

"In the Beekeeper's Work Shop"

Building a Bee Hive: The Screened Bottom Board

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The Screened Bottom Board

As the name implies, a bottom board sits at the bottom of the hive; it is the "floor" of the hive (Figure 1). Basically, the bottom board is a platform connected to two side rails. The platform sits $\frac{3}{4}$ " (though we call for $\frac{13}{16}$ ") from the top of the rail; this space lets us put in an entrance reducer when called for.

Times were when the platform was solid, but since the arrival of the varroa mite and the concept of "integrated pest management" (IPM) the "screened" bottom board has become more popular. In a screened bottom board, the platform is replaced by a narrow frame and the central opening is covered by a wire mesh screen.

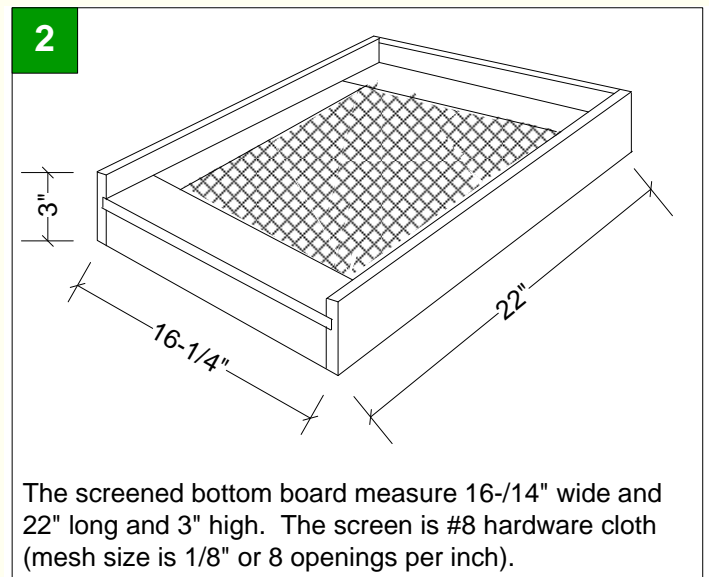
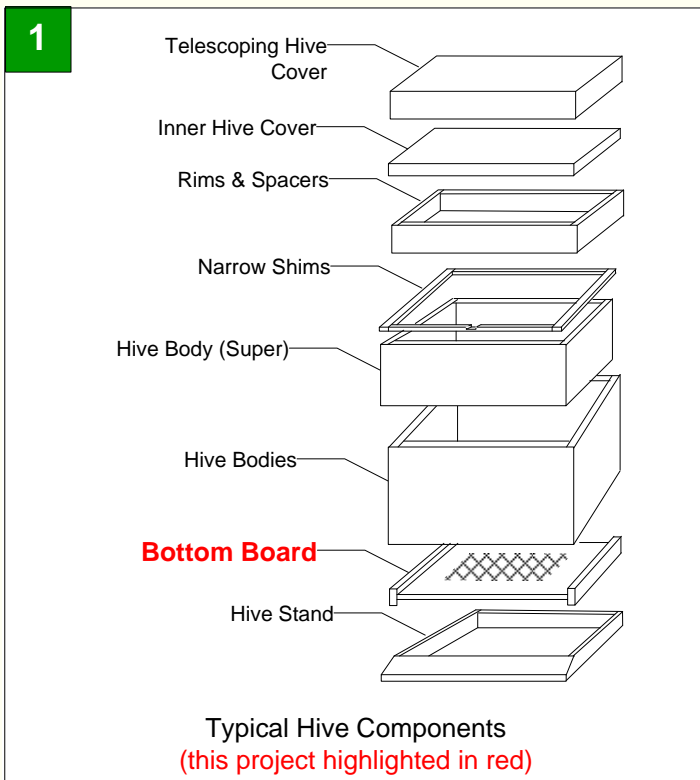
Research has found that a certain number of mites fall to the bottom of the hive as a result of the normal hustle and bustle of the bees above. On solid boards, the mites apparently hitch a ride on passing bees and return to the nest. With a screened bottom, the mites fall through and away from the comings and goings of the passing bees; the mites perish. Using a screened bottom board is a good way to control a certain number of mites in a non-chemical way.

