

# AZ-HIVE

Author: Thomas Arnesen



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# Forword

This document has been created with the best intentions, aiming to provide a comprehensive guide for constructing an AZ-beehive. Since it is currently a theoretical outline, there may be some inaccuracies. The goal is to manufacture all the parts detailed here and verify the measurements. I will also be producing a YouTube series to document the build process and include additional instructions for constructing this type of beehive.

Please note that this document is still a work in progress, but anyone who purchases this book/build description will receive all future updates for free.

To purchase the book/build description, please send 10€ or 11\$ to [thomas.arnesen@tega.se](mailto:thomas.arnesen@tega.se) via PayPal. Be sure to include your email address in the comment section, and you will receive a link to download the PDF. Please keep the link private, as the cost is quite low, and I rely on these funds to build the beehives and the bee house, which will allow me to produce the YouTube series.

The common parts regardless of which hive you build are described in the first chapters and description that only fits a specific hive are described in the hive chapters.

**If you have use for the plans and want to contribute, feel free to send a small amount via PayPal to [thomas.arnesen@tega.se](mailto:thomas.arnesen@tega.se) but dont feel obligated, it is totally free.**

**If you want to spread the document, please use the link to the document as it is expected to evolve.**

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# AZ Hive

## Introduction

The purpose of this document is to enable anyone to build an AZ Hive in a home workshop. While having advanced tools like a table saw and a planer/moulder can make the process easier, they are not mandatory. Take your time to ensure that the parts are precise—small errors made in the beginning will be very noticeable in the end.

The AZ Hive is designed for easy management and maintenance, making it ideal for beginner beekeepers. Its design also minimizes disturbance to the bees, leading to healthier and more productive colonies. The hive is intended to be housed in a bee house, which helps regulate the temperature of the hive and allows you to manage or inspect the hives in almost any weather. Handling frames and inspections become easier since there are no heavy lifts once the hive is in place. Additionally, you only need to paint the front of the hive if it is placed inside a bee house.

This guide will walk you through the steps to build an AZ Hive from scratch using basic woodworking tools and materials. The frame size used in this guide is Langstroth, as equipment like honey extractors often accommodate Langstroth frames. However, you can adapt the hive to fit any frame size you prefer.

## Safety Precautions

**Always keep pets and children away from your dangerous tools and dust.**

1. When building an AZ Hive, safety should be your top priority. Working with woodworking tools and materials can pose risks, so it's important to follow these safety precautions to protect yourself:
2. **Wear Protective Gear:** Always wear safety goggles to protect your eyes from wood chips and dust. Use a dust mask or respirator when cutting or sanding wood to avoid inhaling sawdust. Gloves can protect your hands from splinters and sharp tools, but ensure they fit properly so they don't get caught in machinery.
3. **Keep Your Workspace Clean and Organized:** A cluttered workspace increases the risk of accidents. Keep your tools and materials organized, and clean up sawdust regularly to prevent slips and improve visibility.
4. **Use Tools Correctly:** Read and follow the manufacturer's instructions for all tools and equipment. Ensure that you know how to operate each tool safely before use. Never bypass safety features on tools, such as guards on saws.
5. **Maintain Sharp Tools:** Dull tools are more dangerous than sharp ones because they require more force and are more likely to slip. Keep your tools sharp and well-maintained to reduce the risk of injury.
6. **Be Mindful of Electrical Safety:** Ensure that your power tools are in good working condition with no frayed cords or exposed wires. Use grounded outlets and avoid overloading circuits. Keep cords away from water and flammable materials.
7. **Work in a Well-Ventilated Area:** Woodworking can produce a lot of dust and fumes, especially when using glue or finishes. Work in a well-ventilated space to avoid inhaling harmful particles and fumes.
8. **Secure Your Workpiece:** Use clamps or a vice to hold your workpiece in place when cutting or drilling. This will prevent the wood from moving unexpectedly, reducing the risk of injury.



9. Take Regular Breaks: Working for long periods can lead to fatigue, increasing the risk of accidents. Take regular breaks to rest and stay alert.
10. Keep a First Aid Kit Handy: Accidents can still happen despite precautions. Have a well-stocked first aid kit in your workshop to deal with minor injuries immediately.
11. Stay Focused: Avoid distractions while working with tools. Stay focused on the task at hand and avoid using tools if you are tired, under the influence of substances, or otherwise impaired.

By following these safety precautions, you can reduce the risk of accidents and enjoy a safe and productive woodworking experience as you build your AZ Hive.

## Materials Needed

- Lumber
- Nails
- Screws
- Queen excluder net
- Net for the inner doors
- Wood glue
- Hinges
- 8 mm metal rods
- Frame spacers

## What we will build

- Four types of AZ-hives
- Queen excluder
- Level dividers
- Inner doors
- Outer door
- AZ-frames (langstroth measurements)
- AZ-frames (400 mm high)
- Varroa bottom

## Tools Needed

### The minimum

- Saw
- Router
- Drill
- Metal saw
- Hammer
- Speed Square
- Screwdriver
- Measuring tape
- Sandpaper
- Electric drill, ofcourse it works with a manual one if you have

## Good to have

- Miter saw  
This makes all cutting faster and precise.
- Planer  
So you don't need to buy pre planed lumber
- Jointer  
To get your joints 90 degrees
- Drill press

## Luxury

- 2 or 4 sided moulder  
This is invaluable when making the bee frame rabbet and also when create all your boards to the right dimension but it is not worth it if you only use it for your AZ-hive build.

# Frames

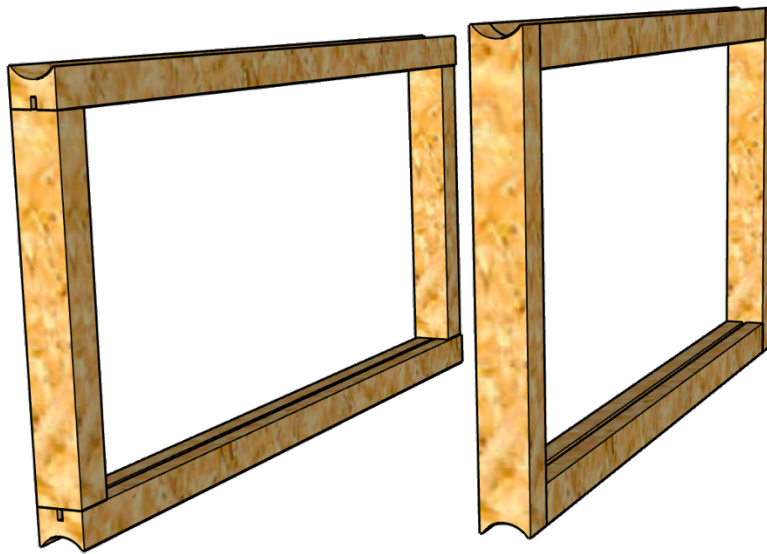
In this description I adapt the frames to Langstroth size.

Why adapt to Langstroth?

The reason is simple: many people already have equipment designed for Langstroth frames, so it might be a good idea to make the frames the same size. If you prefer a different frame size, you can adapt the measurements to any frame size you like, if you also adapt the AZ Hive dimensions accordingly.

To create the frames, I use planed lumber because it ensures more precise measurements and provides a nicer finish. However, using planed lumber is not strictly necessary.

An AZ-frame looks like this



*Figure 1 AZ frame and assembly alternatives*

The outer dimensions of the frames are 448 mm long and 232 mm high. You can choose how to mount the frames. I prefer the method shown on the left because it makes it easier to manufacture the profiled boards.

## Top and bottom bar

- **Left Assembly:** If you use the assembly method on the left, the top and bottom bars should be 408 mm long, 20 mm high, and 25 mm wide.
- **Right Assembly:** If you use the assembly method on the right, the top and bottom bars should be 448 mm long, 20 mm high, and 25 mm wide.

The groove for the wax is 3 mm wide and 6 mm deep and can be made using a table saw, for example. The U-shaped groove on the top and bottom can be created with a router. I use a multi-headed planer to shape the top and bottom bars, and then I cut them to length with a miter saw. However, most people might not have access to a multi-headed planer.

## Side bar

The side bars should be 25 mm wide and 20mm thick.

- **Short Side Bar:** If you mount the top bar on the end of the side bars, the side bars should be 192 mm long.

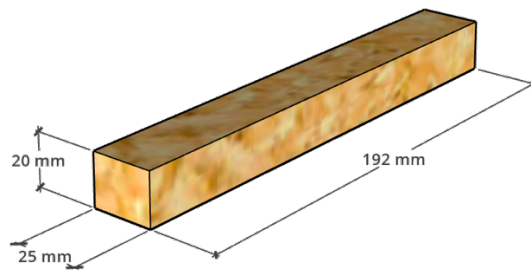


Figure 2 Short sidebar

- **Long Side Bar:** If you mount the top bar on the side of the side bars, the side bars should be 232 mm long.

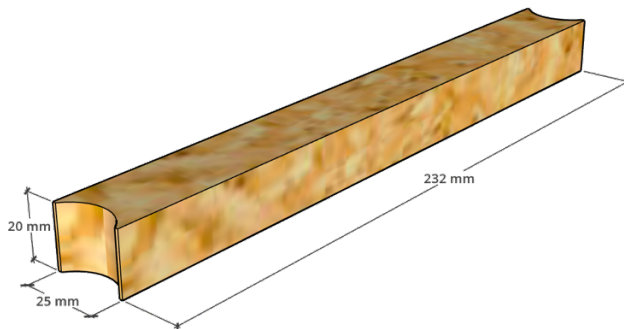
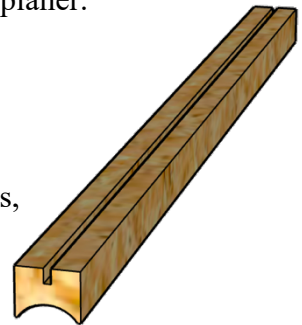


Figure 3 Long sidebar

For the long side bar alternative I would plane a board down to 25 mm, cut it to length and create the groove on the end with a router and then cut up the boards to 20mm wide pieces.



# Internal Separators

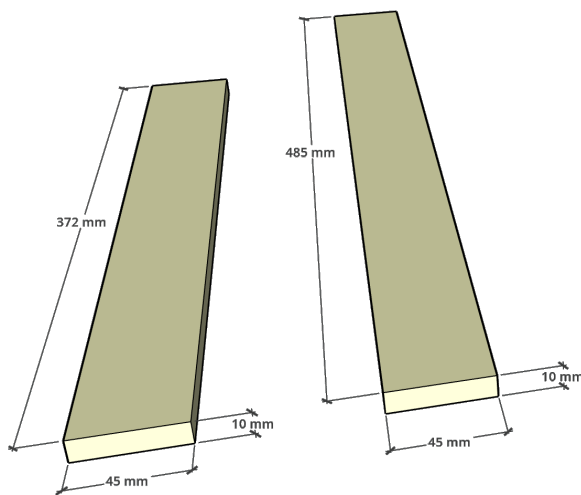
## Queen excluder

The queen excluder is a crucial component of the hive, preventing the queen from accessing certain areas while allowing worker bees to move freely. This helps in managing brood and honey storage. You will need both queen excluders and “Bee Space Dividers”.

You can purchase excluders at a bee equipment store. They are available in metal, plastic, or wood. I prefer the metal ones as they last longer and I believe they are better for the bees. This guide is designed for metal excluders.

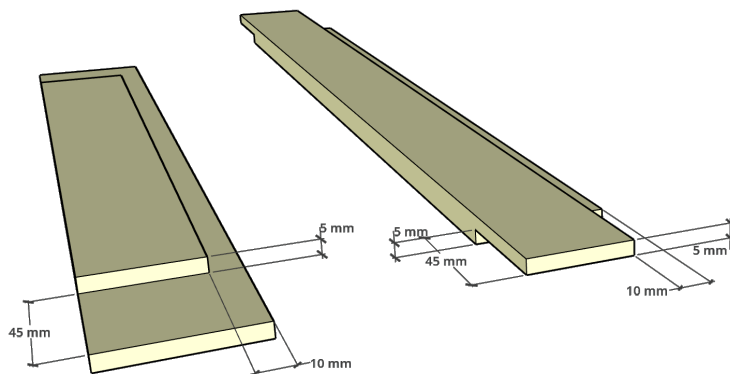
To create the frame, you will need four boards:

- 2 pieces: 10 mm x 45 mm x 372 mm
- 2 pieces: 10 mm x 45 mm x 485 mm



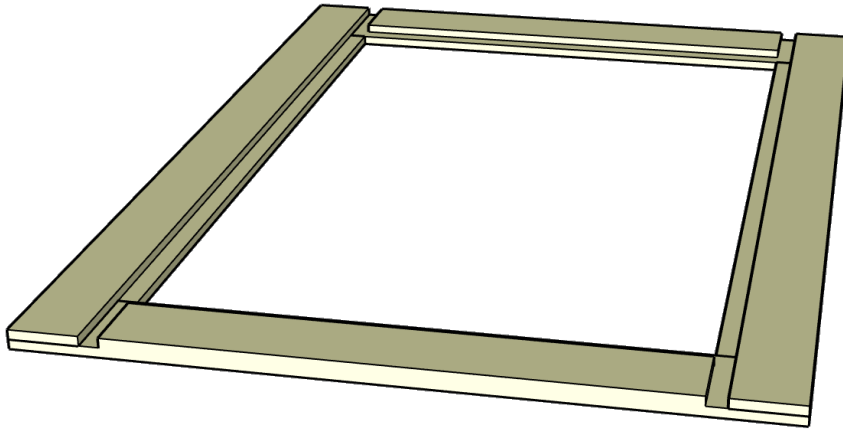
*Figure 4 Boards for the queen excluders*

On one side of each board, create a 5 mm deep rabbet that is 10 mm wide. Additionally, create a rabbet 5 mm deep and 45 mm wide on both ends of the boards using a router. Note that the 45 mm rabbet on two of the boards needs to be on the opposite side.



*Figure 5 Boards with rabbet*

Now, glue the boards together to form the frame.



*Figure 6 Asembled frame for the queen excluders*

Next, fit a queen excluder into the frame. You will need one queen excluder for each beehive and 1-3 dividers, depending on the number of levels in the hive you are building. Glue strips of wood over the holes created by the 10 x 5 mm rabbet to secure the excluder.

## Bee Space Divider

Between the levels that do not have a queen excluder, you need a divider to maintain the correct bee space and provide a resting place for the inner door. This prevents the bee space from becoming too high.

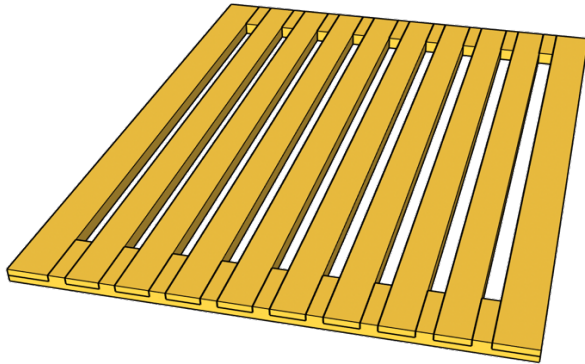


Figure 7 A bee space divider

For this divider, you will need the following components:

- **Left and Right Long Boards (2 pieces):**

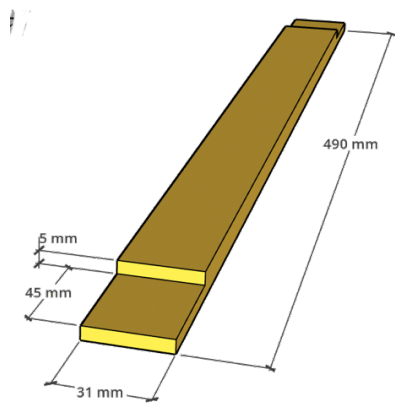


Figure 8 The left and right long boards

- **Inner Long Boards (8 pieces):**

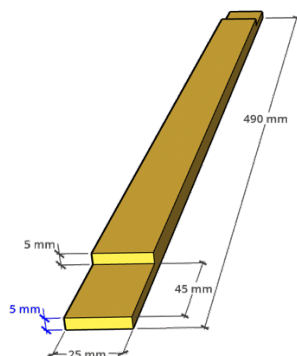


Figure 9 The inner long boards

- **End Boards** that hold the entire structure together (2 pieces):





# Bottom inner floor

## Varroa floor

Varroa, specifically *Varroa destructor*, is a parasitic mite that primarily affects honeybees (*Apis mellifera*). This tiny arachnid is a major threat to bee populations worldwide and is often referred to as the Varroa mite. The varroa floor is designed to help monitor and manage mite infestations by providing a way to observe the mite population within the hive, allowing timely treatment when necessary.

To build the varroa floor, you will need the following components:

- Start by creating a planed sideboard that is 490 mm long, 38 mm wide, and 20 mm thick.

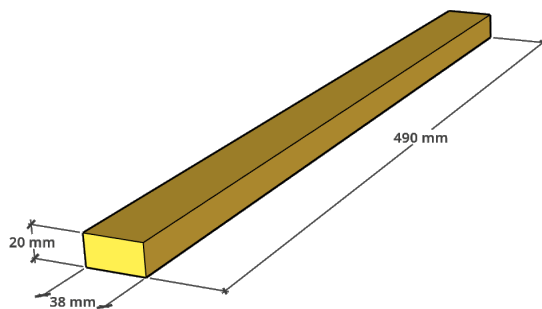


Figure 11 planed sideboard

- Make a 20 mm wide and 10 mm deep rabbet at one end of the sideboard.

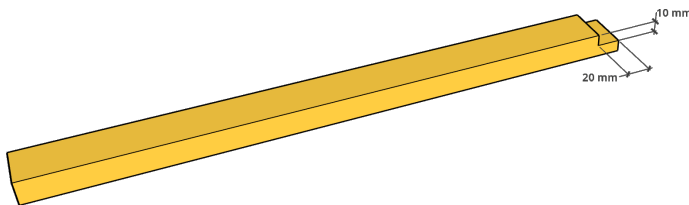


Figure 12 Side board with end rabbet

- On each side of the board, create 10 mm deep rabbets. One rabbet should be 10 mm wide and the other 12 mm wide. Note that these rabbets should be mirrored on the left and right board.

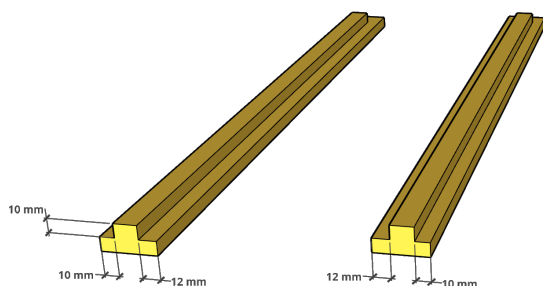


Figure 13 Side boards with rabbets for top and bottom boards

- Create a backend board that is 350 mm long, 28 mm wide, and 20 mm high.

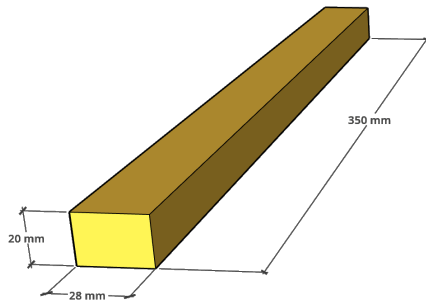


Figure 14 End board

- Prepare a short top board that is 350 mm long, 35 mm wide, and 10 mm high to help hold the varroa mesh.

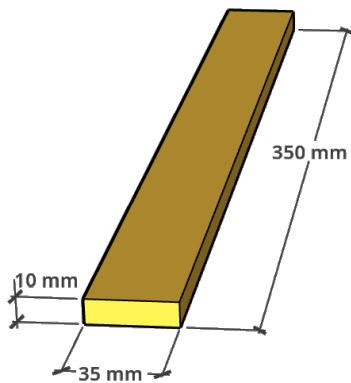


Figure 15 Short top board

- Prepare a long top board that is 420 mm long, 35 mm wide, and 10 mm high to hold the varroa mesh.

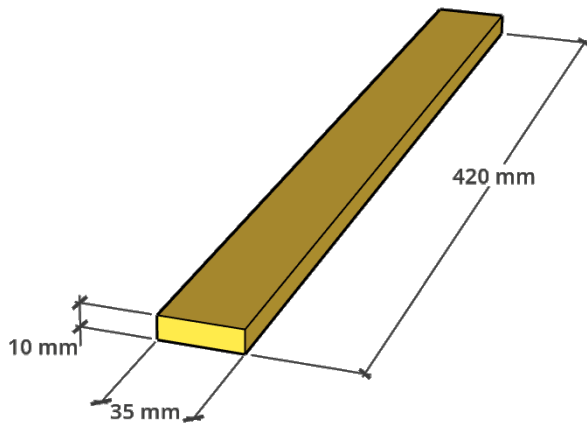


Figure 16 Long top board

- Purchase a mesh for the varroa board, with a mesh size of 3-4 mm. Cut it to approximately 390 mm x 530 mm.

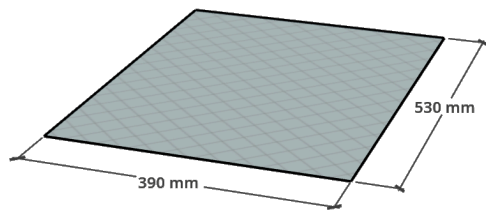


Figure 17 Mesh

- Glue and nail the backend board to the sideboards with the 12 mm rabbet positioned at the bottom.

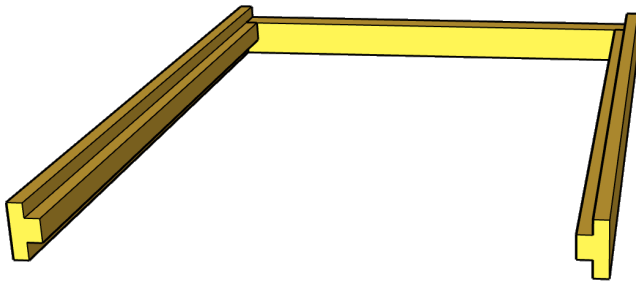


Figure 18 First assembly, sides and backend

- Dry fit the top boards without fastening them, as you will need to add the mesh first.

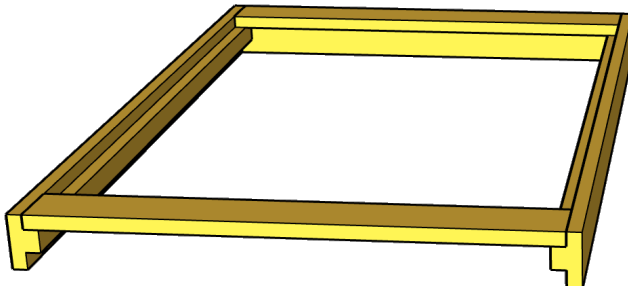


Figure 19 Dry fit the short top boards

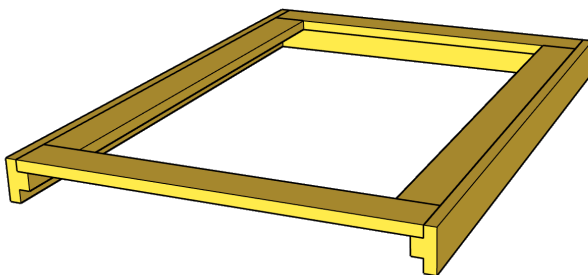
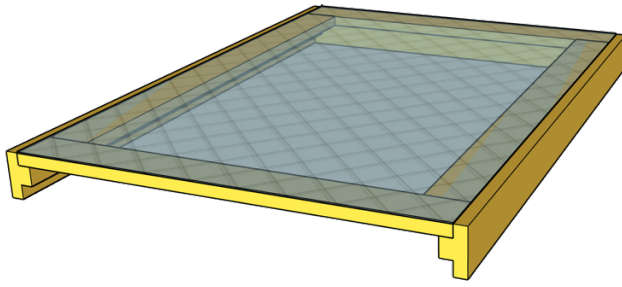


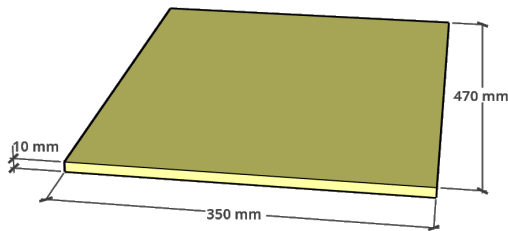
Figure 20 Dry fit the long top boards

- Attach the mesh with a 20 mm overlap around the top boards. Start by gluing and nailing one side to provide stability for the mesh.



