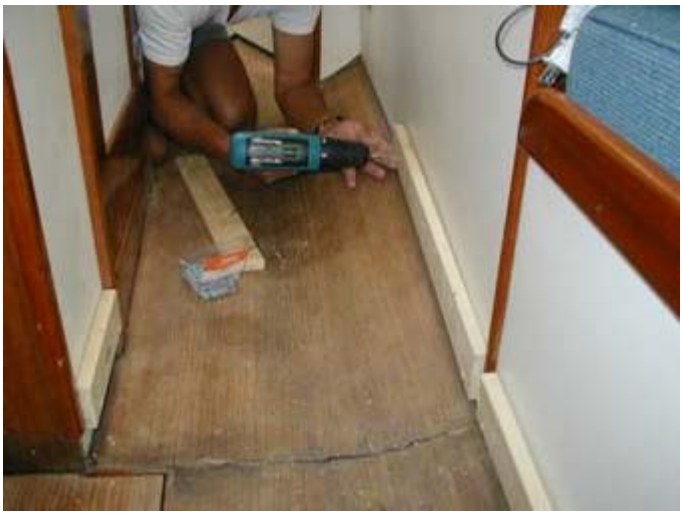


Figure 8 - Furring strips are mounted along the bulkhead to aid in the wedging process

Gluing the Planks

The easiest and most logical place to start is the area of floor enclosed by the port settee, engine and bilge opening. The area is flat and all the planks are cut to the same length. Several planks (without glue) were laid down starting at the edge of the bilge opening and working outwards. The edge was marked with a pencil (on flat areas you can lay two, three, or even four planks at a time). The planks were removed and the bottom of the plank was cleaned with acetone to remove any oily residue. The bottom edge of the surface to be glued to the next plank was beveled slightly with a block plane (to ensure a tight fit). Titebond II glue was liberally applied up to the pencil line making sure glue was applied to the edge of the plank being glued to—the joint between the planks. We then would clamp pine boards to the sole and under the furring strips so we could wedge the planks down. The planks were clamped into place using clamps and wedges placed about a foot apart along the length of the plank. It was very important to make sure each plank was pressed tightly against the adjoining plank and also to the flooring to ensure a good tight bond.

