



‘Fixing’ a hole

Kurt Hertzog provides his top tips on how to deal with wood’s natural flaws

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Woodturners are unique among the woodworking community. Nearly all others in woodworking crafts shun flawed materials. Any visual or mechanical flaw usually indicates shoddy material to the typical end customer. Not only does it reflect poorly on the maker, but it also usually requires additional special efforts to use it successfully. Figure, inclusions, waning, gaps, or voids are most often only acceptable for rustic styles of furniture or building work. Cabinetry, furniture, chests, and other items avoid flawed or figured wood for the most part. For special visuals, makers often employ veneers where the finished look can be more easily controlled. In contrast, woodturners seek out ‘flawed’ woods for the character they bring to the end result. The more gnarly the raw stock, the more desirable it becomes to turn and harness those eye catching features once completed. This month, we’ll take a look at a few ways to deal with some of those issues from a mechanical and cosmetic aspect. The goal is to plant the seeds of techniques and materials you can use as you fix or create areas of interest.

SAFETY

Many woods that have gaps, inclusions, or any other structural flaws may present safety issues when turning if not considered properly. Speeds and feeds need to be managed to turn safely in all materials at all times but especially in woods that may have flaws.

It is never worth putting yourself in harm’s way when working with flawed wood, regardless of its potential beauty. Whenever in doubt, err on the side of safety in preparation, bracing and turning parameters. The adhesives, polymers, acrylics and other chemicals we’ll be dealing with are always to be treated properly. Read, understand and heed the manufacturer’s label instructions on PPE, ventilation and other safety items. Although these items seem to be run of the mill household items, don’t become complacent. Always treat them as chemicals and follow the safety instructions.

◀ Hiding or accenting?

Like the join on a lidded box, it is nearly impossible to hide an interface, repair or fill of any sort. The most effective solution is not to try and make it disappear, but instead to accent it. Show the world the join is there and you've controlled the execution, making it visually pleasing. The same is true for flaws and cracks in wood. If you know the flaw is there, most likely others will spot it as well. Depending on the location of the flaw and what your end goal is, using debris from the turning as filler will at least match the colour and sometimes the

texture. I've never been successful at effectively disguising a flaw. Whether you've selected the wood because you are aware of the flaw, or discovered it in the process of turning, accidentally, or intentionally created it, hiding it will usually be more effort than it is worth.

My advice is to do your best to make it shine. Pick a contrasting colour or different material to bring attention to the flaw in an intended and planned way. You may have to do additional work to make the flaw become more intentional.



When the inside meets the outside you'll have a fill opportunity



Pierced holes lend themselves for colour fill, stone, or metals

Structural or cosmetic issues?

Most of us are turning to create items that are simply visual, or if functional, that don't bear any critical loads. If you turn columns, legs, or other serious load bearing members, you'll know the needs of your turnings and deal with them appropriately. While some of the materials and techniques we'll cover might be applied to some load bearing turnings, application to those

types of turnings is beyond the scope of this article. That said, filling a void in the side of an apple bowl with some contrasting colours is fun and easy to do. From the cosmetic aspect, there are many simple and fun ways to take wood that might need some help and proceed it to a serviceable end point. Of course, the artistic opportunities are endless.

Before or after turning?

Give your excavation and filling plan a bit of thought before you launch into mixing materials. Often it is far easier to execute your plan while the blank is still in the flat. As something that sits flat on the bench or the floor, you can pour in filler materials and easily contain them. With them sitting flat, you can put something underneath to capture any overflow or leakage. You also have the advantage of already having a dam of sorts to contain the filler allowing for a flush, hardened result. Once you begin turning,

you've created a more difficult situation to position, hold steady and contain liquids. The other problem with filling non-flat materials is the damming that must allow for overflow. Without overflow, your meniscus may be below the desired final surface, depending on your shape. Done in the flat, most of these issues go away. Certainly you'll be filling with material that you'll cut away, which then winds up on the floor. Unless your filler is particularly expensive, the convenience and time saved is worth far more than the extra material consumed.