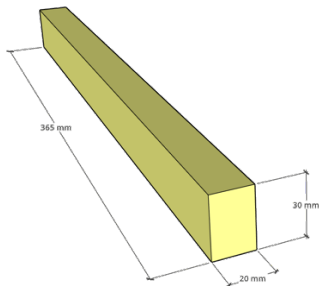
*Figure 21 Varroa bottom with mesh*

- Create the bottom board using 10 mm plywood.



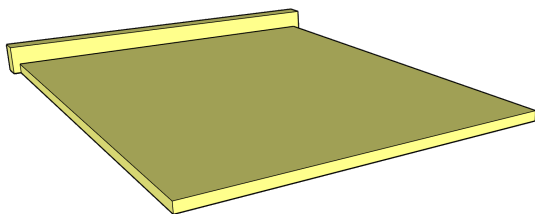
*Figure 22 Bottom board*

- Make a handle for the bottom board. If you prefer, you can add a groove to the handle for a better grip.



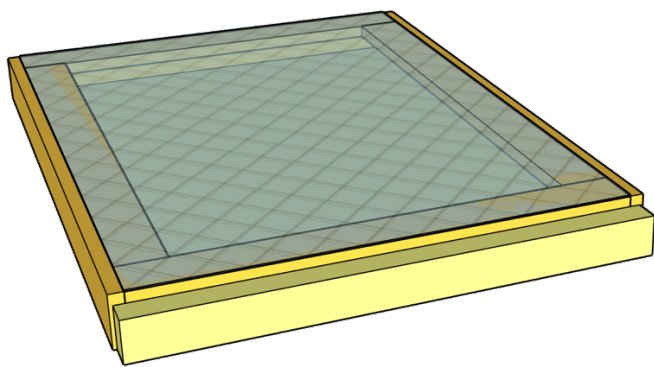
*Figure 23 Handle*

- Glue and screw the handle to the bottom board. Drill pilot holes for the screws to prevent the bottom board from splintering.



*Figure 24 Bottom board with handle*

The end result should look something like this.



*Figure 25 Varroa floor*

Feeder floor

## Roof and bottom

The roof and bottom are identical for all hives described here. You will need six boards, each 100 mm wide, 20 mm thick, and 412 mm long, and one board that is 50 mm wide, 20 mm thick, and 412 mm long.

1. **Assemble the Panel:** Glue the seven boards together to form a panel measuring 412 mm x 650 mm..

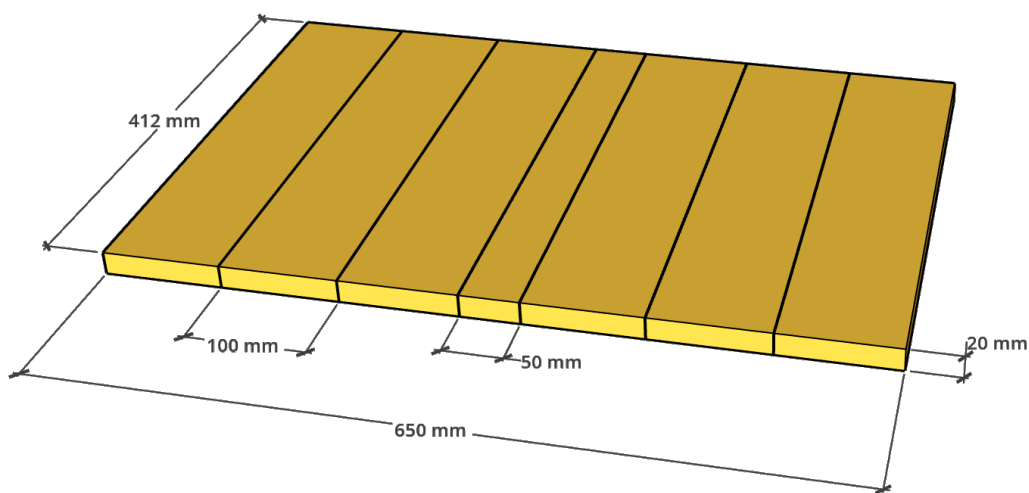


Figure 26 Roof and bottom

2. **Route the Rabbet on the Long Sides:** Using a router, create a rabbet (a recessed groove) that is 20 mm wide and 10 mm deep along both long sides of the panel.

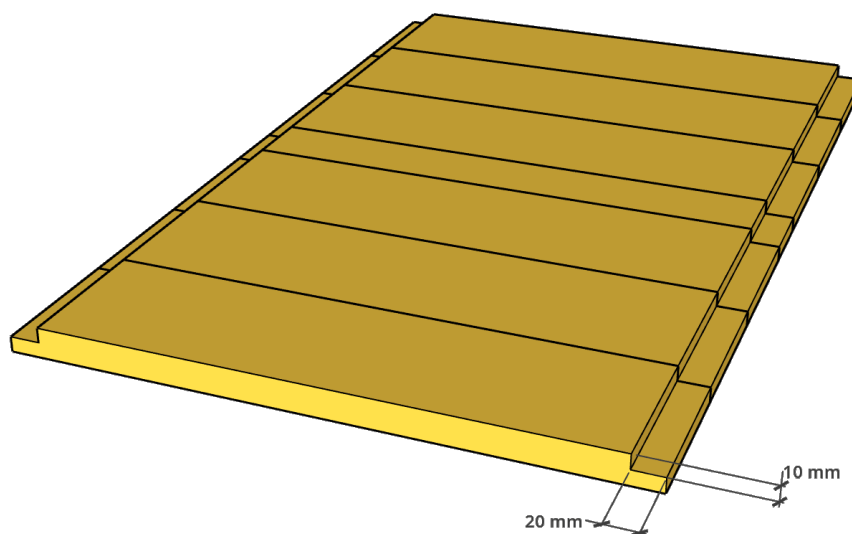
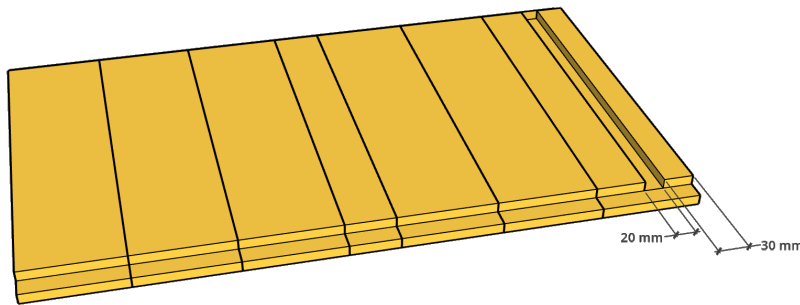


Figure 27 Roof and bottom with rabbet

1. **Create the Rabbet for the Inner Wall:** On one of the short sides, create a 20 mm wide rabbet, 10 mm deep, positioned 30 mm in from the edge. This rabbet will accommodate the inner wall of the hive.



*Figure 28 Rabbet for the inner wall*

## Inner door normal

Each level of the hive has an inner door with a screen, allowing you to access each level without significantly disturbing the other levels. This design also enables you to open the back door and inspect the hive without exposing the entire hive to the bees.

The height of each door is 250 mm, and the width is 372 mm. Since wood is a living material, you may need to adjust the size slightly to prevent the door from fitting too tightly and becoming stuck over time.

You can use contraprofiles with your router. If you decide to do so, remember to account for the profile depth when creating the door—I learned that the hard way! If you forget, you can hang it up in your workshop as a reminder not to make the same mistake again.

In this guide, we will use the simpler method of half-lap joinery, similar to what we used for the queen excluder.

### Materials Needed:

- Two boards: 250 mm x 35 mm x 20 mm
- Two boards: 372 mm x 35 mm x 20 mm
- 1-3 mm metallic mesh

1. **Prepare the Boards:** Rip a board and plane it down to 35 mm x 20 mm, then cut it to the required lengths.

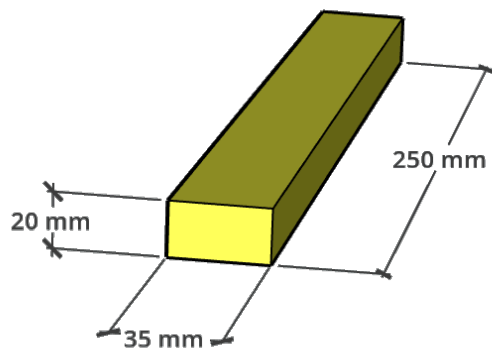


Figure 29 Side inner door board

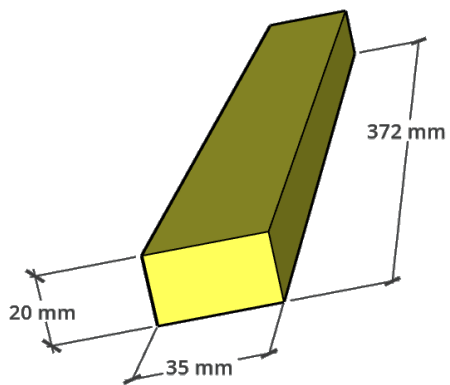


Figure 30 Top and bottom inner door board

2. **Create the Half-Lap Joints:** Route a rabbet on both ends of the short boards.

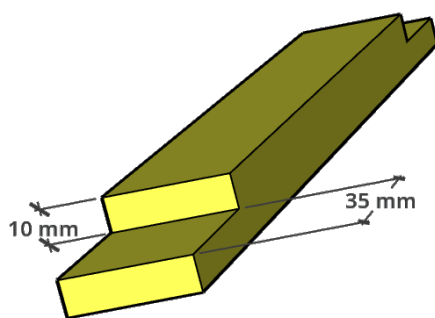


Figure 31 Side board with cut out for lap joint



Repeat the process for the long boards.

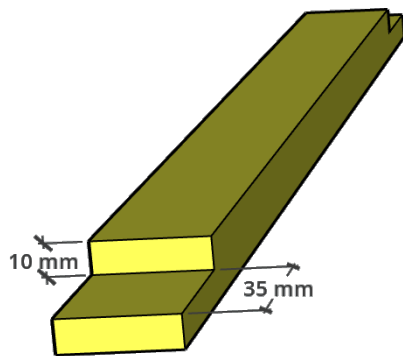


Figure 32 top and bottom bord with cut out for lap joint

3. **Assemble the Frame:** Use wood glue to attach the boards, forming a rectangular frame. Measure from corner to corner to ensure the frame is square.

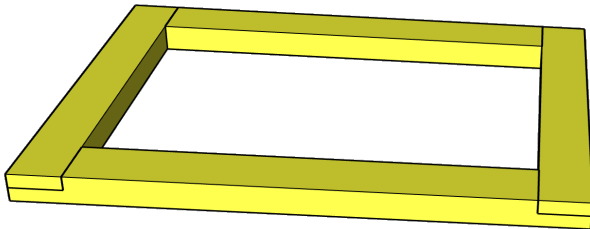


Figure 33 Assembled inner door frame

4. **Rout the Rabbet for the Mesh:** With a router, make a rabbet inside the frame that is 10 mm wide and 10 mm deep.

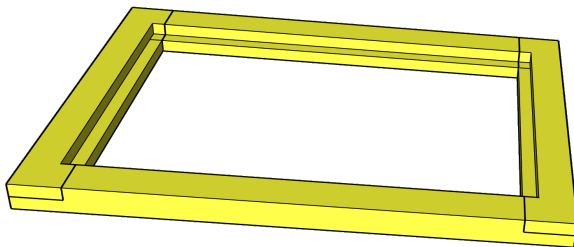


Figure 34 Rabbet routed for mesh

5. **Prepare the Mesh:** Cut a metallic mesh to approximately 220 mm x 340 mm, with 1-3 mm holes.

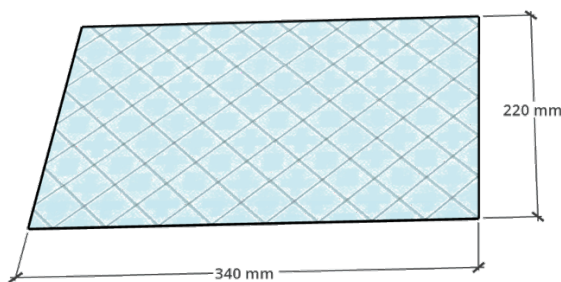
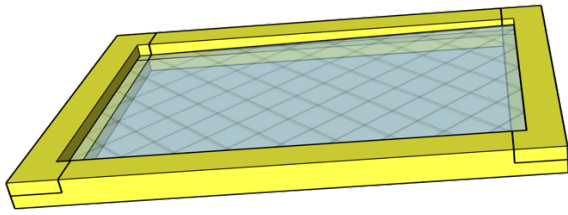


Figure 35 Mesh

6. **Attach the Mesh:** Place the mesh on the frame.



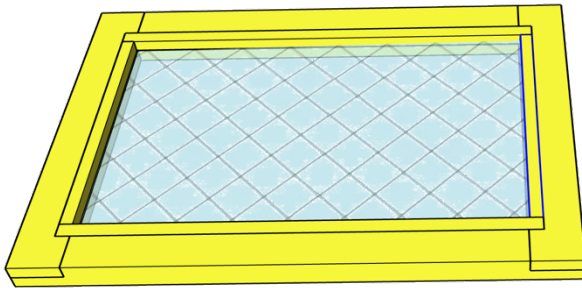
*Figure 36 Mesh placed on the inner door*

Make several 9 mm x 10 mm strips to secure the mesh.



*Figure 37 Fastening board for the mesh*

7. **Secure the Mesh:** Fasten the mesh using glue and the small boards.



*Figure 38 Inner door with fastened mesh*

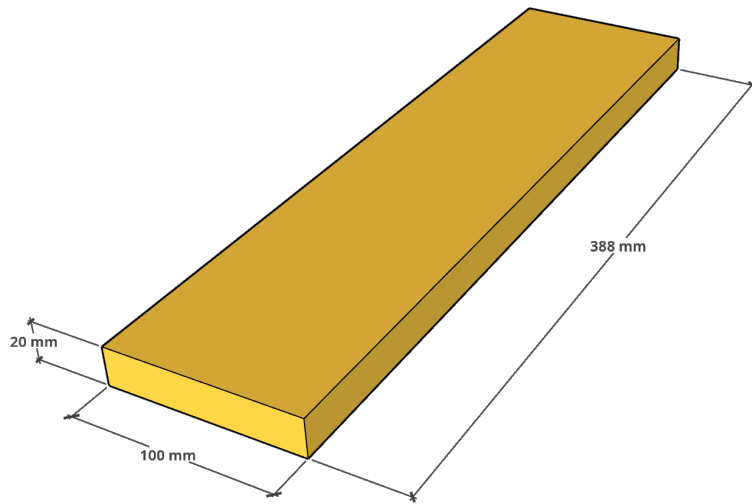
If you wish, you can add a door knob to the door for easier handling.



## Inner wall

For the inner wall, use boards that are 388mm long, 100mm wide, and 20mm thick. These boards will fit into the 20mm x 20mm slots on the side walls.

1. Split some boards as needed to make them fit perfectly.
2. Depending on how exact the slots are and the exact thickness of the board, you might need to trim the thickness fitting in to the slots a bit.

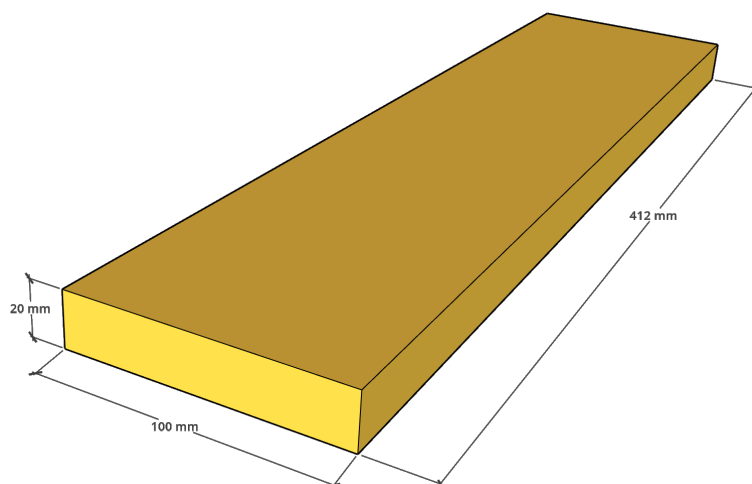


*Figure 39 Inner wall board*

## Front wall

Use boards that are 412mm long, 100mm wide, and 20mm thick for the front wall.

1. Split some boards if necessary to ensure a snug fit.
2. The front wall will support the hive structure.



*Figure 40 Front wall board*

## Isolation

For isolation between the inner and outer walls, use 30mm Stone Wool. This material is preferred because it deters ants and other pests.

1. Cut the Stone Wool to fit snugly between the walls.
2. Add wind protection paper inside the Stone Wool to provide additional insulation for the bees.



*Figure 41 Stone Wool reenforced*



*Figure 42 Wind protection*

## AZ-Hive 4 levels

When it comes to the hive boxes, the height and placement of the rods are the major difference and of course the back door to fit the height.

## Side boards

We need 12 boards, each 100 mm wide, and two approximately 50 mm wide boards. The total height of the side is 1108 mm, which includes an additional 20 mm (10 mm each for the roof and bottom). The depth of the hive is approximately 670 mm, including 20 mm for the front boards. The thickness of all boards is 20 mm.

The lumber used should be 100 mm wide, 20 mm thick, and 1088 mm long. The 50 mm board will be split in two, resulting in two equal boards that are approximately 50 mm wide, likely 48 mm.

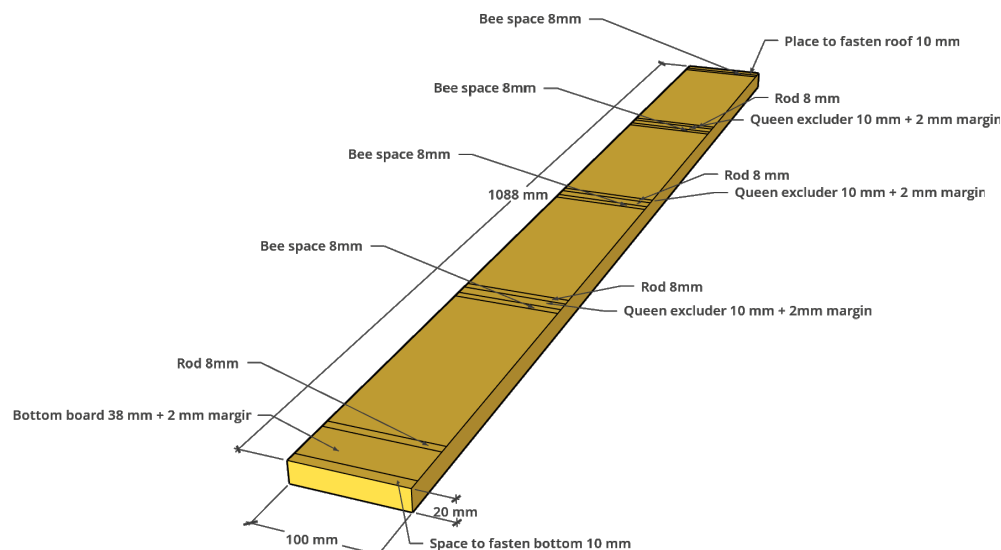
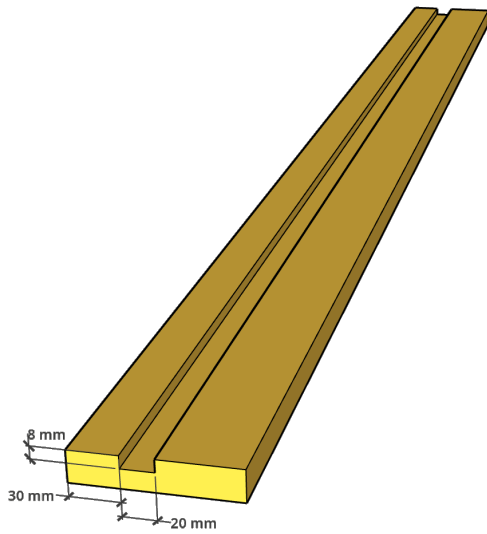


Figure 43 Calculating the side board, not showing the frame heights

### First front board

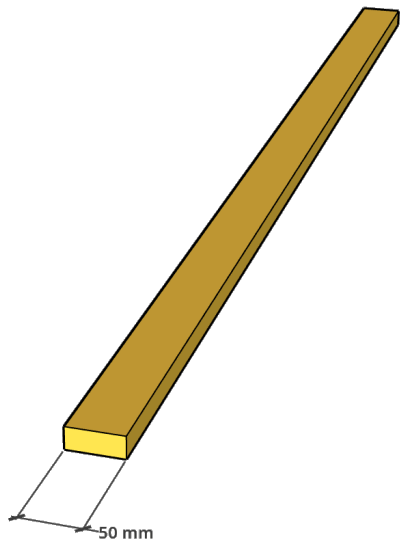
You need two of these boards. On the first side board at the front, route a groove to add the inner wall. A 30 mm space between the inner and outer wall will be filled with insulation.



*Figure 44 First side board to the front*

### Second board

You need two of these. The easiest way is to take one of the 100 mm boards and cut it in half.



*Figure 45 Second board*

### Board with slots for the rods

You will need six of these. Use a router to create slots for the rods. Each slot should be 10 mm wide and 8 mm deep. To allow the rods to be removed and added easily, each slot should be 100 mm long.

