Beyond ABC

These notes refer specifically to push cuts with a bowl gouge. However, much of the information is helpful or even directly applicable in understanding pull cuts with a bowl gouge as well as cuts with spindle tools such as the skew, spindle roughing gouge and spindle gouge.

Anchor:

1. Stance

a. Stand at the lathe with your feet apart and your knees flexed. Keep your upper arms closed to your sides as much as possible. Power to feed the tool into the work should come from your leg muscles. Your quads are the biggest muscles in your body so will allow you the greatest control and endurance. Arm muscles alone, by comparison, provide far less control and have less endurance.

Default stance is comfortable and relaxed, feet shoulder width apart, knees flexed, shoulders relaxed. Your body is the tool holder and adds mass to the tool <u>if your arms are against your sides</u>. Keep the tool on your hip whenever possible. Hold the tool at a downward angle to allow it to make a shearing cut.

2. Body

a. Lower (hips and legs)

i. <u>*Knees bent for joint mobility*</u> You cannot turner bowls with straight legs.
ii. Power comes through your body from the legs.
iii. When reaching across the lathe (i.e. coring the inside of a bowl), engage the lathe with your hip to add stability.
iv. Lateral and transverse motions (see photos below) are combined to make curving motions.

Knees locked keeps your feet planted and prevents any lateral or transverse motion of the upper body. The only movement possible is rotation at the hips.

Knees flexed allows full range of movement. Feet parallel to the lathe allows lateral movement (parallel to the axis of rotation).

Knees flexed. Feet perpendicular to the lathe allows transverse motion (across the face).

b. Upper (trunk and arms)

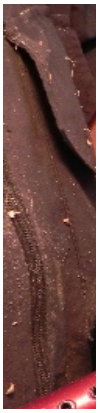
i. Keep your upper arms closed to the body whenever possible for stability.

ii. When you must reach away from your body, endeavour to bring your upper arm back against your body before any other motion.

3. Tool rest

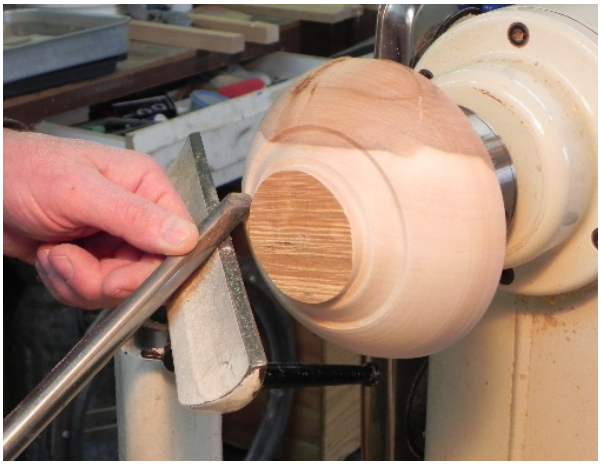
a. If the tool is supported on the wood – do not engage the tool rest with your hand.

i. Your hand and/or fingers against the rest will limit your range of motion.



In both these cases the tool cannot be extended past the tool rest to create the desired form beyond the existing cut.

Not allowing your hand or fingers to engage the tool rest allows free movement of the tool. Trust the bevel to guide and support the tool.



b. If the tool is <u>not supported on the wood</u> – <u>engage the tool rest</u> with your hand to provide support for the tool.

When the tool is not yet on the wood, provide support for the tool by engaging the rest with your forward hand until the cut is established. Once there is enough bevel on the wood to support the tool, disengage your hand/fingers from the rest.

c. Definitely engage the tool rest and use as support when…
   i. Cutting a lot of air (rounding from square, natural edge, multi axis)
   ii. Eliminating chatter (the tool is unsupported) - very short travel i.e. ¼" – ½"
   iii. Need for tight control in some cuts: i.e. beads and coves

Bevel:

