beegin®

INSTRUCTION MANUAL

DIY Guide to Making Your Own
Lightweight Concrete Beehives

THE BEE BUNKA

GOOD DESIGN AWARD® WINNER

Appropriate Beekeeping Technology

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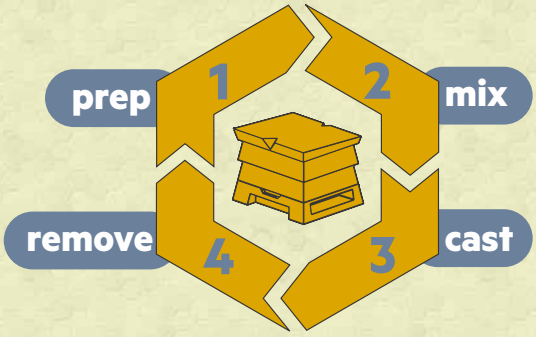
MOULDING PROCESS



MATERIALS	LABOUR
$30	2 HRS

Thank you and congratulations!
You are now beegining the exciting journey to beecoming 'master-caster'.

We like to say that making concrete beehives is as easy as baking a cake: you mix the ingredients, pour them into a mould, let it set and pop it out of the mould. Using the Beegin moulding tools and general building materials you will be able to produce your own durable, insulating and protective beehives cheaply and quickly.

If you've ever baked, you will know that the first few attempts are all about learning. So don't be put off if your first few hives don't come out perfectly. As with baking, there are some simple techniques and steps that you will need to learn to achieve the best results. That is why we have compiled this instruction manual to help guide you along in the beginning stages of making your beehives. Before you get started, read through this booklet to learn about the process and check that you have everything you will need.

We advise that you follow our instructions and suggested materials as much as possible. However, there are many ways to make the Bee Bunka. Throughout this manual we will try to provide the various options for materials and tools that can be substituted for one another. Use what you have available to you, look for ways to reduce your costs, but always look after your moulds and most importantly look after yourself - lift with your knees, ask for help and wear protective gear.

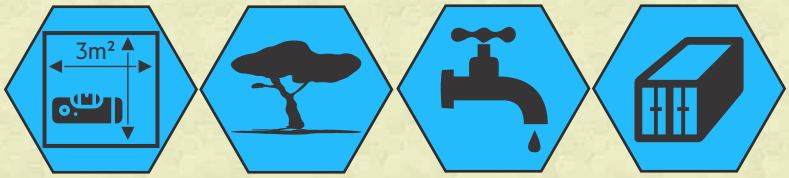
If you don't understand any of the steps, or require further assistance please feel free to contact us using the information on the back cover of this booklet. Posting pictures, questions and videos on the Beegin Facebook page is also a great way to get advice from other makers, and share your insight and knowledge as you become a master-caster!

Second Edition, 2020

Facilities

The choice of location for your beehive production is up to you - depending on your environment and available space. Concrete moulding can be messy, so doing it outside is a good idea. The cement and oil used in the moulding can harm plants that come into contact with it, so don't make the hives on your lawn.

A flat, level space of 3m² (per mould set) with gravel, concrete or bare-earth floor is ideal. There should be water on tap close by. Electricity is not necessary for small-scale production. A roof is also not necessary, freshly mixed concrete and cement-bags can be protected from rain using a plastic drop-sheet. Newly cast concrete should be kept cool and wet for at least 2 weeks - ideally in shade or next to a wall that shields the parts from the hottest part of the day.



1. Level area at least 3m²
2. Shade to keep parts wet & cool while curing
3. Water access nearby
4. Secure place to store tools & moulds.

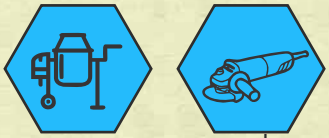
Safety Gear (PPE)

Cement is dangerous, it has a high PH level and is a fine powder that is easily dispersed into the air. Contact with ones skin can lead to skin burns and rashes, and inhalation of cement dust can cause respiratory illness and disease. It is important that the correct safety equipment is used while working with concrete. Wear water-proof gloves, dust masks, goggles, overalls and closed shoes or boots.

Building Equipment

It is important to mix concrete properly. The better mixed the sand, lightweight-aggregate, water and cement are, the stronger the concrete will be. Concrete can be mixed manually (by hand with a spade) - in a wheel-barrow, container or on the ground. For 1-2 mould sets manual mixing will be perfect. For three or more mould sets consider a concrete mixer to save time and speed up production. The same goes for the cutting of the steel wire and round-bars. For small-scale production, manual tools like a hack-saw and fencing-pliers will be fine, but a small angle-grinder will help increase your production speed. A soft sponge and soap can be used to clean the moulds between casts.

Mass Production



Cement is a dangerous material. Wear protective gear! If it comes into contact with your skin wash the area with water immediately!

If it rains a lot where you are, a simple roof may be useful.

What is Concrete?

Concrete is one of the most used substances on Earth. It is durable, cheap, easy-to-use, widely available and can be modified to suit various applications. Concrete is made from cement, water, sand and stone, the cement (dry, gray powder made from limestone) reacts chemically with the water, binding the aggregates (sand & stone) together to form a stone-like material.

Concrete is an easy material to work with. When wet, the aggregates form a liquid slurry that can be poured into a mould (form/mold/shape/tool). After a few hours the concrete hardens (sets) to retain the shape, and the mould can be removed. The concrete left behind will continue to harden and gain strength for around 21 days, after which it is 'cured'.

People have always enjoyed the durability, safety and usability that concrete provides. As it turns out, so do honey bees.

