



The Frame Game

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Kevin Inglin

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Mind the Gap

The key to this presentation is avoiding problems

- *You do not want problems with live bees in the box, but....*
 - It will be after you have bees in the box when you will discover the challenges and live the FRAME GAME.

In this session we will....

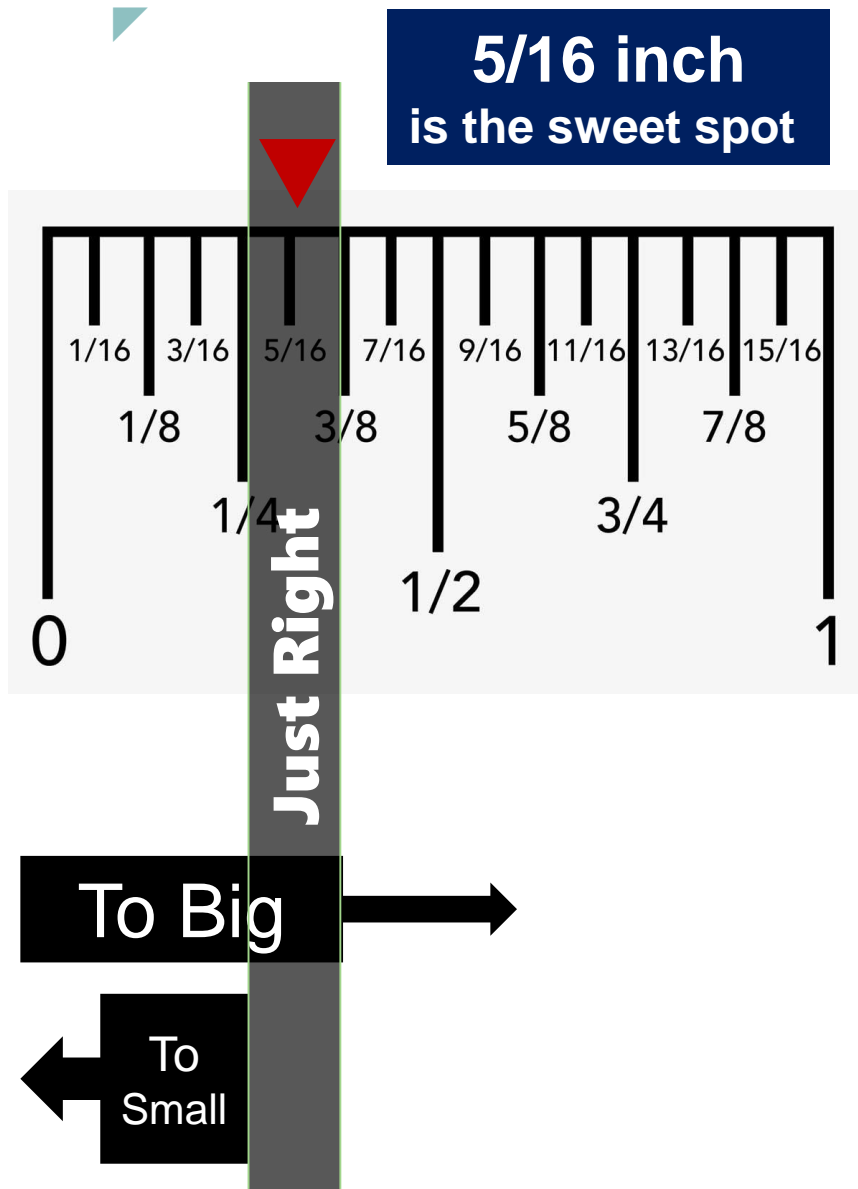
- *Focus on box construction and frames, and how they can trip you up.*
- *Will also talk about marketplace offerings*
- *And add a pinch of management practices*
- *And venture into some unconventional ideas*

✓ The concept of “Bee Space”

- ❑ It is the space maintained in a natural nest to enable bees to pass freely around their nest.
- ❑ Rev. Lorenzo Langstroth is credited with being the first person to have found a use for the bee space.
 - *It enabled us to have what we call "moveable comb" frames in a hive – another thing credited to Lorenzo.*



The principle of Bee Space – 5/16th



- ❑ Bees build excess comb in a space larger than $3/8$ inch.
- ❑ Bees will fill any space less than $1/4$ inch with propolis.
- ❑ Therefore, a space between $1/4$ inch and $3/8$ inch is in the range of acceptable bee space.

5/16th is awesome

Standard Boxes are “Standard”

For the most part this is true.

- ❑ Most major manufactures are true to the ‘standard’
- ❑ However, sometimes (*eBay...cough cough*) you can buy less expensive equipment that not true to typical standard sizing
- ❑ What does exactly does ‘standard’ mean?

Let’s take a look

By the way...
It is 100% Natural
So it has to be good



Image credit: eBay

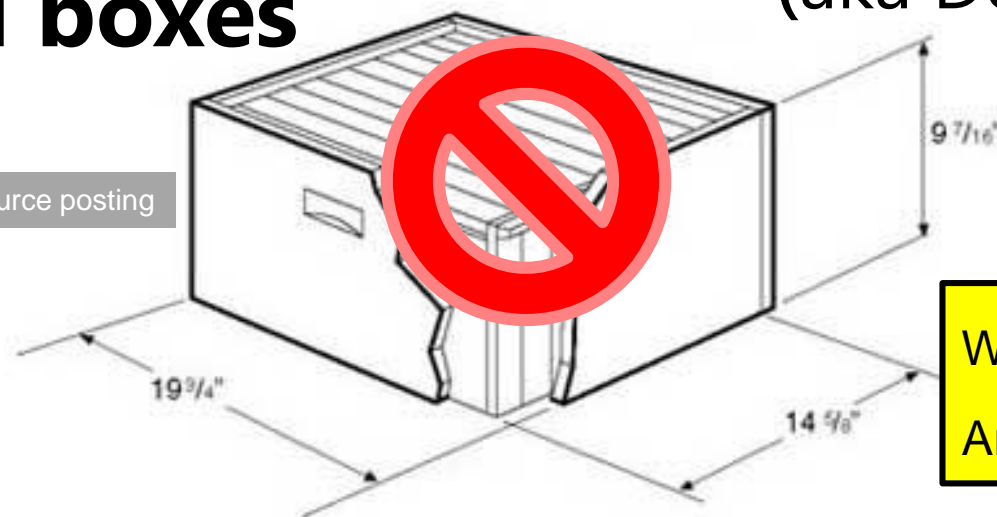
Um...Your knots
are showing



Let's just consider a Hive Body (aka Deep Brood Box)

Standard boxes

Image credit: bee source posting



Full Depth Hive Body

2 pieces $19 \frac{3}{4}'' \times \frac{3}{4}'' \times 9 \frac{7}{16}''$ (sides)

2 pieces $14 \frac{5}{8}'' \times \frac{3}{4}'' \times 9 \frac{7}{16}''$ (ends)

Wait  this says **9 7/16ths!**
And this one  says **9 5/8ths!**

- ❑ They are the "same" universally
- ❑ Big manufacturers have right*
- ❑ Hive body sizes, as far as dimensions are concerned, are standardized

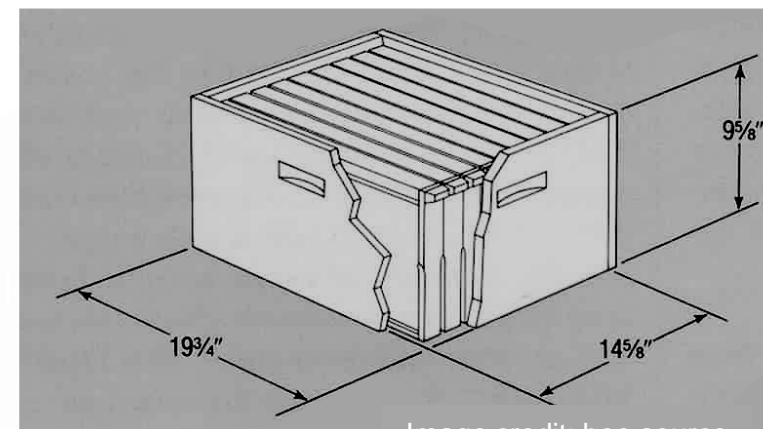


Image credit: bee source
original: penn state guide

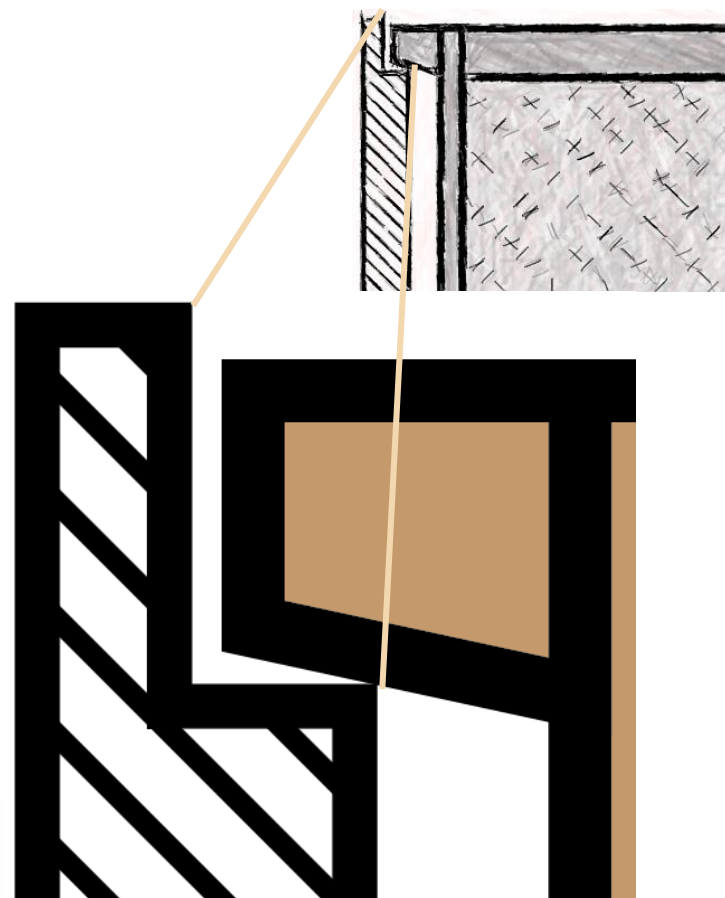
***9(5/8)** high, **14(5/8)** wide, **19(3/4)** deep

