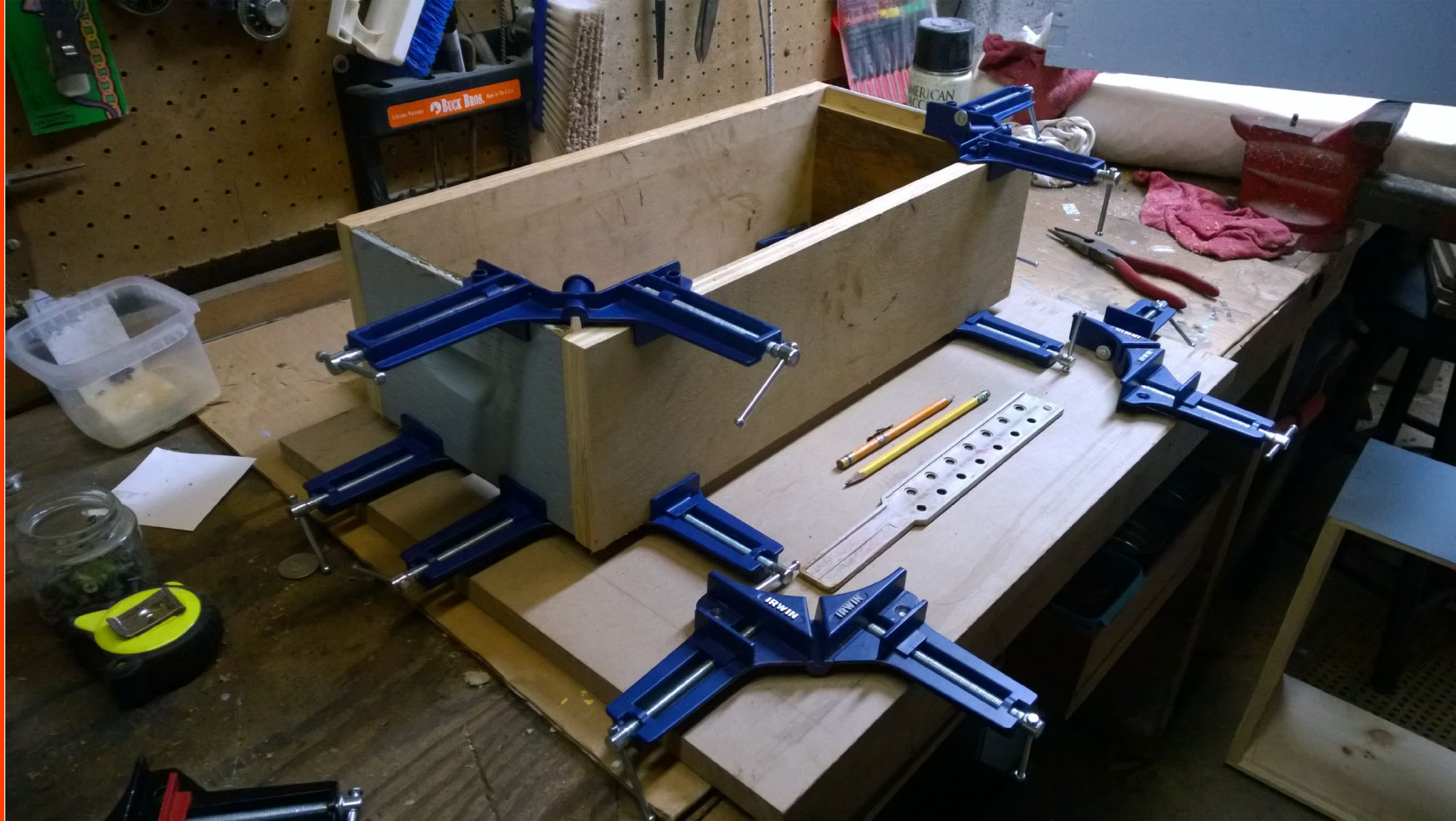




The Managed Mentoring Program on getting started in beekeeping.

