

Finishing for Woodturners – Don Comer

Introduction

When I first started woodturning I went looking for the perfect finish. I'm still looking. There are no "perfect" finishes, only ones that are better at meeting some requirements than others. In this article I will try to cover the characteristics of the major types so you can make your own decision about which one to choose. For more information and insight into all of the nuances and techniques of finishing, I highly recommend Bob Flexner's book "Understanding Wood Finishing".

Why Bother With A Finish Anyway?

A lot of different woods look good without any applied finish when they've been sanded and burnished carefully. Ebony and cocobolo are examples, but that beauty fades rather rapidly. Other compelling reasons to apply a finish are enhanced appearance, protection of the wood, ease in cleaning and water vapor resistance (Important in the case of lidded vessels to preserve the fit of the lid and in segmented turnings to avoid undue stresses between segments).

Choosing a Finish

There are several characteristics of finishes that influence our choices. Here is a listing of the ones I think are most important to turners:

- Ease of Application – Wipe-on, brush or spray, flaw repair, final leveling and buffing
- Appearance – Clarity, color, tint
- Durability – Scratch, wear, stain, chemical resistance (Including fingerprints)
- Distortion – Water vapor resistance (Important in lidded vessels and segmented turnings)

Pertinent Characteristics of the Generally Available Finishes

There are two general categories of finish available. Those you can wipe on with a cloth and those that are best put on using a brush or spray. As a general rule, the wipe-on finishes are easiest to put on but offer the least protection. The brush or spray finishes offer better protection but are generally harder (more labor intensive) than the wipe-ons. A complete rundown is beyond the scope of this article, but here are the major factors I believe you should use in choosing a finish.

Wipe-on Finishes

- **Wax (e. g. Trewax, Briwax, Minwax, Arborwax)** Wax is very transparent, non-yellowing and easy to apply. But it offers almost no protection against scratches and dings or distortion caused by water vapor absorption. It must be refurbished every six months or so for optimum appearance. I do not recommend it as the only finish coat for turnings.
- **100% Tung and Linseed Oil (Behlen and Hope's)** These are old time finishes that are very easy to apply. They offer very little protection, are very slow curing and have a very strong odor until thoroughly cured. Not recommended; there are better finishes that are just as easy to apply.
- **Oil/varnish Blends (Minwax and Behr "Tung Oil Finish" and Watco and Deft "Danish OilFinish")** These are blends of tung oil and/or boiled linseed oil mixed with a varnish. They are usually wiped on with a cloth and therefore are very easy to apply and repair. They have low scratch and vapor resistance because they are relatively soft and do not build up a thick film. They impart an amber tint to dark woods, such as walnut. I use them as a first coat, under lacquer, to provide a "warmer" final color but do not try to use them for filling pores or building a high gloss finish.
- **Wiping varnish - (Jasco, Zar, McCluskey, Waterlox, Formby's)** These are varnishes that have been thinned with a slow evaporating solvent so they can be applied with a cloth. They are not as easy to apply as oil/varnish blends but can be built up to a thicker film. They cure to a harder finish

than the oil/varnish blends but still have low vapor and scratch resistance unless a thicker film is built up. Build up is slow because of the curing process and rubbing and buffing quality is mediocre.

- **Cyanoacrylate Adhesive (CA) – (Hot Stuff, Star Bond, Insta-bond)** Lately this “instant glue” has been being used as a surface finish. It is applied by pouring the adhesive onto the wood and spreading it smoothly with a finger protected by a fingerstall or glove. It does a very good job as a first coat in strengthening and hardening the wood, as well as preserving the original color and figure of the wood. My experience indicates it is extremely hard to repair, level and buff when used as a final finish coat.

Spray and Brush-on Finishes

- **Shellac** Shellac is not a very durable finish but it is very easy to apply and sand. It has exceptional water vapor resistance, which should make it useful on lidded boxes. This would probably help preserve the precise fit we all try for in our lidded vessels.
- **Lacquer** Lacquer is very easy to apply and repair when applied as a spray, which is the main reason I use it for most of my applications. It and shellac have the very best qualities for the final rubbing and buffing. It has very high clarity with just a hint of an amber tint. Among its lesser qualities are average scratch and water vapor resistance and poor solvent and heat resistance. Those lesser qualities are usually not significant unless people with perfume, cologne or hand lotion on their hands decide to pick them up.
- **Varnish (Including polyurethane)** Varnish is considered to be one of the easiest film building finishes for brushing because of its longer curing time. Since brushing introduces its own set of problems, this quality is not attractive to me. It sprays as easily as any finish but the sag and run repair can be very frustrating. If you happen to sand through the top layer while leveling or during run repair, a milky, ghost line (the bond line between the two layers) will appear around the area of penetration. The only way to remove that line is to scuff sand and recoat the entire surface. To avoid this problem, the final coat must not be penetrated during the final leveling and buffing process. The final rubbing and buffing qualities are noticeably poorer than those of lacquer, although a high gloss can be achieved if you are willing to put enough time into the effort. The major attraction of this set of finishes is their scratch and chemical resistance, especially polyurethane. If you’re planning to actually use that wine goblet you turned, I strongly recommend using solvent-based polyurethane. It is the most resistant of all of the practical, commonly available finishes. Two-part conversion finishes (e. g. epoxy) may be tougher but I don’t believe they are practical for the home-based workshop.