Lightweight-Concrete

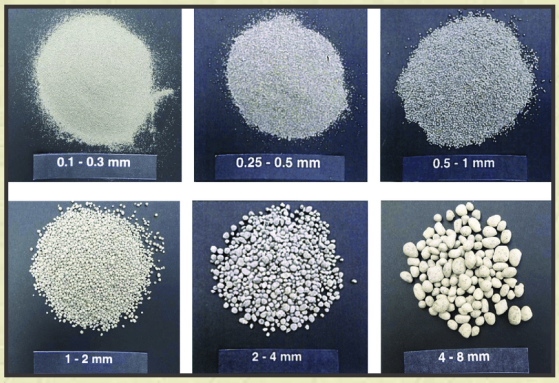
Lightweight concrete has become a common building material and has opened up many new applications and possibilities for concrete. In order to reduce the heavy weight of concrete some or all of the aggregates (sand/stone) are replaced with a lighter substitute. The most common lightweight aggregates are expanded slate or shale, such as Perlite and Vermiculite. Lightweight concrete can be made in different strengths or densities, simply by adjusting the ratio of aggregates and cement. For structural applications, such as our beehives, a medium-density lightweight-concrete is ideal.

Lightweight aggregates have the additional benefit of increasing the insulating capacity of concrete reducing the amount of heat and cold transmitted through the concrete. Perlite and Vermiculite also raise the burn threshold of concrete substantially - allowing it to withstand temperatures of up to 500°C.

Lightweight concrete is a new technology - there are new techniques & aggregates being developed regularly. Keep up to date with what your local suppliers are offering.

Air-crete

A common alternative is air-crete or aerated concrete, where soap bubbles, or foaming agents, are used to entrap air in the concrete in place of the lightweight aggregate. Aerated concrete is much weaker as the cement does not have a physical particle to bond to. To achieve a structural density aerated concrete is cured in an autoclave (heated & pressurised container). That being said, we have had success using DIY air-crete made using soap bubbles (foamed with a drill paint mixer) to make Bee Bunkas. We used lots of fiber reinforcement to strengthen the concrete. You will need to use more cement in this mixture, and a fine building sand.



Different sized aggregates will affect the quantities required. Our ratios are based on 0.5-1mm.

Hempcrete

Hemp hurds are a foam-like material that can be used as a lightweight aggregate. This material is not available everywhere and prices vary widely. However, it is more sustainable than Perlite and Vermiculite, so if you can get it we do suggest using it. Depending on the size of the aggregate you can follow the same ratios as explained in these instructions. There are also techniques to using rice husks as a LW-ag, and some companies have started making LW-ag from recycled materials.

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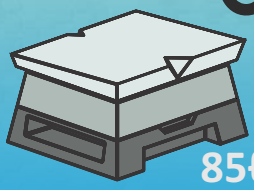
Preferred Mix

The mix design we describe here creates an ideal beehive concrete - balancing weight, durability, strength and cost. However, there are several alternative mixes and aggregates that will also work. The 'lightweight aggregate' described in this mixture is typically construction grade (small particles) Perlite or Vermiculite. However agricultural grade versions (larger particles), polystyrene beads, charcoal, hemp hurds or other lightweight aggregates can be used instead. The reasons we prefer Perlite or Vermiculite is that they are made from a naturally occurring rock, it is fire proof, the particles bond well with cement creating a strong material despite the lower density and it is suitably priced.

Each Bee Bunka (with 1 super) requires approximately 110 litres of concrete to make. Using our suggested mix, the measurements, in litres, would be 50 lightweight aggregate : 30 sand : 30 cement : 30 water.

5 perlite : 3 sand : 3 cement : 3 water

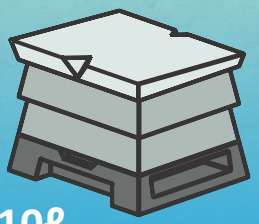


85ℓ

Aggregates become smaller when wet.

Materials:

- **Cement (42.5N or higher ideally)**
- **Construction Grade Lightweight ag.**
- **Washed Sand (river sand ideally)**
- **Clean Water**



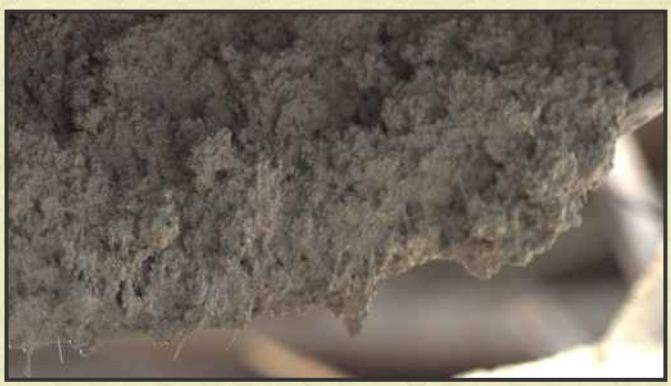
110ℓ

See page 13 for other mixes

Key Mixing Tips

Some quick mix advice from Beegin:

- We use a 4 litre plastic jug to **measure the quantities** as we mix the ingredients together. A standard wheel barrow is only about 50 litres so, if you are mixing in one, you may want to reduce each batch to 17p : 10s : 10c : 10w to fit it into the bucket.
- Before adding water **mix the aggregates as well as possible in their dry state**. Use a spade or your hands (with thick rubber gloves on) to churn up the mixture.
- The water is tricky. Depending on how wet the sand is you may need less or more. It is very important that when making lightweight concrete you **don't use too much water** in the mix. if the mixture becomes too wet the lightweight aggregate can begin to float to the top of the other aggregates, creating concrete that is strong at the bottom and weak at the top. If the mixture is too dry it will be difficult to pour and large bubbles of air will be trapped in the concrete.
- **Keep a record of your quantities** each time so that if you make too much or two little or the mix isn't right you can adjust it next time.
- The final mixture should have the **consistency of porridge** or oat-meal, not soup. You should be able to pick some up in your hand without it pouring out, and when you jiggle your hand on top of the concrete it should level out.