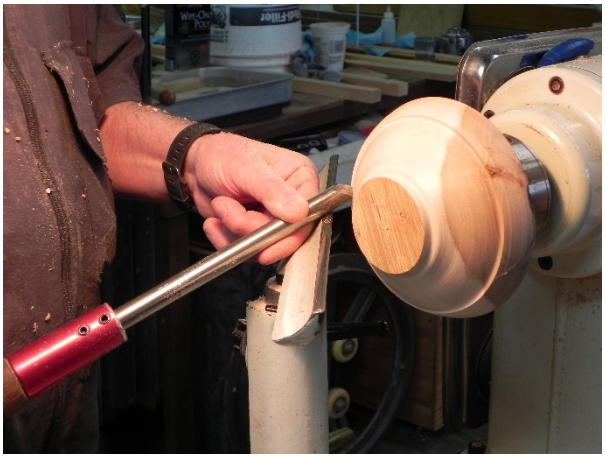
1. The bevel points the way

A turning tool is just like a rear wheel drive vehicle. The power should come from the back. Even though the power is in line with the turning tool, the path that it follows is determined by the position of the bevel, eliminating the ne ed to "pull' the tool in that direction.

2. During a cut, the bevel must be in contact with the wood to provide support for the tool. Think in terms of using the bevel as a guide. It must remain on the wood but too much pressure causes heat and tool breakdown and can also initiate a chatter by compressing soft areas of the wood, then rebounding in harder areas. There is a fine line between "just right" and "too much". Remember Goldie Locks: just right.

3. Grip - <u>your front and back hands have two different jobs</u>
   a. Your front hand's job is to keep the bevel on the surface. The direction of force should be approximately 90° to the bevel. This pressure should not be extreme.
      i. <u>"Steering/powering" with front hand</u> tends to relieve the pressure of the bevel on the work. In some cases, this can actually lift the tool off the work.

In both these grips there is a tendency to pull the tool off the work. The grip will allow/encourage the turner to power the tool into the cut with the forward hand, thus pulling it off the work. The force applied will relieve pressure on the bevel or actually lift the bevel off the work. The lower photo shows the fingers just on the back side of the shank allowing the turner to pull the tool.



ii. Fingers behind tool shank will relieve pressure on the bevel
iii. Fingers between tool and rest will limit the travel of the tool

b. Your back hand feeds the tool into the cut and controls the "openness" of the flute.
   i. Power from your legs is transmitted through your body to the back hand.
   ii. Power from back hand also helps keep the bevel on the work.
   iii. The openness of the flute affects the cutting angle. Often an adjustment of a few degrees has a dramatic effect on the ease of cutting.

4. Rotation for flute adjustment
   a. Rotation of the tool for flute adjustment should be done as if the tool is rotating around a central axis running the length of the tool.
      i. To keep the tool rotating on this axis, this should be done with a "wrist up or down" motion to maintain the established angle of the bevel.
      ii. A "hand up or down" motion causes a rotation but sweeps the tool handle in an arc which alters the angle of the bevel and the tool to the wood.

5. Introducing the tool onto an established cut.
   a. Always place the heel of the bevel on the wood first. Once the heel is on the wood, close the gap between the cutting edge and the wood until dust appears over the cutting edge.

b. Never lead with cutting edge. At the least you will have no control over the initial direction of

the cut. At worst, this will initiate a catch.

6. Establishing a new cut (tool not supported by the wood): Approximate the desired bevel position before entering wood, engage the tool rest with your hand to support the tool, initiate the cut, once the tool is supported on the wood disengage the hand from the tool rest. “Watch the horizon” (silhouette of the form) to see the resulting cut. On the inside of a bowl, watch the cut progress on the opposite side from the cut. Adjust the bevel angle as required to create the desired form

Cut:

