

Making a Perone Hive

The PermApiculture Way

By

Oscar Perone

in collaboration with

Claire McHale

Alexis Torres

Monochrome Printer version
2012

Table of Contents

Introduction.....	3
What is PermApiculture?.....	3
Overview.....	4
About the Size.....	4
Materials Needed to Build the Hive.....	5
What kind of wood is good?.....	5
The Boxes.....	6
Option 1. Using 1x4" boards for (almost) all the boxes.....	6
Option 2. Using 1x4" boards for the three supers and larger-sized boards for the bees' part.....	8
Additional Options for the Hive Body.....	8
Transforming the shape of the hive's interior.....	8
Installing support bars in the Bees' Part.....	9
The Entrance(s) and the floor.....	10
The Entrance(s).....	10
The Floor.....	10
The Comb Grids.....	12
Comb Grid Dimensions.....	14
How to Make the Comb Grids	15
The "Attaching the top-bars directly to the top box in the Bees' Part" Option.....	16
Mass-production Mold Idea.....	17
Trying to Make a Perone Hive with Movable Top-Bars.....	17
The Roof.....	18
Flat Roof Design with Overhang.....	18
Gable Roof.....	19
Making a Gable Roof in Images.....	19

Introduction

What is PermApiculture?

PermApiculture (Permanent + Apiculture) is a system of beekeeping designed to imitate the bees' habitat in nature as closely as possible. It utilizes the Perone hive, a vertical top bar hive which provides the bees with their three greatest needs:

- Lots of Space
- Lots of Honey
- Lots of Peace

These three needs in combination with the design of the hive yield large powerful colonies that are capable of managing disease, Varroa, and cold winters without chemical treatments or expensive equipment.

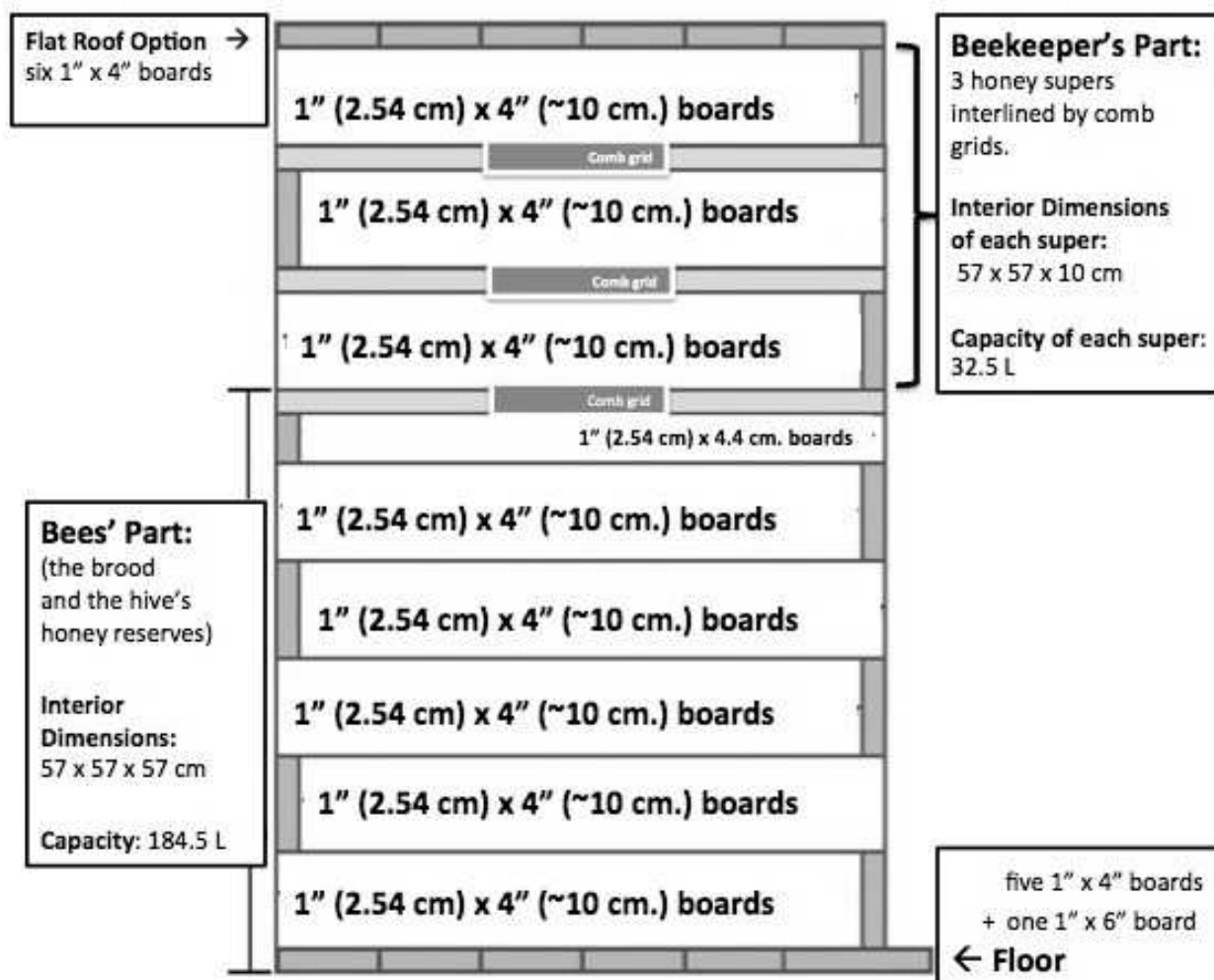
Perone hives are divided into two parts: the bees' part, where the bees keep their brood and honey reserves, and the beekeeper's part. Once occupied by bees, Perone hives are only opened once a year to harvest honey from the beekeeper's part. The beekeeper makes no other interventions and never enters the bees' part.