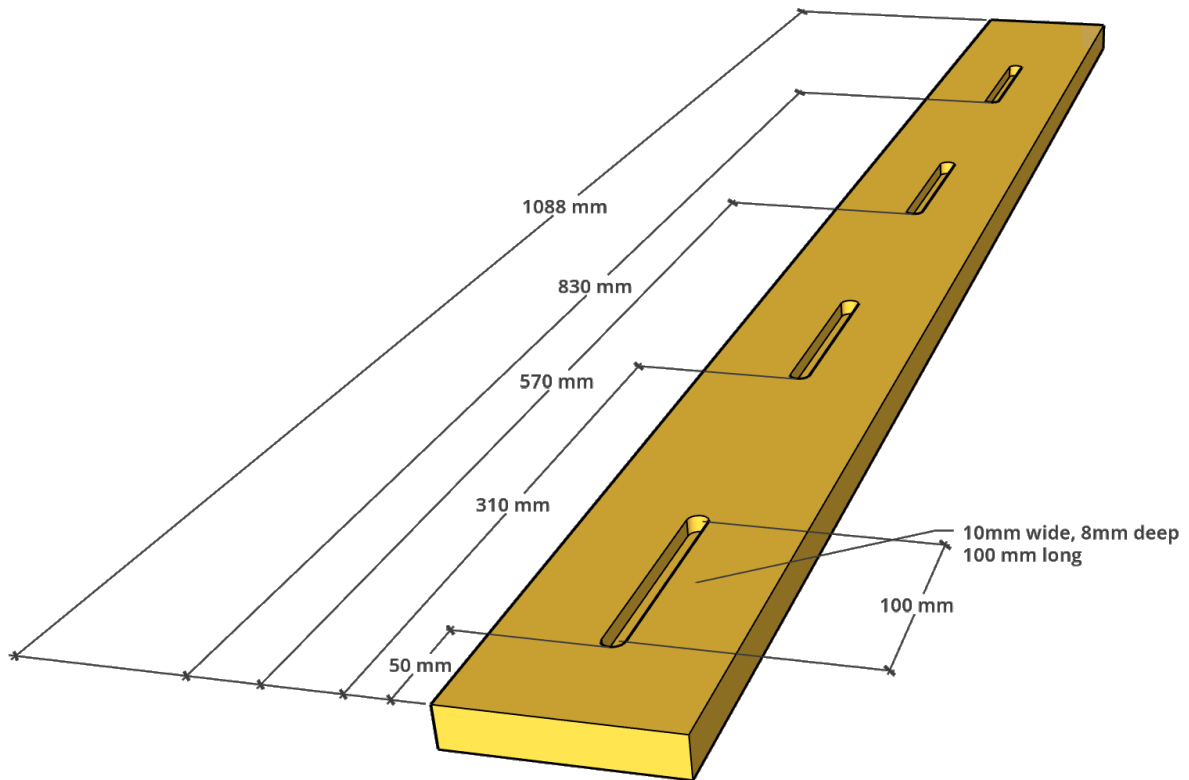


Figure 46 Board with rod slots



## Back door

For the frame of the back door, I prefer to use hardwood like birch, and for the door panel (mirror), birch plywood. This method is simple and effective. While you could use hardwood for the entire door, the approach outlined here is easier and uses hardwood just for the frame.

### Materials for the Back Door Frame:

- **Side Frames:** Two planed boards, each 1108 mm x 80 mm x 20 mm
- **Top and Bottom Frames:** Two planed boards, each 412 mm x 80 mm x 20 mm
- **Creating the Rabbets:**
  - On each end of the short boards (top and bottom frames), create an 80 mm wide and 10 mm deep rabbet.
  - On the long boards (side frames), create 80 mm wide rabbets, positioned 80 mm from the end.

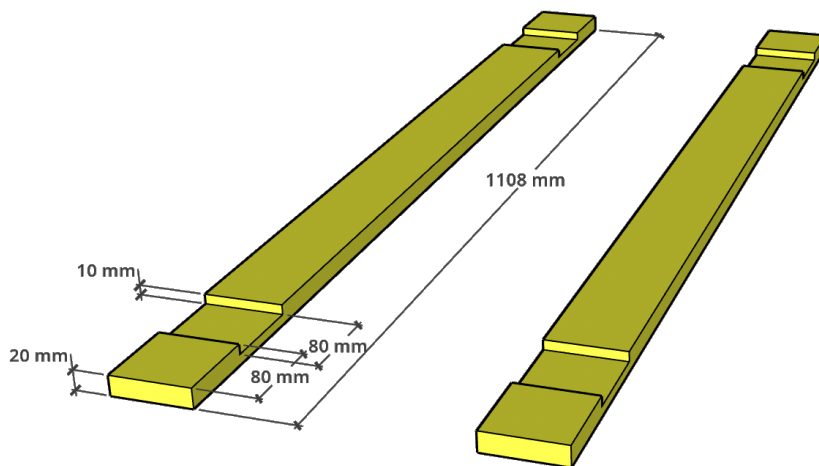


Figure 47 Long frame boards for back door sides

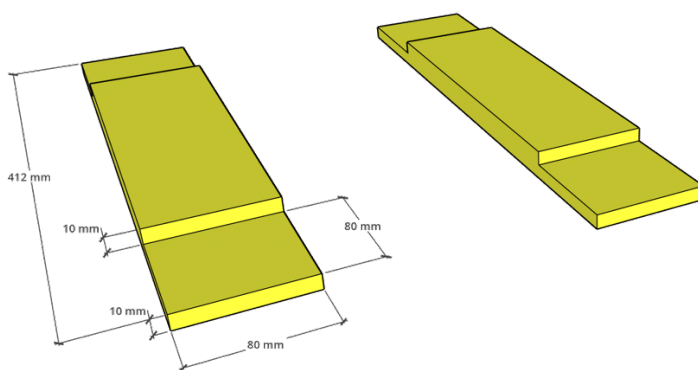
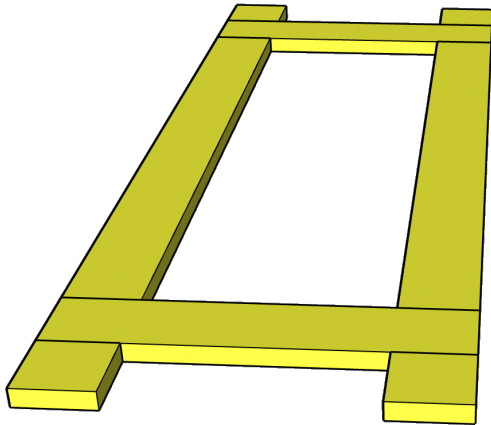


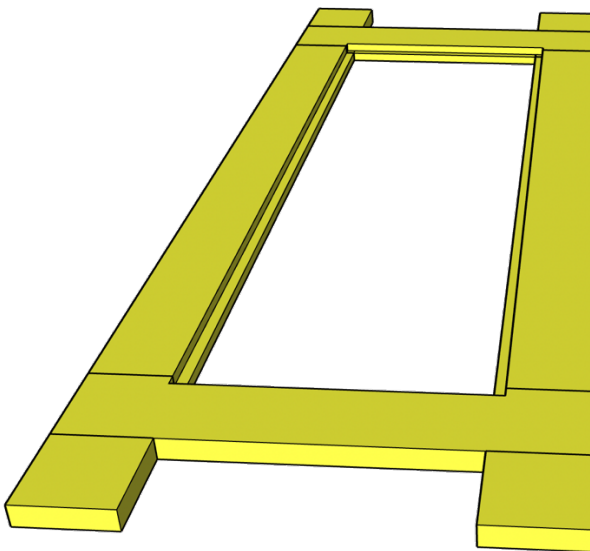
Figure 48 Short frame boards

- **Assembling the Frame:**
  - Glue the boards together to form the door frame.
  - Measure the diagonals to ensure the frame is square. If the diagonals are the same, the frame is properly aligned.



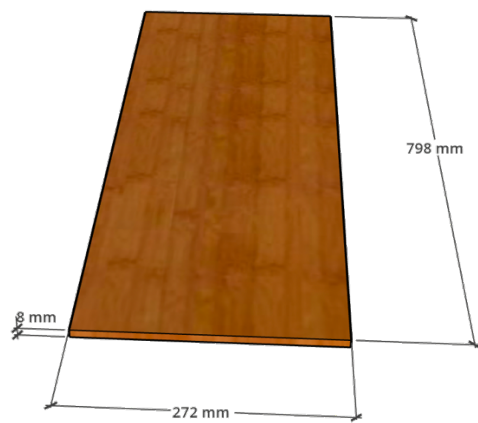
*Figure 49 Frame assembled*

- **Routing the Inner Rabbet:**
  - Route a 10 mm wide and 10 mm deep rabbet around the inner edge of the frame to hold the door panel



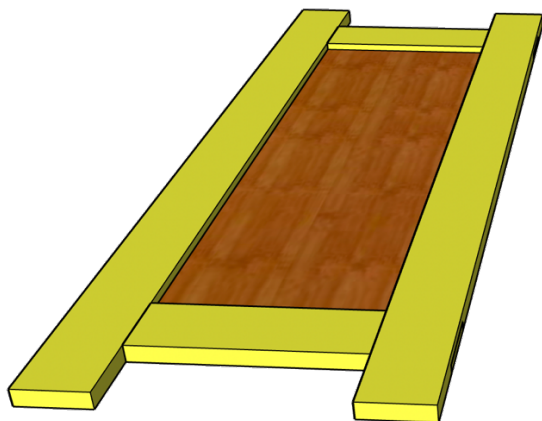
*Figure 50 Frame with rabbet*

- **Cutting the Door Panel:**
  - Cut out the door panel (mirror) from 6-10 mm thick birch plywood to fit within the frame's rabbet.



*Figure 51 Plywood for mirror on the door*

- **Attaching the Door Panel:**
  - Glue and nail the panel in place securely.



## Ventilation Openings

For ventilation, you will need two boards, each 252 mm x 80 mm x 20 mm. These boards will create adjustable openings on the door.

### 1. Creating Ventilation Boards:

- Cut two boards to the specified dimensions for the ventilation openings.

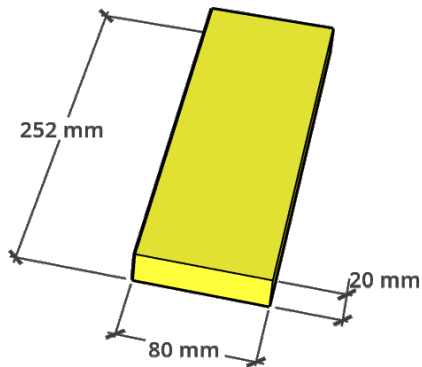


Figure 52 Ventilation board

### Attaching the Ventilation Boards:

- Attach the ventilation boards to the door using hinges, allowing them to open and close.

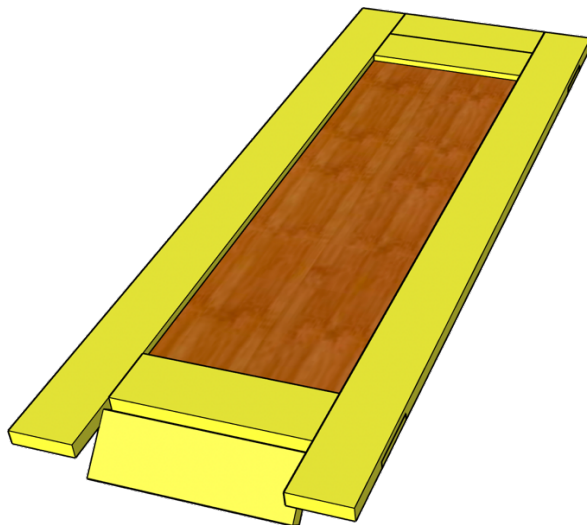


Figure 53 Door with ventilation boards.

### Optional Magnet Mechanism:

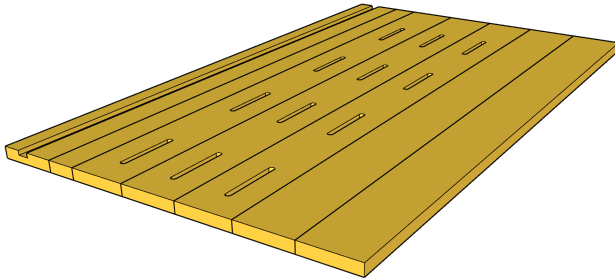
- You can add magnets to the inside of the door to allow the lower ventilation board to open and close. The upper ventilation board will remain open by gravity.

### Final Assembly

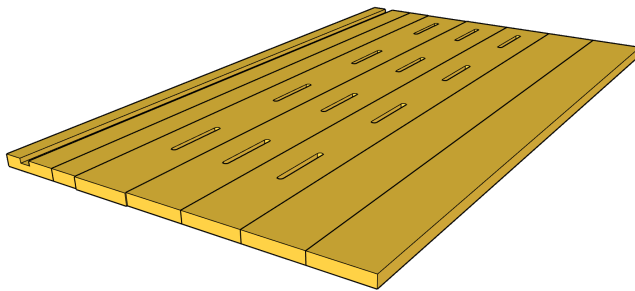
- Once the back door is assembled, install it onto the hive. Ensure the ventilation boards are correctly aligned and functional.

## Assembly

**Sides:** Assemble the sides using the provided boards. The 50 mm boards should be placed as the second board to correctly align the rod slots.

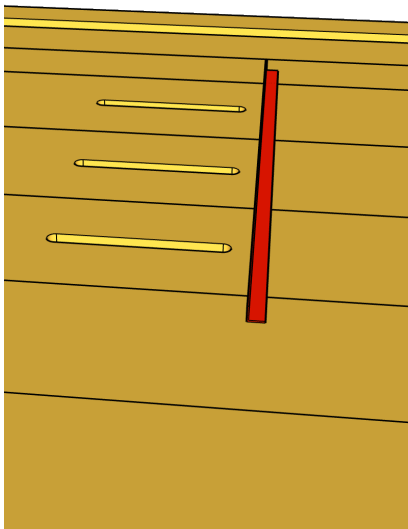


*Figure 54 The first side*



*Figure 55 The second side, Note that it is mirrored compared to the first side*

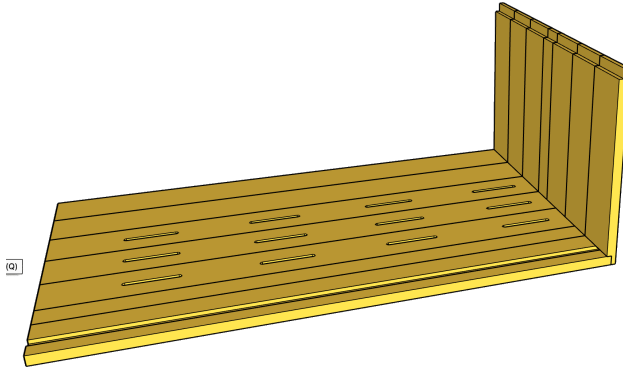
On both side panels, install shelves using angle irons, positioning them 12 mm below the rod rest for the queen excluders and false queen excluders. These shelves should not be added to the bottom row.



*Figure 56 Side with shelf*

## Adding the Bottom

1. Attach the bottom panel using nails. Ensure it is securely fastened to prevent any gaps.
2. Check that the panel is level and properly aligned with the sides.

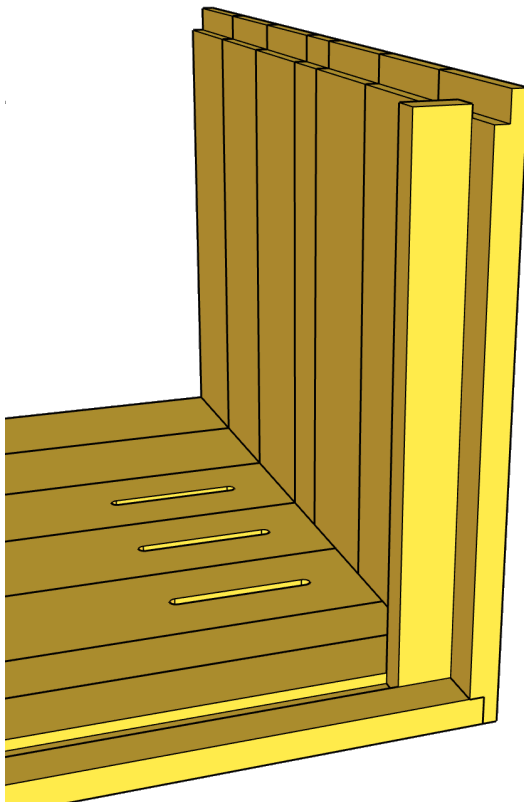


3. .

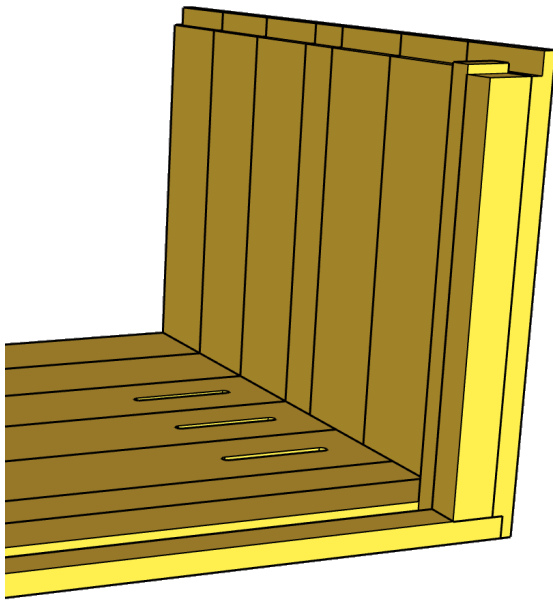
*Figure 57 Bottom fastened*

## Inner Wall Assembly

- Start by adding a 48 mm wide board to the inner slot and secure it with a few nails from the bottom.
- Continue adding inner wall boards, using 12 mm wooden spacers for bee entrances.



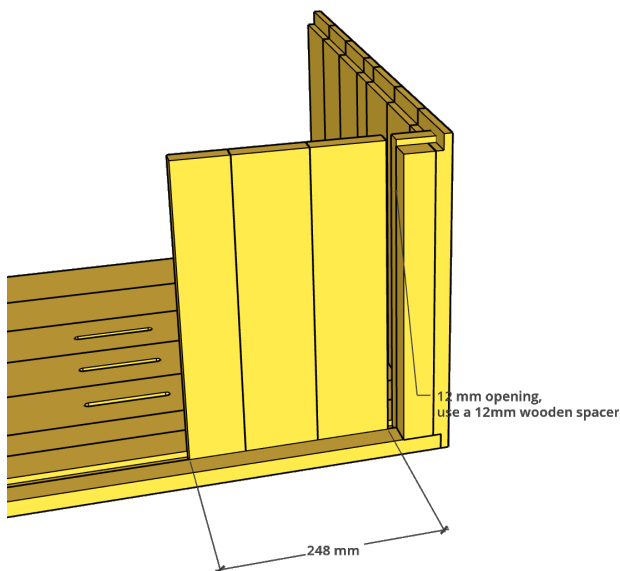
*Figure 58 First inner wall board*



*Figure 59 In between board for the entrance.*

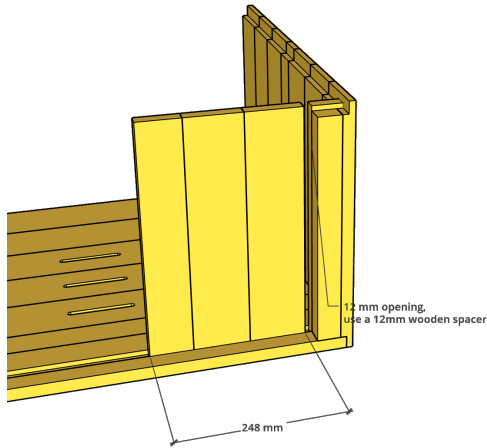
Add a 12 mm wooden spacer for the bee entrance before adding the next inner wall board. You can cut a 12 mm strip from a 20 mm thick board and shorten it to about 8 mm or slightly longer. The bees won't mind if the entrance length is 372 mm or 360 mm, but your sense of perfection might!

Continue adding inner wall boards up to the next entrance, which should be about 2 mm below the alignment of the second level's rod slots.



*Figure 60 More inner wall with 12mm bee entrance*

Add a 12 mm wooden spacer for the bee entrance before adding the next inner wall board. Then, continue adding inner wall boards up to the next entrance, approximately 2 mm below the second level's rod slots.



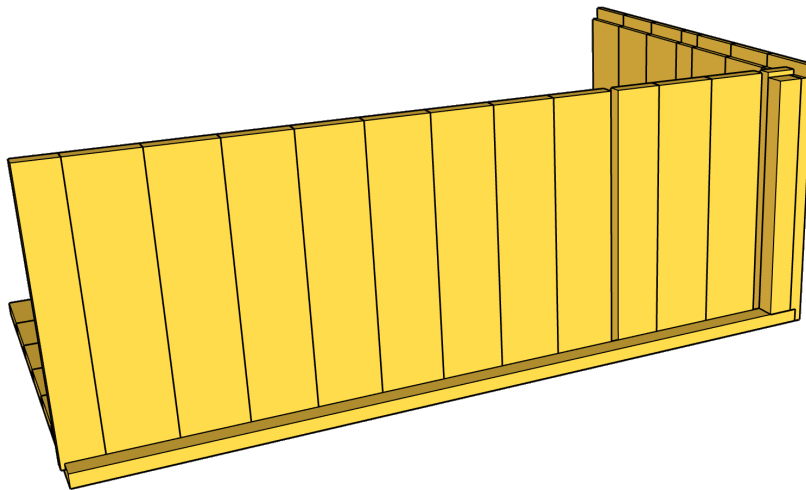
*Figure 61 Add more inner wall boards*

Add another 12 mm spacer and the rest of the inner wall boards.

Note that you do not need to fasten the inner wall boards, but place a nail on the board just above the entrances.

This can be done when the second wall and roof are in place if it is easier.

The last inner board should be cut 5 mm above the side board to fit in the roof rabbet. Do not make it fit the full 10 mm deep rabbet, as wood moves with moisture.



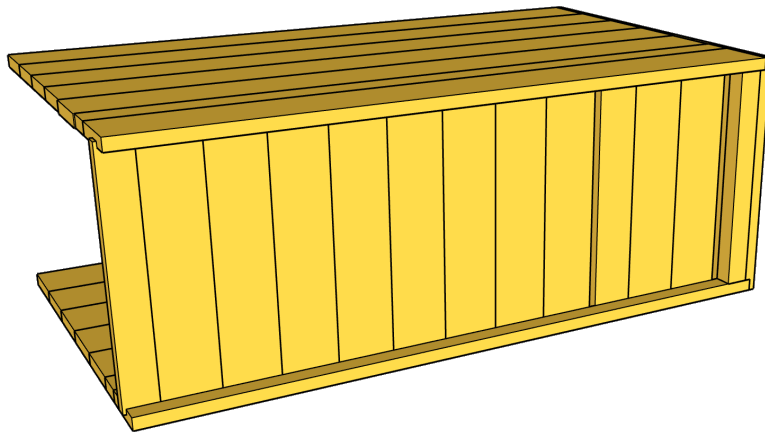
*Figure 62 The rest of the inner wall*

### **Add the Second side wall**

Once you've added all the inner wall boards, proceed to add the second side wall. You may face some difficulty fitting the inner wall boards into the rabbet, but it should work after



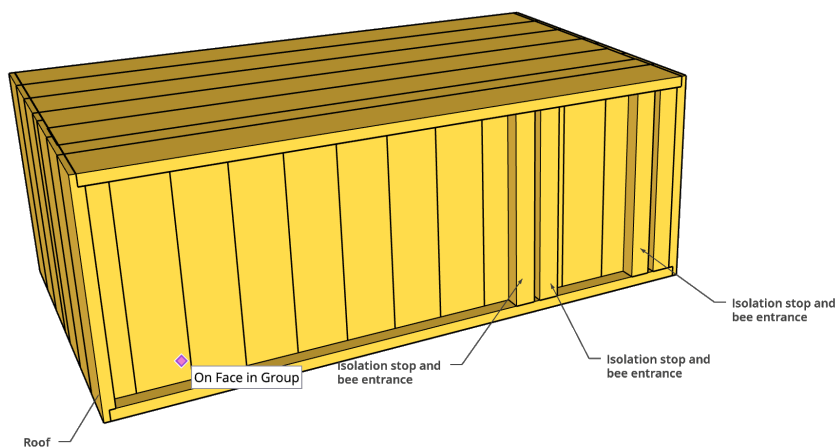
some tries. Secure the second side wall with nails at the bottom and one nail on the inner wall boards, just above the entrances.