Filling cracks, voids, or other flaws is far easier while in the flat before cutting and turning

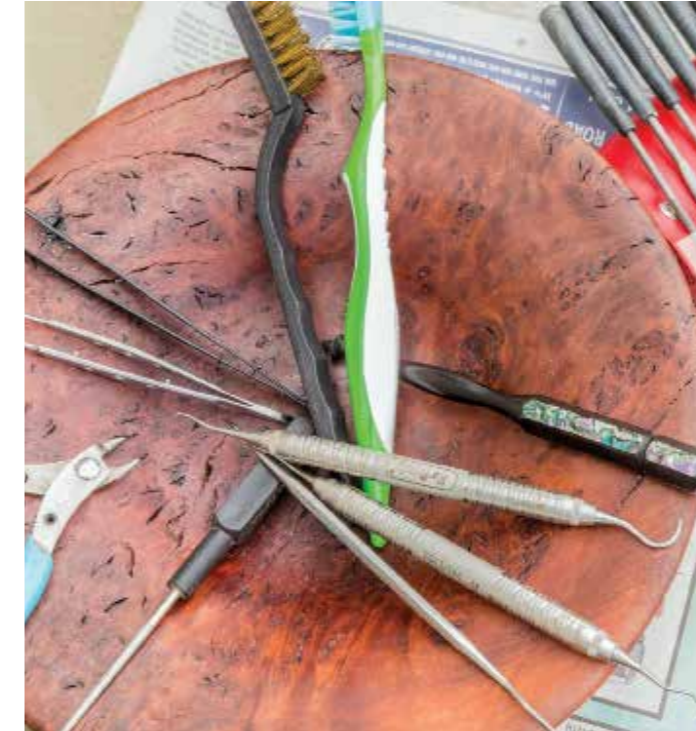


Banksia pods are great filling candidates for smaller items such as pens, ornaments and small boxes

Preparation tools

Did you inherit the hole, gap, crack, separation or whatever flaw you are dealing with? If so, how do you plan to work with it and what will make it agreeable to your solution? If you are creating your own flaws to be able to enhance things artistically, you'll still need to prepare things to accept your added materials both mechanically and visually.

The tools that I use to help prepare the surfaces in either case range from burs and sanding bits to drills and cutters. Nearly all of them will fit and work nicely with a rotary tool. Hand tools are also valuable



The most helpful tools are used for cleaning the debris from crevices

in the preparation process. I find that small reciprocating saws, dental picks and a variety of abrasives lend themselves to the task. If you are working on a larger scale, you might employ a Sawzall, Kutzall plates on a hand grinder or Lancelot tools. The preparation to allow for the addition of fillers is the same but on a larger scale. Depending on your filler material, fill aspect ratio, open or dead ended, created or inherited and base material characteristics, you may need to consider undercuts to aid in retaining your filler.



Remove anything that is likely to come loose. A good clean bonding area will ensure longevity

To colour or not

There are a host of materials that lend themselves to being mixed with your filling agent. Everything from acrylic paints to glitter can be added to nearly all of the two-part adhesives. Clear or natural will give you one look while anything from a tint to a very loud colour can make a different statement in your end result turning. When I am using West System epoxies, I colour with craft store acrylic artist paints. I dispense as prescribed and mix fully before adding

colour. Since there is a finite open time, have everything prepared to allow sufficient time for applying the final mixture to the cavity you've planned. If you have any doubts about your adhesive and your colorant being mixed, use a small sample and test prior to using in large quantity. Your open and curing times might be altered somewhat. In worst cases, you might never get a fully hardened cure. Be certain before you commit to something important.



