Panel Saw lesson Plan
GWG equipment training

Course number: PS101, v1.0
December 28, 2006

Objective:

1) To acquaint the student with the proper methods of operating the Greenville Woodworkers Guild panel saw
2) To teach the student the safety procedures necessary while operating the panel saw.
3) Have the student setup and make basic cross cut and rip cuts using the panel saw.

Materials:

1) Small scrap piece of plywood to be used for test cuts; the plywood should be at least ½" thick and at least 2'-0" long

Training limitations:

1) Optimum class size: 6 or less
2) Class duration, one session, 1-1/2 hours long

Lesson Plan

1.0 Introduction to the Panel saw

1) Describe the purpose of the panel saw:
   a. Intended to cut sheet goods into square or rectangular pieces.
   b. Cross cutting: movable saw mounted on guide rails that are perpendicular to the bottom roller fence.
   c. Ripping: saw rotates in carrier to orient blade parallel to the bottom roller fence, and may be raised and lowered to establish the "width" of the rip.
   d. Maximum cross cut: 50", Maximum rip cut: 96", Max thickness: 1-3/4"
2) Describe how the saw works
   a. Cross Cutting a panel – the saw blade is aligned with cutting lines or marks by moving the sheet on the bottom roller fence until it is properly positioned. Being sure that the saw is raised above the sheet, turn the saw on. Slowly and smoothly pull the saw downward on the guide rails until the saw is at the bottom of the travel. Turn off saw, and move cut pieces away from the blade when it stops turning.
      i. Inspect the guide rails, the "U-bolt" rail bearing, the roller fence, the saw on-off switch, the saw mounting plate and carriage.
      ii. Demonstrate how the saw travels on the guide rails.
      iii. Demonstrate how to rotate the saw from Cross-cut to Rip cut position.
      iv. Demonstrate how the sheet rolls on the roller fence into position.
   b. Rip Cutting a panel – the saw blade is rotated to the horizontal cut position, and set above the roller fence to the desired rip width. The clamping knobs are tightened to hold the saw in the proper position. Spacer wedges are placed on the out-feed side of the saw to prevent pinching the blade as the sheet is fed through the saw. The sheet is placed on the in-feed side of the saw and slowly and smoothly fed into the saw blade. As the sheet exits the saw, add wedges in the saw kerf.
      i. Inspect the saw plate rotation mechanism, and the turn table index pins that lock the saw into position.
      ii. Demonstrate how to set the saw at a desired rip width.
      iii. Point out the carriage lock knob and demonstrate its use.
      iv. Demonstrate how to install the wedges as the sheet is fed.
      v. Discuss the proper procedures for "pushing" the sheet through the saw in the rip position.
      vi. Discuss the proper procedures for "pulling" the sheet through the saw in the rip position.
      vii. Discuss the need for assistance to handle the cut portions of the sheet on the out-feed side of the saw when ripping sheets.

3) Safety procedures
   a. Never attempt to cut used wood or treated wood.
   b. Inspect the saw, roller fence and table frame; remove any debris, scrap wood and tools.
   c. Never wear loose clothing or jewelry when operating the saw.
   d. Always wear safety glasses when operating the saw.
   e. Never reach under the saw mounting plate or Carriage.
   f. Do not poke wooden sticks or other objects under the saw mounting plate or Carriage when the saw is running
   g. Always run the dust collector when operating the panel saw.
   h. Never leave the saw running unattended.
   i. Raise the saw well above the work piece before turning it on when Cross-cutting.
   j. Always Cross-cut from the top down.
   k. When Cross-cutting, use clamps if necessary to stabilize the wood.
   l. When Cross-cutting, be certain that the sheet is supported by at least two rollers
   m. When rip cutting, use wedges in the saw kerf to prevent binding and kickback.
   n. When Cross-cutting or Ripping, keep hands clear of the saw and path of the blade during cutting to avoid injury if a kickback occurs

2.0 Laying out your cuts

Because the panel saw is not well suited for stopped cuts, planning the cut list and layout is very important. You will want to rip cut as many pieces to the same width as will be needed without changing the setup. This is because locating the desired width is difficult and somewhat by trial and error. Some times this requires that a specific rip cut width will be made on several different sheets of plywood, and the balance of those sheets is then cut to other widths and lengths to complete the project cut list.