Frames Rest in a Rabbet Joint

❑ Rabbet Joint:

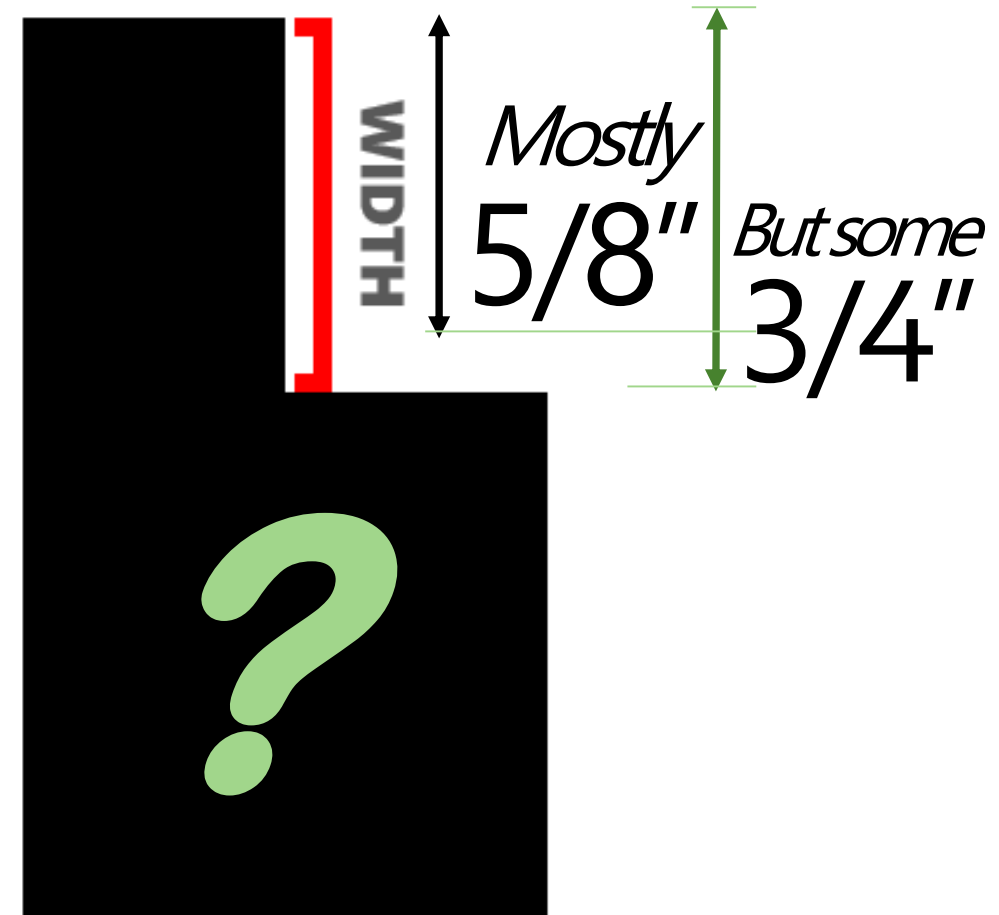
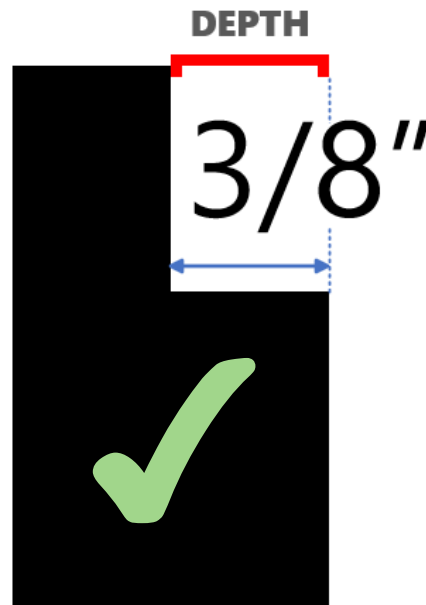
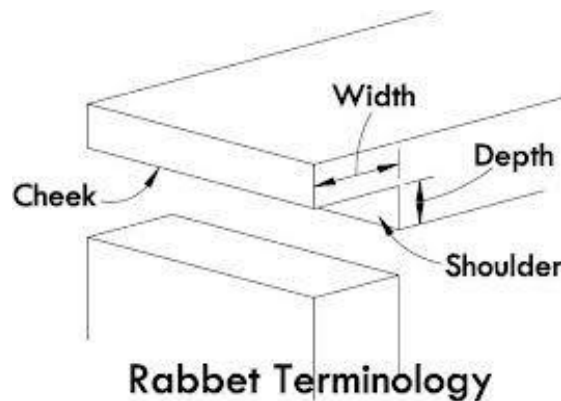
- *Definition*

- **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.



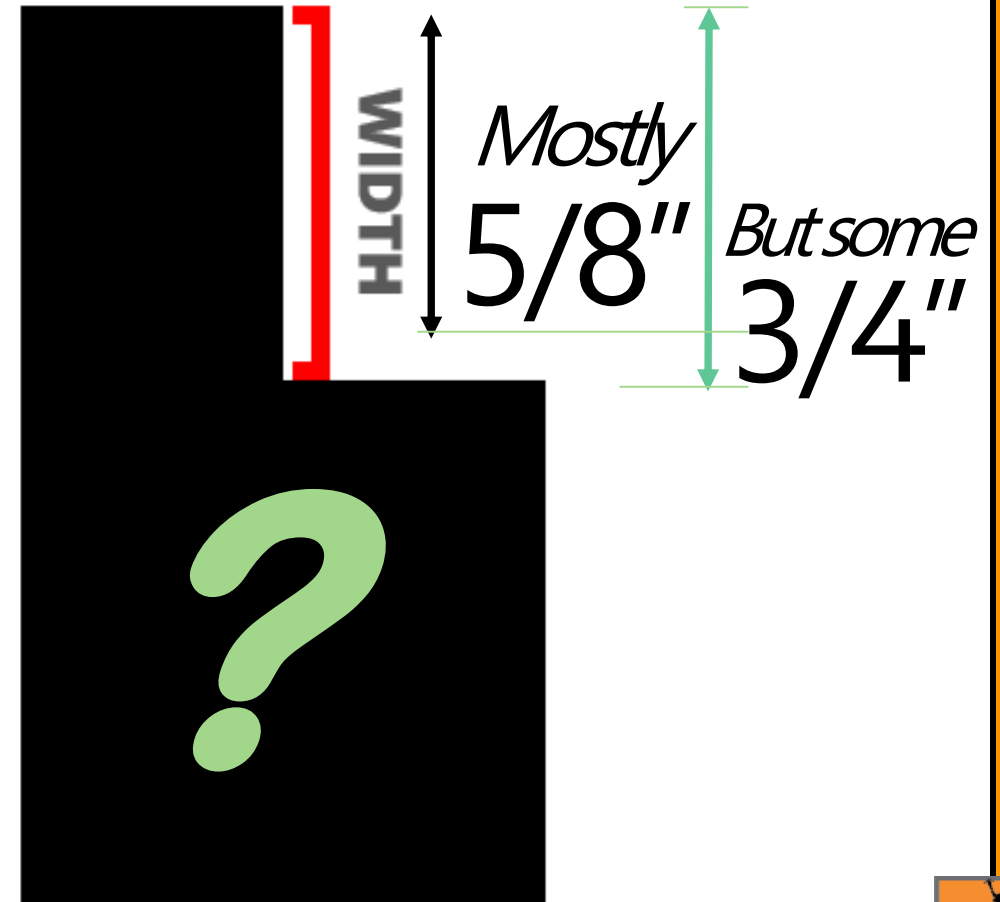
Rabbits are where it can go wrong...

- You would hope frame rests would be universal
...but alas they are not



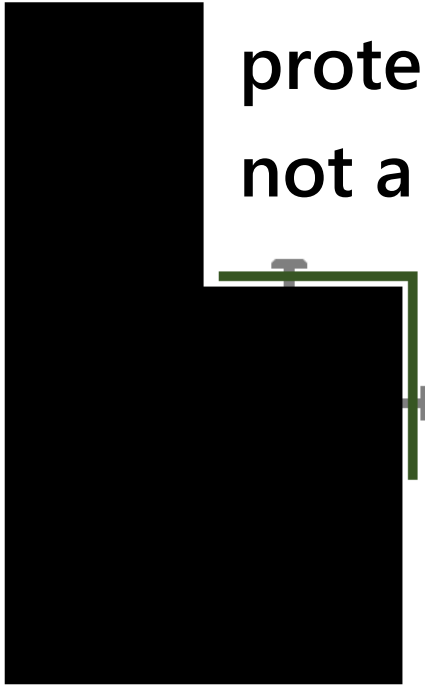
Rabbets are where it can go wrong...

