



The Frame Game

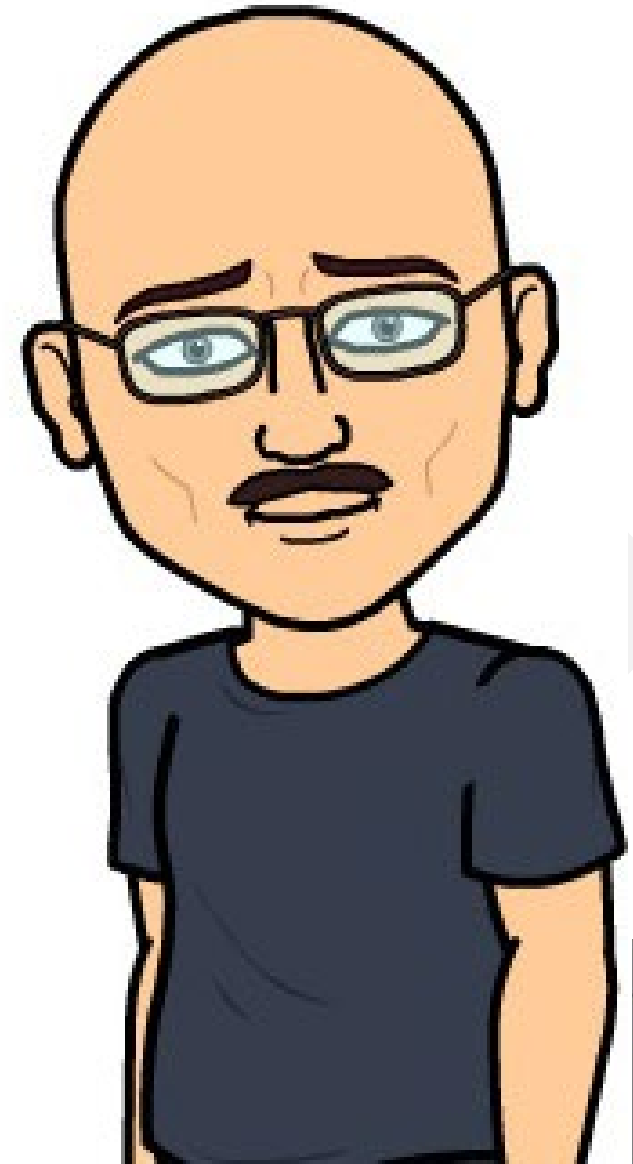
MD State Beekeepers Association
Kevin Inglin EAS Master Beekeeper

February 15, 2020



About me...*an quick intro*

- ❑ **Based in Central NJ**
- ❑ **Hobbyis Beekeepers since 2008**
 - *EAS Master Beekeeper, class of 2019*
 - *Active with Northwest NJ Beekeepers Assoc.*
- ❑ **Host, Beekeeper's Corner 4/2010**
- ❑ **IT Mobile Architect for BMS**



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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....

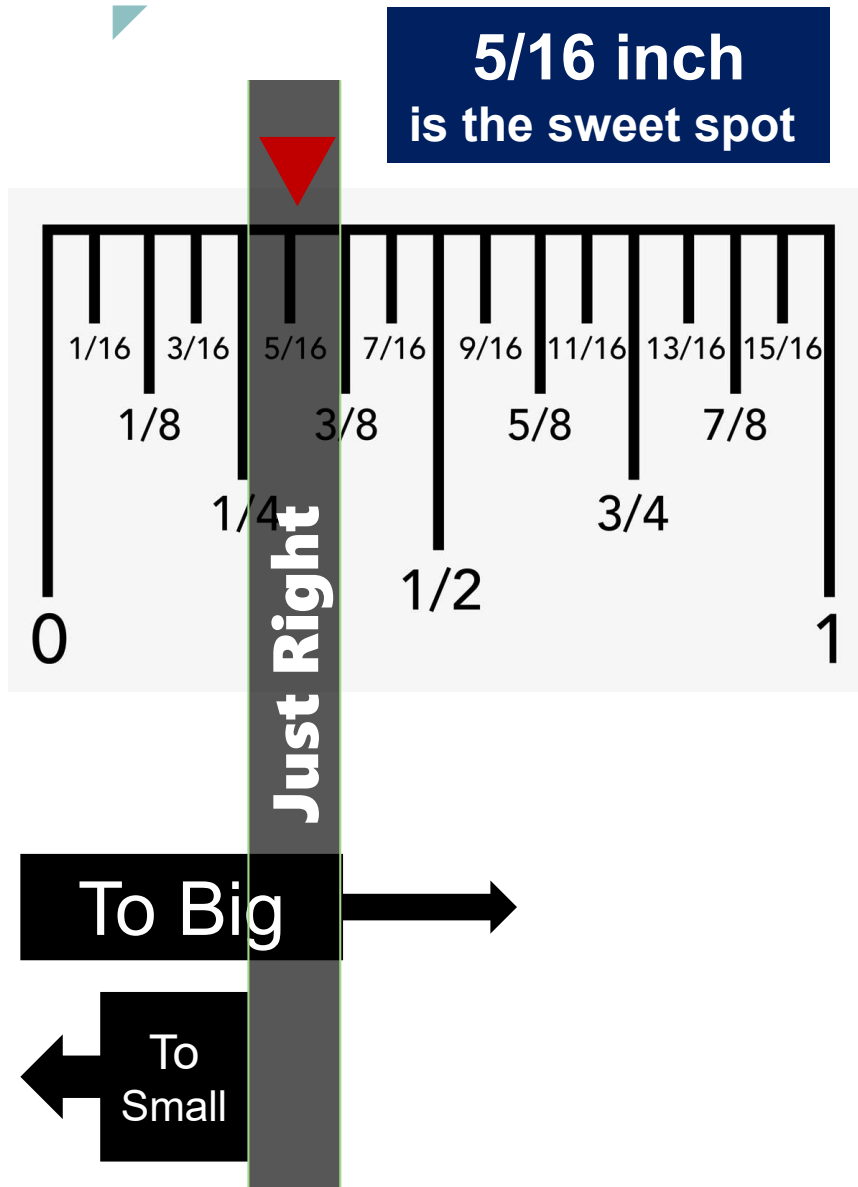
- *Focus on box construction and frames, and how they can trip you up.*
- *Will also talk about marketplace offerings*
- *And add a pinch of management practices*
- *And venture into some unconventional ideas*

✓ 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



As a rule of thumb...

