



The Managed Mentoring Program on getting started in beekeeping.

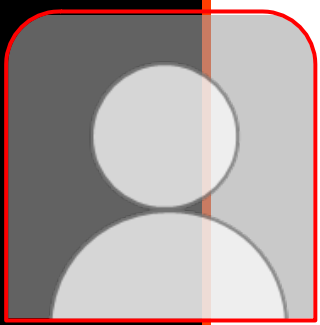
Managed Mentoring



Managed Mentoring

Sourcing and Building Frames / Foundation

Module | Building Frames



What is Covered in this Module

Frame Primer

Frame and Foundation Design

Foundation

Frame Fabrication

Frame Jigs

Frame Assembly

Buying Pre-Manufactured

Drone Brood Frames

Foundationless Frames



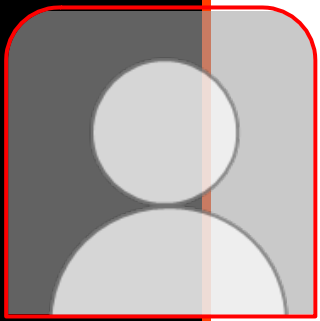
Frame Primer

Understanding important details of frame construction



Frame Primer

- **Frames and Foundation are the core of the hive**
 - *They provide the base for the nest and storage*
 - *As such they are an important consideration in beekeeping*
 - *The design, and options for frames in the marketplace varies*
 - Frames come in different sizes for different box dimensions
 - They vary in design and construction material
 - Foundation choices also vary widely



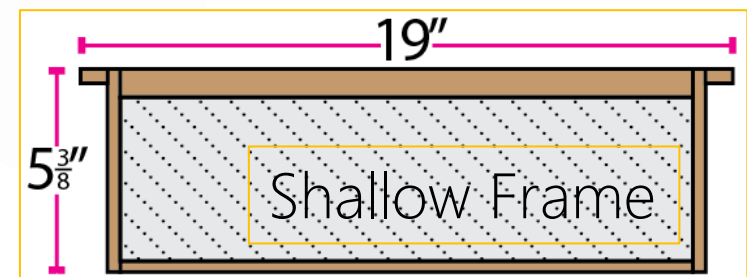
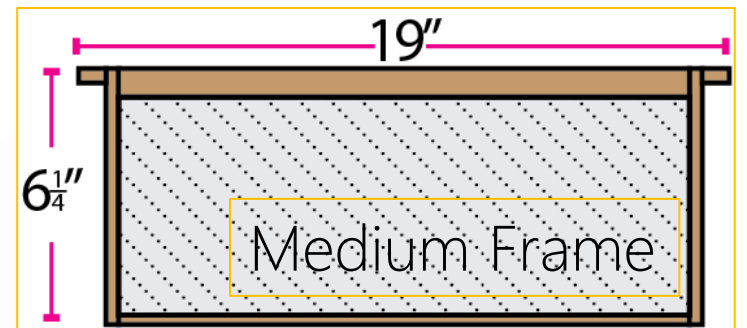
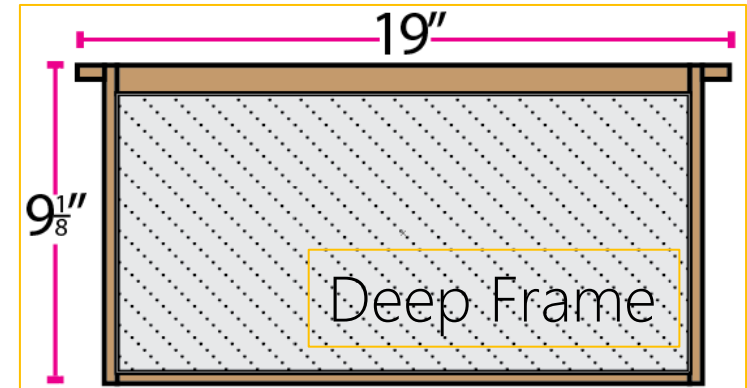
Frame Dimensions are "Standard"

□ Langstroth Hive Dimensions

- *Deep* $19'' \times 9(1/8)''$
- *Medium* $19'' \times 6(1/4)''$
- *Shallow* $19'' \times 5(3/8)''$

□ Designs differ

- *Each manufacturer has discretion on design of the frame components*



Two form factors dominate

❑ Wax and Plastic Foundation Styles

- *These are the two predominant forms sold today*
 - Wood Frame > Wax Foundation
 - ❑ The traditional frame setup is the more conventional way to go
 - Wax foundation is often enhanced by embedded wires which negates having to wire the frame manually.
 - Wooden Frame > Plastic Foundation
 - ❑ Very popular for ease of use, cost, assembly.
 - ❑ Comes with a plastic embossed sheet that is coated in wax.
 - The plastic is offered in a number of colors: white, black, various shades of yellow...



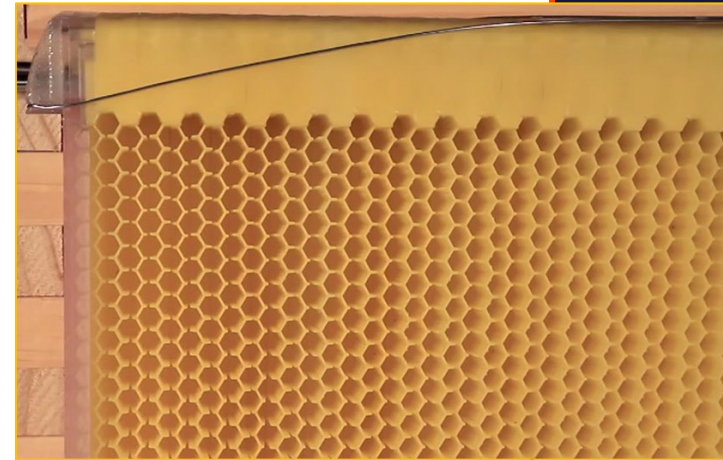
Frame Construction

□ Frame Materials

- *Frames are traditionally made of wood with wax foundation*
- *Variations abound*
 - Frames can be made with Wood for the framing and plastic for the foundation
 - Frames can be purchased as fully plastic (frame and foundation) or metal.
 - They can even be purchased as a single unit in plastic or metal (aluminum) fully drawn – meaning with fully developed cells, not just cell patterns.



Fully drawn plastic frame

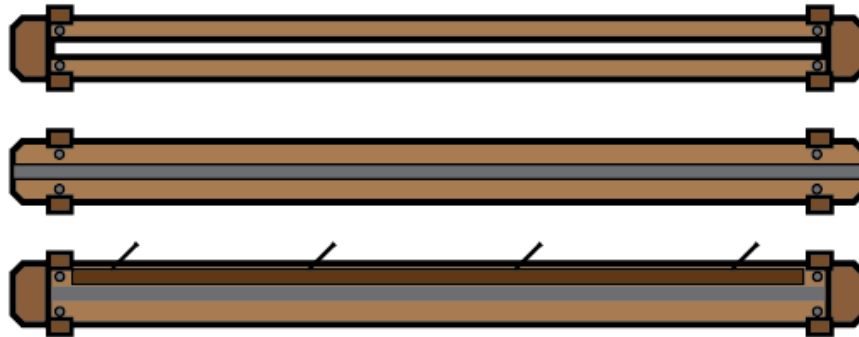


Flowhive Frame



Frame Variations Abound

Top Bars



Slot

Groove

Wedge

□ Pick a Style

- *Settle on wax vs. plastic*
 - Choose the frame style that corresponds to the foundation you are using.
- *Wax Foundation*
 - Conventional Wedge Style frames with crimp wire foundation are recommended.

