



PHOTOGRAPHS BY KURT HERTZOG

What you need to know about bending wood

This month **Kurt Hertzog** looks at the topic of wood bending

Bending wood isn't a common need for most hobby turners or even among the professional ranks. Other than furniture makers, the need to bend wood is not that common. Even so, there are several reasons for tackling this topic. It will force anyone learning to bend wood to really understand the material. Knowing the species and the key points about growth rings, grain orientation, moisture content and more are key to being successful. Other things that will lead to success are attention to detail in the resawing, material thickness, machine setup in the shop and sanding technique.

It's not a skill needed by many, so why go into it? Perhaps a bit esoteric, but I think it brings a lot of understanding to the turner. As noted, the material preparation will certainly create a new understanding about the base material we work with. Probably the most important reason is that it is just plain fun. The cost of entry can be from almost nothing to hundreds of pounds. Start with the discount accessories and work up from there as you wish. Pretty soon you'll be finding ways to adorn your turnings with wood 'made' in a different way.

Safety first

We'll be covering steam bending of wood, so the safety issues are hot irons or hot materials. We won't be covering the large steam chambers that a chair maker might use, so open flame boilers and large quantities of contained hot steam won't be an issue for us. That said, the temperatures of the irons that we will be using are certainly hot enough to cause serious burns. Also, using a microwave has its own issues. It is easy to use and safe to do, but common sense and cautions are in order. As usual, don't attempt things you don't understand or are apprehensive about.



KEY POINTS ON SAFETY

1. The irons and materials are hot. Use caution when handling
2. Never leave irons or/and microwave operations unattended
3. Get and use a microwave for the shop. Never use that microwave for food service again
4. Microwave heating should be done on defrost and be monitored continually
5. Gloves for protection can be used if desired

I tend to work bare handed in spite of the hot iron. I can feel the give in the wood better bare handed than with gloves

◀ WOOD PREPARATION

Depending on your end goal, you can use green wood or dry wood that you will remoisturise. While many will suggest that you soak your materials and then heat them, I've found success working with dry wood and adding moisture during the heating and bending process. For our learning process, we'll be steam-bending woods in the thin range, up to about 5mm. Can you bend thicker? Certainly, but for this exercise and the learning process, we can use the thinner material. Preparation begins with material selection. For the most part, I use wood that I select and then resaw to the thickness that I want. This gives me the luxury of picking the species that I want and finding the blank that I can cut appropriately. I've bent many species of woods, but the ones I favour are cherry (*Prunus avium*) and maple (*Acer saccharum*). They are a local wood and finding them in clear and well behaved grain blanks is easy. They resaw well and bend nicely. Just because someone cut your blank from the tree, doesn't mean they paid attention to the grain. It is key that you select or create your bending blank with the grain running perfectly true to the surface. If you need to trim your material prior to resawing, then do so. Failing to have the grain properly orientated will almost always guarantee a breakage with any serious bend. The best time to sand your stock is now. Not only will the sanding provide a better material to bend, but it is far easier now than later on in the process. Resaw marks in your stock are a place for a fracture to begin if you are a bit heavy handed in the steaming and bending process. Sanded smooth material with the grain running true to the surface is the most ideal bending blank for you to work on.



Material selection will make or break your steam-bending efforts. Here soft maple is selected for resawing because of the straight grain with no figure



While nearly any species can be bent, some bend easier than others. This 100 x 100mm block of cherry is resawn for bending. Cherry and maple bend nicely



They make resawing fences and I own one. I find that with the saw setup and adjustments done properly, I can resaw successfully using the factory fence



Depending on your end goal, it is easiest to sand your stock prior to bending. It bends better and is far easier to sand in the flat state



If you don't have a thickness sander or the stock doesn't lend itself, there is nothing wrong with hand sanding or using a card scraper



With a well adjusted thickness sander, you can easily get to a finished thickness of 0.8mm or less. The thinner the stock, the more successful you'll bend



Good, better, best from right to left. Removing saw marks will reduce the sites where fractures will start. Rough sawn can be bent but requires more care

