Turning gouge bevel angles, another viewpoint
By Lyndal Anthony

Critical Thinking

My method is the best. This angle is the perfect angle. This is the "magic" tool that outperforms all of the competition! Are these claims real or myth?

How do these beliefs get started, or more importantly, why are they perpetuated? It is simple, people tend to take something that "sounds" logical and since it works in certain situations, it becomes a presumed fact.

Critical thinking will require research and careful thought. First you need to do the basic research. How many articles can you find on sharpening angles? How many methods and different cutting tools use a cutting angle? What kind of material are you cutting? What specific instance are you trying to perform? Compare all of the given information and see if there are any common threads within those statements is a good way to start. If there are differences, then start looking deeper.

Is your tool sharp?

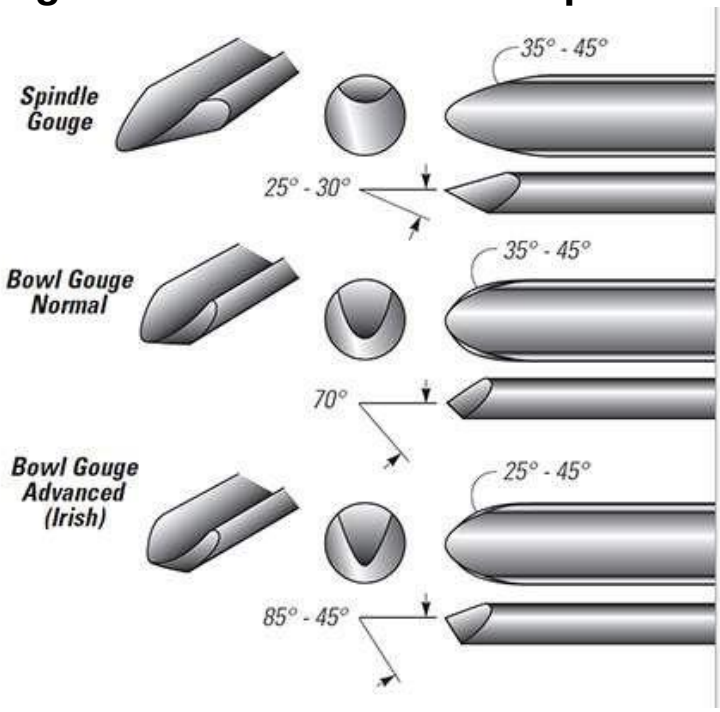
Scientifically a sharp tool has an edge one molecule wide, which is impossible with general sharpening systems. Once the tool starts to cut, it starts to dull. So how sharp is sharp? It may be sharp enough for roughing cuts, but nowhere near sharp enough for a single finish cut. Notice I changed from plural roughing cuts to a singular finish cut!

There are a lot of claims and a lot more myths concerning how long a tools stays sharp. Those claims may be true, but what is sharp? As a machinist, I could track a tool getting dull cutting metal. But I was cutting metal and the wear I tracked was in ten thousands of an inch. Also, that tool was held in an extremely mechanical rigid machine cutting very consistent material. That is entirely different that using a hand held tool cutting a fibrous material with inconsistent densities. Also, what is sharp? How I think of sharp is my razor. I once tried to shave my beard and thought I was going to shred my face. I asked my wife if she had used it and she said she shaved her legs, but thought it was still okay. Sure, it was sharp, but not the right kind of sharp! Cutting wood fibers is very similar. A freshly sharpened tool cuts cleanly, but a second cut isn't quite as sharp. That is why I sharpen every finish cut.

So do you need a 600 grit wheel to get a really sharp tool? Maybe, but don't you normally start sanding right away? So why worry about a really sharp tool if you are going to start sanding? It is simple; if your tool is sharp, you will end up with less tear-out, so you don't have to do as much sanding. MORE IMPORTANTLY, with a sharp tool, you exert less leverage on the work piece, so you decrease the chance of levering the work piece out of the machine AND the cut is much easier to make. Sharp tools require a lot less force to make them work and that makes them much safer to use!

In Conclusion; sharp stays sharp until it starts to cut when it immediately starts to lose its sharpness; how long it stays sharp depends on how hard the wood is, how much wood you are cutting, how fast the lathe is spinning and how good the steel is in the gouge. But the ultimate sharpness is immediate and degrades from there, so the best cut is from a freshly sharpened gouge. That is why I sharpen every finish cut.