Bottom Bars



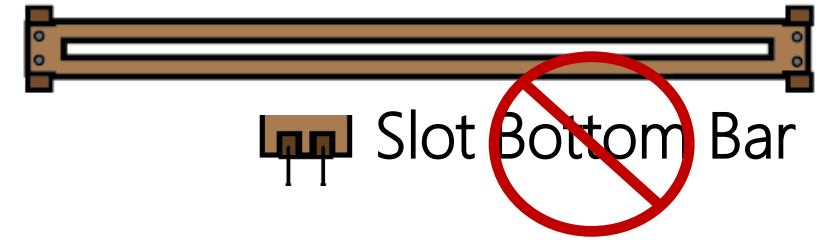
Slot

Groove

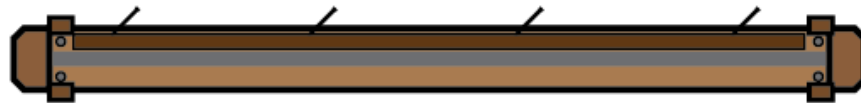
Slot 2

Solid

Wax Foundation Expanded



Top Bar



Wedge

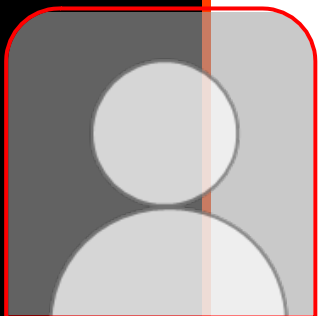
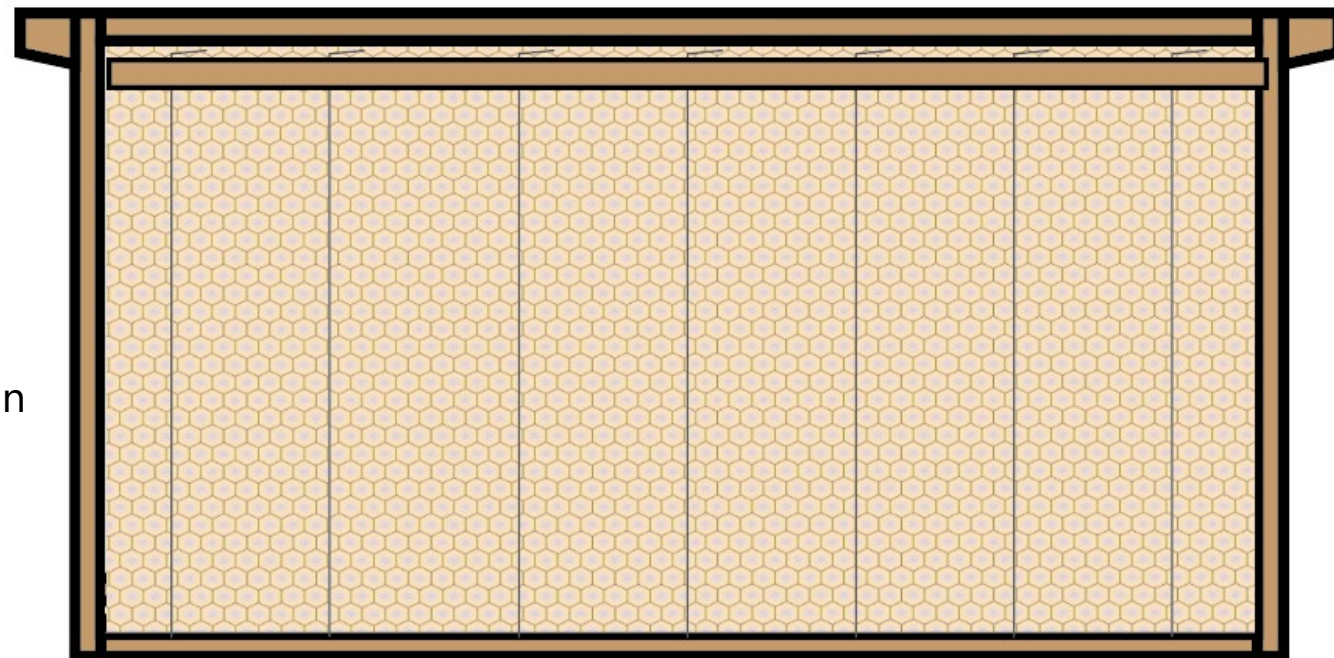
Bottom Bars



Groove

Wedge Frames

- Choose a Wedge Style Frame
- Pick a Groove Bottom Bar
 - Smooth on the bottom, with a groove for the foundation to rest in



**Slotted
bottom
bars lead to
problems**



Frame Design Differences Exist

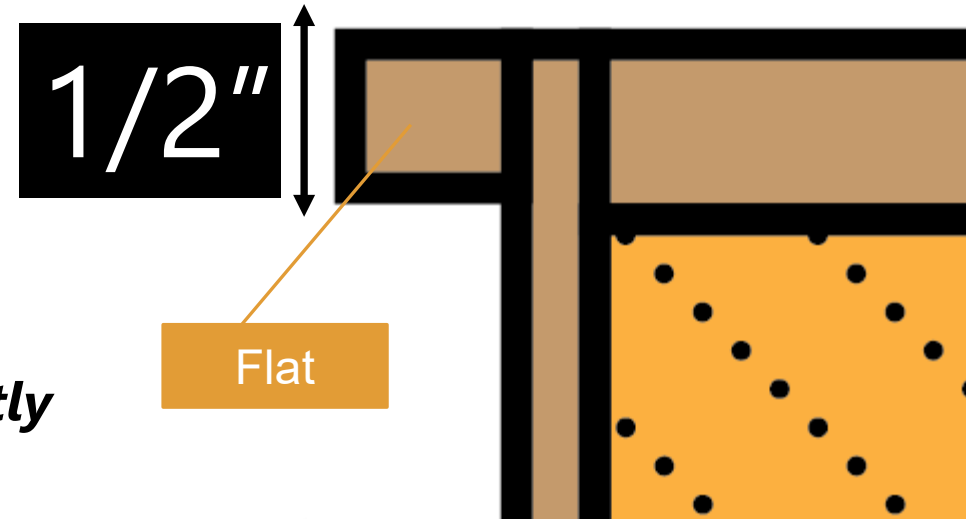
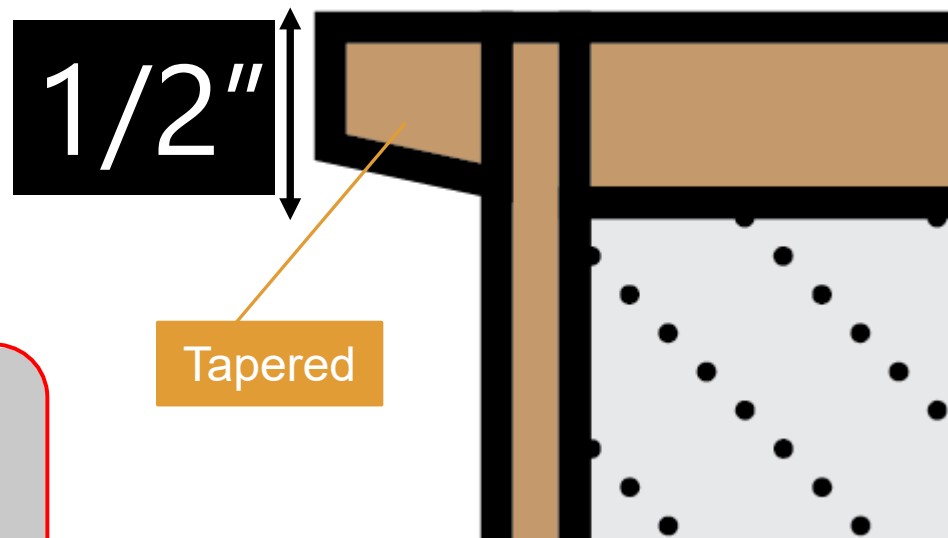
$5/8''$