- ❑ 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

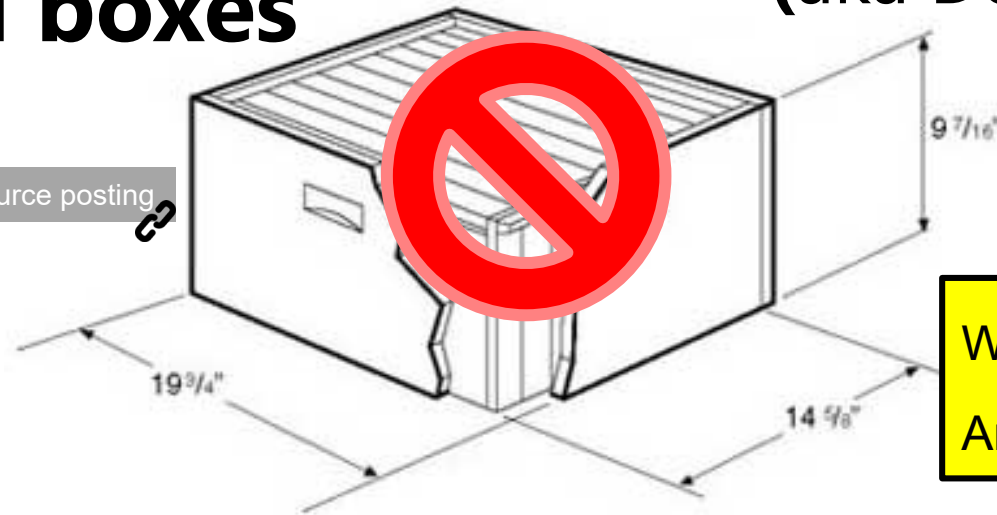
Um...Your knots are showing



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

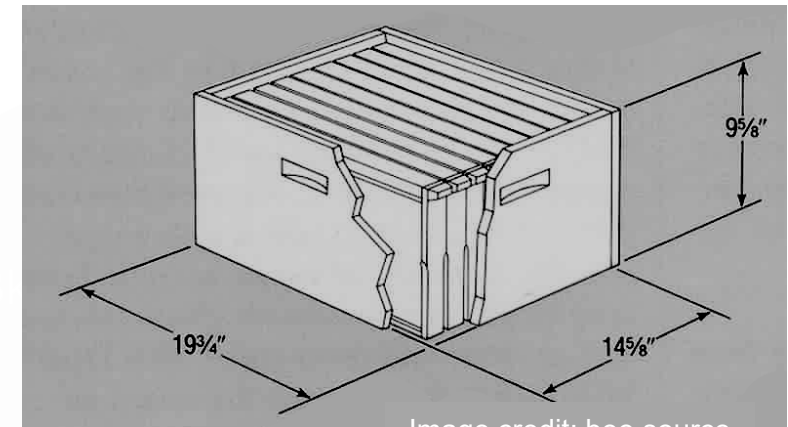



Image credit: bee source
original: penn state guide 

***9(5/8) high, 16(1/4) wide, 19(3/4) deep**

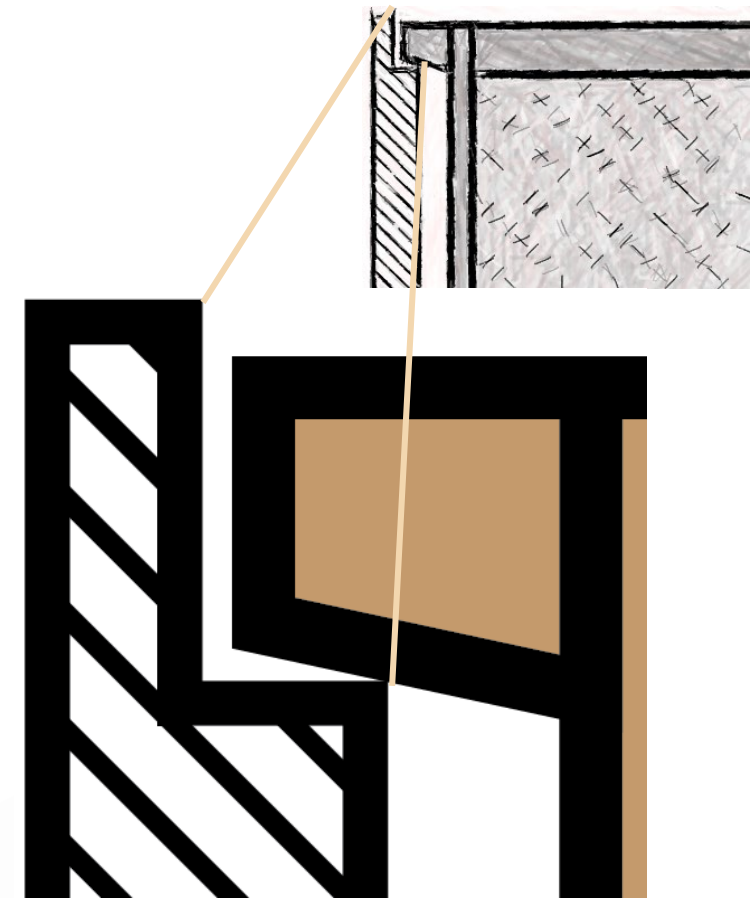
< Note: Exterior dimensions

Frames Rest in a Rabbet Joint

□ Rabbet Joint:

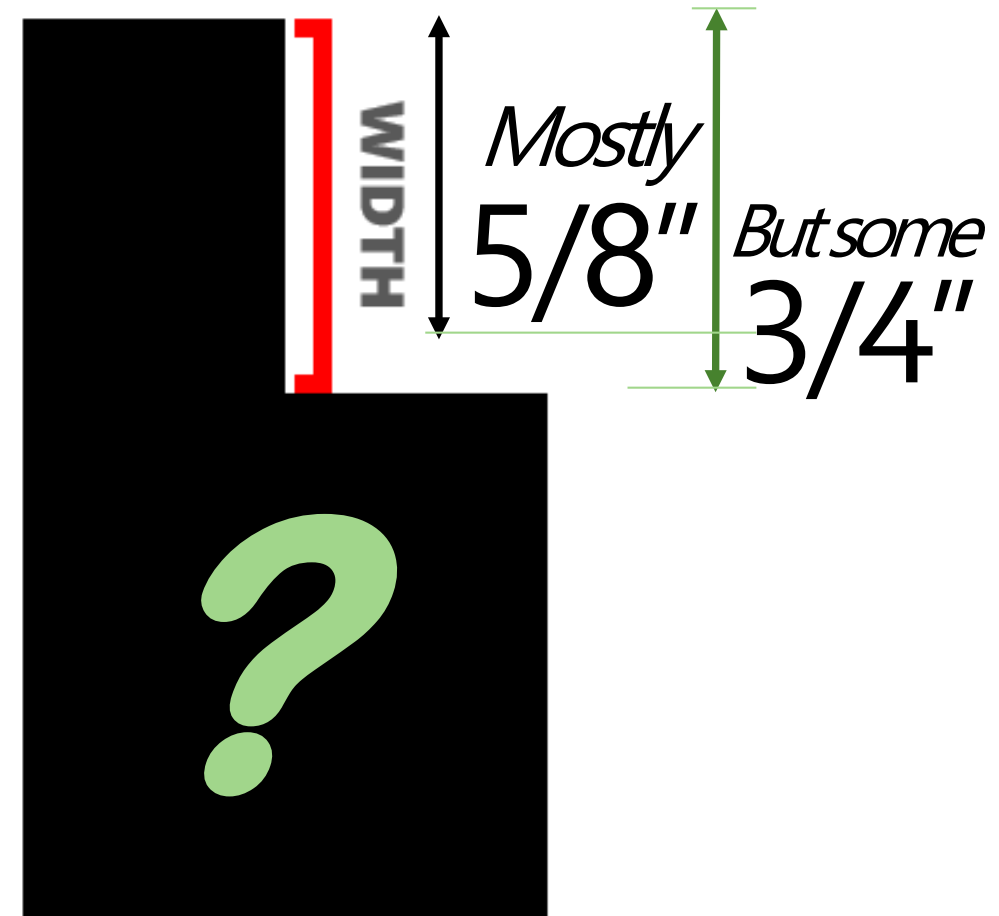
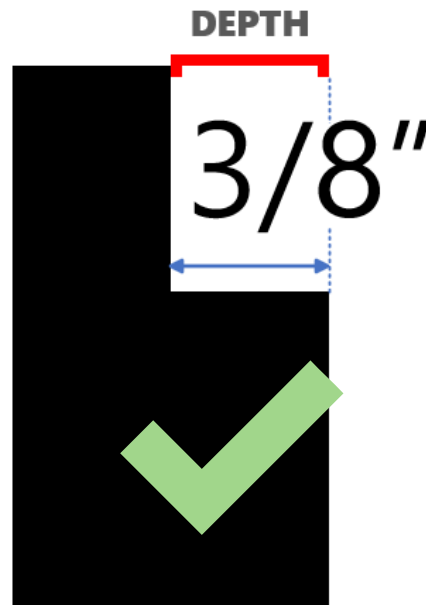
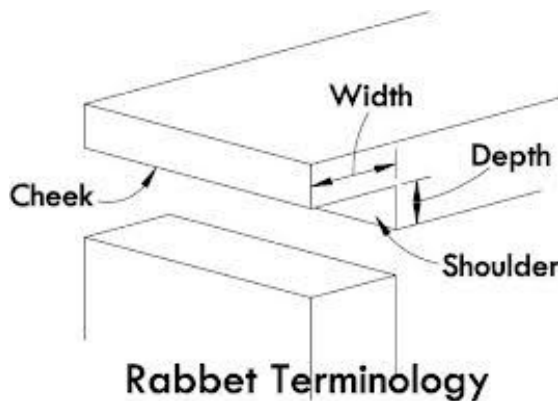
- *Definition*

- **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.



Rabbets are where it can go wrong...

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



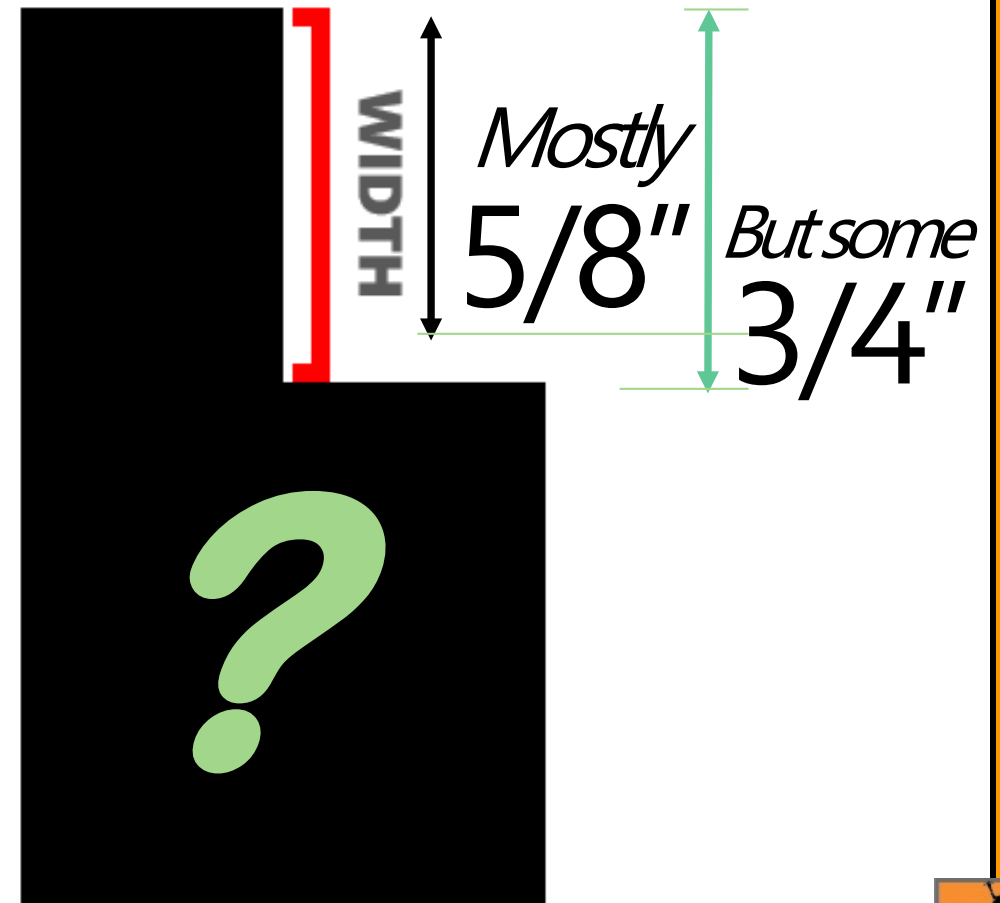
Rabbets are where it can go wrong...

❑ Frame and Frame Rest Designs

- *They are at the discretion of the manufacturer and you have to be aware of the implications*

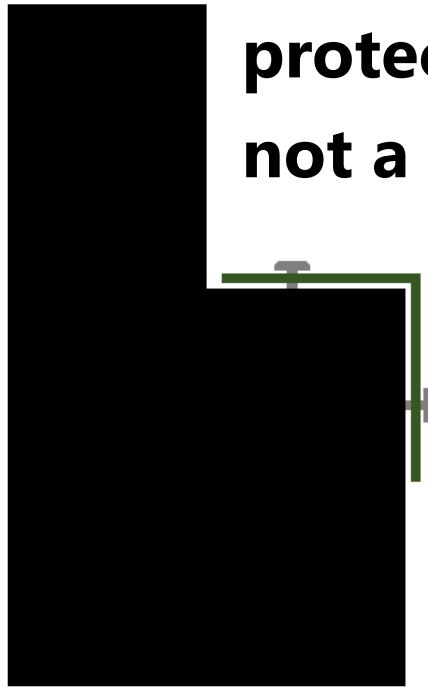
❑ The depth of the frame rest impacts bee space.