KEY POINTS ON MATERIAL PREPARATION

1. Thicker stock is more difficult to bend
2. The grain should be running true to the surface of your bending blank
3. Sanding the blank prior to bending saves time and increases success rate
4. Selection and preparation of stock is the most important part of the process
5. Just because it was cut that way doesn't mean the grain runs true to the cut edge
6. Almost every species can be bent, but some are more conducive than others
7. Don't invest your time in stock you have doubts about. Get different and more suitable stock. Your time is far more valuable

TOOLS TO ADD MOISTURE AND HEAT

Depending on whom you read and believe, there are many versions of how to bend wood. Some have special concoctions that get added to the water or exotic ways to heat the wood. My method is about as simple as I can make it: add water and add heat. When you have sufficient quantities of both, gentle persuasion will effect a bend. The more aggressive the bend, the more gentle yet persistent the persuasion. Avoiding the boiling kettles and steam boxes, let's focus on three easy ways to add heat to the wood. A spray bottle for spritzing water on the wood surface will be the source of moisture. Because I do more than a small bit of bending, I've

invested in a luthier's iron. This electric heating element has a form around which the sides of a guitar are bent. Different forms are available for the different sized instruments where the bent wood is used in construction. You can also use a microwave oven, although you should never use the one in the kitchen. Buy one in the discount houses or charity shop that you can dedicate to the workshop. It can be used for drying wood when you are in a hurry and will also work nicely for steam-bending wood. Do not use a microwave for drying or bending wood and then return it to food service. The smell will permeate the food and make it inedible. Another

easy way to add heat is a household iron. The household iron, along with your spray bottle, will allow you to heat the wood along with the moisture. By progressively heating and moisturising, you can make the wood pliable enough to make it take another shape. The pitch and discolouration on the surface of the iron dictates that you get an iron specifically for this application. Don't press your shirts with an iron that has been used for bending. Neither the microwave nor the household iron work as easily as the luthier's iron. They will work and they are certainly far more affordable, especially if they are charity shop or garage sale purchases.



Made for instrument makers, this luthier's iron is made for bending the sides of a guitar. Different versions are made for everything from violins to basses



A household type microwave will work. Do not use for food service ever again once you've used it for drying or bending wood



A spray bottle of plain tap water and a household iron will work to bend wood. Although it doesn't provide form it can make the wood pliable to work with

THE BENDING PROCESS



A misting spray bottle with plain tap water is all that is needed to wet the wood. I have found that soaking ahead of time didn't improve success at all



Work the wood! This is a progressive process of wetting, heating, wetting, heating, coaxing the form and repeat until it gently yields to your wishes



The thinner the stock, the quicker it can be bent and the tighter the radius. This 815mm length of maple is bent into a coil of 100mm in diameter



If you want to ensure that the coil is perfectly round, use a form of some sort. This jam jar works nicely and creates a perfect circle of 75mm in diameter

The bending process is really quite simple. The wood being bent needs to be wetted in the area of the bend and heated to a temperature where the water steams. If there will be more than one bend, or if it is an extended area being bent, just progress as you are performing the bend. The temperature of the iron needs to be hot enough to literally boil off the water. The process is to wet the wood, heat it to steaming, rewet the wood, reheat it and continue this process as you gently try to spring the wood into the bend you desire. It is a slow process so take your time. You will find that the wood will get to a point where it is very pliable and can be formed easily. The thinner the wood, the tighter the radius and the more quickly it can be bent. If you need a specific radius, use a jar or turn a form of the desired size and wrap your bent wood around it. The coils that I am showing as examples will be resteamed in the microwave and then formed into a shape that is twisted and bent. It doesn't lend itself to a single operation, but rather creating a coil and then a twisted shape secondarily. Steamed as an entirety in the secondary

operation, it can easily be formed, clamped, cooled and then lap joined. The tools of the trade in steam-bending are plastic jawed clamps and rubber bands. Never use anything metal since the wood is wet and the metal will stain the wood. Using plastic jawed clamps or rubber bands allows for shaping and holding in shape without causing any discoloration of the wood. When using a microwave to heat, wet the wood, microwave on defrost, rewet, heat again on defrost and continue until you can begin to form. Start the bend and clamp with rubber bands. Continue the wet and heat process and progressively continue with the desired bend. Do not try on a higher temperature since the defrost cycle is a heat and dwell cycle that works well. Do not leave the microwave unattended. You can get a very nasty surprise should your wood dry out while you are heating it. It is not as fast or as convenient as the luthier's iron, but it is certainly workable. I do my bends on my coils by wetting and heating in the microwave.