Figure 9 - Clamps are placed on the first plank

Figure 10 - A system of wedges was designed to hold the planks in place

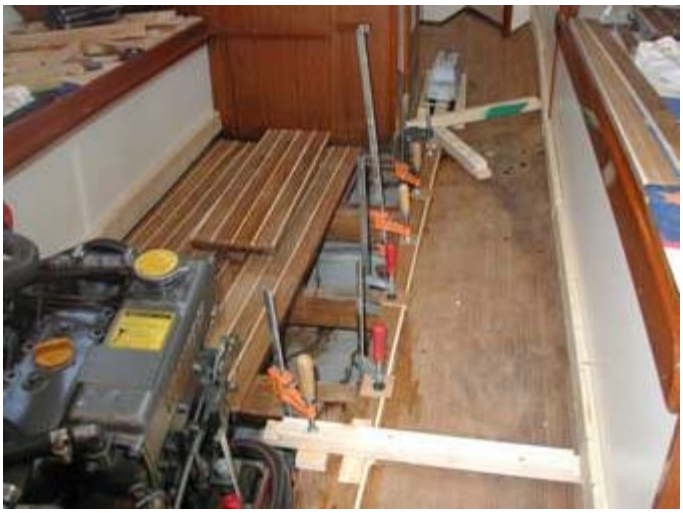


Figure 11 – Aligning plank with bilge edge to start starboard side

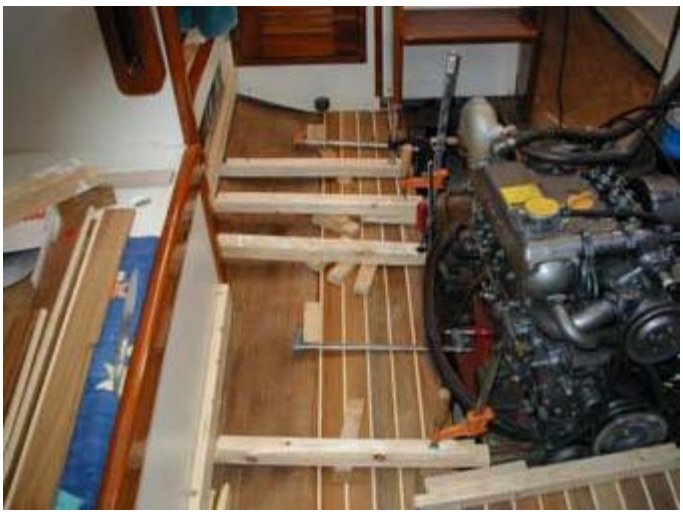


Figure 12 - Clamping planks in galley area

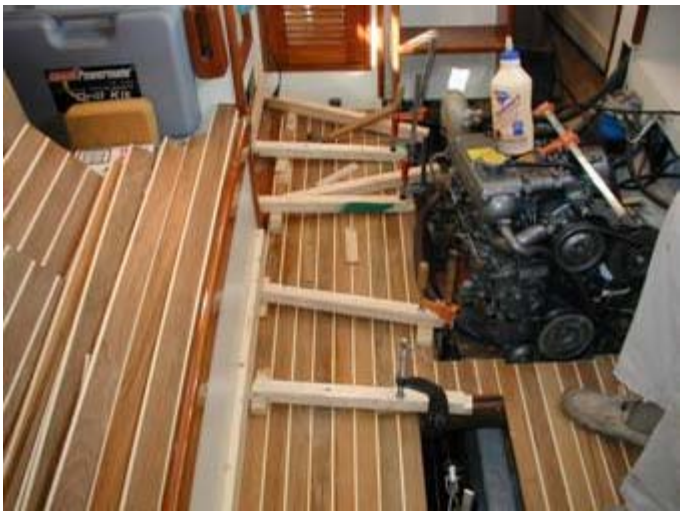


Figure 13 - Galley area almost complete

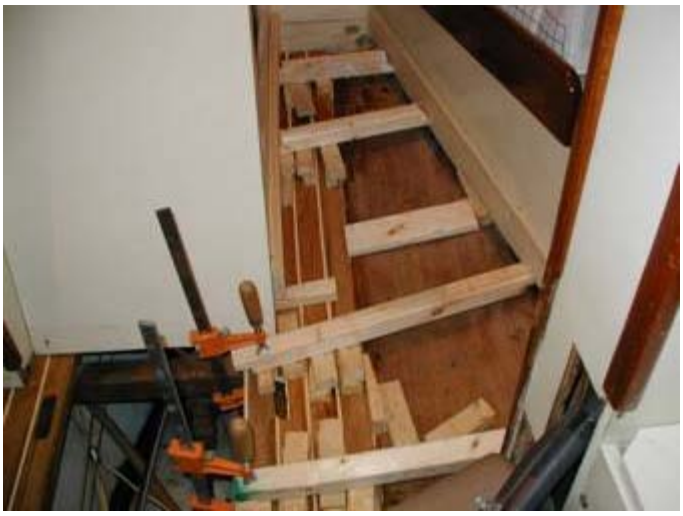


Figure 14 - Quarter berth floor

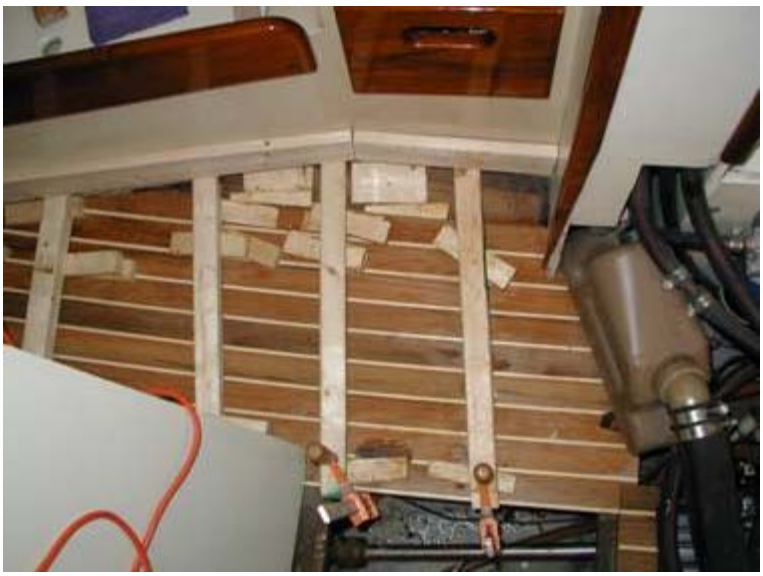


Figure 15 - Another view of quarter berth floor

The excess glue was wiped up (it's water soluble), and then we waited a minimum of 1 hour for the glue to set-up per glue instructions. Note: Allow 2 – 3 hours for the glue to set-up on the curved areas of the sole. After an hour all the boards/wedges would be removed, next three planks cut to size, placed, marked, glued, wedged, and so on. This process was repeated until the flooring was complete. As the interior sole in places is over 13' long, you will need to butt the ends of your 7-8' planks to achieve this length. The joints were staggered, taking care to choose the joining pieces that matched so the joint was not as noticeable. The width of the planks were adjusted as necessary when covering the bilge boards so that they fit accurately without having to split a plank down the middle. Steve milled one or two of the planks slightly wider than the rest for this purpose. The slight difference in size wasn't noticeable, but they came in handy when trying to get things to come out even on the bilge boards. To retain the companionway ladder ends we simply cut holes in the planks at the appropriate locations. This eliminated the need to reuse the original wooden brackets and makes for a much cleaner looking installation.

The curved areas of the sole were most critical.... and exhausting. In the V-berth area, where we couldn't use the bilge area to clamp down boards, we placed the board under the furring strip and then had to drive a nail through the board into the existing sole. Worked fine for one side but on the other side, we couldn't drive a nail because the new sole planks were already down. We used 40 or 50 pound lead weights to hold them down in-place. That twisting on the curved areas made it really hard to keep the planks together. I'd hold them down with my knees and then wedge a scrap pine board to force them together. Sometimes that side wedge would be nailed onto the old sole or forced from the bulkhead if it was close enough. In all cases, if glue did not come out of the butt joint, we would add more glue at that point. We had to make sure there was sufficient glue underneath the plank and on the butt side. Again, allow 2 –3 hours set-up time for the glue in the curved areas of the sole.