Water Based Finishes

Water based finishes have the decided advantage of using water for clean up. They have very high scratch and wear resistance as well as non-yellowing properties. I use one when I do not want an amber tint on the whiter woods such as holly and bleached maple. Flexner says they are superior to varnishes (very superior to polyurethane) but inferior to lacquer for run repair. Their buffing qualities are roughly equivalent to varnish but more difficult than lacquer. Because of their non-yellowing quality and the fact they can be obtained with UV resistance from artist supply stores; I am experimenting with them as a means of slowing down the darkening of highly colored exotic woods such as pink ivory or chakte kok. It is very disappointing to buy a very expensive piece of pink ivory and then have it turn brown in a few months because you displayed it in a brightly lit room. I plan to run a series of experiments this summer to see if UV protectants will actually slow down the darkening.

Applying the Finish

Prepare the Surface

The first step in achieving any good finish is to prepare the surface properly. A transparent or very thin finish will emphasize any surface defect. That is why tool marks, sanding scratches, dents or unwanted voids must be eliminated before any finish is applied. The level of quality depends on your “market” or your preference.

A high quality finish will require more time than a mediocre one but your satisfaction will be greater. Choose the one to fit your audience. Begin your finishing process by cutting or scraping the smoothest surface you can with your turning tools. Good tool technique will greatly reduce the time you will need to spend sanding. Even the smallest tear out will change color and pop out visually when the finish coat is applied. Next sand until all surface scratches and tool marks disappear to the naked eye. For open pore, light colored wood, like oak or ash; this will generally be at around 220 or 320 grit. For darker, denser wood, like ebony or cocobolo; it may require going to 600 grit. I do most of my sanding on the lathe. It makes a good holding fixture and, of course, the lathe does most of the work. I also do a lot of final touch-up sanding off of the lathe. Check for scratches by highlighting the surface with a bright, low angle light. Be sure to look as deep into the nooks and crannies as you can. Once the scratches are gone, you're ready to apply the finish.

The following process is predicated on building a film finish that can be leveled and buffed to any degree between a matte to high gloss sheen, as desired. It also assumes that the finish will be sprayed. Since most turners produce small turnings, spray cans are a practical way to apply it. Especially if your shop space is limited and you want to avoid the hassle of filling and cleaning a spray gun for every small touch-up job you have. I almost never apply finish while the turning is on the lathe. Ventilation is not adequate there so I take it outside. Visibility is much better and I can adjust the spray angles more easily.

First Coat

I never use fillers or finishes labeled “Matte” or “Satin Gloss” because the additives in them degrade the clarity and obscure the figure and color of the wood. Sanding sealers may ease the sanding somewhat but are not worth the extra hassle. I sometimes use Watco Danish Oil to impart a warmer tint to walnut but generally I just use whatever finish I plan for the final coat. After allowing the first coat to dry thoroughly, I sand to remove the raised grain and inspect carefully to make sure I have not overlooked some flaw. If I find one I sand it out, patch the finish and repeat the process until I'm satisfied.

Build Coats

I build up the film by repeatedly coating with whatever finish I have selected. Even if I have a porous wood such as oak, I use the final coat finish as filler. I generally do not sand between coats unless I cannot meet the maximum time limits specified for between coats (e. g. polyurethane). There are no time limits for lacquer so I just apply multiple coats until I have filled the pores to the level I want for that particular piece. Once I have reached that level, I sand out any runs or sags (inevitable in my case) and check to make sure I have not penetrated to the bare wood. If it looks good I'm ready for the final coat.

Final Coat

For the final coat I am especially careful to avoid sags and runs and to make sure the entire surface is covered. With lacquer you can do this in stages. For example, you can spray the bottom, allow it to dry, turn it over and spray the top without worrying about over spray. I'm not sure about varnish. There's that ghost separation line between layers to worry about. Allow the finish to dry at least two or three days for lacquer and a week for varnish before you attempt to do the final leveling and buffing. You'll be happier with the effort and results, I believe.