- *And subsequently **the gap above and below***



Real Quick: An additional complication to consider

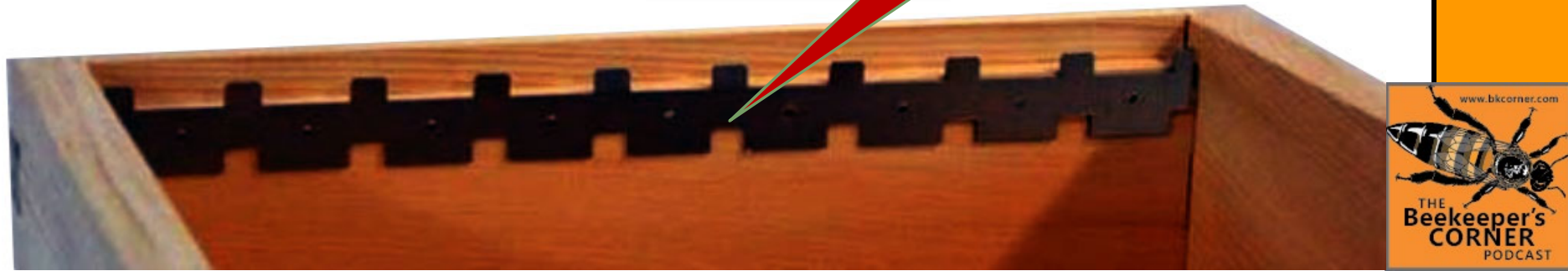
Standard 90°
protectors are
not a problem



Other frame
rest protectors
can cause
difficulties



What about
these...
Problems?



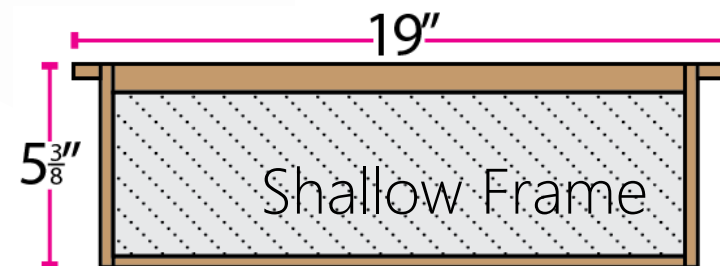
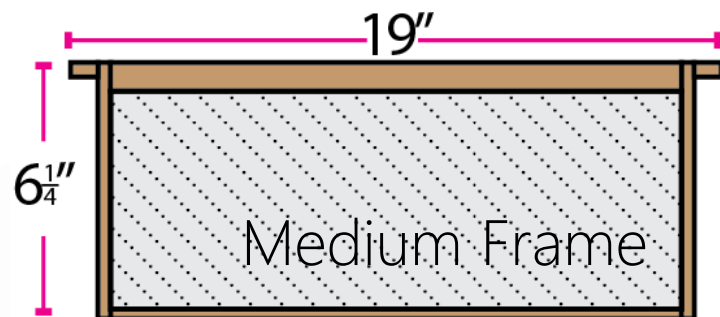
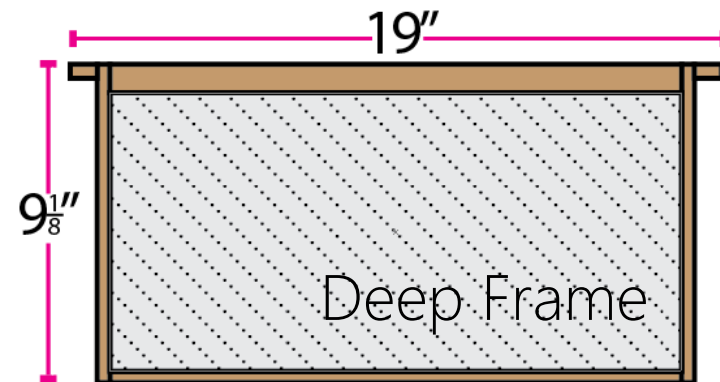
Frame Dimensions are “Standard”

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.



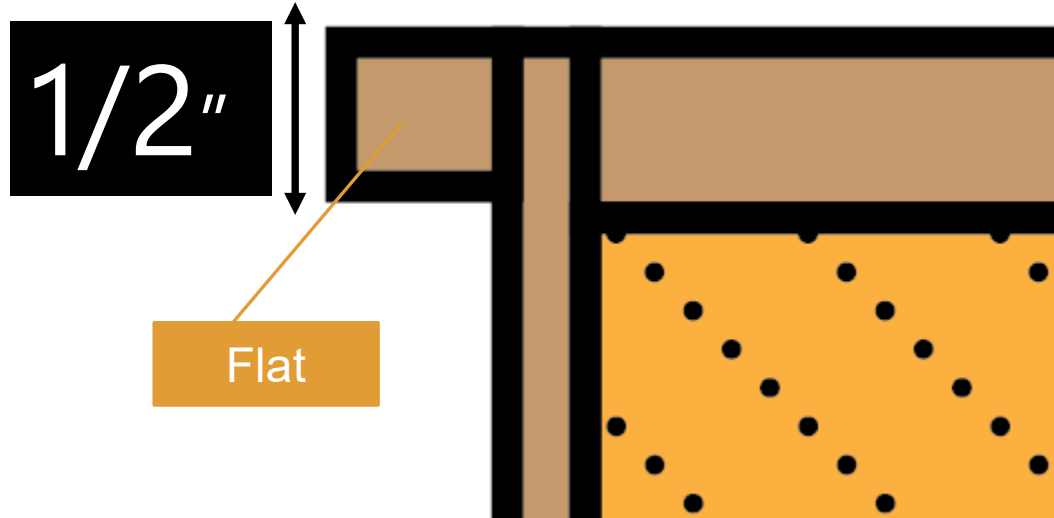
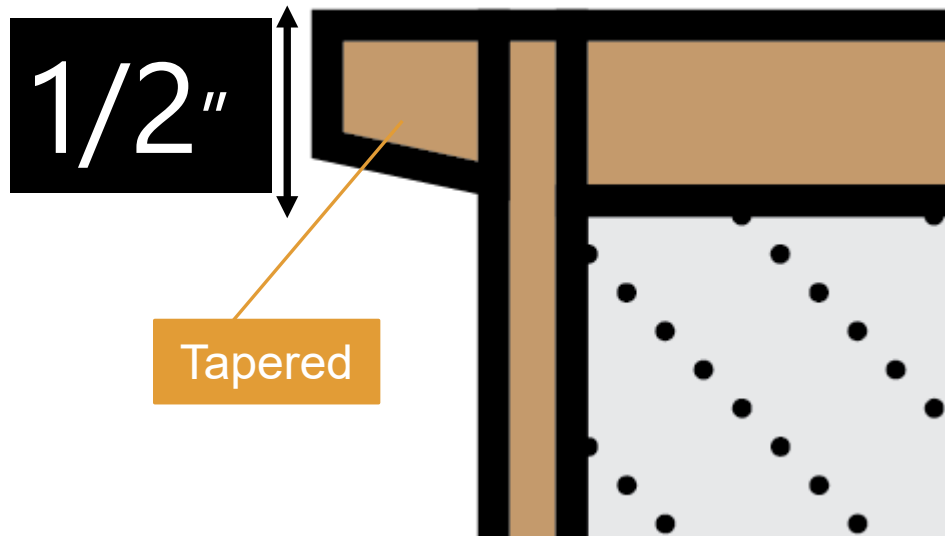
Ear Size & Shape Differs

❑ Standard 1/2 Inch

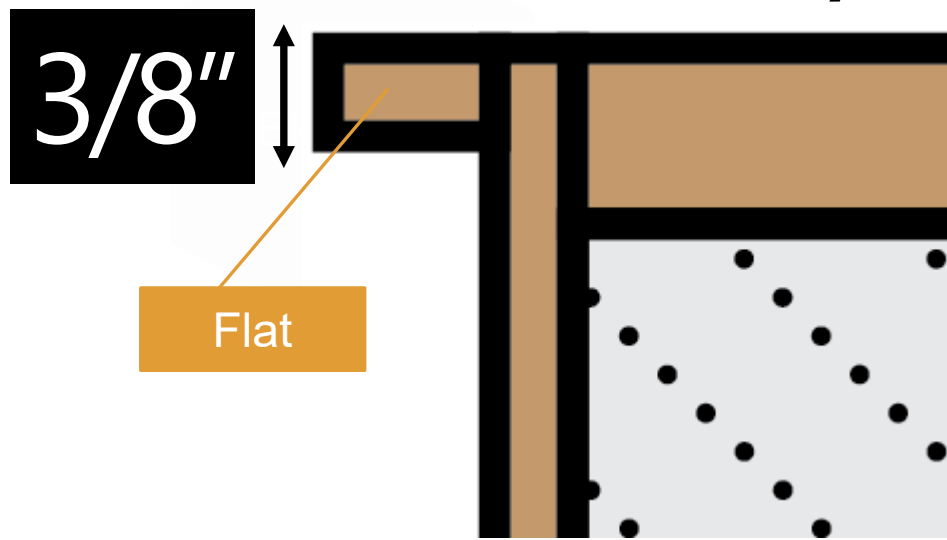
- Sometimes tapered...

Sometimes not...