Screened bottom boards also have a role in monitoring mite populations. You can slip a sampling board under the



screen from the rear of the bottom board and count the natural 24-hour mite fall. By charting this count over time, you can get a pretty good idea of the population trend of the hive's mite load. If the trend is up, or sharply up, then it might be time to consider more mite control actions.

The sampling board is also used when dusting your hive with powdered sugar, another IPM mite control strategy. Bees dusted with powdered sugar will groom themselves and each other, thus knocking off a good number of mites. With a bottom board in place, you can count these fallen mites and again get a good idea of the phoretic varroa population of the hive.



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Basic Construction

A screened bottom board is constructed from 1x4 pine and consists of a frame supported by two side rails (Figure 2). The opening of the frame is covered by #8 hardware cloth (8 squares to the inch) which allows the natural mite fall to pass through and away from the bees coming and going. A 1/4" dado (groove) runs along the inside of the rails under the

frame. These grooves allow you to slide in a "sampling" board when counting natural mite fall or for counting mites when treating your hive with a powdered sugar dusting. The sampling board can be a sheet of white corrugated plastic or a piece of tempered Masonite® covered with white adhesive shelving paper. A filler strip on the back (top of the frame) and front (below the frame) complete the bottom board.

Before You Begin...

All of the dimensions shown in the drawings and cut list are for a standard 10-frame hive. A table is provided at the back of this article with the sizes of the various components for an 8-frame and 5-frame "nuc" hive.

Also, a few words should be added regarding the choice of lumber used for a screened bottom board. Some would lean toward using treated lumber, since the bottom board is likely to be close to (or in contact with) the ground. Treated wood in these locations will last longer.

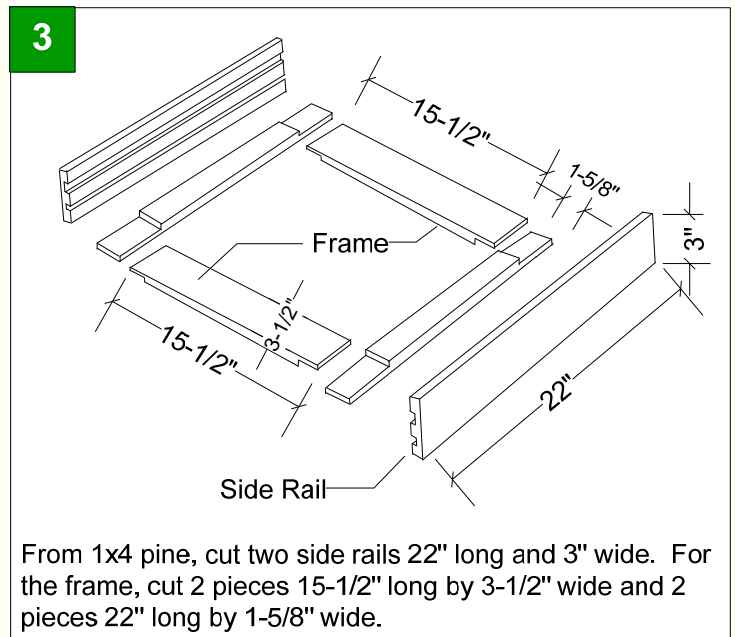
Others may opt for regular (untreated) pine, preferring not to have chemical-saturated wooden ware in their hives. We tend to fall into this latter group. Our bees have enough issues to deal with without us adding on with unknown long-term chemical exposure issues. A properly painted screened bottom board will last a long time. But if we have to replace it a few years earlier than one made out of treated wood, then so be it. In the long term, our bees may be better off because of it.

Construction Details

(For a 10-Frame Hive Screened Bottom Board)

Step 1. Cut the Side Rails and Frame Pieces

From 1x4 pine, cut two pieces for the side rails 22" long and 3" wide (Figure 3). For the frame, cut one front piece 15-1/2" long and 3-1/2" wide, one back piece 15-1/2" long and 3-1/2" wide and 2 side pieces 22" long and 1-5/8" wide.