The Final Stage: Leveling and Buffing

Begin the final process by leveling the finish coat. This provides a smooth finish free of ripples, over

spray and dust nibs. I use wet 400 grit, followed by 600 grit wet-or-dry sandpaper. I sand until I have a uniformly scuffed surface. Then I am ready for the final buffing to achieve the sheen I want. For lacquer, I go directly to a soft cotton buffing wheel charged with white diamond buffing compound. For varnish and water based, I find it is better to start with a Tripoli charged wheel and then graduate to a white diamond charged wheel if I want a higher gloss.

Summary

The critical operations for a good quality finish are the preparation of the wood before applying the finish and the final leveling and buffing. The preparation gets rid of unwanted tool and sanding marks. The leveling gives a smooth surface and eliminates dust nibs and sags. The buffing brings up the shine to whatever level you desire.

Final Word

A high quality finish requires an extra effort but the tactile feel and sight of a smooth, glossy film finish is more than worth it. That is, if you're into that sort of sexy stuff.

Woodworking Finishing Procedures

Finishing

One of the most difficult woodworking tasks for beginners is finishing. There is a bewildering array of finishing products available to woodworkers today but comparative product information is hard to come by. All finishes have certain strengths and weakness when compared to each other. An excellent reference on this subject is [Understanding Wood Finishes](#) by Bob Flexner and I highly recommend it.

This article is an attempt to provide you with a few easy finishing procedures to follow and to explain the differences between types of finishes. Instead of an all-encompassing review, these procedures are written expressly for woodworkers with little experience at finishing. By following these simple steps, one should be able to achieve a very nice finish on almost any woodworking project.

General Advice

The first procedure of a good finish starts with surface preparation. Sand, scrape, or plane the surface until the surface is free of defects and uniform. The amount of sanding and the grit of sandpaper used can have a significant impact upon the way "stain" will appear on a wood surface. The wood surface should be evenly sanded to a 150 or 220 grit uniform surface. Take care to remove all glue marks and scratches, common stains will highlight these defects. If you have not done much staining you should experiment before applying any stain to your project.

When applying several coats of a film type finish, it is best to apply the gloss version of the product as a base even when a satin sheen is desired as the end product. The satin sheen products contain particles in them to deflect light. Many layers of these deflectors may make a finish look muddy compared to a finish built up with clearer products.

When sanding the finish between coats, sandpaper is used to remove any large irregularities and to make the finish level. Scotch pads or synthetic steel wool is used afterwards to more uniformly abrade the surface and obscure any scratches made by the sandpaper and to provide a better surface for the following finish layer. As the finish is built up into a more level surface, the grit number of the abrasives used between coats is increased.

It is not a necessity that you use the same finish technique or product on the entire project. For example, assume you chose Danish oil as the primary finish for a chest of drawers. You may use polyurethane or acrylic for the drawer boxes, interior parts, or the applied back. This would save a great deal of time and effort.

Do not apply any stains or finishes in direct sunlight.

If the finish has not dried thoroughly it will ball up or make "corns" on the sandpaper. If this is the case, allow the finish to dry more, continuing to sand and applying more finish on top may degrade the overall finish quality.

One technique I **always** use is to make a sample board out of cutoffs from the project. With this sample piece I can test different stains and finishes to see how the project will appear when complete. It is also used to test any finishing technique deviations before applying them to the project.

Be sure to read and follow the safety precautions listed on the product container.

Definition of terms:

Polyurethane: Refers to oil based products only.
Sheen: Surface reflection characteristic, either gloss, semi-gloss, or satin.
Smooth: Surface texture, smooth does not mean gloss.
Acrylic: Refers to water based polyurethane and similar water based products.

Woodworking Finishing Procedures

Thinned Polyurethane

- Pro:** Durable, good choice for high wear surfaces.
Easy to apply.
- Con:** Cross grain scratches between coats may be visible.
Requires several coats for a good finish.

Procedure:

Polyurethane is a film finish. The easiest way to apply polyurethane is to thin the regular product to a mixture of 50% poly and 50% mineral spirits. Thinning the product like this offers a few advantages over not doing so. First it will be easier to apply, any runs will be less noticeable, (thinner) and the adhesion is better. There are polyurethane products that are already thinned in a similar manner, they are usually referred to as "wipe-on polyurethane".

I prefer to use Parks brand polyurethane because it is dark and cheap, I also use Varathane because it is lighter and a little better. The problem with this procedure is the difficulty explaining the difference between wet and light coats of finish. It would be advisable to experiment with this procedure before using it on your project.