Managed Mentoring



Managed Mentoring

Building Hive Equipment

Lesson | Beekeeping Box Assembly



What is Covered in this Module

Building Boxes

Fabrication Workspace

Glue and Nails

Clamping Systems

Assembly Walkthrough

Frame Rests



Building Beekeeping Boxes

**Instructions, Guidance, and Tips for Building
Woodenware**



Fabrication Workspace

□ Workspace Basics

- *Pick a place where you can setup camp to fabricate, and paint*
 - Take into consideration your 'workbench', temperature, paint odors, and/or any other impacts while occupying the space.
 - Mind the temperature when gluing and painting. Comfortable room temperature is desired during these activities.
- *Prep the tools and adjuncts*
 - Clamps, Hammers, screwdrivers, rags, drop clothes, scrapers, sandpaper, nails, glue and other tools and hardware will be required. Gather what you need and organize your workspace.



Inspect the Woodenware – Dry Fit

□ Woodenware run through

- *Inspect all of the pieces for problems ahead of time*
 - While uncommon, some kits could have flaws. Know ahead of time, by looking for cracks/splits, misaligned milling, problems with drilled holes, etc.
 - Do this ahead of time, and contact your provider if something is not quite right.
- *Dry Fit*
 - It helps to test the fit, and doing so also burnishes the wood.
 - It can help in final assembly, and may negate struggling when trying to assemble when pieces are glued.



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*

- Merge the box pieces together at the finger joints.
- 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



Silicone Brushes



□ Silicone for Spreading

- *Consider using a silicone brush to apply the glue*
- *They work well for getting into the nooks and crannies of the finger joints and as you can tell, the clean up pretty well once the glue dries*
 - These brushes are common in cooking stores, and are used to baste meats and other foods during cooking.



Nails

□ Nail Size and Formats

- *Hardware Differs but there are recommended sizes*
 - Boxes are typically built with a size 7D nail (2 ¼" by 12 ½ gauge).
 - If in doubt, order the nails where you buy your equipment.
- *Nail Types*
 - Use exterior grade nails, or ensure they are encapsulated by paint
 - A favorite is hot-dipped galvanized nails, and the upscale choice are stainless steel
 - Most beekeeping catalogs sell common box nails, and they must be encapsulated in the paint system.

Hive Boxes

Hive Deep (44) - 7D nails

Hive Medium (27) - 7D nails

Each Frame (Wedge Style)