PermApiculture and the Perone hive were created by Argentinian Oscar Perone, who has been a beekeeper for over 40 years.

There are currently thousands of Perone hives throughout Mexico, Central, and South America. The Perone hive and PermApiculture system of beekeeping holds great promise in reversing the trend of Colony Collapse Disorder. This year several of the beekeepers in the Latin American PermApiculture network loss several of their Langstroth families to CCD. Their Perones on the other hand continue to live and thrive. Some of these beekeepers are in their third year of using Perones.

Overview



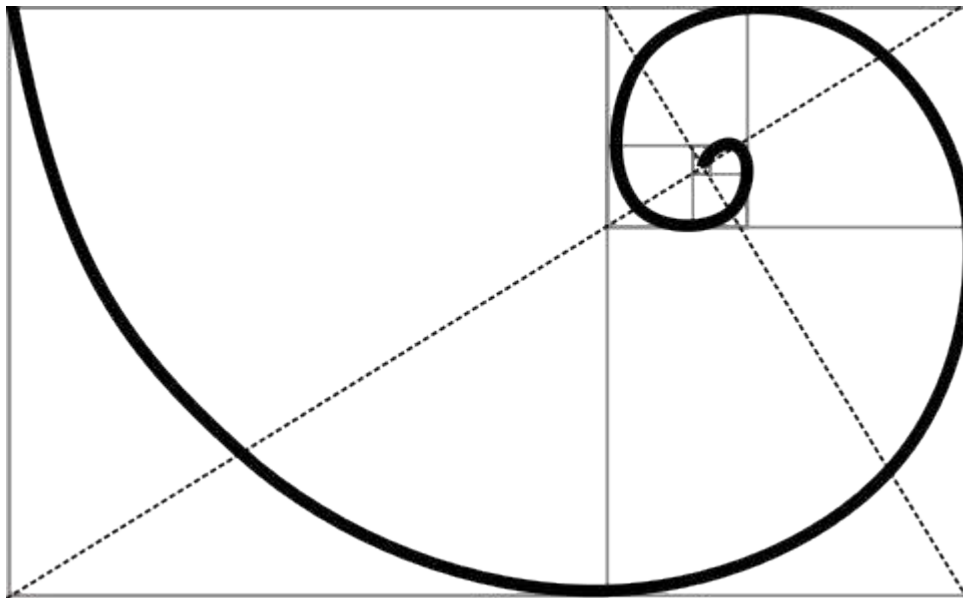
A diagram detailing one of the many ways to build a Mk 2 Perone Hive

About the Size

The Perone Hive's size is based on two factors:

1. A capacity of 280 L (282 L to be exact): In his 40 years of beekeeping, Oscar experimented with various sized hives, but observed that the colonies he was working with were strongest, most resilient, and most productive when they had around 280 L of space.
2. The Golden Ratio - The hive has the proportions of a Golden Rectangle. For centuries mathematicians, artists, and architects have been fascinated by the Golden rectangle, which is believed to be more "ascetically pleasing" than rectangles whose sides do not have the golden ratio. The Golden Ratio is found repeatedly throughout nature, in the spiral of nautilus shells, the base of pine cones, and the distance or length of various human body parts. For a more visually enriching presentation of the Golden Ratio and Rectangle, you can check out the video:

<http://www.youtube.com/watch?v=fmaVqkR0ZXg>



Materials Needed to Build the Hive

The main materials will be:

- Saw
- Hammer
- Nails
- Measuring tape, chisel, and a square can also be handy

UNTREATED WOOD: Most commercial lumber, for preservation purposes, is treated with chemicals that also serve as fungicides and insecticides – substances that can have a big effect on little bees.

What kind of wood is good?