1. If you are applying this finish to unsealed wood the first coat of finish will act as the sealer, apply it liberally with a brush, wipe up any "ponds", do not allow them to cure. If you are applying it to a surface that has been sealed the poly will not soak in as much. *Note: common pigment and gel stains seal the surface.*
2. After the first coat has dried, sand lightly with 220 or 320 grit paper. This poly mixture is very easy to sand, take care not to sand through the finish into the stain, if any. Wipe off any dust caused by sanding.
3. Apply a wet, uniform coat with a foam brush. After the finish has dried, sand with 320 grit paper. Repeat this step until the finish appears to have sufficient build. (one to three coats)
4. Continue applying the poly with a rag at this point. Apply the finish sparingly but try to maintain a wet edge to avoid any lap marks. After the finish has dried, sand with 320 grit followed by a synthetic steel wool pad. Be sure to wipe off any dust caused by sanding. Repeat this step until the surface is free of any irregularities. (two to five coats)
5. You may call the finish complete at this point or repeat the previous step with a different sheen of the same product.
6. This final step is optional. Rub out the finish using #0000 steel wool to a uniform sheen level. You may apply a paste wax to the surface if desired.

Woodworking Finishing Procedures

Danish Oil

- Pro:** Smoothest most easily obtained "perfect" finish.
Easy to repair.
- Con:** Not as durable as film finishes.
Finish may require periodic maintenance.
Procedure requires lots of elbow grease.
Should not be applied over common pigment or gel stains.

Procedure:

Danish oil is considered to be a penetrating oil type finish. In actuality, the oil does not penetrate very deeply, just a little deeper than typical film finishes. When using this type of finish, there is no need to sand the wood surface with anything higher than 180 or 220 grit sandpaper prior to finishing. In order for this finish to work properly it must be able to penetrate into the wood. It will not be able to do so if you have stained it with the commonly available pigment or gel stains. If you wish to stain the surface you can use a water based dye applied first or use a tinted Danish oil.

This finish is one that even an amateur can apply and achieve excellent results if the proper steps are followed. There are several procedures that are similar to the one outlined below, any of them will work, this is a simplified version. I use Deft Danish oil but the procedure should be the same for all "Danish oils".

1. Even if you wish to use this product as a stain as well as a finish, apply the "natural" color of the product to end grain areas first then the colored version. This will keep the end grain from looking darker than the rest of the surfaces. Apply a very wet coat to all surfaces, allow the oil to stand on the surface for about 30 minutes, apply more to any areas that become dry during this time period. After 30 minutes or if the oil starts to become a little "tacky", wipe it all off.
2. Immediately apply another wet coat of oil to the surface, allow to stand for about 15 minutes or until it starts to become tacky. Wipe all oil off of the surface. The surface will "bleed", or seep oil onto the surface for a few hours after application. You do not want this bleeding oil to harden so wipe the surface down every half hour or so. Open pore woods like oak will bleed more than woods such as maple. Note, the more vigorously you wipe the oil off, the more it will bleed, heat causes this.
3. From now on, you should apply the finish every other day. You may continue to use the tinted version of the product or switch to the natural colored oil at this point. From this point onwards, the oil will be applied with sandpaper. Start with 320 or 400 grit black sandpaper and wet sand the surface using the oil as a lubricant, This will work the oil into the surface and smooth the surface as well. You must wipe all of the excess oil from the surface before it becomes tacky during each application. Continue this operation every other day, switching to a finer grit of sandpaper each time. You can keep this up a long time but the benefits start to diminish after 600 grit.
4. After you have applied all of the oil you want, you may now apply either a coat of lemon oil or solvent wax (Watco) using the sandpaper method. This will become the final finish. As an alternative, you could use a paste wax wiped on with a rag and buffed out. The preferred wax to use will be colored to avoid any white spots.
5. About every year or two, you may wish to apply a coat of the natural finish oil and / or wax to the surface to restore it's sheen.

Woodworking Finishing Procedures

Sprayed Lacquer

- Pro:** Easy to apply.
Quick process.
100% adhesion with underlying layers.
Easy to rub out.
- Con:** Not as scratch resistant.
Low solids content, requires several coats.

Procedure:

This procedure is for spray can applications only, in particular, Deft lacquer products.

1. Use the gloss sheen for the initial coats of finish. If you are applying this finish to unsealed wood the first coat of finish will act as the sealer, spray on two to three even coats. If you are applying it to a surface that has been sealed, spray on two even coats. Allow the finish to dry. *Note: common pigment and gel stains will seal a surface.*
2. Lightly sand with 220 or 320 grit paper, wipe any dust from the surface and spray on another coat of the gloss sheen, allow to dry.
3. Depending upon absorption, you may need to repeat the previous step until the surface is smooth.
4. Lightly sand with 320 or 400 grit paper and wipe the dust from the surface. You may switch to another sheen now if desired. Spray on this coat and allow to dry.
5. Inspect the surface and repeat the previous step if desired.
6. You may choose to leave the surface as-is, or rub it out depending upon the look desired.
7. To rub out the surface, sand it lightly with used 1000 grit paper then switch to #0000 steel wool. Lacquer rubs out very easily, use just enough force to make sure every surface has the same sheen. Thoroughly clean the surface and apply a paste wax or furniture polish.