Nearly any two-part epoxy works well but I favour West System epoxy with its various options



Dry colours, acrylic paints, sparkles and more, can be added to your epoxy to liven things up

◀ Mixing and filling with pourables

There are several key items to remember regarding the mix and fill part of the process; these are all extremely important to the success of your efforts. Always mix more than you'll need! This is not the time to be frugal. Most of the fillers we'll deal with are two-part chemical mixtures. Should you fill your cavity and find out that you are short of material, you may not have enough time to measure, mix and dispense your additional filling agent. Unless you are planning and are capable of doing a multi-pour fill, have more

than sufficient material ready for your pour rather than run out. The other problem you'll face should you run out is that with coloured mixtures, you'll probably never create exactly the same colouring mix again. Close maybe, but it doesn't take much mismatch to catch the eye. A solution to this is a two- or multi-part pour. The substrate can be the natural adhesive colour while subsequent 'top coat' pours can be coloured. Care needs to be taken not to cut through your colour material if you choose this route. Seek out

clean up materials before you begin to mix and pour and keep these handy. Searching for clean up materials after you discover you have a dreadful leak in your damming, is far too late. The amount of adhesive that will run out all over the place and the difficulty you'll have cleaning it up is amazing. You'll remember this preparation forever once you have a major leak without being ready. Once you've leaked some of your adhesive, you may be back to the initial problem of not having sufficient material to complete your pour.



Cleaned and ready for fill with tape dams in place



Regular two-part epoxy can be used and coloured with regular artists acrylic paint



With everything ready, you'll need to mix the epoxy, blend in the colorant and apply within the open time

Filling with solids

I'm certain you've all seen a bowl with turquoise filling the cracks. There are many crushed stone and ground metals available in the craft trade that work nicely as fillers. Depending on where you live, you may have local rock collectors who may be good sources for material. There are also many vendors online. Filling with solids is usually carried out into a dead-end crack or cavity, but it can also be done open on both sides with appropriate damming. Depending on the look you want, you can fill with coarse sizes of your filler material

followed by finer to pack things in nicely. From my experience working with metals or stone, I've found that thin cyanoacrylate is the correct adhesive. You'll find that working in stages by doing a partial fill to let the adhesive soak and then repeating once or several times, is advisable on thick fills. Containment or damming for solids usually isn't an issue unless you've decided to work in the round, turning and creating a channel to fill. This is necessary when making accent rings on bowls, boxes, goblets and other round items.



Brass key cuttings will work but commercially available metal powders are cleaner and more uniform in size



Crushed stone is available in different mesh sizes and colours from jewellery suppliers



Thin and very thin cyanoacrylate adhesive fastens metals and stone in place, made easier with precision dispensing tips



Modestly priced, extremely small and easily positionable, these tips are especially useful when working with metals

Creating containment features

The creation of containment features is a bit of an art. Depending on whether you are working flat or in the round, it will take on different sizes and shapes. The filler material will also demand different designs and materials. Containing adhesive in place until cured varies considerably from holding metal powder in place while you drip in cyanoacrylate adhesive or corral colored epoxy. The tricks I've learned over the years are to plan your containment features like dams. For the most part, you'll be using tape to seal against the surface and something mechanical to provide support for your tape. The walls you'll build can be pretty perpendicular if you wish but don't agonise over this. I mask the adjacent areas with the appropriate tape: this is key. If the adhesive on your tape isn't resistant to the chemicals in your pour, you'll have problems. My painters' tape will work for some fillers, especially for short durations. When longer durations are needed for the poured material to cure, I use an automotive paint detailers' tape which is

impervious to nearly anything. I buy 3M tape that is lacquer resistant. I can also use it to mask when I'm spraying lacquer as a finish as well. It is rather expensive, but a roll will likely last you a lifetime and then some. Properly applied and stuck down, I get no or minimal wicking. In my applications, it really doesn't matter since it is a cleanliness issue. I'll usually be cutting away to that surface and a bit below.

To support the back side of my tape dams, I use modelling clay. Colour is unimportant, as is the brand. Buy a block of modelling clay at your local craft store and you'll have it for years. Unless you leak adhesive all over it, you'll be able to reuse it over and over. Children's dough or putty also works nicely. Regardless of what you choose, be certain it is permanently assigned to 'shop use once you use it. I take care to put tape on the surface of the wood where the clay will sit, to prevent any possible wicking of chemicals from the clay into the wood. Discolouration can occur and may wick in further than you will cut.