- ❑ Frame and Frame Rest Designs
 - *They are at the discretion of the **manufacturer** and you have to be aware of the implications*
- ❑ The depth of the frame rest impacts bee space.
 - *And subsequently **the gap above and below***

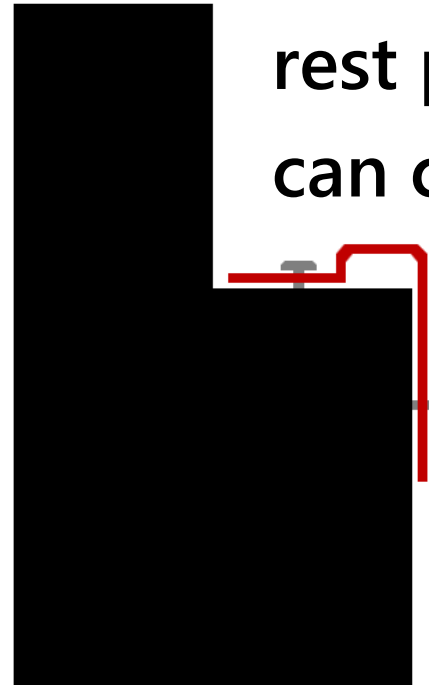


Real Quick: An additional complication to consider

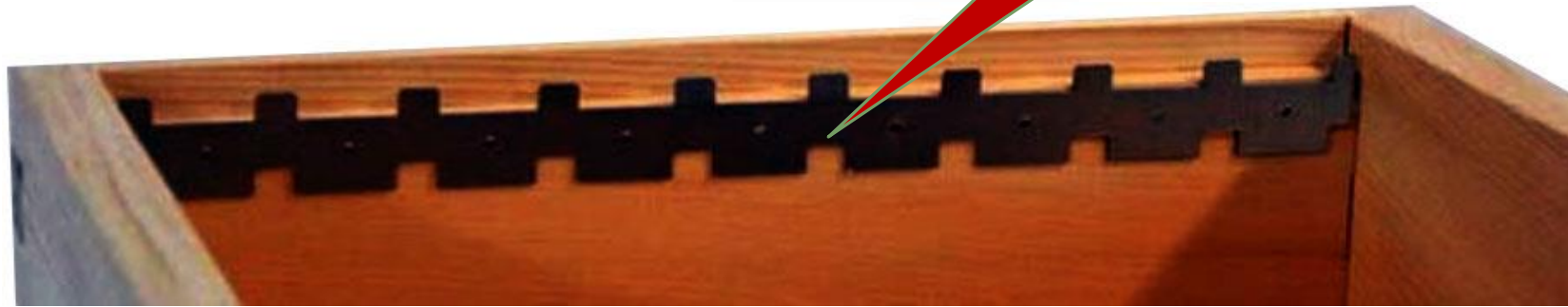
Standard 90°
protectors are
not a problem



Other frame
rest protectors
can cause difficulties



What about
these...
Problems?



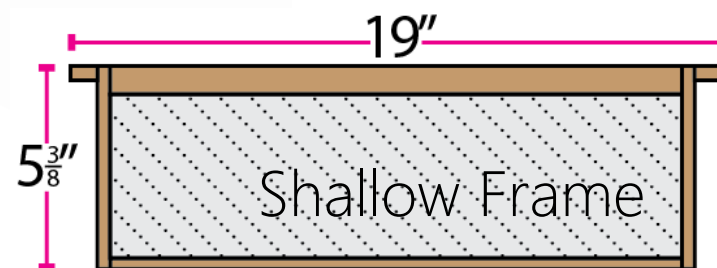
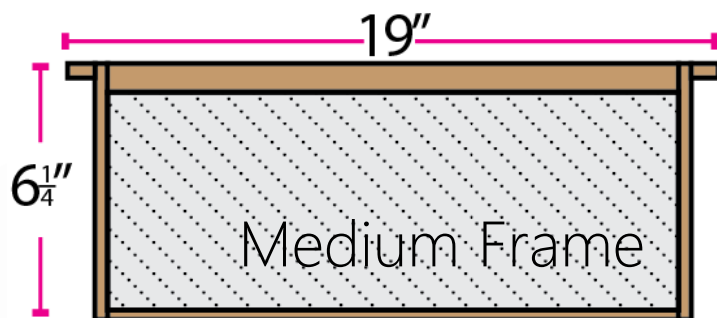
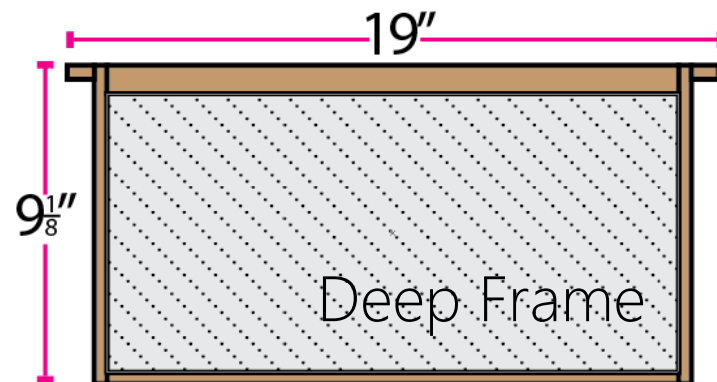
Frame Dimensions are “Standard”

Langstroth Hive Dimensions

- ❑ Deep $19'' \times 9\frac{1}{8}''$
- ❑ Medium $19'' \times 6\frac{1}{4}''$
- ❑ Shallow $19'' \times 5\frac{3}{8}''$

However- Things differ by
Manufacturer – mostly in
construction...

and sometimes in dimension



Just how “Deep” are they?

DEEP END
BARS ARE...

9 1/8"

□ End Bars vary by manufacturer

- *Take your mix and match frames and put them in a box.*
- *Turn them over and look at how they end bars end up. It is a recipe for bee space problems. Some can vary from **1/4** to **3/8ths**.*

By the way, these are not staged. I simply took 9 random frames that I had been cleaning and hung them between two rails.

It is what I had laying around.



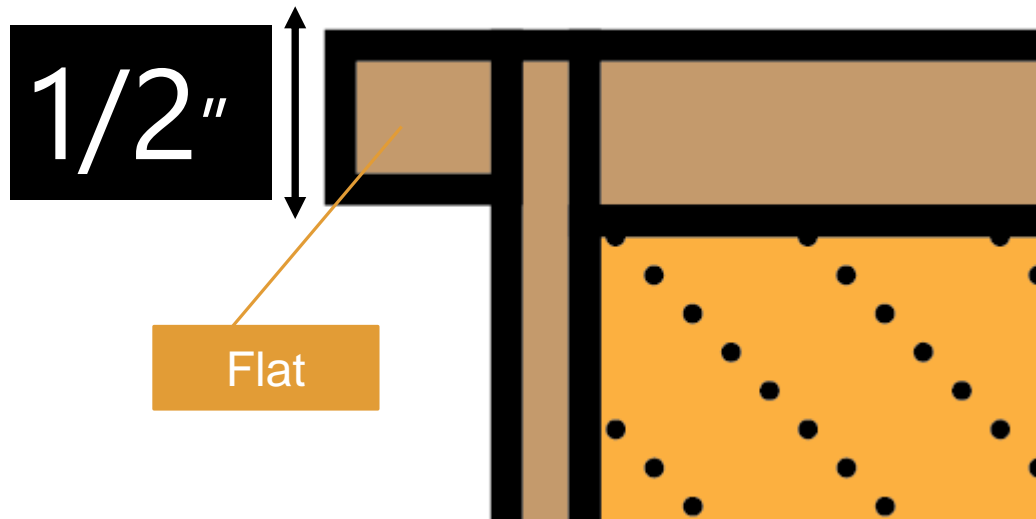
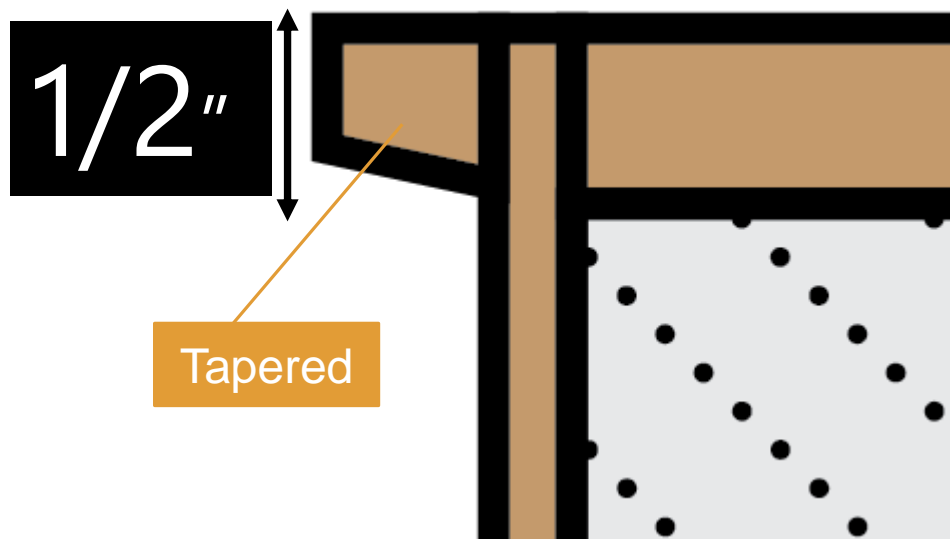
Ear Size & Shape Differs

- Standard 1/2 Inch

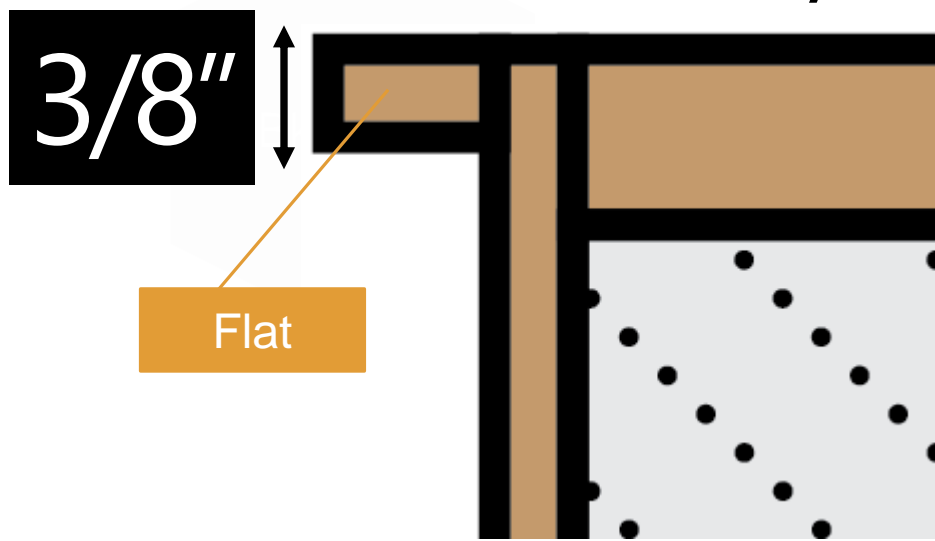
- Sometimes tapered...