This ornament hanger is created by steam-bending a length of wood into a coil shape so it can be completely steamed at once and then twisted into shape



Rubber bands can be used to hold shape once bent but also can be used as a bending aid by tensioning then wetting and heating

KEY POINTS ON BENDING

1. Gloves will protect the hands but deaden the sense of touch for yield
2. It is a progressive process. Be patient. Once a crack starts, it is garbage
3. The iron needs to be hot – just below burn temperature
4. For microwave operation, use only the defrost cycle for a few minutes then repeat
5. Never leave the microwave unattended while it is in operation
6. Tight radius bends are performed slowly and progressively. Don't hurry
7. Use forms or mandrels to create specific radius or perfect curves

TIPS AND TRICKS

The art of steam-bending is just that. Even with the finest and most appropriate equipment, it is a sense of touch that will win out. Go slow and let the heat and moisture work for you. The wood will get to a 'give' point and you'll sense it. Muscling it will not work. The secret tool of steam bending is the rubber band. Buy an assortment of different lengths, sizes, and shapes. You can create clamping that can't be performed any other way. Additional twists, stretching so that part of the band is stretched tauter than the other part, adding additional bands, and more let you hold your

bent work or help bend the material as you work. Bend work with no holes, cut aways or other points where stresses can occur in bending. These stress points are a failure in waiting. Work only with stock that has no stress points for the bending portion. The most important piece of advice is stock preparation with the figureless grain running straight and true with the face of the stock. Failing to heed this will cause failures during the process or somewhere in the future. Do all secondary operations after the bending. Holes, scallops, material cutaway, piercing, pyrography or any other processes that will

create stress points in the wood need to be done after bending. Drilling holes need to have a support backup to provide for drilling and breakthrough control. Where you will have opposing bends, you need to put a radius in the interface to prevent breakage and splitting. Twists and curves add interest. Don't make everything look like it was machine made. You are hand crafting, so don't be afraid to have things appear to be hand crafted. Do not forget about the past article on multi-piece assemblies. You can create presentation ideas that not only can be disassembled but also allow for interchangeable parts.



The meagre rubber band is an incredibly versatile clamp. By twisting, stretching and controlling contact points, you can perform clamping like no other



The shapes you can create are almost limitless, especially when you integrate twists to accent the finished shape



Regardless of the material and the ultimate shape, if the grain isn't perfectly oriented to the surface of the wood it is likely to fail, now or later



Steam-bending works best with regular shaped wood. Add contours, holes, scallops and other features after the bending is completed