So what angle of bevel and bevel shape shall I use?



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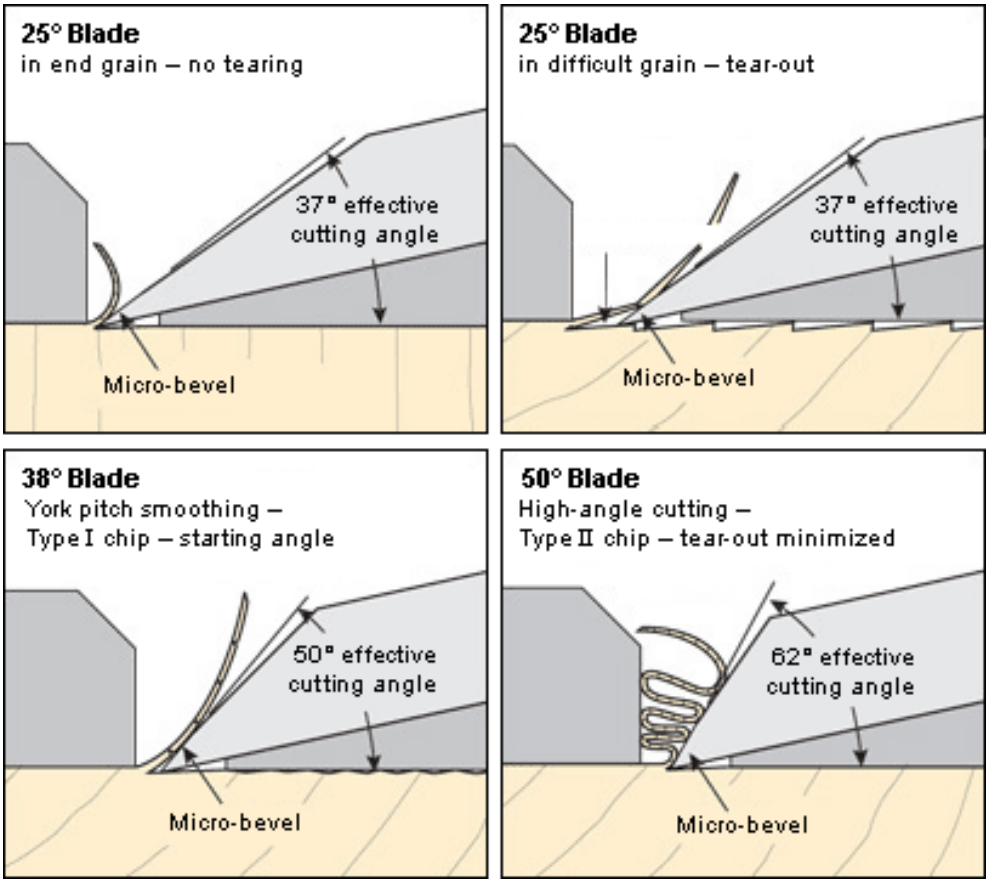
First, What I learned almost fifty years ago in high school wood shop where we were limited to all hand tools is information I still use. We started with a block of wood that we had to make flat, parallel and square with a hand plane. Cutting with the grain had an entirely different feel and outcome than planing end grain. If you think about this carefully, you can understand why you don't want to use a skew on the outside of a bowl. It will cut will little effort with the grain, but when it gets to the end grain which is much harder to cut, it drags the tool down with the vastly increased friction and causes an instant catch.

So why do most hand planes have the iron set at a 45° angle? Woodworkers found that that angle was good compromise between a low angle for softwoods and a high angle for hard and highly figured woods. With that in mind, tool manufacturers started making specialized hand planes for more specific cuts.