*Figure 63 Second side wall added*

### **Add roof and isolation boards**

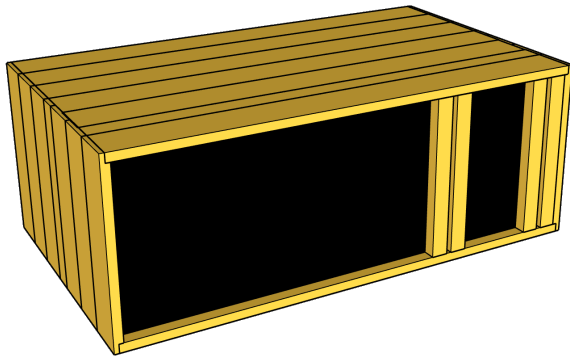
Add the roof and the boards that will hold the insulation in place. These boards will also serve as the bee entrances.



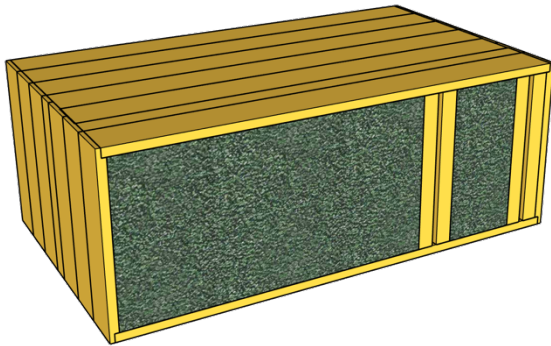
*Figure 64 Roof and bee entrance.*

### **Add isolation**

Once the inner wall is complete, add wind protection (such as wind paper) and insulation (stone wool or similar)..



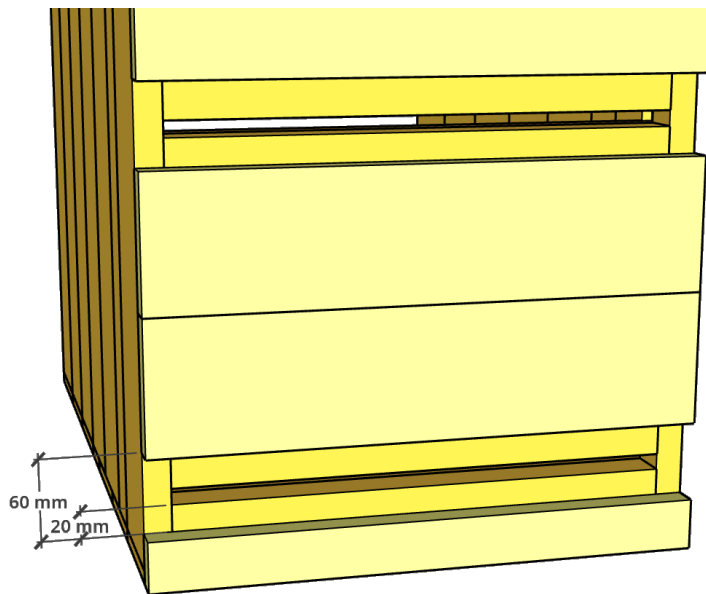
*Figure 65 Added wind paper*



*Figure 66 Stone Wool isolation*

### Add front wall

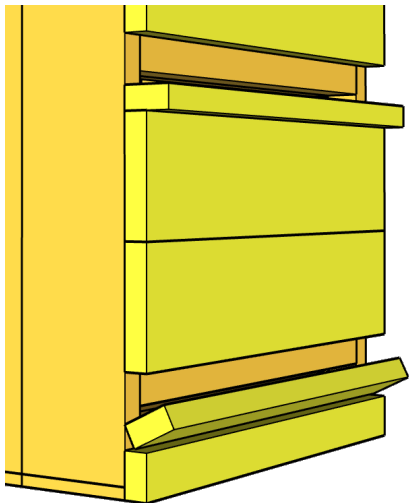
Attach the front wall boards, leaving a 20 mm space below the front entrance and a total of 60 mm.



*Figure 67 Front wall boards*

### Add closable entrance

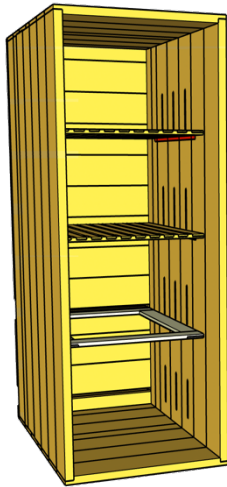
Use a 412 mm x 40 mm x 20 mm board for the closable entrances. Attach them using hinges.



*Figure 68 Closable entrances*

Add a locking mechanism to secure the entrance during transportation. You can use either a metal lock or a wooden lock that rotates to lock the entrance.

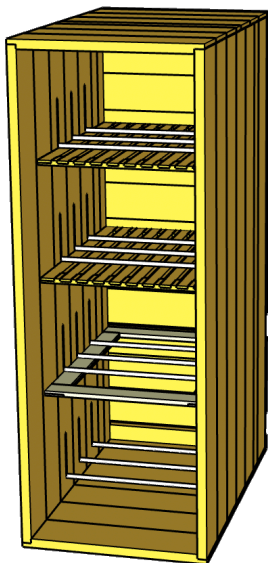
- Place the queen excluders on the shelves.



*Figure 69 Box with queen excluder and divider*

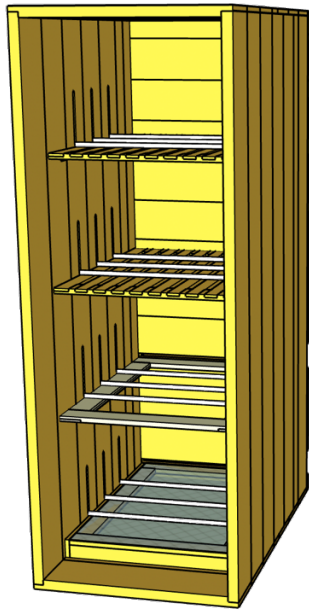
Cut the rods to the correct length. If you made the slots for the rods 8 mm deep, the rods should be 388 mm long. Adjust the length slightly if necessary, depending on the depth of your slots. The main thing is to ensure that the rods are secure and cannot fall out on their own.

Insert the rods into place, ensuring they are secure and cannot fall out by themselves..



*Figure 70 Rods added, check that they cant fall of by them selfs*

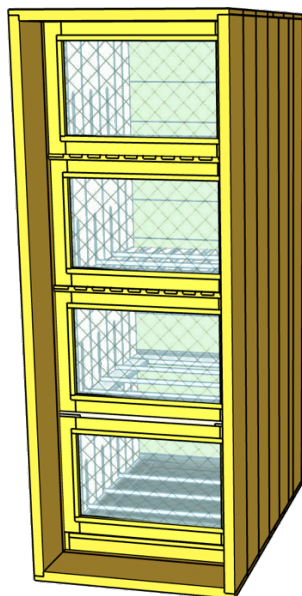
Add the varroa floor



*Figure 71 Varroa floor added*

Add two bee frame spacers on the inner wall per level, along with corresponding spacers on the inner doors. Add the frames and dry-fit the inner doors. If the doors fit too tightly, you can plane down 1-2 mm on the sides to ensure easier handling later.

Mark where the door locks should be positioned.



*Figure 72 Inner doors added.*

For the locks, you can use hatches or rods.

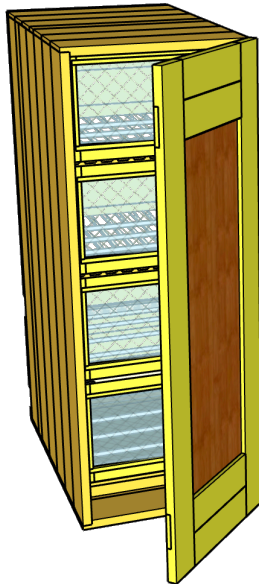
Add the locks and assembly the inner doors again.

### Adding the Outer Door

Lastly, add the outer door using **lift-off hinges**.



These hinges allow you to remove the door easily without the need to unscrew anything, making it more convenient for inspections or maintenance. Once the hinges are attached, ensure the door is aligned properly and test the lift-off functionality to ensure it operates smoothly.



*Figure 73 Finished hive*

And the hive is finished.

# AZ-Hive 3 levels

## Side planks

The total height of the side is 826 mm, that includes 2x10 mm that the roof and bottom adds. The depth is approximately 670 mm including 20mm of the front boards and the thickness is 20 mm.

We use lumber that are 100 wide, 20 mm thick and 826 mm long. The last board we split in two so we get two equal boards that are approximately 50 mm wide, probably 48mm.

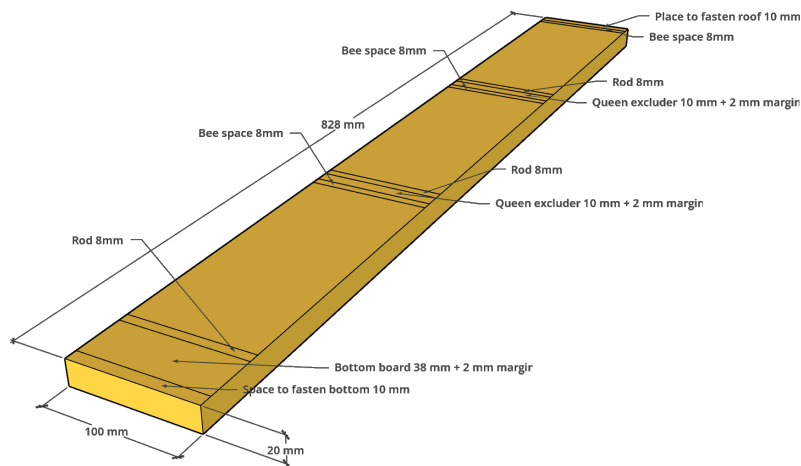


Figure 74 Calculating the side board, not showing the frame heights

## First front board

On the first side board to the front we need to add a routed groove to add the inner wall. Between the inner wall and the outer wall we will later add 30 mm isolation.

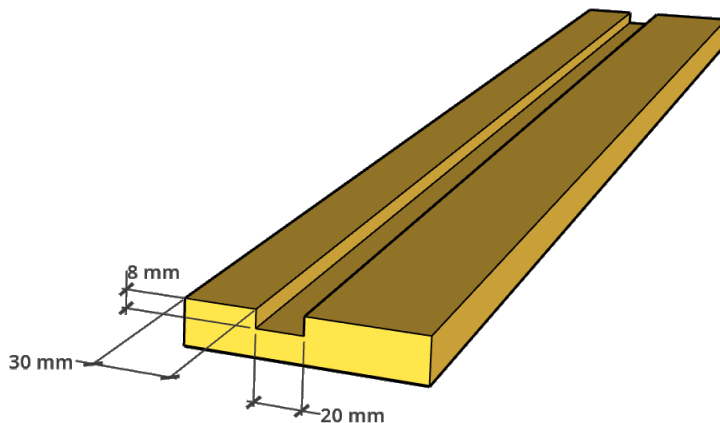
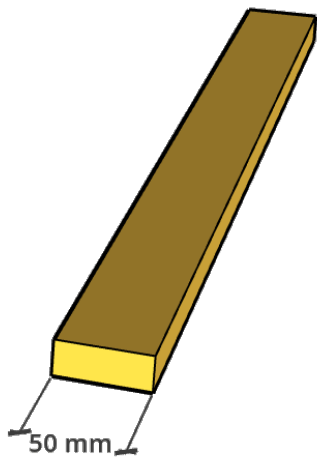


Figure 75 First side board to the front

## Second board

You need 2 of these and the easiest way is to take one of the 100mm board and cut it in half.

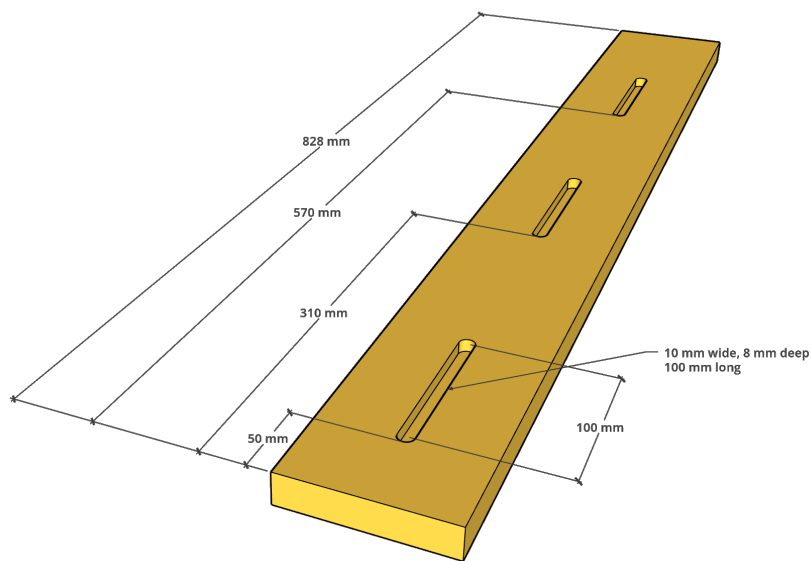


*Figure 76 Side board*

### **Board with slots for the rods**

We need 6 of these.

With a router, create slots for the rods. 10mm wide and 8 mm deep. To be able to remove and add the rods, create the slots 100mm long.



*Figure 77 Board with rod slots*



## Back door

For the frame of the back door, I prefer to use hardwood like birch, and for the door panel (mirror), birch plywood. This method is simple and effective. While you could use hardwood for the entire door, the approach outlined here is easier and uses hardwood just for the frame.

### Materials for the Back Door Frame:

- **Side Frames:** Two planed boards, each 848 mm x 80 mm x 20 mm
- **Top and Bottom Frames:** Two planed boards, each 412 mm x 80 mm x 20 mm
- **Creating the Rabbets:**
  - On each end of the short boards (top and bottom frames), create an 80 mm wide and 10 mm deep rabbet.
  - On the long boards (side frames), create 80 mm wide rabbets, positioned 80 mm from the end.

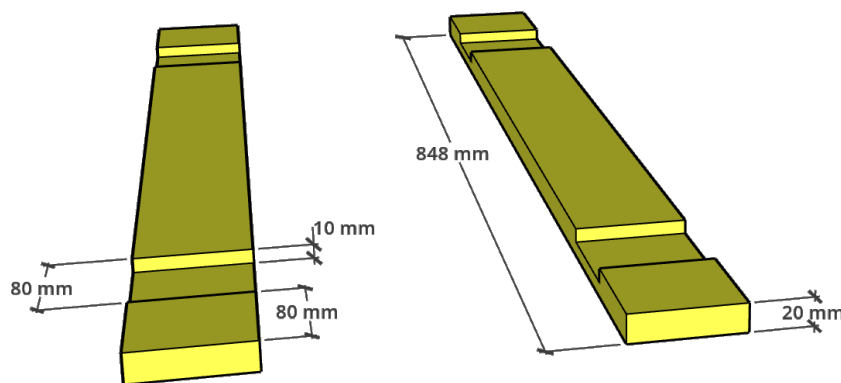


Figure 78 Long frame boards for back door sides

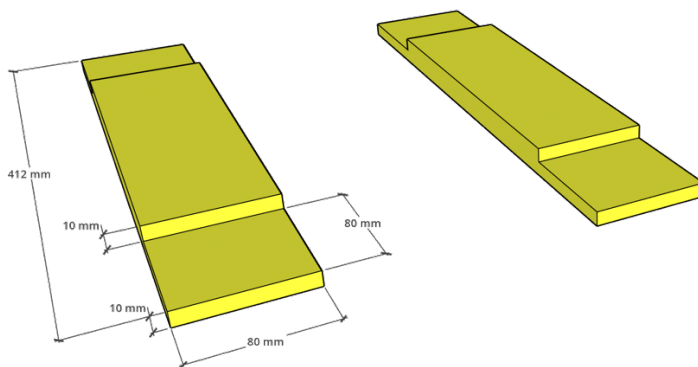
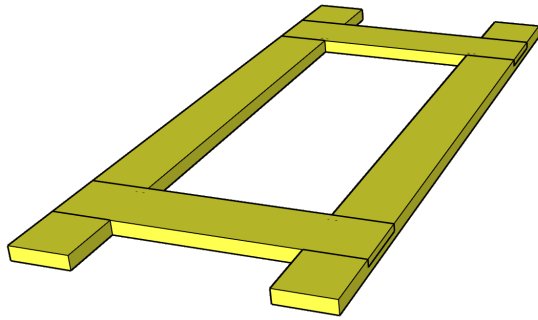


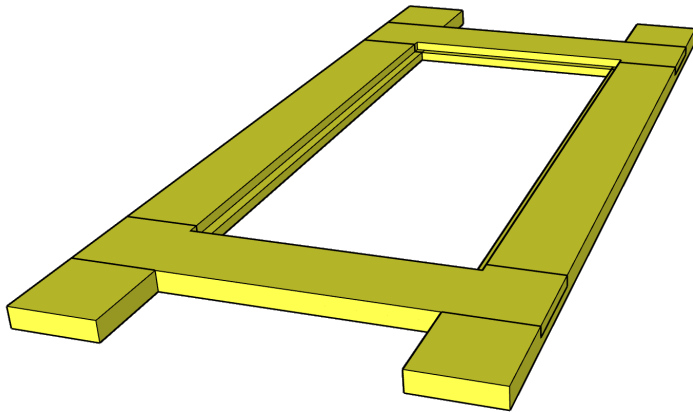
Figure 79 Short frame boards

- **Assembling the Frame:**
  - Glue the boards together to form the door frame.
  - Measure the diagonals to ensure the frame is square. If the diagonals are the same, the frame is properly aligned.



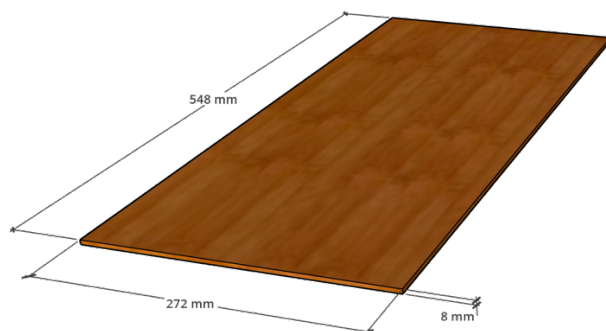
*Figure 80 Frame assembled*

- **Routing the Inner Rabbet:**
  - Route a 10 mm wide and 10 mm deep rabbet around the inner edge of the frame to hold the door panel



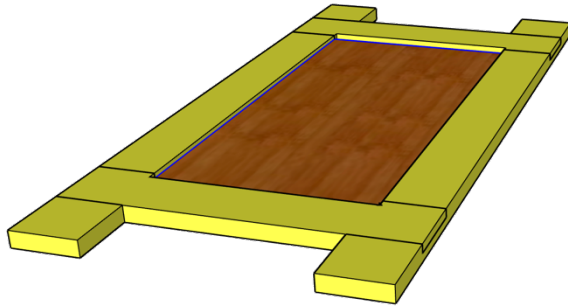
*Figure 81 Frame with rabbet*

- **Cutting the Door Panel:**
  - Cut out the door panel (mirror) from 6-10 mm thick birch or any other type of plywood to fit within the frame's rabbet. Size 548 x 272 x 8 mm.



*Figure 82 Plywood for mirror on the door*

- **Attaching the Door Panel:**
  - Glue and nail the panel in place securely.

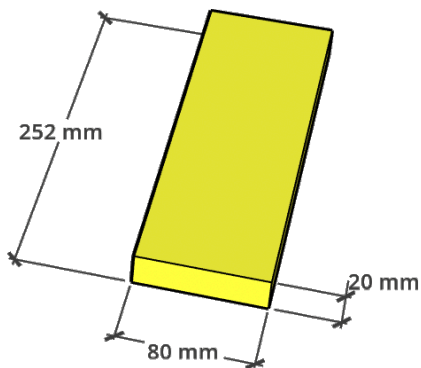


### Ventilation Openings

For ventilation, you will need two boards, each 252 mm x 80 mm x 20 mm. These boards will create adjustable openings on the door.

#### 2. Creating Ventilation Boards:

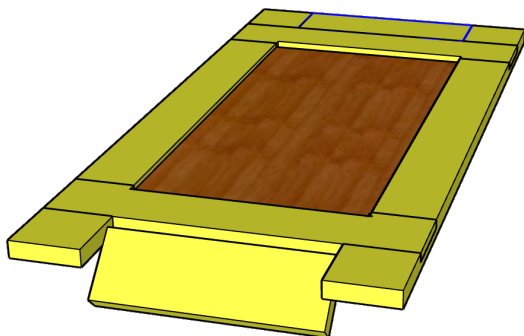
- Cut two boards to the specified dimensions for the ventilation openings.



*Figure 83 Ventilation board*

#### Attaching the Ventilation Boards:

- Attach the ventilation boards to the door using hinges, allowing them to open and close.



*Figure 84 Door with ventilation boards.*

#### Optional Magnet Mechanism:

- You can add magnets to the inside of the door to allow the lower ventilation board to open and close. The upper ventilation board will remain open by gravity.

Once the back door is assembled, install it onto the hive. Ensure the ventilation boards are correctly aligned and functional.

## Assembly

### Sides

The sides are assembled like in the picture. The 50mm board are placed as the second board to get the rod slots in a good position.

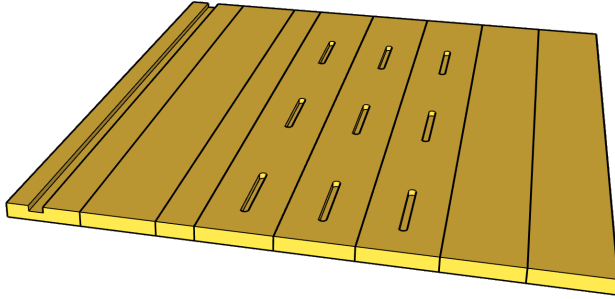


Figure 85 The first side

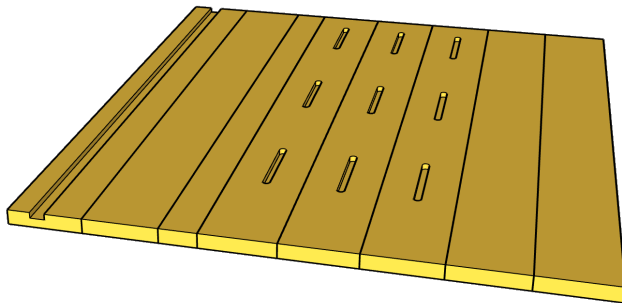


Figure 86 The second side, Note that it is mirrored compared to the first side

On both side panels, add shelves with angle irons 12 mm under the rod rest for queen excluders and false queen excluders. Not for the bottom row.