Tapered rests differently

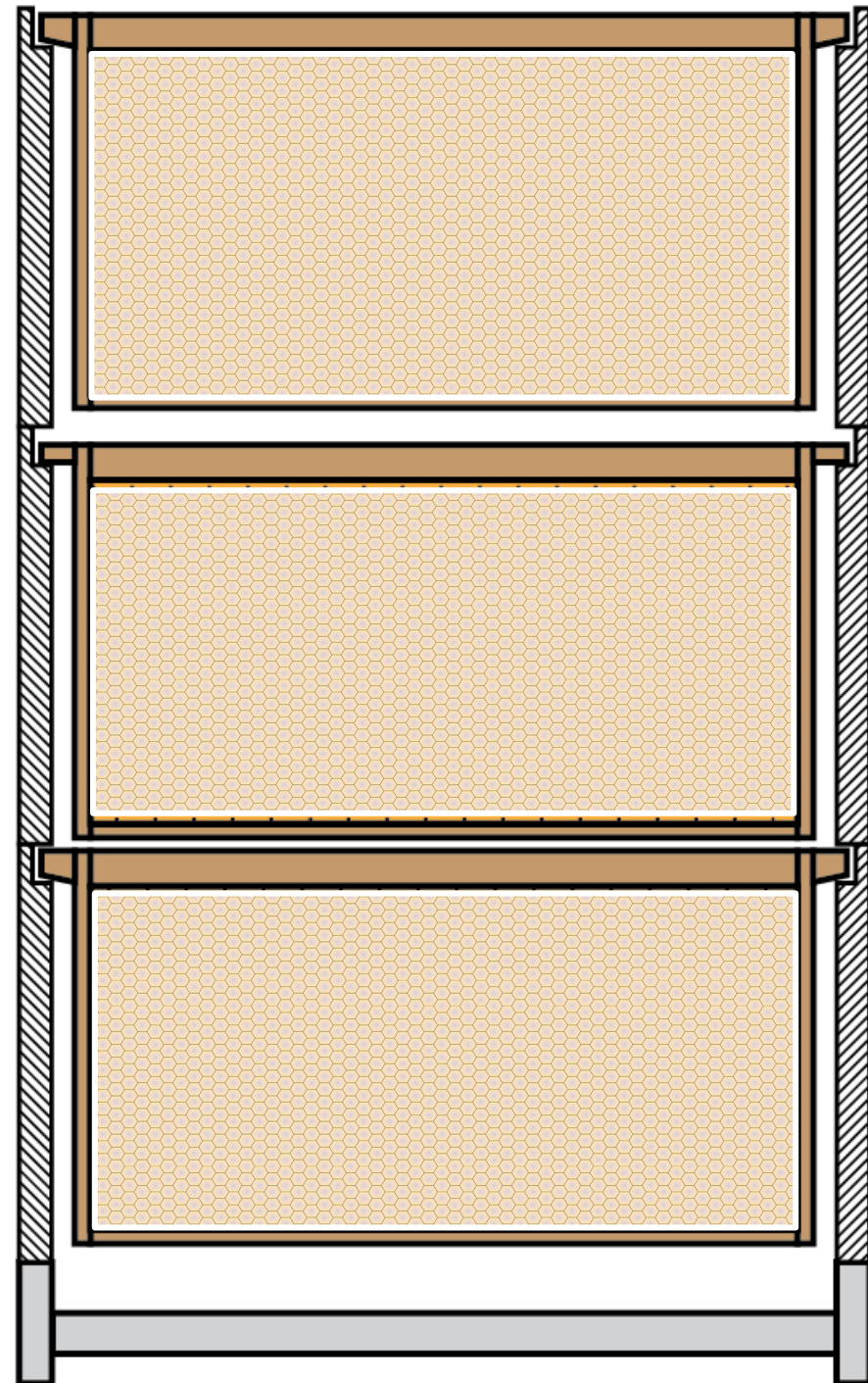


❑ "Standard?" 3/8ths



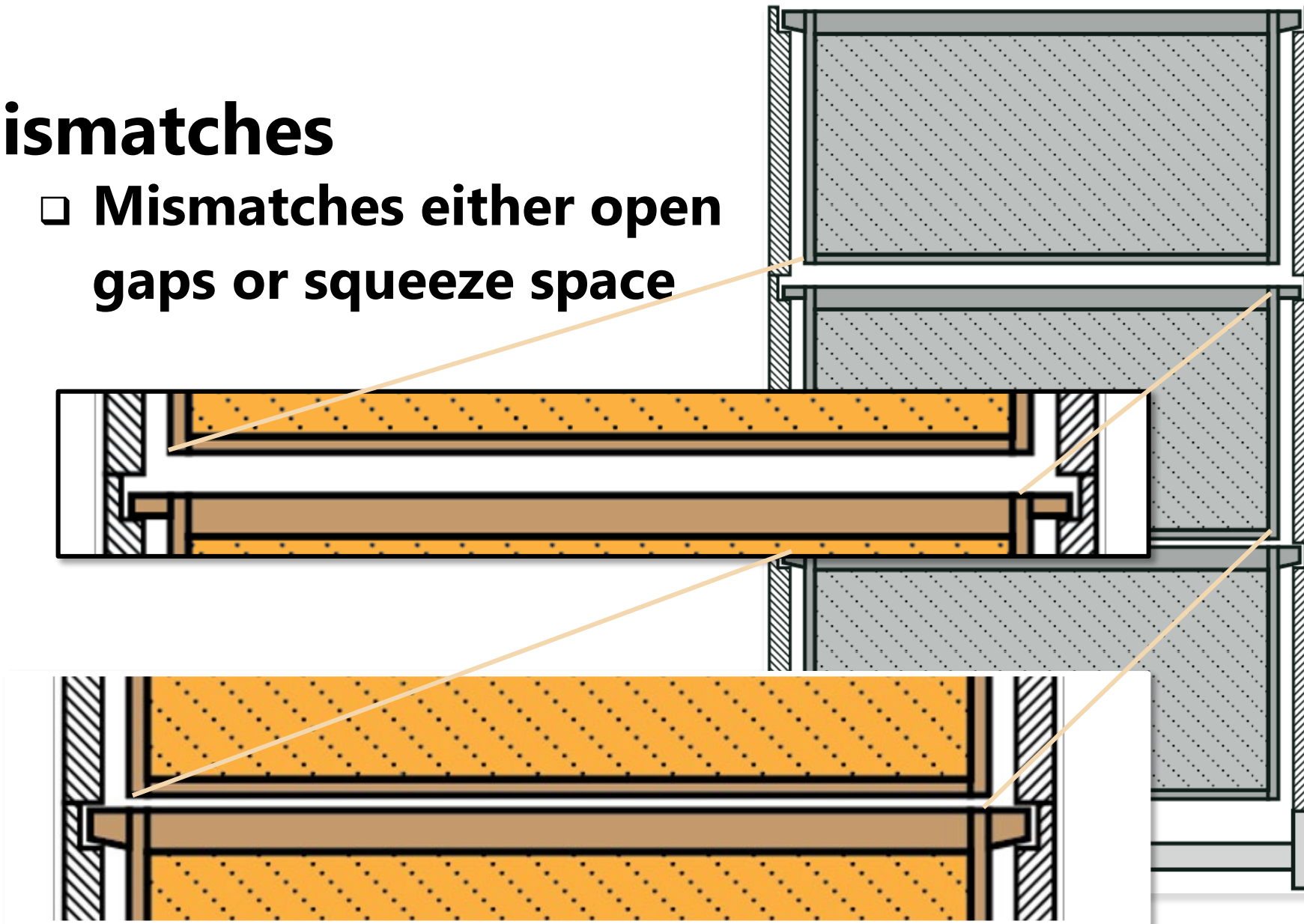
Mismatches

- ❑ 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

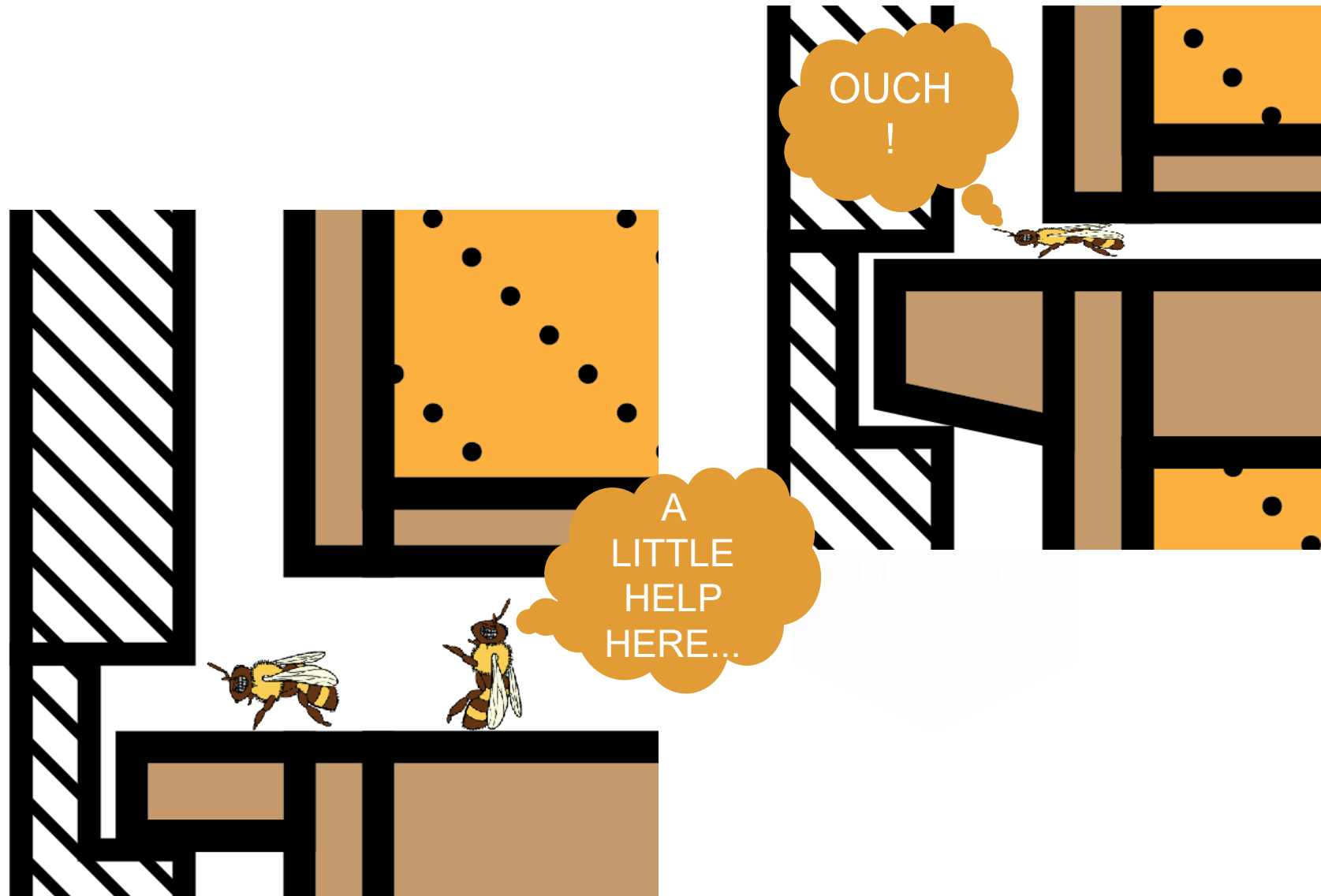


Mismatches

- ❑ Mismatches either open gaps or squeeze space



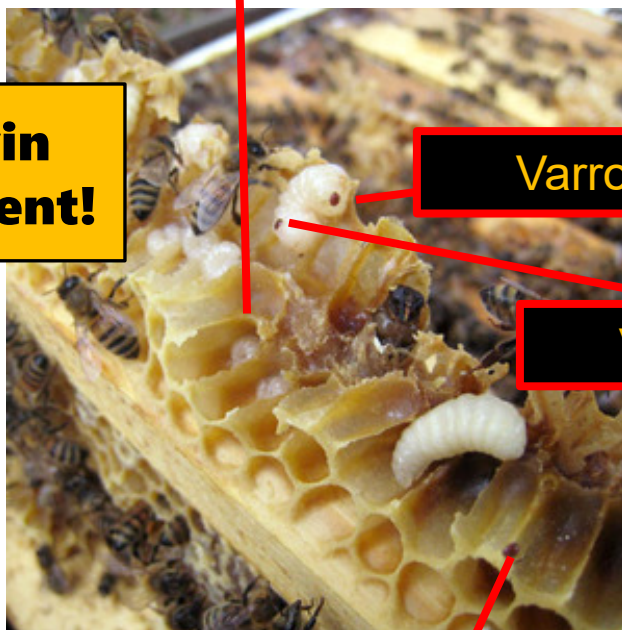
Bee Space Matters



Real Gap Problems

Bridge Comb Under Frames

Kevin
Moment!



Varroa!

Varroa!

