

THE CHARLOTTE SAWDUST

The Official Journal of
The Charlotte Woodworker's Association

www.charlottewoodworkers.org

Small Talk

In this issue, I have reprinted an article I found on the internet about dust control and finishes. A recent project of making refrigerator panels left me with less than desirable results in the final finish coats using a urethane finish.

My shop, like most of you, is in my garage which is far from dust free. I have a dust collection system which I use regularly, but as you know it is great for collecting dust chips but still circulates the fine dust around the room.

At a recent estate sale (that Phil Ashley conducted) I picked up a dust filter fan and replaced the filter with the finest (laboratory grade) filter. I applied one more coat and still had dust in the finish. I guess it is time to find another finish that is more forgiving to final rub downs.

I thought of finding a cheap tent to make a paint booth out of that could be taken down and stored for another time since I don't have enough room to leave it up all of the time.

I would love some suggestions from all of you "experienced" finishers.

See you at next week's meeting.

Sincerely,

Mike Dyer

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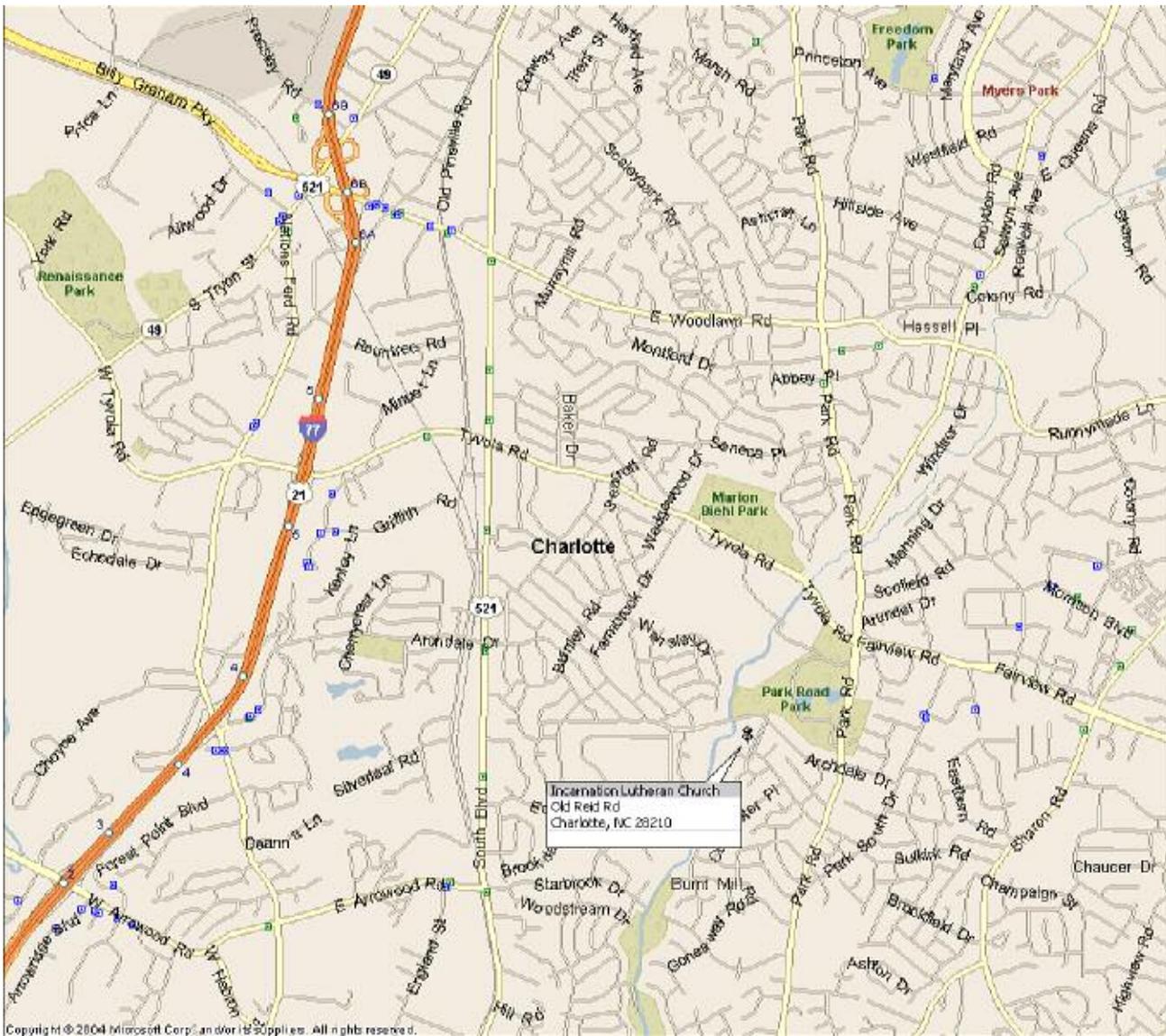
(704) 814-9580 evenings