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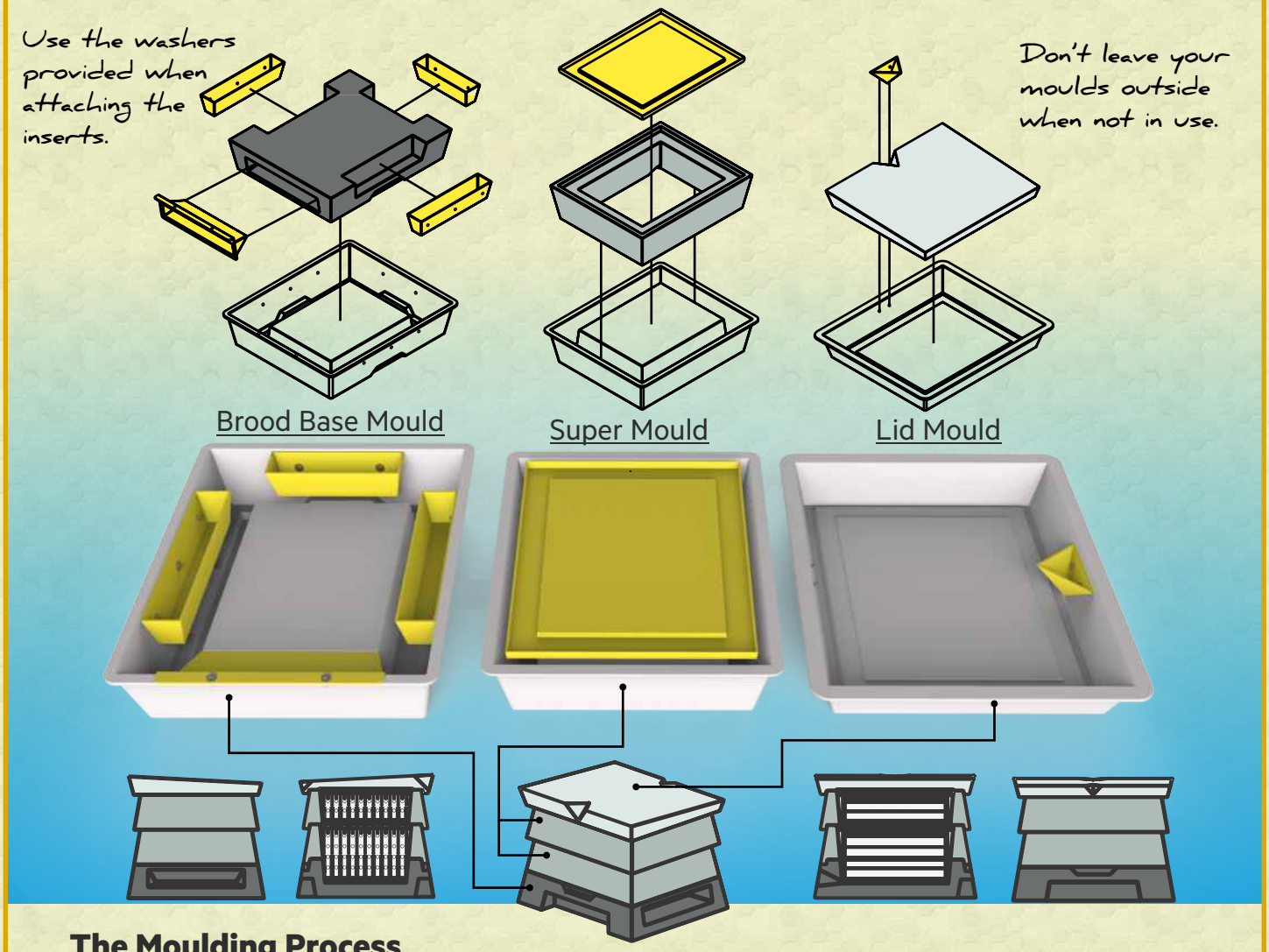
Forming Concrete

Concrete is usually formed using steel or wooden shutters - panels bolted together to create a hollow cavity. We experimented with shuttering as well as various other forming materials and techniques, settling on the easiest and fastest method - tray moulding. Tray moulds are one-part shapes, like ice-trays or sand-castle buckets, that are filled and emptied from a wide opening that all the sides are tapered towards. Forming concrete is a four part process - Preparation, Casting, Demoulding and Curing.

Bee Bunka Moulds

The Bee Bunka is made using 3 moulds. The **Brood-Base Mould, a Super Mould and the Lid Mould**. A basic mould set consists of one of each mould. A production set will have an extra Super Mould for producing a brood chamber (base & super), a super and a lid with each cast. The moulds are made from high-impact and chemically resistant, thermo-formed plastic. The plastic and the specially engineered shape of the parts help ensure that the concrete parts come out easily every time. The moulds all feature small inserts (yellow pieces) that create special indentations on the concrete parts and are easy to assemble.



The Moulding Process

You do not need any fancy equipment or expensive machinery or technical skills. T**o make Bee Bunkas all you need is a set of moulds and some materials**. We like to say 'it's as easy as baking a cake' - prepare the moulds, mix the materials, pour the mixture into the moulds, let it set and pop them out. Still, after making hundreds of concrete beehives, we make mistakes and one comes out with an air-pocket, a crack, chip or separated aggregates. We don't mind, we just patch them up (you can use epoxy for this) and use them on our own apiaries and we have some really poorly made hives that have been working for years alongside the masterpieces! Once you get a hang of the moulding process you should be able to take a hive out, prepare the moulds and cast the next one all in a matter of hours. **Don't rush though, that's how mistakes get made!**

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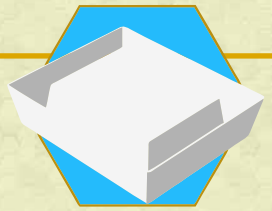


1. Lubrication

Concrete sticks to all materials. It sticks to plastic less than other materials, but still sticks. So before the concrete goes into the moulds a lubricant must be applied to the plastic. Before assembling the moulds and placing reinforcement use a paint brush to cover the moulds internal surface with a thin layer of oil.