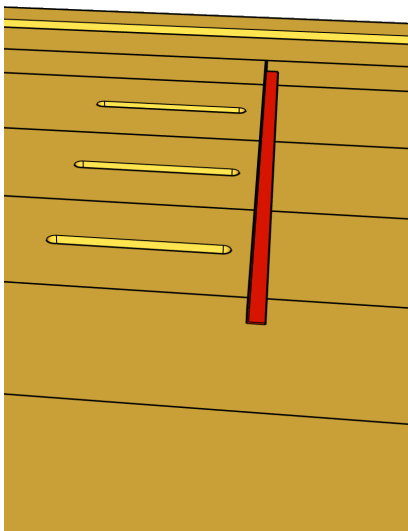
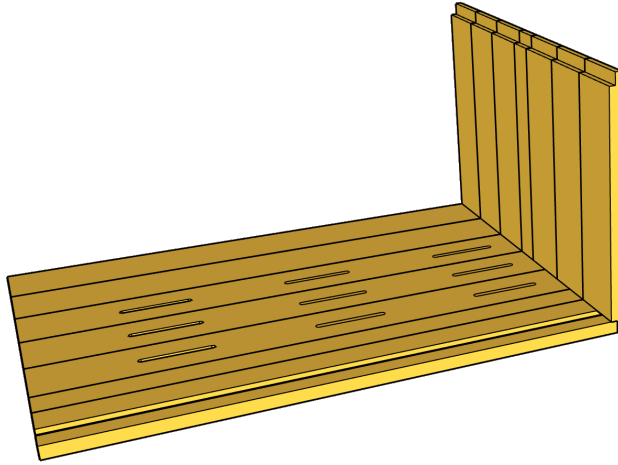


Figure 87 Side with shelf

### Add bottom

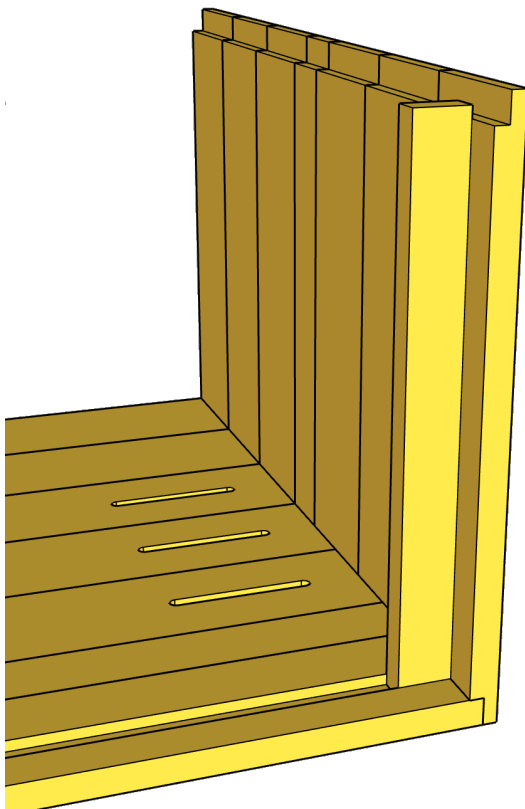
Use nails and add the bottom.



*Figure 88 Bottom fastened*

### **Add first bit of inner wall**

Split a inner wall board so you get a 38 mm wide board and add it to the inner slot and fasten it with a couple of nails from the bottom. Nails are not absolutely necessary but it might make it a bit more stable when you start assembly the box. If it works fine without then skip them.



*Figure 89 First inner wall board*

### **Add entrance bit**

Cut a board 38mm x 30mm x 372mm to use between the inner wall and the lowest entrance. Nail or screw it to the first inner wall board. Predrill the hole for the fasteners.

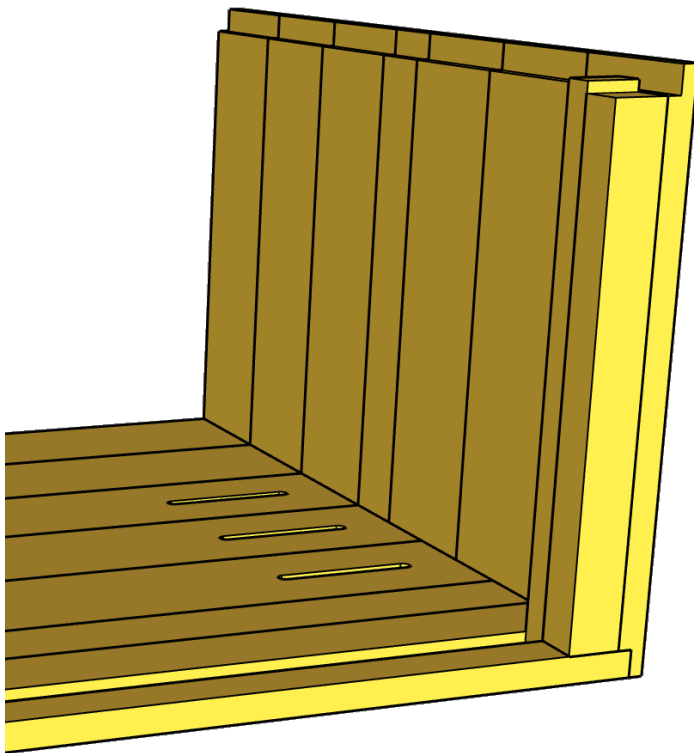


Figure 90 In between board for the entrance.

### Add more inner walls boards

Add a 12mm wooden spacer for the bee entrance before you add the next inner wall board. You can cut a 12 mm strip from a 20mm thick board and shorten it to 8mm or a bit longer. The bees won't mind if the length of the entrance is 372mm or 360mm but your sense of perfection might.

Then add inner wall boards up to the next entrance that should be about 2 mm under the thought line from the second level's rod slots.

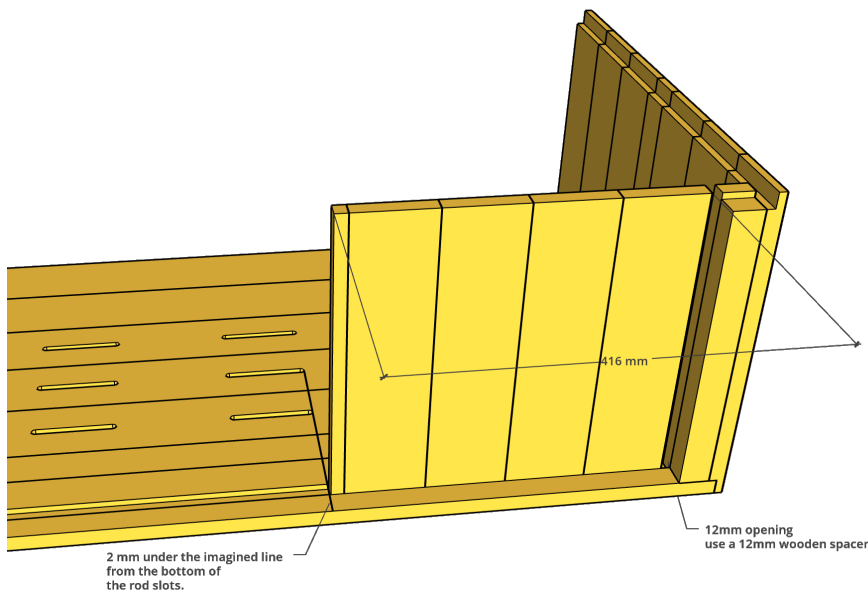


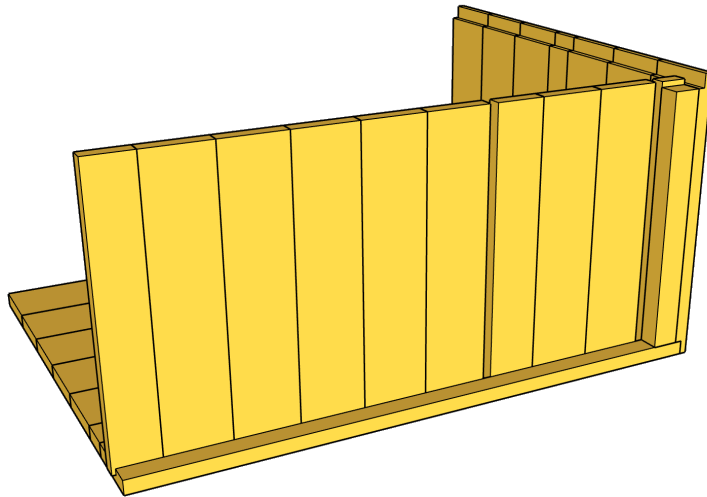
Figure 91 Add more inner wall boards

### Add the rest of the inner wall

Add another 12 mm spacer and add the rest of the inner wall boards. Note that you do not need to fasten the inner wall boards but put a nail on the board just above the entrances. This can be done when the second wall and roof is in place if it is easier.

The last inner board should be cut of 5 mm above the side board to fit in the roof rabbet.

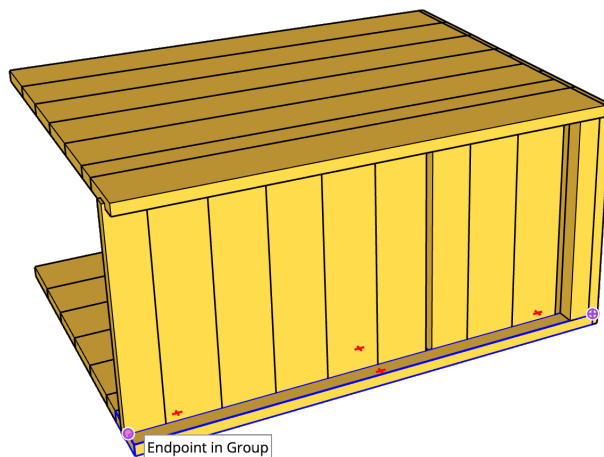
Do not make it fit snugly into the entire 10mm rabbet., as wood move a bit depending on moisture.



*Figure 92 The rest of the inner wall*

### **Add the other side wall**

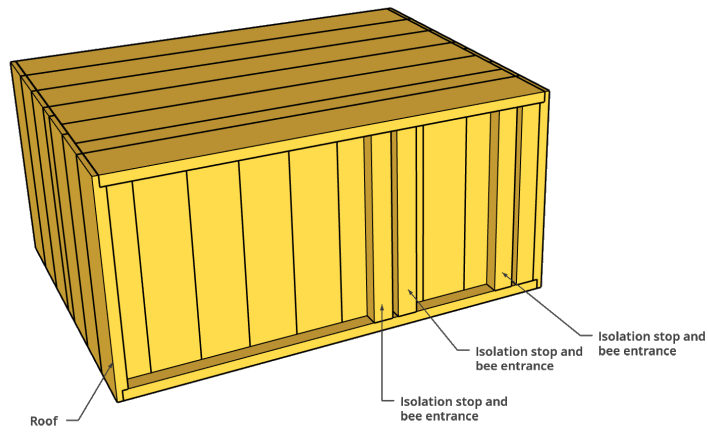
Now that you have added the boards for the inner wall you can add the second side wall. Expect some issues getting the inner wall boards in the rabbet but after some tries it will work. Use nails from the bottom and one nail on the inner wall boards closest above the entrances.



*Figure 93 Second side wall added*

### **Add roof and isolation boards**

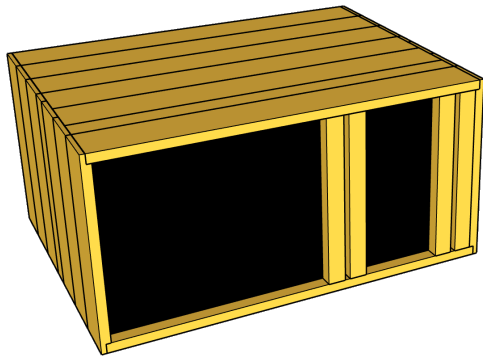
Add roof and bords to hold the isolation in place. The boards are also the bee entrances.



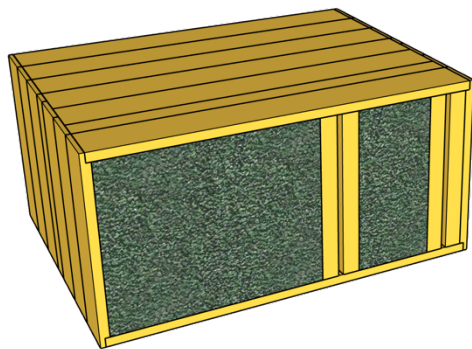
*Figure 94 Roof and bee entrance.*

### **Add isolation**

Now when the inner wall is done we add wind protection and isolation.



*Figure 95 Added wind paper*



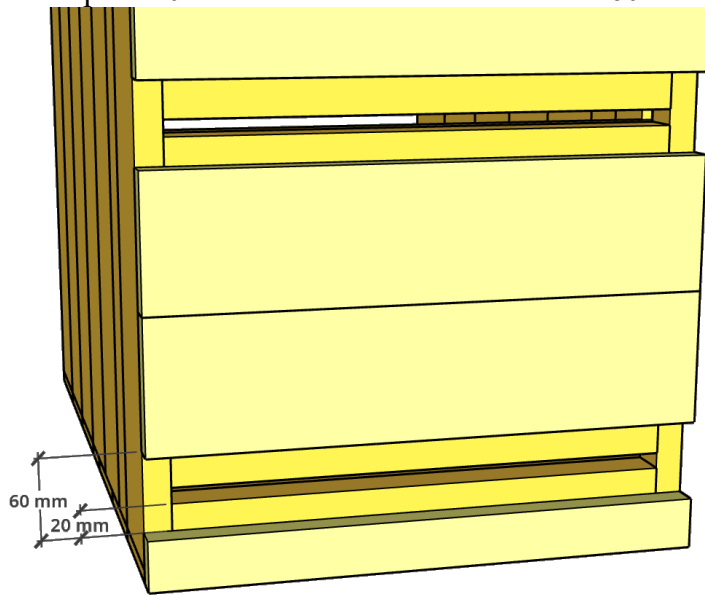
*Figure 96 Stone Wool isolation*



### Add front wall

Add the front wall boards.

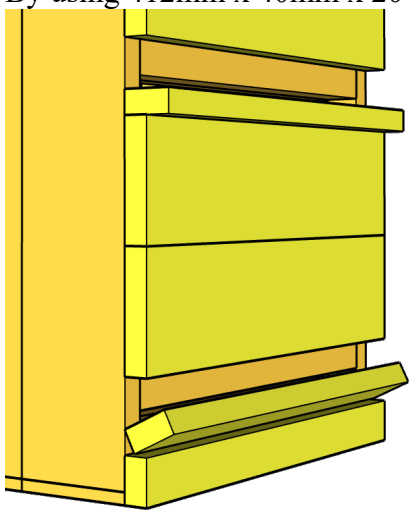
Leave space 20mm under the front entrance and 60 mm up.



*Figure 97 Front wall boards*

### Add closable entrance

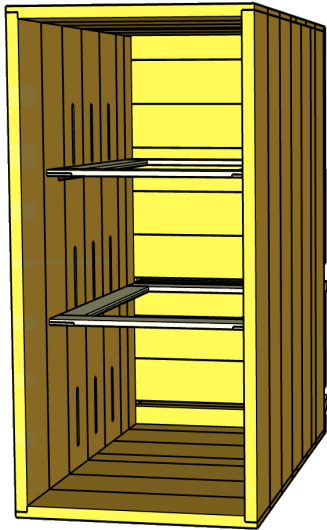
By using 412mm x 40mm x 20 mm board. And using hinges, add closable entrances.



*Figure 98 Closable entrances*

Add a lock mechanism so you can close the entrance during transportation. You can use a metal lock or wooden lock that you turn to lock the entrance.

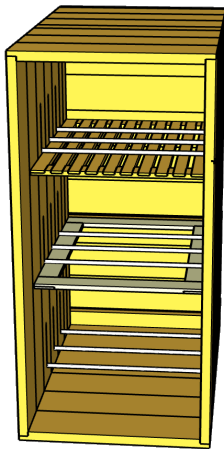
Put in the queen excluders on the shelves.



*Figure 99 Queen excluder and divider added*

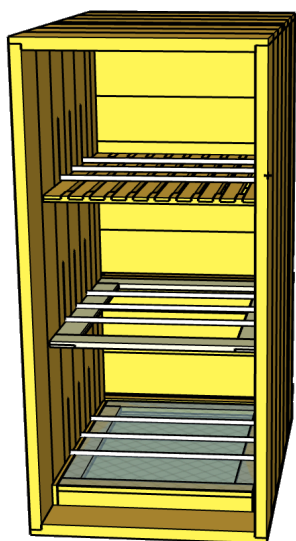
Cut the rods to the correct length. If you made the slots for the rods 8 mm deep, the rods should be 388 mm long. Adjust the length slightly if necessary, depending on the depth of your slots. The main thing is to ensure that the rods are secure and cannot fall out on their own.

Insert the rods into place, ensuring they are secure and cannot fall out by themselves..



*Figure 100 Rods added, check that they cant fall of by them selfs*

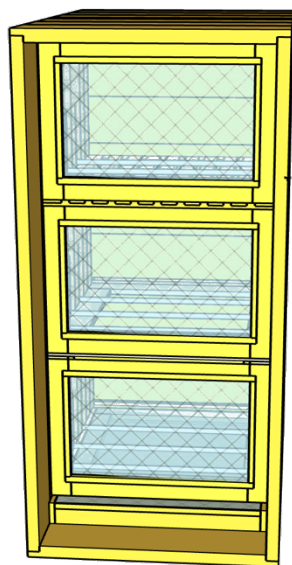
Add the varroa floor



*Figure 101 Varroa floor added*

Add two bee frame spacers on the inner wall per level, along with corresponding spacers on the inner doors. Add the frames and dry-fit the inner doors. If the doors fit too tightly, you can plane down 1-2 mm on the sides to ensure easier handling later.

Mark where the door locks should be positioned.



*Figure 102 Inner doors added.*

For the locks, you can use hatches or rods.

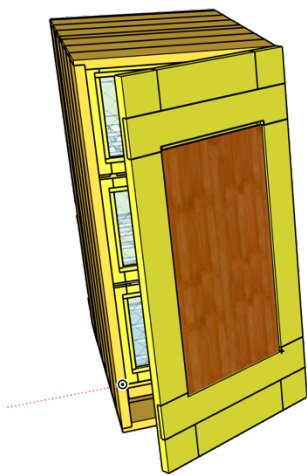
Add the locks and assembly the inner doors again.

### **Adding the Outer Door**

Lastly, add the outer door using **lift-off hinges**.



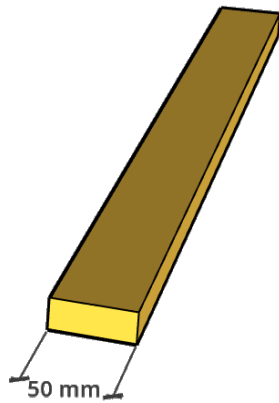
These hinges allow you to remove the door easily without the need to unscrew anything, making it more convenient for inspections or maintenance. Once the hinges are attached, ensure the door is aligned properly and test the lift-off functionality to ensure it operates smoothly.



*Figure 103 Finished hive*

And the hive is finished.

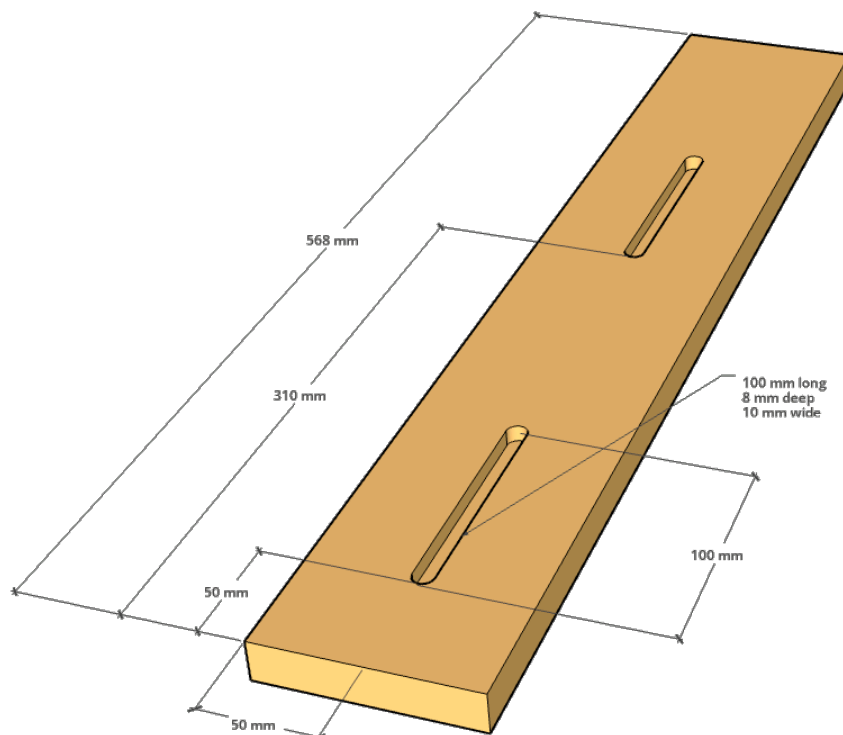
You need 2 of these and the easiest way is to take one of the 100mm board and cut it in half.



### Board with slots for the rods

We need 6 of these.

With a router, create slots for the rods. 10mm wide and 8 mm deep. To be able to remove and add the rods, create the slots 100mm long.



*Figure 106 Board with slots*

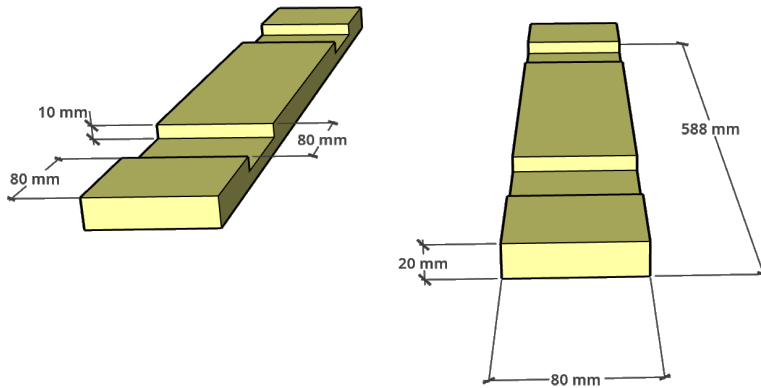
## Back door

For the frame of the back door, I prefer to use hardwood like birch, and for the door panel (mirror), birch plywood. This method is simple and effective. While you could use hardwood for the entire door, the approach outlined here is easier and uses hardwood just for the frame.

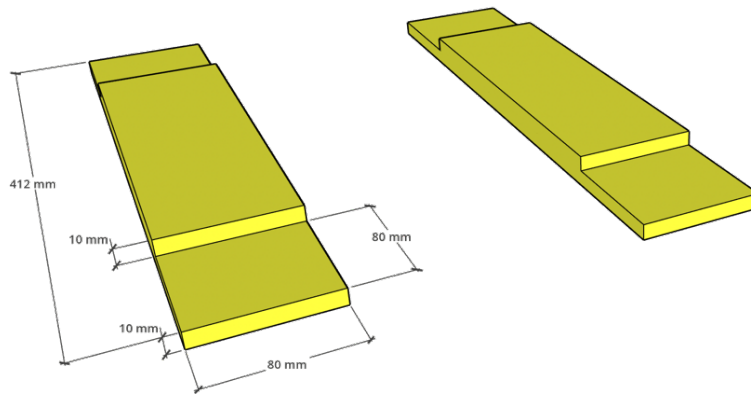
### Materials for the Back Door Frame:

- **Side Frames:** Two planed boards, each 588 mm x 80 mm x 20 mm
- **Top and Bottom Frames:** Two planed boards, each 412 mm x 80 mm x 20 mm
- **Creating the Rabbets:**

- On each end of the short boards (top and bottom frames), create an 80 mm wide and 10 mm deep rabbet.
- On the long boards (side frames), create 80 mm wide rabbets, positioned 80 mm from the end.