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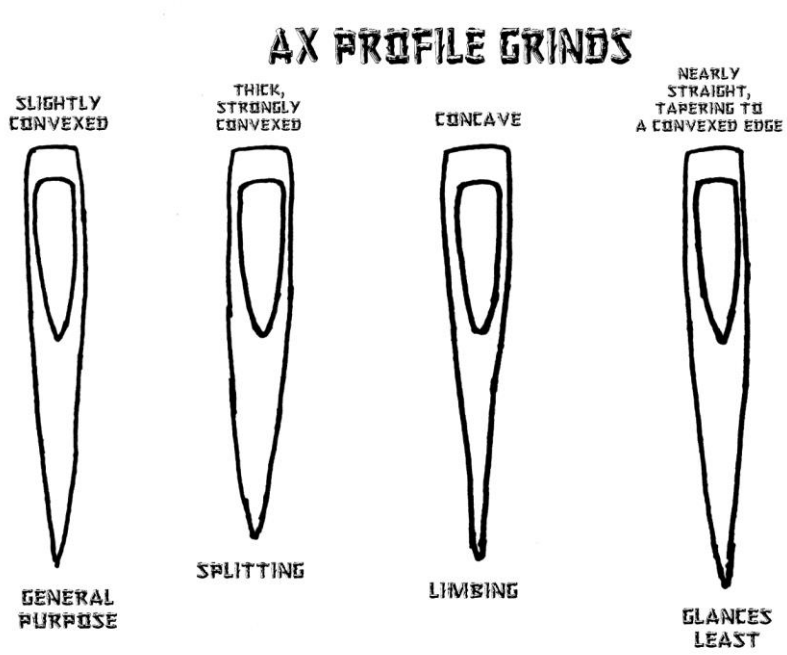
Woodturning is a bit different than hand planes so I feel that the angle isn't as important as learning the "feel" of the tool. Once you learn the feel, then the tool and the cuts are predictable. The predictability is what makes the cuts controllable. On a hand plane having the sole of a plane controlling the cutting angle and depth of cut makes that tool very predictable even with a beginner. A turning tool is a chisel and the cut and depth of cut is controlled by the bevel which requires a steeper learning curve.

In my observations and research on cutting angles I have discovered that I could shape an axe head and make it work differently (limbing axe) for more specific uses, supporting what I accidently found years ago when I re-shaped an axe head much thinner by just thinking of how it should work comparing it to a wood chisel. It worked amazingly well.

Now compare how a thin limbing axe works on shopping down a tree versus a splitting maul. The maul wants to just bounce off the tree rather than cut and it is easy to bury a thin axe head in the tree. This is the basis of what to think about when considering bevel angles.



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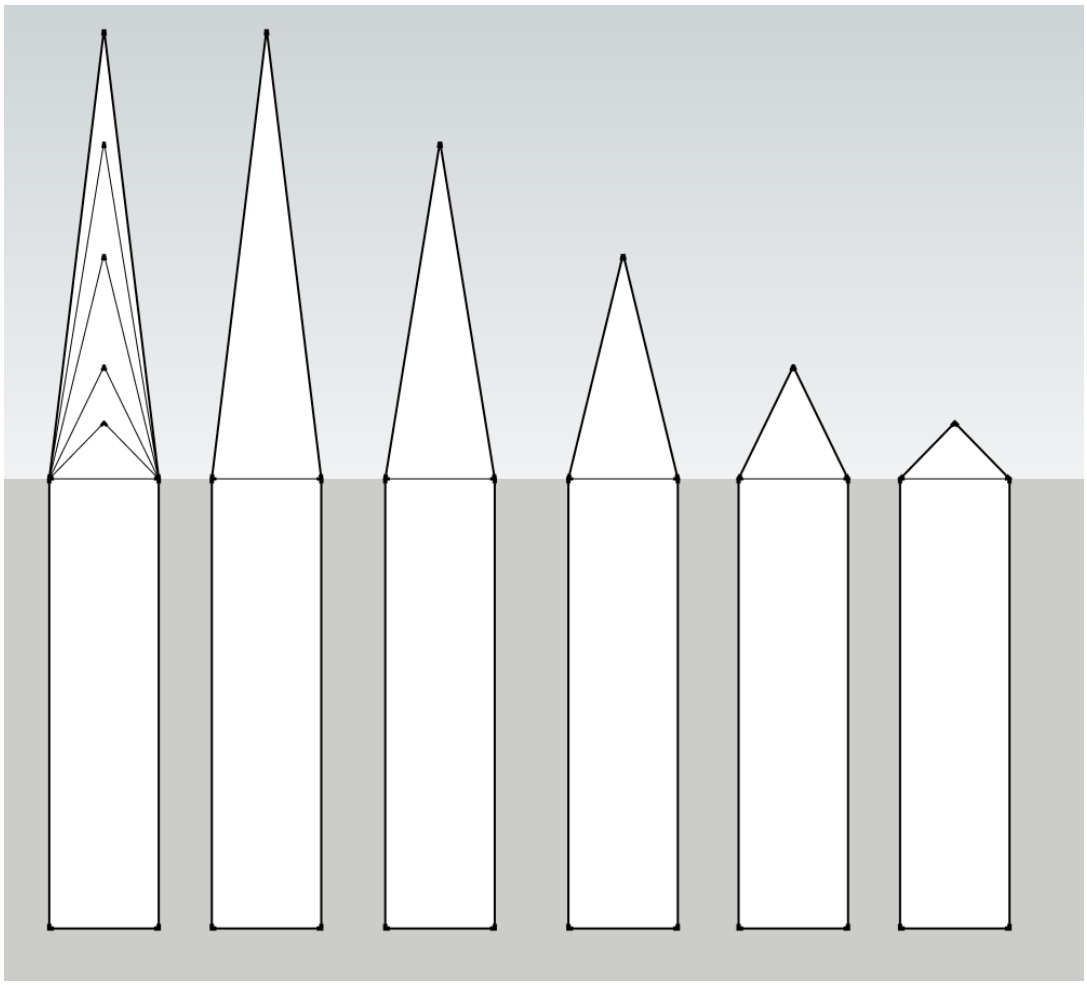
Most turners shy away from a skew because it tends to dig in and skate because it cuts so aggressively. It is hard to handle and you don't want to try and get it to work "Off the Bevel". A spindle gouge is easier maneuver but it still likes to skate if not handled correctly; but a bowl gouge is much easier to handle though because of the blunter angle, it doesn't want to cut as aggressively as a skew or spindle gouge.