Top Bar (4) - 1 ¼" nails

Bottom Bar (4) - ¾" nails

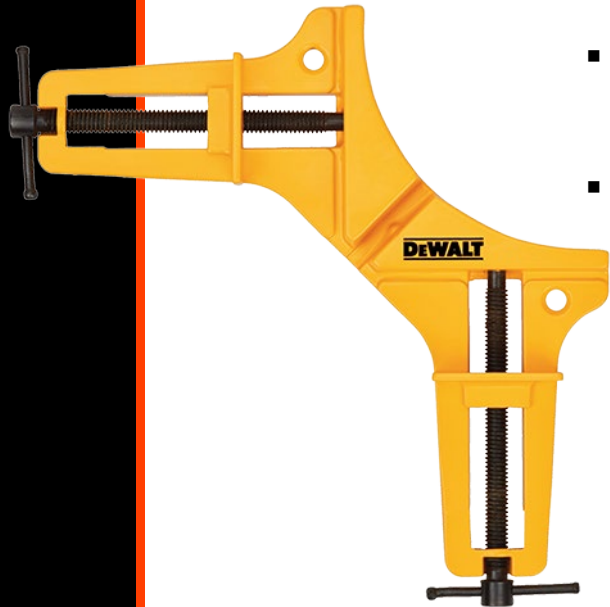
Side Nails (2) - ⅝" nails



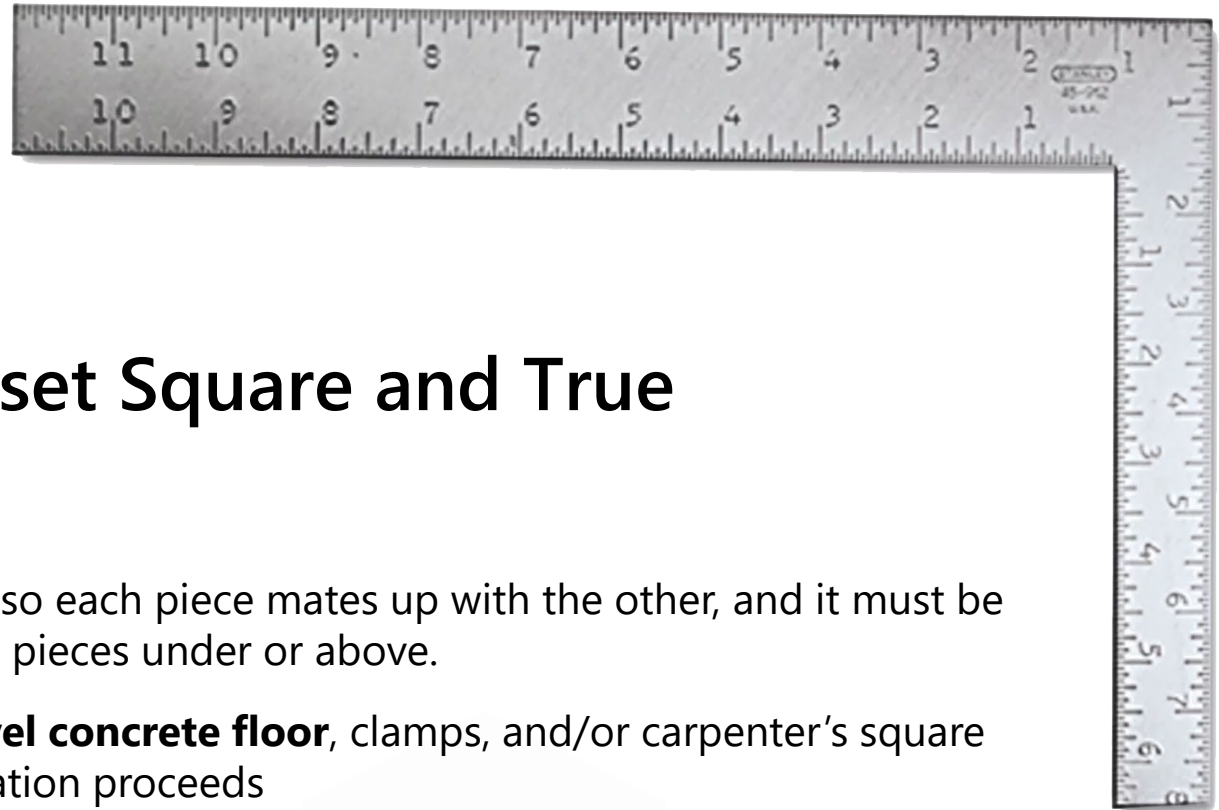
Consider Clamping Systems

□ Corner and Woodworking Clamp Benefits

- *Lock in Square and True, then drive the fasteners*
 - Consider the benefit of wet assembly with glue, and then clamping the box pieces.
 - Clamping can guarantee that a piece stays square and true. They also make it easier as they hold the piece, freeing up your ability to drive the fasteners
 - Clamping also applies force at the joints and this is suggested that the pressure at the joint glued surfaces results in a better bond.



Initial Fabrication



□ Nail Procedure to set Square and True

- *Square and True*

- A box has to be **square** so each piece mates up with the other, and it must be **true** so it sits flat on the pieces under or above.
- A **flat surface**, like a **level concrete floor**, clamps, and/or carpenter's square help in testing as fabrication proceeds

- *Setting the nails*

- Assemble the boxes – test square and true, and systematically drive the nails.
- Test as you go along and adjust prior to any errors being locked in.



Handle Out, All 4 Sides!

□ Be Sure to Check

- *Before you drive your nails...*
- *Make sure that the handles are facing out on all sides*
- *It is hard to do, but it is possible... ask how we know!*



Nailing Technique

- 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.
 - Use care not to get too heavy handed, as you will possibly have errant strikes and damage the woodenware.
 - Slow your hammering down as the nail is close to being set
 - Focus on accuracy; this helps prevent 'dinging' the wood with the hammer head as you finish driving the nail.



Hammers & Rubber Mallets

□ Tightening Joints and Nailing

- *After boxes are glued, 'wet' assemble them, using a rubber mallet and/or clamps as required.*
 - Slide the joints together, and clamp or tap the boxes to tighten up the joints
 - Clamping the boxes actually does a better job than a mallet.
 - Soft Mallets do not mar the wood and leave dents.
- *Hammers*
 - **Moderate** sized hammers – *not to heavy, not to light.*
 - Provide the right force, and dexterity, while avoiding fatigue with heavy or light hammers



Troubleshooting – Errant Nails

□ Dealing with Nails that do not set well

● *Bent over nails*

- If they are not fully driven, take the claw of a hammer and pull the nail
 - Sometimes you can twist it sideways instead of the conventional rocking manner
- If the nails are fully flat, use an awl or screwdriver to pry it up; then extract
 - Use whatever tools need to extract the nail, while trying not to damage the wood. Often a pair of needle nosed pliers works here.