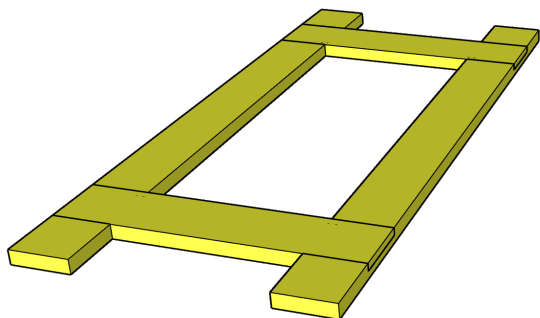


*Figure 107 Long frame boards for back door sides*



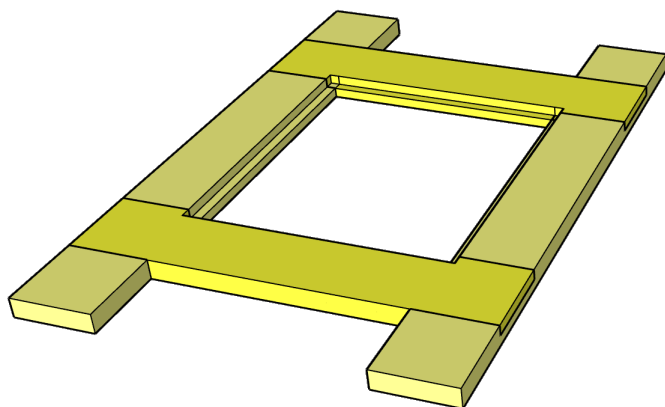
*Figure 108 Short frame boards*

- **Assembling the Frame:**
  - Glue the boards together to form the door frame.
  - Measure the diagonals to ensure the frame is square. If the diagonals are the same, the frame is properly aligned.



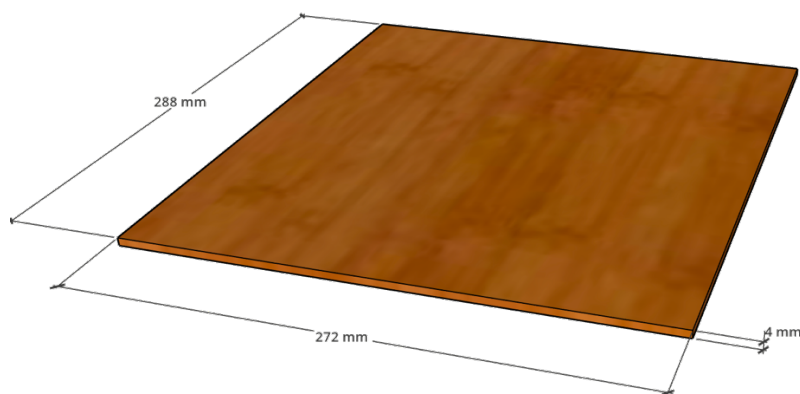
*Figure 109 Frame assembled*

- **Routing the Inner Rabbet:**
  - Route a 10 mm wide and 10 mm deep rabbet around the inner edge of the frame to hold the door panel



*Figure 110 Frame with rabbet*

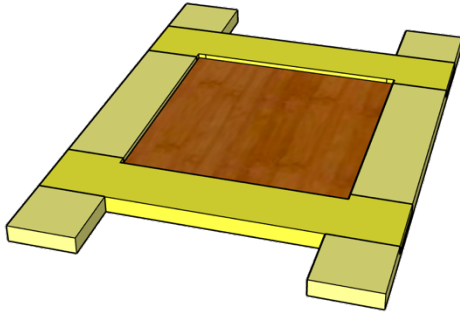
- **Cutting the Door Panel:**
  - Cut out the door panel (mirror) from 6-10 mm thick birch or any other type of plywood to fit within the frame's rabbet. Size 288 x 272 x 8 mm.



*Figure 111 Plywood for mirror on the door*

- **Attaching the Door Panel:**
  - Glue and nail the panel in place securely.



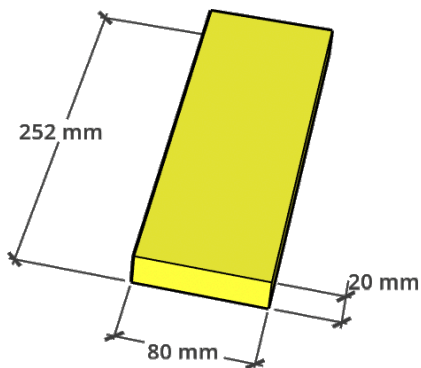


### Ventilation Openings

For ventilation, you will need two boards, each 252 mm x 80 mm x 20 mm. These boards will create adjustable openings on the door.

#### 3. Creating Ventilation Boards:

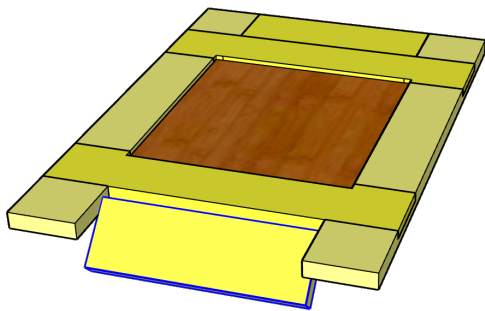
- Cut two boards to the specified dimensions for the ventilation openings.



*Figure 112 Ventilation board*

#### Attaching the Ventilation Boards:

- Attach the ventilation boards to the door using hinges, allowing them to open and close.



*Figure 113 Door with ventilation boards.*

#### Optional Magnet Mechanism:

- You can add magnets to the inside of the door to allow the lower ventilation board to open and close. The upper ventilation board will remain open by gravity.

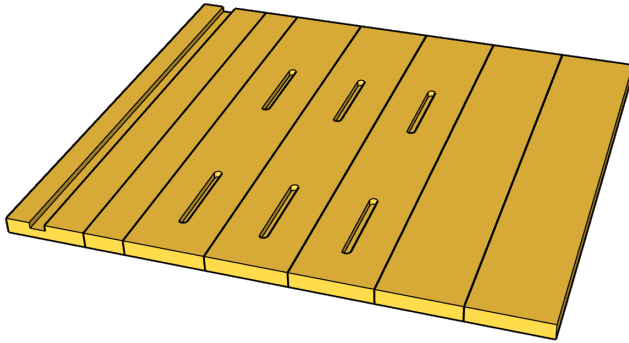
Once the back door is assembled, install it onto the hive. Ensure the ventilation boards are correctly aligned and functional.



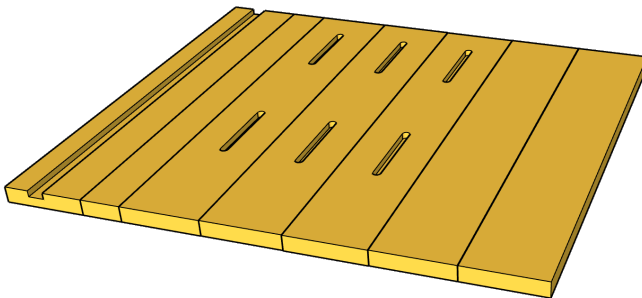
## Assembly

### Sides

The sides are assembled like in the picture. The 50mm board are placed as the second board to get the rod slots in a good position.

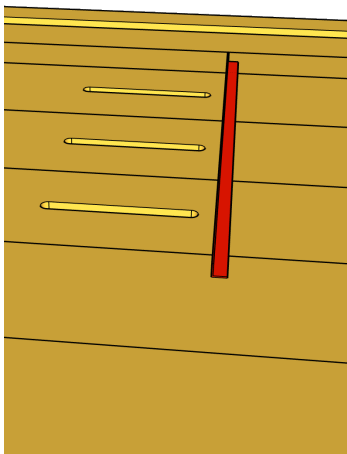


*Figure 114 The first side*



*Figure 115 The second side, Note that it is mirrored compared to the first side*

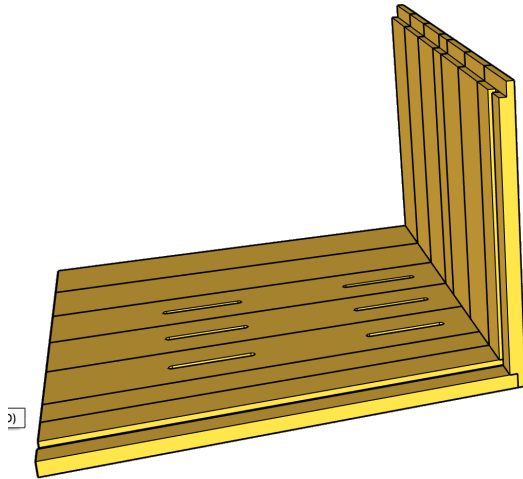
On both side panels, add shelves with angle irons 12 mm under the rod rest for queen excluders and false queen excluders. Not for the bottom row.



*Figure 116 Side with shelf*

### Add bottom

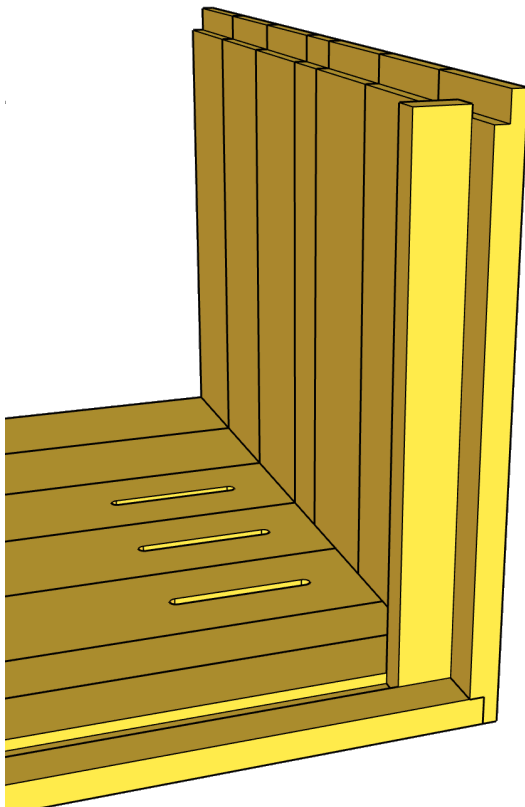
Use nails and add the bottom.



*Figure 117 Bottom fastened*

### **Add first bit of inner wall**

Split a inner wall board so you get a 38 mm wide board and add it to the inner slot and fasten it with a couple of nails from the bottom. Nails are not absolutely necessary but it might make it a bit more stable when you start assembly the box. If it works fine without then skip them.



*Figure 118 First inner wall board*

### **Add entrance bit**

Cut a board 38mm x 30mm x 372mm to use between the inner wall and the lowest entrance. Nail or screw it to the first inner wall board. Predrill the hole for the fasteners.

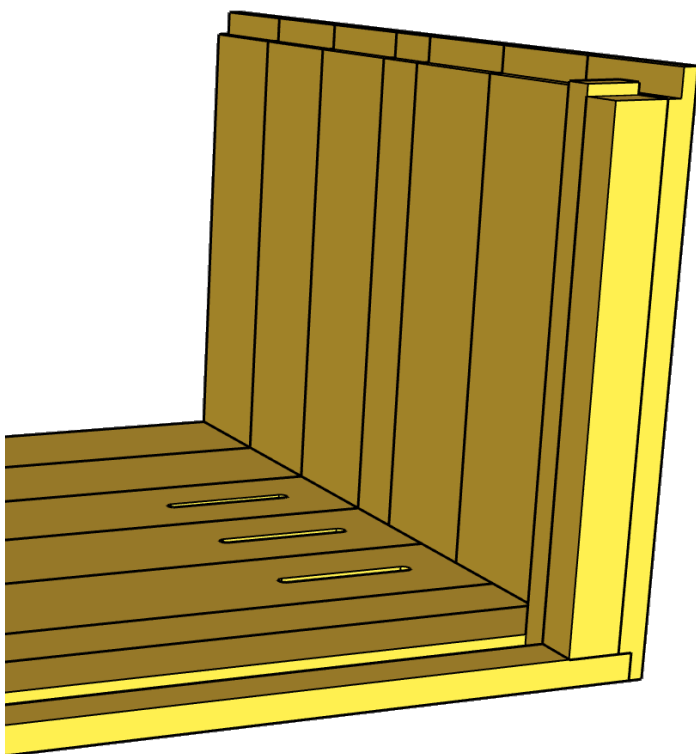


Figure 119 In between board for the entrance.

### Add more inner walls boards

Add a 12mm wooden spacer for the bee entrance before you add the next inner wall board. You can cut a 12 mm strip from a 20mm thick board and shorten it to 8mm or a bit longer. The bees won't mind if the length of the entrance is 372mm or 360mm but your sense of perfection might.

Then add inner wall boards up to the next entrance that should be about 2 mm under the thought line from the second level's rod slots.

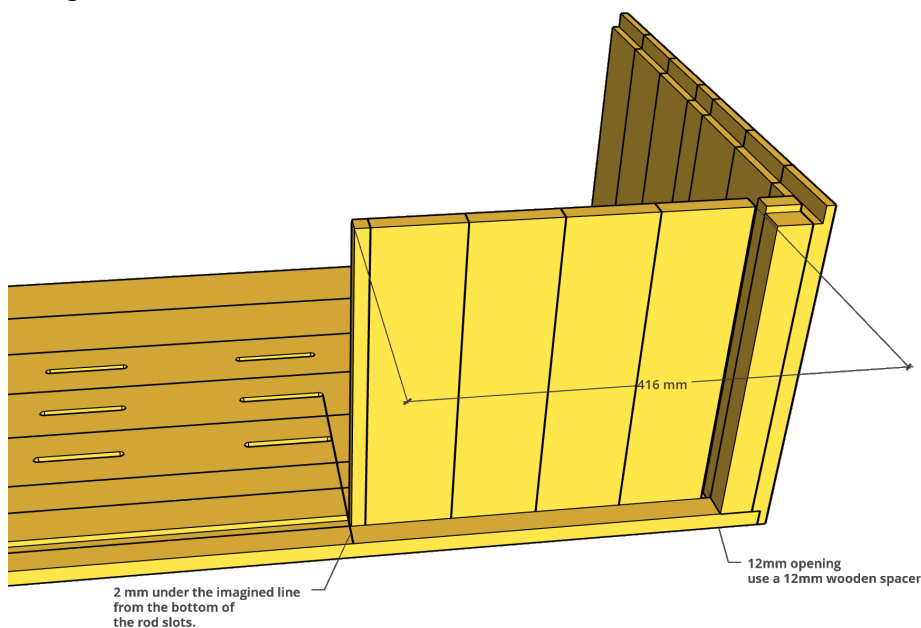
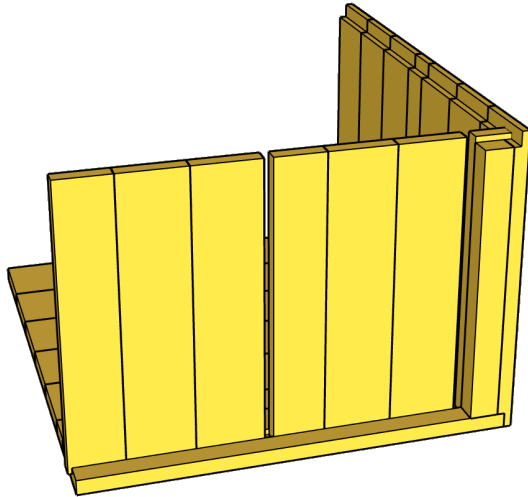


Figure 120 Add more inner wall boards

### Add the rest of the inner wall

Add another 12 mm spacer and add the rest of the inner wall boards. Note that you do not need to fasten the inner wall boards but put a nail on the board just above the entrances. This can be done when the second wall and roof is in place if it is easier.

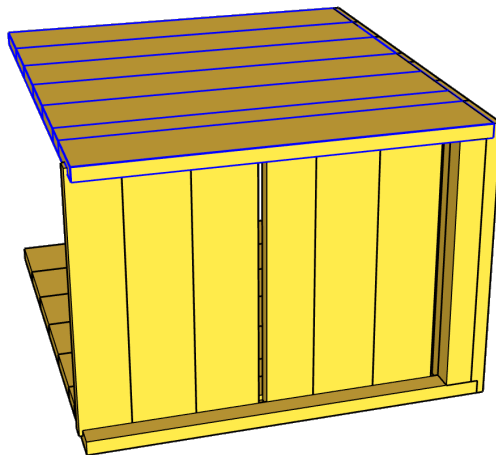
The last inner board should be cut of 5 mm above the side board to fit in the roof rabbet. Do not make it fit snugly into the entire 10mm rabbet, as wood move a bit depending on moisture.



*Figure 121 The rest of the inner wall*

### **Add the other side wall**

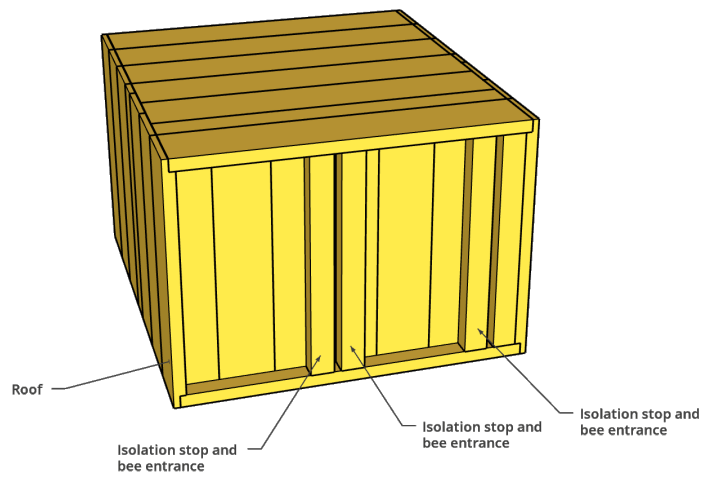
Now that you have added the boards for the inner wall you can add the second side wall. Expect some issues getting the inner wall boards in the rabbet but after some tries it will work. Use nails from the bottom and one nail on the inner wall boards closest above the entrances.



*Figure 122 Second side wall added*

### **Add roof and isolation boards**

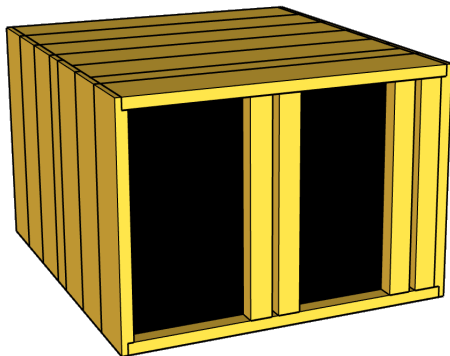
Add roof and bords to hold the isolation in place. The boards are also the bee entrances.



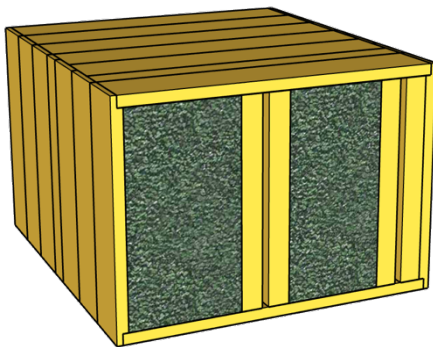
*Figure 123 Roof and bee entrance.*

### **Add isolation**

Now when the inner wall is done we add wind protection and isolation.



*Figure 124 Added wind paper*

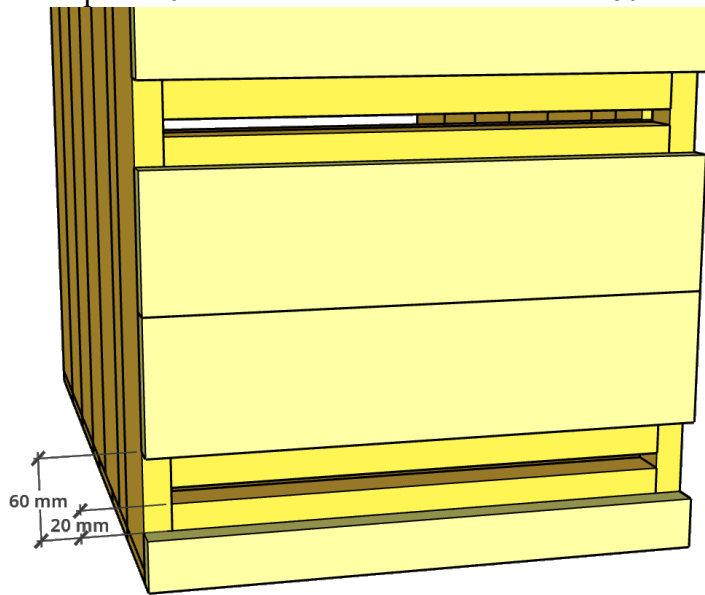


*Figure 125 Stone Wool isolation*

### Add front wall

Add the front wall boards.

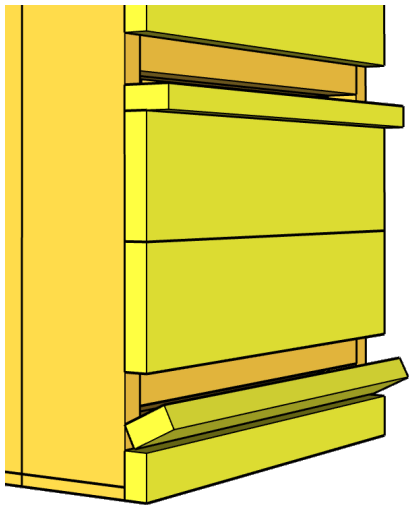
Leave space 20mm under the front entrance and 60 mm up.



*Figure 126 Front wall boards*

### Add closable entrance

Use a 412 mm x 40 mm x 20 mm board for the closable entrances. Attach them using hinges.

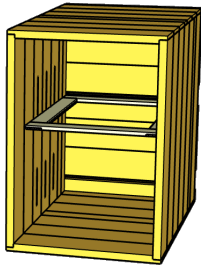


*Figure 127 Closable entrances*

Add a locking mechanism to secure the entrance during transportation. You can use either a metal lock or a wooden lock that rotates to lock the entrance.



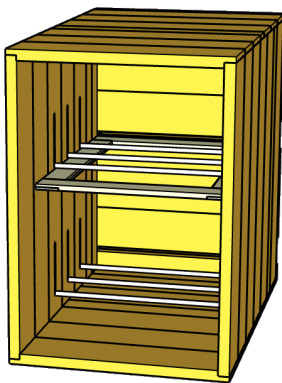
- Place the queen excluders on the shelf.



*Figure 128 Box with queen excluder*

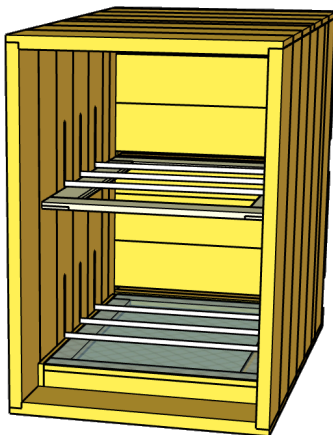
Cut the rods to the correct length. If you made the slots for the rods 8 mm deep, the rods should be 388 mm long. Adjust the length slightly if necessary, depending on the depth of your slots. The main thing is to ensure that the rods are secure and cannot fall out on their own.

Insert the rods into place, ensuring they are secure and cannot fall out by themselves..



