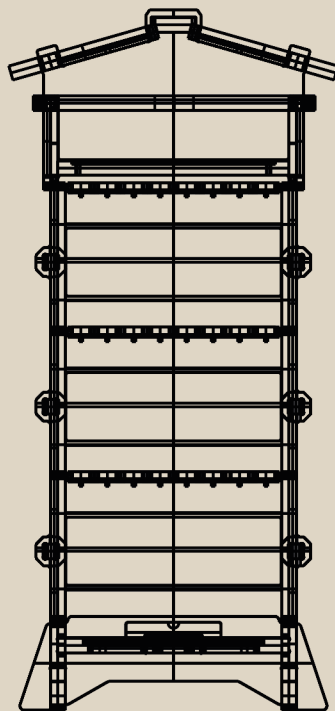




OPEN SOURCE BEEHIVES



**[BARCELONA WARRÉ HIVE
v2.4]**



OPEN SOURCE BEEHIVES

www.opensourcebeehives.net

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OPEN SOURCE BEEHIVES



OSBH - What is this?

The Open Source Beehives project is a collaboration between Fab Lab Barcelona and the Open Tech Collaborative. The project aims to build a global community of experienced and beginner beekeepers to share data and collectively study the disappearance of bees. Through the data gathered and generated we hope to find evidence of the factors causing the problem, prove what they are, and adjust them.

This document contains the information you will need to download, fabricate and assemble your Barcelona Warré Hive v2.4.

Open Source + Citizen Science

We continue in a long tradition of open and shared Beehive designs. The CC-BY-SA license we have chosen gives anyone the rights to download, edit and remix their own versions of the OSBH designs. We think participation in design is something to be actively encouraged. By adapting, improving and creating new variations of these hives we hope to encourage investigation, innovation and a spirit of collaboration.

SHARE - copy and redistribute the material in any medium or format.

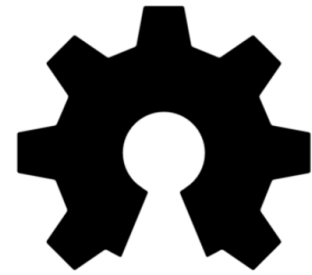
ADAPT - remix, transform and build upon the material for any purpose, even commercially.

COMMERCIALIZE - sell the beehives.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Open Design

If we don't share what we know, how can we learn from each other? We would like to encourage all participants to contribute what they can to improve the project. This might be peer review, debugging existing designs, or creating an entirely new design! By collaborating together, we can disrupt the trends of centralisation and ownership that have benefited the few at the expense of many. Together, we can build a series of open, distributed designs ready for mass customisation and local manufacturing, accessible to anyone.



GITHUB

We use Github to host our designs and file repositories. This online platform can be used to publish and share computer code, design files and other digital content. It allows anyone access to download files, make changes, "fork" new versions and work in a distributed and networked fashion. If you'd like to contribute to the project, Github is the place to make comments and add your work.



www.github.com/opensourcebeehives

CNC and Digital / Local Manufacturing

Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) are what allow us to create digital designs, and turn them into physical things. This combination of technologies are making it possible for anyone with access to a CNC milling machine, 3D printer, or laser cutter to download CAD files and make them locally. Our beehive files are designed to be easily understood by a CNC machine operator, and are translatable between many types of CNC machine.

1

Engage an active and diverse community to respond to the threats faced by bees everywhere.

- To encourage and facilitate responsible backyard beekeeping.
- To host regular community events to be held online and in distributed locations.
- Create a forum that democratically highlights best beekeeping practices.
- Generate participatory actions and community awareness campaigns to promote bee health.

2

Bridge the information gap between beekeepers and maker communities.

- Encourage information sharing between people with differing backgrounds and expertise.
- Provide data tools to reference local contexts, traditional knowledge and regional environmental conditions.
- Develop a range of communication tools to facilitate innovation in local beekeeping.

3

Develop open source hive meta designs that are suitable for local and digital manufacturing and that can be optimised for locality.

- Develop number of hive 'meta designs' that are used as a base for adaption.
- Provide an online parametric design systems for users to adapt their design online.

4

Employ embedded sensor technologies to monitor and study colony health.

- Design open source sensor board targeted for small scale Beekeepers and Citizen Science.
- Openly publish data on the Smart Citizen Platform.
- Develop alerts and remote monitoring systems to notify users of potential problems.

5

Enable radical and innovative forms of citizen science.

- Engage with and link to expert data analysis and modern scientific practises.
- Develop protocols and pathways for 'Cooperative Enquiry' and 'Citizen Science'.

Source Files: www.github.com/opensourcebeehives



BCN Warre - v2.4 - 3DModel - 20mm.3dm

Rhinosaurus software has been used to generate this 3D model. Here you can play and tinker with the original designs.



BCN Warre- v2.4 - Nesting - 20mm.3dm

A nesting file is essentially a flat version of the design laid out to generate cutting strategies and tool paths. Adjust this file to calibrate it for different woods and machines.



BCN Warre - v2.4 - STL Model - 20mm.stl

The STL export file provides an easy way to load the model into web viewers. This is not a place to edit the design.



BCN Warre - v2.4 - Cut Strategies - 20mm.dxf

This file contains the cutting strategies to load into your CAM software. Please look at the layers, they describe what tool paths to use.



BCN Warre - v2.4 - Window Cuts - 20mm.dxf

This file contains the cutting strategies to load into your CAM software to cut the Window Panes. This can be done with either a laser cutter or a CNC machine.



BCN Warre - v2.4 - 3D Strategies - 20mm.stl

This STL file contains 3D information needed to cut an angle using your CAM software. This will be loaded as the machine operator generates the tool paths.

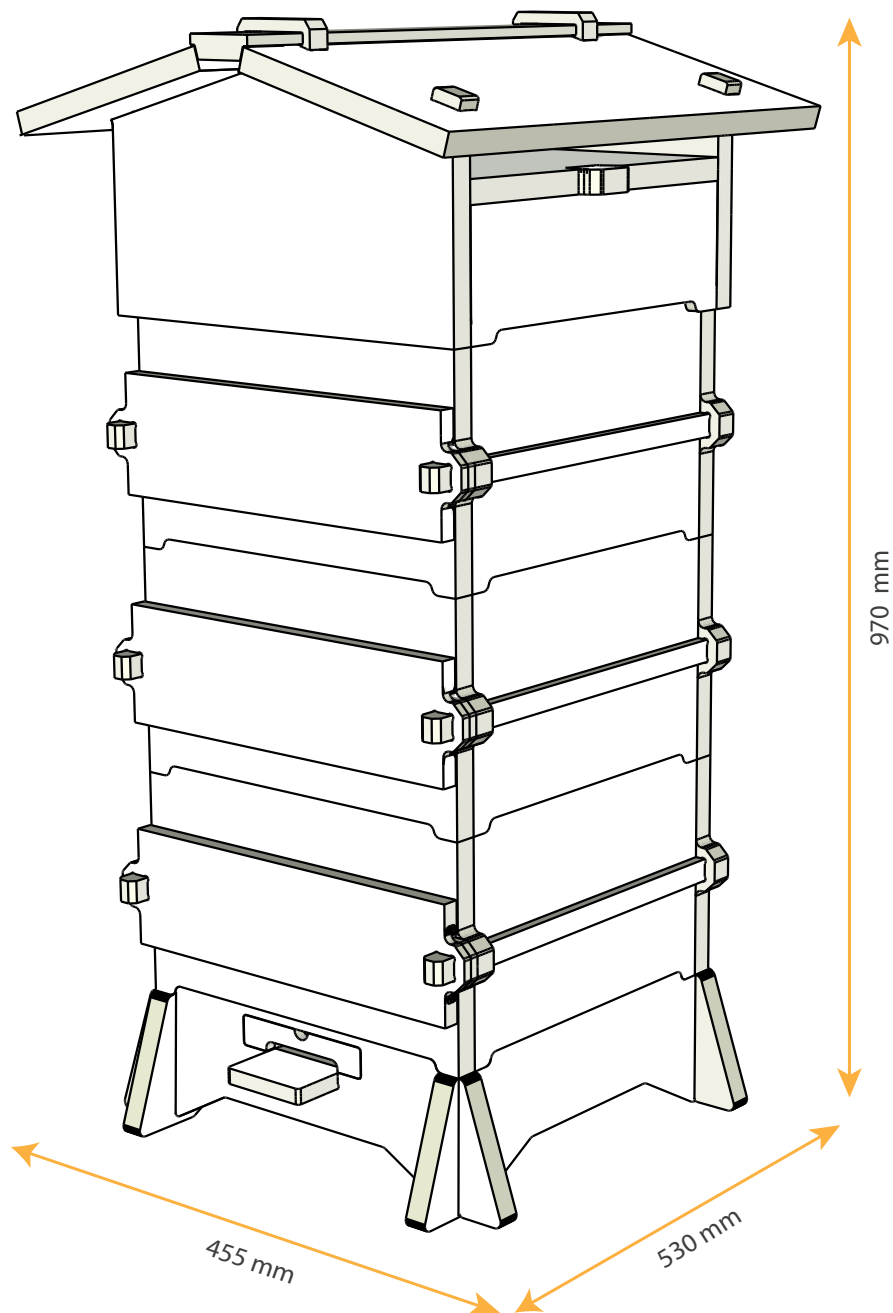


BCN Warre - v2.4 - Other Files Types - 20mm

We have included this folder with some different types of export files. These accommodate for different CAD / CAM software that might be used.

(Note: 19mm Metric / 3/4 inch U.S.)

