

## **Home Made Mason Bee Paper Liners That Work by Randy Person**

The simplest mason bee homes are holes drilled in wood. While easy to make, they have several disadvantages. Pests, especially mites, are a natural part of the mason bee life cycle. In wood, the mature cocoons cannot be removed for cleaning, so pest populations remain high. It is also nearly impossible to clean the holes for re-use without destroying either unhatched adults or freshly laid eggs.

Many who raise mason bees turn to paper liners. These treated paper or cardboard tubes fit into holes in wood or other medium, or are sometimes used alone. The bees nest in the tubes (or “straws”), which can be removed when the bees are mature. Fresh liners in the holes provide clean nest spaces for the following season. Some liners can be opened for access to the cocoons for cleaning, but many are difficult. In those, bees still emerge in association with pests. Plus, there is the ongoing expense of replacing the liners annually.

If you like to build your own bee houses, and are able to drill long, straight holes, there is a way to make your own lined bee holes. Not only will you save money, but your home-made liners are easily opened to harvest the cocoons for cleaning. Credit for this idea goes to Dave Pehling, of the Washington State Cooperative Extension office in Snohomish County, Washington. He described the idea to me in conversations several years ago, and I have tested and refined the basic idea since.

### **The Block**

The heart of the system is the block. Since I also use the tray systems developed and sold by Beediverse®, my blocks are very close to that size. This allows me to place the Beediverse® blocks interchangeably with my home-made ones. The blocks are 3 ½” square and 5 ½” long. After the backs are added, they are about 6” long, the same as the Beediverse® blocks. Choose a wood with a fairly straight grain – bad grain can pull even a sharp drill bit out of line. Also, don’t use a highly aromatic wood like cedar or redwood, unless it’s well weathered. Their rot and bug repellent qualities work on mason bees, too!

The ideal hole size for mason bees is 5/16”. We’ll drill these 3/8”, and after the liner material is inserted, they will be very close to ideal. For clean holes, use brad point bits. For a series of parallel holes, a drill press is handy, if not essential. Most home drill presses have a maximum hole depth of around 3”, so the holes have to be done in two steps.

First, lay out the hole pattern. I use a 5 x 5 pattern, for 25 holes in each block. Each hole is a little under ¾” from the next, center to center. Various sources suggest spacing from 1” on center on down to bundling the straws and stuffing them into a can. My spacing seems to work well.

Place the block on end in the drill press, and drill each hole as deep as you can. If you clamp a guide onto the drill press table, you can slide the block along it, and be sure the holes are in a straight line. You just have to get the spacing right.

The first step was done with a standard length bit, about 5" long overall. For the second step, I clamp the block to a scrap 2 x 4, which is then held in a vise. Switching to a longer bit in a hand-held drill, finish boring the holes through and slightly into the scrap. The holes drilled on the press serve to guide the long the bit as it completes the holes. Be sure the final product has clean holes with no major slivers or burrs in the holes.

### **The Back**

The back of the block needs to be sealed. Cut a piece of 3/8" or 1/2" plywood or other sturdy material just slightly smaller than the end of the block, so there is nothing hanging out to catch as you install and remove the block. Clamp the end on the block, and drop a long pencil down the sets of four holes at each corner, marking the approximate center of each. Since the holes never come out even, I find this much easier than measuring and guessing. Connect these points diagonally; where they intersect is the optimum spot for screws. Drill lead holes in the back for the screw size you choose – I usually use 1 1/4" drywall or deck screws. Then clamp the back to the block, and use those holes to drill lead holes in the block. Finally, drill clearance holes and countersink the holes in the back. Fasten the back to the block, and then remove the screws. Be sure the block hasn't split (that's why lead holes are needed). Repair with a good water resistant glue if needed.

### **The Rolling Rod**

To get a small roll of paper in those long holes takes help. I use a metal rod a few inches longer than the block. 1/4" diameter works well. So does 3/16", but it's a little harder to use (with my fat fingers). Make sure it's clean and smooth, and be sure there are no burrs on the ends from cutting it. Smooth wood should work fine, too.

### **The Paper**

I've tested many types of paper over several years, including grocery bag stock, typing paper, freezer wrap, cooking parchment, and wax paper. Only the cooking parchment works every time. The wax paper is usually OK. In fact, you may want to line a few holes with it just to watch the bees chew it. It's very strange to see long strings of wax paper hanging down from the holes! The other papers seem to either absorb moisture from the air or trap it inside the tube. Both lead to mold and mortality – do not use them. The cooking parchment I've used is Reynolds Parchment Paper. It's light and translucent white. I've seen other that's heavier and tan, but haven't used it. If you do, let me know how it works.

There should be several layers of paper in each hole. To see how big to cut the paper, start with a piece about 3/4" longer than the block, and four inches wide. Roll it tightly

around the rolling rod, and hold it against the rod as you slip it through the hole and out the back. When the paper is sticking out both ends, release it. It should try to unroll, and will expand to fill the hole tightly. Push one end flush with the front of the block. To measure the width needed, make a small cut through all layers at the point where the corner of the paper is. Then remove and unroll the paper – the cuts will mark full turns. Measure how much is needed for three full turns, plus a little. Then figure how to use your material best, and cut enough rectangles to line each hole. As an example, the material I have is 15” wide. Dividing that into four equal pieces does not give three layers. So I just cut it into thirds, and use pieces 6 ¼ “x 5”. I get nearly a full extra layer, and that’s better to me than being weak.

### **Fill the Holes**

Gather up your blocks, paper, and rolling rod, and plunk down to your favorite TV show or video. You’ll soon get the feel of getting the paper started on the rod, and getting a good, tight roll is the secret to getting the tubes in place easily. If the tubes don’t fill out immediately, push them back and forth a few times. That usually seats them. You’re done loading when all the paper ends are flush with the block on one end, and sticking out the back at the other.

### **Bend the Tubes**

Place the block on it’s face, with the tubes sticking up in the air. Bend each tube sharply down. Bend all the same direction. A sharp crease at the end will maximize available tube space.

### **Seal the Back**

Place the back on the block, and screw it in to secure the tube “tails.” Those closest to the edge will be sticking out. They trim easily with a sharp knife. The block is ready to use.

### **Next Fall**

In the fall when the bees are mature, remove the back, grab the tails, and pull the tubes out. They will maintain shape fine. However, you can easily unroll them to inspect your harvest and clean them. For more information on this, see the fine book written by Dr. Dogterom, available at Beediverse®. Finally, sometime during the winter, cut more paper, re-line the holes, and you’re ready for another season.

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All you need for your own lined bee nest



Roll the paper tightly around the rod



Hold tight, slip rod and paper into hole



Release paper, it unrolls to fill hole



Bend over tails sticking out the back



Screw on back, trim tails; you're done!

For a more complete photo series, see the companion PowerPoint show,  
**Paper liners that work.ppt.**