I have just described how the bevel angle affects how the turning gouge cuts. A skew slices right through end grain and leaves a polished finish as well as being able to get into narrow "V" grooves. The thin acute angle lets the gouge cut very aggressively. By contrast, the bowl gouge with its much blunter angle doesn't really want to cut and if you go to an even blunter angle like 60° or 70°, those really don't want to cut. If the tool doesn't want to cut, it is easier to control the cut.



The more blunt an angle is, the less it “wants” to cut

So what is next? If you research the profiles of axe heads, you will find that the shape of the axe head is as important as the grind angle. You will also find that a blunter angle will stay sharp longer, but reduces the slicing action. The same holds true for carving chisels AND turning gouges. A 40° bowl gouge angle will not cut as cleanly as a skew but it will sweep nicely through the inside radius of a bowl which a skew can’t. A spindle gouge won’t do the inside of a bowl either because the angle of the bevel is too acute and at some point the angle will force the tool shaft against the outer edge of bowl, forcing the cutting edge off the bevel which controls the depth and controllability of the cut, but it sure works great on spindles. A skew has a very acute angle so it tends to cut very aggressively although it slices wood fibers very cleanly.

So what this means is that there is no “magic” bevel angle, only specific angles that works well in a particular areas/situations. For me, I can do 90% of my turning with a bowl gouge, but there are specific times I use another tool/bevel angle. One of our club members works for the USDA Forestry Department. Part of his job is slicing and analyzing end grain. To slice the end grain, he uses a single edge razor blade. So, it makes sense that the bevel angle to cut wood grain can be as acute as 7° to 8°, a skew is about 30°, a detail gouge is about 25° to 30° a bowl gouge can be as blunt 60°. So if you think about all of this, the angle can vary drastically according to how and where you are cutting wood fibers.

How about the shape of a bevel? What I have found is that a hollow ground bevel cuts a little more aggressively than a flat ground bevel like you get from a belt sander or by honing a hollow grind bevel with a flat stone. They all work well, but they may “feel” different which may change the predictability of the cut. It will just be a matter of getting used to that feel.

And last, there is the convex bevel. A convex bevel doesn’t want to cut, so the advantage there is they don’t want to cut. That requires a different “feel” but it may be an advantage for a tool that cuts too aggressively such as a skew. The only way to find that out is to experiment with each type of grind shape and angle to see what is most predictable and easy to use for you and your style of turning.

So in conclusion, be skeptical of empirical statements. Find what works for you and use it, but be open to other opinions not only on bevels shapes, and/or bevel angles but also on different techniques. Try them and if they don’t work for you, at least you know why they don’t work for you.

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