Projection



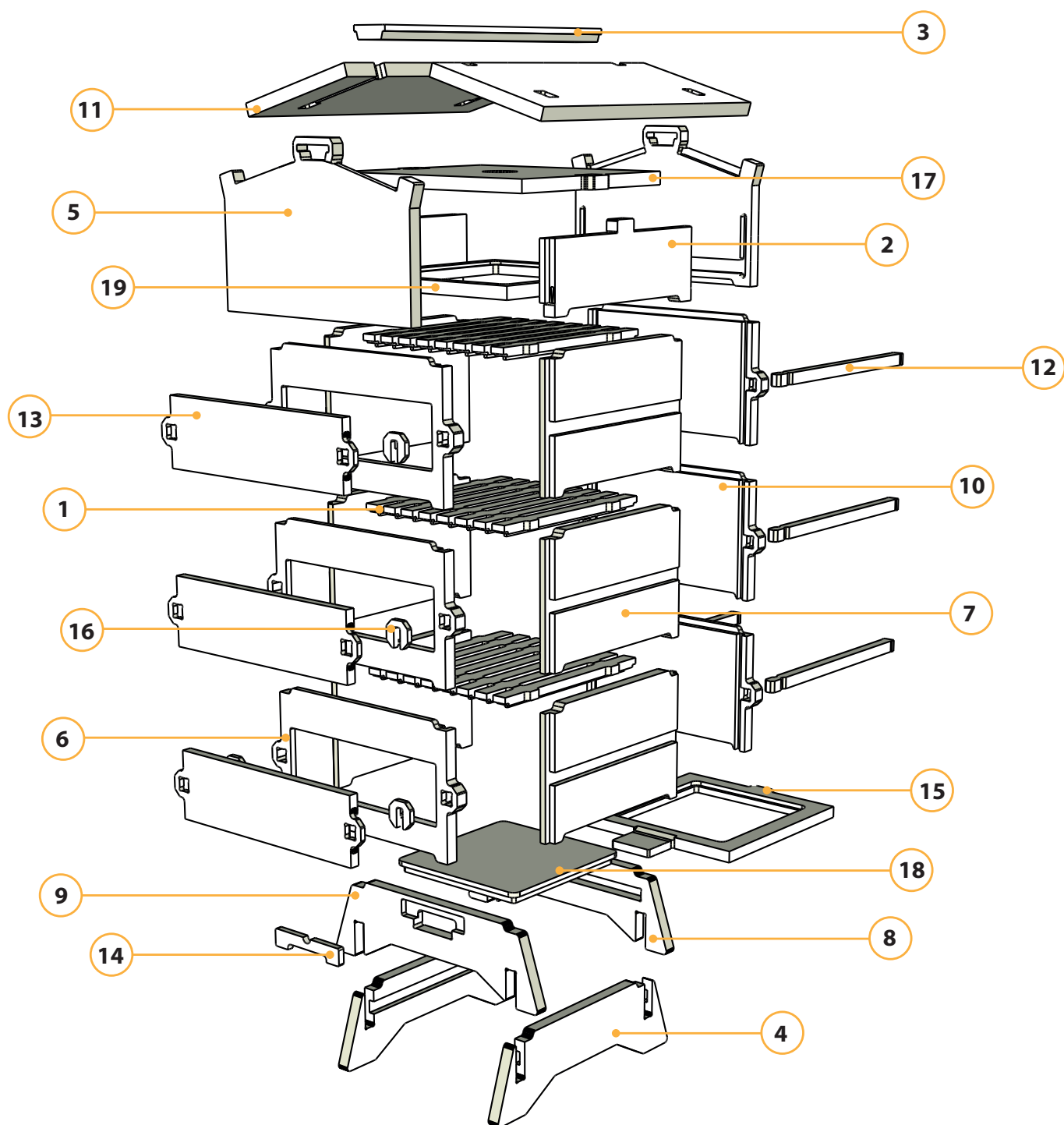
HIVE HISTORY

The Warré hive design was originally developed by the French Beekeeper Abbé Émil Warré, and published in 1948 in his book 'Beekeeping For All'. Warré named the hive the 'Peoples Hive' and designed it for ease of use and for amateur Beekeepers. This modern iteration was created and tested at Valldaura Labs and Fab Lab Barcelona together with the Open Tech Collaborative in Denver Colorado. The hive is a vertical top bar type and follows a tradition of natural beekeeping methods.

FEATURES

- Open Source Hardware = Open to adapt
- Locking system = no screws
- Fits one standard wood board 1220 x 2440 mm
- Reversible entrance for different seasons.
- Removable base tray + Varroa Draw adaption
- Stacking and stable box structure.
- Windows in every box.
- Removable lid
- Quilt Box

Exploded View



COMPONENTS

1.	TOP BARS	x 24
2.	ROOF SIDE PANELS	x 2
3.	ROOF BEAM	x 1
4.	BASE SIDES	x 2
5.	ROOF GABELS	x 2
6.	BOX FRONT	x 3
7.	BOX SIDES	x 6
8.	BASE BACK	x 1
9.	BASE FRONT	x 1
10.	BOX BACK	x 3

11.	ROOF PANELS	x 2
12.	BOX RAILS	x 6
13.	BOX SHUTTERS	x 3
14.	ENTRANCE BLOCK	x 1
15.	LANDING / FLOOR	x 1
16.	BOX LOCKS	x 8
17.	QUILT CAP	x 1
18.	TRAP DOOR	x 1
19.	QUILT FRAME	x 1

Extra Materials

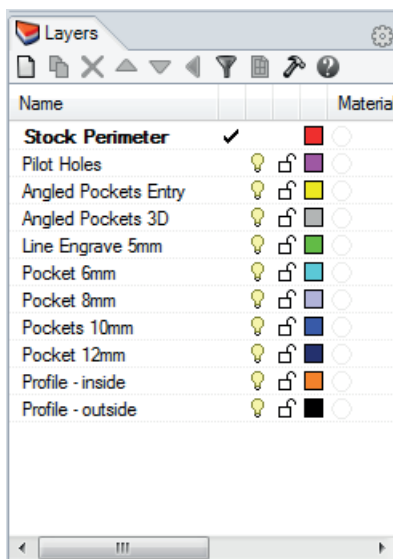
20.	Window Panes	x3
21.	Hessian Cloth	x1

Note : Numbers correspond to Cutting List (pg. 11)

CNC MILLING*

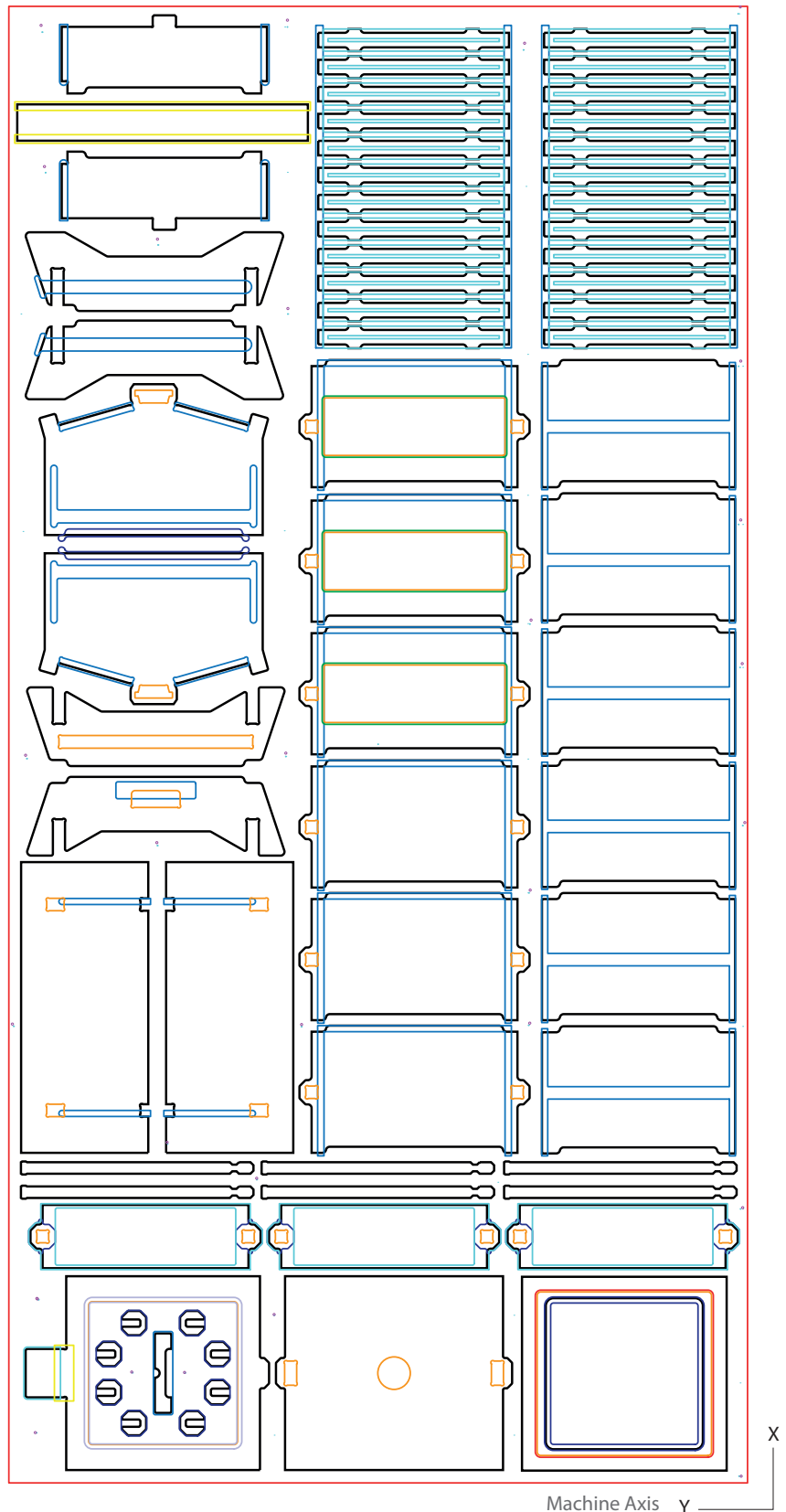
The hives have been designed to be cut using one standard size wood board of 1220mm x 2440mm or 4 x 8 feet. This drawing shows the Geometry and Cut Strategies that a machine operator will need to use with their own CAM software. To help in the creation of the machine 'tool paths' we have split the strategies into colour coded layers and named them according to the strategy required. See the 'Nesting' and 'Cut Strategy' files.

CUT STRATEGIES



NOTE:

We have created three file types for 19mm (0.75 inch), 20mm and 21mm thickness boards. It is common for wood boards to have slight variations, so be careful to measure your wood before selecting the files. In these design every millimetre counts.



*A CNC router is a computer-controlled milling machine. They are often used to manufacture custom cabinetry and are available in most metropolitan areas. Check out these links to locate one in your city: www.themakermapping.com. The Fablabs network: www.fablabs.io and also www.fabhub.io