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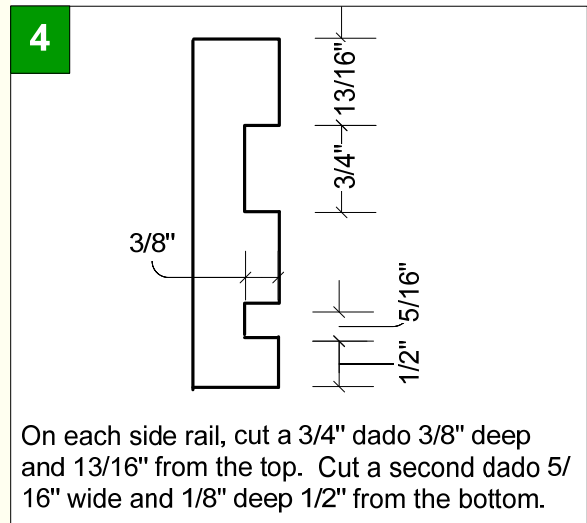
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Step 2. Cut Two Dados on Each Side Rail

You will need two dados running the length of each side rail (Figure 4). The topmost dado is for the frame and is $3/4$ " wide and $3/8$ " deep and $13/16$ " from the top edge. The second dado is for the sampling board and is $5/16$ " wide and $3/8$ " deep and $1/2$ " from the bottom edge.

Using a stacked dado blade makes short work of this operation, though you can make multiple passes with a single blade if that is what you have to do.



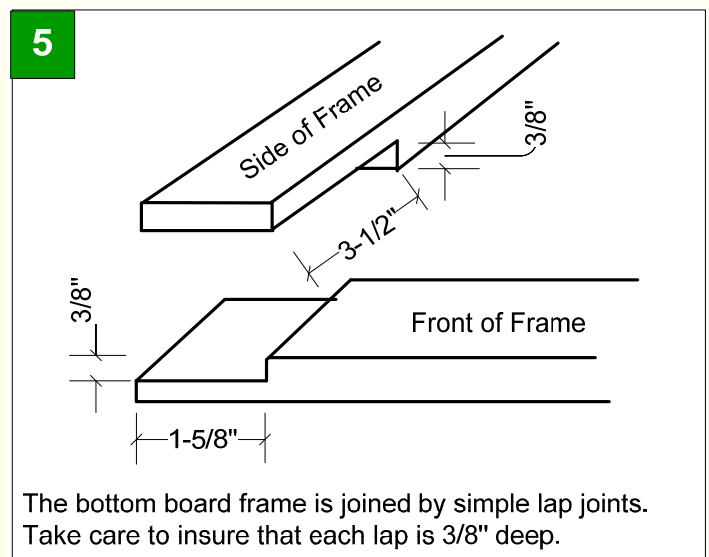
Step 3. Make the Frame

The frame is joined by simple lap joints (Figure 5). This requires that you cut two corresponding rabbets on each joint $3/8$ " deep. On the front of the two side pieces, the rabbet will be $3-1/2$ " wide. All of the other rabbets will be $1-5/8$ " wide.

Everything will work better if your rabbets are exactly $3/8$ " deep, so that when the frame is assembled the joints are exactly $3/4$ " (the same as the boards). You may need to make a few test cuts to make sure the rabbets are $3/8$ " deep (see Photo Gallery, #2).

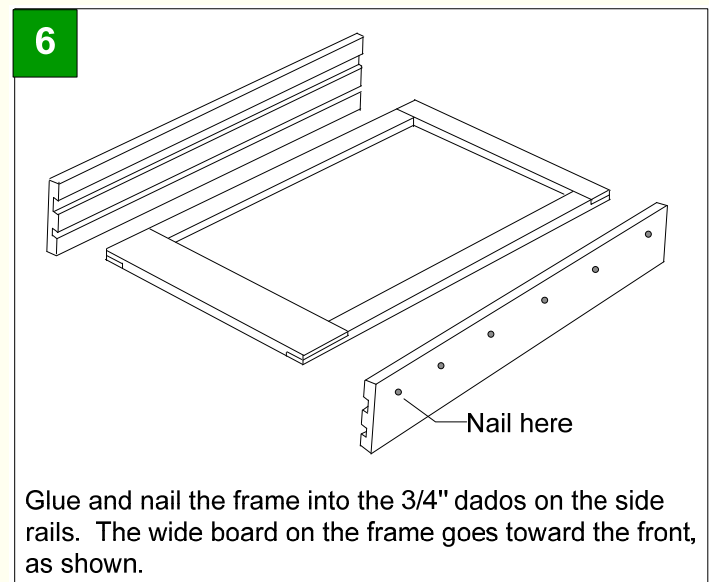
Again, a stacked set of dado blades makes cutting rabbets of this width quick. However, you can also nibble away using the standard blade on your saw.