□ "Standard" 1/2 Inch

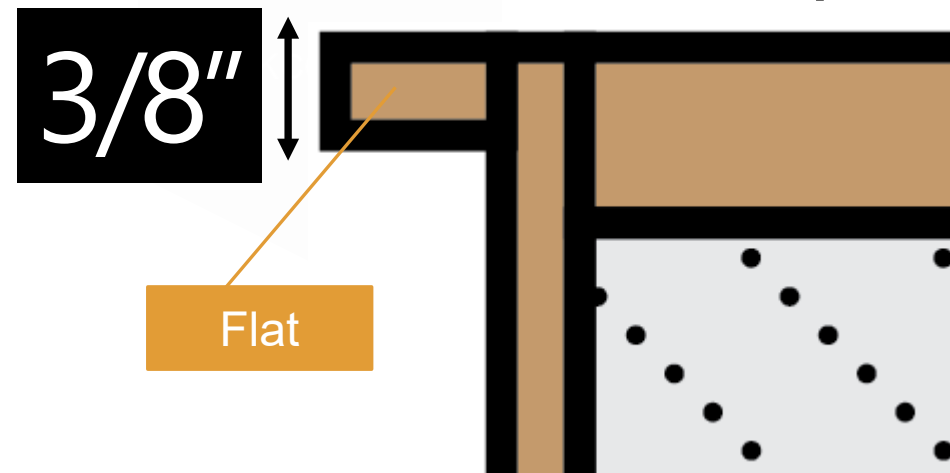
- Sometimes tapered...

Sometimes not...

Tapered frames rest differently



□ "Standard?" 3/8ths

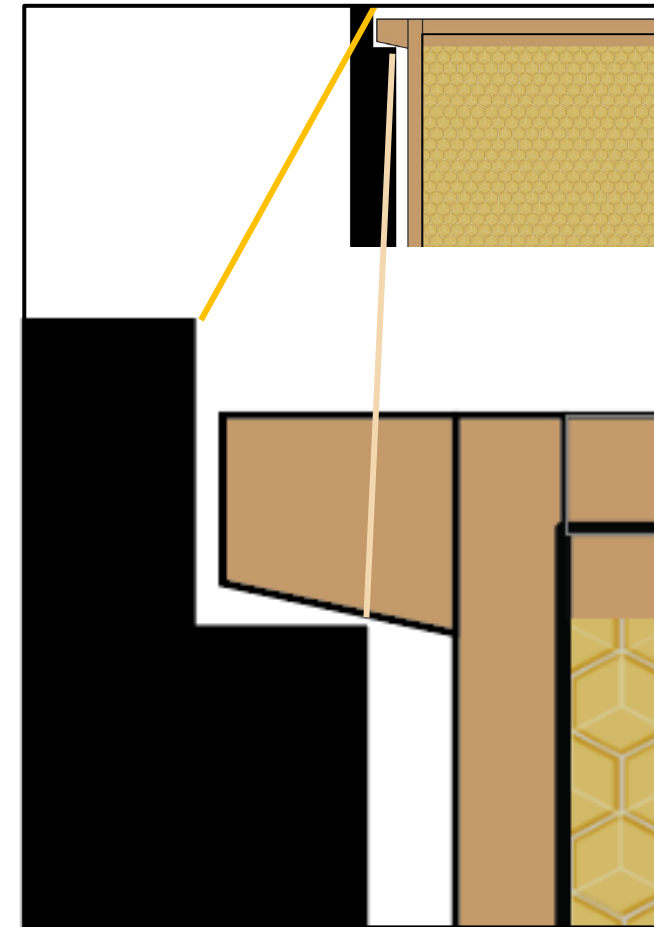


Frames Rest in a Rabbet Joint

Definition

Rabbet:

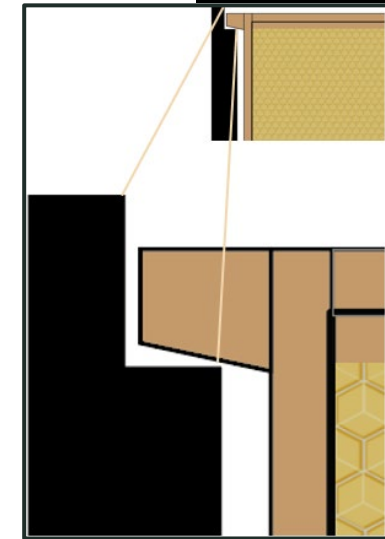
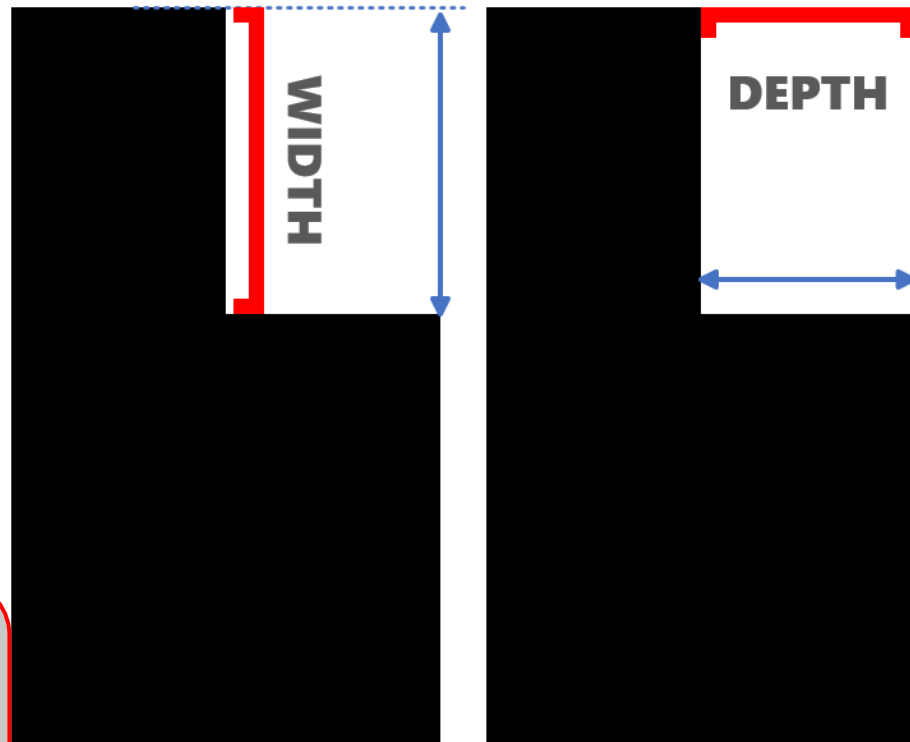
A step-shaped recess cut along the edge or in the face of a piece of wood, typically forming a match to the edge or tongue of another piece.



Frames Rest in hive box Rabbets

Consider the dimensions of rabbet width and depth...