For example, I want to make a book case with one fixed shelf. The outside dimensions of the book case are 30" high x 40¾" wide x 18" deep. The shelf will be 16" deep to allow for future door clearance. All corners will be made using a ⅜" x ¾" rabbet. The shelf will be mounted in a ¾" x ⅜" deep dado. You have ¾" plywood available for this project

The cut list is:

2 pc.	Side	30"x18"	¾"x⅜" dp. rabbet ea. end and one long edge, 16" dado centered
2 pc.	Top/Bot	40"x18"	¾"x⅜" deep rabbet on one long edge
1 pc.	Back	40"x29¼"	¾"x⅜" deep dado, 40" long, centered
1 pc.	Shelf	40"x16"	no modification

Discuss layout,

Special emphasis that all cuts must go all the way across the material.
Max cross cut is 50"; plan cuts longer that 50" for ripping
The panel saw doesn't replace a Table Saw,
Always consider the best equipment to use for any cut: Panel saw, Table saw, Miter or Band saw.

Student exercise: Layout the cuts for the above cabinet making the best use of material and the fewest number of setups possible

3.0 Procedures for Cross-Cutting a panel

1) Cross cutting is any operation cutting a panel perpendicular to the bottom roller fence. Panel saws are not well suited for stopped cuts and all cuts should completely cut a panel into two parts
2) Cross cutting is always done using a vertical cut with the saw carriage starting in the upper most position and moving it downward through the panel. Care must be taken never to place your hand in the path of the saw cut.
3) Position the saw in the cross cutting position with the saw blade oriented vertically by rotating the saw mounting plate if necessary. To rotate the saw carriage:
   a. Pull the indexing pin (located to the left of the blade guard)
   b. Rotate the carriage placing the motor on the right side of the saw
   c. Allow the indexing pin to snap into the hole when the carriage is properly rotated.

4) Loosen the Carriage Lock Knob located on the left guide rail and raise the saw to the top of the guides.
5) Carefully mark the desired cut position on the panel and extend the mark onto the work piece edge.
6) Place the work piece on the right (infeed) bottom roller fence with the cut mark on the top edge
7) NOTE:
   a. The work piece must be wide enough to be supported by at least two fence rollers when in position to be cut.
   b. Cuts removing a narrow cut-off (one inch or less) must be made with the work piece to the left of the saw and the drop on the right side of the blade to avoid jamming between the blade and the chatter guard located inside the blade guard cover.
8) Roll the work piece under the saw and align the saw blade with the cut mark paying careful attention to which side of the cut mark will be the saw kerf. Scales on the frame will assist in locating the panel, but measurements while in position and observation of the blade at the cut mark should be used to confirm the cut.
9) Once positioned, secure work piece in position with clamps, or hold it firmly in position without placing your hand above or below the saw in line with the cut.
10) Thin materials, such as Formica, must be backed with scrap piece of plywood covering the vertical frame behind the saw. Consider using the Table saw or router for thin material.
11) Turn on the Dust Collector and open the gate at the panel saw.
12) With the saw positioned well above the work piece, loosen the Carriage Lock Knob and grasp the handle on the saw carriage. Lift the On/Off lever switch to start the saw.
13) Allow the saw to come up to speed before moving the carriage to engage the work piece.
14) Make a "nick cut" and withdraw the work piece. Measure and verify the position of the cut.
15) Move the saw carriage slowly and smoothly down through the work piece until the carriage contacts the bottom end-of-travel stop.
16) NOTE: If the saw binds or stalls during the cut, stop the saw motion and press the switch into the "OFF" position. Do Not attempt to re-start the saw. Adjust the work piece to relieve the cause of the bind and raise the saw carriage until it is clear of the work piece. Make necessary adjustments and re-start the cut.
17) When the saw carriage has completed the cut, press the on-off switch to the off position and wait for the blade to stop spinning.
18) Remove the pieces by sliding then away from the blade on the roller fence
19) Raise the saw carriage to the top of the guide rails and lock into position by tightening the Carriage Lock Knob.