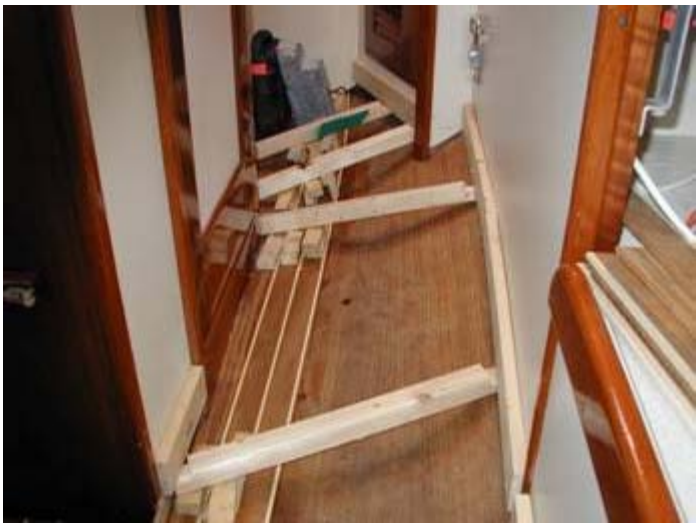


Figure 16 - The curves surfaces were a challenge

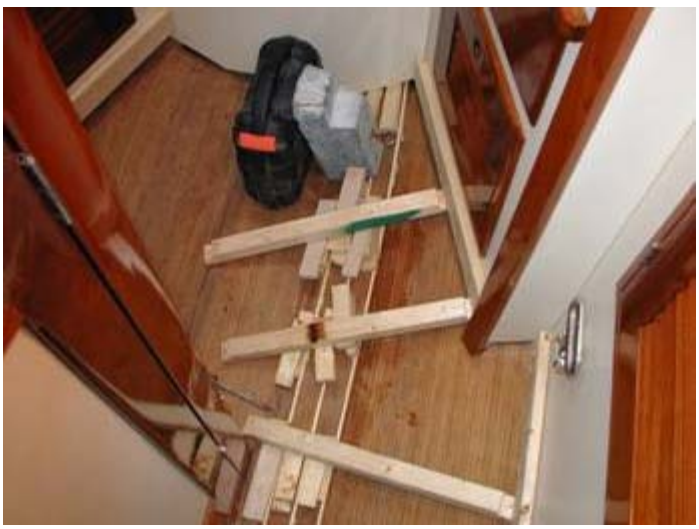


Figure 17 - Clamping braces are nailed to the old floor to hold wedges

We actually had only a few scrap pieces left. Good estimating on Steve Hottinger's part. Since he did his T34C, H H Tremor, last fall, that experience really helped. Once having experienced the process we went through, I can honestly (humbly) say that there is no way I could have done that project by myself. Steve is a "master" at anything he tackles. Truly a genuine person and a great friend. When Steve was asked if he'd like to do soles for a living, his reply was, "That was the last one!" ;-)

