Main Cabin Sole Project

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You finally were able to get the perfect Good Old Boat! She just passed her survey, her electrical equipment was not installed by Thomas Edison and Samuel Morse, the deck does not leak, (you hope!), she has almost new sails, a beige shag rug in the main cabin and a... "wait a minute!" Did you say shag rug in the main cabin? That will have to go!

After weighing costs and personal abilities you decided that wood grain peel & stick tile will make things much better. Guess what; the peel part worked much better than the stick part! After just one season your main cabin sole looks something like a checker board. And the loose tiles chase themselves around the cabin every time there are waves higher than 6". The whole mess looks about as nautical as a badly kept J.C. Penny shoe department!

What to do?

Take a look at the picture that introduces this "how to" article. What you are looking at is a main cabin sole that is made from red oak planks with mahogany inlays. The amazing part is that materials can be had for very low cost! How can this be, you may ask? Just keep reading and all will be explained.

Photo 1 New Red Oak and Mahogany Floor

This project will be divided into two parts. The first section will be a discussion of how the various parts were acquired and fabricated, while part two will deal with the installation and finishing of the oak and mahogany sole.

Before we can fabricate anything we first have to get the raw materials. You may recall that I said that materials may be had for 'a very low cost'. To accomplish this unlikely goal you will have to check at your local "big box lumber store" (ie: Home Depot).

The lumber departments of these stores will often have available 'cull' lumber carts. These consist of lumber items that for some reason can not be sold at retail. They may be split, warped or damaged. These items are frequently offered at 10 cents on the dollar! What you need to look for is red oak base molding. Either colonial or modern will work. It will take you some time to collect enough material to complete this project, so it is wise to plan well ahead to insure that your material supplies will be adequate. The mahogany can be obtained at the same place, but in a slightly different manner. Many times items like windows, paneling and plywood are shipped from Asia on wooden pallets. Often these pallets are made from Philippine mahogany. It will be necessary to plane the rough pallet boards, but you will find that much of this pallet stock can be finished into serviceable mahogany boards.

Once you have acquired your materials, the fabrication portion of the project can begin. At this point you will need to assess both your woodworking abilities and your woodworking tool inventory. You will need, as a minimum, a table saw, miter saw, thickness planer, belt sander, orbital sander and a dado blade for the table saw that is able to cut a 3/4" dado.

To begin you will have to calculate the amount of material your project will require. Measure your cabin space to determine the square footage of the cabin sole.

Remember your high school geometry? (length X width = area). If your cabin is not rectangular you can divide it into separate rectangular sections and add the areas together to determine your total cabin square footage.

You will need 6 running feet of cabin plank for each square foot of cabin sole you plan to cover.

Example: if your cabin sole measures 7' x 3' your square footage is 21 sq. ft. Area times 6 = materials. (21 x 6 = 126); which means you will need 126 feet of cabin planking to complete the sole in your 7' x 3' main cabin. I would add 15% to allow for cutting and fitting end pieces and for areas around bilge accesses, companion way ladder, etc.

Now that we know how much planking we need, how the heck do we create the darn things?

The planks we will use are to be cut from the base molding we discussed above. If you cut the fancy edge off the top of the molding and then run it through a planer to smooth up the top and bottom sides you will come up with a plank that measures 2 1/2" wide by 3/8" thick. Our project will require 146 feet of this planking. (126 + 15% = 145.3).
The next step involves the mahogany inlay. From the mahogany that you have collected cut strips that are 3/4" wide by 1/8" thick. You can set up your table saw to do this operation. The safest and quickest way to cut these strips is to use a finger board to hold the material in place as it is fed through the saw. You will have to cut enough mahogany to inlet 50% of your planks, so we will need 74 running feet of mahogany strips to complete our project.

Photo 2 Finger Boards on Table Saw

After the mahogany strips are cut, 50% of the oak planking will have to have a dado, or groove, cut to accept the mahogany strips. To do this set up your table saw with a 3/4" dado cutter set to cut a 1/8" deep dado directly in the middle of each plank. Again use finger boards to insure a safe cutting operation.
The final step in creating our planking is to cut a ship lap joint in each of our planks.
"What the heck is a ship lap joint?", you ask. Visualize two dominos that are stacked on top of each other. If you move the top domino a 1/4' to the left you have created a ship lap joint. A ship lap plank will have a notch or grove in the top edge and a corresponding grove in the diagonally opposite bottom edge. All our planks must have this joint cut into them. Again, set up your table saw, with the dado blade set to a 3/16" depth, (one half the plank thickness), and set the saw fence so the dado will cut a 1/4" wide groove. Run each plank through the saw twice, reversing the plank after the first cut so the diagonally opposite edge receives the second cut. Perform this operation on all the planks that you have prepared for your project. Don't forget the finger boards!
If at this point you are saying to yourself "there is no way I can do all that"! Do not despair! If necessary, all the operations discussed above can be farmed out to a local woodworking shop and completed for a reasonable cost. Weather you create the planks yourself or have them done there are several steps to complete before we can think about installation.
You have the mahogany strips and half your planks that have 3/4" dados cut into them. Now it is necessary to glue the strips into the dados. To complete this task you will need to create a gluing jig. Basically, the jig consists of a series of wooden "hold downs", (¾" x ½" x 6"), that are screwed directly to a bench or 2X8 piece lumber. I recommend using Tight Bond Waterproof wood glue for this operation. It is easy to use and cleans up with water. To install the inlay, pre fit each piece into the dado. (if everything has gone well there should be no surprises at this point.) Lay a glue line into the dado and press the inlay into the grove. Overlay the inlay with wax paper to prevent adhesion of the inlay to the clamping pieces. Place the hold downs over the inlay and screw the hold downs into the bench top, or 2x8 plank; forcing the inlay down into the dado grove. ***(See photo #3)*** Wipe excess glue away with a wet cloth and leave over night to dry. Continue this process until all inlays have been glued in place.