Truthfully, the topic of bees' wood preferences isn't a very well-researched area, though Dr. Thomas Seeley, author of *Honeybee Democracy* mentions that when he was studying wild bee hives in the 1970s, he observed that the bees didn't seem to favor one species of tree over another when it came to making their home. In the northeastern U. S. , he found hives equally dispersed throughout pines, hickories, oaks, elms, maples, walnuts and ashes.

In many parts of the world Red cedar is a traditional choice for bee hives because the oils it contains naturally help preserve the wood without any type of chemical treatment. Due to our personal environmental convictions regarding sustainability, we recommend using species that are native or local to your area.

The Boxes



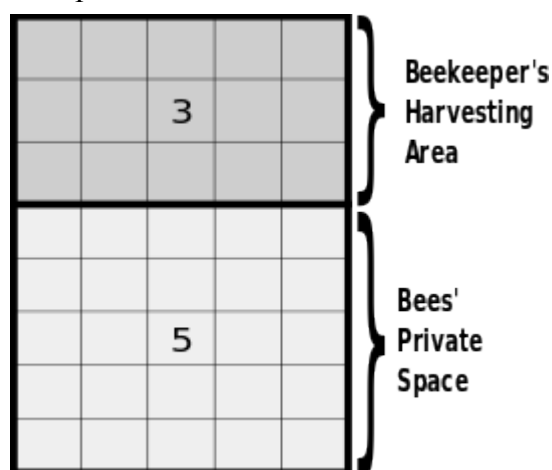
This is probably the easiest part of building the hive and you can go about doing it a few different ways:

Option 1. Using 1x4" boards for (almost) all the boxes

Pros: You don't need too many cuts of wood.

Cons: The bees' part won't be as united as it potentially can be.

In this method you can think of the hive in "eighths:" 3 parts beekeeper's part, 5 parts bees' part:

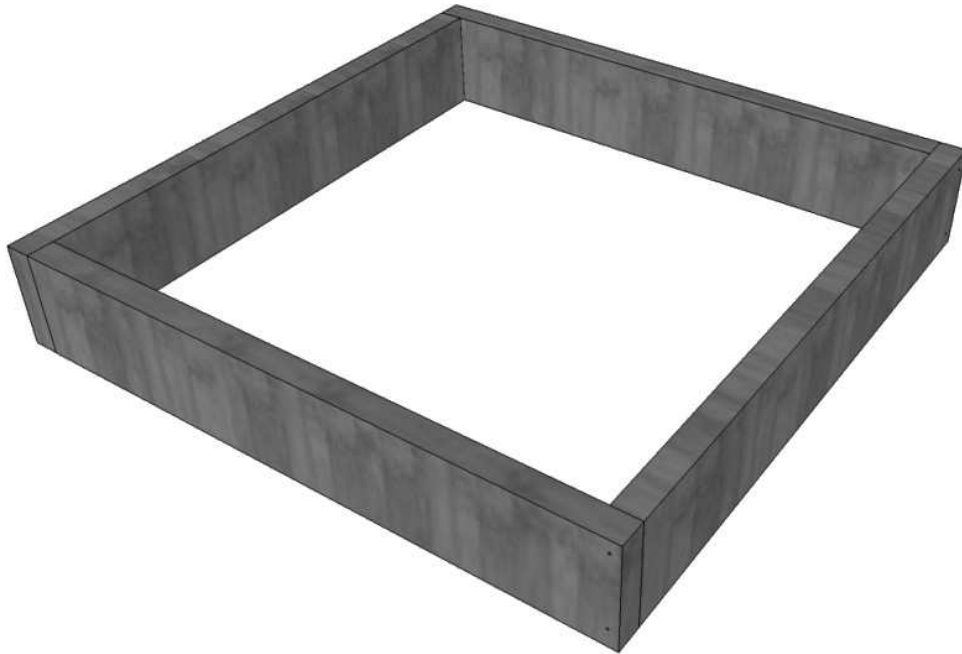


So then, using 1" by 4" boards you will need to make eight boxes (3 supers for the beekeeper's part and 5 boxes that will be put together to form the bee's part)

To make a box, cut 4 boards so that they are 57 cm. long + **the thickness of the board**. (Each one of your boards should be around 59.5 cm long). Assemble them and nail them together in the following way: (View from above)



Angled view of how to assemble and connect the boards



Note: In order to complete the interior dimensions of the bees' part of the hive (57 x 57 x 57 cm). you'll need to make one small box too, a box in which the boards are 1" x 4. 4 cm. This small box will be joined to the other five boxes. You can see the small box, outlined with stripes, in the picture below:



Option 2. Using 1x4" boards for the three supers and larger-sized boards for the bees' part

Pros: The bees' part will have less gaps.

Cons: You'll need more than one measurement of board to build the hive body.

The most important thing about the bees' part is that its internal dimensions should be 57 x 57 x 57 cm.