April Program

Bruce Bogust will give a demo on repairing table tops

Meeting Time

Meetings of the Charlotte Woodworker's Association are held the third **Tuesday** of each month, except for December. Meeting is to be held at the Incarnation Lutheran Church, 6400 Old Reid Road, Charlotte, NC (just off Archdale Drive).



Following a social and refreshment time that starts at 5:30pm, our meetings start at 6:00pm. Get to the meeting early and get to know your fellow woodworking enthusiasts. This will be our first time at our new meeting place but we hope that it will become a great home for us.

Write an article for Sawdust (thanks for all the help from those that have)

Please consider writing an article for The Sawdust, this is your newsletter what do you want from it? What do you want to share with your fellow woodworkers? Everyone likes to share, share your successes, failures, and

mistakes, have fun with it and share with others at the same time. Contact Mike Dyer @ secretary@charlottewoodworkers.org or call (704) 379-1919 days or (704) 814-9580 evenings.

CWA Mentor Program

The following members have offered their help to anyone interested in learning skills or new techniques in their area of interest. Contact each person to arrange times to get together if interested.

Name	Area of Interest	Phone	Email
Wayne Cooper	***	704.409.1417	cooper@arconmfg.com
Bill Golden	Shopsmith & Accessories	704.525.9691	popstoyshop@earthlink.net
Dwight Hartsell	Woodturning	704.598.6029	woodwight@aol.com
Wayne Manahan	Sharpening	704.786.0768	wmanahan@vnet.net

Classified Section

\$\$ For Sale \$\$

Contact me if you have any tools, wood or services for sale. This section is offered for free.

Workshop Dust Control

An introduction to the methods and strategies for effective dust control.

Whether you're working in a commercial woodworking shop, or on the first project in your garage, dust control is an important issue. With repercussion ranging from dust in your finish to potential health issues, dust control tools and measures have become more prominent in woodworking over the last decade. The good news is that the vast majority of dust can be controlled with a few simple steps.

Reasons to Control Dust:

Health Effects

The health effects of long-term exposure to wood dust are the primary reason to control dust in your workshop. When I was in high school I worked in a lumberyard cutting wood for customers. I never wore any hearing or dust protection equipment. I discovered that after about four years I was more sensitive to the dust and would become congested and tight in my chest.

Now I wear a respirator whenever I work with wood. I discovered later that my experience is not unique. I've heard many stories from professional woodworkers who have had to retire due to severe allergies stemming from decades of working without any form of dust control. Beyond simple allergic reactions other health effects include: Eye & Skin Irritation, Respiratory Effects, Nasal Cancer and increased sensitivity.

Fire Risk

Sawdust poses a serious fire hazard in a workshop. Wood is flammable and the light powdery dust form

it can burn very quickly and with explosive force. If wood dust is concentrated heavily in the air, and then exposed to a spark, it can cause an explosion. The fire jumps from particle to particle in a similar manner as a grain silo explosion. Fortunately this is not very common. Sawdust lying around your shop is more likely to catch fire and burn from a stray spark or flame.

Slipping Hazard

Sawdust on a smooth floor can become slippery and cause accidents.

Dust in Finishes

If your trying to achieve a smooth "piano like" finish it will not be possible with dust in the workshop. The dust will settle on your finish and leave imperfections.

Tool Life

Dust collected in power tools can reduce their lifespan. The dust can block air ports and get into the internal parts thus shortening their life. The best way to control this is to draw the dust away from the tool with a vacuum during use. (More on this later) You should also use compressed air (or a vacuum) to blow dust out of the inside of the tool.