Sometimes not...

Tapered rests differently

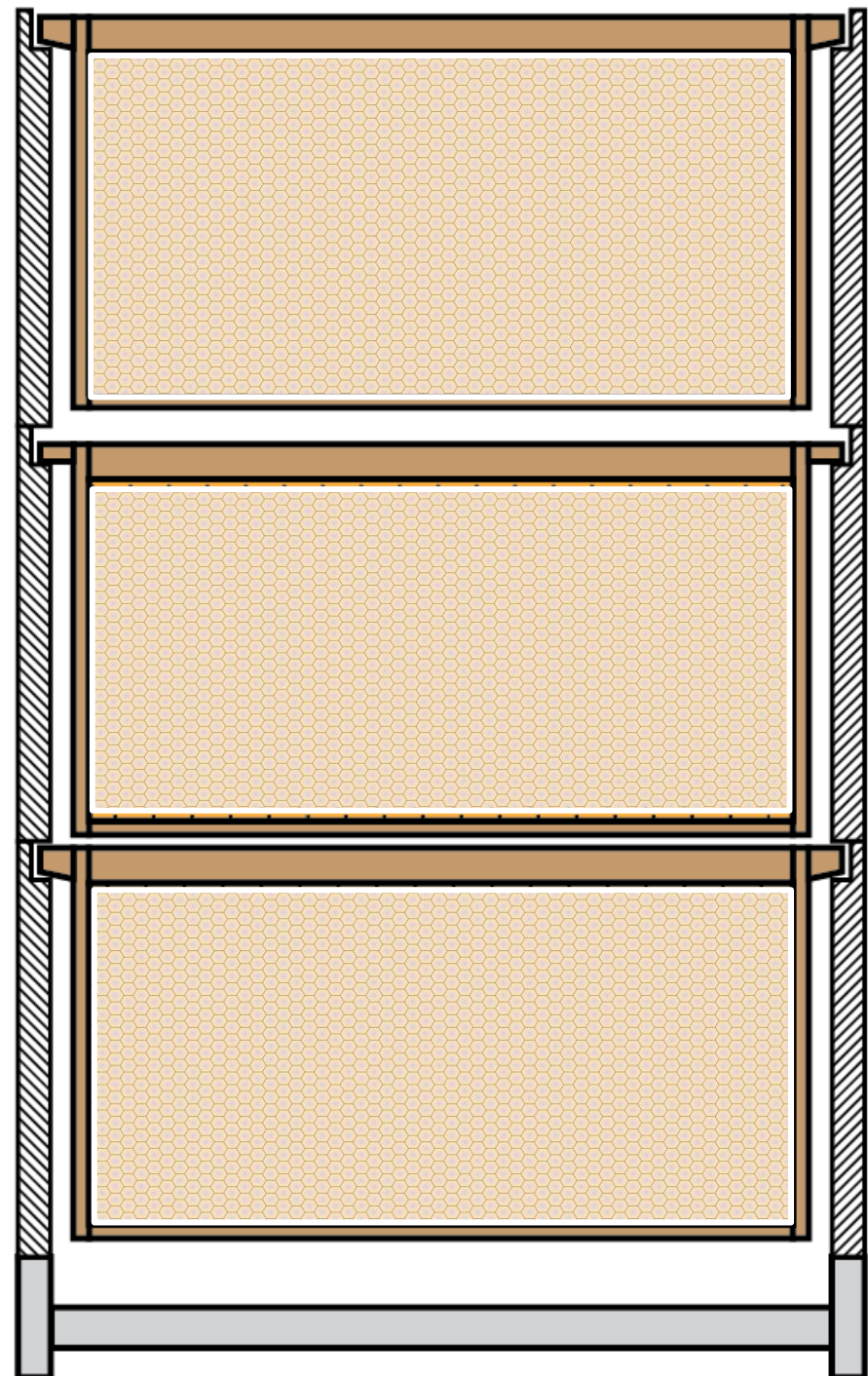


- "Standard?" 3/8ths



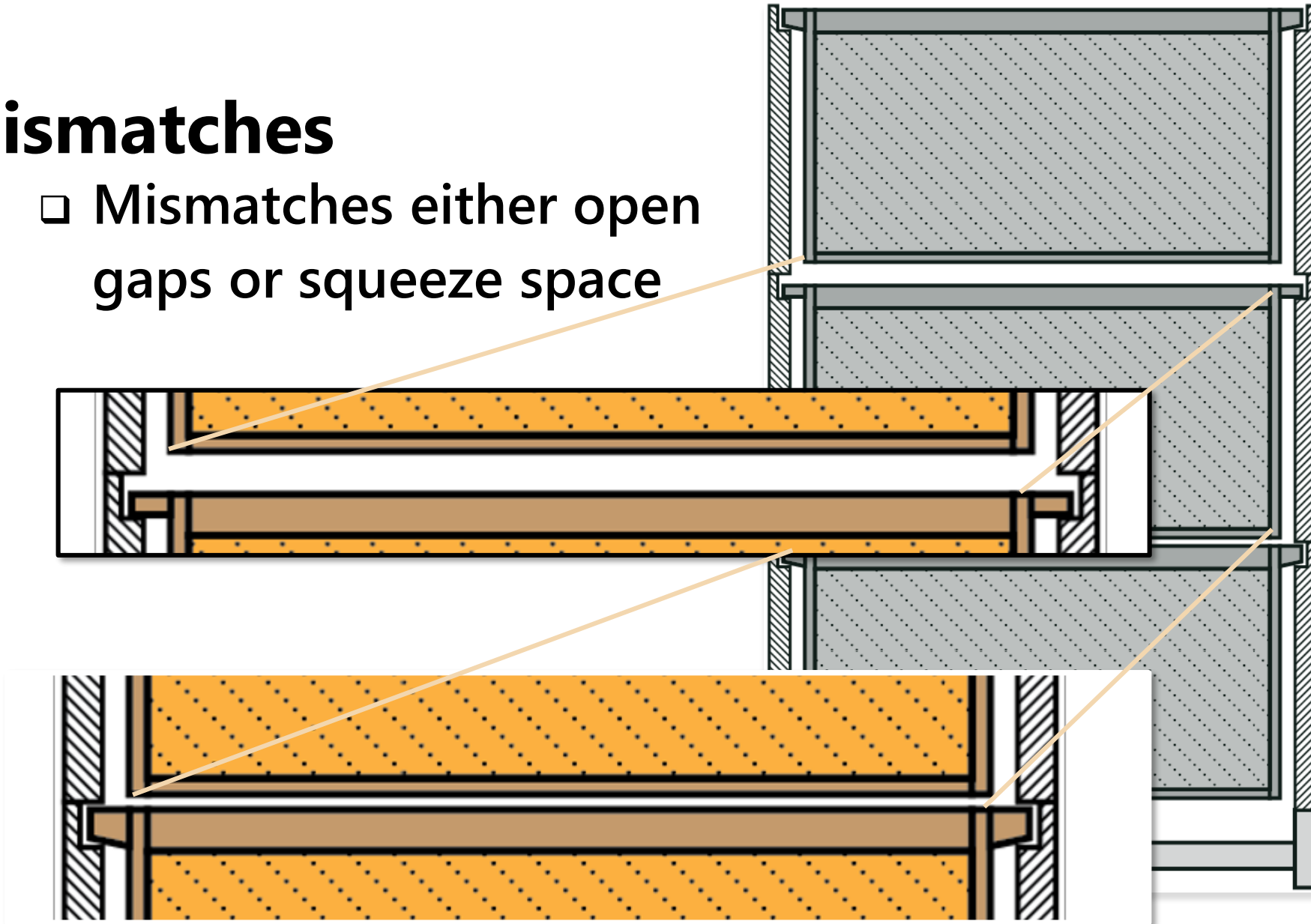
Mismatches

- ❑ Mismatches causing alignment problems
 - Intermixing **1/2 inch tabs** with **3/8 inch tabs** cause gap differences.
 - Mix and matched **frame rests** also impact how the frame hangs in the box