Woodworking Finishing Procedures

Wiping Varnish

Pro: Durable, good choice for high wear surfaces.
Requires fewer coats than wiping polyurethane.
Easy to apply.

Con: Cross grain scratches between coats may be visible.

Procedure:

This procedure for wiping varnish uses the General Finishes line of products. The waterlox line of products could also be used if the material is thinned one to one with mineral spirits. The best description for this product is "high performance polyurethane". Compared to the thinned polyurethane technique this product requires fewer coats, and has a harder more durable surface.

1. Apply a wet, uniform coat with a foam brush. After the finish has dried, sand with 320 grit paper. If you are applying this finish to unsealed wood, you may need to repeat this step.
2. After the first coat has dried, sand lightly with 220 or 320 grit paper. This product is very easy to sand, take care not to sand through the finish into the stain, if any. Wipe off any dust caused by sanding.
3. Continue applying the finish with a rag at this point. Apply the finish sparingly but try to maintain a wet edge to avoid any lap marks. After the finish has dried, sand with 320 grit followed by a synthetic steel wool pad. Be sure to wipe off any dust caused by sanding. Repeat this step until the surface is free of any irregularities. (two to four coats)
4. You may call the finish complete at this point or rub out the finish.
5. To rub out the finish, abrade the surface with #0000 steel wool (with the grain) to a uniform sheen level. Apply a solvent or paste wax to the surface afterwards.

Woodworking Finishing Procedures

Water Based

Pro: Durable, good choice for high wear surfaces.
Easy to apply.
Dries fast.
Water cleanup.
Low odor.
Uniform sheen.
Self leveling.
High solids content, fast building.

Con: Low resistance to some household chemicals.
Some formulations appear to have a "white" cast to them.
Very difficult to remove cured finish.
Water can mark a cured finish, (water marks should go away after 24 hours).

Procedure:

There are several names for this product. Most likely, anything that is labeled varnish, polyurethane, or Crylic, appears "whiteish" in liquid form, and is cleaned up with water is an acrylic. These products are fairly new to the consumer market and the formulations are still being perfected.

Acrylics are often labeled as "water white". The general definition of this is that the product will impart no additional color to the surface. This may or may not be a desirable feature depending upon the circumstance. Acrylic applied directly over raw walnut or cherry will have a VERY different appearance that any oil based product which usually impart varying degrees of an amber color.

Even though this product has many good qualities, it is controversial in use on fine furniture. I usually reserve this product for use on interior furniture components, house trim, and shop furniture. These are the applications it seems ideally suited for.

Under no circumstances should you use real steel wool as an abrasive between coats of finish!

1. If you are applying this product over any other oil based stain or finish, abrade the surface with a scotch pad or synthetic steel wool to provide "bite" for the acrylic and keep it from beading on the surface. Polyurethane can be used as a sealer for acrylic. This will help avoid the grain raise problem associated with water base finishes. However, polyurethane will impart an amber tone to the finish, this may or may not be desirable.
2. Apply a coat of sealer made by the same manufacturer of the acrylic if possible. After the sealer has thoroughly dried, sand with 220 grit paper followed by a scotch pad. If the sealer has been applied over an unsealed surface you may need to repeat this step depending upon the amount of grain raise.
3. Apply as many coats of the gloss product as desired to build the surface. In the right conditions, this products cures quickly, you may apply consecutive coats usually within two hours. There is no need to sand between coats if applying them consecutively.
4. After the surface has been built up to the desired level you may switch the sheen to semi-gloss or satin for the final coat(s). Apply one or two coats of the final sheen.

Finishing on the Lathe ... Michael Dresdner

In many ways, finishing on the lathe is easier than finishing in the flat, because the motor turns the work for you. Besides, most turned projects get gentle treatment and do not require very durable finishes, so you can choose your finish based on appearance and ease of application rather than toughness. But the bottom line is that any type of finish that can be applied to furniture can go on turned objects too.