Checking for Dust in the Shop

Still not convinced that you need to control the dust in your workshop? Then try this simple test. After a day of working in your shop turn off the lights and use a bright flashlight or a laser pointer. You will see all of the particles in the path of the light beam. Keep in mind that this is the same air that you're breathing! You either need to remove the dust from air or your lungs will do it for you! Note: This simple test is useful for determining if your shop is clean enough for applying a finish to your project.

Types of Dust

There are three types of "dust" that you will encounter in your workshop. Each of these requires a slightly different control strategy.

Shavings

Wood shavings are typically created by planing wood by hand. These shavings are long and curly. Shavings don't affect your lungs, but they do require special collection considerations. They may tend to clog dust hoses and are best collected with a dustpan.

Chips

Chips are smaller than shavings and are typically generated by routers, shapers, and planers. Electric planers can produce a lot of shavings and require a good shop vac or collection system to run smoothly. Check your vacuum frequently as these savings can fill up a system quickly. Sawdust is often created at the same time as chips.

Sawdust

Sawdust in the workshop is a serious safety issue and requires proper control. The fine dust can be difficult to control and requires special precautions. Dust is most frequently created as a by-product to cutting operations such as with a table or band saw or from sanding. The best way to control sawdust is at the source, as we will discuss below.

Dust Control Strategies

Shop Ventilation

There are many dust control strategies and the most effective are often the simplest. The hazards are increased when dust is concentrated into an enclosed area. Because of this opening a door, window, or

garage door can have a big impact. Even more effective is to use a fan to blow the dust out. You can also work outside for especially dusty operations.

Masks & Respirators

Dust masks and respirators are an important part of personal protection in a workshop. Even if your working in a well-ventilated shop (or outside) you still need to wear protection. The most common masks are the disposable white cloth masks. These offer some level of protection, but are porous and allow small particles to pass through. They should not be used when working with chemicals, as they can't filter them out.

The second level of protection is a professional respirator. This is a rubber mask that has replaceable canisters. The canisters can be changed for different operations. Canisters for filtering out dust particles are typically made with pleated sheets of filter material.

Chemical filter cartridges typically have carbon in addition to the particle filters. These are useful when working with finishes and chemical strippers. They have a limited lifespan so please read the directions before using.

When using a respirator it is important that it is fitted properly to prevent air from leaking in around the edges. Read the instructions carefully for proper fitting. As a general rule, when working with a respirator, if you can smell the dust or chemicals, you have an air leak.

Air Cleaners

Air cleaners (a.k.a. Air Polishers) are used to continuously filter the air and remove small particles. They are useful for removing the very small dust particles that escaped your dust collection systems. An air cleaner is a good addition to an already existing system but your should put your efforts and money first into controlling dust at the source as well as preventing it from getting into the air in the first place. Air cleaners are also useful for cleaning the air to an extra degree if you are trying to achieve an ultra-fine finish.

Tool Dust Collection

As we mentioned above, you should try to control the dust at the source, and tool-based dust collection is the best initial strategy. Many of the tools on the market today offer dust ports and, in some cases, built in dust bags and filters. The dust filters and bags work well but can allow small particles to pass through. The best strategy is to use a hose that connects to the tool's dust.

A shop vac or stationary system can then be fitted with HEPA grade <1 micron filters. This not only helps to control dust, but also in the case of sanding, can actually lengthen the life of your sandpaper and make the process go faster. If you have a vacuum system we recommend you upgrade the filter and keep it clean. In our shop, we keep two filters on hand so that we can quickly replace the filter, wash out the dirty one, and allow it time to dry.

Shop Vacuums

Shop vacuums are very effective at controlling dust. As mentioned above, go ahead and upgrade your filter for the best results. Shop vacuums can be used to suck up dust and wood chips in the shop. They can also be connected directly to hand and stationary shop tools to collect dust. When connected to tools they should be turned on before and after the tool is used. When working with chip producing tools such as a planer or router they may require frequently emptying.

Dust Collectors

Dust collection systems are ideal if you have a large workshop or do a lot of woodworking. The stationary dust

collector can be setup out of the way and tied into all of your tools through a central collection line. The systems allow for the use of various fittings and options such as floor sweeps.