CUTTING LIST

TOP BARS

1

ROOF SIDE PANELS

2

ROOF BEAM

3

BASE SIDES

4

ROOF GABLES

5

BOX FRONT

6

BOX SIDES

7

BASE BACK

8

BASE FRONT

9

BOX BACK

10

ROOF PANELS

11

BOX RAILS

12

BOX SHUTTERS

13

ENTRANCE BLOCK

14

LANDING FLOOR

15

BOX LOCKS

16

QUILT CAP

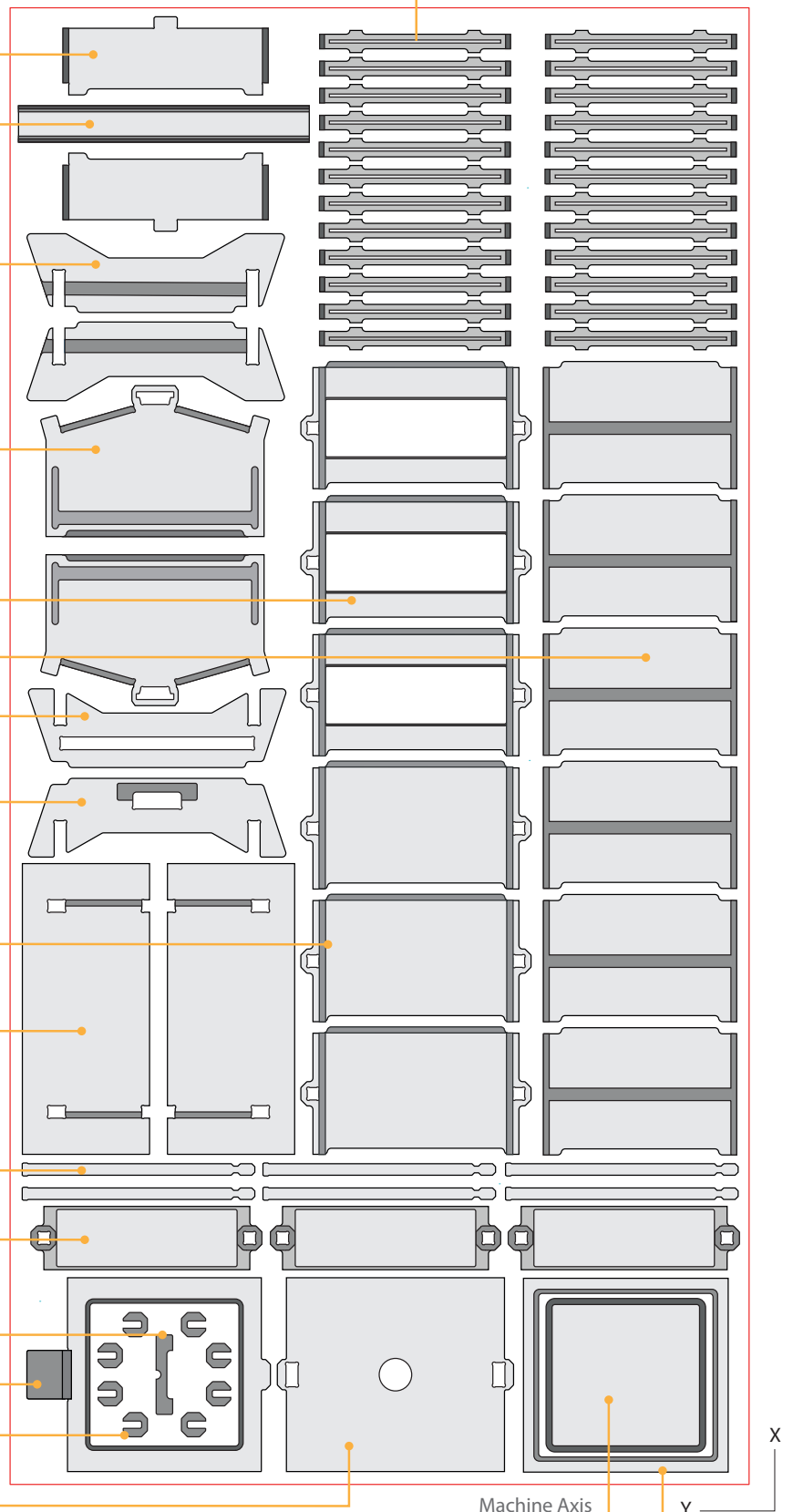
17

TRAP DOOR

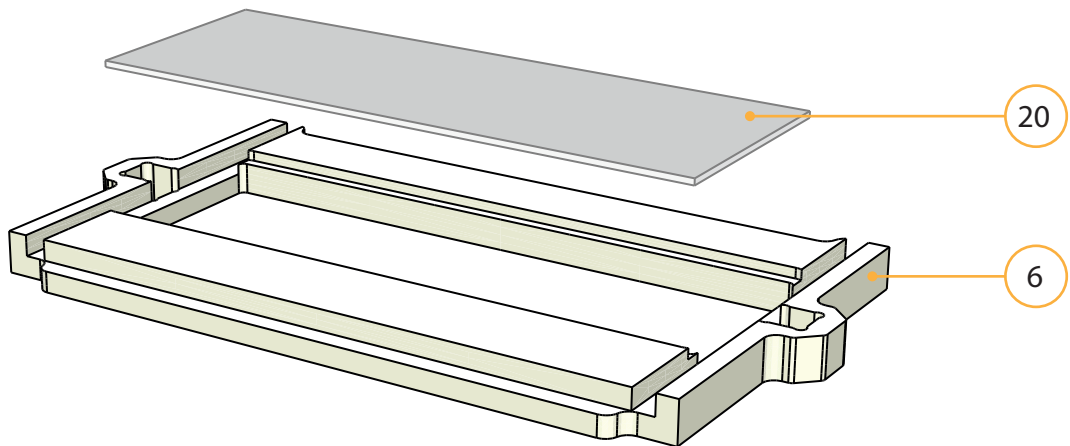
18

QUILT FRAME

19

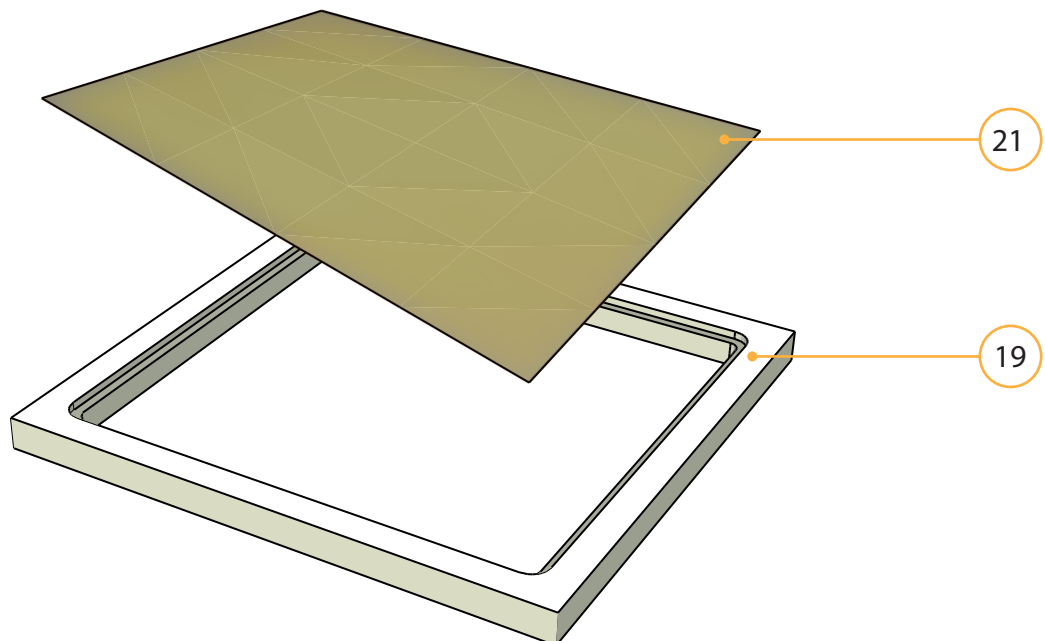


BOX WINDOW



1. Take each Box Front and place it flat on the a bench surface. You will need to have laser cut or milled the window panes from 3mm Plexiglass or similar material. Then tack in the window planes to secure them in place.
-

QUILT FRAME

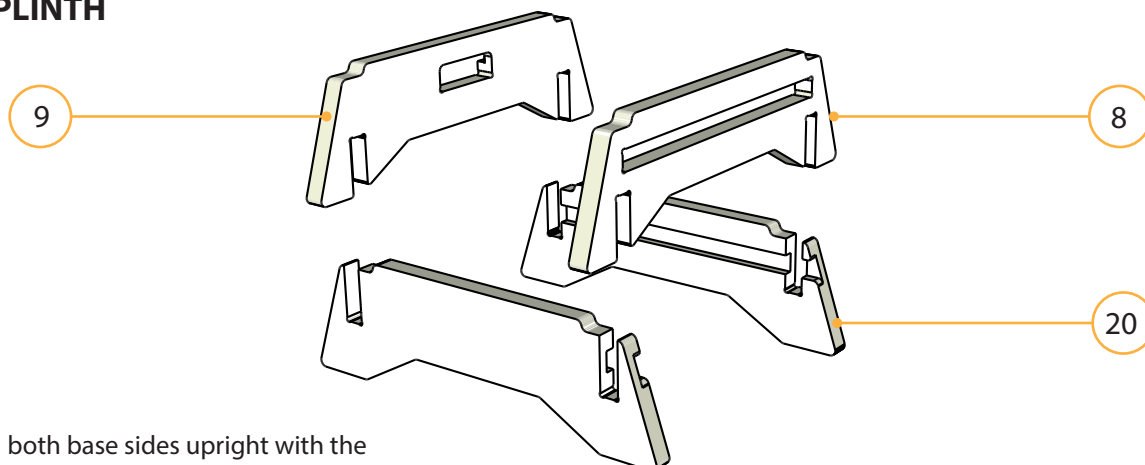


2. Take the Quilt Frame and place it with the rebate up. Then cut a hessian o raffia material to fit the outer perimeter of the entire quilt frame. Carefully staple or tack the Material to be taught into the rebate.

Note: Fold over the material and tack a second time for extra strength.

Assembly 1

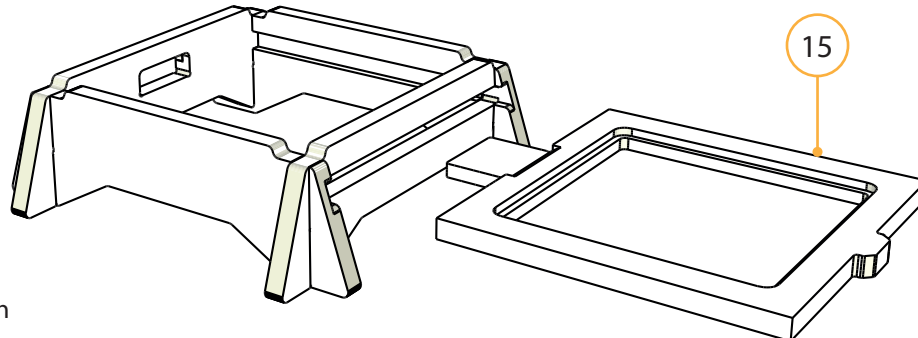
BASE PLINTH



3. Stand both base sides upright with the channel on the inside. Locate the Base front to the end where the channels are closed and the base back to where they are open.

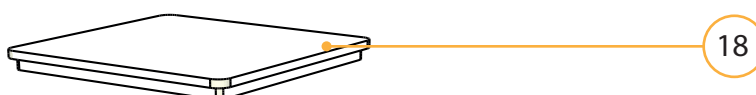
Note: Place the base front with the space for the entrance block on the exterior.

