

Making Model Gratings - Scott Bradner

Determine the right size

If you know the dimensions of the original grating then you can determine what the bar thickness & spacing should be on the model.

If you are not sure then this is a reasonable rule of thumb for gratings sailors would walk on - the holes and bars should be the same size and a size that is small enough so that a barefoot sailor would not find uncomfortable. That said, you are somewhat constrained because you will need to get a saw blade that is the thickness of the grating bars. I work in 1/8" = 1' scale (1:96) which works out 1" on the original is 0.01042" on the model. Two inch bars and holes seem like a reasonable size for underfoot grating so that means that 0.020" bars and holes would produce a grating that is reasonably accurate in scale.

Once you figure out what size bars you will be using you get a saw blade for your mini circular saw that is the thickness of the bars. In my case, I got a 0.020" thick saw blade.

Cutting jig

You then need to make a jig to ride in the slot or slots of your mini circular saw that has a short bar the same width as the saw blade spaced a saw blade width away from the saw slot.

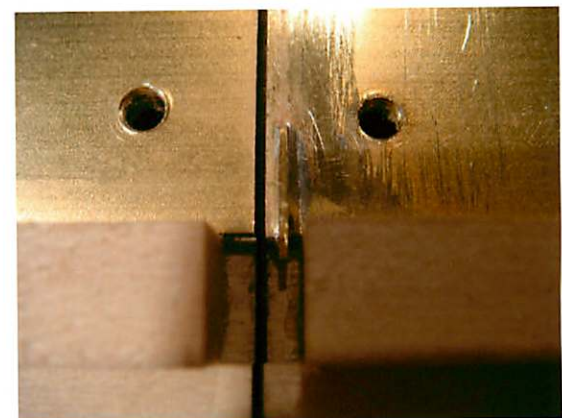
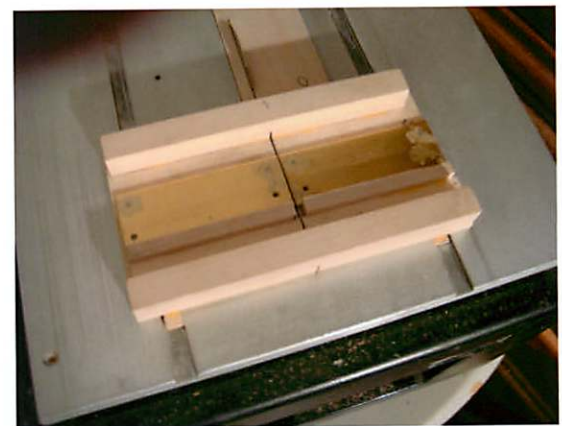
The wood

The wood you use should be carefully chosen - it should be hard enough to hold a clean edge and fine enough grain to support fine detail. I've used boxwood & pear - I have not tried basswood but I would expect that it would take special care because it is so soft.

You need to buy or cut a bunch of wood strips to make the gratings. The strips should be slightly less thick than the saw blade - 1 to 1 1/2 thousands - just enough so that they have a close fit into a slot cut by the saw blade. The strips want to be quite a bit wider than the final thickness of the grating in order to properly



A young apprentice at the wheel of an uncrewed barge.



support them during assembly. For a 0.020 size the strips can be about 1/4" wide. I cut a slot in a small piece of scrap wood to use as a gage to be sure the wood strips are the right thickness and sand the strips down by hand to adjust if needed. I get my wood strips from HobbyMill (<http://www.hobbiymillusa.com/>) Jeff Hayes at HobbyMill knows about this technique for making gratings - if you tell him what you are doing he can produce wood strips of the right size.

Cut the strips to a length about the same as the width of your vice (in any case, the length needs to be longer than the maximum dimension of the grating you are making - get a bigger vice if your current one is too narrow)

Cut two strips of 1/16 x .25 basswood the same length as the grating strips - these will be used to protect the grating strips from tearout.

Laminating the wood

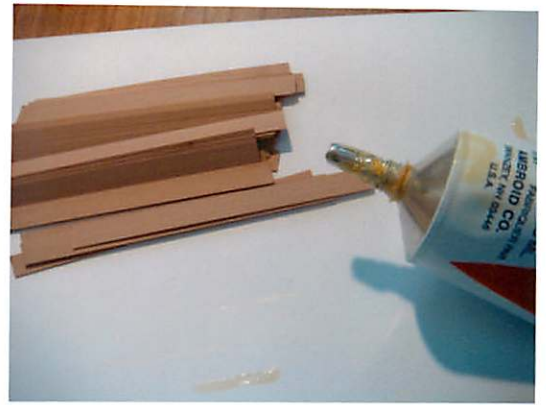
Laminate enough of the strips together to make the final grating with some spare for breakage, with the two basswood strips on the outside - use Ambroid glue & clamp in a vice. I use wax paper to protect the vice. Let the glue dry well.