How you get that 57 x 57 x 57 cm is really up to you. Technically, if you have a board that's 57-some cm. high, you could assemble the bees' part by building just one really big box.

As you can see in this hive below, (location: Island of Chiloe, Chile) the Bees' Part was assembled using three boxes.



Additional Options for the Hive Body

Transforming the shape of the hive's interior

Oscar Perone is a firm believer in “sacred geometry”, the belief that the universe was created according to a certain geometrical plan and that by copying the shapes nature provides us, we maintain a connection with the universe. Applying this concept to PermApiculture, Oscar cuts long wooden bars (24 mm x 24 mm, the same cut used for the top bars in the comb grids) in half at 45 degree angles and places one each corner of the hive, so the hive goes from having a square interior

to an octagonal interior. Mr. Perone chooses to do this because 90 degree angles barely exist in nature. By making the interior of the hive an octagon we come a bit closer to having a circle, a shape that does reoccur in nature.



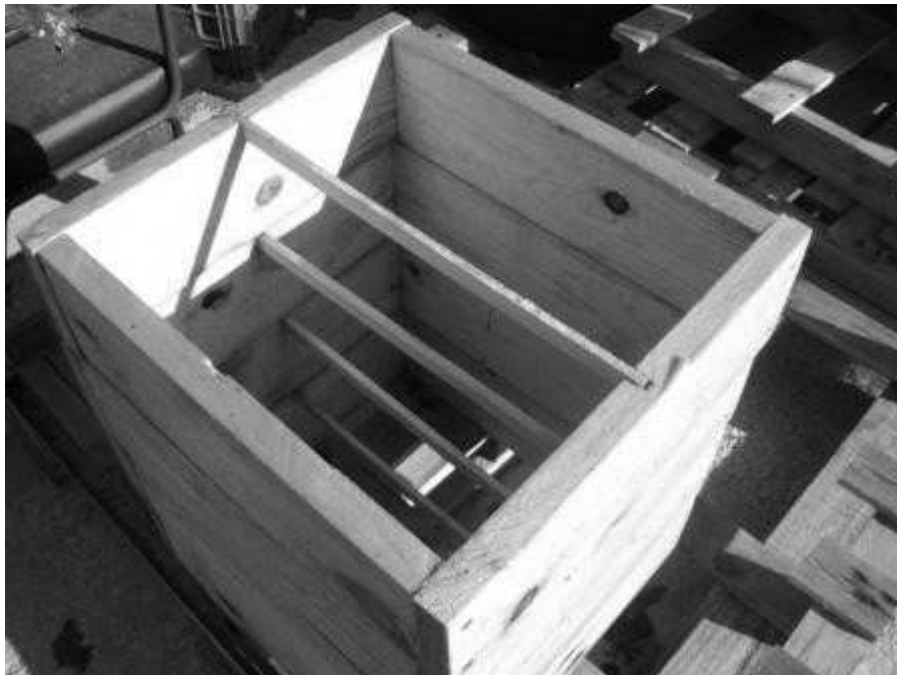
Notice the corners are in angle.



You can see the same has been done here in the corners of the super.

Installing support bars in the Bees' Part

This is an alternative to placing branches inside the brood area (prior to the bees' arrival) and also a design recommendation if you absolutely want/need to move your hives for pollination services or any other reason, a difficult but not impossible task with Perone hives.



With a hammer and chisel you can make notches in the hive boxes and then fit the bars inside.

The Entrance(s) and the floor

The Entrance(s)

The entrance to the hive is 9 mm high by 5 cm wide. You will need to make an entrance in the bottom box of the bees' part.



1. Measure and mark the width and height of the entrance at the bottom center of the board where you wish to make the entrance.
2. Using a saw, make small two cuts (no deeper than 9 mm) on either side of the marks you've outlined for the entrance's width.
3. Using a hammer and chisel, remove the wood within the outline and sculpt out the bees' entrance.

If you wish you can place a second entrance in the lowest super. This is very useful because when the bees first move into the hive they will be a bit far from the floor. Having a second entrance near the comb grid helps young colonies come and go from the hive more efficiently while they are in the process of growing. Their combs may not reach the vicinity of the floor until the end of their second year, at which point they will start using the lower entrance more often. Entrances can also be closed off with adobe and reopened as needed.



The Floor

Once you've got your entrance chisled into the lowest box of the bees' part, you're ready to add on the floor.

Basically all you need to do is take the box in which you made the entrance (the lower entrance, if you are choosing the two-door hive route) and nail boards to its underside, so that you have a floor.

Perone emphasizes the importance of letting one tablet stick out on the entrance side so that the edge of the board forms a landing pad for the bees.

If you choose to build the hive mainly out of 1" by 4" tablets, you can construct the floor using five 1" x 4" boards + one 1" by 6" board, positioning the last board so that it jets out and forms the landing pad.

