3D Cube Cutting Board Design and Build (5/20/2020)

1.0 Dimensioning Lumber

Center boards are ¾" thick (walnut and cherry)
Sandwich boards should be milled and dimensioned to $^{7}/_{16}$" (maple)
Width of boards using 60° angle requires 7" for four strips, 9" for six strips (see Figs. 6-8)
Use hot glue and planer to mill boards wider than 4"
Board length dictated by final cutting board thickness and length … 47" yielded 16" x 2" final
Board height dictated by width of strips … 1.3" x 8 strips = 10 ½" final

1.1 Sandwich Board Glue Up

Glue boards into sandwiches (use stiff underlay to ensure they are flat)

1.2 Ripping

Set blade to 60° angle and install sacrificial board on Incra Fence
Make slabs 1.0" thick (when re-oriented and planed will yield ¾" – same as central board)
Use JessEm hold downs, sacrificial fence, feather board and push stick…TRICKY CUT, BE CAREFUL

2.0 & 3.0 Strip Glue Up

Trim strips to be rectangular; use planer to tidy up strip width and provide edge for glue up
Square boards on one end (after checking which face will be up)
Arrange so that perfect cut is on the bottom. Carefully mark strips for easy assembly.
Glue and clamp as normal (use vertical pressure to prevent strips from buckling)
Check that glued up panel remains square

3D Cube Cutting Board Design and Cutting Instructions

4.0 Cross Cut

Plane from 0.866" to ¾" after strip glue up (same as ¾" central board thickness for 1:1 aspect)
Pick a final cutting board thickness … calculate/optimize board length to utilize full strip length
Crosscut using table saw sled and stop block to ensure identical thickness of the strips

Final Board Glue Up

Flip strips up; every other strip is rotated end-for end after flipping it up. Validate 3D Cube.
Glue and clamp as normal
Check that glued up panel remains square

Final Dimensioning and Sanding

Use roundover bit to prep edges before using planer (if you do not have thickness sander)
Hot glue and stiff underlay as planer sled to secure first surface flat
Sand edges using conical sander or belt sander to square up board (could also use table saw)
Rout 4" long, ⅝" high by 1¼" recess for finger hold
Sand through normal progression of grits to 320

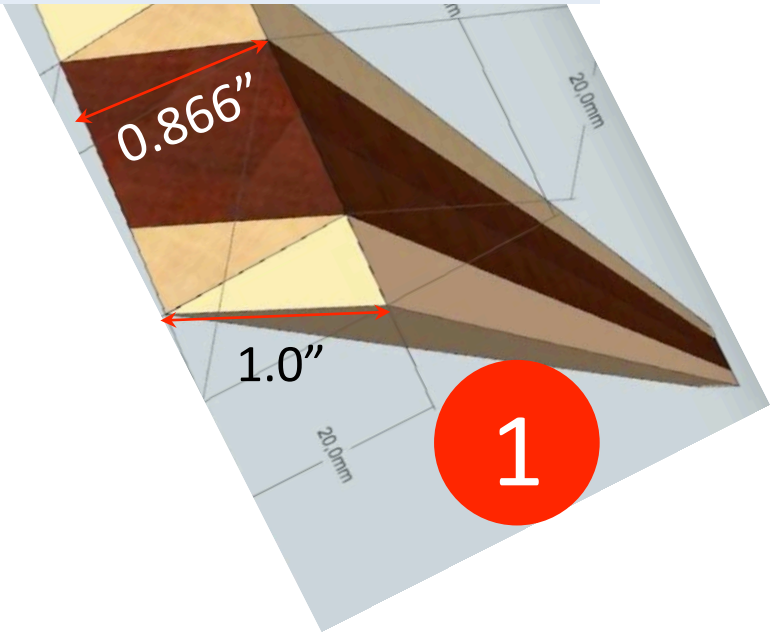
Finish

Saturate with mineral oil over about 4 hours or until the finish is uniform
Top coat with carnauba wax / mineral oil finish