LANDING / FLOOR

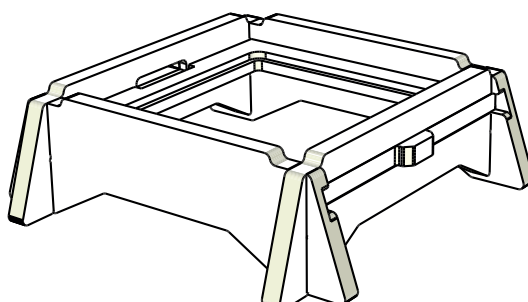


4. Slide the Landing / Floor through the back until it is flush with the front side wall. No gaps.

TRAP DOOR

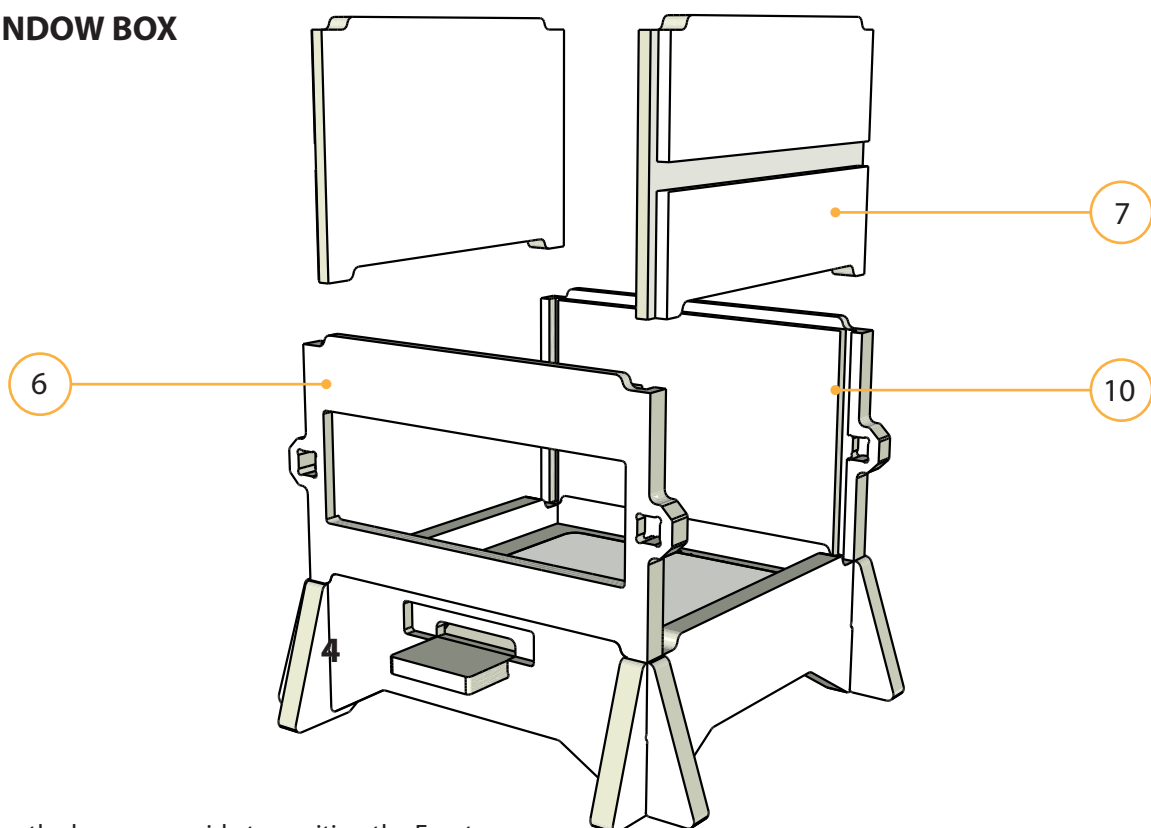


5. Add the Trap door to the top of the Landing / Floor. Make sure that it is tight and flush with the top.



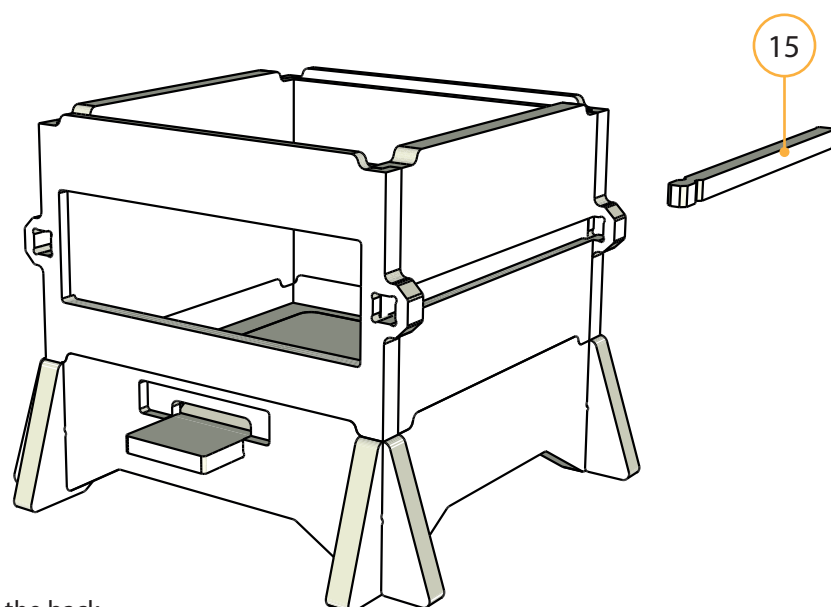
Assembly 2

WINDOW BOX



6. Use the base as a guide to position the Front and Back box sides, making sure the grooves are on the inside. Then slide the side pieces into the grooves. Make sure the channels cut into the side pieces are facing out.