It is not unusual to see fancy or beautiful wood used for turnings, and you want a finish that brings out the best in the wood while going on easily and drying fast. The two most common ones are oil and wax, both of which apply easily with a rag right on the spinning work. Sand the work very fine (400 or above), dip a rag or fine scotchbrite pad into some boiled linseed oil, and press it onto the spinning work. For an even finer look, rub the wet oil into the wood using 600 grit wet/dry paper or simply use a handful of shavings. As the pressure from your hand creates friction, the resulting heat will help cure the oil faster. Oil will add depth and warmth to the wood. As people handle the piece over the years, they will constantly renew the finish by adding a bit of sebaceous oil (oil from our skin) to it as well.

You can apply wax the same way, by rubbing it on with an abrasive pad or sanding it in, then buffing it with a rough cloth. However, you might find that wax leaves the end grain feeling rough or knobby. Instead, try this: First flood the raw wood with [Zinsser Bulls Eye SealCoat](#) and wipe off any excess immediately. The SealCoat will absorb more into the end grain, sealing it so that it behaves more like the flat grain areas. Let it dry for about 2 hours, then lightly sand with 400 grit paper or finer. This will quickly remove the “fur” from any grain that was raised by the alcohol in the SealCoat. When it is smooth, apply your wax on a pad or rag and buff it as usual. You will notice that the wax lays out more evenly on this lightly sealed wood than on raw wood.

One final trick for pen makers: For a fast, tough gloss finish, get the slowest drying cyanoacrylate glue (super glue) you can find (some are 60 second cure). Working with two rags on the spinning lathe, wipe on a thin coat of cyanoacrylate and immediately follow it with a thin coat of boiled linseed oil. The glue will react with the oil and cause it to immediately cure into a very hard, glossy film. Sand lightly between coats and add as many as you like, using the two rag method. With a bit of practice, you can apply 4 coats, fully cured, in as many minutes.

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American Association of Woodturners
Whether used alone
or over other finishes,
wax is a common and
versatile finish for
turned pieces.

Wax & the Woodturner



By Alan Lacer

Bill Hunter uses a series of buffing wheels charged with compounds before applying carnauba wax to his cocobolo pieces.

I grew up in an age of hand-waxing your car to give a near bulletproof finish: water beaded, sun reflected, rocks bounced off hardly noticed.

So when I came to woodworking, I figured it would be pretty much the same with wax on wood: a strong, tough barrier between the world and my finish or the wood. The problem seems to be that it makes a difference whether it is wood or painted metal beneath the wax. I wonder if it could be that the tough and hard barrier on my car may not have been quite so tough after all?

It is hard to imagine a single finish playing as many roles as wax does in our field. Turners use it to

seal green wood, slow the drying of rough-turned bowls, lubricate cup centers and tool rests, assist sanding of wood and finishes, blend with other finishes for different effects (such as shellac or oil), add color (either overall or just in the pores of the wood), adjust sheen, reduce damage caused by water or grimy hands, minimize scratching, and sometimes serve as the only finish on a piece. But all of this gets ahead of the real story.

Wax benefits

Before choosing wax as a finish, one needs to know the strengths and weaknesses of this material. On the upside, wax:

- Reduces scratching, as it creates

a slick surface.

- Reduces staining and water spotting under some conditions.
- Works well on oily or resinous woods (such as cocobolo, bocote, tulip wood, and ebony), which are difficult to finish.
- Adjusts luster or shine that ranges from flat to an ultra-high gloss.
- As a clear wax, preserves the original color (especially on woods such as holly and hard maple).
- As a colored wax, adds color or special effects.
- Adds one more barrier between the outside world and the wood or the finish.
- Adds a finished look to the wood piece.
- Can be an incredibly fast finish

compared to most other options for finishing wood.

Wax's three strongest benefits are that it is reversible, repairable, and renewable. Because it is easily **reversible**, you can strip it with several solvents, including naphtha, turpentine, xylene, toluene, and mineral spirits (in most cases).

Because wax is **repairable**, you can re-buff or re-wax the surface. There are no bonding questions of the old coat with the new coat because the solvents in a new coating will usually reactivate the previous wax coating.

Because wax is **renewable**, you can re-buff a surface that begins to dull. Or, you can add a new coat to regain the original look.

Ray Key is one of the proponents of lubricating sandpaper with wax. This does several things: reduces sanding dust, makes the paper less aggressive, and reduces scratches.

Wax weaknesses

However, on the downside:



Dark wax on dark wood

Light wax on dark wood

- Even the best waxes don't hold up well to a lot of handling. The softer forms of wax, like beeswax or soft paraffin, smudge easily from handling.

- Even short contact with liquid affects the finish, and worse, water passes readily through the wax into the wood or onto the finish below. Even though there is some resistance to staining, I found that mustard and ink passed through the wax fairly quickly (less than one minute in most cases).

- Strong food items may affect the wax coating.

- Some waxes use "hot" solvents to turn them into paste or solutions. This may be a major problem for water-based finishes or uncured finishes like lacquer.