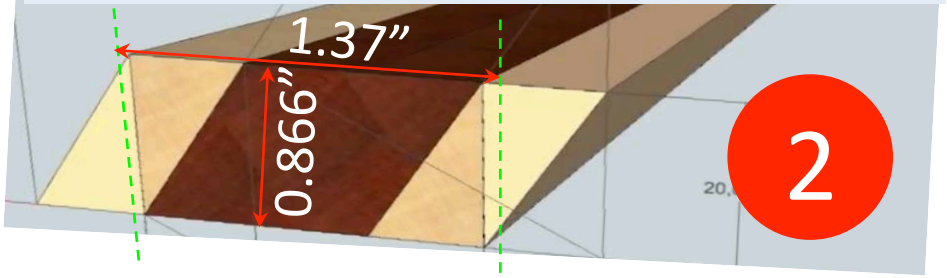
YouTube Reference: https://www.youtube.com/watch?v=5n0LdU8ZOJU

Basic Table Saw and Planing Strategy

Slab Thickness 1.0
Strip Thickness 0.866”



Trim Slightly Proud on Table Saw
Strip Width Approximately 1.37”

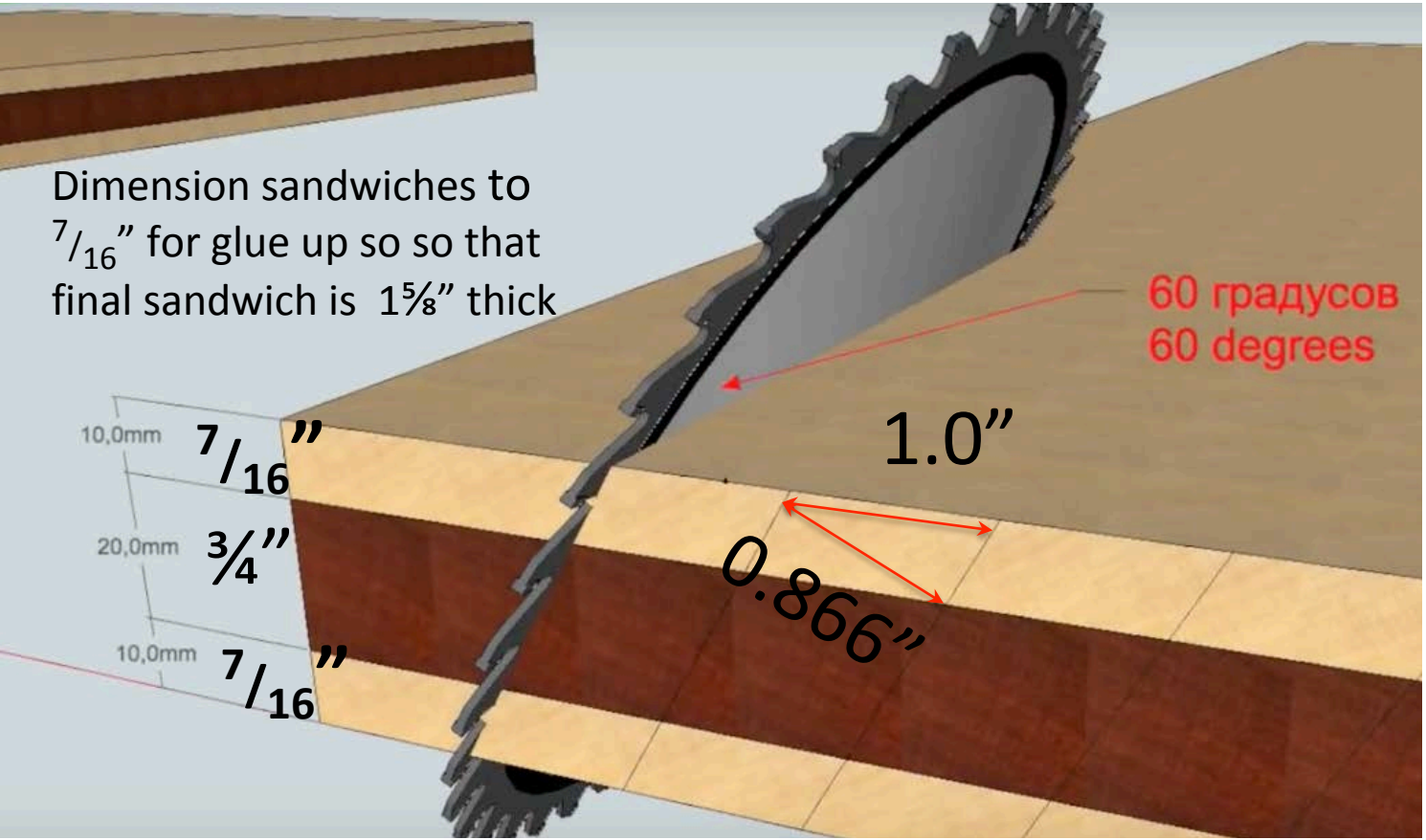


Plane Strip Width to 1.3”
For Glue Up

Plane Thickness Back to ¾”
after Glue Up and Before
Crosscut

Dimensioning Lumber

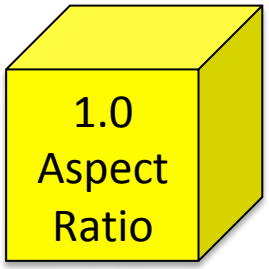
- Center boards are ¾” thick (used darker woods like walnut and cherry)
- Sandwich boards are lighter colored and should be planed to $^{7}/_{16}$” for glue up (maple)
- Width of boards using 60° angle requires 7” for four strips (~1 ¼” for each additional strip)
  - Number of strips determines height of cutting board: 8 strips at 1.3” each is 10 ½“
  - Use hot glue and planer sled to mill wider boards (wider than 4” jointer)
- Strip length dictated by final cutting board thickness, length, kerf width and a safety buffer…
- $L_{Strip}=((T_{CB}+Kerf)*(L_{CB}/(\cos 30°*SlabThickness”))+3\ ½”)$ e.g. L_{Strip}= 44” = (1¾”+⅛”)*(16”/(¾”)) +3 ½”