However, you can use whatever dimensions you find convenient. Below are photos of Nicolas Cabezas adding the floor onto a hive in Chiloe, Chile.



The Comb Grids



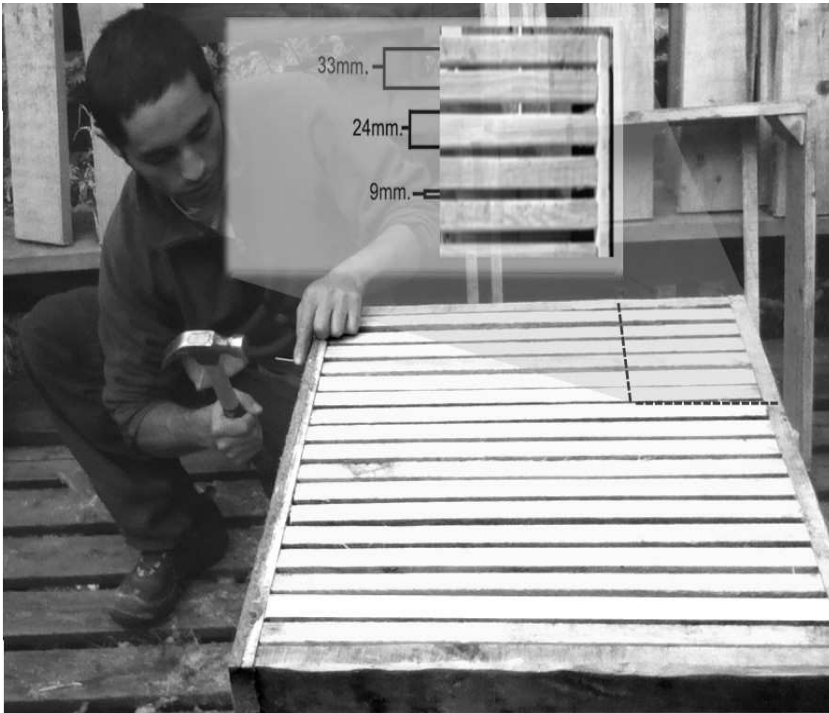
Perone hives have three comb grids – one on top of the bees' part, one between the first and second super, and one between the second and third super. In lieu of the roof, you do not need to place a comb over the uppermost super. (Though if you really want to make an additional comb grid, you can).