● *Protruding nails*

- The best offense against this is a good defense.



Troubleshooting – Errant Nails

□ Dealing with Nails that do not set well

● *Bent over nails*

- There is another technique that employs a pair of needle nose pliers to extract the nail.
- Place a thin piece of wood flat on the surface and lay your pliers on it;
 - This serves to protect the wood from marring as the metal of the pliers is harder than the soft wood and will leave marks if left unprotected
- Grab the shaft of the nail with the pliers sitting flat on the wood. With a firm grip twist the pliers against the wood and turn the nail up out of the hole.
 - It might take a few times to reset the pliers against the wood and move the tip back closer to the wood as you twist.

Avoid reusing bent nails, they often cause problems going being nailed a second time. Grab a fresh nail and discard the bent one.



Troubleshooting – Errant Nails

□ Dealing with Nails that do not set well

- *Misguided - **Protruding nails***

- Sometimes nails do not go in straight; they twist, they turn
 - The best offense against this is a good defense. Try to see this as it is happening and avoid driving the nail head flush. If you can get a hammer underneath, extract it the conventional way.
 - Recover the situation by drilling a pilot hole that is straight and redrive the fastener.
 - If you did drive it all the way in, hit the pointed end to make the nail head emerge so you can get purchase on it. Do not leave it this way, it will cause numerous problems later.
 - Sometimes you can put the flat head of a screwdriver against the tip of the nail and strike the screwdriver shaft if you find it hard to get a blow directly on the point of the nail to reverse it.



Troubleshooting – Split Wood

□ Dealing with a split

- *Errant Nails could cause wood to split.*
 - Most common on the finger joints
 - If wood does split – there are two paths
 - If you can – remove the piece and glue the split, clamping it before putting it back to nail.
 - If the piece cannot come apart (say with other nails fastened) consider pulling out the errant nail, and glue the seam.
 - Drill a pilot sideways across the split, and drive a temporary screw to hold the split closed – or just glue it the best you can. Then back the screw out and fill it with glue.
 - Once the split is mended, re-nail the offending area.



Nailing Process

□ One Corner to All Corners

- *How you nail is personal preference – and there are several ways*
 - One Corner
 - Set a few nails in the single corner, checking square. Then nail the remainder and lock in the corner until it is fully fastened. Then, when done, move on to the next corner.
 - Partial on All Corners
 - Set a few nails in one corner – and lock it in square (checking true as you go)
 - Set a few nails in another corner – and lock in square. Repeat this to all four corners.
 - Then once each of them is held square, and you have checked the box is true, go back to the first corner and finish the remaining nails.



Remember to test

□ Test square as you go

- *Each time you hammer a fastener into the box, check to see if the piece is square.*
 - The simple act of hammering, often can make things go awry
 - Sometimes is not the hammering, but you leaning on the piece to hold it while hammering
 - Whatever the case, you will be well served if after each nail is set to check the square.
 - If it is found out of square, gently put it back in square and drive the next nail
 - Eventually you will have enough nails in the box that it will hold square each time you check it. Here you can go a little further between nails before keeping yourself honest and checking periodically until you are finished.

Or use
clamps to
hold it
square
and nail
away



Frame Rests

□ Protective Coverings



Photo credit: BetterBee

- *Suppliers sell metal strips that are nailed to the inside of the boxes.*
 - The metal strips provide protection from woodenware damage
 - Hive tools can slice or gouge woodenware when dislodging frames
 - Frame Rest also provide a hard surface to scrape against when periodically cleaning deposited propolis on the frame rests.
 - Buy the simple, smooth version of these.
 - Do not buy ones that have guides in them that help space the frames. They are very problematic to work with and create difficulties at times when working frames.



Closing Comments

■ Customary Close

- Where we stand, where we are going...
 - *This lesson closes out tips, tricks, and advice for building hive woodenware.*
 - *Our next topic moves to instruction and methods for painting hive equipment:*
 - **Painting Hives**, Tips and Tricks
 - **Sourcing and Selecting Bees**
 - Being informed **about Packages and Nucs**
 - Learning the important concept that **Beekeeping is Local**



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.*