1. Adjusting cutting edge for optimum cut.

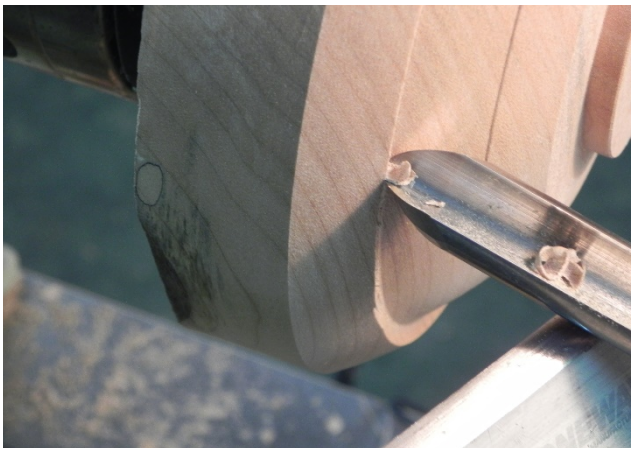
    a. Gouge: Rotate tool to adjust flute for optimum cutting angle.
        i. Overall, the flute of a bowl gouge will be facing the direction of the cut.

ii. The flute is "fully closed" when 90° to the rotation and is the least aggressive, suitable for starting a cut. Unfortunately, there is little shear produced and the tool more or less "pushes" the wood off so needs to be rotated to the ideal cutting angle after the cut is

initiated.

iii. The flute is fully open when facing upward and is extremely aggressive to the point of certainly causing a catch.

iv. The most ideal position for the flute depends on the wood species, dryness, overall angle of the tool to the work, feed rate and probably other conditions. About 45° to the horizontal usually produces a clean cut so it is advisable to adjust the flute angle to



achieve the cleanest cut. Often a degree or two can make all the difference. (See #4 under
"Bevel")

b. Tool angle to the horizontal affects the cutting angle.
    i. If your tool rest and lathe height (spindle at elbow height) are adjusted properly any tool will typically be held at an upward angle to the wood with the shoulders relaxed and upper arms at your sides. This generally produces a suitable shear angle for the cut.

    ii. At times, turners become tense while turning due to uncertainty or fatigue. This often results in the shoulders rising which causes the tool to he held horizontally or even downward. This negatively affects the overall cutting angle of the tool. Try to recognize this situation, relax your shoulders, stretch and take a short break – perhaps sharpening the tool.

c. The direction of the cut is controlled by your upper body rotation as noted above in "Anchor - #2-Body. Even during those times when it is impossible to close your upper arms against your body (e.g. reaching across the lathe when coring the inside of a bowl) you should attempt to bring the upper arms toward the body in the first stages of the cut.

> A good way to initiate a cut is to "lever" the tool into the work rather than a straight push. Holding the tool at a significant downward angle, place the cutting edge just at the face of the wood – without actual contact – then using the tool rest as the pivot point, lift the tool so that it enters the wood. You have two advantages when using this method. First, you have to lift the back of the tool a few inches compared to the fraction of an inch that will penetrate the cut, so there are no sudden forces placed on the tool. Second, you have brakes; something you don't really have when pushing. To stop, all you have to do is stop lifting the back of the tool. This is also a great way to make a controlled exit from a cut.

The Anatomy of a catch:

1. A dull tool.
    a. What remains of the cutting edge on a dull tool is slightly above the line between the toe and heel of the bevel, so there is a tendency to angle the cutting edge to make it cut. In doing so the bevel is lifted off the wood allowing the cutting edge to dig in resulting in a catch.
    b. Solution: sharpen the tool.
2. Leading with the cutting edge rather than the heel.
    a. Addressing the wood with the cutting edge first causes the tool to dig in, since the bevel is unable to support the tool.
    b. Solution: Contact the work with the heel of the bevel first. Always lead with the heel (see 5 b. under "Cut").
3. Load/support points not in line with rotational force.
    a. The contact or support point of the tool on the rest should be directly in line (90° to the axis of rotation) with the cutting point on the wood. When not in line, this will cause the cutting edge to rotate into the wood, causing the catch. In the photo below the line on the right represents