Single Stage Dust Collectors

Single stage dust collectors are designed to suck dust and debris into filter bags. They are called single stage because all of the materials are sucked through an impeller on their way to the filters. The primary disadvantage of this, is that the impellers have to be made bigger and stronger to withstand the impact of the debris. The larger impellers tend to be noisier and require more power to turn.

Dual Stage Dust Collectors

In a dual stage system the debris first enters a cyclone separator chamber where the large debris is separated from the fine dust. The fine dust then moves on to the filter bags. Because only the dust is passing through the impeller, it can be lighter weight. The filter bags in a dual stage collector are designed to filter out dust (not chips like a single stage). They are often made to <1 micron standards vs. 5 micron for a single stage filter.

Pre-Separator

Various pre-separators are available and can be added on to a single stage system to help remove large chips. The separators are typically a plastic cap designed to be fitted onto a metal trashcan. The area within the trashcan allows the large chips to "fall out" and collect at the bottom allowing the fine dust to travel on to the dust bags. While not as efficient as a dual stage system, a pre-separator is a great add on. You will typically experience a static pressure loss with these systems though.

Filter Bags

Filter bags are available in a wide range of sizes and filter ratings. The filters are rated in microns referring to the smallest particle size the bag can filter out. One micron or less is ideal for a shop filter. Most systems come with bags around 5 microns.

Whole Shop Systems

Setting up a whole shop dust collection system is the ideal way to collect and control dust from the point of origin. With a whole shop system a main line is run with lines branching off to each piece of equipment. Blast gates are used to control the flow from each machine. If you're considering purchasing a dust collection system, you should design the layout first to ensure you purchase the right size collector. See the resources section at the end of this article for a couple of good books on the topic of setting up a dust collection system. They cover subjects such as pressure calculations, static pressure loss, main lines, etc.

Piping - Metal vs PVC

The piping you use in your shop is an important consideration. As sawdust moves through the pipe at high velocities it will create a static charge that needs to be dissipated. This prevents shocks as well as the potential for an explosion. Properly grounded metal piping will dissipate the static charge. PVC pipe can also be used but it must be wrapped with a grounded bare copper wire on the inside and out. If you use any plastic fittings (such as a blast gate) on metal piping you need to attach a copper jumper wire to bridge the fitting and continue the ground. We offer a [copper wire grounding kit](#) complete with the wire and fittings you need. You can also purchase the materials from an electrical supply house.



Dust Hoses

Dust hoses are typically made from a soft flexible plastic and are helically wrapped to help them stay open. The dust hoses are used to connect equipment to the piping. They also help prevent machine vibration from traveling into the piping. You can use a longer piece of collection hose to allow for movement of the machine. Smaller hoses can be run from the system to hand power tools.

Dust hose are available in clear and black anti-static. The clear hoses allow you to see any clogs but need to have a copper wire added on the inside and outside for static dissipation. The anti-static hoses have an additive in the polymer that allows them to conduct the static and do not require a grounding wire.

Blast Gates

Blast gates are used to control the flow of air from the main line to the machines. By opening a blast gate suction is allowed to occur at that machine. You should only open one gate a time unless your system is designed for multiple machine to be operated at the same time. (This is typically only done in larger commercial shops.)

The blast gates are available in aluminum and plastic. The aluminum gates are more durable and do not require a grounding wire. The plastic gates are more economical but require a grounding wire to jump the grounding around the gate.



Clamps

Various clamps are available for dust collection systems. Wire clamps are the most economical and are ideal for multiple connections. Steel band clamps work well when a more secure connection is required. Key hose clamps are used for connections that need to be removed frequently.

Connection Fittings

Various fittings are available for connecting hoses together. Y-Fittings, T-Fittings, Splices, Elbows, and others are also used to layout a system. Other fittings are available for reducing and enlarging hoses to allow them to connect to tools and other systems. Specialty fittings such as floor sweeps and lathe dust collection hoods are also available.



Ever feel like your projects have a mind of their own?