- Moisture vapors—the source of wood expanding and contracting—pass through a thin wax finish, which does little to slow this exchange. (The thick layer of wax used for green wood is excellent for stopping or greatly retarding moisture exchange.)

Remember that even with these limitations, the finish—if there is one—underneath the wax will probably offer some added protection and even luster. Thus, some of these downsides are not usually catastrophic.

Wax and oil mixes

There is one category of wax mixture that we should single out for a closer look: wax and oil. You'll find many homemade blends promoted and commercial blends marketed: beeswax and cooking oil, paraffin and mineral oil, beeswax and orange oil, beeswax and linseed and/or tung oil, beeswax and walnut oil. Some of these mixtures create soft waxes, with either oils that never dry



To stop moisture loss in turning blocks, turners often purchase blocks with heavy wax coatings. Two forms are melted paraffin and a wax emulsion, such as Anchorseal. When applied thickly, wax is excellent for stopping or greatly reducing moisture exchange. However, in thin layers, wax has limited value in reducing moisture penetration.

(cooking and mineral oil), oils that dry eventually (semi-drying oils like walnut oil), or oils that certainly will dry (tung and linseed oils).

One attribute of the wax-oil blend is a big draw: It gives a soft, silky look and feel to the piece that may be very important for point-of-sale appearances. (Remember that some fruits, vegetables, and candies get waxed—not for taste, but for eye appeal.)

In the case of decorative pieces, the oil and wax mix may achieve a look desired by the turner on a long-term basis. If that's the goal, I recommend using an oil that will eventually dry.

However, the blends I have identified make a soft finish even softer—and the surface even more prone to water spotting and dulling.

If a non-drying oil is applied to a decorative piece, a wonderful "dust catcher" is created. This finish will give the piece a dirty look over time—especially if the wood has large, unfilled pores. On a functional piece like a salad bowl, you may even wash away a non-drying finish or find it is attacked readily by some food items.

If the blend produces the desired look, go for it. Just don't have high expectations for a tough finish. As an alternative, oil a piece, then



Apply stick wax to pieces while still mounted on the lathe. Bill Hunter softens the sheen of a cocobolo piece with 4/0 steel wool.

apply wax over it.

Apply wax— count the ways

From a woodturner's standpoint, there are a number of methods to apply wax and buff a waxed piece.

One of the more common ones is to apply a liquid, paste, or stick wax directly onto the piece while still on the lathe. If it is a paste or liquid, wait until the solvent has evaporated sufficiently (sometimes this is expressed in minutes on the product container) and buff away with a soft cloth.

For a stick wax, there is no waiting time—the friction of holding the wax against the piece softens it sufficiently to spread over the piece. Buffing with a soft shop paper towel works for me.

Another option is to charge a buffing wheel with a wax (usually in stick form). In this case, hold the turning and travel over its surface with the waxed wheel. You can also coat a turning off the lathe with a liquid or paste wax, then buff out the finish on a dry buffing wheel (not charged with wax).

One of the most basic methods is to hand apply wax off the lathe and buff by hand with a soft cloth. Although this is an excellent method, it doesn't produce an ultra-high sheen (if desired).

A more unusual method is to immerse thin turnings into a bath of melted wax, a method Del Stubbs embraced. To follow Del's method, soak pieces a short time in melted beeswax in a crockery cooker, then dab off the surface as you lift pieces from the wax bath. This does several things: It gives the pieces a soft, low-sheen finish. And because it essentially plasticizes the thin pieces with wax, it adds to the durability of such delicate work.

Some turners who make duck calls use the dipping technique.

Mix your own blends

If you are into a little kitchen science and the control that comes with mixing your own finishes, wax is a good place to begin.

You can create your own blends of different waxes, decide if you want to create a stick form or a paste form, determine the softness

of paste or stick (or dried wax if a blend), control the type of solvent that puts your wax into a mix, and decide what color you wish the wax to be.

There are so many commercial varieties available that the option of mixing your own blend is less and less common. But don't let that deter you if you are drawn to the reasons cited.

Mixing your own blends or forms of wax usually involves heat and potentially very flammable materials (solvents especially, but even some



You can easily tint small batches of wax by first melting wax shavings in a bath of hot water, as shown above. Then, blend in tinting bases to add color before cooling the mixture. Mixol, a universal tinting base manufactured in Germany, is available in 20ml bottles from Woodcraft and other woodturning suppliers.



Thin pieces dipped in melted beeswax increase strength and produce a low luster.

waxes). The best advice is to put your container into a hot water bath. All of the common waxes melt below 180°F.