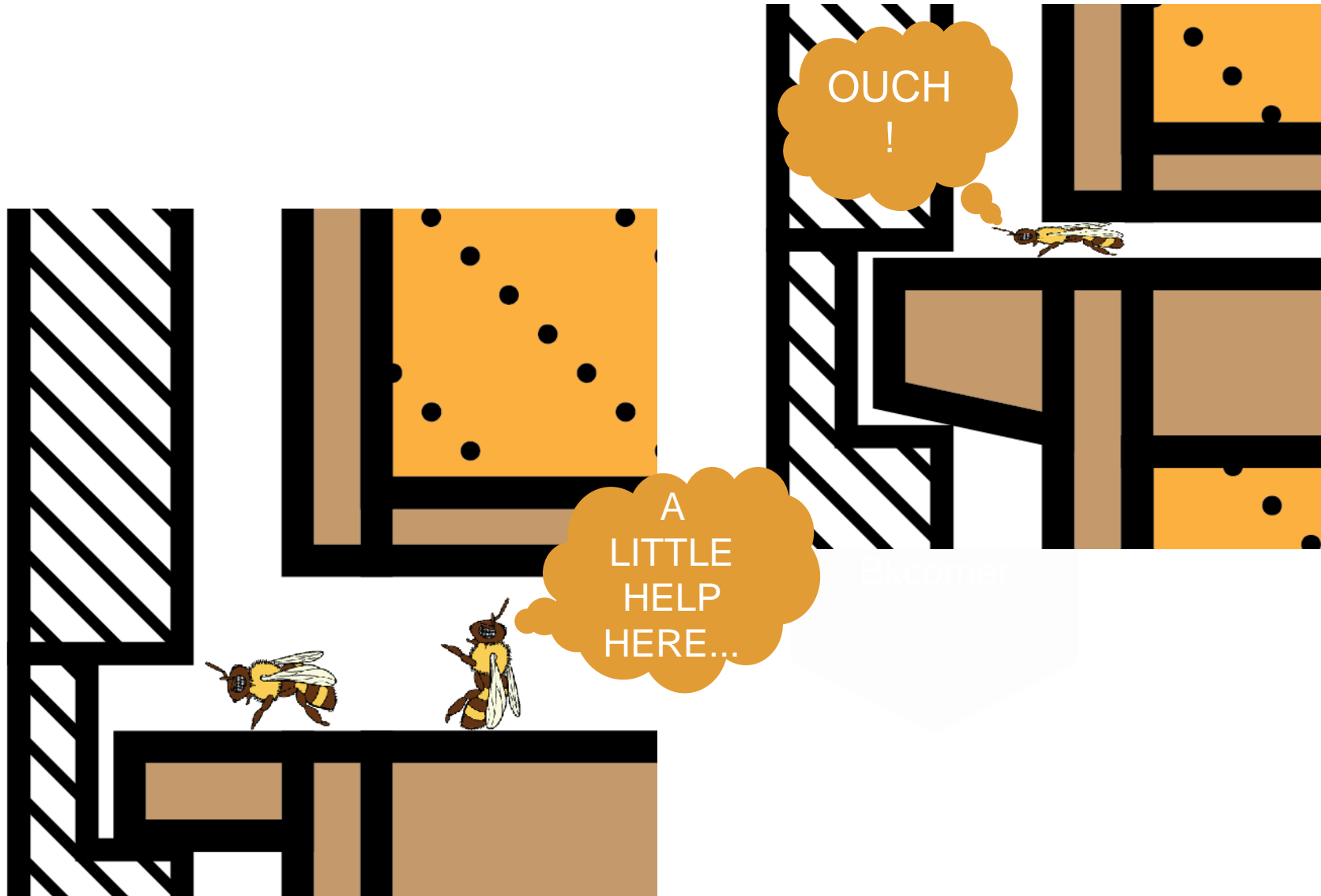


Mismatches

- ❑ Mismatches either open gaps or squeeze space



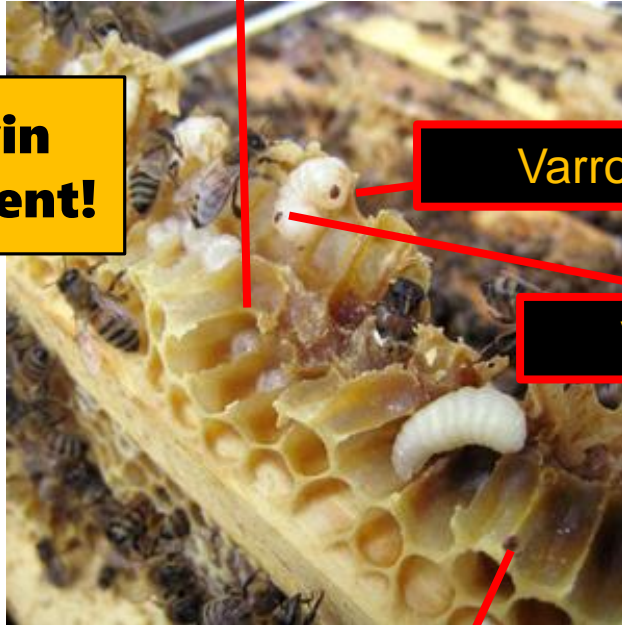
Bee Space Matters



Real Gap Problems

Bridge Comb Under Frames

**Kevin
Moment!**



Varroa!

Varroa!

Varroa!

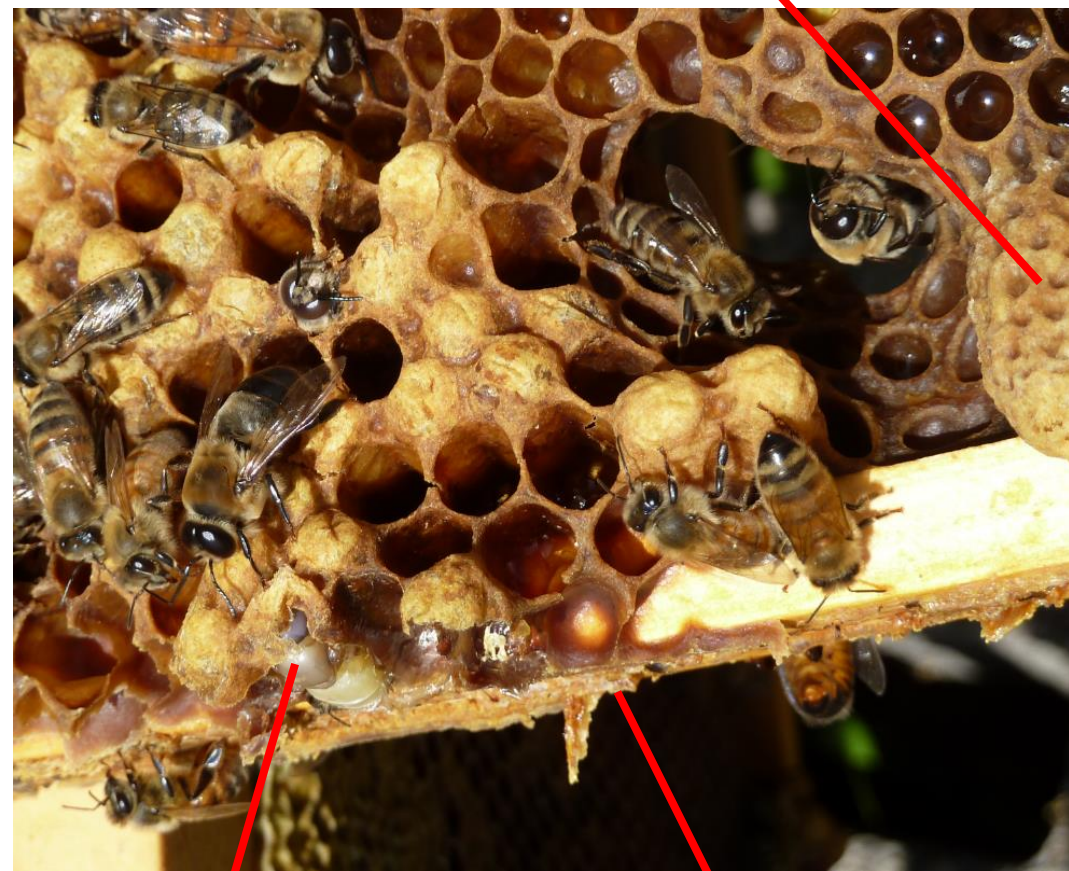
BKcorner

Real Gap Problems

Bridge Comb Under Frames



Queens in Danger

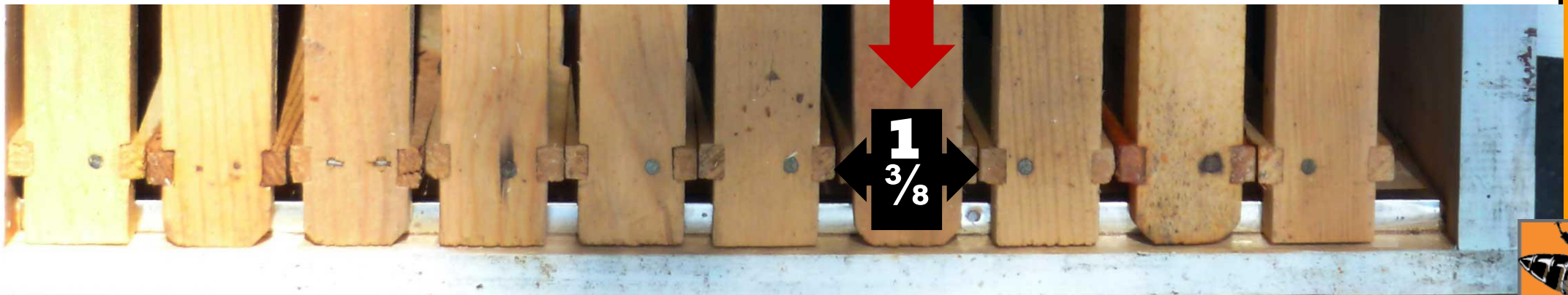


Damaged Bees

Propolis Issues

Frame Width, Is that a problem?