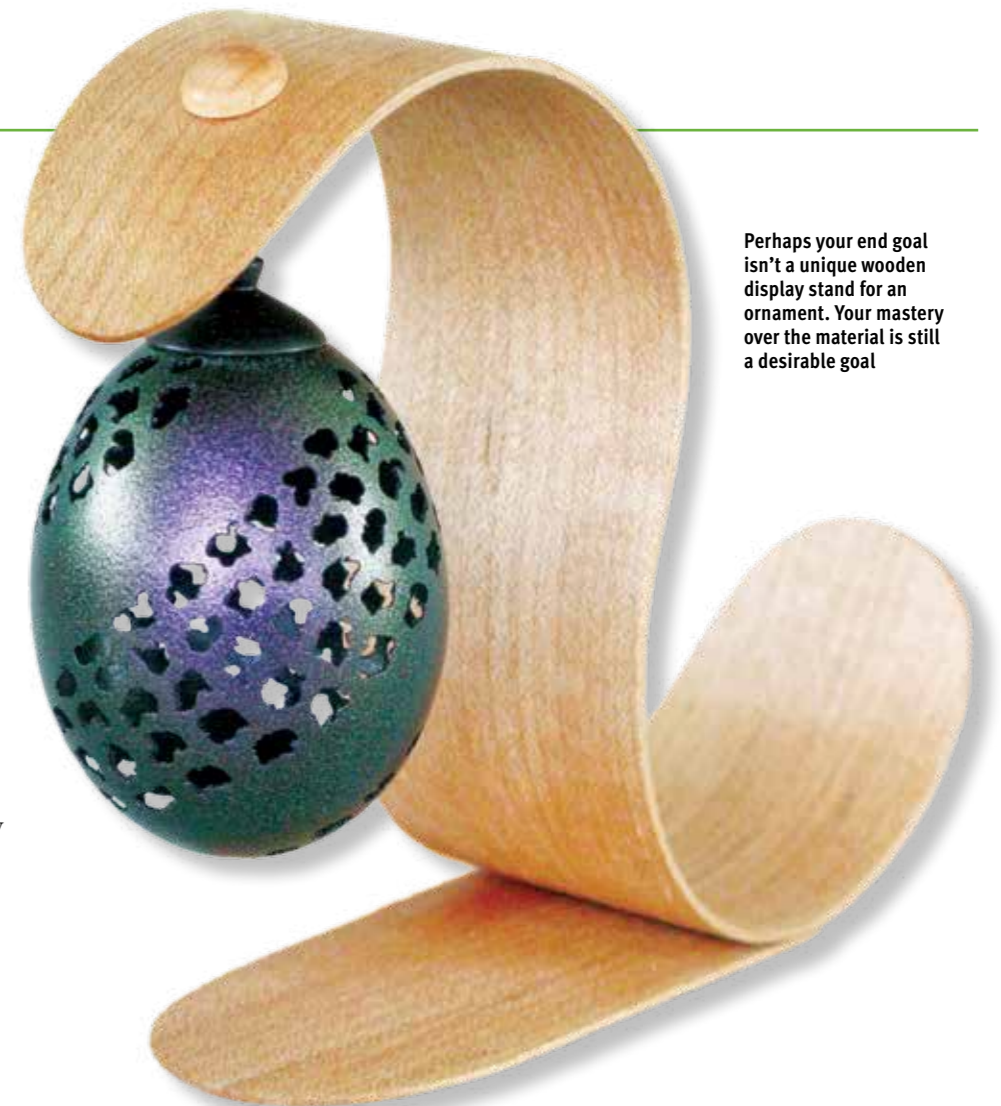
Wherever you intend to have any bend such as this, you need to create a radius at the interface points to prevent breakage and splits

KEY POINTS ON TIPS AND TRICKS

1. The sense of touch is the key to the process. Feeling when the wood is ready to bend
2. Don't put any stress points into the material prior to bending. Always afterwards
3. Selection and preparation of the stock is the highest priority
4. Secondary operations usually require fixing down to provide appropriate support
5. It is handmade. Don't be afraid to let the handmade show. Flaws no, handmade yes
6. Bending adds another dimension to working wood beyond turning
7. Create component parts from your bend material to further explore uniqueness

CONCLUSION

Those who turned off at the beginning when they saw steam-bending have missed a golden opportunity to explore a new area. There are many turners and many things a turner can do to make their work unique. Whether it be the material they use, the special shapes they create, the after-turning effects they can add or other ways to make their own mark. The ability to have your work stand apart from the rest of the turners is something most of us aspire to have. The examples in this article were mainly pen stands and ornament displays, but the goal was to show the process. With the ability to make the wood conform to a non-cut shape you wish, you are free to explore a myriad of presentation ideas. Regardless of what you currently make, you can use steam-bending to create components to be added to your works or help display your work. We've only covered the basics of flat stock bending. You can certainly continue on to work with spindles, thicker stock, more complex bending, or adornment on your bent wood. Dry wood, sawn properly, add some water, add some heat, repeat the water and heat until you can coax it where you want it. Does it get any simpler than that? ●



Perhaps your end goal isn't a unique wooden display stand for an ornament. Your mastery over the material is still a desirable goal