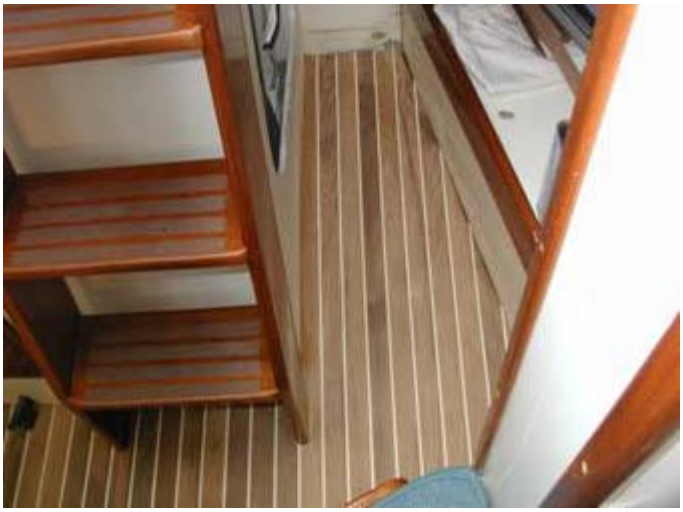


Figure 18 - Completed floor in quarter berth awaiting a coat of sealant

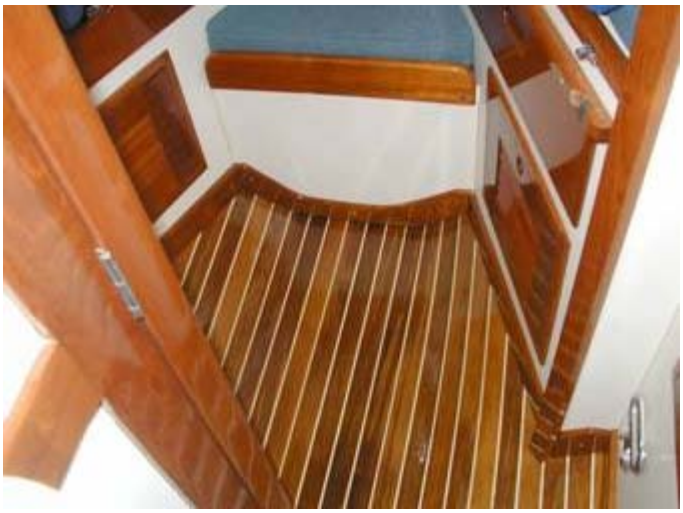


Figure 19 - V-berth complete

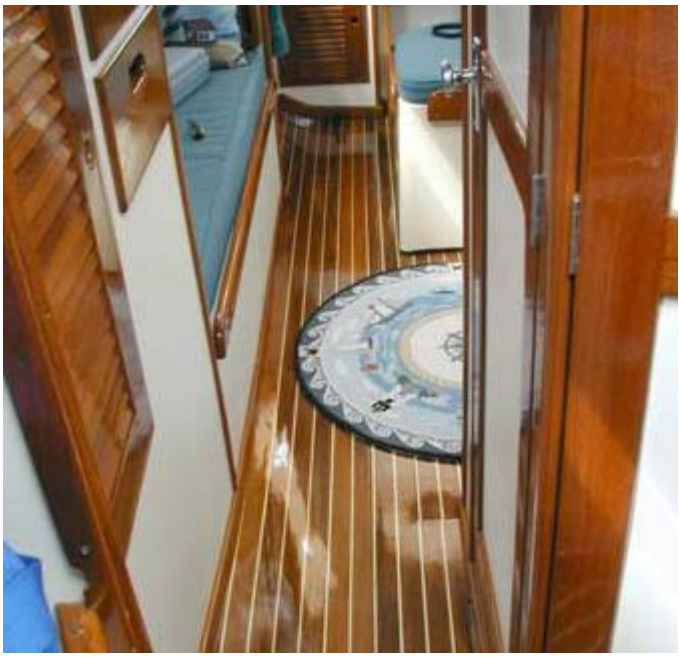


Figure 20 - View looking aft

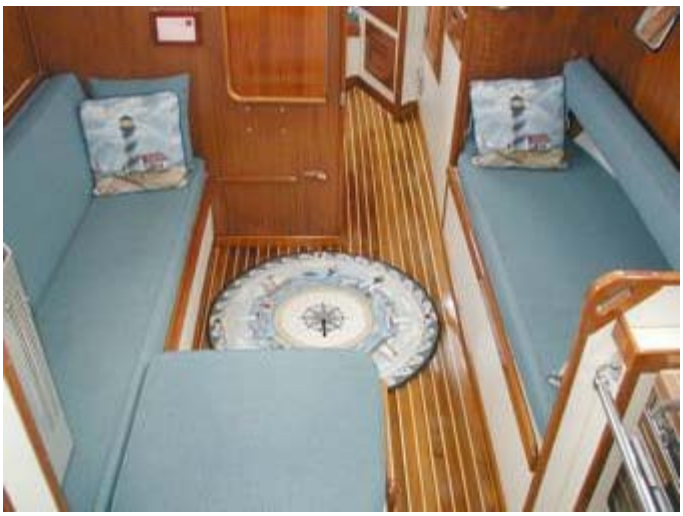


Figure 21 – Salon Completed

Finishing

After the teak & aspen was installed it looked pretty rough, especially all the glue stains. With the bilge boards in place, the entire floor was sanded smooth starting with a coarse grit of 60 and working down to a final grit of 220. This is a REALLY dusty job, so a sander connected to a shop vac was a godsend at this stage.

We were able to apply one base coat of TufShield to the floor before storing for the winter. In the spring, we applied four more base coats and reinstalled the woodwork trim. Steve used Minwax polyurethane varnish on his floor and it looks great, also. We chose the TufShield because we had it on the old floor and were really pleased with durability and looks.