4.0 Procedures for Rip-Cutting a panel

1) Rip Cutting is a horizontal cut made by fixing the saw carriage on the guide rails and passing the work piece through the saw blade while sliding it on the roller fence. Panel saws are not well suited for stopped cuts and all cuts should completely cut a panel into two parts
2) Place the saw in the rip-cutting position with the saw blade oriented horizontally by rotating the saw mounting plate if necessary. When feeding the work piece from right to left, the saw motor is positioned at the upper part of the carriage. To rotate the saw carriage:
   a. pull the indexing pin (located to the left of the blade guard)
   b. Rotate the carriage placing the motor above the saw
   c. Allow the indexing pin to snap into the hole when the carriage is properly rotated.
3) The Panel Saw is located so that an eight foot sheet can be ripped, passing the work piece from right to left. Removing the pieces will require care and the clearance will be tight.
4) Ripping operations are very difficult to perform without two people. Do not attempt to cut large pieces without assistance.
5) Loosen the Carriage Lock Knob located on the carriage at the left guide rail and raise or lower the saw to the desired position above the roller fence for the rip cut to be made.
6) Carefully mark the desired cut position on the panel and extend the mark onto the work piece edge.
7) Place the work piece on the right (infeed) bottom roller fence with the cut mark on the leading (left) edge
8) NOTE: the work piece must be wide enough to be supported by at least two fence rollers at all times during the cut

9) Roll the work piece into contact with the saw and align the saw blade with the cut mark paying careful attention to which side of the cut mark will be the saw kerf. Scales on the frame will assist in locating the panel, but measurements while in position and observation of the blade at the cut mark should be used to confirm the cut.
10) Tighten the Carriage Lock Knob.
11) Thin materials, such as Formica, must be backed with scrap piece of plywood throughout the length of the cut. Panel saws may not be the best choice for this operation, and using a table saw should be considered.
12) Panels that are warped, bowed or that do not support themselves well may bump into the frame members preventing them from being fed smoothly through the saw. A helper can assist by guiding the material over the frame.
13) Turn on the Dust Collector and open the gate at the panel saw.
14) With the saw positioned properly grasp the handle on the saw carriage. Lift the start lever to start the saw.
15) Allow the saw to come up to speed before engaging the work piece.
16) Make a "nick cut" and withdraw the work piece. Measure and verify the position of the cut.
17) Move the work piece slowly and smoothly through the cut
    a. It is best to have an assistant guide the work piece along the outfeed roller fence
    b. As the work piece clears the carriage guide rails, the assistant should insert wedges into the saw kerf to prevent the weight of the upper piece causing blade pinch and possible kickback or binding
18) NOTE: If the saw binds or stalls during the cut, stop all motion and press the switch into the "OFF" position. Do Not attempt to re-start the saw. Adjust the work piece to relieve the cause of the bind and withdraw the work piece. Make necessary adjustments and re-start the cut.
19) As the trailing edge approaches the right carriage guide rail, the operator stops pushing and the cut is completed by pulling the work piece from the outfeed side of the saw.
20) As the panel exits the saw, take care that the upper piece doesn't fall off of the lower piece causing injury or damage to the saw.
21) When the work piece is clear of the saw, press the On/Off switch and allow the blade to stop turning before removing the pieces.
22) When making rip cuts 1" wide or less, the narrow cutoff part must be on the top to avoid jamming the cutoff between the blade and the chatter guard located inside the blade guard cover.

5.0 Other notes

1) Storing the saw on completion of your work
    a. Rotate the saw carriage plate to the vertical (Cross Cut) position.
    b. Raise the carriage to the full up position and snug the Carriage Lock Knob.
    c. Close dust connection gate and turn dust collector off.
    d. Cleanup the saw and surrounding area using a vacuum cleaner
2) Duplicating cuts
    a. Repeated length Cross Cuts are made by clamping a scrap piece of wood onto the roller outfeed fence at the desired position. The stop block may also be attached to the frame if that is more convenient.
    b. Duplicate rip cuts are made easily with a panel saw. No change of setup is required. The work piece is simply run through the saw as many times as needed.