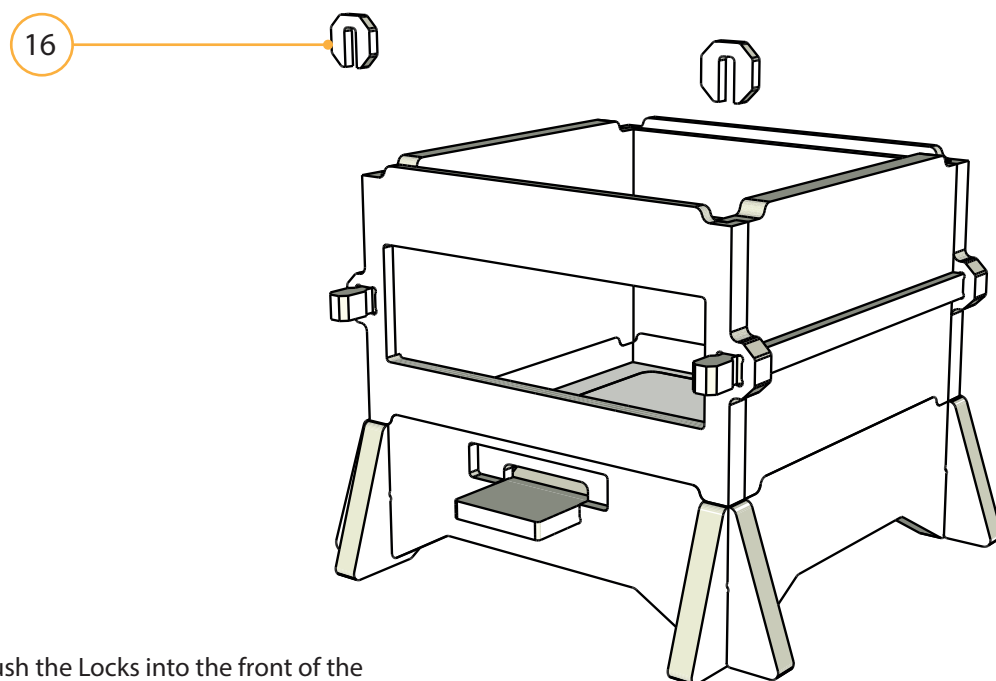
BOX RAILS



7. Add the Box handles from the back,

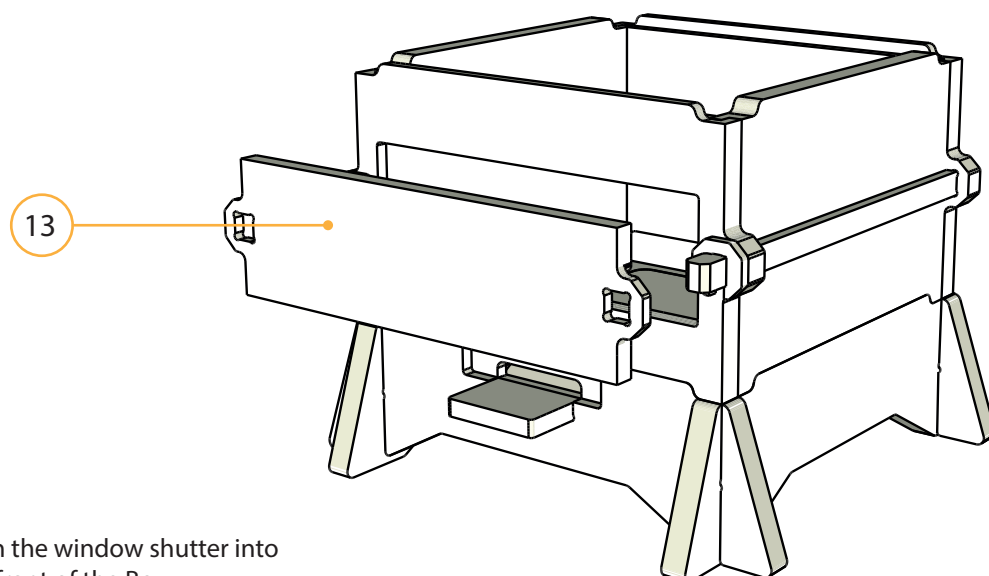
Assembly 3

BOX LOCKS



8. Push the Locks into the front of the Box andles to lock them in place.
This should be a tight fit!

WINDOW SHUTTER

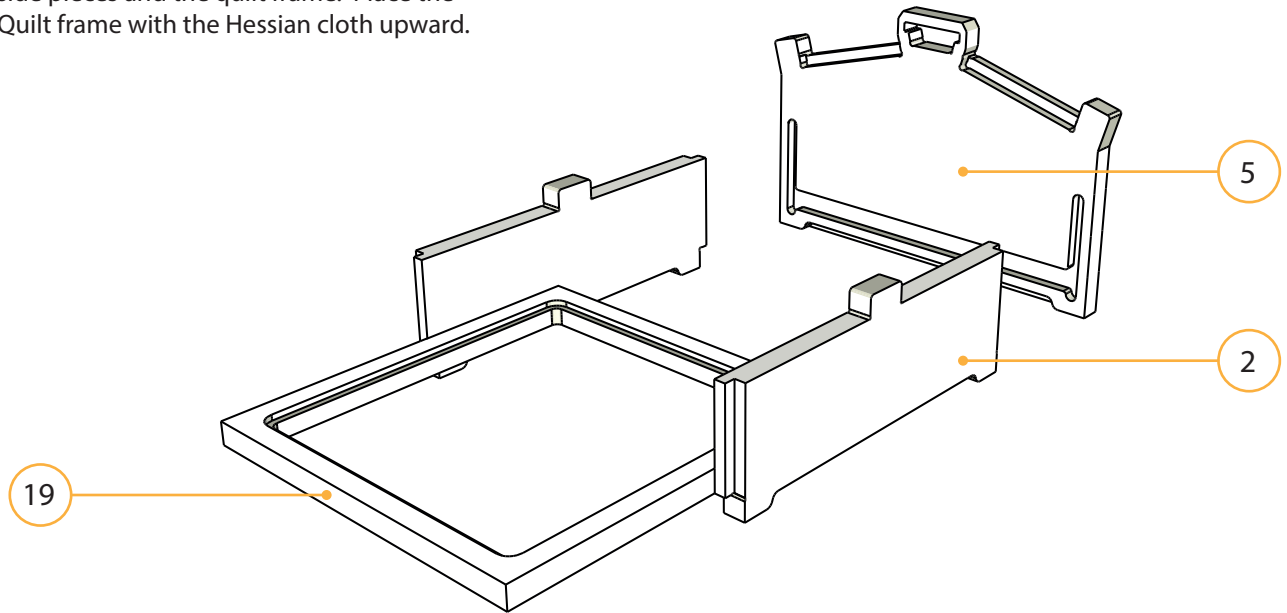


9. Push the window shutter into the front of the Box.

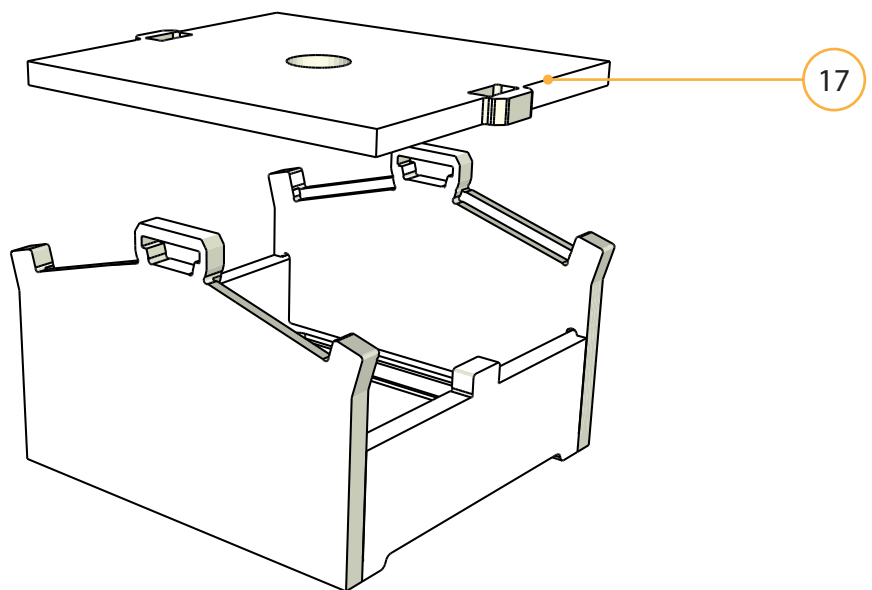
Assembly 4

ROOF AND QUILT BOX

10. Take one Gable end and slot in the roof side pieces and the quilt frame. Place the Quilt frame with the Hessian cloth upward.



QUILT CAP

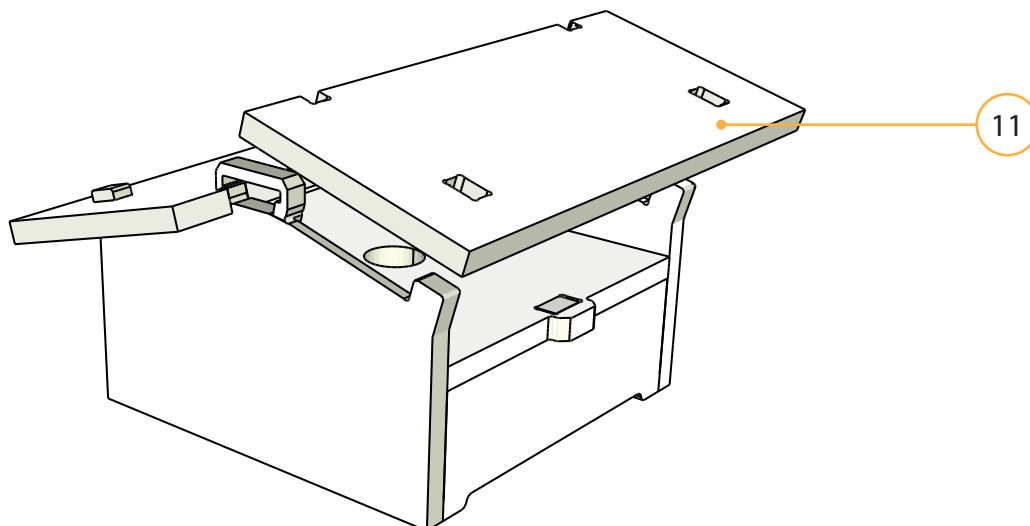


11. Add the other Gable end and place the Quilt cap onto the roof side pieces.

Note: you should fill the quilt box with large chip sawdust at a later point.

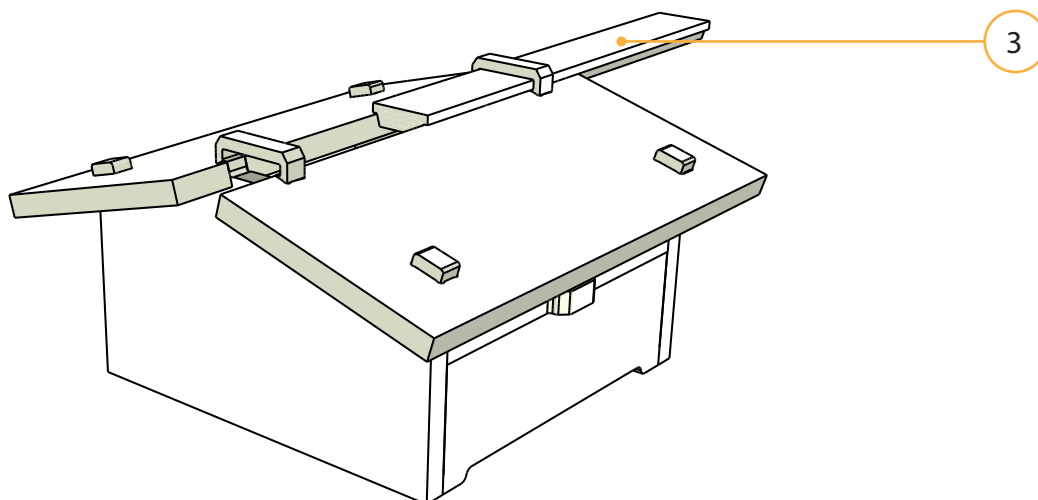
Assembly 5

ROOF PANELS



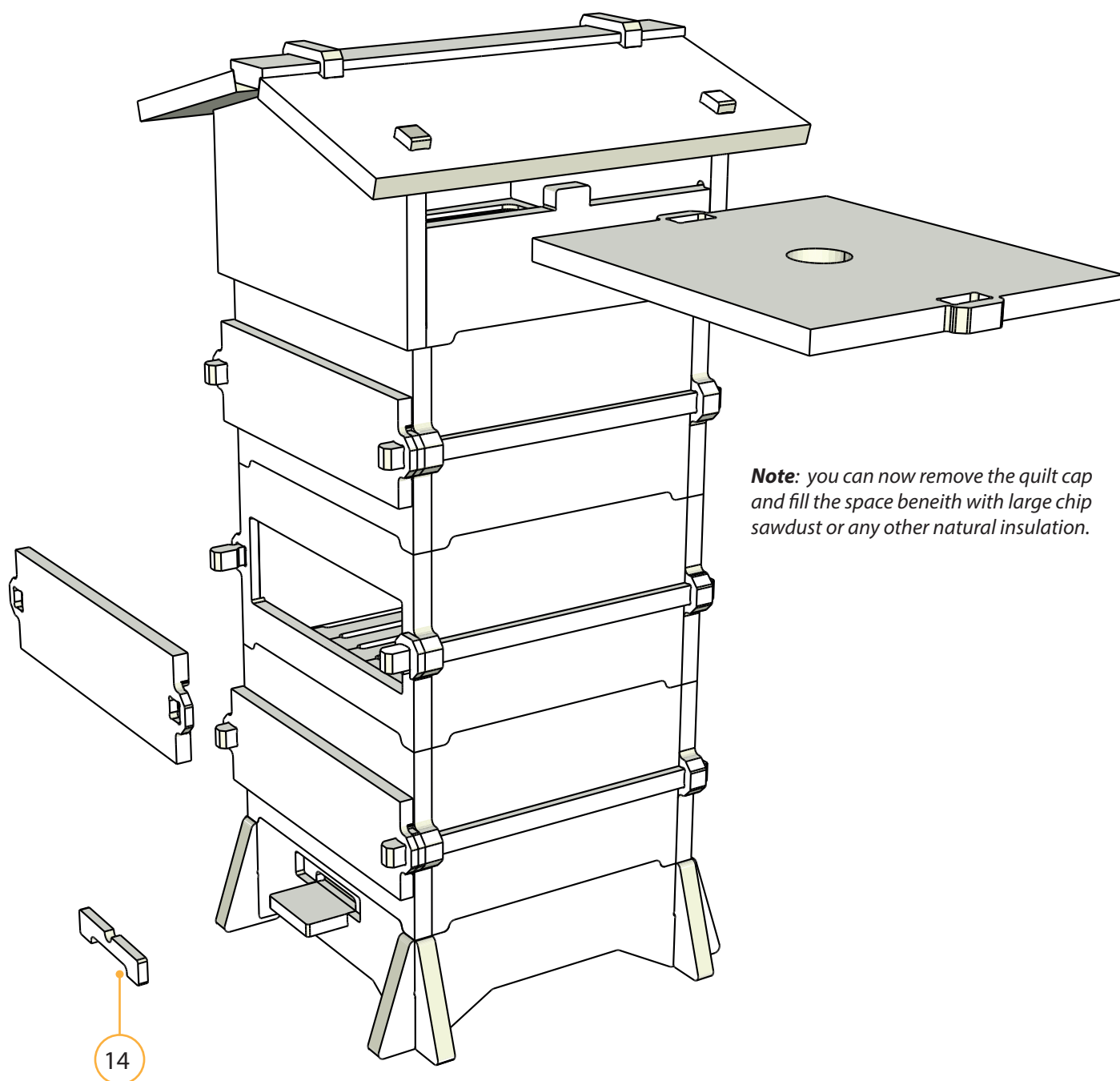
12. Push both roof pieces onto the gable ends making a tight fit with no over lap that could block the beam.