- ❑ What about side to side – shoulders across?
- ❑ Here it seems things are truly universal.
 - *No discrepancies found– every frame end bar is $1\frac{3}{8}$ ".*



Construction / Purchase Advice

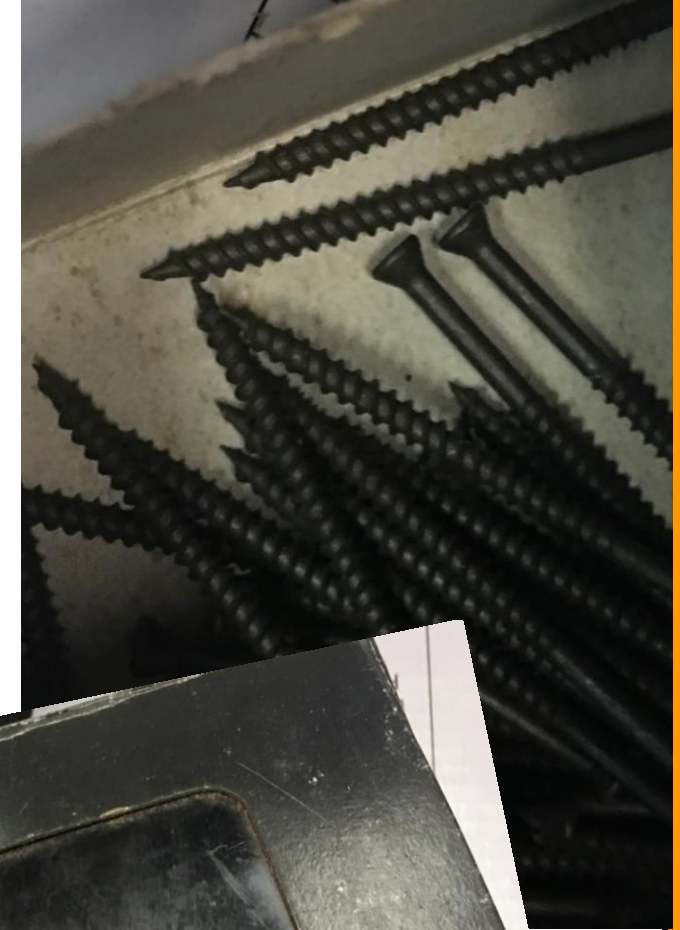
Build Boxes True

- ❑ Boxes that are not square and are not true (Flat) will cause space problems
 - *Twists cause distortion gaps*
- ❑ Non Square, oblong boxes can cause frame misalignments



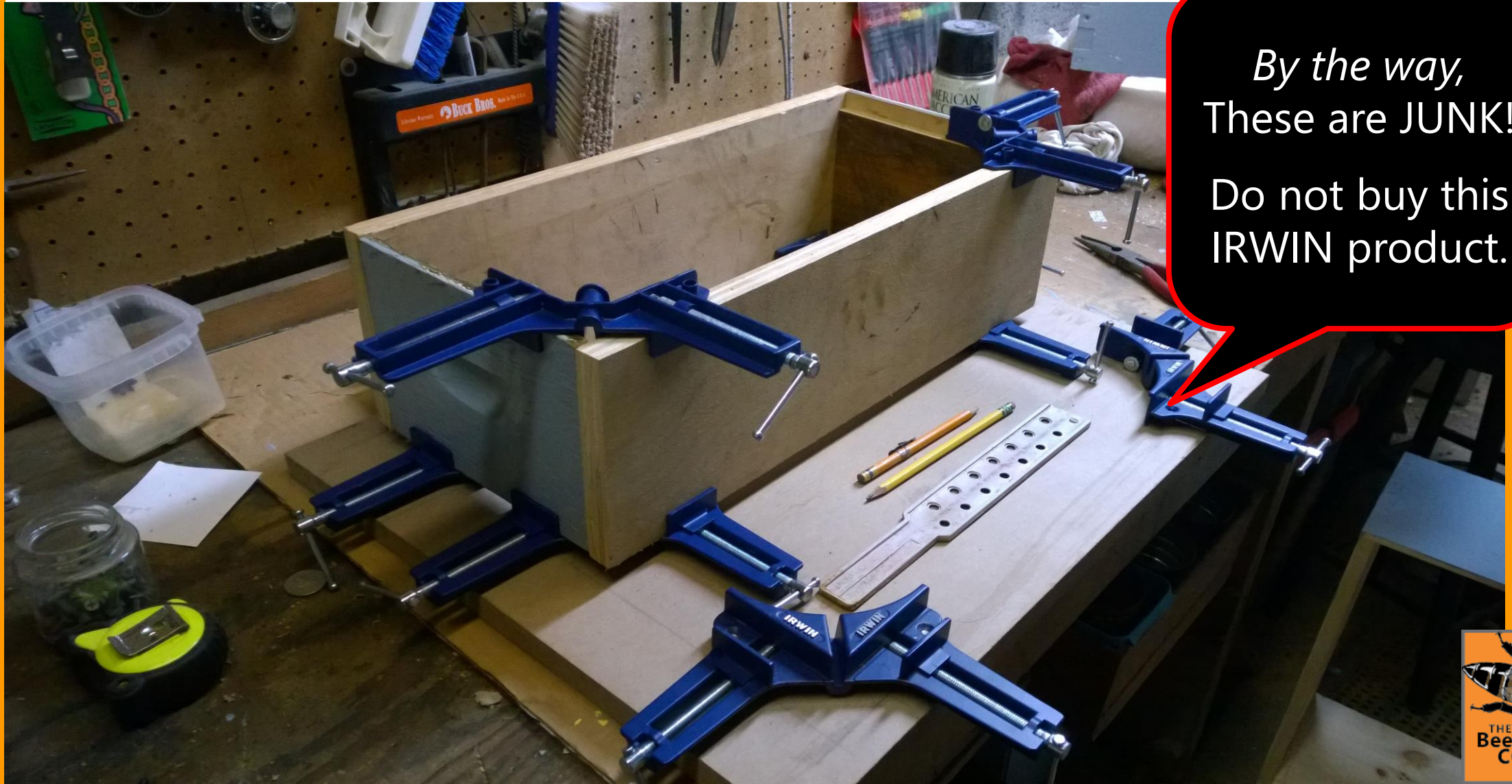
Have you ever considered... *Trim head screws*?

- ❑ What if you used screws instead of nails?
 - *Would you need to glue the box?*
 - *If something went wrong, could you back it out and fix it?*
 - *Yes, yes you can. How do I know. This is what I do...*
 - *Incidentally, they do not rust... in case that was a question*



Consider a JIG or CORNER CLAMPS

*By the way,
These are JUNK!
Do not buy this
IRWIN product.*



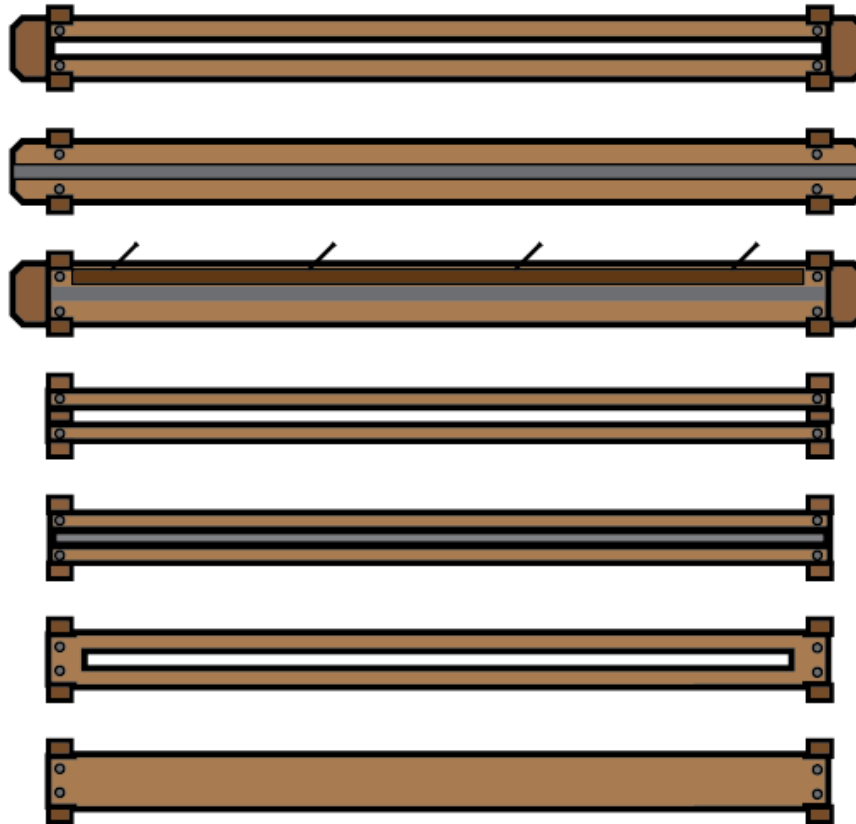
Another idea to square things



The Frame Game: Variations Abound

Top Bars

Bottom Bars



Slot

Groove

Wedge

Slot

Groove

Slot 2

Solid

Settle on a type

❑ Frame offerings vary

- *Settle on a type of Frame Design and stick with it.*
*and **buy foundation from that Frame Supplier***

❑ Wedge Frames are the standard

- *Combined with crimp wire foundation*

Get the Right Foundation: Frames and their foundation

Deep Size Examples (Kelley)

- ❑ 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!