Photo 3 Bench Hold Down Clamps

The final finishing of each plank will consist of sanding the top surface with belt and orbital sanders until the inlay is smooth. If any gaps occur in the inlay joint you can spread a bit of glue in the gap and use the orbital sander while the glue is still wet. The sanding dust will mix with the glue and fill in the gap! The color will match too!
If you have a bilge access in the main cabin you will have to create a frame around the access hatch. To do this it is necessary to create an inverted "T" plank. Start with a regular ⅜" x 2 ½" plank and saw a 3/16" deep X ¼" wide

notch in each edge of the plank. This is not a ship lap joint! Both notches, or grooves are on the same surface of the plank. Make enough of the "T" planking to make the frame around your bilge access hatch. ***(See photo #4)***
Well, there you are; the planks are all done, you still have all your fingers; (I hope), and we are ready to load all this up and head for the boat yard! Let's go!

Photo 4 Bilge Cover and Frame

Before we can begin the installation there is yet another item that we will need to create.
This project is designed so that no screws are used in the installation. The reason for this is to allow the completed sole to move and flex, compensating for seasonal expansion and contraction due to the changing humidity and moisture conditions that are encountered in the marine environment. Because we will not be fastening the planks in the normal way, we must create our own special installation tool kit.
To do this we will require 6 Irwin "Quick Grip" 32" clamps. These clamps are designed so that the ends can be inverted, thus turning the clamps into spreaders. In addition to the Irwin clamps/spreaders we will need to make six extensions. These extensions are made from 1 x 2 furring strips, (super inexpensive). Three are to be 60" long and three to be 36" long. The extensions will require a slot to be cut in the edge the full length of each 1X2. The slot should be 1/2" deep and as wide as the bar on the Irwin spreaders. Finally we will need to place an adjustable hose clamp, (1 ¾" size), around each extension. In use the Irwin bar is placed in the slot so that the bottom pad presses directly on the top of the extension. Lightly tighten the hose clamp midway on the extension, so that the bar is held in the slot, but is still able to slide up and down. It is also a good idea to glue a solid rubber pad on the base of the extension to prevent any marring of the oak planks.
In use place the head end of the spreader against the overhead, directly above the plank to be glued. Extend the 1x2 until it contacts the plank and then squeeze the pistol grip until the entire spreader is very tight. You will need several spreaders to properly secure each plank. The 60" length extensions will allow you to clamp from the floor to the overhead while the 36" extensions will be used in areas where space is limited.
Well, now we have all the pieces to our puzzle, now all that remains to be done is put the whole mess together!

Photo 5 Irwin Clamps with Extensions

The adhesive is a very important part of this project. You may recall that we are not using any fasteners in order to allow for natural expansion and contraction of our wood sole. To ensure a positive and permanent adhesion of our planks to the existing sole it is necessary to use 3M Marine Adhesive/Sealant Fast Cure 5200. The Fast Cure part of this product is very important as the cure time is 24 hours instead of 1 week for the regular 5200. You will need 1 10 oz. Tube for each 2 sq. Ft. of sole you plan to cover.

The installation process begins by establishing the center line of the cabin sole and thoroughly cleaning the existing sloe to remove any gunk. I used acetone to clean the fiberglass sole in our boat. If your sole is wood, a light sanding will do to clean up the surface. Next, will be the installation of the frame around the bilge access. Using the "T" molding we made earlier you will cut and fit a frame around the bilge access port. Use 45 degree miters on the corners. Build the entire frame using Tightbond glue and brad nails in the corners. When the frame is completed, secure it to the existing sole using several beads of 5200 on the bottom of each frame piece. Clamp in position with several spreader/clamps. Be sure the frame aligns with the center line and is properly positioned over the access hole. The cure time for 5200 Fast Cure in normal conditions is 24 hours. If the temp or humidity is other than normal be sure to check the info on the product to determine proper cure time. It is very important to allow the 5200 to cure properly!