After dry fitting the frame, glue and clamp each joint, checking for square as you go. Several $1/2$ " brads or staples in each joint can also be used while the glue sets.



Step 4. Assemble the Bottom Board

We can now install the side rails to the assembled frame (Figure 6). The frame goes into the $3/4$ " dado cut into the side rails in Step 2. The wide board of the frame goes toward the front with the notched side down, as shown. Glue, clamp and nail the rails to the frame.



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Step 5. Install Front and Back Fillers

Using scrap 1x4 cut two fillers; one goes on the front below the frame and the other goes on back above the frame (Figure 7). Both fillers will be 14-3/4” long and high enough to fill the gap between the frame and the top (or bottom) of the rail. Glue and nail the fillers to the frame and the side rails.

Step 6. Install the Hardware Cloth

Cut a piece of #8 hardware cloth about 14” by 19” or about two inches large than the opening (Figure 8). The edges of the hardware cloth may be sharp (wire stubs sticking out) so you may want to fold each edge over a 1/2” or so. Then staple the hardware cloth on the top of the frame. An air stapler with 1/2” staples works well for this job. Keep the screening taught as you staple it down.

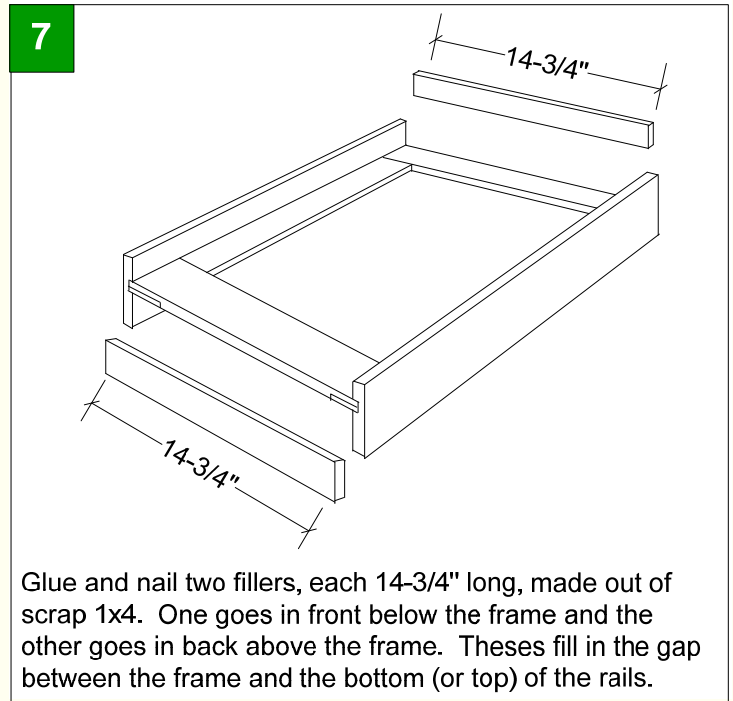
For extra credit, you might want to take some scrap aluminum trim stock and make 1/2-inch protective edges (bindings) around the hardware cloth. Start with 1-inch wide strips of aluminum and bend in half lengthwise for the binding. Slide the binding over the edge of the wire and then staple through the binding. (This is why you never throw away scrap aluminum trim stock, no matter how small the piece!)

Step 7. Make the Sampling Board

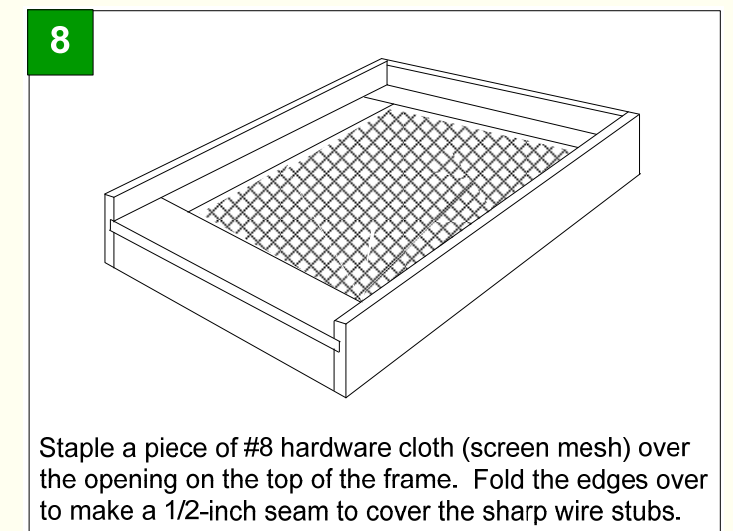
The sampling board can be just about any type of 1/4” material sized to fit in the lower dado (15-3/8” by 21”). White corrugated plastic will work (if you can find it) or you might want to try hardboard covered with white adhesive shelf liner. The white color makes it easier to see the mites when counting.