The Depth



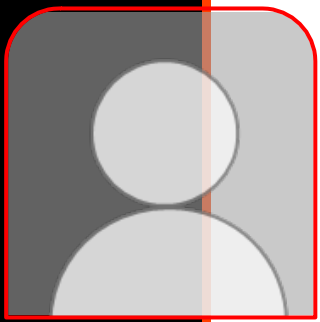
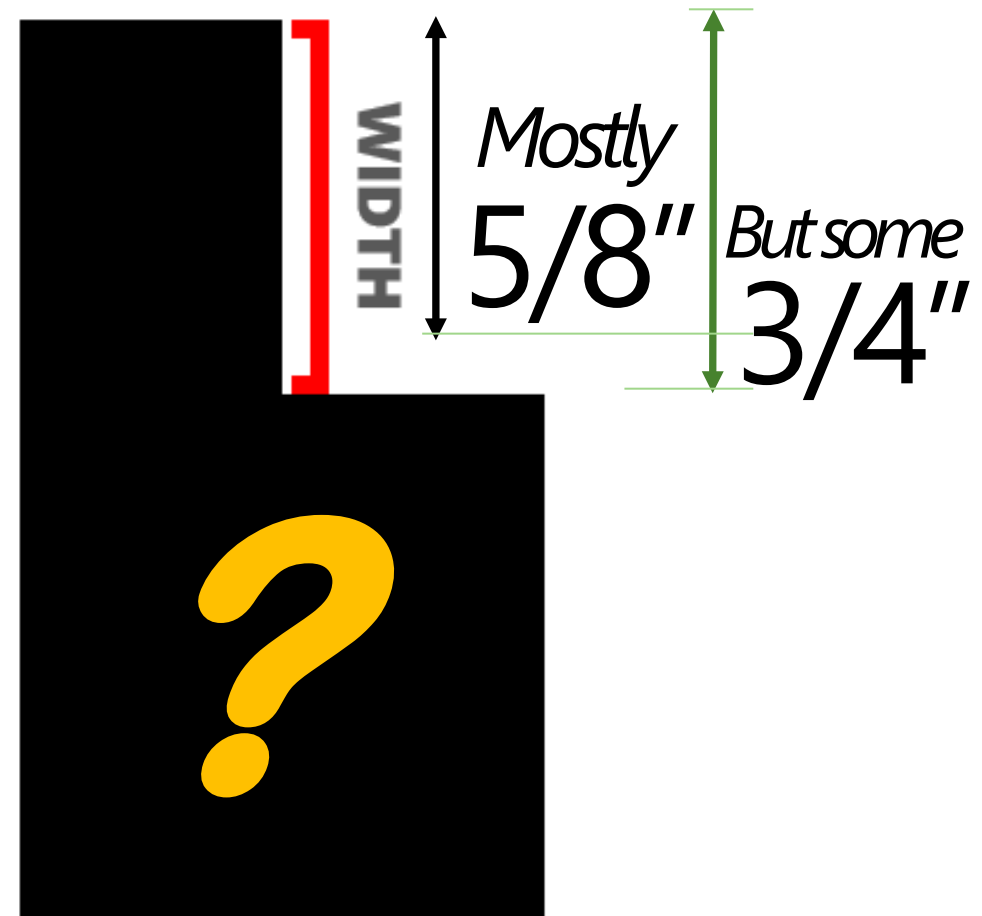
DEPTH

$3/8''$



Rabbits Dimensions - Vary

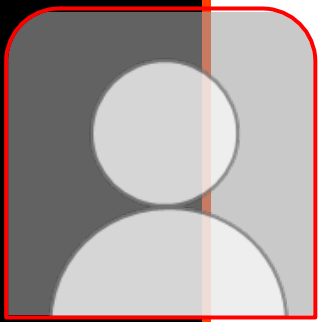
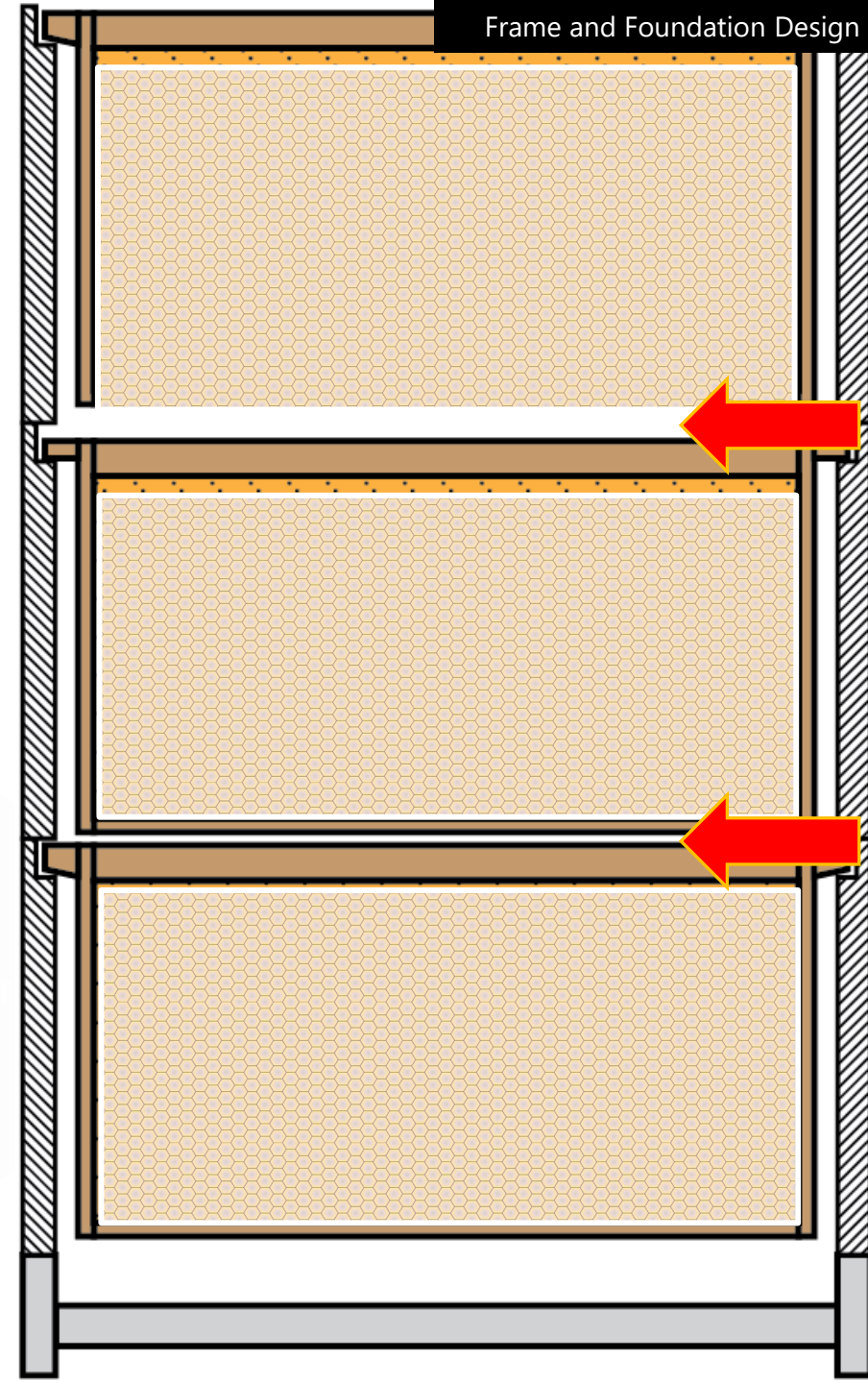
- ❑ Widths are not universal
 - *The dimensional width of a Rabbit can vary*
- ❑ Why this matters
 - *Bee Space*
 - The design you choose will impact how the frames hang in the hive.
 - This can lead to space problems if the frame design and box hardware are not compatible and designed to work together.



Mismatches

❑ Mismatches result in alignment problems

- *Box dimensions affect how frames occupy the boxes*
- *Mix and matched frame rests and rabbet dimensions impact how the frame hangs in the box*
- *Intermixing tab sizes and shapes cause gap differences.*



Source your Foundation (get the right size)

Buy Frames + foundation together

Foundation Size
Varies!

Deep Size Examples

- ❑ **Wedge Bar – Divided Bottom**
 - *Uses wired 8 1/2" foundation with hooks*
- ❑ **Slotted Top Bar – Grooved Bottom**
 - *Uses wired 8 7/8" foundation with no hooks*
- ❑ **Wedge Bar – Solid Bottom**
 - *Uses wired 8 1/8" foundation with hooks*
- ❑ **Wedge Bar – Grooved Bottom**
 - *Uses wired 8 7/16" foundation with hooks*



Foundation Varies!