Varroa!

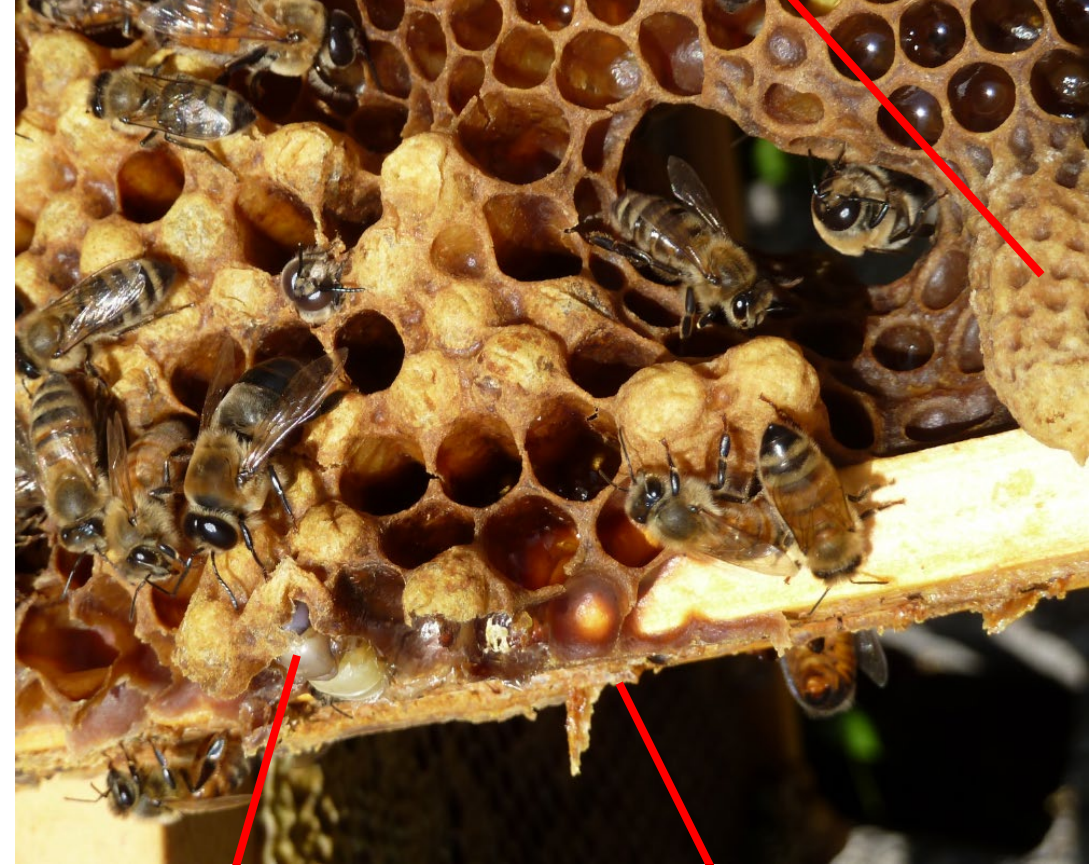
BKcorner

Real Gap Problems

Bridge Comb Under Frames



Queens in Danger

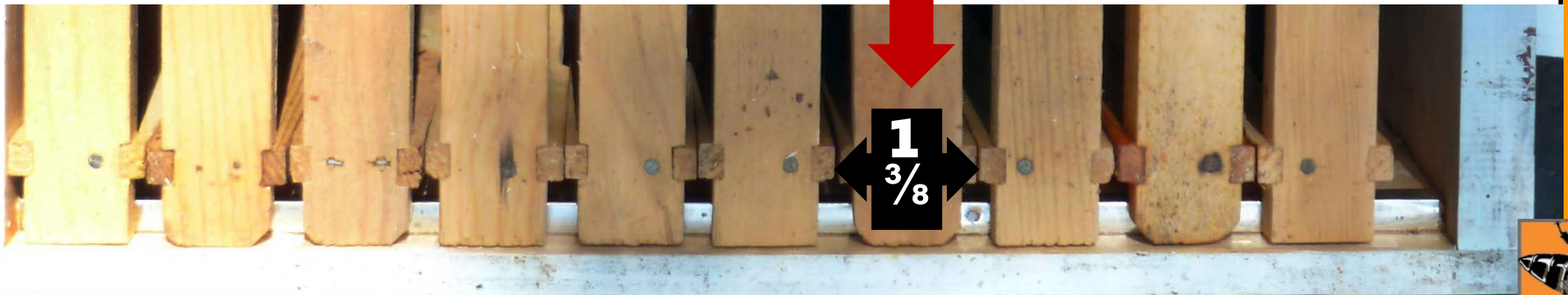


Damaged Bees

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

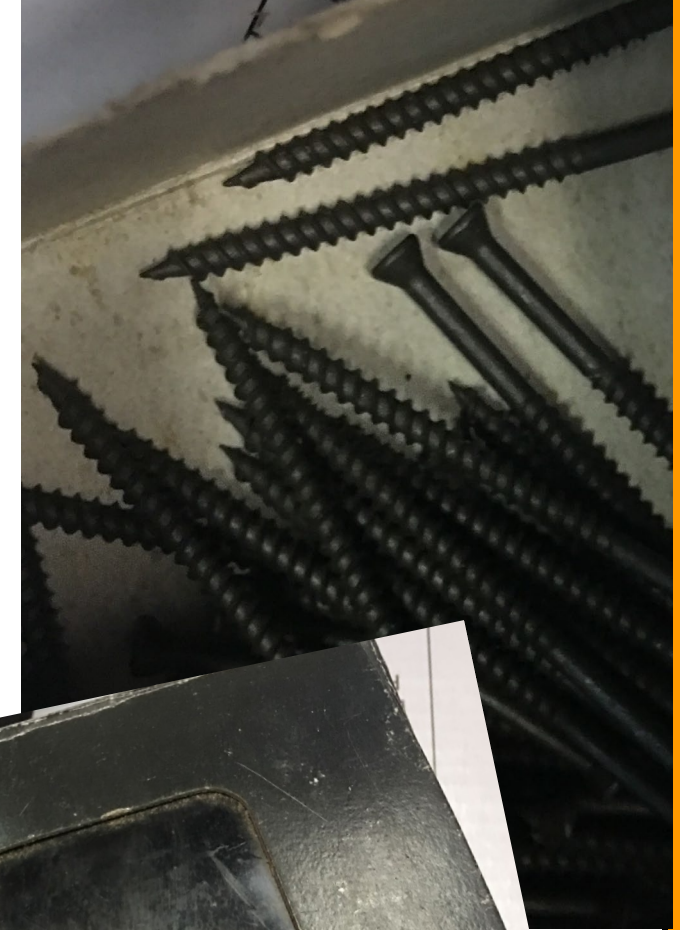
- ❑ Boxes that are not square and are not true (Flat) will cause space problems
 - *Twists cause distortion gaps*
- ❑ Non Square, oblong boxes can cause frame misalignments