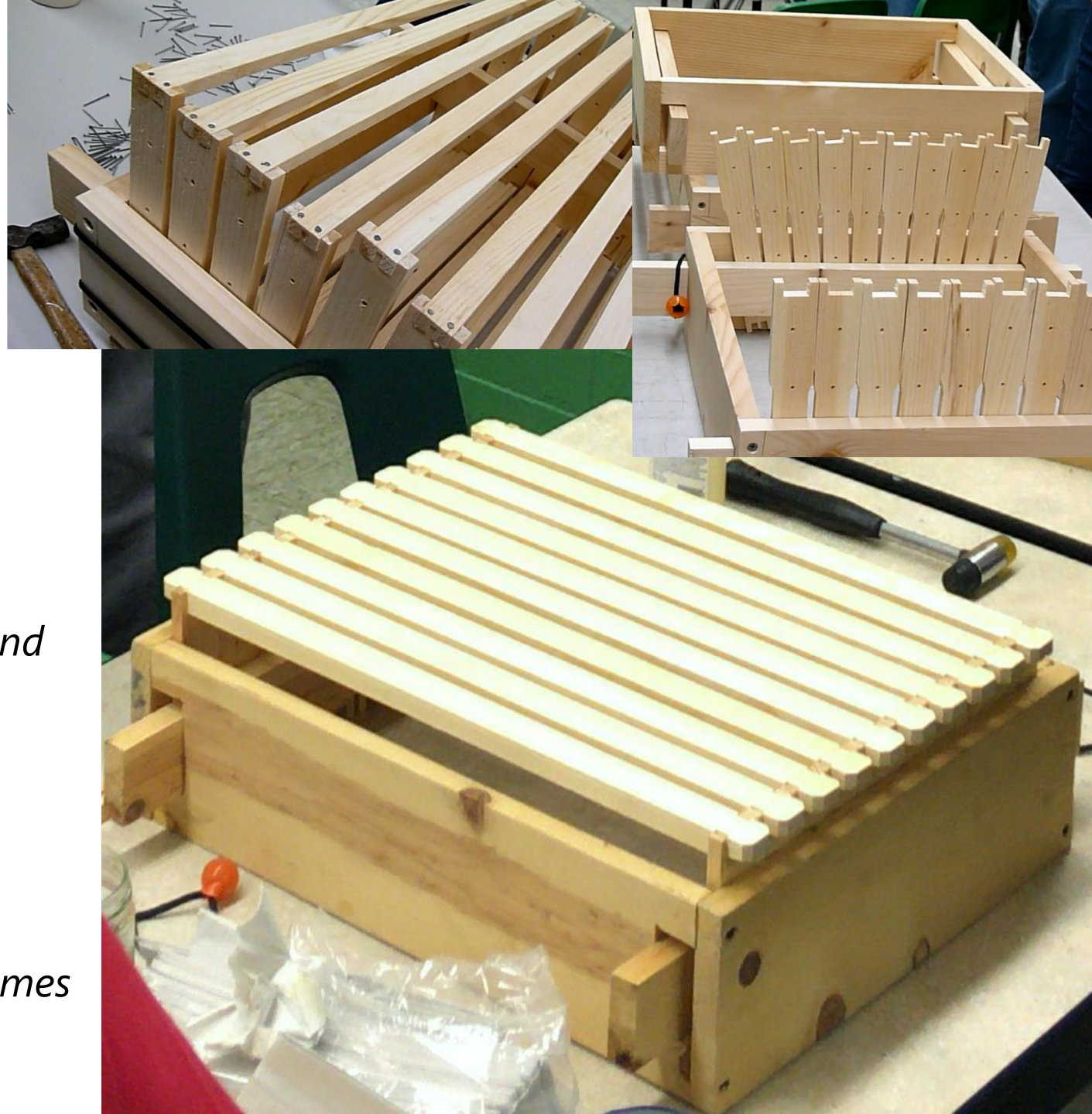
Foundation Varies!

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

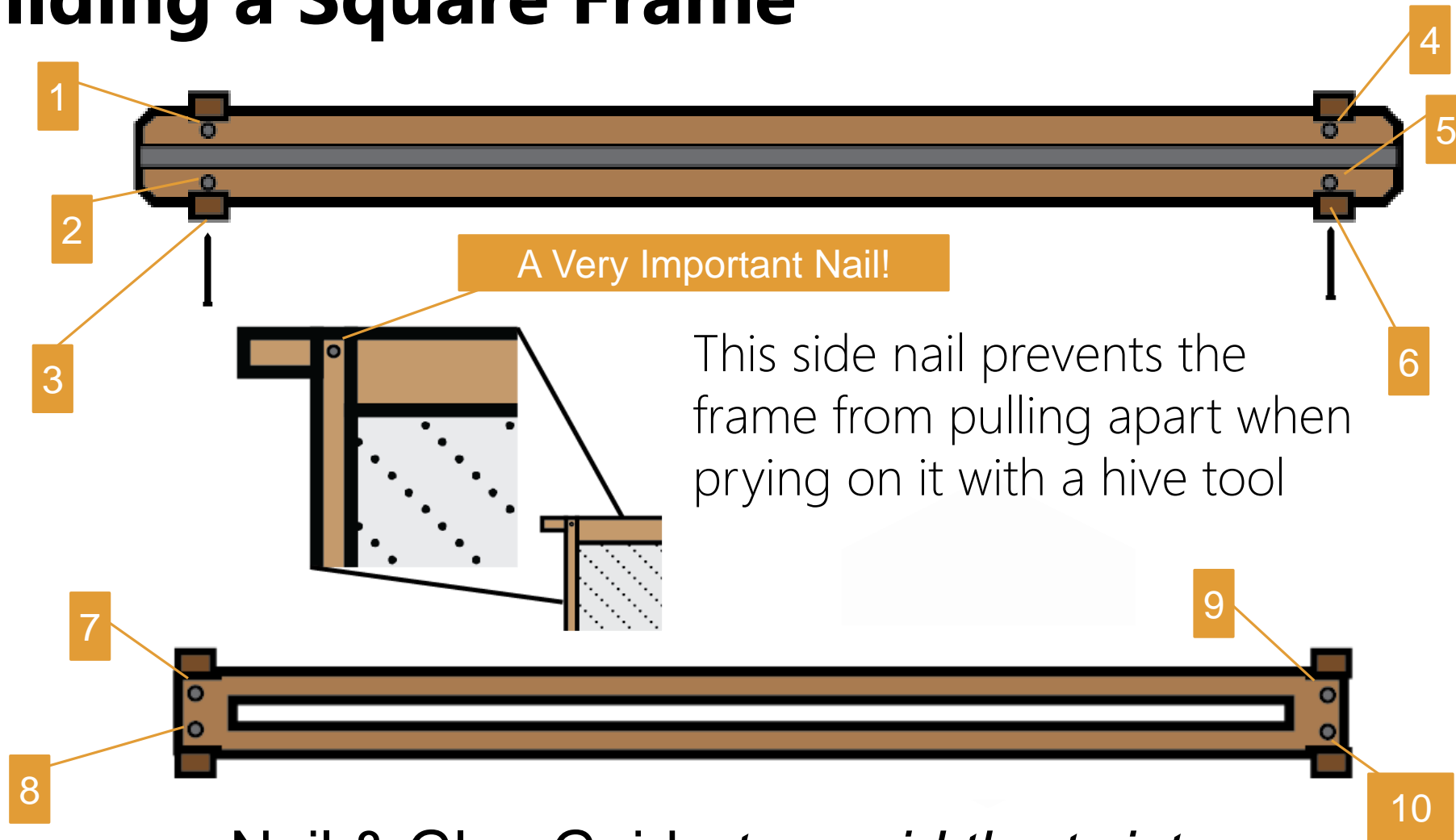
This is extreme for illustrative purposes, but I have seen this in other peoples hives.

Build Frames True

- ❑ Frames out of square can also cause space problems
 - *Twists cause distortion gaps and raised bottom bars*
- ❑ Consider a Frame Jig and/or a mini square
 - *Might also consider wiring frames so they hold their shape.*