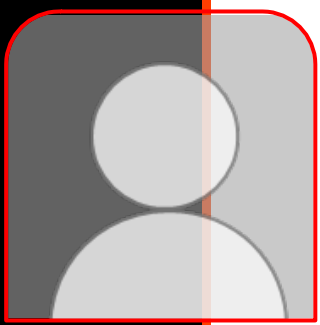
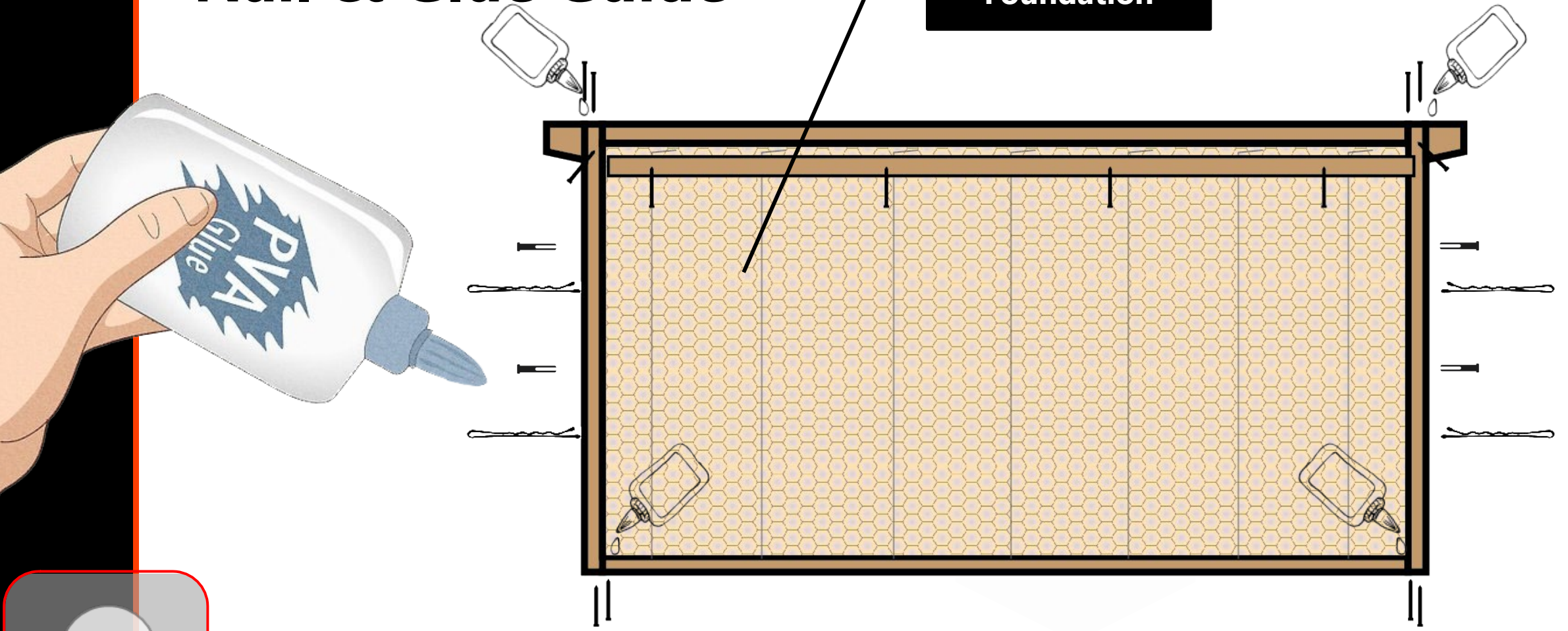
**Put the wrong size in
You get banana comb**

This is extreme for illustrative purposes, but it is not uncommon to see mismatches.

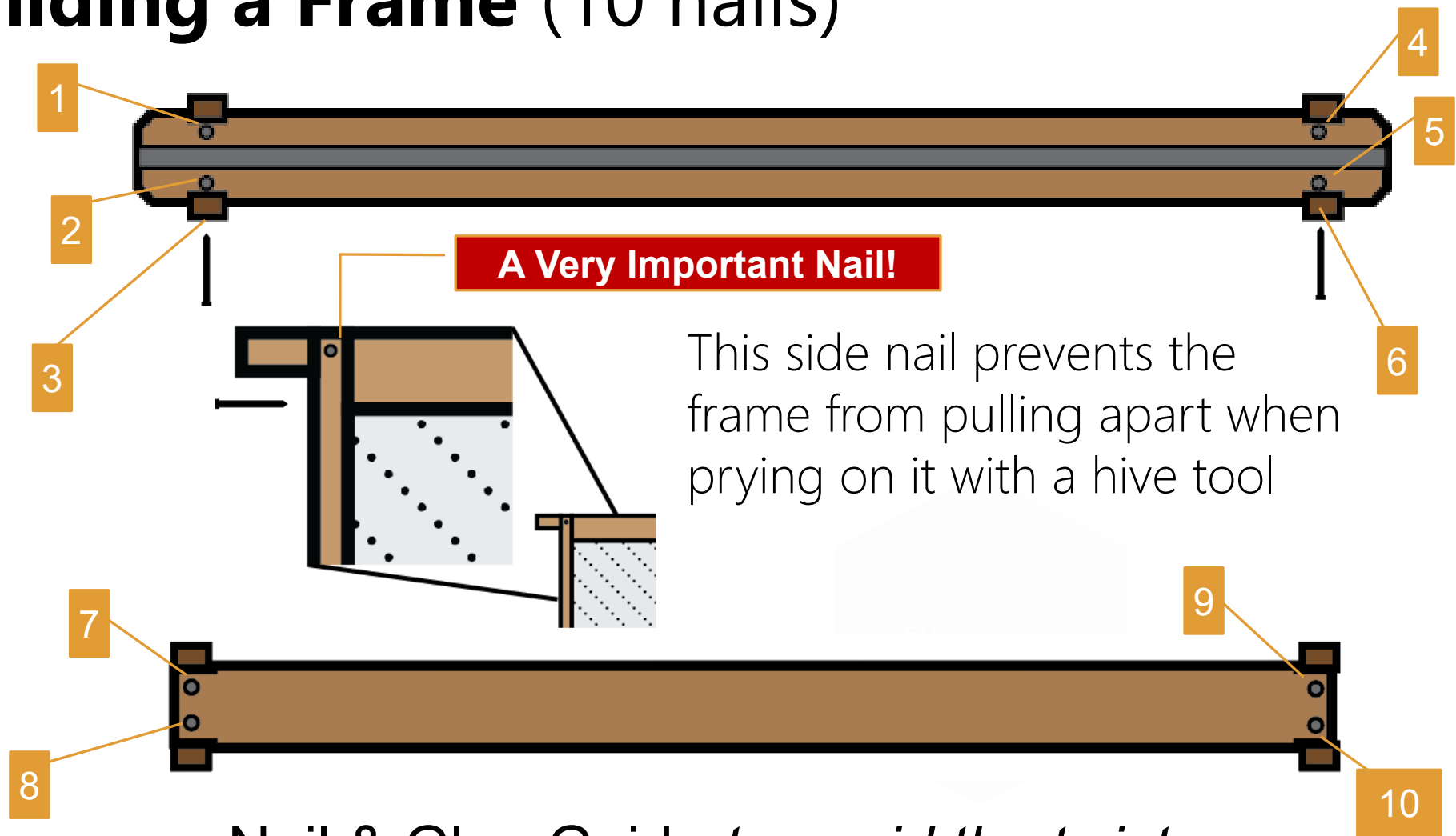


Nail & Glue Guide

This is Crimp Wire Foundation



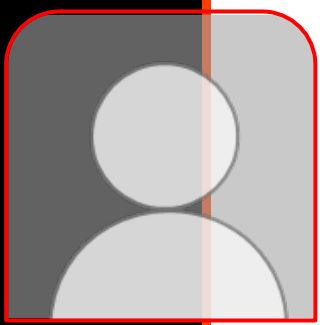
Building a Frame (10 nails)