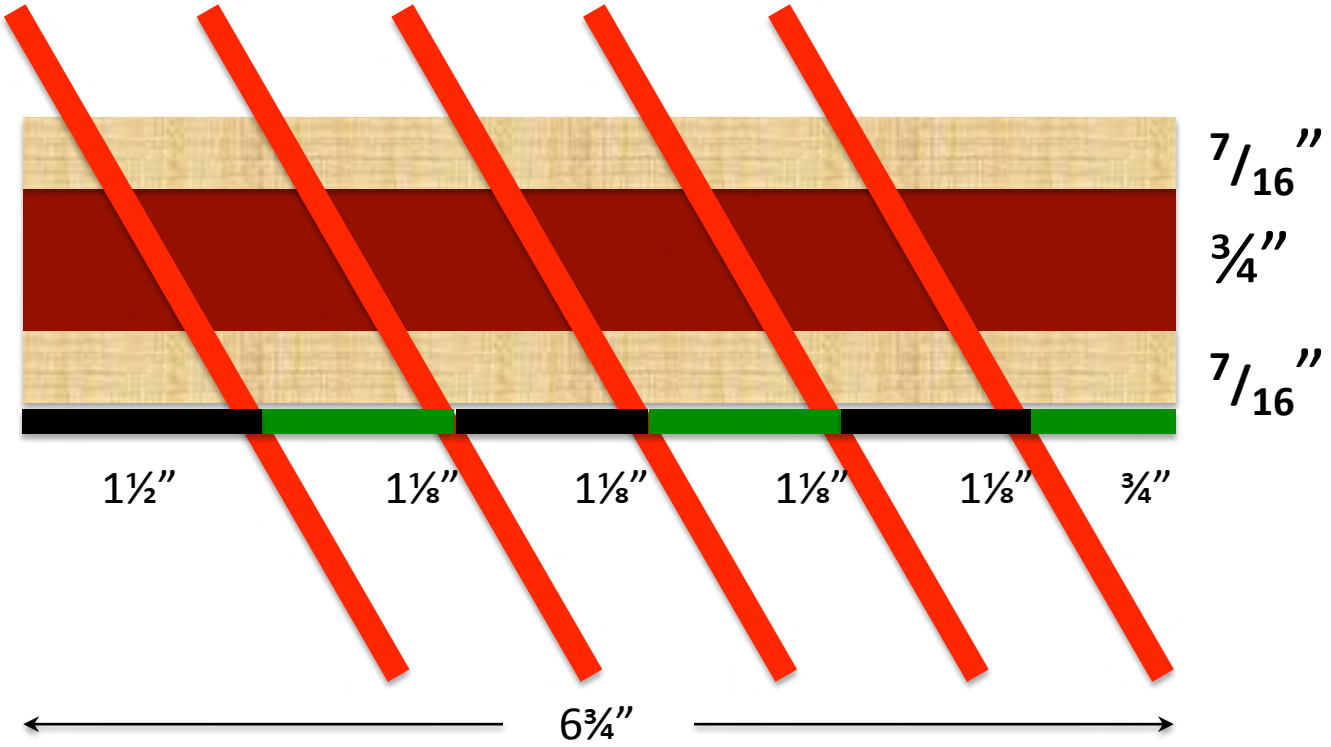


Board Width for Thick Slab is for ¾", 60° Blade and Slab Offset of 1.0"

- 60° blade angle
- Slab offset of 1.0"
- Uses planer to ensure perfect joints and 1:1 aspect ratio
- Use planer to adjust aspect ratio downward