Wood Finishes Summary

Maybe my problems with dust are because I am using the wrong finishes. As I am still learning and have not yet found “my finish” that I will predominately use for the rest of my life, I am always searching and trying “new-to-me” finishes. Here is a simple comparison of most finishes and I have only tried a couple of them.

When selecting the perfect wood finish it’s easy to become overwhelmed with all of the slick labels and marketing hype. A quick trip to the local home project center will reveal the hundreds of different choices. The term finish is often used loosely to refer to any chemical that is applied to wood. The term actually refers to a clear protective coating that sits on or in the surface of the wood.

Stain, Paint, and Finish are the three primary classifications for common wood treatments. Stains contain pigments and are used to tint the wood. Paints contain colored pigments and sit on the wood to form a protective coating. Some finishes are simply paint with out the pigment that lay down a clear protective coating.

There are five common types of finishes on the market. They are:

- 1) Oil
- 2) Varnish and Polyurethane
- 3) Shellac
- 4) Lacquer
- 5) Water-based Finishes

Applying finishes is one part of woodworking that doesn't require many tools. In fact there are only three main tools used to apply all of the finishes listed above; rags, brushes, and a spray gun. Many professionals will use a spray gun for smooth even coats.

Selecting a Clear Finish

When you are selecting a clear finish it is important to remember the qualities you require from the finish.

It must protect the wood.

It must be durable enough for the intended application.

It should be as easy to apply as possible.

Vapor Exchange

To protect your project for the long term you should select a finish that has a maximum resistance to moisture vapor exchange. Thicker finishes tend to slow down this exchange more. Keep in mind though that thicker might not always be better. Polyurethane is more prone to cracking after 4 or 5 coats. In this case, varnish might be the best choice.

Durability

The durability of a wood finish is an important part of protecting the wood beneath. A durable finish is more important for a tabletop than a mantle or picture frame. Durability has more to do with the chemistry of the finish than the number of coats. For example a single coat of polyurethane is more durable than multiple coats of a water based finish.

Ease of Application

It'll probably surprise you to learn that the ease of applications is one of the key factors to achieving a professional finish. Slow drying finishes like polyurethane and varnish are relatively easy to apply with a brush. However, their slow dry time leaves them vulnerable to dust landing on the surface and leaving spots. Faster drying finishes can be difficult or impossible to apply without a spray gun. Oil finishes aren't affected by dust since they soak into the wood.

Now that we've covered some of the basics let's take a look at the different type of finishes. There are five primary types of finishes, a bunch of sub-categories, and a limitless number of brand names for these finishes.

Oil Finishes

These types of finishes have been used for centuries to treat and preserve wood. Oils are different from most other finishes on the market because they seep into the wood and penetrate the wood's fibers. Because of this, oil finishes cannot be built up to a thick coat like polyurethane or varnish can. They offer less protection but are also easier to apply which is their primary advantage. Another advantage is that simply simply wiping on more oil can often repair minor scratches.

There are two types of oils, those that cure and those that don't cure. Oils that don't cure should generally be avoided because that can continue to seep into the wood leaving the surface unprotected. They can also leave a sticky surface on the wood. Linseed oil and Tung Oil are both oils that cure and work well as finishes.

Linseed Oil

This oil is made from the seeds of the flax plant. Look for “Boiled” linseed oil. This product has an added metallic drying agent that helps the finish dry in a day. Linseed oil without this additive can take over a week to dry.

Tung Oil

Pure Tung oil is pressed from the nuts of the Tung tree. Unlike Linseed Oil, this finish does not require drying additives and cures in several days.

Applying Oil Finishes

The primary advantage of using these finishes is their ease of application. Simply wipe it onto the surface with a clean cotton rag, wait 10 minutes, and applying more oil and allow time to cure. Always sand lightly between coats. Linseed Oil generally requires three coats to achieve the “hand rubbed” look. Tung Oil may require 5-6 coats to achieve the same results. The first few coats will tend to cure rough but will even out during the last few coats.

Varnish

Varnishes are one of the most protective finishes available. This level of protection increases with additional layers. The primary down side of varnishes is that they are slow drying which can allow dust and dirt time to settle and damage the finish. Because of this it is best to finish your project in a clean dust-free room if possible. Varnishes are produced by cooking an oil and mixing it with a resin such as synthetic alkyds, phenolics, and polyurethanes. Interestingly, polyurethane finish is actually varnish made with polyurethane resin to make the finish more protective and durable.