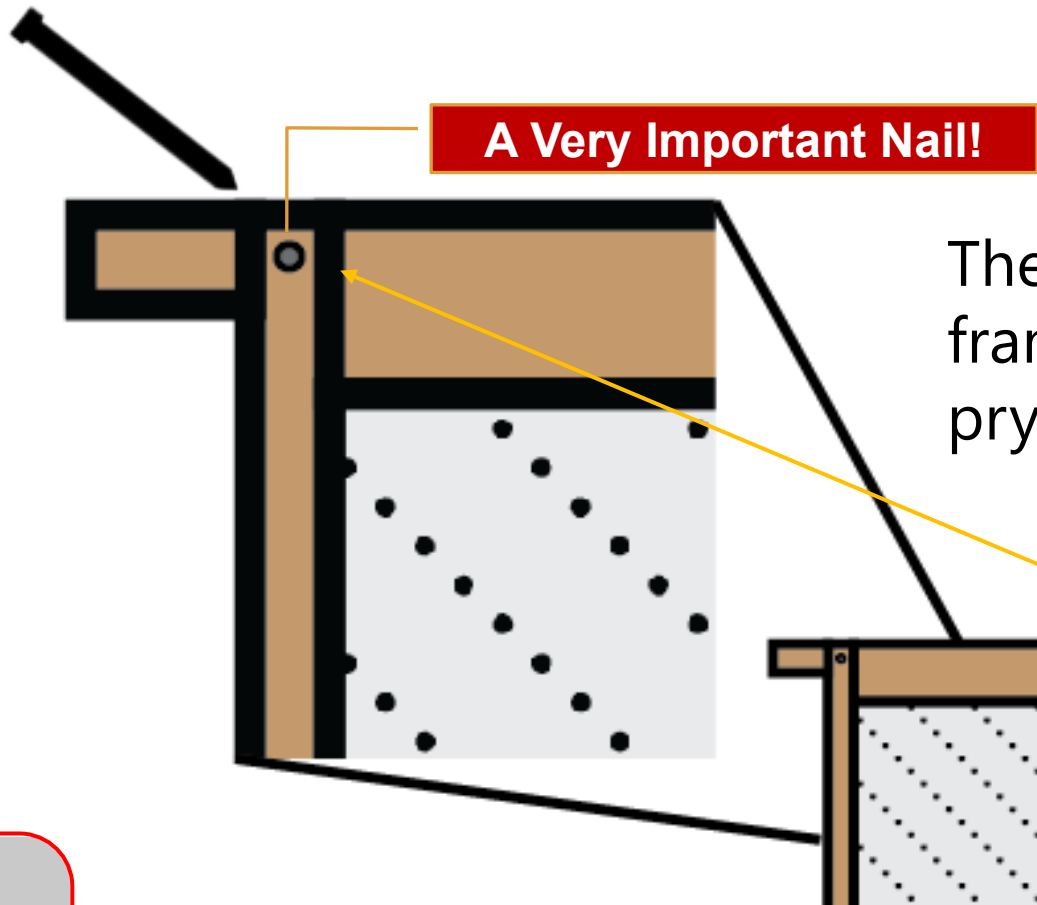
A Very Important Nail!

This side nail prevents the frame from pulling apart when prying on it with a hive tool

Nail & Glue Guide *to avoid the twist*



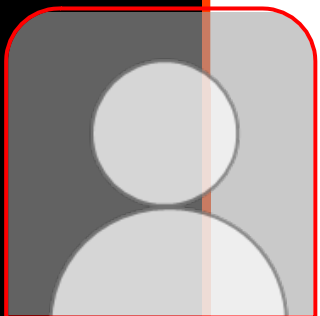
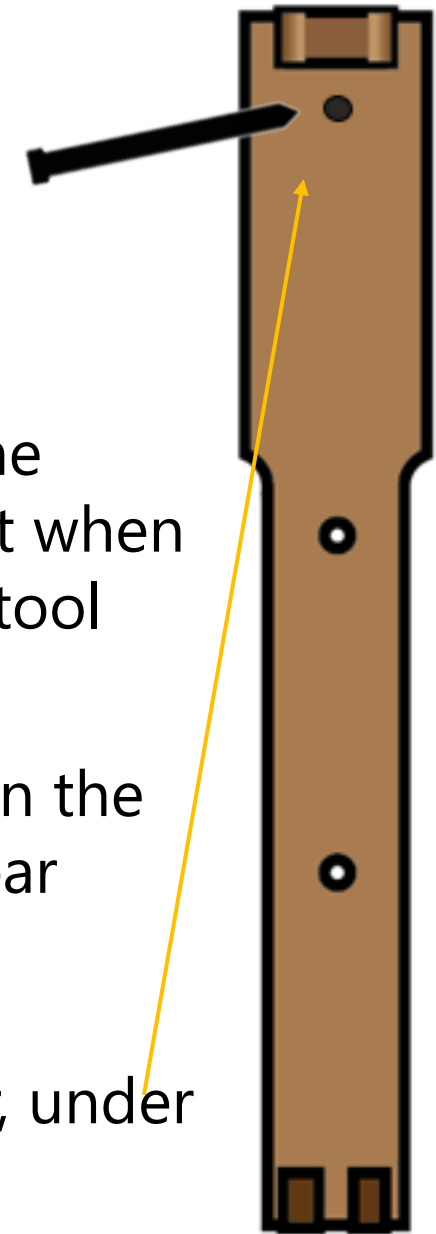
Side Nail Expanded



The side nail prevents the frame from pulling apart when prying on it with a hive tool

It can be placed in the ears of the side bar (left),

Or in the end bar, under the ear (right)



Air Guns – Nails/Staples

□ Nail Guns and Fastening Staples are an option

- *Pneumatic air guns and staples are another option*
 - Many do not have this kind of setup, but if you do, it is a viable way to go
 - Be sure to calibrate the pressure for driving the staples



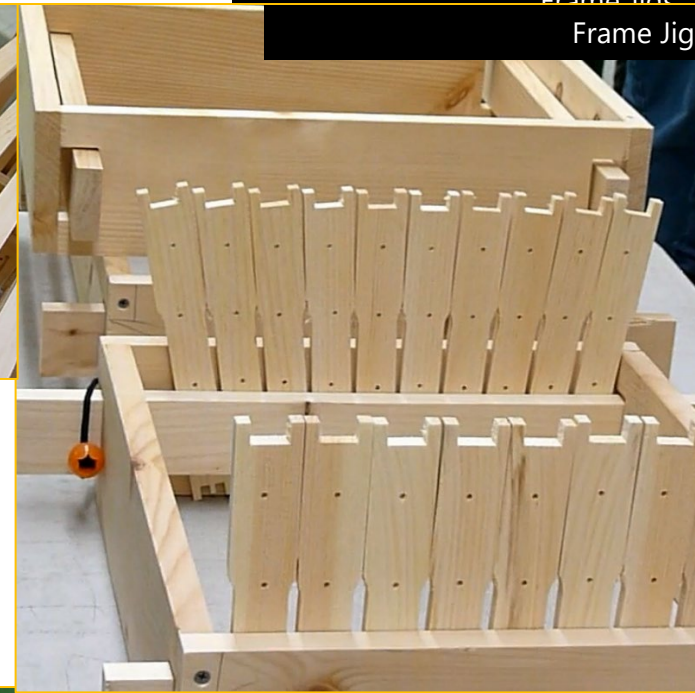
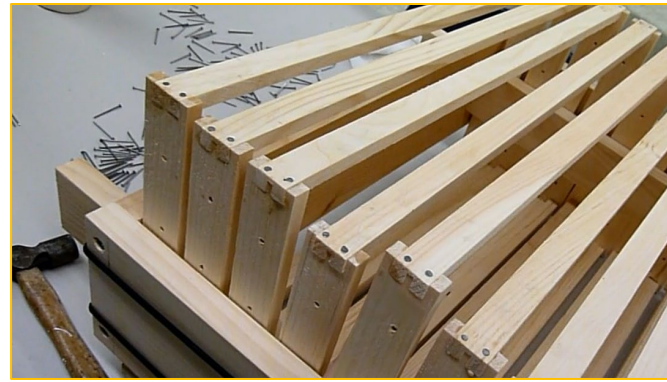
Use a Jig