  See Fig. 3, Step 4

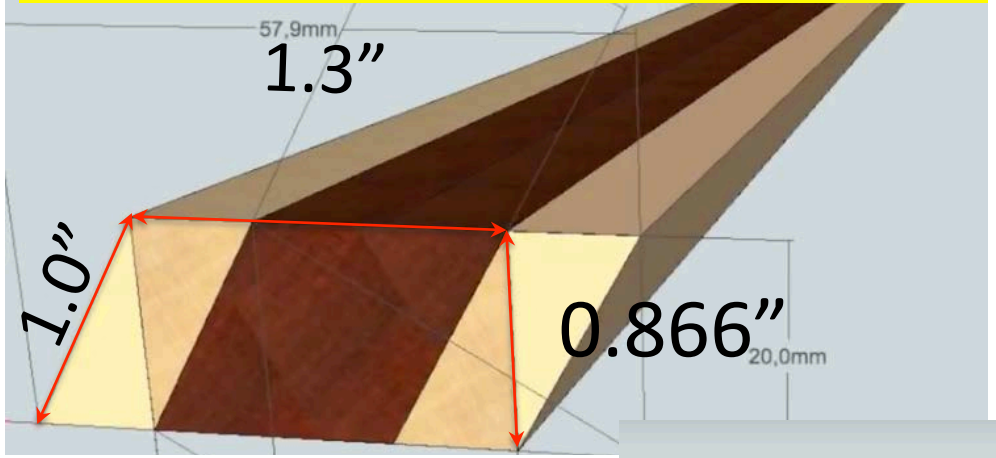




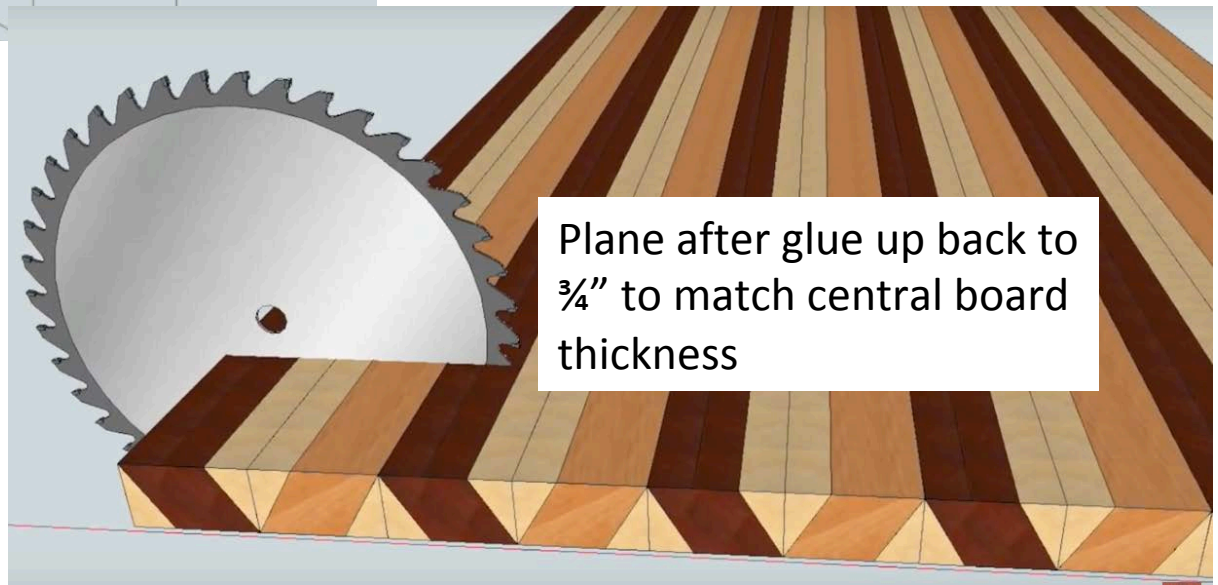
Ripping

- Set blade to 60° angle and install sacrificial board on Incra Fence
- Rip slabs 1.0 ” thick to provide enough material to later plane glued-up strips to ¾”
- Use JessEm hold downs, feather board and push stick … TRICKY CUT, BE CAREFUL