Thinner oils run off the walls faster, resulting in un-lubricated side walls. Only lubricate the walls when you are ready to pour the concrete.

Release Agents & Oils :
- Wax based shutter oil (best)
- Shutter oil
- Old engine oil
- Vegetable oil (conola/sunflower)
- Silicon based release agents

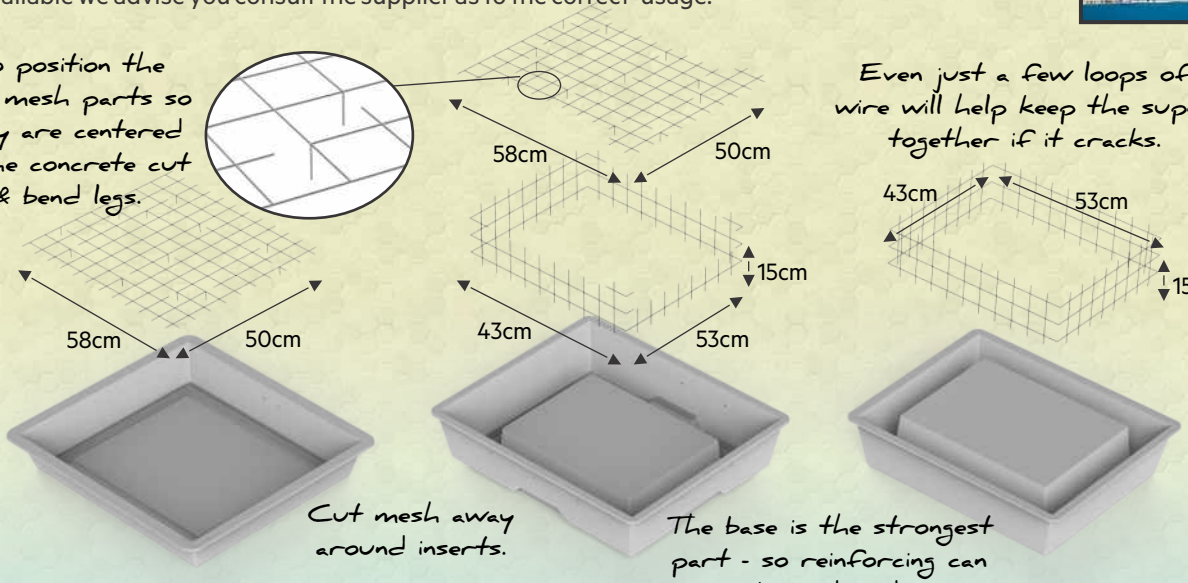
Main Core Reinforcement :
- 50x50x1.6mm welded galvanised steel mesh (best).
- Fencing wire galvanised.
- Reinforcing rod bent to a frame.

2. Reinforcement

Giving your concrete an **internal steel structure is important for preventing cracks and breakages**. A simple steel skeleton can double the strength of concrete. We generally use welded steel mesh to create the reinforcement, cutting pieces from a roll with plyers and creating the 4 flat and square pieces shown below. Before assembling the moulds place the reinforcement into the mould cavities trying to position it so that it ends up in the middle of the concrete.

You can also reinforce your concrete with fibers. Either steel or plastic reinforcing fibers come in lengths 1-5cm, ranging from hair thickness to 0.5mm. While these fibers do increase strength they should not be used alone. At Beegin we use 40x0.4mm polypropylene reinforcement fibers (100g per hive) to add extra strength on top of the steel mesh skeleton. Due to the wide range of fibers available we advise you consult the supplier as to the correct usage.

To position the flat mesh parts so they are centered in the concrete cut & bend legs.



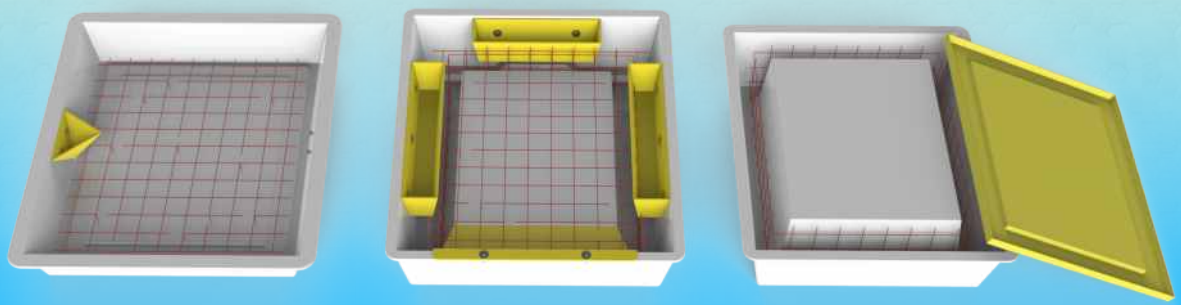
Even just a few loops of wire will help keep the super together if it cracks.

Cut mesh away around inserts.

The base is the strongest part - so reinforcing can be reduced.

3. Mould Assembly

Our moulds are pretty simple. The image below shows what the moulds look like, assembled and ready for concrete. The inserts are all screwed on using the wing-nuts and bolts provided. A good way to speed up the process is using a cordless drill to fasten and remove the bolts. It is important to oil the inserts before assembling the moulds.