If you go for the first option, place the container holding the wax and solvent (if any—not necessary at all in creating your own blend of stick wax) inside another container so the heat is diffused before contacting the container holding the wax and solvent.

A centuries-old finish is a mix of shaved beeswax and turpentine. For a small batch, try 2 ounces (by weight) of beeswax and 3 tablespoons of turpentine. Heat it slowly to liquefy the mixture, stir to get an even mix, then let cool.

If you are patient, the turpentine will dissolve the beeswax without heat—it is just slower and requires more stirring to get an even blend. The amount of turpentine determines the softness of the mixture. If the mix is too thin for your liking, reheat with more wax; if it's too thick of a paste, reheat with more turpentine.

The application is like any other paste wax: Spread over the

workpiece, allow the turpentine to dry, and then buff. It's more or less a standard paste wax, but you control several variables. You can add shaved pure carnauba (usually considered to be a premium natural wax, but very hard and even a bit brittle compared to beeswax) into this mix to alter properties of sheen, hardness, and color. For a faster drying period, experiment with other solvents like mineral spirits, naphtha, or toluene. Some of the solvents may be harsh on uncured or water-based finishes below the wax—always perform a test sample before applying to the work.

How do you choose a wax?

How do you choose? I can tell you it is not by cost alone, as some of the least expensive waxes perform as



What is this stuff?

What is wax? You could say it is a fatty, oily substance with water-resistant properties that is solid at room temperatures. The origin of the English word wax referred to the material used to create the storage chambers for honey and brood in a beehive—hence the notion of beeswax. In practice, wax can be derived from the animal world: bees, lac bugs (source of shellac), other insects (used to produce Chinese wax), sheep's wool, and whales (for spermaceti). From the plant world: tropical plants (like the palm leaves used for carnauba), desert plants (for candellilla), the cuticle covering of leaves, or orange and lemon peels.

Even the mineral world yields wax as found in some forms of coal and minerals (montan and ceresin waxes which are actually fossilized vegetable wax), and certainly in petroleum (paraffin and microcrystalline, which started as organic plant and animal material). Today, there are numerous synthetic waxes with a multitude of applications—sometimes as a coating for wood.

As a woodturner considering wax as a finishing material, our options are not really so overwhelming. It comes in liquid, paste, and solid stick form. The most common types are petroleum-based (which includes microcrystalline waxes as well as the more common form of paraffin that we see in candles and sealing wax), beeswax, and carnauba. At times, woodturners use waxes from one source, but most commercial waxes are blends of several waxes formulated to achieve certain qualities.

Unfortunately, manufacturers like to keep a mystique about their “secret blends,” so we seldom know what waxes or solvents are in the containers.

well as some of the most expensive.

Turners use almost every variety of wax, including automotive and shoe waxes. The best advice is to try several brands of sticks, pastes, and liquids. Narrow your selection based on waxes that give you the properties you prefer (color, sheen, less likely to smudge from handling, more water or stain resistance).

Whether you concoct your own blend or discover one of the many commercial options, you will find a wax that fits your taste. However, put considerable emphasis on how it applies and how it comes off. Does it go on easily (with whatever method you have chosen), and does it come off nicely without streaking or unevenness?

To understand the limitations, test wax over bare wood. This is easily done on plywood or wood samples: Apply two coats of your wax sample, then let it cure for a day or so just to be fair about solvent evaporation.

Next, put droplets of water, ink, and mustard on the samples. Do these different materials dull the surface, pass through the wax, and raise or stain the grain? How much contact can the wax take before



The Japanese toy, top, and kokeshi turners use wax almost exclusively. Their traditional wax, Japan wax, is not technically a wax but a vegetable tallow. However, it is applied and performs like anything we label as wax.



Do you need some color in your wax?

You can add tinting colors or dyes to darken a wax (black, brown, and reds are the most common for this effect). Or, create your own liming wax by adding white color to the mixture to serve as a general tint or to fill the pores. For a stunning effect, add a patina wax of almost any color. There are also a variety of commercial color waxes available.

there are problems?

And one more test of your favorite wax: When waxing darker woods with large pores (such as walnut or cocobolo), does your wood sample stay white in the pores? If so, look for a darker wax.

Conclusions

There are plenty of reasons to use wax in certain situations: for a particular look and feel (especially as regards sheen), for woods that

are hard to finish with traditional approaches, for decorative pieces that will not be handled a great deal, to preserve the color, to add color to a piece, and to add a thin barrier between the wood or finish and the outside world.

Yes, wax does help reduce scratching and offers a bit more water and stain resistance than the finish alone—just not to the extent that some of the manufacturers would lead us to believe.

Play to its strengths and be aware of its limitations. In so doing, you will have another powerful option in your arsenal of finishing tools.

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