*Figure 129 Rods added, check that they cant fall of by them selfs*

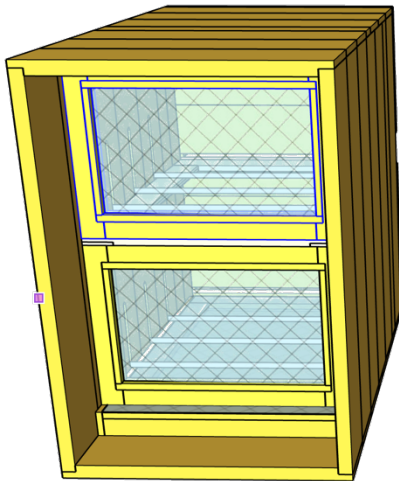
Add the varroa floor



*Figure 130 Varroa floor added*

Add two bee frame spacers on the inner wall per level, along with corresponding spacers on the inner doors. Add the frames and dry-fit the inner doors. If the doors fit too tightly, you can plane down 1-2 mm on the sides to ensure easier handling later.

Mark where the door locks should be positioned.



*Figure 131 Inner doors added.*

For the locks, you can use hatches or rods.

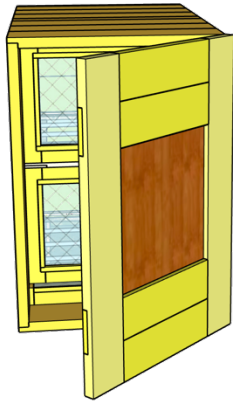
Add the locks and assembly the inner doors again.

### **Adding the Outer Door**

Lastly, add the outer door using **lift-off hinges**.



These hinges allow you to remove the door easily without the need to unscrew anything, making it more convenient for inspections or maintenance. Once the hinges are attached, ensure the door is aligned properly and test the lift-off functionality to ensure it operates smoothly.



*Figure 132 Finished hive*

And the hive is finished.

## AZ-Hive 4 levels with 400 mm bottom level

### Inner door high

The only difference between this and the normal inner door is the length of the side boards (418 mm) and then of course the size of the mesh.

#### Materials Needed:

- Two boards: 418 mm x 35 mm x 20 mm
- Two boards: 372 mm x 35 mm x 20 mm
- 1-3 mm metallic mesh

Cut the mesh to a square 340 mm wide and 390 mm high.

1. **Prepare the Boards:** Rip a board and plane it down to 35 mm x 20 mm, then cut it to the required lengths.

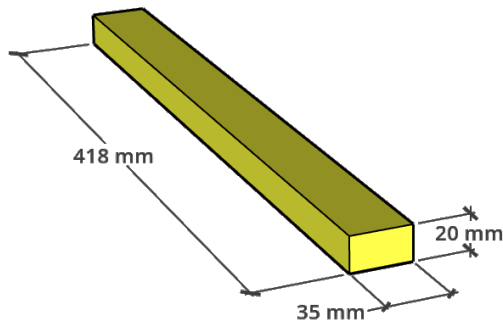


Figure 133 Side inner door board

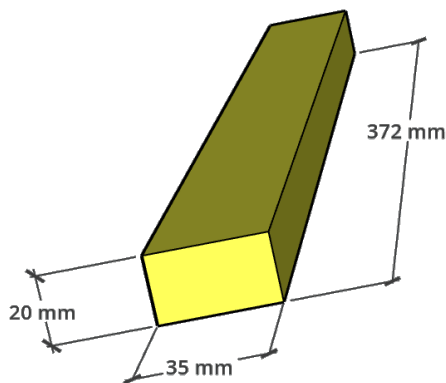
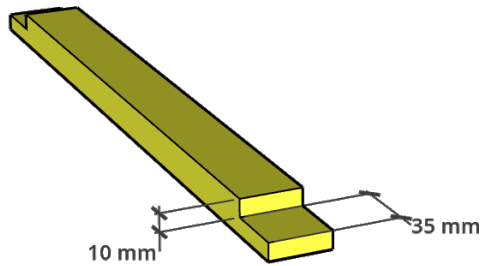


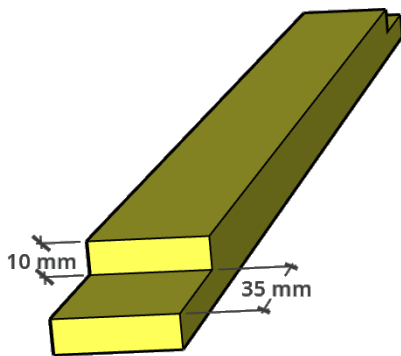
Figure 134 Top and bottom inner door board

2. **Create the Half-Lap Joints:** Route a rabbet on both ends of the short boards.



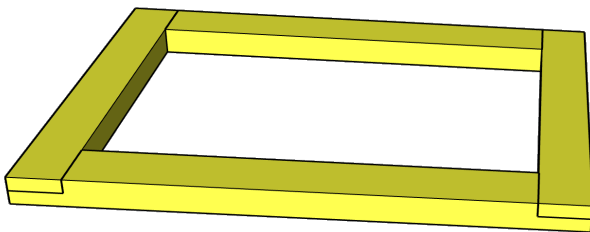
*Figure 135 Side board with cut out for lap joint*

Repeat the process for the long boards.



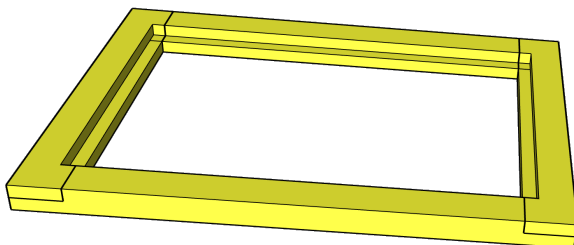
*Figure 136 top and bottom board with cut out for lap joint*

3. **Assemble the Frame:** Use wood glue to attach the boards, forming a rectangular frame. Measure from corner to corner to ensure the frame is square.



*Figure 137 Assembled inner door frame*

4. **Rout the Rabbet for the Mesh:** With a router, make a rabbet inside the frame that is 10 mm wide and 10 mm deep.



*Figure 138 Rabbet routed for mesh*

5. **Prepare the Mesh:** Cut a metallic mesh to approximately 220 mm x 340 mm, with 1-3 mm holes.

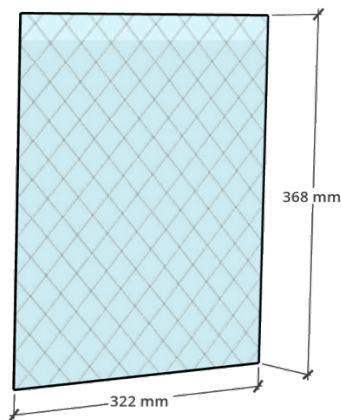


Figure 139 Mesh

6. **Attach the Mesh:** Place the mesh on the frame.

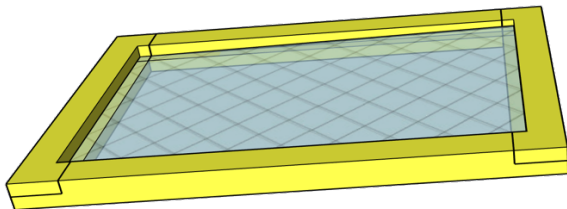


Figure 140 Mesh placed on the inner door

Make several 9 mm x 10 mm strips to secure the mesh.



Figure 141 Fastening board for the mesh

7. **Secure the Mesh:** Fasten the mesh using glue and the small strips.

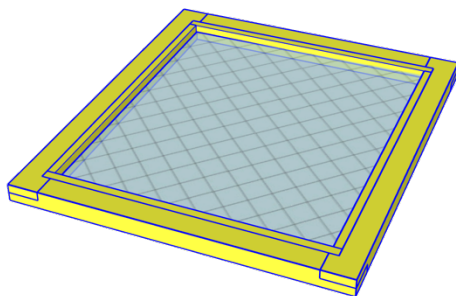
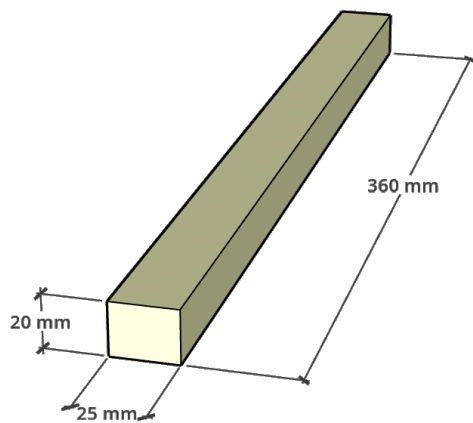


Figure 142 Inner door with fastened mesh

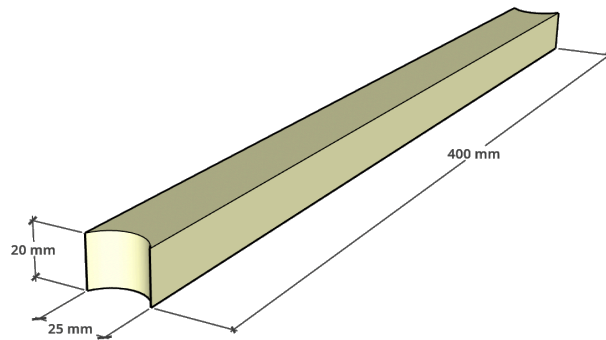
## High brood frames

Note, this is a experimental frame and used for the 4-level hive with 400 mm bottom level. If you don't want to experiment, use the standard frames 232 mm high.

For this frame you use the same top and bottom as the normal frame described earlier but the total height is 400mm



*Figure 143 Short sidebar for 400mm high frame.*



*Figure 144 Long sidebar for 400 mm high frame*

## Side boards

The total height of the side is 1276 mm, that includes 2x10 mm that the roof and bottom adds. The depth is approximately 670 mm including 20mm of the front boards and the thickness is 20 mm.

We use lumber that are 100 wide, 20 mm thick and 1256 mm long. The last board we split in two so we get two equal boards that are approximately 50 mm wide, probably 48mm.

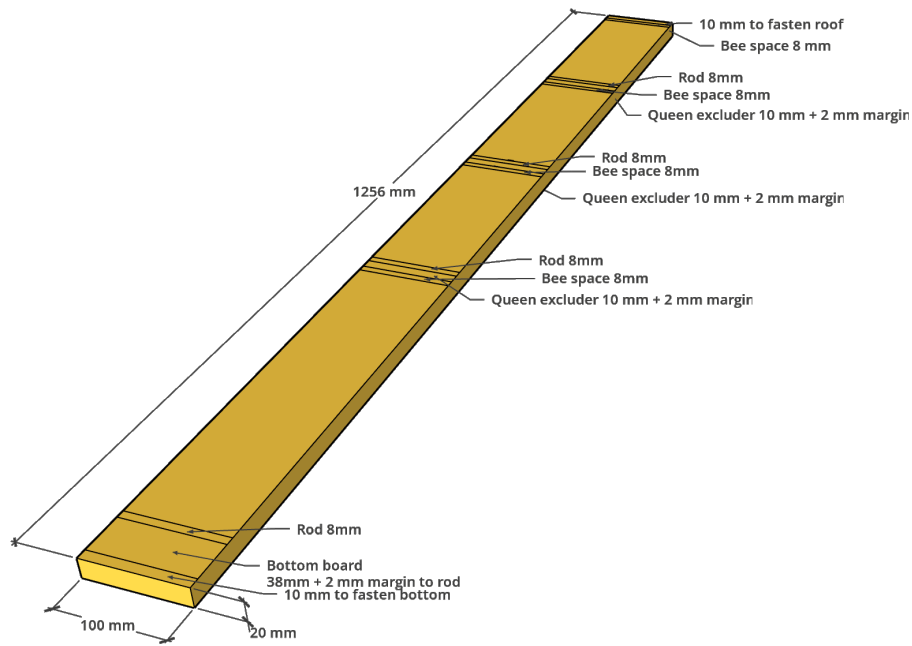


Figure 145 Calculating the side board, not showing the frame heights



### First front board

On the first side board to the front we need to add a routed groove to add the inner wall. Between the inner wall and the outer wall we will later add 30 mm isolation.

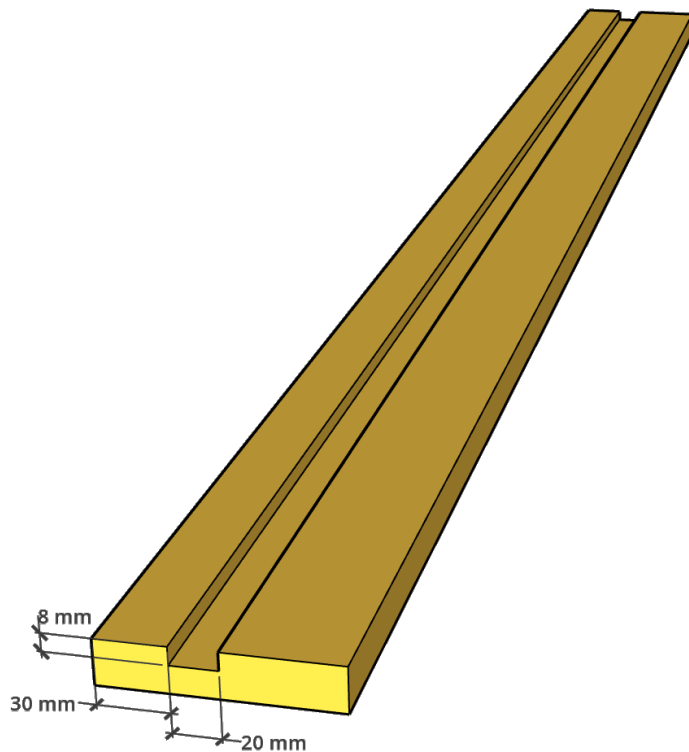


Figure 146 First side board to the front

### Second board

You need 2 of these and the easiest way is to take one of the 100mm board and cut it in half.

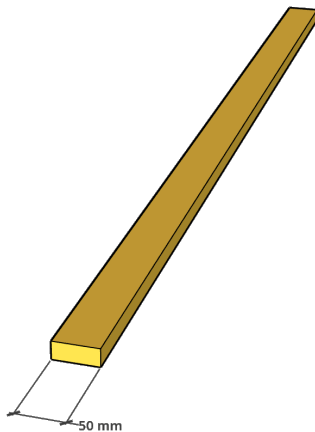


Figure 147 Second board

### Board with slots for the rods

We need 6 of these.

With a router, create slots for the rods. 10mm wide and 8 mm deep. To be able to remove and add the rods, create the slots 100mm long.

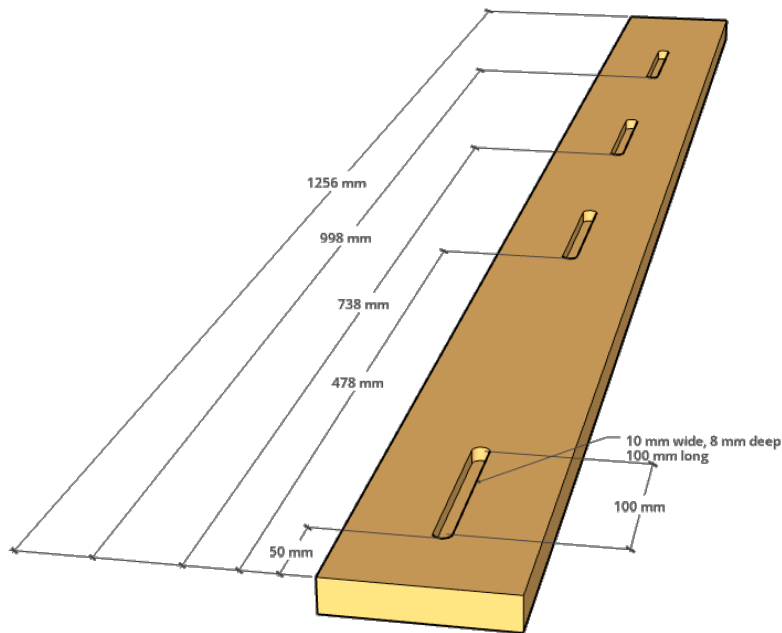


Figure 148 Board with rod slots

## Back door

For the frame of the back door, I prefer to use hardwood like birch, and for the door panel (mirror), birch plywood. This method is simple and effective. While you could use hardwood for the entire door, the approach outlined here is easier and uses hardwood just for the frame.

### Materials for the Back Door Frame:

- **Side Frames:** Two planed boards, each 1266 mm x 80 mm x 20 mm
- **Top and Bottom Frames:** Two planed boards, each 412 mm x 80 mm x 20 mm
- **Creating the Rabbets:**
  - On each end of the short boards (top and bottom frames), create an 80 mm wide and 10 mm deep rabbet.
  - On the long boards (side frames), create 80 mm wide rabbets, positioned 80 mm from the end.

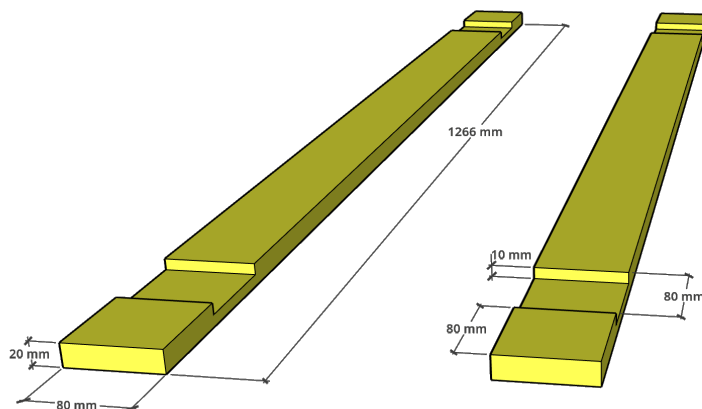


Figure 149 Long frame boards for back door sides

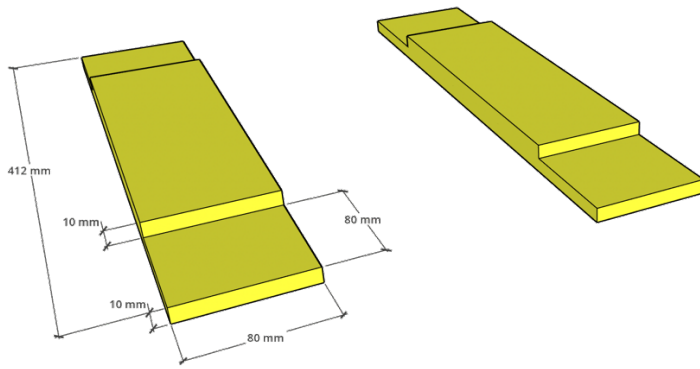


Figure 150 Short frame boards

- **Assembling the Frame:**

- Glue the boards together to form the door frame.
- Measure the diagonals to ensure the frame is square. If the diagonals are the same, the frame is properly aligned.

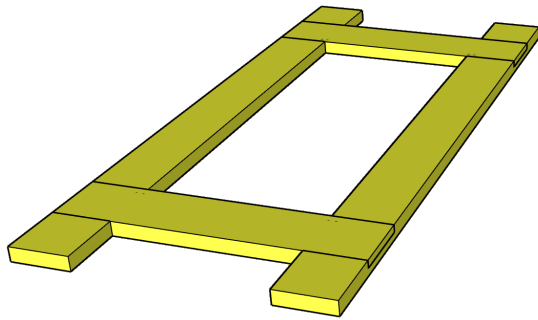


Figure 151 Frame assembled

- **Routing the Inner Rabbet:**

- Route a 10 mm wide and 10 mm deep rabbet around the inner edge of the frame to hold the door panel

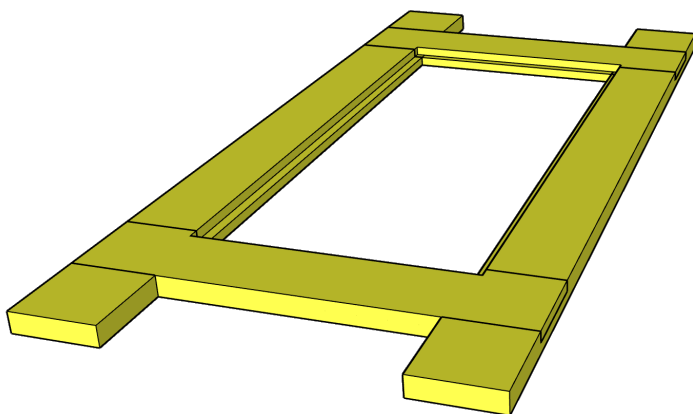


Figure 152 Frame with rabbet

- **Cutting the Door Panel:**

- Cut out the door panel (mirror) from 6-10 mm thick birch or any other type of plywood to fit within the frame's rabbet. Size 966 x 272 x 8 mm.

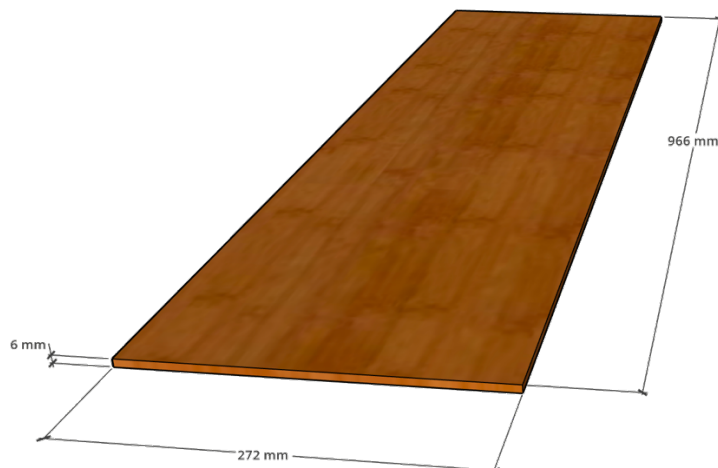
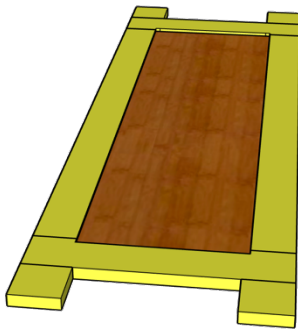


Figure 153 Plywood for mirror on the door

- **Attaching the Door Panel:**
  - Glue and nail the panel in place securely.



### Ventilation Openings

For ventilation, you will need two boards, each 252 mm x 80 mm x 20 mm. These boards will create adjustable openings on the door.

#### 4. Creating Ventilation Boards:

- Cut two boards to the specified dimensions for the ventilation openings.

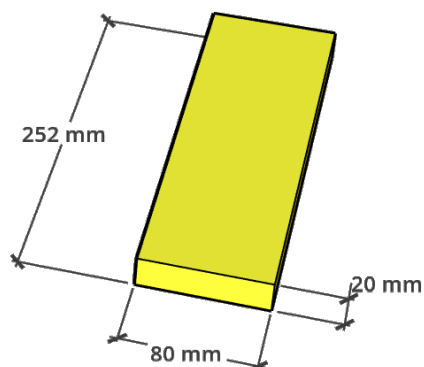
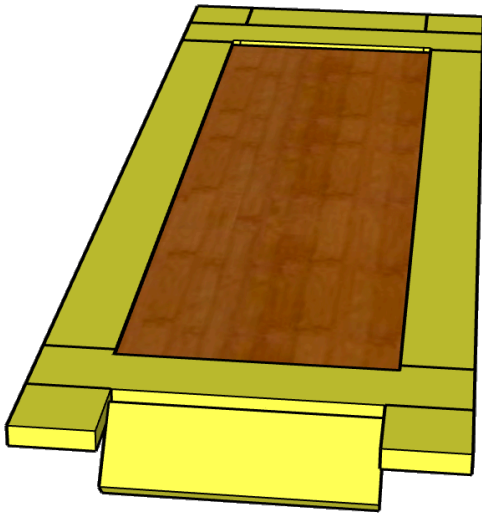


Figure 154 Ventilation board

**Attaching the Ventilation Boards:**

- Attach the ventilation boards to the door using hinges, allowing them to open and close.