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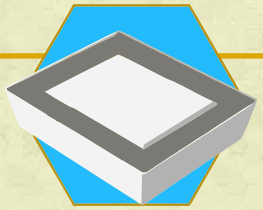
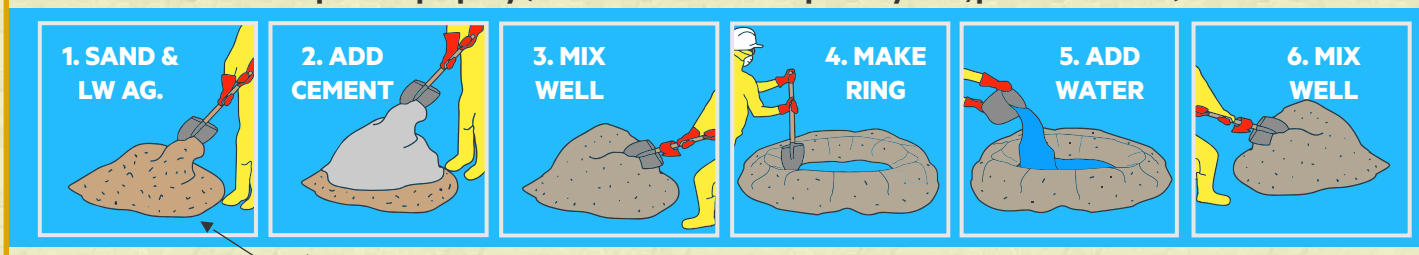


1. Mixing

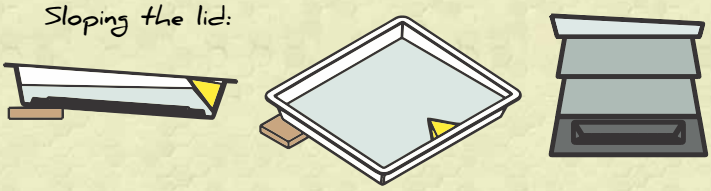
Small quantities of concrete can be mixed in a wheel barrow. For large loads mix the concrete on a flat, clean ground surface (put a plastic sheet down to avoid mess). Here are the steps to follow for mixing the concrete:

1. **Start by placing the sand and stone together in the correct quantities in a pile.**
2. **Then place the cement directly on top of the pile.**
3. **Mix the dry aggregates together.**
4. **Spread the mixture out into a ring wall.**
5. **Pour water into the center. Start with half the intended amount and add more in the following step**
6. **Mix the components properly (there should be no clumps of dry sand, perlite or cement).**



Add reinforcing fibers here.

Sloping the lid:



NB! The lightweight-concrete should be a bit too dry to easily slide into the moulds without some help, but wet enough that when it is jiggled it levels.

2. Casting

With your gloves on, use a small bucket to scoop the well mixed concrete out and into the moulds. You can use you fingers or a clean stick to push the concrete down into the sides of the super and brood base (especially under the inserts). Full the Brood and Super moulds to their rims. The Lid mould does not need to be fulled to the rim. You can decide how thick you would like the lid to be. What we usually do is tilt the lid mould by placing a plank under one side. This gives the lid a slope so that the rain will run off to one side (away from the entrance) and makes the lid a bit lighter.

3. Vibrating

Concrete is vibrated to remove the air bubbles from it. With lightweight-concrete vibrating the mixture can cause the lightweight aggregate to float - separating from the cement and sand. But the concrete must still be vibrated to remove large air pockets.

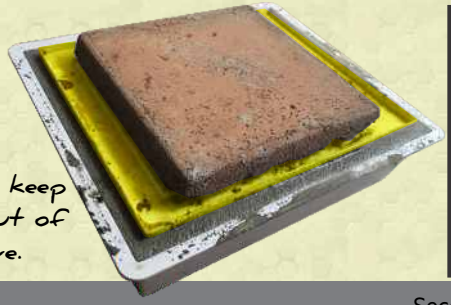
Try these methods:

A. Using a clean, thin stick, move around the mould poking the concrete, pushing to the bottom of the mould.
B. Using a rubber mallet or just your hand gently bang against the rim and/or side of the mould repeatedly.
C. Don't vibrate the mould too much. When large bubbles stop coming to the surface you should stop.

4. Super Board Press

To complete the super mould, the yellow rectangular press board can be inserted after filling the mould with concrete. The board creates the ridge/lip on the underside of the super that helps locate the part onto the brood base and on top of other supers. The board also flattens the bottom of the super to create a level join and ensure the super is the correct depth for super frames to be separated by the bee space. Follow these steps:

A. **Make sure the top surface of the super mould is clean so the board can lie flush with the flat surface.**
B. **Place the board over the super so that it pushes the concrete out to the sides.**
C. **Place a heavy object on top of the board to keep it pressed down while the concrete sets.**
D. **The board can be removed after 5 hours.**



The lip helps keep rain water out of the beehive.

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1. Setting

Concrete reaches 70% of its hardness within 48 hours. The longer the parts are left in the moulds the harder and stronger they become making it less likely they will break during removal. However, they also shrink and can become difficult to remove when they are dry. It is generally ideal to remove the parts between 30 and 50 hours after casting.

2. Disassembly

Remove all the inserts. Unscrew the wing-nuts and use a paint-scraper or screwdriver to pull the pieces out. The rectangular inserts on the Brood Base can be taken out before turning the mould over. The entrance insert can be removed once the concrete part is out of the main mould. Again you can use an electric drill with a screw-driver bit to remove the bolts faster.

3. Releasing

Be gentle! Be gentle! Be gentle! This is the point where the parts are most likely to be cracked or broken! Rushing this part of the process will only result in disappointment. If the concrete is dry pour water over the part and leave it for a few minutes to soak in. Here are some notes for the removal of each part:

LID: Often when turning the mould over the lid will slide out and bang the edge on the ground, chipping off a piece. It is best to hold the concrete part onto the mould, turn it all the way over and then release it vertically. This is easy to do with 2 people, both gripping an edge and using your fingers to hold the part and the mould together.