INTERMEDIATE DIMENSION – PRE GLUEUP

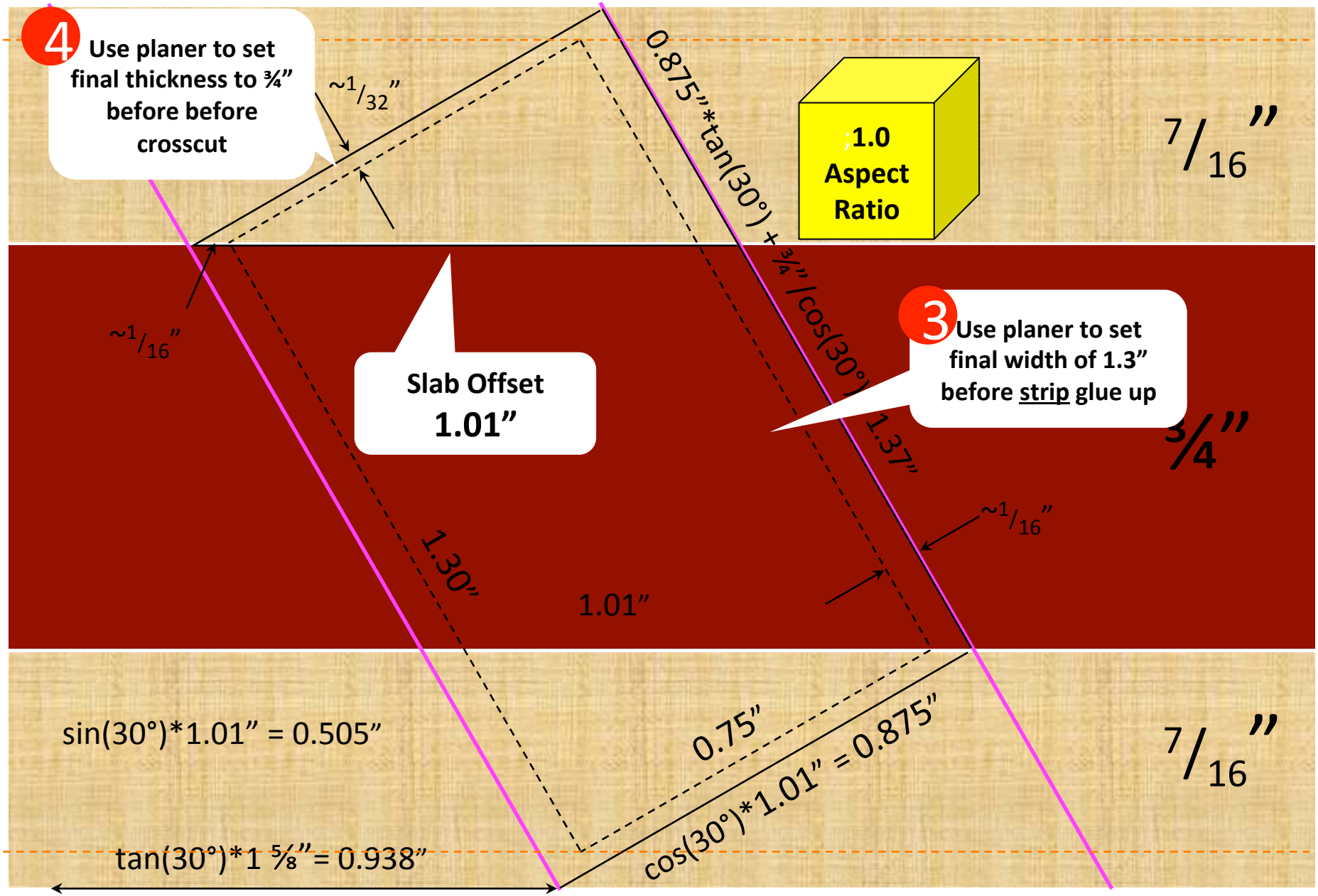


- Use planer to adjust aspect ratio
- Arrange strips to minimize glue lines. Orient strips to put face that needs to be planed up.
- Trim one end of strips for squaring. Glue.
- After glue up, plane panel and crosscut