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

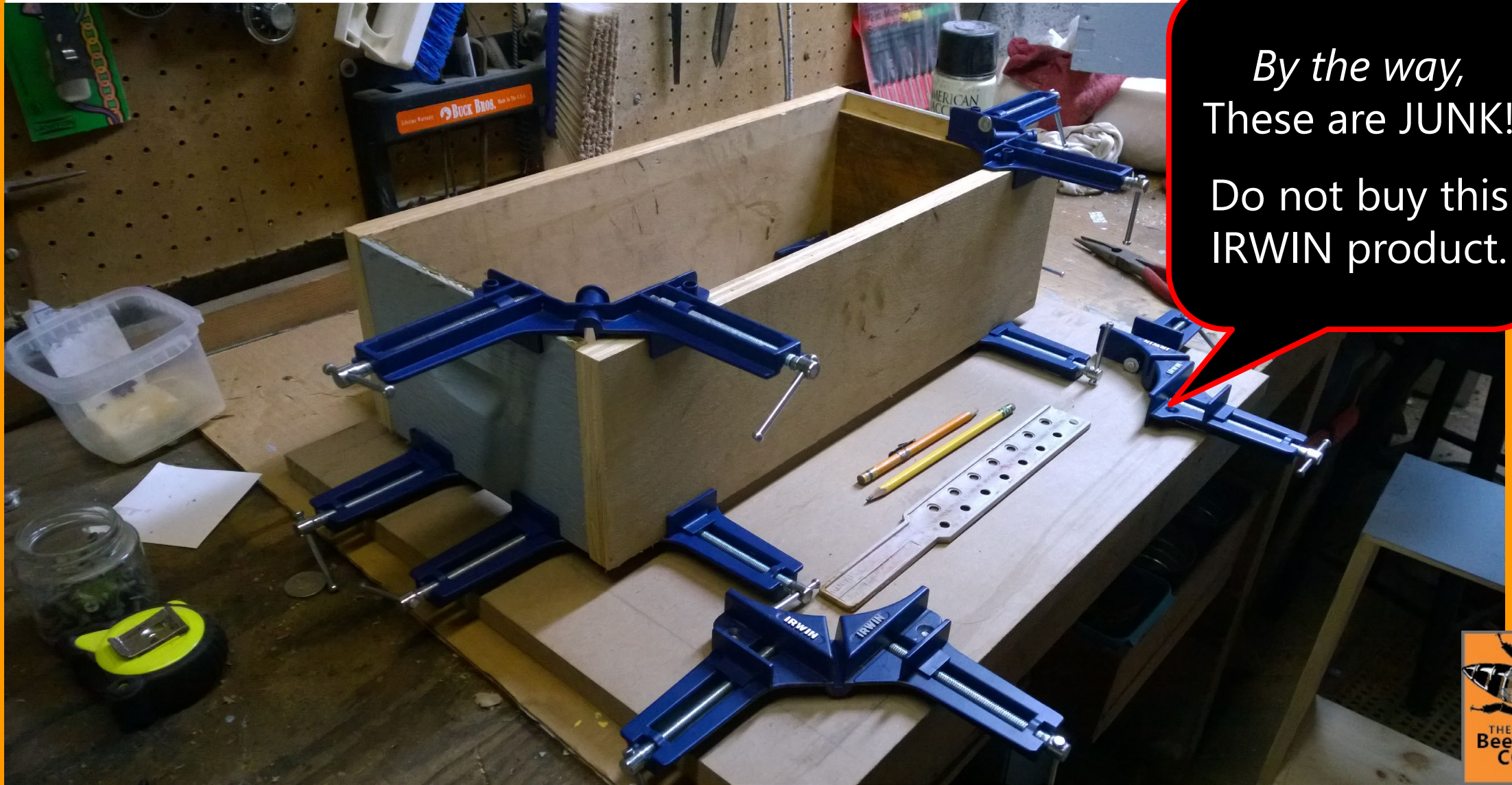
❑ What if you used screws instead of nails?

- *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.*



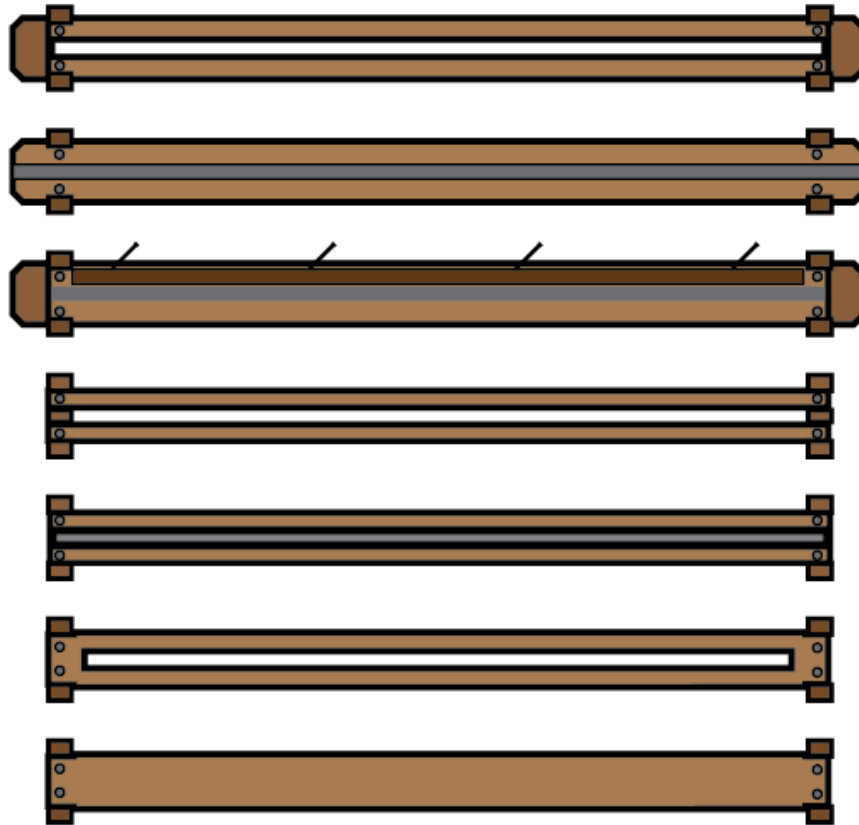
Another idea to square things



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.