- **BROOD BASE:** Remove the rectangular inserts and nuts from the entrance insert. Place a piece of wood under each edge of the mould rim so that the concrete part has a small gap between the mould and floor to drop out into. If the part doesn't come out immediately lift an edge 1cm up and drop it gently onto the piece of wood under the edge. Doing this to each edge, moving from one to the next in a circle, should loosen and free the part.
- **SUPER:** Do the same as above, working in a circular system. Bump one edge, then the one to the right of it and keep rotating 90-degrees to bump the sides in a circular pattern. This action must be gentle and careful.

4. Cleaning Parts

The parts all have areas that could use a bit of manual cleaning. The super will have a sharp outer-edge around the base, the brood base will have some flashing around the entrance and the lid may have overly sharp top edges. The parts are much easier to clean when the concrete is still soft and hasn't cured. So when you take the parts out of the moulds it is a good idea to also clean them up quickly. This can be done with a strong paint scraper. Be careful, especially near corners on the lid and super. Scrape layers away at first and get a feel for the strength of the material.

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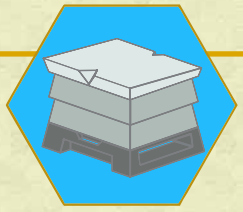


NB! Curing is not the same as drying!

Curing

Curing of concrete is defined as providing adequate moisture, temperature, and time to allow the concrete to achieve maximum strength and hardness. Concrete products, such as the Bee Bunka, generally require about 14 days to cure to a point where they can be used. Concrete that is not cured properly may be weak and although you may not see visible cracks, there can often be small internal fractures that could cause trouble later on. Follow these steps for 14 days to cure your concrete parts properly:

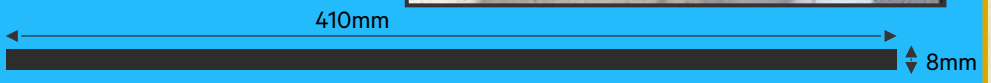
- **Be very gentle when moving freshly de-moulded parts as they are still weak.**
- **Place the freshly de-moulded parts somewhere cool and out of the sun.**
- **Keep the parts wet by spraying them with water twice a day.**
- **If it is very hot and dry in your area try to cover the parts with a plastic sheet to trap the moisture in.**
- **If it is very cold (below 8°C) in your area you should allow extra setting and curing time.**

When the 14 days are up you can begin using the parts. There may be some dust left on the surface of the concrete parts once they are cured. Use a brush and water to wash the parts - the bees don't mind a bit of dust, but it will be less work for them.

Frame Support Bars

The Bee Bunka hive requires two bars per chamber to hold the frames in place. These bars can be made from 8mm steel round-bar. If other thicker bars are used the slots where the rods are held can be adjusted to hold the rods at the correct height. The bars should be 410mm long. You can cut these with a bolt cutter or hacksaw from longer lengths of 8mm round bar.

You can also use a strip of wood stuck to the side wall with epoxy to make the support bar.



Other Parts

An inner cover is a good idea - a thin flat sheet of fabric, cardboard, metal or plastic that goes underneath the lid. This ensures that the bees haven't stuck the frames onto the lid with propolis, so you can take the lid off easily. You may wish to use entrance reducers, queen excluders, feeding-trays, Varroa-traps, beetle-traps and pollen traps. You can use all of these on the Bee Bunka should you wish. We have designed the hives so that it will work with most standardised equipment. The entrance reducers will have to be customised to fit the Bunka, and if you use frame holders that clip onto the side walls of the super you will need to adjust the clamp width. **We have instruction manuals available on our website that explain how to make some alterations to the hives - like a floor opening and deep supers.**

A thin layer of concrete forms at the back of the entrance during moulding that must be broken away with a screw driver. This allows you to set the size & position of the opening. Or a removable wooden reducer can be fashioned..

Waterproofing & Sealing

We don't generally waterproof our concrete. It is an additional expense, and is usually unnecessary. However, if your beehives are placed directly on the ground or in a damp spot or if you get snow in the winter you may experience a problem with the concrete parts absorbing moisture. This can be prevented by adding an waterproofing agent to the concrete during mixing or by painting a sealer onto the cured parts after production. These products are usually silicon based and easy to find at building supply shops and equally as easy to use.

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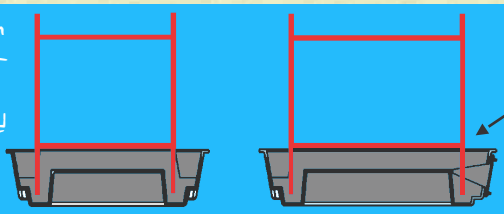
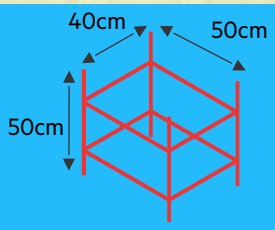
Legs for the Beehive

It is ideal to have the hive entrance above the ground (+40cm). Placing the hive on a stand makes it easier to work with and can protect the bees from pests and animals. There are a wide variety of stand options available. Which one you choose will depend on your resources and environment. If ants are a problem in your apiary, then an anti-ant stand may be necessary. If vandals are a problem then a stand that helps keep people out can be useful. If floods occur then a secure, high stand to keep the hive above water. You can also embed the stand into the Brood Base during casting. Simply insert the top of the stand into the concrete while it is still wet and let it harden onto the stand. This helps prevent stand theft - for the scrap value of the steel.

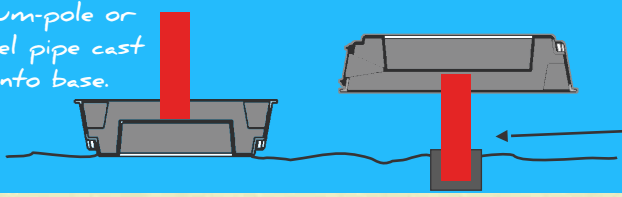
We use 10-12mm steel rebar/Ybar to make the simple stand shown here.