When more oil is used than resin the finish becomes more flexible. This type of varnish is called “Spar Varnish” and is ideal for outdoor use because the flexibility makes it more forgiving of seasonal wood movement.

Applying Varnishes

Achieving a perfect varnish finish is a combination of skill and experiences as well as access to the right tools for the job. Work in a clean dust-free environment. The room should be prepared by wiping it down surfaces with a damp cloth. Also be aware of dust that can be generated by human skin and clothing. The wood should be wiped with a tack cloth and the finish transferred into a separate working container.

Varnish is usually applied with a brush using long steady brush strokes. In contrast to paint varnish brush strokes are much more apparent. Work in the direction of the grain and “tip-off” your brush strokes with lightly brushed vertical strokes. Varnish should be wet sanded between coats with a fine sandpaper.

Wiping Varnish

“Wiping Varnish” that has been thinned with Paint Thinner is also available. Use caution since some manufacturers refer to their wiping varnish as “Tung Oil”. Read the labels carefully since these products are completely different. One way to test this product is to pour some of the finish onto a piece of glass and allow it to dry. If the finish cures to a hard finish it’s varnish. This product can be applied with a brush like varnish or with a cotton rag like an oil finish. The advantage of wiping varnish over an oil finish is that you can leave some of the finish on the surface and build up to a thicker coat.

Oil/Varnish Blends

Just to make thing a little more confusing the finish manufacturers introduced a blend of varnish and tung or linseed oil. These finishes are applied and act similar to an oil finish but the varnish adds some additional protection. They will still cure in the wood like an oil finish and should not be used if you plan on building up layers on the surface.

Shellac

Shellac is one of the few natural resins still in use today. Although not as durable as a Lacquer or Varnish, shellac still provides a modest amount of protection. Shellac is not the best finish for tabletops, chairs, and kitchen cabinets due to high wear requirements of these items.

The big advantage, and the reason the finish is still in use today, is that Shellac is alcohol based which makes it very fast drying. Because Shellac is fast drying it is less likely to collect dust like varnish. It is often too thick to apply with a brush and requires thinning with denatured alcohol before it can be brushed. This finish also requires that you work fast with your brush and maintain a wet edge.

It is available in a range of colors from clear to an orange/amber color. Orange/Amber shellac is known for the warm tones it gives wood. Shellac breaks down over time, so be sure to purchase a fresh can, and don't use anything over a year old.

Lacquer

Lacquer is used most often in furniture factories because its fast drying properties reduce dust related finish problems. It is usually applied with a spray gun although "brushing lacquers" that cure slowly are also available. If you choose to spray a lacquer finish be aware that the fumes are hazardous to your health and the dry dust can be explosive.

Water-Based Finishes

Because of increasing environmental concerns a new class of finishes has been developed. These "Water-Based" finishes are often marketed as "polyurethane", "varnish", or "lacquer" which is untrue since all of these finishes are solvent-based. You can tell if a finish is water based because the can should mention "water cleanup" as an added feature. "Water-based" finishes are basically latex paint without a pigment. The two primary downsides are that they tend to hold visible brush marks and are less durable than the more conventional finishes. They also tend to bubble with brushing. You'll want to use a synthetic bristle brush and try not to over-brush the surface. Also try to avoid temperature and moisture ranges that exceed indoor conditions. Moisture or temperature ranges on either end of the scale can cause drying problems.

Sanding your Finishes

Properly preparing your finish between coats is an important step. With finishes that require building to achieve a thick coat it is extremely important to sand with fine sandpaper between coats to remove bumps and high spots. Wet sanding with special "wet sanding" paper is an excellent way to smooth out the surface without creating lots of airborne dust, which could land, in your next coat of finish. The best advice we can offer is to test your finishing techniques on a piece of scrap wood before you move on to your recently completed masterpiece.

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Show your CWA membership card at any of the listed
 places and receive benefits (except for Woodcraft and
 Harbor Freight USA, which are not able to provide
 sponsorship in the form of discounts).

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Next Meeting:
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At the Incarnation Lutheran Church