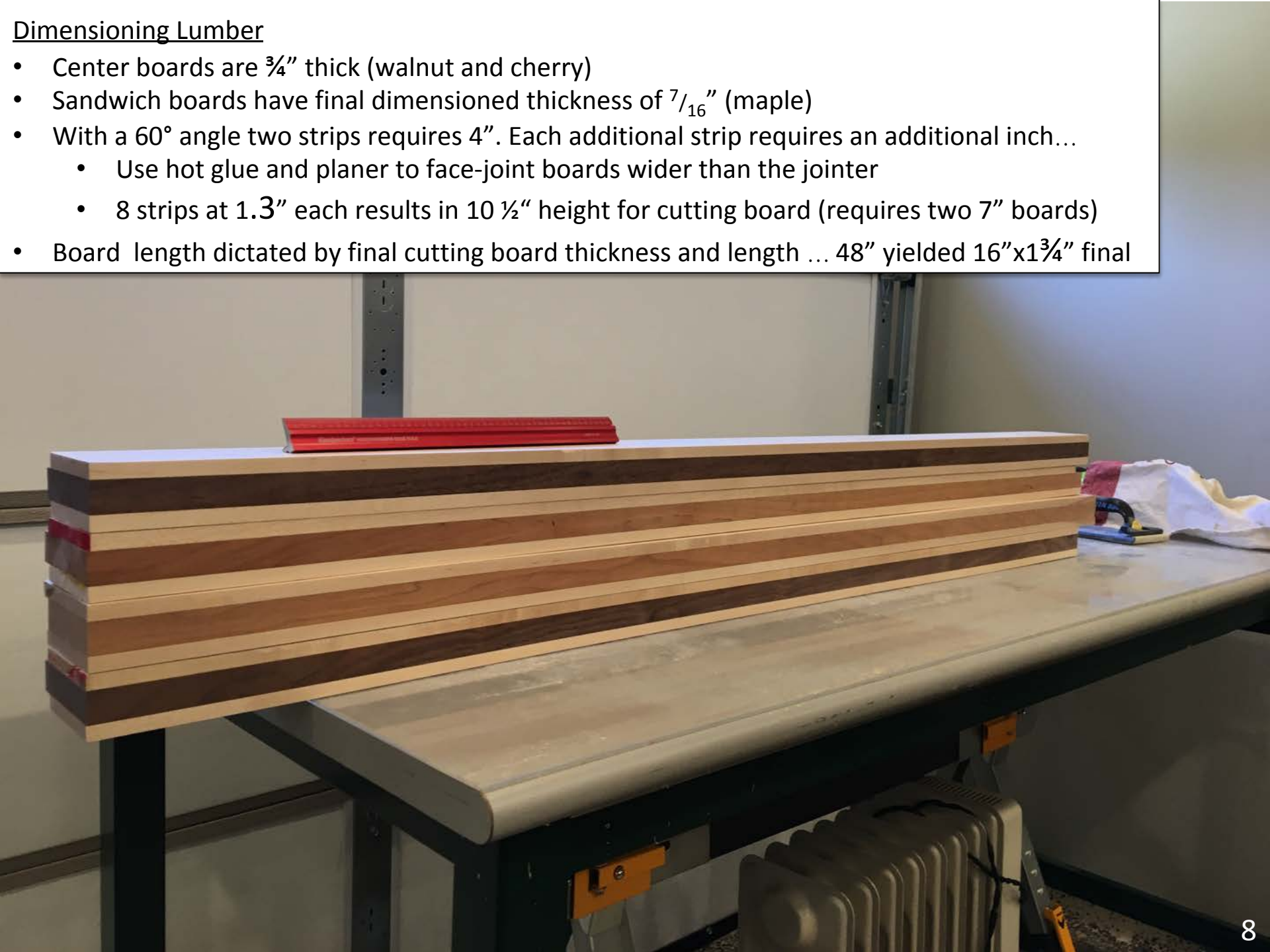
Plane after glue up back to ¾” to match central board thickness

Slab Thickness Necessary to Yield Center Board Thickness ($^{7}/_{16}$”/cos(30°))*2 = 1.01”)