*Figure 155 Door with ventilation boards.*

**Optional Magnet Mechanism:**

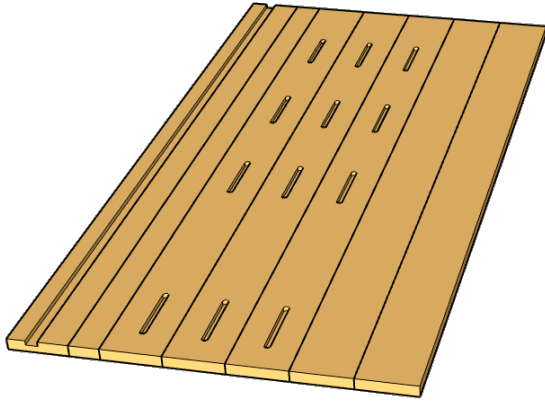
- You can add magnets to the inside of the door to allow the lower ventilation board to open and close. The upper ventilation board will remain open by gravity.

Once the back door is assembled, install it onto the hive. Ensure the ventilation boards are correctly aligned and functional.

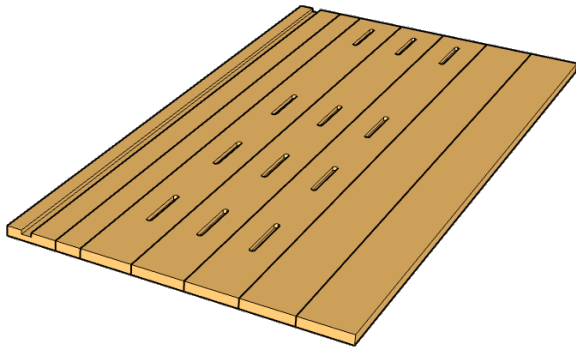
## Assembly

### Sides

The sides are assembled like in the picture. The 50mm board are placed as the second board to get the rod slots in a good position.

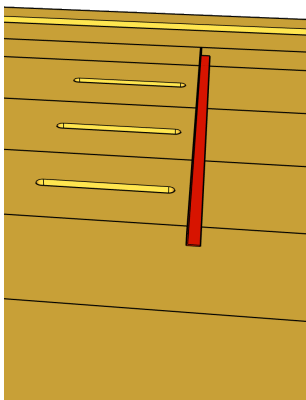


*Figure 156 The first side*



*Figure 157 The second side, Note that it is mirrored compared to the first side*

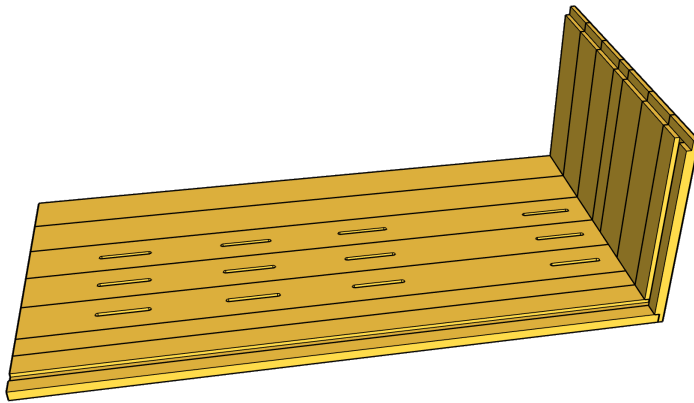
On both side panels, add shelves with angle irons 12 mm under the rod rest for queen excluders and false queen excluders. Not for the bottom row.



*Figure 158 Side with shelf*

### Add bottom

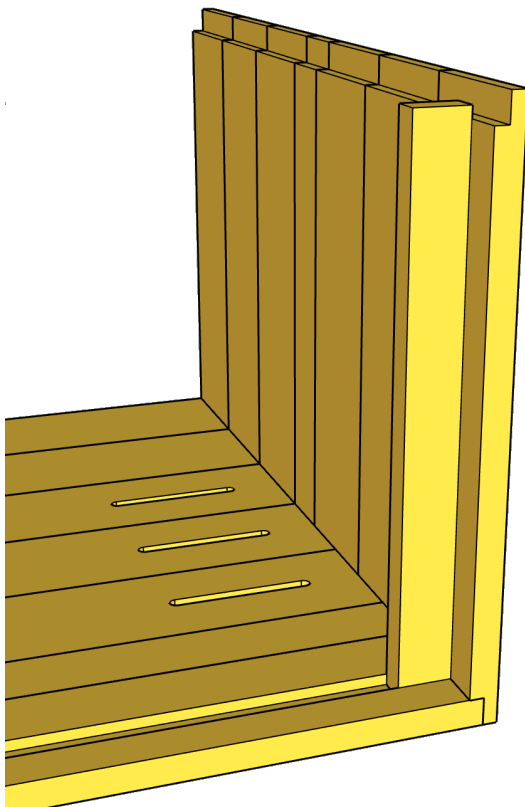
Use nails and add the bottom.



*Figure 159 Bottom fastened*

### Add first bit of inner wall

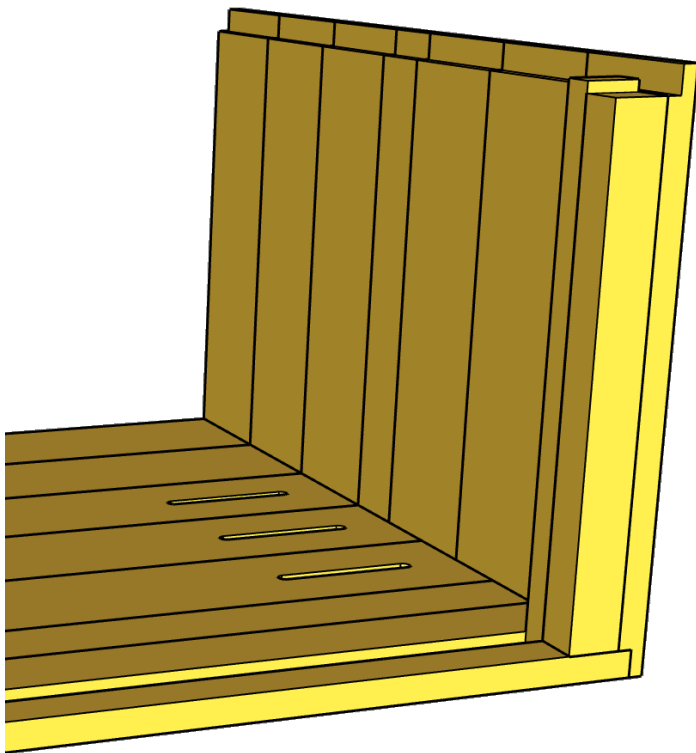
Split a inner wall board so you get a 38 mm wide board and add it to the inner slot and fasten it with a couple of nails from the bottom. Nails are not absolutely necessary but it might make it a bit more stable when you start assembly the box. If it works fine without then skip them.



*Figure 160 First inner wall board*

### Add entrance bit

Cut a board 38mm x 30mm x 372mm to use between the inner wall and the lowest entrance. Nail or screw it to the first inner wall board. Predrill the hole for the fasteners.



*Figure 161 In between board for the entrance.*



### Add more inner walls boards

Add a 12mm wooden spacer for the bee entrance before you add the next inner wall board. You can cut a 12 mm strip from a 20mm thick board and shorten it to 8mm or a bit longer. The bees won't mind if the length of the entrance is 372mm or 360mm but your sense of perfection might.

Then add inner wall boards up to the next entrance that should be about 2 mm under the thought line from the second level's rod slots.

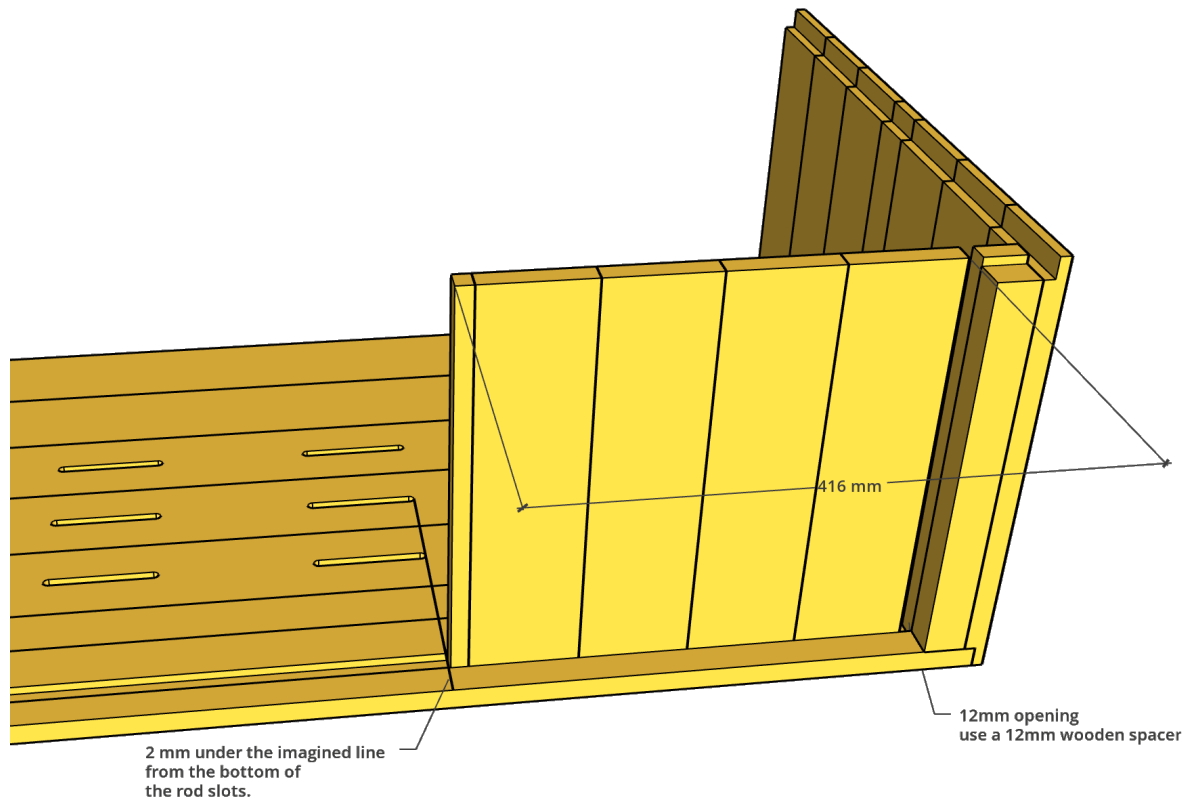
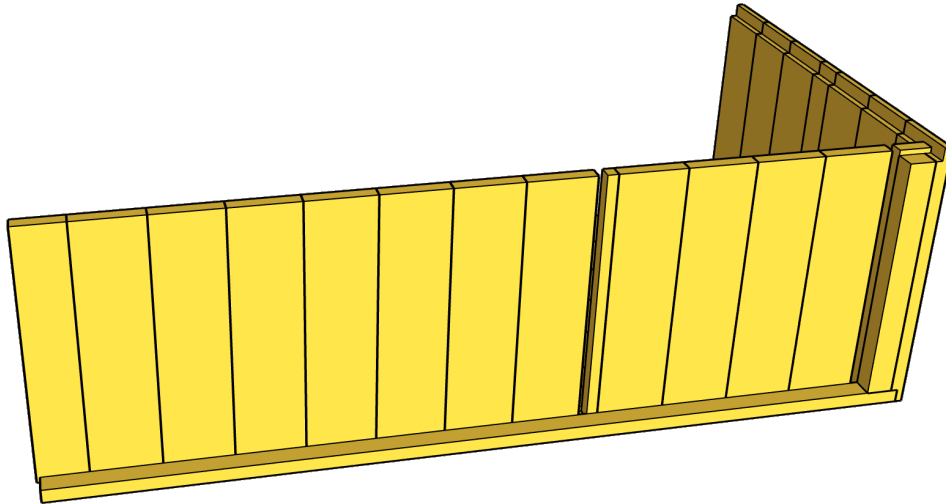


Figure 162 Add more inner wall boards

### Add the rest of the inner wall

Add another 12 mm spacer and add the rest of the inner wall boards. Note that you do not need to fasten the inner wall boards but put a nail on the board just above the entrances. This can be done when the second wall and roof is in place if it is easier.

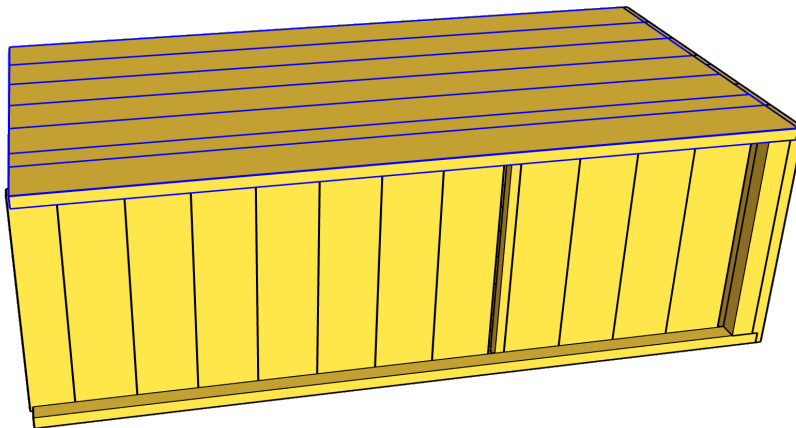
The last inner board should be cut of 5 mm above the side board to fit in the roof rabbet. Do not make it fit snugly into the entire 10mm rabbet, as wood move a bit depending on moisture.



*Figure 163 The rest of the inner wall*

### **Add the other side wall**

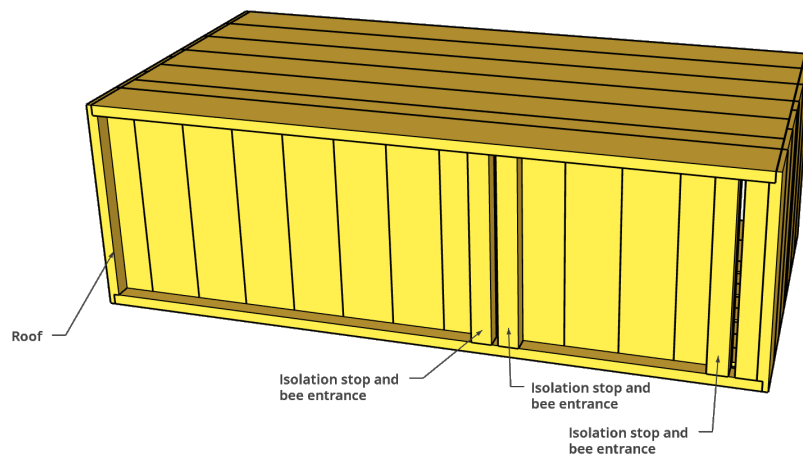
Now that you have added the boards for the inner wall you can add the second side wall. Expect some issues getting the inner wall boards in the rabbet but after some tries it will work. Use nails from the bottom and one nail on the inner wall boards closest above the entrances.



*Figure 164 Second side wall added*

### **Add roof and isolation boards**

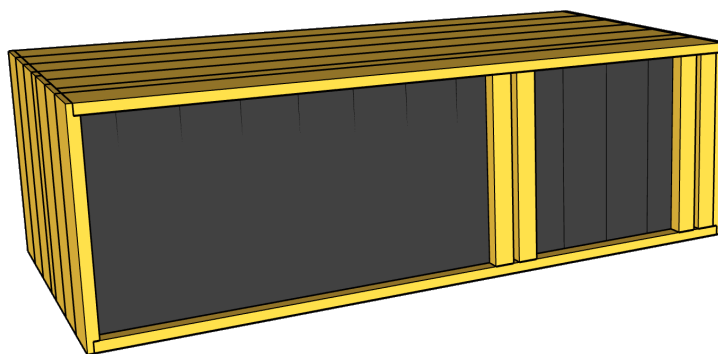
Add roof and boards to hold the isolation in place. The boards are also the bee entrances.



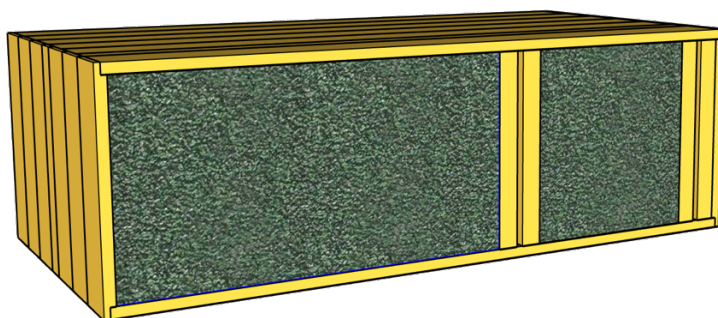
*Figure 165 Roof and bee entrance.*

### **Add isolation**

Now when the inner wall is done we add wind protection and isolation.



*Figure 166 Added wind paper*

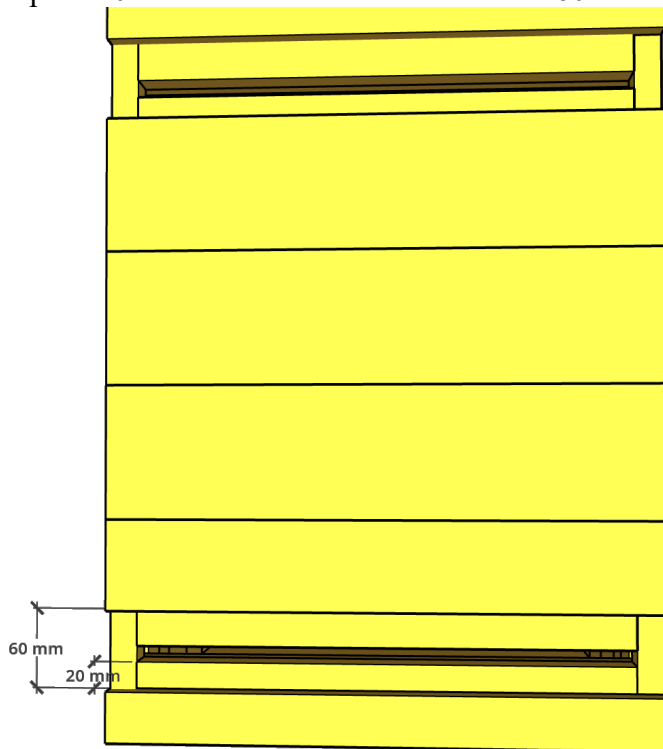


*Figure 167 Stone Wool isolation*

### Add front wall

Add the front wall boards.

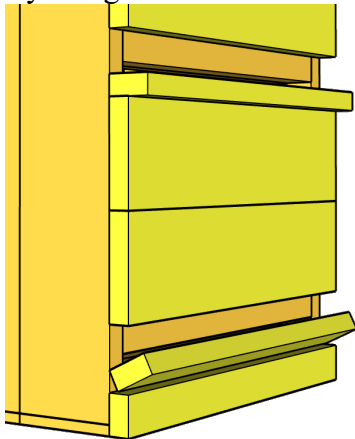
Leave space 20mm under the front entrance and 60 mm up.



*Figure 168 Front wall boards*

### Add closable entrance

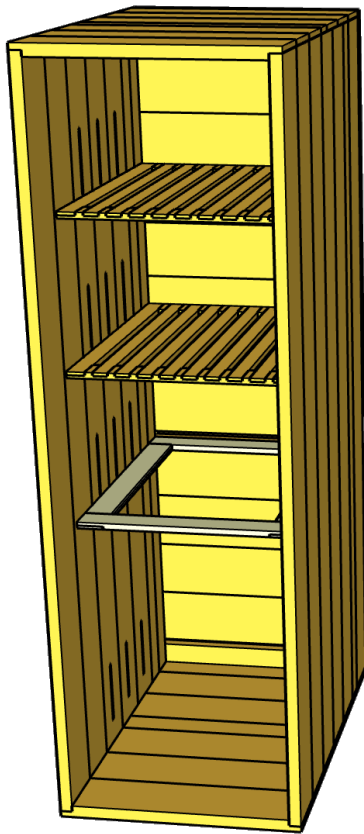
By using 412mm x 40mm x 20 mm board. And using hinges, add closable entrances.



*Figure 169 Closable entrances*

Add a lock mechanism so you can close the entrance during transportation. You can use a metal lock or wooden lock that you turn to lock the entrance.

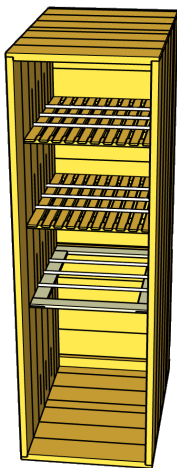
Add the queen excluders on the shelves.



*Figure 170 Hive with queen excluders and dividers*

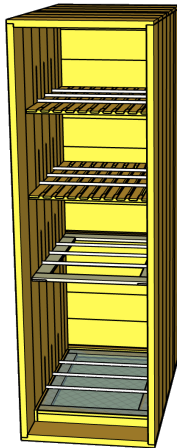
Cut the rods to the correct length. If you made the slots for the rods 8 mm deep, the rods should be 388 mm long. Adjust the length slightly if necessary, depending on the depth of your slots. The main thing is to ensure that the rods are secure and cannot fall out on their own.

Insert the rods into place, ensuring they are secure and cannot fall out by themselves..



*Figure 171 Rods added, check that they cant fall of by them selfs*

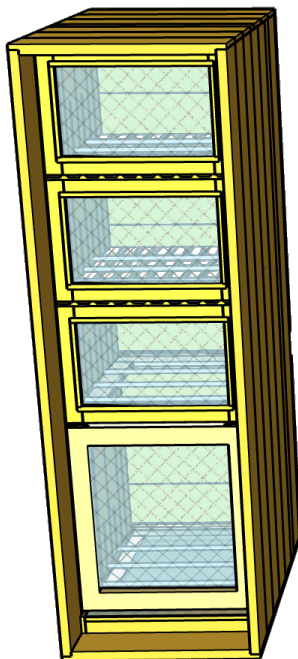
## Add the varroa floor



*Figure 172 Varroa floor added*

Add two bee frame spacers on the inner wall per level, along with corresponding spacers on the inner doors. Add the frames and dry-fit the inner doors. If the doors fit too tightly, you can plane down 1-2 mm on the sides to ensure easier handling later.

Mark where the door locks should be positioned.



*Figure 173 Inner doors added.*

For the locks, you can use hatches or rods.

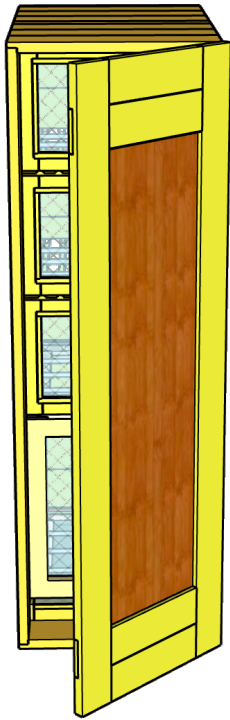
Add the locks and assembly the inner doors again.

### Adding the Outer Door

Lastly, add the outer door using **lift-off hinges**.



These hinges allow you to remove the door easily without the need to unscrew anything, making it more convenient for inspections or maintenance. Once the hinges are attached, ensure the door is aligned properly and test the lift-off functionality to ensure it operates smoothly.



*Figure 174 Finished hive*

And the hive is finished.