6.0 Practice cutting

1) Each student sets up the saw for a 3" cross cut and makes the cut
2) Each student sets up the saw for a 3" rip cut and makes the cut.
3) Alternating the type of cut will enable each student to have the experience of rotating the saw carriage for the next cut.

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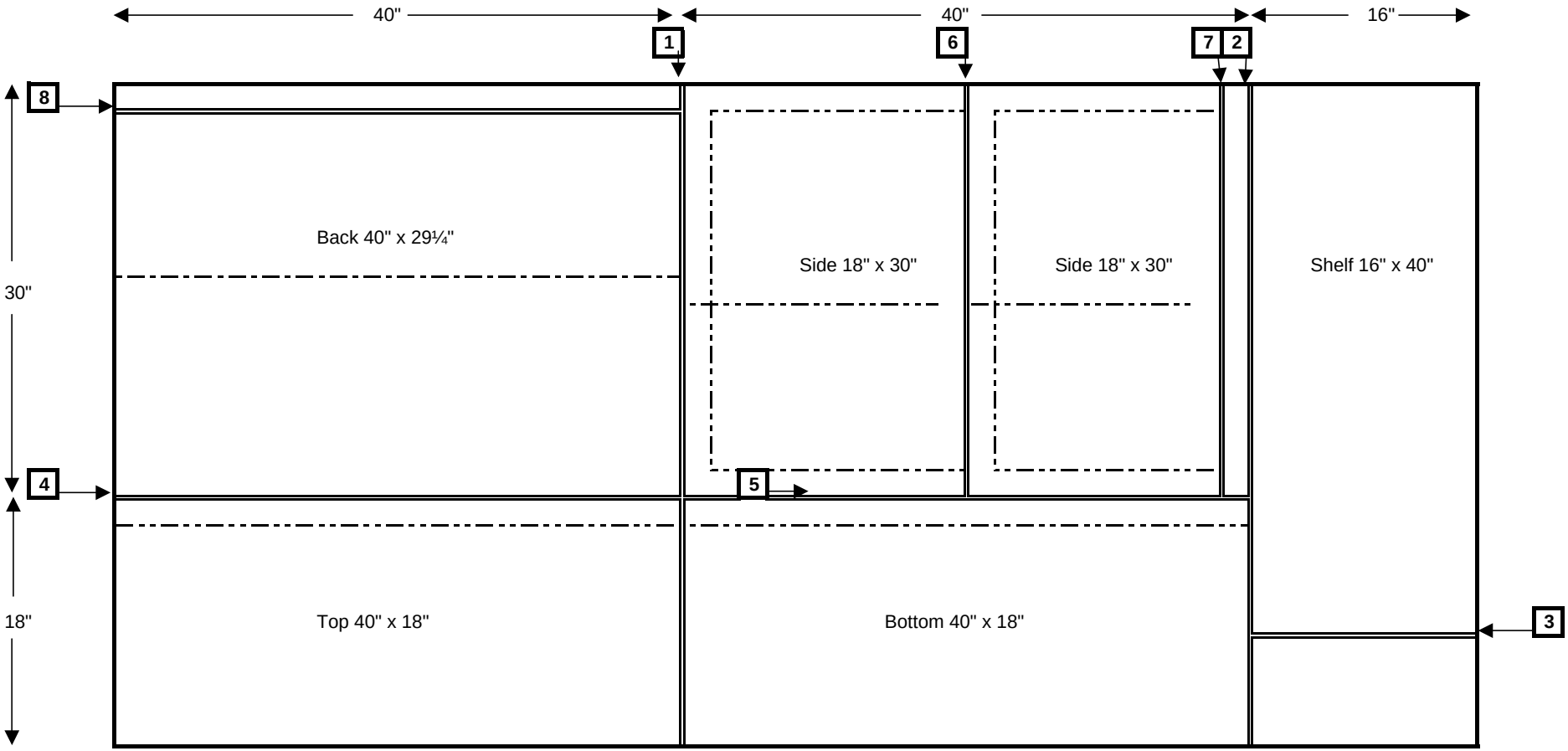
H.Ireland, Dec 28th, 2006



1, 2	Cross cut at 40"
3	Cross cut at 40"
4, 5, 6, 7	Rip at 18"
8	Rip cut L to R at 29¼"