The 3 comb grids' positions in the hive, marked in black rectangles

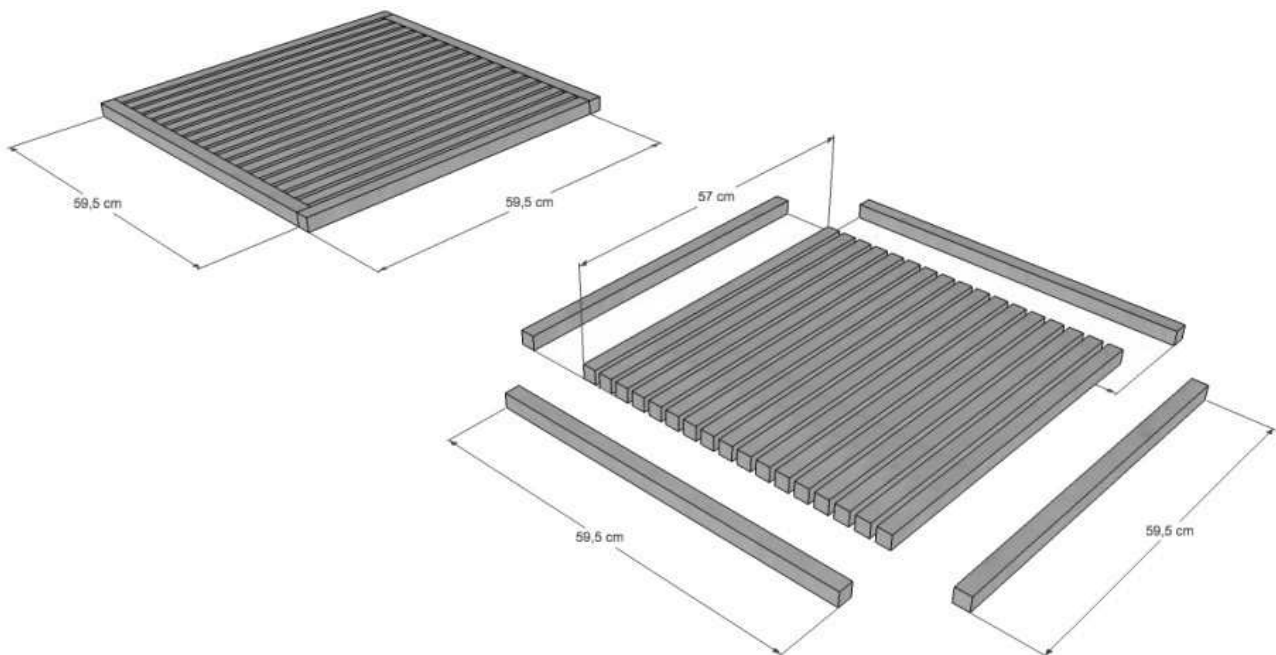
Comb Grid Dimensions

The most important thing about the comb grid is that the distance from the center of one bar to the center of the next bar measures 33 mm. This 33 measurement is key to the temperature control of the hive – helping the bees to form a tighter cluster at night and in the winter. The tighter cluster and lack of wide gaps (from which hot air can easily escape) enable the bees to maintain a temperature that's too hot for Varroa to handle. The distance between the centers of the comb may also have a major influence on the diameter of the cells that bees build; the closer the combs, the smaller the cells.



In a Perone hive then, the comb grid bars are 24 mm high by 24 mm wide with a distance of 9 mm between each one.

The comb grid that goes over the Bees' Part will consist of the frame and 17 bars. The remaining two comb grids, the ones that go in between the supers, can be made with just 16 bars, placing a greater distance between the bars, because the bees do not need to worry about heating the upper part of the hive. This design detail is also meant to yield a slightly larger honey harvest (than if the upper comb grids had 17 bars).



Bar lengths

How to Make the Comb Grids

You will need wood that is 24 mm wide by 24 mm high.

For one hive you will need 49 bars that are 57 cm long. These are the bars that will go in the interior of the comb grid. (17 for the comb grid that goes over the Bee's part and 16 and 16 for the two comb grids that go in between the supers).

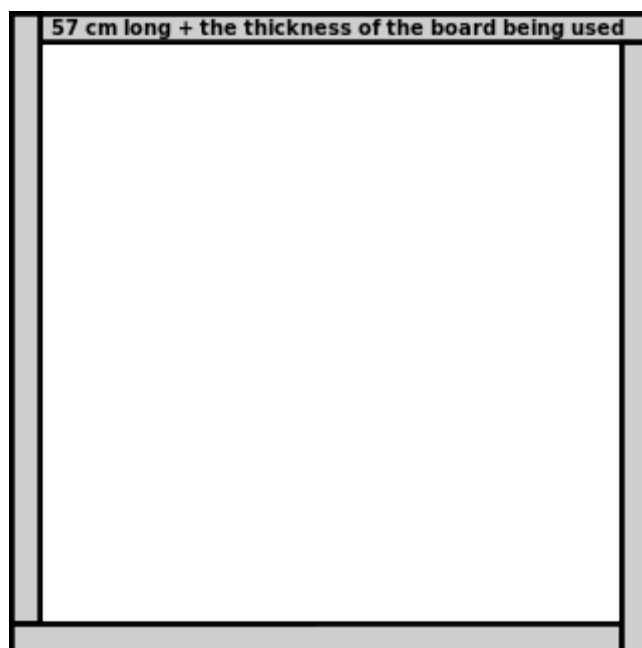
For the frames of the comb grid, you will need a total of 12 bars that are around 59.5 cm (the same length as the boards used in the boxes).



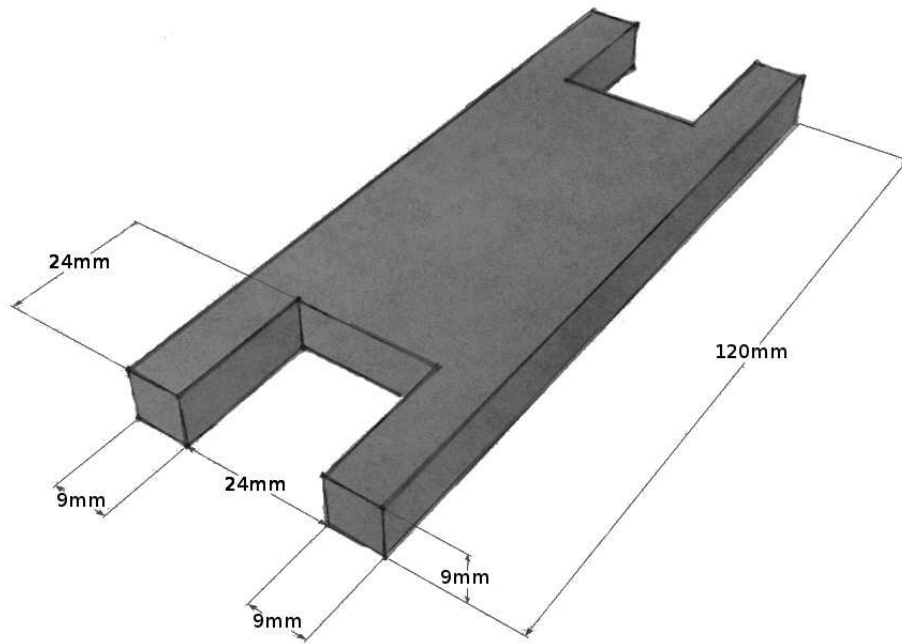
Bars cut for the comb grid

To make the frame arrange four 59.5 cm long bars just like you arranged the boards for the boxes, and nail them together.