Building a Square Frame

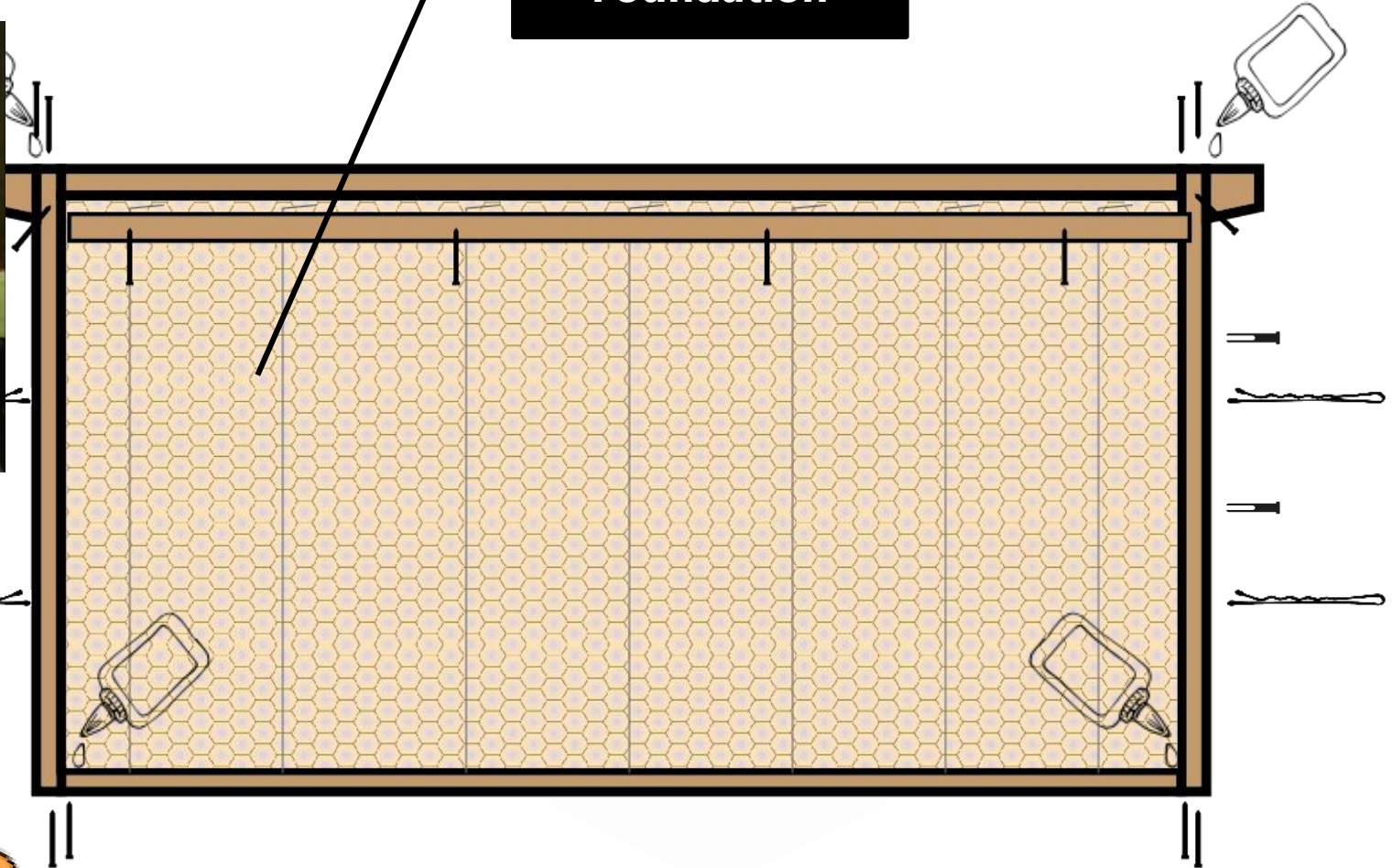


Nail & Glue Guide *to avoid the twist*

■ Nail & Glue Guide



This is
Crimp Wire
Foundation



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



Avoid Grooves

Grooves in frames, top or bottom, are not your friend. They encourage excess comb and propolis in the wrong places. *Troubles from above, troubles from below....*



Bad, *evil* things
happen w/
slotted frames

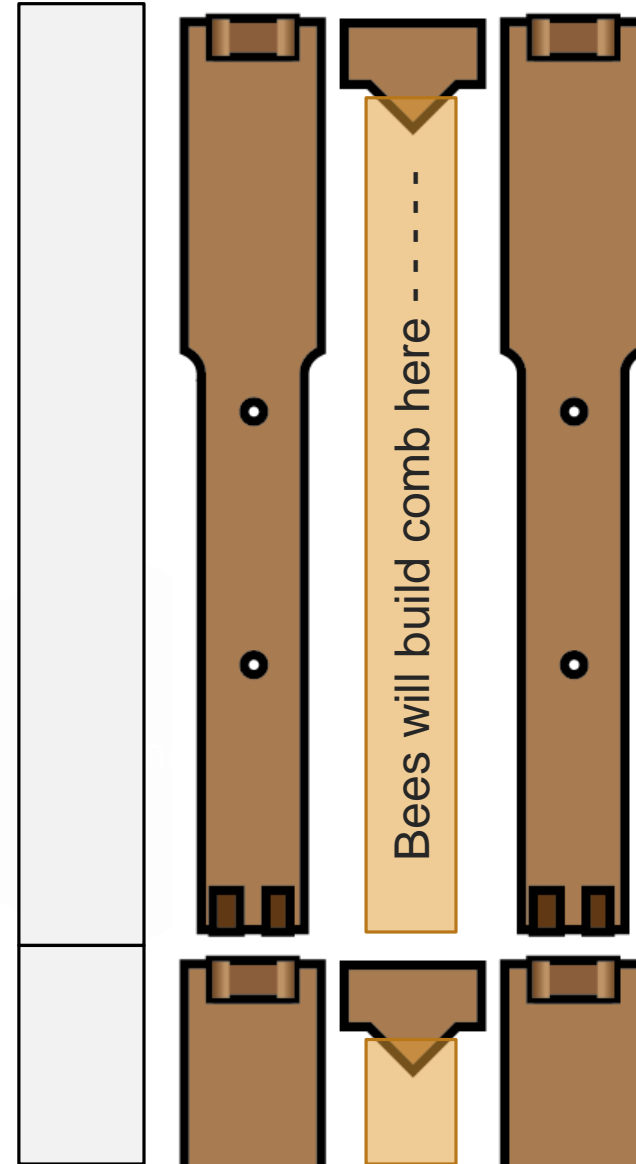
Tops and Shoulders

- ❑ No, I am not talking about the latest fashions...
- *Keep the tops of your frames clean*
- *Keep the shoulders of your frames clean*



What about Foundationless?

- ❑ Place a top bar with a comb guide to coax the bees to build their own comb – *no foundation*.
 - Place it between two drawn out frames for best results.
 - Could use popsicle stick in a slotted top bar too!



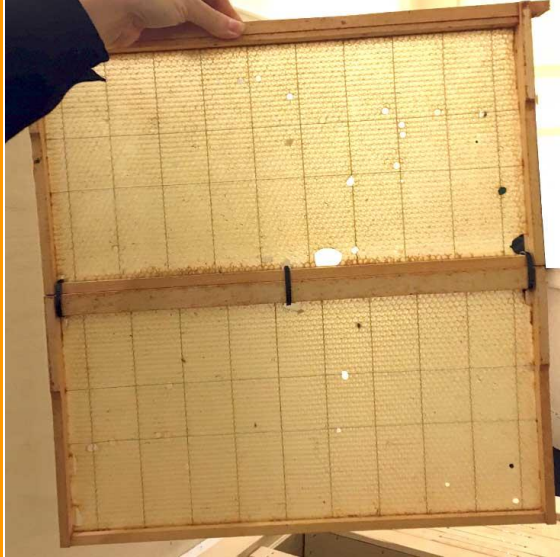
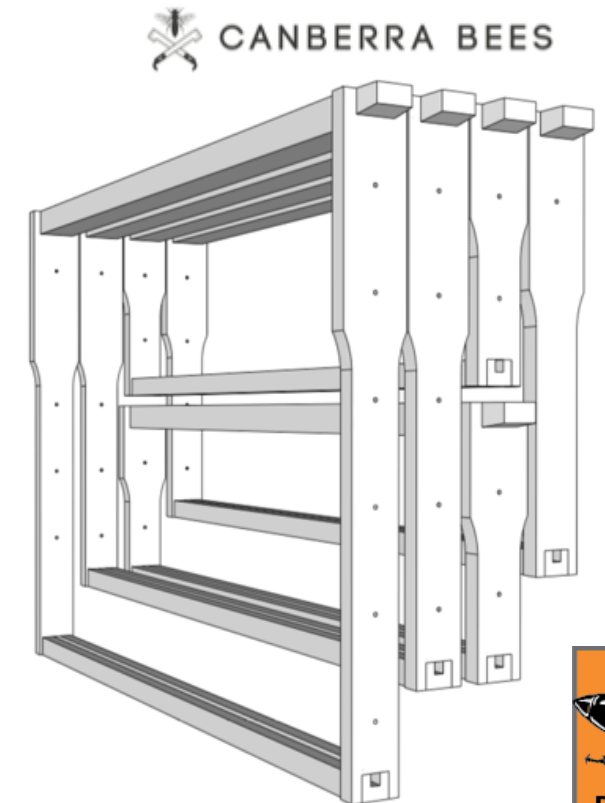


PHOTO & HIVE: BOB KLOSS



▶ A Different kind of Frame Game

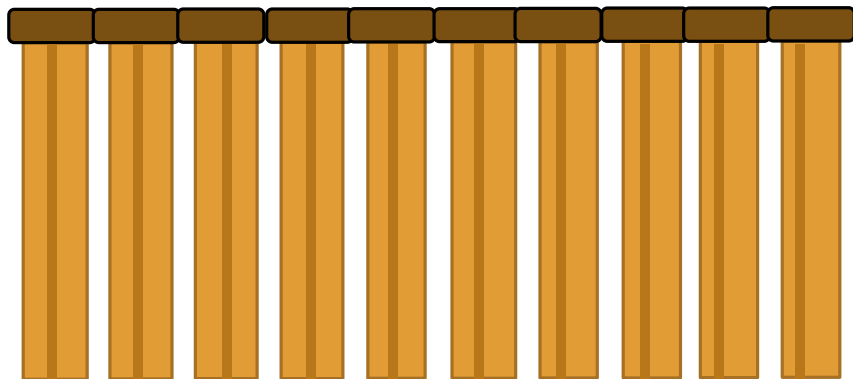
- ❑ Sometimes the idea is to break the rules.
 - *Some beekeepers are considering building frames that span boxes. Custom sidebars that cross two boxes.*
 - *Recreating the Modified Dadant / Dadant-Blatt brood frame* <http://www.canberrabees.com>
 - Eric from Canberra Bees is cutting end bars with lasers and experimenting with these frame ideas.
Visit his forum for more info.



Wyatt Mangum's Work

Migration of the mid-rib

- Wyatt's recent *Bee Culture* article discussed the dynamic of the progression of the mid-rib
- The farther they build down the line, the more the mid-rib pushes off center.



For the Top bar beekeepers



Thickness of frames wax determines how deep the bees build the cells on a comb face

Wyatt's fix > Rotate frames that require comb up into the middle of the brood chamber for more a more consistent mid-rib build out.

What is wrong with this picture?

Comments about the beekeeper do not count!

Welcome to adventures in beekeeping



Put offenders at the bottom

- ❑ If you have non standard boxes...
 - *One thing you can do is place non-standard boxes at the bottom, over the bottom board.*
 - *The gap over the bottom board is forgiving and it allows you to use an errant box or set of frames.*



Final Tips and Advice

What did I learn today?

- ❑ Keep frames clean and tidy
- ❑ Stay with one equipment manufacturer – frames and boxes
 - *If you are not that good with wood.... Let them build it for you?*
- ❑ Build your equipment with jigs and use woodworking squares and/or clamping systems
 - *Mark your frames with manufacturer info and year*
 - *Use the right frame rests*
- ❑ Donate mismatches to a good cause



Comments and Questions?

Kevin Inglin
kevin@bkcorner.org



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