Tool List

Miter saw
Small handsaw

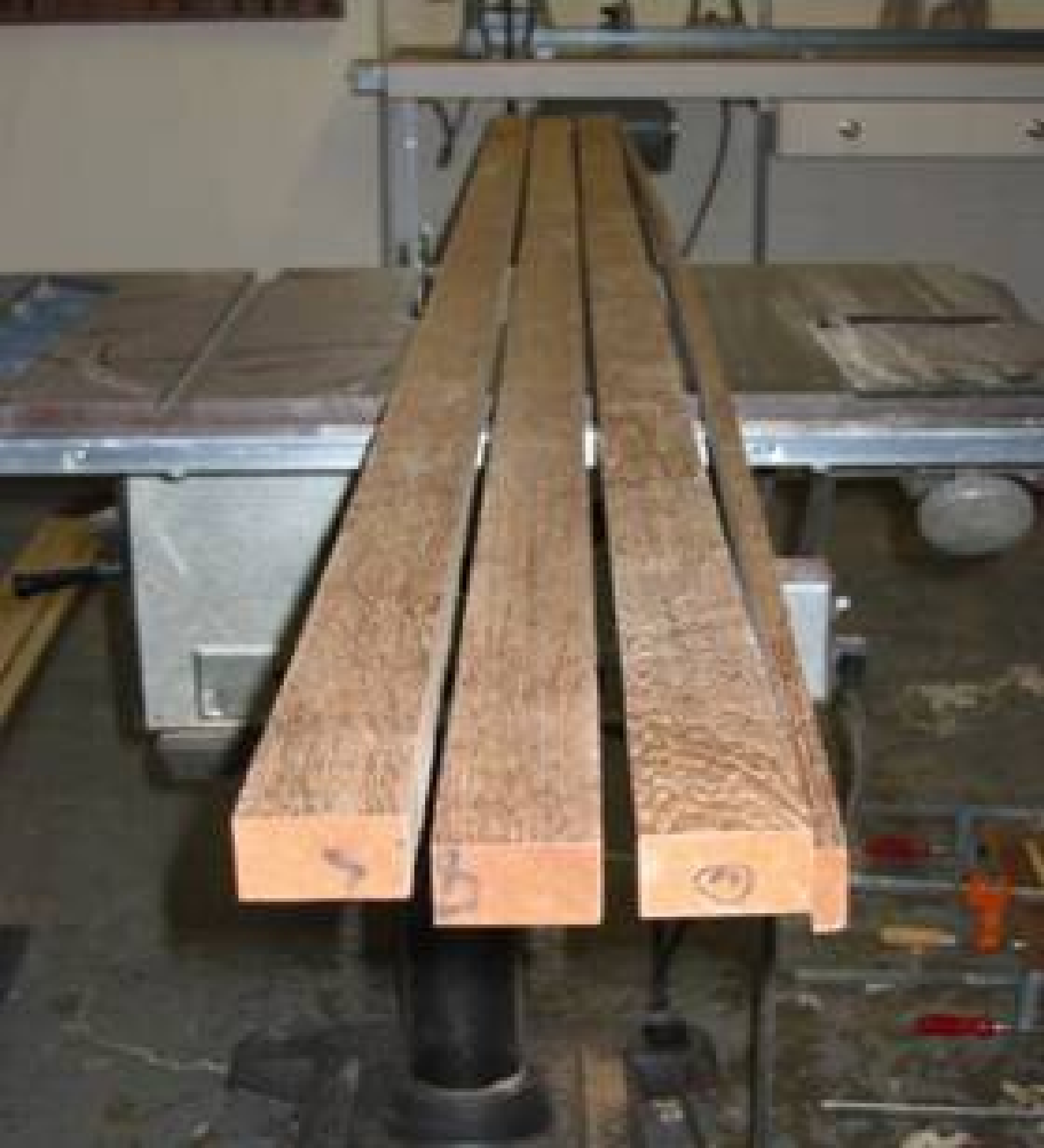
Coping saw
Electric saber saw
Small finishing sander
Large sander, e.g., 6”
Clamps (lots of them—all shapes and sizes, C-clamps, bar clamps)
Shop vacuum
Hammers
Square
Rule
Pencils
Block plane
Chisel
Weights (lead ingots, barbells, sandbags, etc.)
Table saw (if milling your own planks)
Band saw “
Portable planer “