ROOF BEAM



13. Slide the roof beam over the top of the roof panels and through the sockets of the Gabel ends.

REMOVABLE PARTS

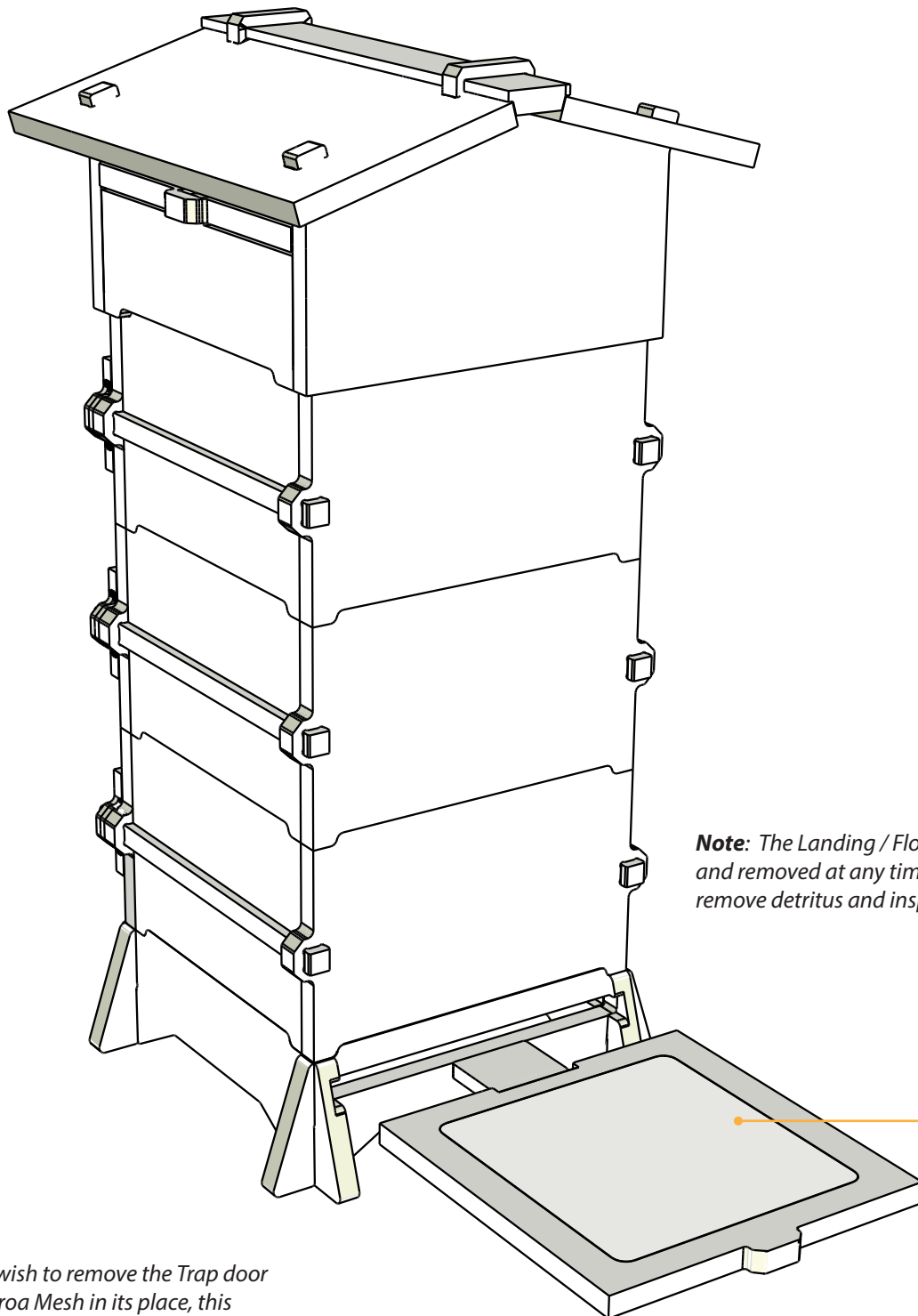


14. Stack the Boxes and add eight bars to each of them.

15. Add the Entrance block, firstly with the larger gap down to prepare for installing your bees.

Modifications

Trap Door / Varroa draw



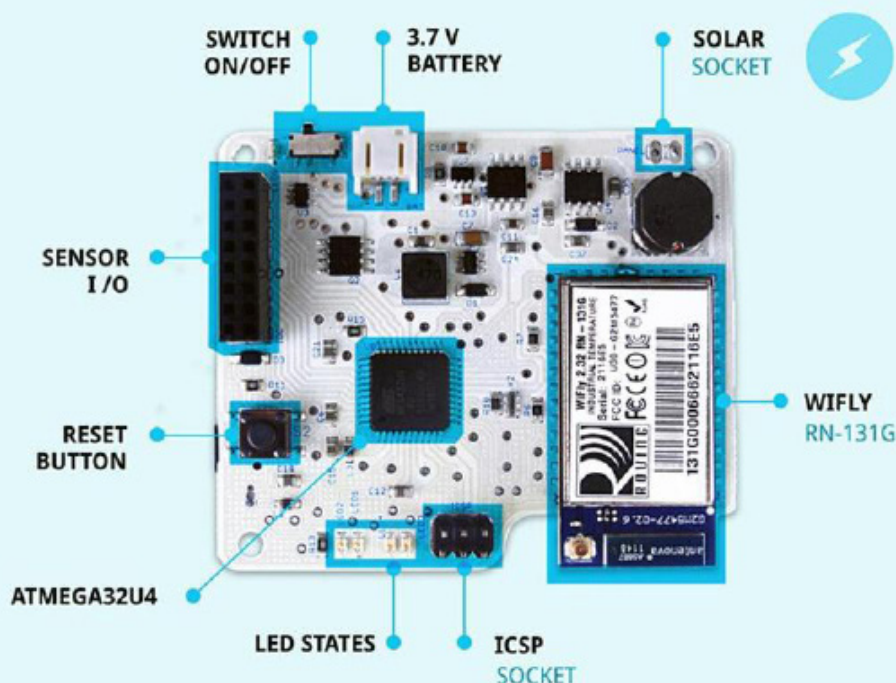
Note: The Landing / Floor can be pulled out and removed at any time. This will allow you to remove detritus and inspect for Varroa mite.

Note: You may wish to remove the Trap door and install a Varroa Mesh in its place, this adaption will serve well for the bees as the Varroa can then be collected and removed for analysis.



The Smart Citizen Platform

Developed within Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia (laac), Smart Citizen is a hardware and software platform that empowers people to monitor the environmental conditions of their cities. The Smart Citizen project is based on geolocation, Internet and open hardware and software for data collection and sharing (Smart Citizen Kit - SCK , RESTful api, Mobile App and, the web community).



Beehive Sensor & Software Development

We are adapting the Smart Citizen platform for the Open Source Beehives project. Our vision is to develop a field-ready sensor package that can be integrated within hives without interfering with their natural habitat. Sensor data will be streamed to an online platform, where it will be openly available for public analysis.

Our data collection priorities include the following:

- hive population
- hive weight
- temperature
- humidity
- acoustics
- EMF fields

Functionality

The OSBH sensor kit will monitor hive conditions, stream data to an online software platform and mobile application, and will trigger SMS/email notifications to users based on patterns in the information.

We will develop a field-ready enclosure for the sensor package that also shields the bees from EMF fields by using a Faraday cage.

Get Involved

Email sensors@opensourcebeehives.net to help us develop open source hardware and software for the OSBH project.



PLANT THESE

HERBS



LAVENDER



CATMINT



SAGE



CILANTRO



THYME



FENNEL



BORAGE

PERENNIALS



CROCUS



BUTTERCUP



ASTER



HOLLYHOCKS



ANEMONE



SNOWDROPS



GERANIUM

ANNUALS



CALENDULA



SWEET ASYLUM



POPPY



SUNFLOWER



ZINNIA



GLEOME



HELIOTROPE



TO HELP SAVE BEES

Further Hive Preparation

Sustainable & Nontoxic Wood

If you choose to use plywood, please try to select a supply that is free from formaldehyde and harvested from responsibly managed forests. Internationally you can look for the 'Forestry Stewardship Council' FSC certification standard. This means that the forest the wood have come from have been managed responsibly. In the United States and if using Plywood look for wood that meets the CARB Phase 2 standard, which is the highest rating for nontoxic plywood in the nation.

Treating the Wood

Whichever wood you choose, you may wish to treat the wood to protect and seal it against the weather. many people paint their hive too and feel that certain colours help bees to find the hive. Blue hives in Greece, Slovenia has a strong folk art tradition of colourully painted hives.

When treating the wood, make sure you leave ample time for it to fully dry. There should be no strong smells or residual vapours being released when your bees are installed. It is not recommended to paint or treat the inside of the hive.

Plywood is not as weather resistant as hardwoods, so it is necessary to apply a non-toxic varnish that will protect the exterior of your hive without disrupting the Bees. We have used Linseed oil with a good deal of success, and it is common practise for Beekeepers to mix wax into the lindseed oil before applying it.

Overview

This section will introduce you to the basics of Top Bar beekeeping. We will cover how to start a hive in your backyard, and some general introductory guidelines to keeping honeybees. There is so much to know, and we are only beginning to scratch the surface in this document. It is highly recommended that you investigate other resources in our Further Reading section below, find a mentor, or join a local beekeeping class to strengthen your beekeeping practice.

Your backyard or rooftop are great places to keep bees. Keeping bees connects us to a larger ecosystem even within urban areas. The experience is inspiring and humbling, as beekeepers often find themselves engulfed in the mysterious and magical world of bees.

Why Use a Warré hive?

Warré hives allow the bees to build “natural” or “free” comb. Other styles of hive such as the Langstroth hive typically use pre-made plastic foundations or commercially produced wax comb, whereas Warre hives allow the bees to build their own comb, limiting their exposure to foreign substances. It has also been argued that the bees build smaller cell sizes in free comb, allowing them to more easily manage Varroa Mites (common pathogen in honeybee colonies) reproducing inside the cells.

Warre hives are also designed to best fit the bees needs, with proportions that are easy for them to heat and manage.

Supplies

Below are a few pieces of equipment that will help you interact more confidently and effectively with your new colony. These are recommended, but many beekeepers form their own tool kits to follow their knowledge and practise:

Bee suit and gloves

This commonly used layer protects the wearer from bee stings, but lots of beekeepers do not use a full suit or gloves at all. The most important thing is to feel calm and confident. As a new beekeeper, it is wise to start with a suit and gloves until you are more comfortable.



Hive tool

The hive tool is a simple woodworking tool used to pull frames apart and remove them from the hive when the bees have stuck them together. This is essential kit for top bar beekeepers.

Smoker

Smokers are used to calm the bees by masking their alarm pheromones. Blowing smoke into the hive also makes the bees retreat into the hive to gorge themselves with honey.

Bee brush

The bee brush is used to gently remove bees from the comb when harvesting honey. The brush is also a helpful tool when catching swarms, or getting rid of bees left on top of the top bars before closing the lid.

Beeswax

Before installing bees into your hive it is smart to rub beeswax on bottom ridge of the top bars. This will encourage the bees build along the top bars, so they can be easily extracted.

Placing Your Hive

Beehives can be placed in a variety of different environments. It's important that you consider the needs of your bees when deciding the hive's location. Please read the considerations below carefully, as it is tricky to move the hive once the bees have been introduced.

Things to consider:

Heat management: In the cold the bees huddle together in a cluster shivering and metabolizing honey to stay warm. In the heat they fan the hive with their wings, but it is more difficult for them to manage intense heat than cold.

When placing a hive in your backyard, a good place is under a deciduous tree, where the hive gets cool shade in the hot summers, and warm sun during the cold winters. There are many variations if you do not have a shady tree in your backyard, depending on the light and heat within your own backyard. Sometimes a fence can offer shade for part of the day, .

When placing a hive on a rooftop a rug, carpet, or other insulative material should be placed under the hive to protect against hot tar paper or other roofing materials. Shade is a necessity when keeping bees on a rooftop. If no structural shade is available, it may be necessary to construct one yourself.

Accessibility: You will want to place your hive somewhere it will be easy to access and manipulate throughout the year. Keep in mind you will need to remove the roof to install bees, extract honey, and maintain the hive on a relatively regular basis.