Mill or sand the top & bottom (across the laminations) of the laminate to be flat & square.

Cutting the slots & separating out the combs

Using the jig described above to cut slots across the laminated strips. The slot depth should be a bit more than 1/2 of the finished thickness that you want the grating to be to give some extra material for finishing the grating.

Soak the slotted laminate in acetone - it will dissolve the Ambroid glue and release the individual combs. Do this outdoors - acetone is not good for you and is very flammable.



Making the assembly jig.

Take a piece of balsa with a cross section larger than the grating you want to make and cut off an inch or two.

Using the above jig cut slots in the end of the balsa - use the end grain so it will not break off so easily - the slots should be about 1/8" deep

Glue the balsa to a base with the slots up

Assembling the grating

Insert enough of the combs into the slots in the assembly jig to make up the width of the grating you want to make - this supports the strips for meshing with the cross pieces

Using a syringe, put a very small drop of wood glue in each of the slots in a comb you will use as a cross piece. I use a wood glue such as Elmers or Titebond that does not set up too quickly. Do not use cyanoacrylate glue - it sets up too quickly and it dissolves in acetone, which will be used in a later step.

Fit the glued comb & press down onto the combs in the assembly jig to be sure they are fully interconnected and cut off any excess length.

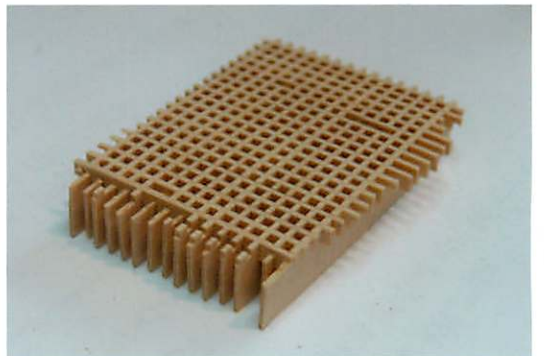
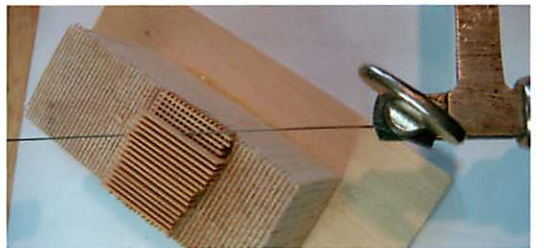
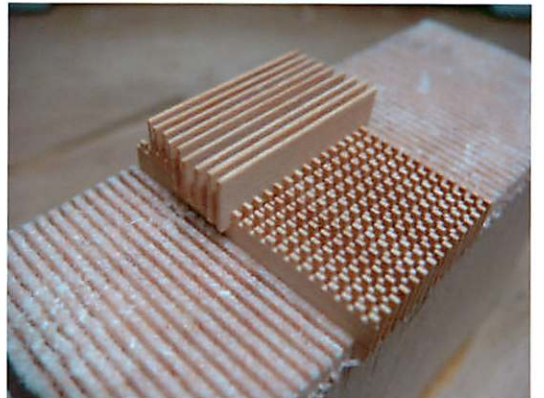
Repeat until you have the length of grating you want.

If the glue budes out from the cross members when you put them in, use a small piece of square brass rod to clean off the excess - do the cleaning after you lay each cross member before the glue dries.

Let glue dry well.

Use a fret saw to cut off the excess strips on the top side of the new grating.

Sand smooth and down to the tops of the cross members. Don't worry if you get some breakage since this will be the bottom of the final grating.



Take the grating out of the assembly jig.

Glue the grating face down on a small piece of scrap wood using Ambroid glue - use a lot of glue, enough glue to totally fill the grating.

Glue two brass rods with a size of a bit more than the thickness you want the grating to turn out along side of the grating - let the glue dry well

Using the fret saw cut the excess strips off using the brass rods as a guide. Add more Ambroid glue if the holes in the grating are not full.

Sand or mill the top of the grating down to the cross members (note that the Ambroid glue will support the grating during this finishing process).

Soak the grating and holder in acetone - it will dissolve the Ambroid glue and release the final grating.

Cut the grating to size and frame it.

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