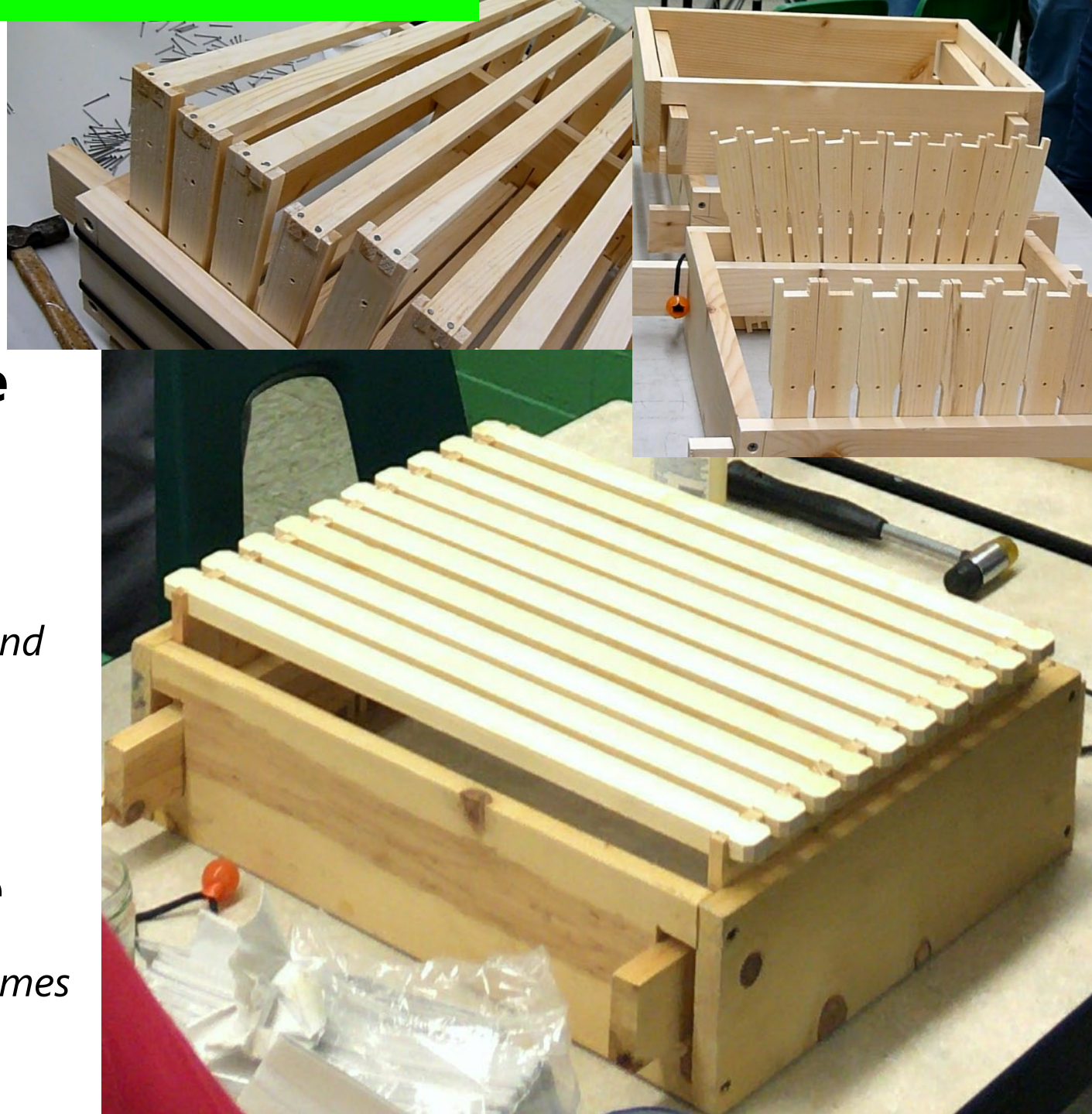
Build Frames True

- ❑ **Frames out of square can also cause space problems**

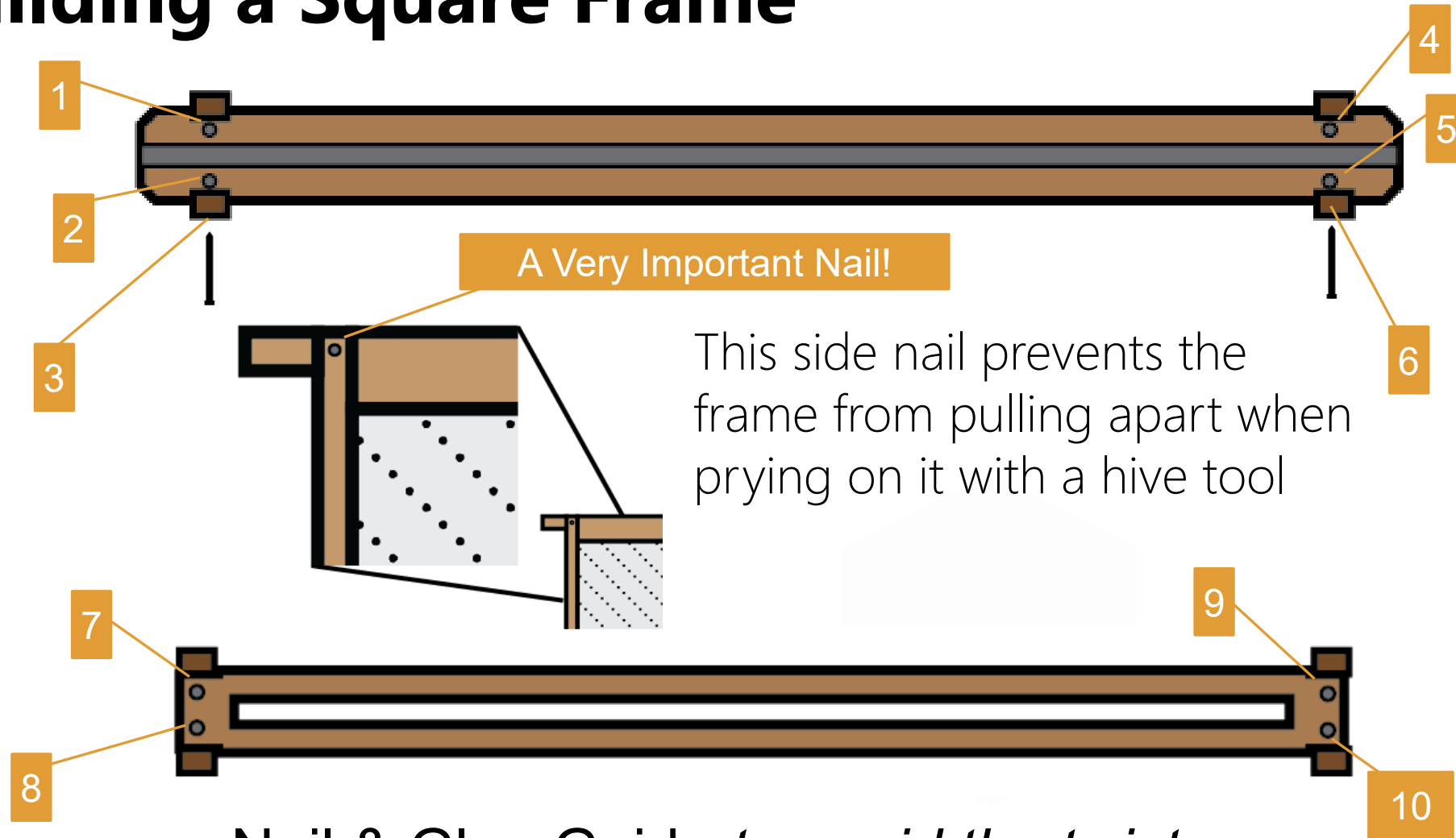
- *Twists cause distortion gaps and raised bottom bars*