Dimensioning Lumber

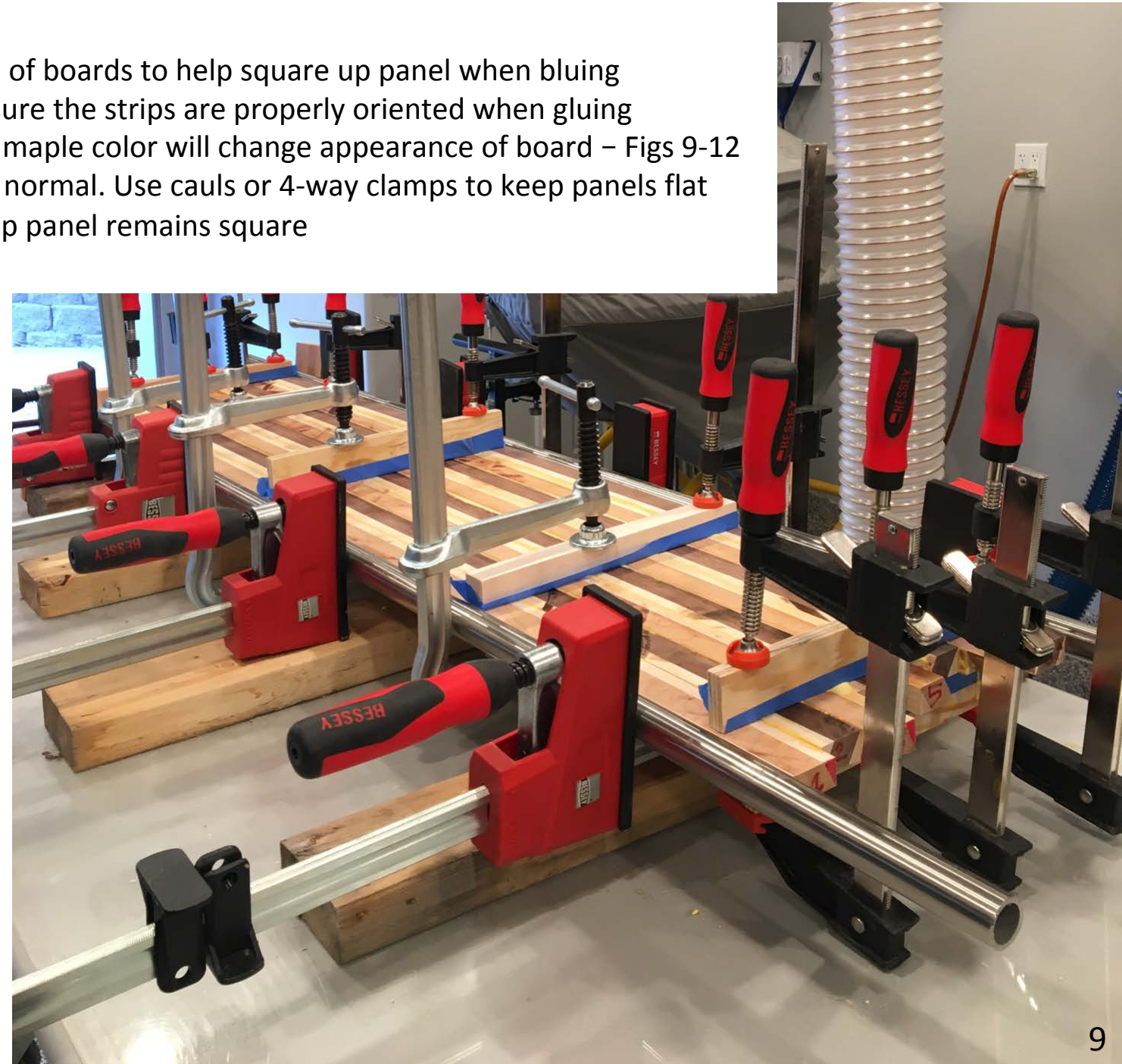
- Center boards are ¾” thick (walnut and cherry)
- Sandwich boards have final dimensioned thickness of $^{7}/_{16}$” (maple)
- With a 60° angle two strips requires 4”. Each additional strip requires an additional inch…
  - Use hot glue and planer to face-joint boards wider than the jointer
  - 8 strips at 1.3” each results in 10 ½“ height for cutting board (requires two 7” boards)
- Board length dictated by final cutting board thickness and length … 48” yielded 16”x1¾” final



Strip Glue Up

- Square off left end of boards to help square up panel when bluing
- Label ends to enusure the strips are properly oriented when gluing

  Differences in maple color will change appearance of board − Figs 9-12
- Glue and clamp as normal. Use cauls or 4-way clamps to keep panels flat
- Check that glued up panel remains square



Final Board Glue Up

- Arrange boards to minimize offsets between cubes
- Check that glued up panel remains square
- Glue and clamp as normal

Final Board Sizing

- Shim board as necessary to have same “reveal” along edge