Bee Traffic: Bee traffic will be limited to, but concentrated directly in front of the hive. The bees fly up and out quickly, so other than a few feet directly in front of the hive entrance, the bee traffic will hardly be noticed. It is not a good idea to place the hive facing any trafficked sidewalks, pathways or sitting areas. Some city ordinances require that hives are placed behind a 6 foot barrier so they fly over the barrier. This is a good way to keep bee traffic unnoticed.

Water Source: A bird bath or other water catchment area filled with rocks or a bucket with floating wood chips work best. It's important the bees have somewhere to perch near the waterline in order to drink. If a river or pond is nearby, these will also work nicely.

Drainage: With all wooden hives it is important that the legs do not soak in water for prolonged periods to avoid swelling. Choose a well drained space, and sit the four legs atop four bricks or similar. Remember to ensure the hive remains level and stable.

Moving the Hive: If you find the chosen hive location is inappropriate after installing your colony, unfortunately, moving your hive is a difficult process. You can move the hive 3 feet / 1 meter each day towards the new location, or move them 3 miles/ 5 kilometers or more at a time. Bees have a great internal GPS system. When moving the hive short distances the bees will try and return to the original entrance, and will get lost. Moving it slowly allows them to adjust. When you move them 3 miles/ 5 kilometers or more they are out of their orientent flight range. Upon noticing this the bees will reorient themselves. Move your bees only at early morning or dusk when all the bees are inside the hive. There is no need to tape up, or shut the bees in, just be gentle, and use smoke to chase them back inside if needed.

Populating Your Hive

There are three ways to populate your backyard or rooftop hive with bees. New colonies should be introduced in early Spring when temperatures are warmer and plants begin to bloom.

Packaged Bees

The most common way for new beekeepers to start a hive is to purchase a package of bees. Packages are produced by commercial beekeepers who split their strong hives into boxes that contain a caged queen and usually 3 pounds of bees. This package can be collected or sent via the mail in early Spring. When purchasing a package you can most often count on ending up with a healthy, productive colony.

Installing bees from a Package

To install a package first remove the caged queen and hang her cage between two top bars. The screened part of the cage must be facing outwards so that the worker bees can feed and care for her. Make sure the cage is secure and will not fall into the hive. Next, contain the colony between the first 4-5 frames. If you do not limit the bee's space it is likely they will abscond, or leave, finding their new home hard to heat and inhospitable.

Top Bar Beekeeping Crash Course

The Bees will also need to be fed with sugar syrup. Put 1 part hot water and 1 part sugar in a jar and shake until the sugar dissolves. You can use the jar as a feeder by poking small holes in the lid and turning it over on a stand (the bees must be able to access the drip) or you can use a store bought feeder. A general rule is to continue feeding your bees sugar syrup until they stop eating it. Refill your feeder as needed. You can also feed your bees with a pollen patty.

After the queen has been hanging in the hive for three days, you can return to release her. Remove the plug at the bottom of the cage using your hive tool while the opening is facing inside the hive. Watch your queen walk into the hive to insure she is inside and looks healthy.

Swarms

Catching a swarm is a great experience for all beekeepers, and is easy to do. Each spring, honeybee colonies that survive the winter with strong numbers tend to swarm. This is how bee colonies reproduce. A third of the colony shoots out of the front of the hive, and take to the sky in search of a new home. The swarm will land on a branch, park bench, fence etc. and wait while scout bees look for the perfect new home. Hanging in a large mass, these home hunting bees can be captured in a box and introduced to a beekeeper's backyard hive. Because they are already looking for a home, it is usually easy to convince them to stay.

Most of the time, swarms are a sample of the strongest colonies. For this reason, some beekeepers prefer to catch swarms, encouraging successful genetics, adapted to the local environment. The downside is swarms are a mixed bag, you don't know what you are going to get. Swarms can carry disease and mites with them, they might also have some undesirable behaviors - prone to swarming, aggressive etc. Many of these problems can be solved by re-queening the colony, others can be more serious.

Finding a swarm

The first step to acquiring a swarm is to get on a swarm list. The majority of people who end up with swarms in their backyards, on their fences etc. are unsure what to do with them. They usually call a beekeeping association, beekeeping supply store, or online swarm removal source to ask for help. These resources will connect citizens with swarms to beekeepers wanting to populate their hive/s. After being contacted through a swarm list, the beekeeper must act quickly, arriving at the swarm location before the home-hunting bees are gone. Sometimes it can take days for a swarm to find a home, other times it only takes a few hours. It is always a good idea to ask where the swarm is located, how high up it is, and how long it has been there to make sure you have the ability to catch it.

Capturing a swarm

You will need:

- 1 x bee suit
- 1 x bee brush
- 1 x ladder (if needed)
- 1 x large cardboard box.

To catch the swarm you must knock the swarm into your cardboard box. Place the box underneath the hanging bees and give the object they have landed on a good shake. If the bees have swarmed onto something like a wall or house, a gentle brush or sweep with your bee brush will do. In some cases if the object they have swarmed onto is small enough, like a tree branch, it is easiest to cut the branch into the box and take the whole thing with you. If you are successful in catching the majority of the swarm in the cardboard box, the bees will begin to send out pheromones, sticking their abdomens in the air and fanning their wings. This is a call to the rest of the colony. If you let the box sit on the ground, or near where the swarm originally hung, and wait 10-15 minutes, the majority of the swarm will join their colony in the box. If there is still a large mass of bees hanging, you may need to do an additional shake or brush into the box. It is impossible to get all of the bees in the box, and sadly some will be left behind, but the majority of bees will hopefully find your backyard hive the perfect place to live.

Installing a Swarm

To install a swarm into your hive make a small space in-between the top bars to dump the bees. In a top bar hive make sure to close down the space using your follower board to contain 4-5 frames. If you do not limit the bee's space it is likely they will abscond, or leave, finding their new home hard to heat and inhospitable.

After a week or two, when the bees have built comb, return to the hive and look for eggs and larvae, insuring that the queen arrived safely with your swarm.

A Nuc

A Nuc is a small colony that comes with both bees and a few frames of brood (unborn bees) and food (honey). This is a major advantage, because these things take time for bees to create, and will give your new colony a large head start on the season. Using a nuc to populate your hive is expensive, but also the easiest way to introduce bees. However, it is difficult to find a nuc for Top Bar style hives. Most commonly they come on Langstroth frames that will not fit into a Top Bar hive.

Nuc's also have the greatest first year success rate, as the bees will not abandon the brood or leave the hive.. Like a package, Nuc's are produced by commercial beekeepers so you can trust that the bees will have a desirable genetic makeup, and arrive without disease.

Installing Bees From a Nuc

To install a Nuc, simply put the populated frames into your new hive. If there are bees left over they can be knocked into the hive, or left in front of the hive to follow their colony in on their own time. Reduce the space inside of the hive using the follower board to contain the new frames of bees and an a couple empty frames.

Interacting With Your Hive

Once your bees are installed, it's important to understand how to monitor their health and progress as a colony. Below is some advice on how to do this effectively.

Getting to Know Your Bees

As a new Beekeeper, the best thing you can do is spend time with your bees. This includes making routine hive inspections usually once a week in the spring and fall, and once a month in the summer. You can also spend time with your bees by watching them come in and out of the hive and observing them in your garden. The best skill a beekeeper can have is recognizing their bees: how they move, sound, smell, what they are bringing into the hive, what they are building, what they are storing. Once a beekeeper knows what their bees do, they have the ability to notice when something is different, allowing the beekeeper to seek instruction when something changes. In your first season, everything will be new, and it is helpful to find a mentor and some reliable resources on bees and beekeeping.

Top Bar Beekeeping Crash Course

Who's In the Hive?



Worker Bee: Almost all of the bees in a colony are worker bees. These bees are all female, and they run the show. Throughout their lives, worker bees have a variety of jobs from feeding brood, cleaning house, building comb, caring for the queen, storing honey and pollen, guarding the front door, and finally foraging for pollen and nectar outside the hive. While it is easily mistaken that the queen is in charge, it is actually the worker bees who communally make all of decisions in the hive. They decide and prepare to swarm and raise new queens when necessary etc.



Queen Bee: There is only 1 queen in every colony. Her one and only job is to lay eggs. She can lay up to 2000 eggs a day at peak season! Unlike other bees, queen bees can live for up to 3 years. The worker bees take very good care of their queen, because without her the colony can struggle to survive. The mother of every member inside the colony, the queen also defines the genetic makeup of the colony. Their temperament, personalities, and behavioral qualities are all inherited from the queen.



Drone Bee: Drone bees are the only males in the hive. Their only job is to mate. They wait around their whole lives to mate with a virgin queen. If they are lucky enough they will mate once after which they fall to their death because their sexual organs are barbed, similar to a worker bee's stinger, and pull out their insides upon copulation. A queen will mate with 5-15 drones once in her life, and spend the rest of her life inside the hive. Drones do no work inside the hive, they do not even have stingers to defend the hive with. The worker bees often care for them and feed them, but they are quick to kick the drones out in the fall once they are no longer necessary.



Brood: Brood is a term for baby bees in the hive. This includes eggs, larvae, and pupating bees inside the cells. Once they have emerged from their cell, they are adult bees.

Products from the Hive

Honey

The most popular product of honeybees, honey is produced using nectar collected from blooming plants. Traveling from plant to plant, the bees collect nectar and store it in their special honey stomachs where the nectar's sugar structure changes. It is then deposited into a wax cell where bees fan it to reduce the water content. Finally, the finished honey is capped in wax, like a lid on a jar. Honey is the bees carbohydrate and an important food inside the hive. When harvesting honey remember that bees need honey to survive.

Pollen

As honeybees move from flower to flower, they carry pollen on their back legs. Inside the hive pollen is the bees' main source of protein and other important nutrients, but outside the hive the unintentional transfer of pollen from flower to flower in the act of pollination makes blooming plants and bees perfect partners.

Wax

Bees build their homes out of wax. Inside the hive honeycomb is built to store honey and pollen. The comb is also where the queen lays eggs and brood is raised.

Propolis

Propolis is used by the bees to seal up any drafts and stick things together like glue. Bees make propolis by chewing up plant resins and tree saps.

Data

As honey bees do their foraging tour of the environment around the hive they collect information about it too. In many ways bees are an indicator of the health of an ecosystem. It is important to recognise them for this fact. By analysing the honey and pollen of the bees we can understand more about our environments. The longevity of a colony is the best measure of its health and the state of their environment.

Working in the Warré Hive

The Warre Hive

Each hive has its own particular methodology and principles to follow. It is recommended that the reader research and study the Warré and natural beekeeping to get a perspective of its history and practise, and also to become more familiar with the basics of bee biology. Many Books and best practise manuals have been written about using the Warré hive and so much information cannot be transferred here. However, we have listed a number of references included David Heaf's book "Natural Beekeeping with the Warré" and encourage you to read also Phil Chandlers writings and refer to the Bio-bees forum on the same subject.

Stacking Boxes.

In the Barcelona Warré, we have supplied initially three stacking boxes. The boxes are normally referred to by their layers with the Brood box at the bottom, a window box or inspection box in the middle and a number of Supr box at the top. There is no difference between the construction of these boxes but rather they are named by the activities that go on inside. As the colony grows into the hive and begins to fill it - new boxes can be added. We have usually started with two boxes for a new colony as a single box can be filled quickly.