Photo 6 Close up of Cap Plank and Irwin Clamp

After the bilge access frame is cured in place the first planks can be installed. Using the center line as your starting point measure the required distance, cut the plank to length, coat the back with 2 beads of 5200 and install using the spreaders against the overhead to secure in place. Be sure to check that the plank does not move as pressure is applied. The number of planks that you can install at any one time is dependent upon how many spreaders you have. I used 6 and could do two planks at a time, depending on plank length. To ensure proper adhesion you should apply spreaders no further apart than 2 ½ feet. ***(See photo #5)***

Once you have the center line planks installed you can continue the process by installing adjacent planks in the same manner as the original two. The only difference will be that a light bead of 5200 must be applied to each edge joint to ensure adhesion between planks. It is a good idea to lay planks in an alternate pattern. (i.e.: work one plank on the starboard side of the center plank and then the next one on the port side of the center plank.) Continue to measure; cut and glue planks in place until you have covered the entire cabin sole. Again, I would like to emphasize that the spacing of the spreaders while installing the planks is very important! Do not exceed the 2 ½ foot spacing or you may not get 100% adhesion.

Wow! Look around you; the old cabin sole is no longer an eyesore. You now have a oak and mahogany cabin sole that looks great but is still a bit lumpy. At this point you will find it necessary to begin sanding the newly installed planks. A belt sander will work best to begin this operation. Use an 80 and 100 grit belts for the initial sanding process. After the majority of the rough edges have been sanded relatively smooth you can break out the orbital sander and continue the work until you are satisfied that you have an acceptable surface to begin finishing. It is during this portion of the work that you should check all the joints and seams to be sure there are no voids anywhere. If you find any, remember the trick we talked about earlier. Just place a bit of wood glue on the open seam and sand the area with an orbital sander until the dust/glue mixture fills in the void. This little trick will make the finished job look professional!

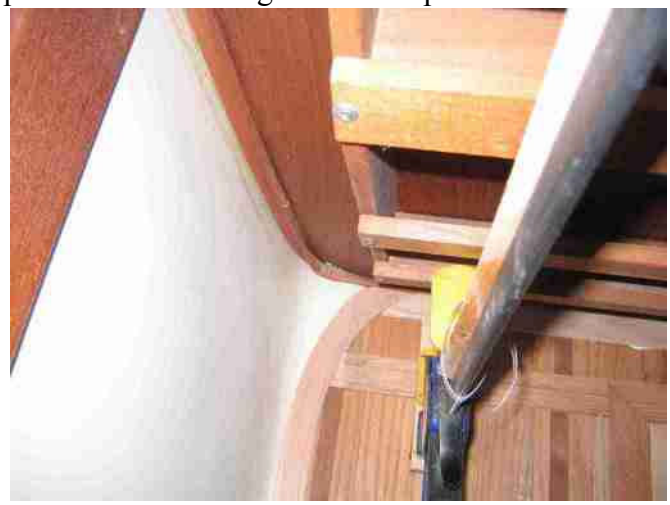

Photo 7 Corner Detail

At this point you will have to make a decision. If you have fitted the outside and end planks tightly against the bulkheads and settee bases you can go on to the finishing. If, like me, you have a bit to much gap between the final plank and the bulkhead you can create a cap plank to finish the job. A cap plank is ⅜" thick and 1" wide. It is made from any left over oak that you may have. After you cut the cap plank, (make them as long as you can), round off the two top edges using either a router or the orbital sander.

The cap planks are installed directly on top of the outboard sole planks. They are snugged up against the bulkhead or settee bases and fastened in place using 5200 and the spreaders

just like the sole planks. The cap planks form a frame around the sole and give the entire project a really nice finished look. ***(See photo # 6 = close up view of cap plank and photo #7 Corner detail before cap plank)***

Once the sanding is complete it is time to grab your shop vac and clean the entire area that you plan to finish. The next step prior to staining is to wipe the new woodwork with a tack cloth. This will collect all the dust and crud that the vacuuming missed and will leave the surface ready for the next step. After tack clothing, wipe the entire surface with a damp cloth and wait for it to dry. Final sand with 220 grit paper and wipe once again with your tack cloth.

The end is in sight! Now we can stain our work. As oak is a very light wood is advisable to use a stain prior to the final varnishing. A great feature of oak is that it has a distinctive grain pattern that is beautifully brought out by using the proper stain. I selected Minwax Golden Pecan stain for our project. Golden Pecan stain gives us a beautiful golden color that is much like teak. After applying the stain coat wait 24 hours before applying the final varnish coats. I would recommend at least three coats of marine grade spar varnish to ensure a finish that will last through several seasons.

There; you see I told you that you could do it! Just wait until your sailing chums see what you have created. I can guarantee you that they will want a cabin sole just like yours and you can tell them: "it's easy, I did it all myself and you can too!"

Photo 8 Completed Project