Lumber Milling

FACE-TO-FACE GLUING PROCESSES
The Lumber Milling Process With Face-to-Face Gluing

Often times, a wide panel made of solid wood is needed – or perhaps a thick, wooden component is needed. In these situations two or more pieces of wood can be laminated together to form a wider or thicker component.

The lumber milling processes used for producing laminated or “built-up” components are similar to that of the single piece processes, but with a few key differences.

- The steps must be followed in sequence to ensure the laminated wooden components produced are: structurally sound, flat, straight, square, and to the specified size.
Considerations Behind the Process

Thick boards are difficult to dry successfully and therefore you will rarely see solid wood boards over 2” to 3” thick. If a thick, wooden component is needed, for a turned stair post for example, it is necessary to laminate two or more boards together face-to-face to achieve the required thickness.

Whether you are gluing boards edge-to-edge or face-to-face it is important to know that properly machined glue joints are *stronger than the wood itself!*
Face-to-Face Process – Step 1

Cutting the individual boards to a rough size is the first step.

- When rough cutting the stock, remember to allow enough extra width on each individual board. When laminating boards face-to-face it is often times necessary to rough rip the material to 3/8” or more oversized in width.
- Often times the boards will “slip” during the gluing process. The increased amount of width given to the boards will help ensure the laminated panel can be jointed flat and planed to its final thickness after the glue has dried.
- For aesthetics, try to match the grain and the color of the individual boards used in the glue-up. Rough cutting all of the individual boards out of the same board will help for grain and color matching.
Calculating the rough cut sizes will vary depending on the final use for the glued-up panel and the number of individual boards used to make up the panel.

- If aesthetics are not important, than the best yield should be considered and the panel can be made from individual pieces varying in thickness.

- If aesthetics are important, than all of the pieces used in the panel should be approximately the same thickness.

These boards have been cut to a rough width and a rough length. The boards will be glued face-to-face to become a thick and wide laminated panel.
Face-to-Face Process Step 2

A semi-flat face is needed to start the process. That means rough joint one face on each board to about 90% clean.

- The goal here is to leave the board as thick as possible. Only remove the minimal amount of material necessary in order to have a 90% smooth and flattened surface. You will be running each board through the planer, in the next step, to clean-up both faces of the board and make the faces parallel to each other.

- **Do nothing with the edges at this point!**
Face-to-Face Process Step 3

Plane both faces of the board to 100% clean. Whether you take the stock to a predetermined thickness or leave it at an oversized thickness, it is a decision that is controlled by the desired final outcome of the laminated piece.

- Do nothing with the edges of boards at this point. You will need the boards to remain at their full rough width in order to have enough material to flatten and smooth the laminated panel down to its final thickness after the glue has dried.

- After all the boards have been planed, layout the order in which the boards will be glued-up. Match grain and color and mark on the boards the desired orientation.

Here all the boards have been planed to a specified thickness. The specifications call for the 10 middle pieces to be 0.75” thick and the two outer pieces to be 0.875” thick.
Face-to-Face Process Step 4

Now that both faces on all of the boards are 100% smooth, flat, and parallel to each other, they can be laminated face-to-face.

- It is critical to ensure all of the glue lines have been closed. Much greater and uniform clamping pressure is required across the entire glue-up.

- To ensure adequate glue is spread across the face of each board, a glue roller is needed. Any areas “starved” for glue will be weak and cause the lamination to fail.

It is important to keep the edges and ends of boards to a close alignment to ensure the glue-up will be oversized enough to yield the final finished dimensions.

Work quickly when spreading the glue. Wood glues typically start to precure in about 2 minutes.
Face-to-Face Process Step 5

After the glue has dried, approximately 24 hours, the dried glue should be scraped off the surfaces. The laminated panel can now be run across the jointer to create a smoothed and flattened surface.

- Only take off the minimal amount of material needed to make the surface smooth and flat.

One face of the laminated panel has been run across the jointer.
Face-to-Face Process Step 6

The laminated board can now be run through the planer to bring it to the specified thickness.

- Inspect the panel for any defects in the glue lines. It is easier to make repairs at this point in the process before proceeding onto the remaining steps.

Both sides of the panel are now smooth, flat, and parallel to each other. The panel is now at the specified thickness.
Face-to-Face Process Steps 7,8,9,&10

At this point, the remaining processes are the same as you would use for single-piece and edge-to-edge lumber milling.

• Joint one edge straight
• Rip to final width plus 1/16”
• Joint the sawn edge to bring the part to its finished width size
• Crosscut one end square
• Crosscut the other end to finished length.

In this particular example, steps 8,9,10,&11 will be done following a different set of processes. This block will be used for the clip-board exercise.
Clip Board Exercise

You will be using the face-to-face milling process as part of the clip board exercise. Be sure to follow the directions carefully as you fabricate the block that will be used for your exercise.

• Only bring your laminated block to step 6. Do not cut your block to the finished width or length size at this point.

• Write your name on the laminated block and turn it in to the Instructor for evaluation.

• After evaluation, store the laminated block in your locker. The remaining clip board machining processes will happen later in the course.
Final Outcome

• Following these lumber milling steps in their exact order will ensure you are producing laminated parts that are flat, straight, square, and to the specified thickness, width, and length.

• Be sure to allow adequate curing time for the glue. Typically, PVA wood glues reach 80% of their strength after only 30 – 40 minutes. This however is not enough time to let moisture from the glue evaporate from the wood. Sunken glue joints are the result of machining before the wood has dried.

• Lumber milling is THE essential first step in countless woodworking tasks. You will use these steps throughout the course and in your career as a professional woodworker. Taking care to perform these steps accurately will save time, material, and frustration. These steps will become easier with repetition and experience.

• Remember: producing parts that are almost square or almost the right size will produce parts that almost fit.