Following the natural beekeeping method any new boxes should be added to the bottom of the stack, meaning that the queen will begin to spend more time laying eggs in the fresh comb at the bottom of the stack, and that the top boxes are used as a honey store. A Warré hive can be stacked up to five boxes high.

Quilt Box

Normally a separate box is added to the inside of the roof cavity and is known as the quilt box. However in the Barcelona Warré hive we have designed in what we call a quilt frame. This acts in exactly the same way as the quilt box but is built directly into the roof. The quilt is usually made up of a layer of sawdust, and acts as an insulating layer. The quilt also allows for ventilation to circulate naturally through the hive.

Top Bar Beekeeping Crash Course

Hive Inspection

The best time to inspect your colony is during the day when temperatures are above 60 degrees fahrenheit/15 degrees celsius, without wind or rain. Opening the hive at colder times (especially when misty) has been likened to ripping the bed covers off a sleeping person on a cold Winters morning. It will bother the bees and is not advised! The bees also maintain a temperature of up to 90 degrees within the brood cluster. If the brood gets too cold, it can die.

When working in your hive it is important to be calm and move intentionally. In a top bar hive the bees sometimes attach comb to the hive walls. Check before removing frames from the hive, and do so carefully.

What to Look For

When inspecting your colony, your main objective is to find evidence of a healthy queen. You can be sure your hive has a queen if you find her inside, or if there are eggs in the hive. After 24 hrs eggs hatch into larvae. Eggs are evidence that the queen was present within the last 24 hours, which is second best to finding the queen herself. Ideally you can find both to know the queen is present AND laying eggs. It takes practice to find the queen and recognize eggs. Eggs look like small grains of rice at the bottom of a cell, setting them apart from crescent moon-shaped larvae. If you wear glasses remember to bring them with you when inspecting the hive. Moving the frames into the sun sometimes makes it easier to see.

Other things to notice when inspecting your hive are pearly-white plump larvae in many stages of growth, convex cell cappings, calm worker bees, and plenty of food stores. If worker bees look deformed, larvae is brown and/or twisted, mites are observed on the backs of any bees, there is a lack of colony growth, brood is dead in the cells, or anything else unusual, consult additional resources to find out what is going on inside your hive. As mentioned before, the best way to monitor your bees health is to spend plenty of time with them so you will notice when something is different or wrong.

Watching for Swarming

In Spring months, if your colony is strong and healthy it is natural for them to swarm. You can manage your colony to prevent swarming by giving the bees more space. Be careful not to do this too soon or too fast, because the bees still need to heat the space. If you find swarm cells - queen cells on the outer edges of the frames - this is a sign the bees are already getting ready to swarm. Once this happens it is hard to convince them otherwise.

Top Bar Beekeeping Crash Course

Getting the Bees Ready for the Winter

When the last warm days of the season are coming near it is time to get your bees ready for Winter. Using the follower board or false wall, close down the hive to contain only the brood cluster and honey stores. It is best to feed your bees and insulate them with a breathable material. Burtap or tarpaper are sometimes used. Do not use plastic, this can cause molding. You can also use hay bales to block the hive from cold winds. Fall is also the time to administer any medications or mite treatments if you choose to do so. Be sure to wait until after honey harvest to treat your bees. Once you close the hive down for the Winter leave it shut until warm Spring days return. The bees will seal everything with propolis, and you do not want to break their seals during cold weather months.

Harvesting Honey

Harvesting honey from your top bar hive is easy to do. Simply use a bee brush to remove the bees from the comb that is full of honey, and cut the comb from the top bar. Smoke can also be used to chase bees from honeycomb. Hang a nylon paint strainer into a five gallon, food grade bucket. The cut comb can be placed or smashed inside the paint strainer. Honey is heavier than wax and will drain out of the strainer into the bottom of your bucket. This method works best if your honey bucket is kept in a warm place. Comb can also be cut and placed directly into jars. Cover the honey as soon as it is removed or it will be difficult to leave without lots of bees.

Honeybees make honey to sustain themselves through long cold Winters. Depending on how long and cold the Winter is, the bees will need a varying amount of honey to make it until Spring. Ideally, a beekeeper's job is to manipulate the colony into making excess stores so there is enough for us to take. Yet it is hard to guess how long and hard the Winter will be or how much honey the bees will need. Some beekeepers calculate how much honey to take by weight. Some hobbyist beekeepers wait until Spring and take whatever is left over.

You now know the basics of Top Bar beekeeping!
Please check out the resource below to learn more.

Further Reading

The Warré hive and Beekeeping

[Beekeeping for all](#)

by Abbe Warre, Translation by David Heaf
'as described on Bio-bees forum'

This book describes the development, construction and operation of the 'People's Hive' of Abbé Émile Warré (d. 1951). Responding to the obvious decline in beekeeping in France since his youth, Warré experimented with some three hundred and fifty hives of various designs with the aim of producing a hive that was simple, economical, bee-friendly and assured a surplus for the beekeeper. The resulting 'People's Hive' described in his book *L'Apiculture Pour Tous*, which ran to twelve editions in French. The full 12th edition translated into english by David Heaf (one of the more prominent modern day users of the the warré hive.)

[Natural Beekeeping with the Warre Hive](#)

by David Heaf

Authors Gary Paul Nabhan, a Ph.D. conservation scientist, and Stephen Buchmann, a research associate in ecology & evolutionary biology at Arizona State, are both pollinator enthusiasts. The majority of their research is done in the Sonoran Desert, a surprisingly robust ecosystem. *The Forgotten Pollinators* set the stage for pollinator conservation awareness within the United States. I highly recommend this book, as it navigates the social and environmental pressures on pollinators as essential ecological partners.

[The Barefoot Beekeeper](#)

by P. J. Chandler

Phil Chandler is an outspoken Top Bar beekeeper from the UK. His work challenges traditional beekeeping methods, seeking holistic approaches to keeping bees within today's economic and agricultural realities that tend to define apiculture. His book *The Barefoot Beekeeper* is written for beekeepers with a general knowledge about honeybees. It is one of the only beekeeping books that focuses on Top Bar beekeeping, teaching the beekeeper to draw upon a grounded knowledge of bees beyond a list of seasonal instructions.

Refferences + Further Reading

Native Pollinators

[Attracting Native Pollinators: The Xerces Society Guide, Protecting North America's Bees and Butterflies](#)

by The Xerces Society and Dr. Marla Spivak

Perhaps the best native bee reference available, this book offers information on native bee identification, habitat management, and community involvement. Because the book is written for the common backyard bee-enthusiast, its information is relevant to anyone who works with bees. Supporting bee minded people outside academia, this book aims to integrate native pollinators into human populated areas.

[The Forgotten Pollinators](#)

by Stephen L. Buchmann, Gary Paul Nabhan and Paul Mirocha

Authors Gary Paul Nabhan, a Ph.D. conservation scientist, and Stephen Buchmann, a research associate in ecology & evolutionary biology at Arizona State, are both pollinator enthusiasts. The majority of their research is done in the Sonoran Desert, a surprisingly robust ecosystem. The Forgotten Pollinators set the stage for pollinator conservation awareness within the United States. I highly recommend this book, as it navigates the social and environmental pressures on pollinators as essential ecological partners.

[Keeping the Bees: Why All Bees Are at Risk and What We Can Do to Save Them](#)

by Laurence Packer

Laurence Packer is a researcher and professor at York University. In his book he introduces his favorite bees and their roles in ecosystems and agriculture. The latter part of his book focuses on contemporary conservation concerns for the bees and the connected impact on human populations. Packer uses academic research of his own, but also that of many other contemporary melittologists (those whose academic study focuses on wild bees) throughout his book. It is one of the only full length contemporary publications on the topic of wild bees.

References + Further Reading

Apiculture and Theory

[The Beekeeper's Handbook, Third Edition](#)

by Alphonse Avitabile, Diana Sammataro and Roger A. Morse

A good beekeeping book is hard to find. The Beekeeper's Handbook is a reliable text for beginning and advanced beekeepers. As your practice grows this book can stay with you, as there is always more detailed information to explore.

[Bee Manual](#)

by Haynes

"The Bee Manual" offers a clear and concise introduction into the fascinating world of the honey bee and the addictive craft of beekeeping. For various reasons, the number of bee colonies has been declining and there is great interest in trying to aid their recovery. Anyone wanting to keep bees first needs to learn about the individuals, how colonies operate and how the beekeeper can work with these insects to help them thrive, carry out their pollination activities and produce a satisfying honey crop. Full of colour photos and clear step-by-step text, this book offers practical advice for anyone planning to take up this absorbing hobby.

[Clan Apis](#)

by Jay Hosler

This comic book depicts the evolution of bees and the daily life within a honeybee colony. This unique source offers an accessible account of the basics about honeybees. The visual characterization of honeybees explains often foreign and complex phenomenon within the hive, like swarming, in a joyful and accessible fashion.

[Honeybee Democracy](#)

by Thomas D. Seeley

Honeybee Democracy is an exciting report on Tom Seeley's in-depth research on swarming. His research details the process of swarming, how a swarm chooses and finds a new home, and how they get there. A window into the magic of honeybee colonies, this book will inspire and enlighten anyone who finds intrigue inside a honeybee hive.

References + Further Reading

Following the Bloom

by Douglas Whynott

In *Following the Bloom*, Journalist Douglas Whynott follows American commercial beekeepers on their migratory routes to pollinate mon-crops across the country. Whynott proposes that migratory beekeepers are the "...last real cowboys, the last people moving livestock across the united states." The beekeepers' temperament matches this characterization as Whynott tells stories about their renegade lifestyle trucking large loads of stinging insects from one bloom to the next. He highlights the level of insanity it must take to be a commercial beekeeper, while simultaneously acknowledging their immense body of unrecognized knowledge. This book is a great peek into the realities of beekeeping in the United States.

The Buzz about Bees

by Jurgen Tautz

With spectacularly beautiful colour photographs and an easy understandable text *The Buzz about Bees* tells the story of honeybees in a new perspective. Based on the latest data, notably from his own research group, Jürgen Tautz provides a wonderful insight into the realms of bees. The entire range of astonishing bee activities is described. Remarkable action photographs never shown before present bees busy with cell cleaning, caring for the brood, serving in the queen's court, visiting flowers, receiving nectar, producing honey, comb building, entrance guarding, heating and cooling. Spotlights include bees grooming, swarming, fighting, telephoning, sleeping and communicating by high-toned beeping, scents and dances.

Bee Photographs by Rose-Lynn Fisher

by Rose-Lynn Fisher

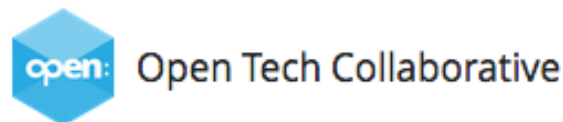
Bee is a book of photographs in magnifications ranging from 10x to 5000x. Presenting views of the bee's eyes, wings, antennae, hair, sting and more. *Bee* aims to inspire surprise, curiosity and awe through the unique perspective provided by scanning electron microscopy, melding art and science in these images. When our frame of reference is shifted, the interplay of observation and imagination can inspire new ideas, connections and applications.

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