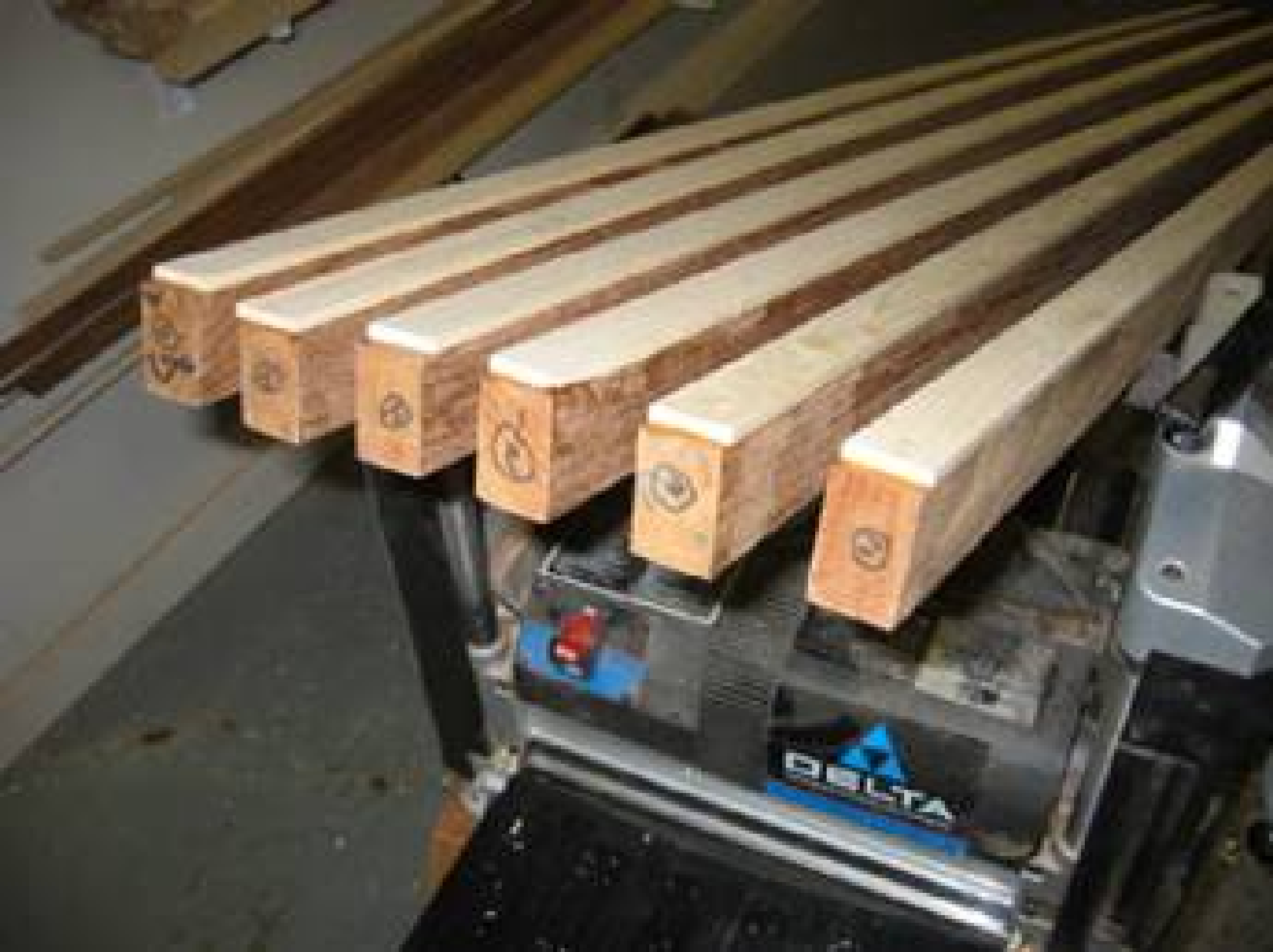
Material List
16 board feet of teak (1” thick)
4 board feet of holly/maple/aspen/popular
2 32oz bottles of glue, e.g., Titebond II **
Acetone
Medium size finishing nails (to attach wedge blocks to floor)
Sandpaper
1x2x8 pine strips (to install around interior perimeter of cabin)
2x2x8 pine (to cut crossbars for wedge clamps
2x4x8 pine (to cut wedges from)

Steve’s rationale behind the choice of Titebond II for and adhesive:

** ”The recommended adhesive for this type of installation would be some type of thickened epoxy. Wood glues in general do not work that great on teak, and because of that, epoxy is the recommended adhesive for any teak joint that may be under stress. Someone also suggested “Gorilla Glue” as a possible alternative. In spite of that, I chose Titebond II, which is a wood glue. Although not a recommended product for this type of installation, I decided it would be an acceptable alternative, plus I also liked its water resistant properties and ease of use (one-part, water cleanup). Titebond II is an ANSI (American National Standards Institute) certified Type II adhesive. To pass the Type II test, glued specimens withstand a 3-cycle soak test. The test consists of soaking the test samples in water at 75°F ± 5°F for 4 hours and than dried at a temperature between 120 and 125°F for 19 hours. This cycle is repeated until the samples fail or until three cycles are completed. For wood glue to achieve a strong bond, the pieces being bonded require clamp pressure (this is not true with epoxies—pressure is not required for a good bond). This ensures good contact between both surfaces and compression of the glue line. When gluing with a wood glue, a thin glue line is required for a strong bond (again, not true with epoxies). As all the planks in my installation were to be fitted under pressure (clamped, wedged, etc.), this clamping requirement was considered to be met. The sole was laid in October 2001, and as yet no planks have come loose. “

For additional pictures of this project see http://community.webshots.com/user/sinsal34

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