Next, take the 57 cm bars. Now, this part is very important and probably the trickiest part of making the hive: you need to make sure that each 57 cm bar is spaced 9 mm from its neighbors.



We recommend making a very simple mold out of a fine but raw wood like the one shown below.



Spacer with dimensions

Each prong should measure 9 mm. This way you can stick each 57 cm bar between the two prongs of the mold and hold it in position with the proper spacing while you nail one side of the bar to the frame. You can then remove the mold and position the next bar likewise.

We recommend positioning and nailing several bars on one side first, before firmly nailing the bars in place on the other side, so that you can make sure the spacing between them is as accurate as possible.

The “Attaching the top-bars directly to the top box in the Bees’ Part” Option

In this option, you only need to make two comb grids for the Beekeeper’s Part. Instead of making a third comb grid for the Bee’s Part, you can simply nail the top bars inside the uppermost box of the Bees’ Part, since you shouldn’t ever have to lift these.



The bars have been nailed directly in the top box of the Bees’ Part

Mass-production Mold Idea

If you plan on building a lot of Perone hives, you may want to consider making a larger-scale mold for the comb grid like the one below:



More substantial mold for Perone comb grid



Putting slats in

Trying to Make a Perone Hive with Movable Top-Bars

We personally haven't tried this, because, quite frankly, beekeeping is not as regulated in South America as it is in many English-speaking countries, so there hasn't been a pressing need for us to explore this area. ("Necessity is the mother of invention" so they say). However, we do realize that many of you who are reading this right now, may live in places with a law requiring that your bees' combs be removable. You may also face the possibility of an inspector stopping by and asking you to open up your hive.

There are a few beekeepers in the U. S. who have replaced the comb grids with top bars. Since this is new territory for the Perone hive, we really can't tell you how well this will or will not work. We can only tell you that this is something that a few people are trying out. We do have some observations though:

1. If you are in a position in which removable combs are an issue for you and you wish to try this method, you should not place any branches or support bars (like the ones shown here) inside the body of the bees' part. If you do, it will be very difficult to remove the top bars with the comb.
2. Make sure that you give the underside of the top bars a lot of texture so that the bees can attach their comb as firmly as possible. You can do this with a chisel.
3. If an inspector does ask you to see the brood, handle the top bars very gently. These are big combs and they really aren't meant to be removed from this hive.

Unfortunately that's all we can really say about that for now. As new developments and ideas come in regarding the "Perone Hive + removable comb regulations" we will post them in this section of the website.

The Roof

To decide what kind of roof you want to make for your hive, you want to consider your local climate conditions.

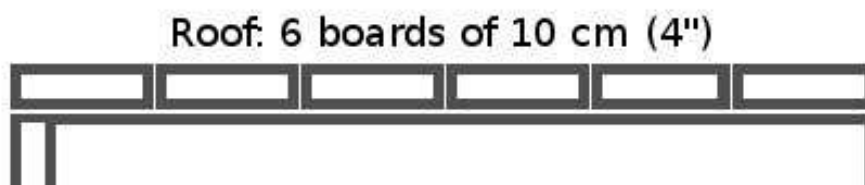
If you live in a place where it's rather warm or temperate and you receive little rainfall, a flat roof is appropriate.

If you live in a place where you get a lot of rain, you probably want to consider a gable roof with an overhang.

If you live in a place with extreme cold, think about making a Warré-style quilt with a gable roof.