Everything from duct tape to painters and auto pin striping tapes can be used, depending on you base and chemicals



If needed, support your tape dams and funnels using modelling clay

Turning

You'll find quite a variation in the turning characteristics of the different fillers. Epoxies with acrylic colours will cut very easily. Actually, they will cut too easily. I find that depending on the location and expanse, cutting will tend to tear or pull on the material. Even though it has hardened, depending on the brand and the filler ratio, it may still be far softer than the surrounding wood. Sharp tools, light touch and higher yet safe speeds are required, obviously based on your turning size and shape. When you are first learning, I suggest that you keep the cross sectional

areas of filler relatively small. You'll learn about the correct ratio of adhesive to filler material and what the fill area shape and size relationships need to be for success. Other than the very hard materials such as the crushed stone, your high speed steel tools will work nicely. When you've done a fill with crushed stone and cyanoacrylate adhesive, you'll find that high speed steel will not cut as you'd like and will dull rapidly. For these applications, I've had better success with carbide tools. Many years ago I built my own using carbide cutters from the metal working trades. Not

intended to cut wood and not as sharp as today's woodcutting carbide cutters, these work better as a scraper rather than a cutter.

You'll find that your woodturning carbide cutter tools will work but cutter life will be shortened dramatically. Alternatives are high speed steel scrapers. Keep the engagement area small. Having a burr doesn't seem to matter since it is gone immediately. High speed, small engagement, and light touch will keep from tearing out chunks. Power sanding with small discs, 50mm and smaller, in the coarser grits works well for these applications.

Sanding and finishing

Depending on which method and materials you are using, you'll either have no problems at all or be faced with some challenges.

Sanding challenges will include gummy sanding. Some adhesives, especially filled ones, will tend to be soft and will not cut cleanly. For those where the abrasives gum up easily with your filler material, I'll offer a couple of suggestions. Certain brand abrasives and especially the steared versions will gum less and clean more easily. Another solution is to use Abranet.

It is an open abrasive that sheds offal easily. Another sanding issue can be the differences in material removal. Much like the sanding rate differences between face and end grain when sanding a bowl, you can experience the removal differences between your filler and your parent material. The best solution is to do localised sanding. Tailor your sanding to each area where differences occur to compensate. Finishing may offer challenges as well. Depending on your finish and the filler materials, you may not get the same or any penetration at all. The colour change will also be different although you've got intentionally contrasting materials I hope. Much as you'd mask off a window before painting the framework, mask off your dissimilar materials if you need to prevent finishing problems. Be certain that the masking tape and materials you use are up to the task. Your finish may leech under the tape depending on the chemicals and the tape adhesive type. When in doubt, use a test



Quality wet/dry abrasive and power sanding materials will find good use with epoxies, stone and metals

piece to determine not only which tape to use but how long it can remain in place. I find that my automotive paint supplier

has a tape assortment that will solve nearly any problem. They are used to the critical needs of masking in their industry.



Whether metal filings or stone with cyanoacrylate or colored epoxy, give filling a hole a try

Conclusions

As with most of my columns, space precludes covering all of the bases. Most of the time, I try to distill things to the more common and readily done aspects. I present the concepts and hope you run with them. Usually getting started doesn't cost much. Often you have the materials to get things kicked off. If purchases are needed, I try to offer the most modest costing approach to get started, at least to try things out. My goal is to whet your appetite and get you to dive in.

Already involved, perhaps you'll learn some alternative ideas or methods. If I've managed to get you to try something new or a different way, I've succeeded. Chances are you've got some epoxy adhesive in the 'shop and acrylic paints. The acrylic paint can be for the shed or a painting. It doesn't matter although the shed colours might be less appropriate. No excuses to not have a go. Bang out that bark inclusion, cut some slots, expand the crack or find a flaw and do some epoxy colouring or one of the other ideas. ●