The tips of the stand legs are submerged into the corners of the brood base.



Gum-pole or steel pipe cast into base.



Alternatively you can insert a short piece of steel pipe into the base. The pipe can then be fitted into a wider pipe that has been mounted in the ground at you apiary.

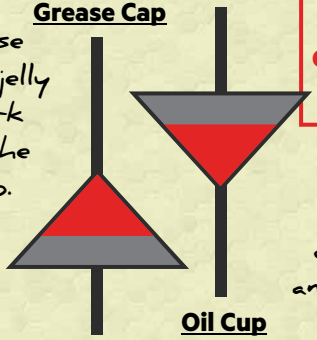
Ant Deterance

The most common way of keeping ants out of the hive is to create a well of oil or grease that walking insects cannot cross and so prevents them from reaching the entrance. The two shown above each have their down-sides. The Oil Cup often ends up full of bees and rain water. The Grease Cap often ends up with sand splattered upwards by rain. Still having trouble? Try Diatomaceous Earth (type of ash) - a good, non-toxic ant deterrent that can be sprinkled around the base of the bee hive to ward off ant colonies.

Your hive must be level! A slight slope towards the entrance is also acceptable for helping drain water.

Machine grease or petroleum jelly (Vaseline) work well to fill the inverted cup.

Grease Cap



Oil Cup

Used engine oil works well as it doesn't evaporate and coats any debris that falls in.

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Additional Protection

The concrete beehive on its own protects the bees and you from many things, like animals, weather, fires and theft of the entire hive. However vandalism and honey theft may still be a problem. Badgers and people can be extremely persistent, working for days to open a beehive. One of the best practices is to visit your remote beehives as regularly as possible to detect problems early and save swarms that have been attacked. The image below is of a camp built to keep a honey badger away from the hives. Once a badger has found an apiary they will return regularly. The heavy rocks on top of the lids act as an extra hurdle for the badger. The fence and wire was mainly to deter people as badgers can easily dig under fences,

Vandalism

Typical vandalism (throwing rocks at the hive, burning it or knocking it over won't be a problem. But if someone decides to attack the hive with a 20 pound hammer they will do some damage to the hive and its contents. This is an unfortunate, and hopefully rare, possibility. If you are worried about vandalism it is advisable to not place the hive on a stand that can be pushed over and try to keep it well hidden in the bush. Oxide can be added to the concrete to give it a more natural colour.

Honey Theft

If someone has the tools and equipment they may be able to open the hive and remove frames of honeycomb. To prevent this the hive can be locked with a chain around the body. The grooves on the lid and the handles on the brood base are there to hold a chain in place so that it can't be slid off of the hive. We use a device made by Gripple (shown in pictures) to tighten and lock steel cables around our hives. These devices are cheaper than a lock and chain and easier to operate than regular hives straps when you have gloves on. There are many ways to lock the beehives, even ways to cast extra bits into the concrete that can assist in locking. you could incorporate something into the stand design. We advise that you experiment and find something that works for you.

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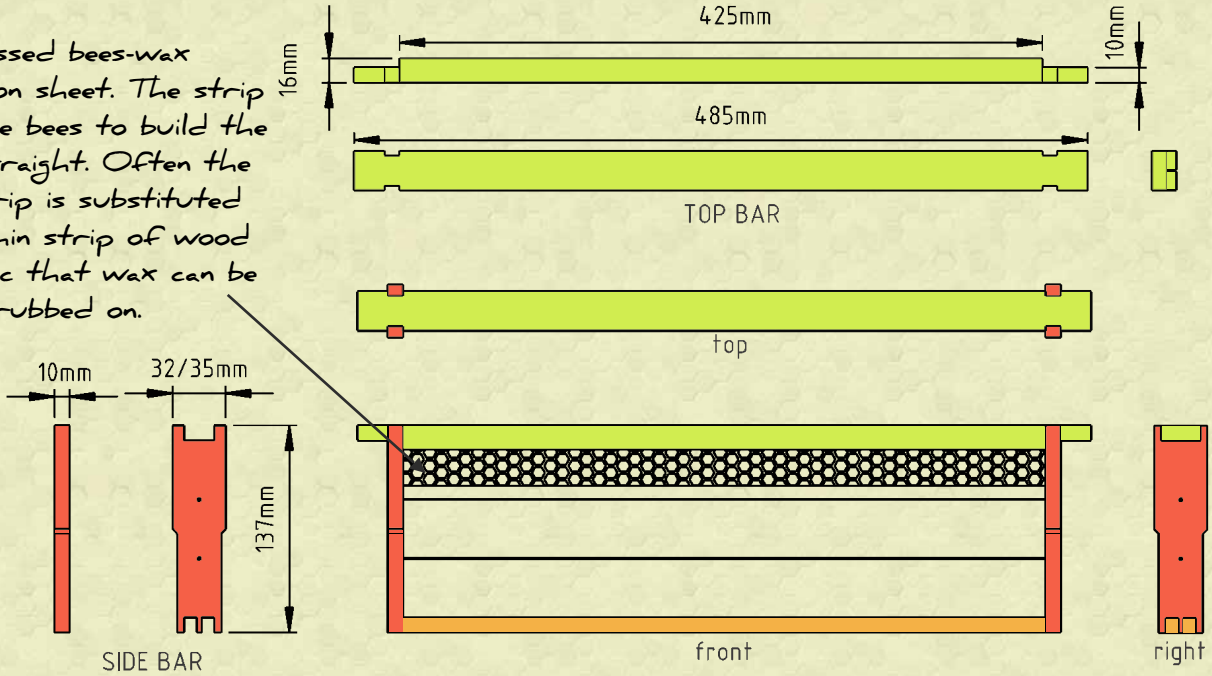
Wooden Honey Frames