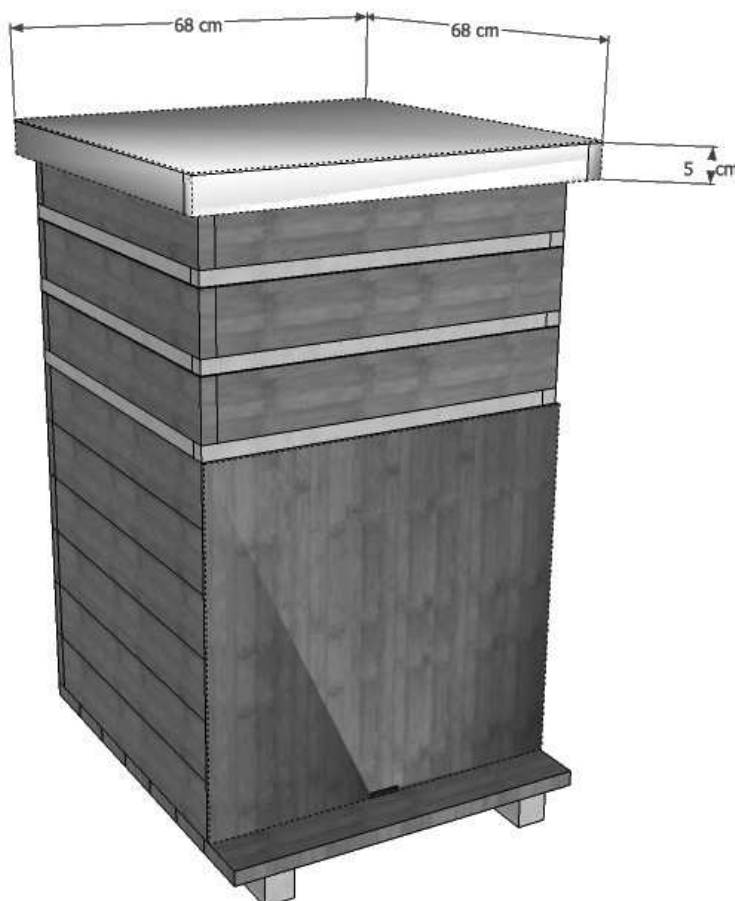
At any rate here are a few designs to get you thinking.

The Original Flat Design:



This roof can be built with six 1" x 4" boards. Cut the boards so that they are 62 cm. long. Nail them directly to the top super.

Flat Roof Design with Overhang



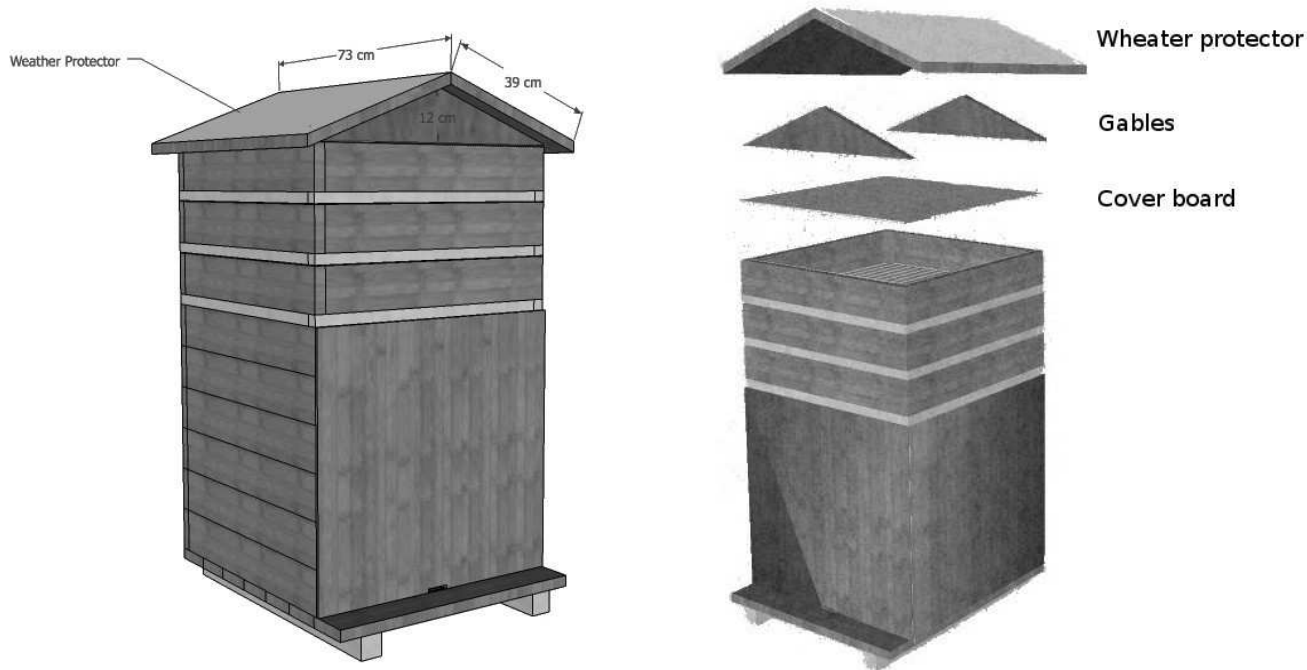
This design is somewhat reminiscent of a Langstroth roof and is commonly used throughout central Chile. A tarp or other impermeable material can be attached to the exterior of the roof if you like.

Gable Roof

This may take a bit more time to make, but if you're in a corner of the world where you see more rain than sun, it's a good option.

You can put a cover board or cloth between the top super and the roof if you wish, but most of the time it shouldn't be necessary.

The exception is if you place a small swarm in the hive; because it is weak it may try to make the brood in a smaller higher space – like the roof.



Making a Gable Roof in Images