- ❑ **Consider a Frame Jig and/or a mini square**

- *Might also consider wiring frames so they hold their shape.*



Building a Square Frame



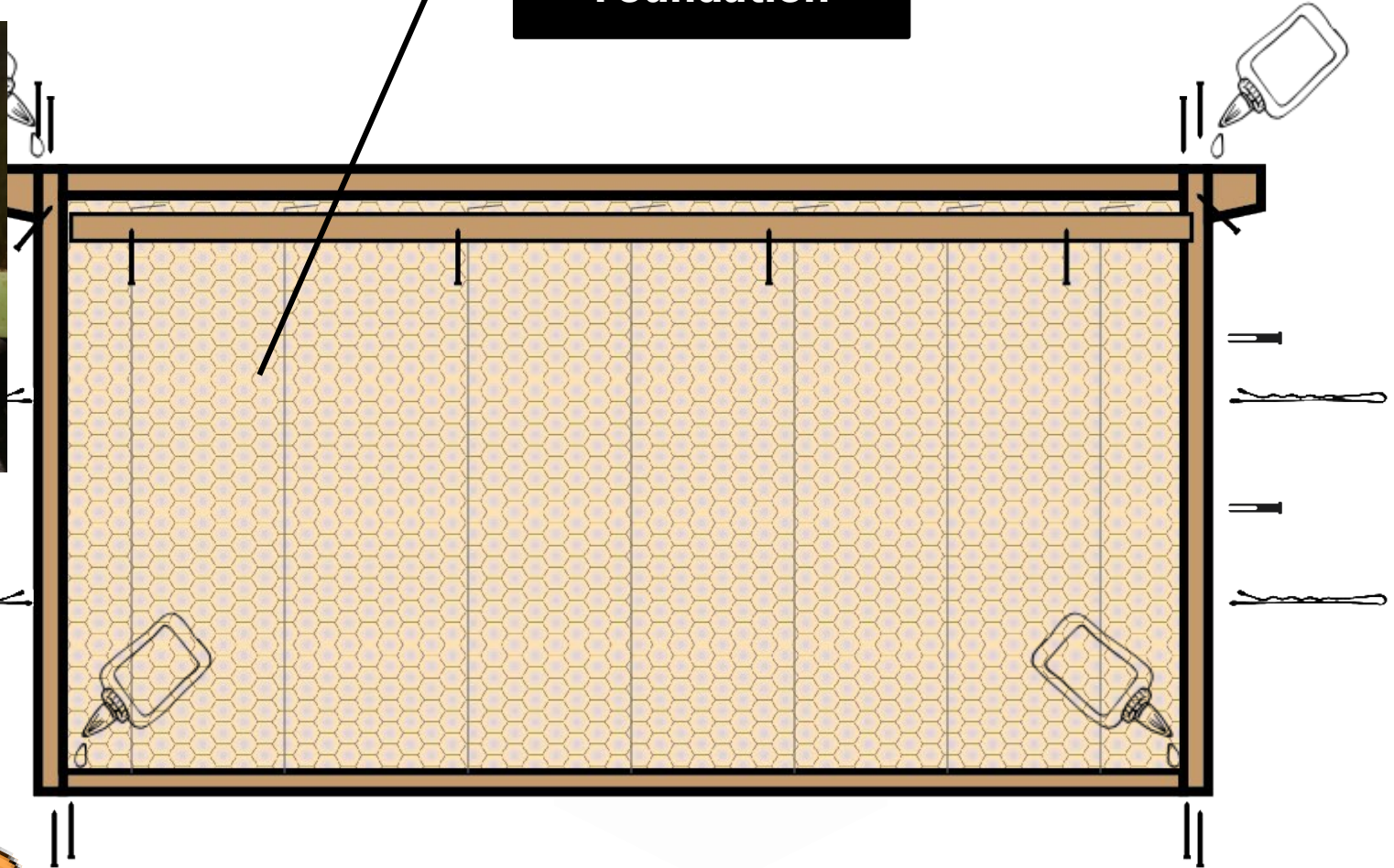
Nail & Glue Guide *to avoid the twist*

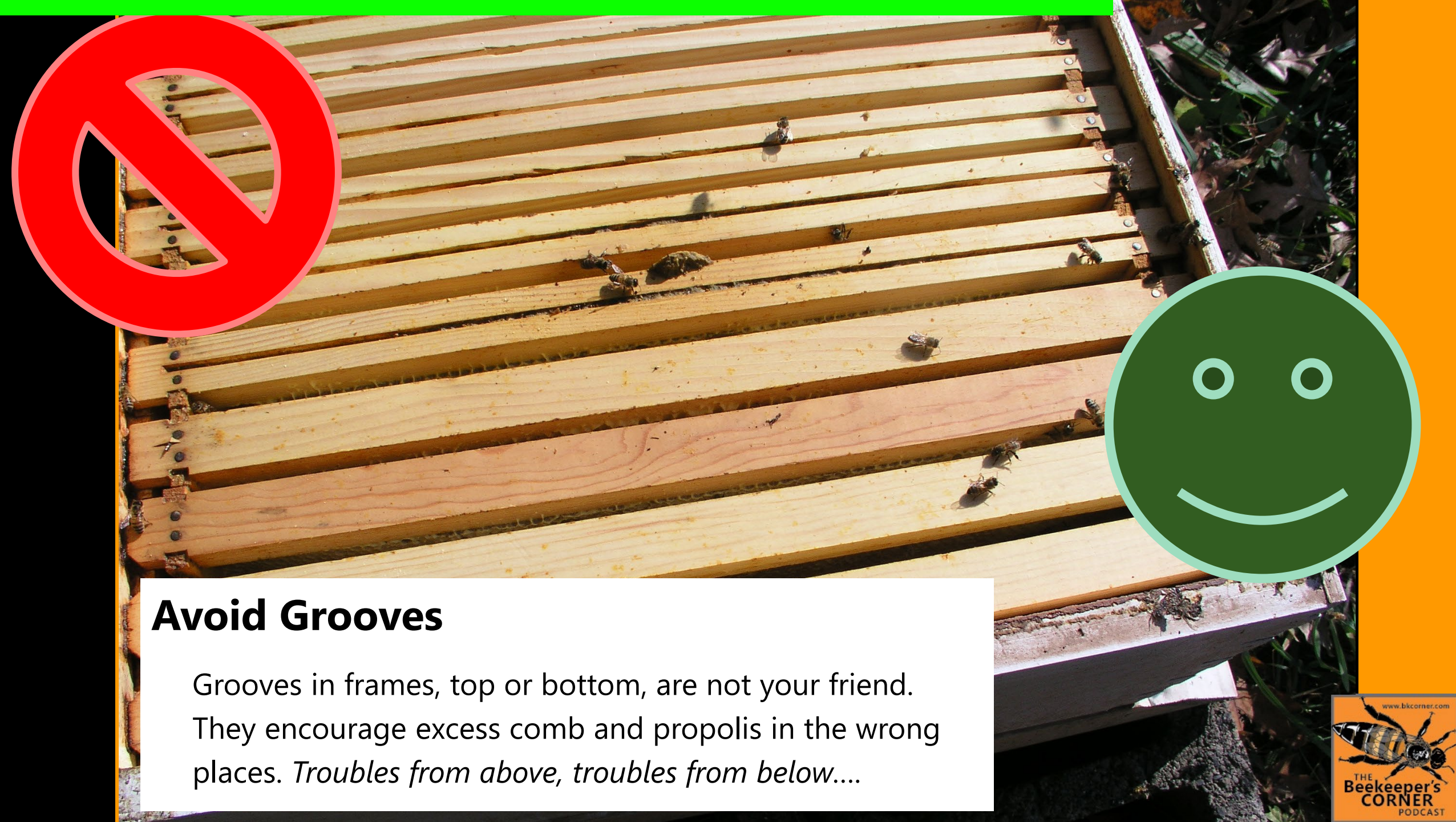
Nail & Glue Guide

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

- ❑ Keep the tops of your frames clean
- ❑ Keep the shoulders of your frames clean



What is going on here?

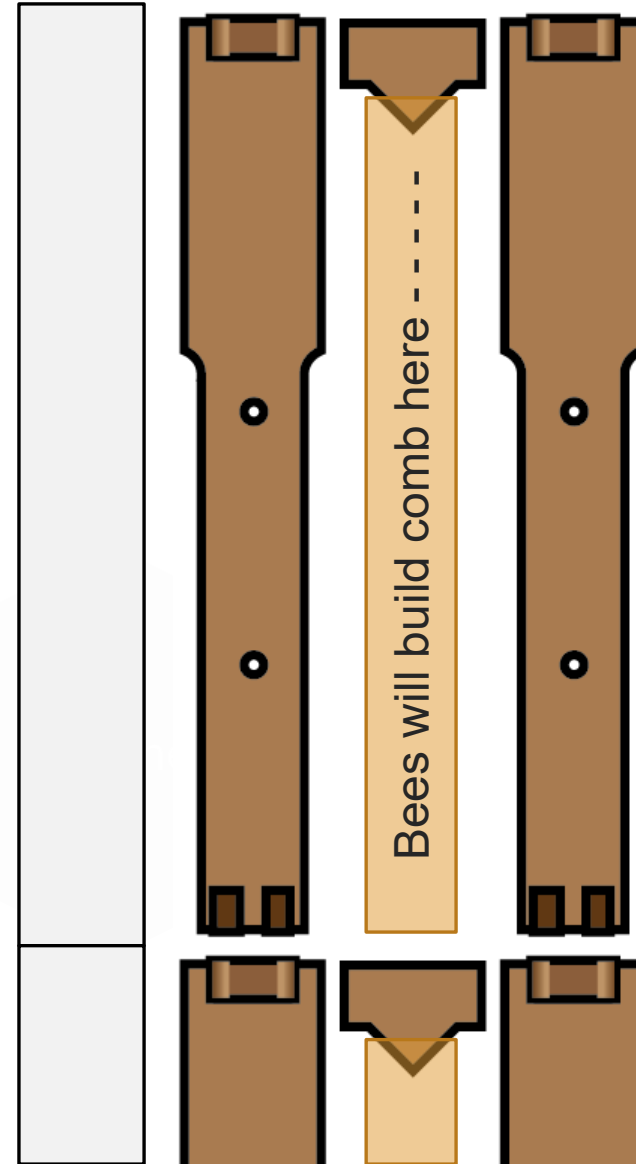
❑ **The middle five frames are from a Nuc**

- *Isn't it curious that the burr comb on the top bars is only on the plastic frames?*



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!



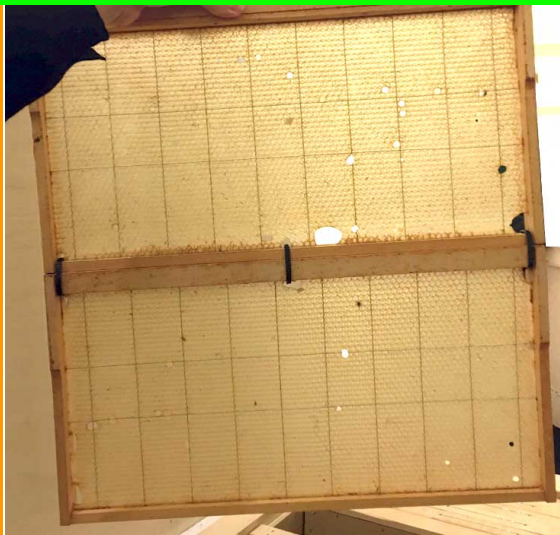


PHOTO & HIVE: BOB KLOSS



A Different kind of Frame Game

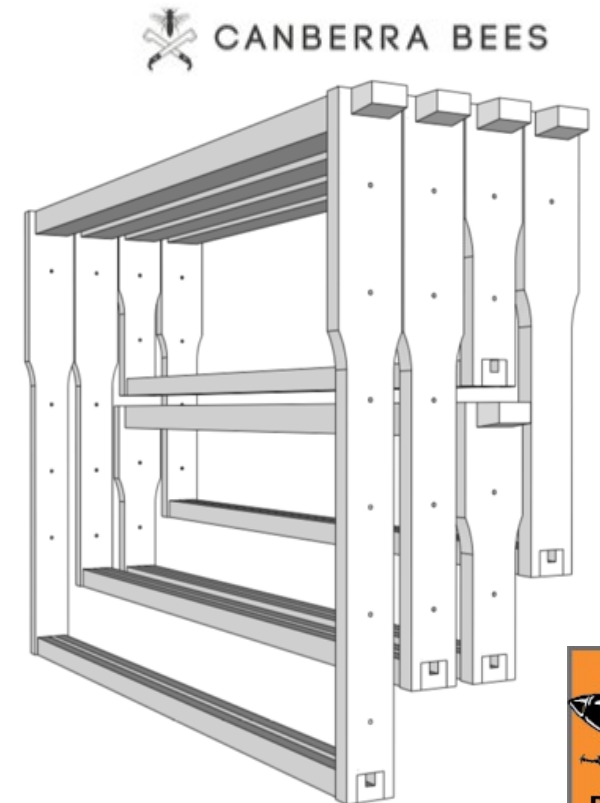
❑ Sometimes the idea is to break the rules.

- *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.

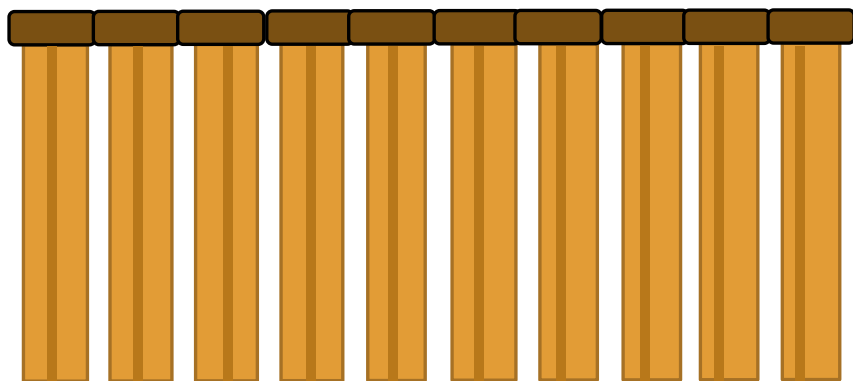
Visit his forum for more info.



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

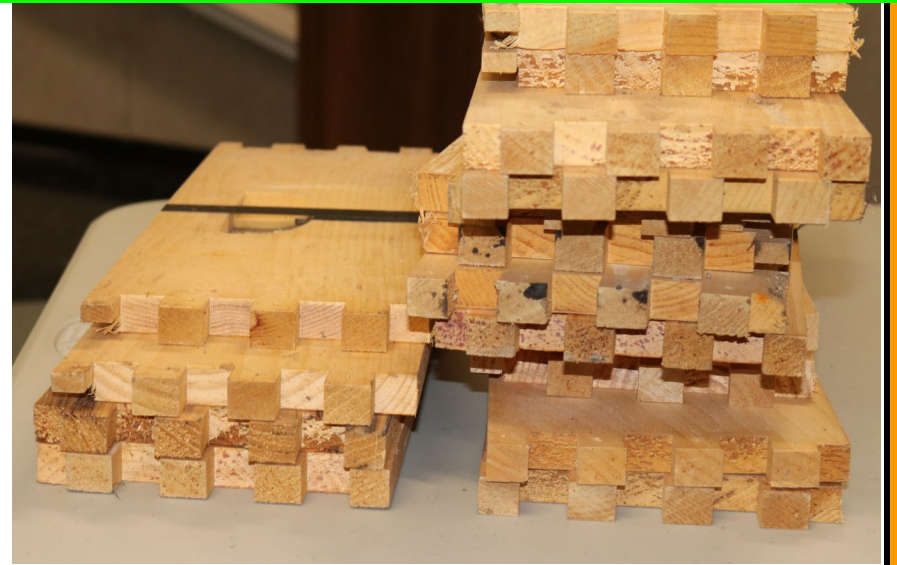
❑ If you have non standard boxes...

- *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?

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After this weekend this will be posted at www.bkcorner.org