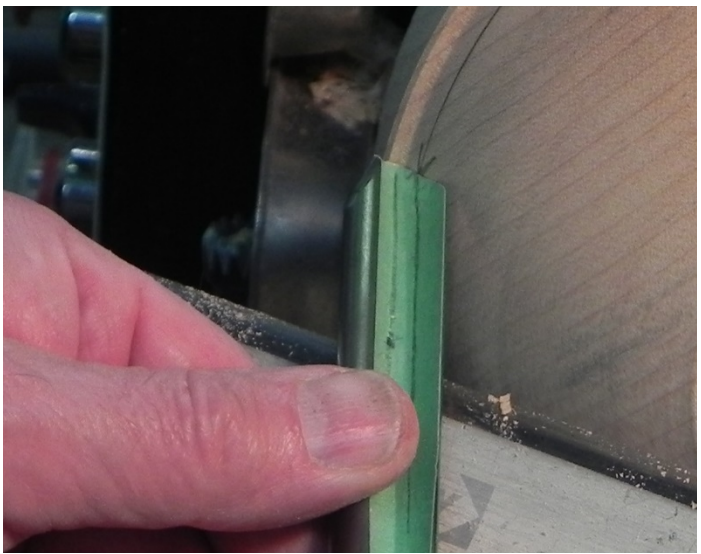
the cutting or load point. The line on the left represents the contact or support point. The distance between the two represents the leverage the load has on the tool, causing it to twist.

b. When the points are in line, the force acts along the length of the tool so we have a significant mechanical advantage with the length of the tool behind the rest compared to that beyond the rest. Body mass alone is enough to resist this steady cutting force.
c. When the points are not in line they impart a rotational motion to the tool so the only mechanical advantage is the diameter of the tool compared to the cutting point away from center, which can be very little indeed. Reaction time and muscle strength are typically not enough to resist this sudden cutting force.
d. Solution (all tools): Always keep the contact and load points in line by adjusting the angle of the tool to the work. If consciously setting the cutting point slightly out of line, be prepared for the rotational forces and keep the misalignment to a minimum.
e. This knowledge will allow you to use the wing effectively. To align the load and support point on the outside of the bowl it is often necessary to hold the tool almost vertically to align the

> Hint: Aligning the load point with the support point is what makes the "sweet spot" on a skew the sweet spot. Knowing this and always addressing the wood with the heel first will eliminate catches with this misunderstood tool.

two with the rotational force of the work

4. Flute position
    a. "Coming around the corner": the scene of the ***mother of all catches***
        i. When using a bowl gouge with a swept back grind, do not allow the cut to take place on the swept-back portion if the flute is in or near the open position (flute facing up [toward the direction of the force]). This most often occurs inadvertently when shaping the outside form of a bowl toward the end of the cut near the rim. Turners intuitively learn that they can keep the bevel on the work by gradually rotating the flute to the open position rather than rotating their body to keep the flute on a more closed position. Sooner or later the load point is far enough from the support point (see #3 c &



d above) that a catch occurs. Considering the diameter and rim speed of the workpiece, this catch makes a skew catch on a piece between centers look peaceful.

b. Entering a face cut: the “rim destroyer”.
   i. When entering a face cut (e.g. cutting the inside of a bowl) the flute should be completely closed. The rotational force where the tool enters the work (approximately 9


o’clock plus) is vertical. If the point of the tool entering the work is at an angle rather than in line with that downward force, the reaction is to cause the tool to travel in the direction the flute is leaning – usually outward. While the reaction is negligible at the smaller diameters, it becomes progressively more evident at greater diameters (and speed).

   ii. The solution is to enter the work with the flute completely closed, in which case the contact point of the tool will be in line with the force causing no lateral motion of the tool. Often the tool appears to the turner as being closed, but leaning over the tool and looking straight down at the wings of the flute, it is evident that the flute is still partially open. “Levering” the tool into the work rather than a direct push allows much more control, so engaging the work is much smoother, enhancing control.

   iii. Once the tool has entered the cut, providing a small “land” for supporting the tool, it is then possible to slowly open the flute to a more effective cutting angle