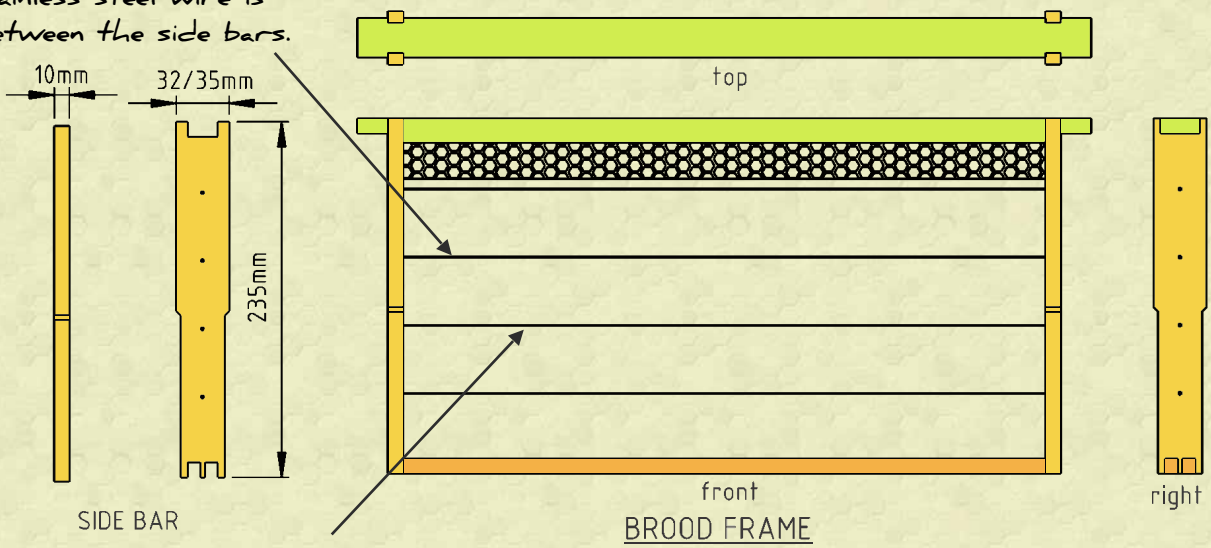
The Bee Bunka takes standard sized Langstroth frames. These are typically made from untreated wood. The basic measurements for the frames are shown below. You can often find local beehive manufacturers who can supply you with the assembled frames or unassembled pieces. If you would like to make them yourself you can simplify the design in a number of ways to make it easier to make and cheaper. While plastic frames are becoming more popular we suggest you research that option properly before making the decision to buy frames that may not work with your bees.

Pressed bees-wax foundation sheet. The strip guides the bees to build the comb straight. Often the wax strip is substituted for a thin strip of wood or plastic that wax can be rubbed on.



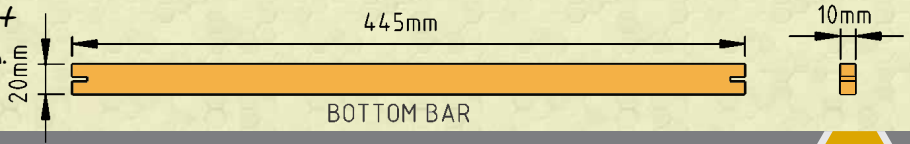
SUPER FRAME

Thin stainless steel wire is strung between the side bars.



BROOD FRAME

The wire becomes embedded in the wax-comb giving it reinforcement for when the frames are spun.



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COST

CALCULATE THE COST OF A HIVE		
ITEM	**QUANTITY**	**COST**
MOULD SET	1/200 hives	
EQUIPMENT & TOOLS	see equipment section	
CEMENT	30ℓ	
LW AGGREGATE	50ℓ	
SAND	30ℓ	
REINFORCING	2m² (for mesh)	
STEEL BARS	1.6m	
OIL	0.5ℓ	
WATER	60ℓ	
LABOUR	5hrs	
FRAMES	10 Brood + 10 Super	
OTHER PARTS	queen excl., inner cover, etc.	
TOTAL		

How much it will cost you to make each Bee Bunka will depend on expenses that can differ from place to place. We have sketched out the this table for you to fill in which will tell you how much your hives will cost roughly. We also encourage you to experiment and discover new mixes, here are a few to start off with:

ALTERNATIVE CONCRETE MIXES					
Lightweight Concrete					**Regular Concrete**
COMPONENT	LIGHT	MEDIUM	HEAVY	HEAVY	DENSE
LW AGGREGATE	5	5	4	1	-
SAND	2	3	4	1	1
CEMENT	3	3	3	1	1
STONE	-	-	-	-	1

Recommended mix

Glossary:

Mould - A hollow shell used to form concrete.
Casting - Pouring a mixture into a mould.
Aggregate - A material that is part of a mixture.
Demoulding - Removing a part from a mould.
Mix-design - The concrete recipe.
Reinforcement - Something that adds strength to a structure, embedded inside the concrete.
Insert- A detachable piece of the mould.
Wing-nut - (Butterfly-nut) A finger operated nut.
Curing - The chemical process of concrete aggregates bonding and hardening.
Setting - Transition of concrete from liquid to solid.

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NOTES

CONTACT DETAILS

The Beegin Appropriate Beekeeping Technology was developed in South Africa to help beekeepers, farmers and bees. The moulds are available for anyone, anywhere in the world to purchase, allowing them to make and sell Bee Bunkas freely. In this way Beegin aims to generate hundreds of Bee Bunka production operations in as wide an area as possible - increasing access to the technology in each new area.

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If you get stuck, or have any questions, don't hesitate to contact us. If you are having fun and have no problems we would also like to hear from you. Keep in contact with us and the Beegin community.