- ❑ Frames out of square can also cause space problems

- *Twists cause distortion gaps and raised bottom bars*

- ❑ Consider a Frame Jig

- *They are really a good way to go*
 - *Available in most catalogs these days*



Glue the Top Bar

- Glue the inside edge
 - *Ensure the glue covers each of the surfaces that meet up between the side bars*
 - Glue both the top and bottom of the side bars



Glue Application and Assembly



□ Gluing

- Apply an even layer of exterior based glue to surfaces that will be joined together during assembly

- Consider an aid to spread the glue in a uniform thin coat.
- Mate pieces together while the glue is still *active* and *open* – **wet...**

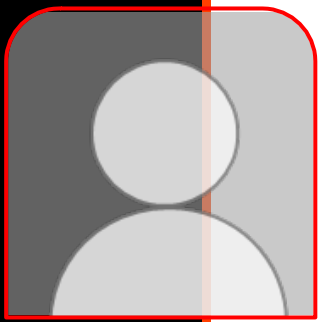
● Assemble

- Wipe any glue that squeezes out with a slightly-damp towel
 - Don't use a cloth that is too wet, it could wash out or dilute the glue



Insert the Top Bar

- ❑ Insert the top bars in all of the frames
 - *Set the top bars down into the glue.*

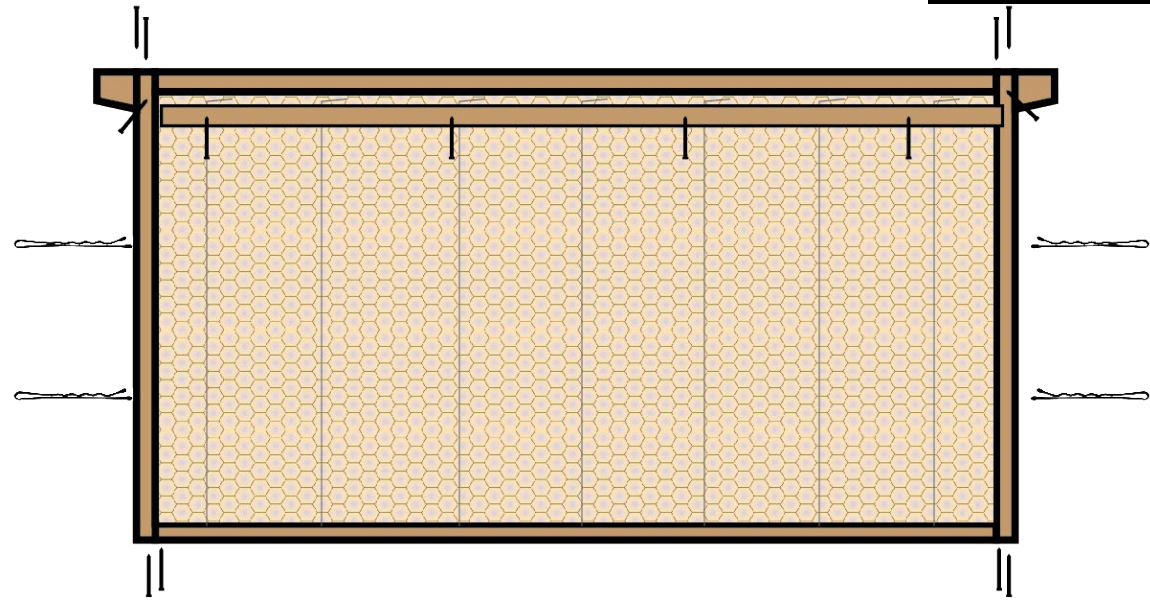


Nails

□ Nail Size and Formats

- *Nail Types*

- The size of the nail is dependent up on the design of the frame
 - The sizes shown here are considered conventional
 - Manufacturers can choose how 'beefy' their top bars are, how thick the side bars are, the design of the bottom bars; all of the dimensions will have influence what nail you will need
 - If in doubt, source the nails from the manufacturer where you buy your frames.



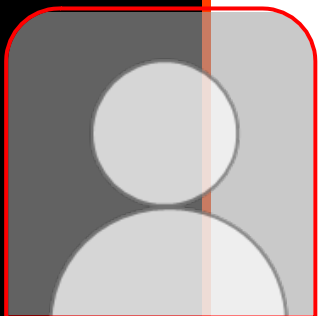
Each Frame (Wedge Style)

Top Bar (4) - 1 1/4" nails

Bottom Bar (4) - 3/4" nails

Side Nails (2) - 5/8" nails

Wedge Nails (3) – finishing nails



Nailing Technique & Hammering

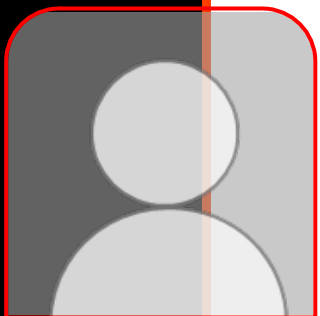
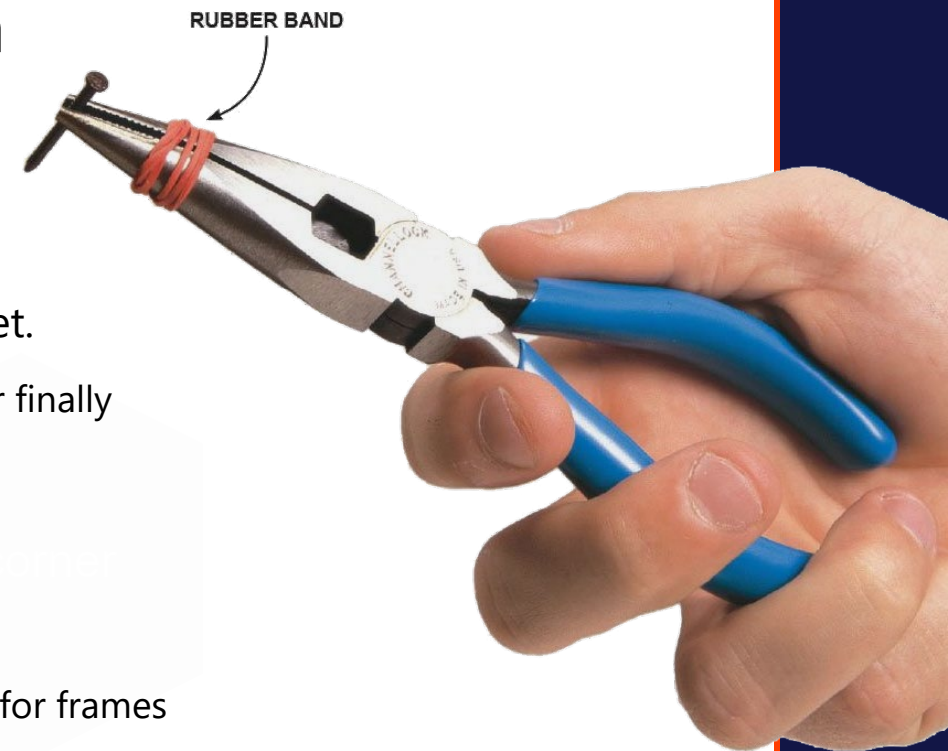
❑ Set the nail softly, then drive them in

● *A recommended way to nail*

- Tap the nail until it holds the piece in a few places
- Test for square and true; proceed to drive the nails until set.
 - ❑ Medium blows with the hammer to start, soft focused blows for finally setting the nail.