Step 8. Paint the Screened Bottom Board

We suggest that you paint the screened bottom board using a quality latex primer and two top coats. You may want to paint the bottom board before installing the wire mesh. Don’t skip on the paint job since it will probably be the last time you paint the bottom board. A good paint job will greatly prolong the life of your equipment. We prefer to paint the bottom board before installing the screen.



Glue and nail two fillers, each 14-3/4” long, made out of scrap 1x4. One goes in front below the frame and the other goes in back above the frame. These fill in the gap between the frame and the bottom (or top) of the rails.



Staple a piece of #8 hardware cloth (screen mesh) over the opening on the top of the frame. Fold the edges over to make a 1/2-inch seam to cover the sharp wire stubs.

Resources

Dadant & Sons (1997). *The Hive and the Honey Bee*. Chapter 12.

“Building a Bee Hive” series. Published on-line at www.michiganbees.org/beekeeping/in-the-beekeeper's-workshop. For other beekeeper’s workshop project plans, search for “workshop”.

A video of other projects are available on our YouTube channel...

<http://www.youtube.com/user/beekeepersworkshop>

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List of Materials: Screened Bottom Board

WOOD

			Reference Figure
A	Side Rail (2)	3/4 x 3 – 22	3 & 4
B	Frame Ends (2)	3/4 x 3-1/2 – 15-1/2	3 & 5
C	Frame Sides (2)	3/4 x 1-5/8 – 22	3 & 5
D	Back Filler Strip (1)	3/4 x 13/16 – 14-3/4	7
E	Front Filler Strip (1)	3/4 x 1-9/16 – 14-3/4	7
F	Sampling Board (1) - see note	15-3/8 x 21-1/4	

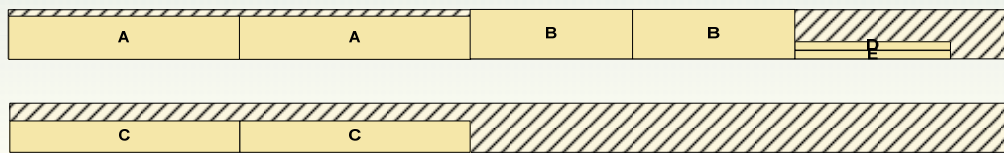
HARDWARE

19" x 14" (approx.) piece of #8 Hardware Cloth
 1-1/4" nails for assembling frame
 1/2" staples
 Franklin's Titebond® Glue
 Paint

Note: Sampling Board can be 1/4" hardboard (tempered Masonite®), plywood or corrugated plastic.

Cutting Diagram: Screened Bottom Board

3/4" x 3-1/2" - 96" (1X4 Pine)



Sizes for Screened Bottom Board

	Outside Dimensions (Assembled)		Frame Ends (B)		Frame Sides (C)	Filler Strips (D&E)	Sampling Board (F)
	Width (in)	Length (in)	Width (in)	Length (in)	Width (in)	Length (in)	Width (in)
5 - Frame	9-1/4	22	3-1/2	8-1/2	1-5/8	7-3/4	8-3/8
8 - Frame	13-3/4	22	3-1/2	13	1-5/8	12-1/4	12-7/8
10 - Frame	16-1/4	22	3-1/2	15-1/2	1-5/8	24-3/4	15-3/8

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Photo Gallery...

1



2



3



4



5



6



7



Photo Captions:

1. Side rail dado being milled; guard raised for photo.
2. Test rabbet for depth. Shown is not deep enough.
3. Cutting the dado for the sampling board; guard raised for photo.
4. Cutting the lap joints.
5. Completed lap joint.
6. All pieces milled and ready to assemble.
7. Note edge seam on screen.