● *Hammer*

- **Light** sized hammers for frame building
 - ❑ Provide the right force, and dexterity, for the smaller nails used for frames
 - ❑ Rubber band on pliers can help hold the nail



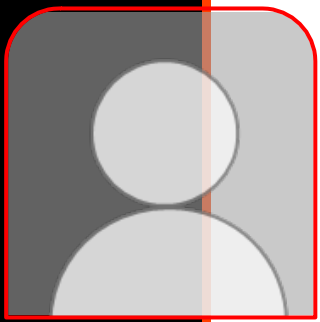
Insert Bottom Bar

- Two nails, each side
 - *Turn the Jig over*
 - **Glue the joint**
 - *Insert the bottom bar*
 - *Drive two nails on each side*
 - Through the bottom bar and up into the sidebars
 - Again, Take your time to get the nails straight



Nail the Side Nail

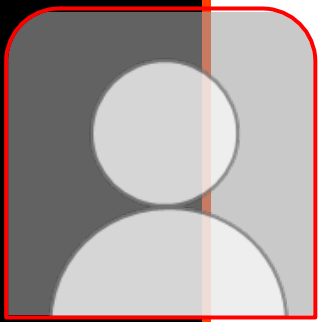
- Two nails, each side
 - *Nail the side nail through the ear of the sidebar and through the top bar.*
 - As noted earlier, you could alternatively nail this through the sidebar and into the top bar from each end



Pre-Built

❑ Consider Pre-Built

- *Once in your life it would be beneficial to build frames*
 - It helps you understand their qualities and design
- *You can buy pre-built frames from vendors*
 - It is a time-consuming task to build frames
 - ❑ Keep in mind – 10 frames for each box, usually 4 boxes for a single stack (2 deeps [20], and 2 mediums [20])
 - ❑ Save labor, but consider that there are shipping costs
 - ❑ Manufactures often assemble with staples – not a concern, but it is a difference.



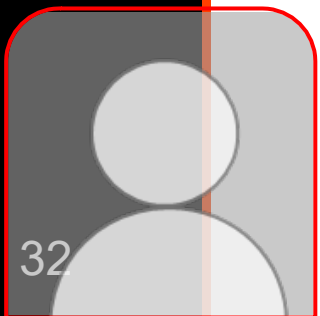
Mark your Frames

❑ Manufacturer and Year

- *Consider using a sharpie to mark your frame tops*
 - In this case BM was the Manufacturer (Brushy Mountain) and the 14 was the year (2014)
 - It is helpful to keep frames from a single manufacturer in a box (in case you did not follow the guidance to use only one manufacturer)
 - It also provides a reference from where to reorder your foundation in the future
 - ❑ It is recommended that you switch out your wax every once in a while for healthier colonies. For this you install replacement foundation



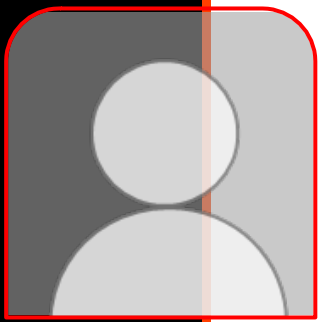
Tip: When you build your frames, put the manufacturer *and* year on them.



Drone Brood Frames

□ Integrated Pest Management

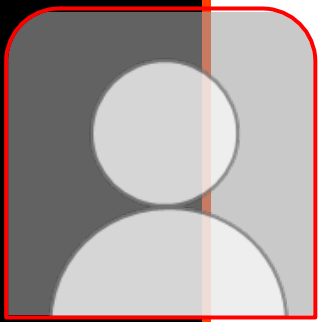
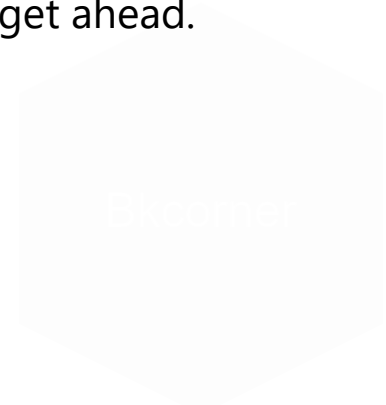
- *Drone brood frames are part of an integrated pest management program*
 - The frames are typically a single piece, and are often green in color
 - You use two per hive – swapping one out when the other is capped
 - The cell sizes are bigger, drone size, which results in bees building solid drone comb on these
 - When cells are capped, you pull the frame and cull the bees. This discards the drones as well as the mites inside the cells
 - Mites prefer drones – and this is a proven way to lower the mite counts in your hive.



Bettercomb

❑ Fully Drawn Wax Foundation

- *These frames come from the factory with perfectly drawn honeycomb.*
 - The wax is not from bees, but from a proprietary manufacturing process.
 - The purpose here is for use in emergency, or to get ahead.



Bettercomb

❑ Fully Drawn Wax Foundation

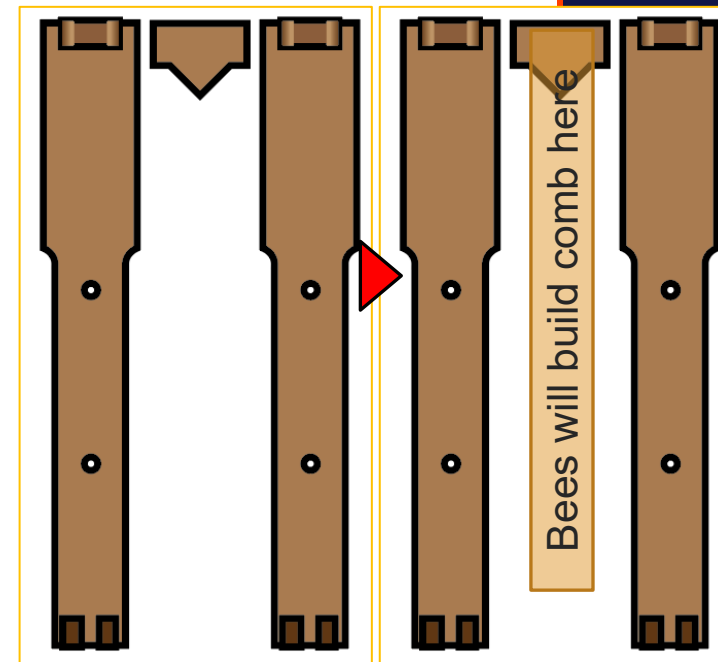
- *Mixed Reviews and some controversy*
 - It has been said that the bees take to it well
 - We have seen that in some instances, the wax does not hold up, and sags under weight and in the heat of the interior of the hive. They are working on tweaking the formulations to resolve this.
 - Some do not like that this wax is in with honey and food products
 - ❑ Bees recycle wax in the hive for whatever use they have, They may take some from one area and move it to another for whatever needs they have.
 - ❑ Consider that they can take this wax from say a brood frame, and use it to cap the honey in the honey box above.
 - ❑ This also has an implication for harvesting wax for *pure* wax candles.



Foundationless Frames

□ Popularized by Kelley Beekeeping

- *These frames provide a guide for bees*
 - They use the guide to affix the comb with no foundation
 - The benefit is pure comb, 100% built by bees. No recycled wax, sourced by manufacturers, that could have contaminants in it given it is used.
- *In use – provide drawn comb as a guide*
 - A foundationless frame is nestled between two drawn frames
 - This prevents the bees from building errant comb.
- *Other Choices Exist – Frames with guides and starter strips*



Closing Comments

■ Customary Close

- Where we stand, where we are going...
 - *This lesson closes out instructions for building frames*
 - *Our next topic moves to instructions, tips, and tricks for constructing hive woodenware.*
 - Guidance for **Hive Fabrication**
 - **Painting Hives**, Tips and Tricks
 - **Sourcing and Selecting Bees**
 - Being informed **about Packages and Nucs**



Q&A

- **What Questions did we not anticipate?**
 - If you have feedback, you can leave a constructive comment; but be nice.
 - You could also send an email to comments@managedmentoring.com
 - *Please refer to this video in the subject so we know what the reference is.*

