

# OFF-CUTS

**SEPTEMBER 2009**

Website: [www.stpetewoodguild.com](http://www.stpetewoodguild.com)

**Meetings are held on  
4<sup>th</sup> Tuesday of each month  
NEXT MEETING --  
TUESDAY SEPTEMBER 22<sup>ND</sup>. 2009  
7:00 p.m. to 9:00 p.m.**

**Program:  
KAYAK BUILDING - BY KEVIN**

Grace Lutheran Church  
Fellowship Hall  
4301 16<sup>th</sup> Street North  
(at its intersection with Haines Rd.)

## Recycling Heat

By Joe Pettit

If you've worked in the Florida summer, you know how unbearable the heat can be, especially inside a workshop. Some, like myself, have added air conditioners their workshops to counter this. But that is a large expense and, in my case, the heat dumps out of my office into the workshop area. If only there was a way to use that heat...

Months ago, I had started stockpiling stacks of green lumber with the intent of air drying it in the safety of my workshop. When I noticed the heat coming off my air conditioner, I came up with a plan to recycle that heat into drying my lumber. By building a box around my air conditioner and the lumber stack, I was able to use that heat. But first a primer on how air conditioners works.

Air conditioners have two radiators and some pumps and compressors. One radiator is the cooled area, while the other is outside. Interior air is drawn through the radiator where the heat is transferred to the much cooler Freon within the radiator.

The cooled air is then ejected back into the conditioned space. The Freon is then compressed which causes it to heat up. The compressed Freon is then pumped into the outside radiator. Exterior air is drawn through the radiator, picking up heat from the compressed Freon and then ejected back outside. The cooled Freon is then allowed to expand which drops its temperature. The now cool Freon gets pumped back to the interior radiator where the process continues. The system is basically a heat pump, taking heat from inside and transferring it outside.

Now, to build your lumber kiln, you'll need the following:

- 1 air conditioned work space (Heat source)
- 1 air conditioner
- 1 drying box large enough to hold your lumber
- Air ducting from outside the workspace to the A/C intake
- Air ducting TO your drying box
- Air ducting TO outside (waste heat)
- Lots of fans

I won't provide plans, since every kiln is different, but this is the general idea:

1. Duct outside air to the air intake on the outside radiator (usually slots on the side of a window unit A/C).
2. Duct the exhaust air from the outside radiator to your drying box.
3. Duct the hot moist air in the drying box to outside.
4. Add fans as needed to keep the air flowing properly
5. Make sure that the hot air inside the drying box mixes with the lumber stacks well, or it will simply pass outside without picking up any moisture.

Monitor the drying rates. My kiln dries remarkably fast, perhaps too fast. This can cause checking and warping in the wood. However, proper drying procedures are a topic for another day. Have fun recycling the heat.

## MEETING MINUTES – 7/28/09

The meeting was called to order by Chairman Joe Pettit at 7:05 P.M.

Guest; Jesse Wilhelm

### BUSINESS DISCUSSED

- Christmas bowls – ideas and plans available
- Coast Guard tables are finished
- State Fair project – Mike and Joe will coordinate
- **2010 Officers – President and VP candidates are needed**
- Crislip Arcade recovery – Pete explained the progress. He showed projections of the project.

### Show & Tell

Pete – Wood puzzle

Scott Tiffany – Vertical router table

Bernard MacDonald – Table plans

Jesse Wilhelm - Showed a portfolio of his chainsaw carving

50/50 winner – Steve Stutts

### Program – Potluck

Joe – Jig for making finger pulls

Pete – Wood Turning

Jesse Wilhelm – Log Carving

### Anticipated Programs for 2009:

September: Wood Kayaks

(Kevin Thompson)

October: Jigs and Fixtures.

November: Elections and Year in Review.

December: Christmas Party

### Treasurer's Report

**Club Balance = \$5053.30**

**67 members**

**HOLIDAY MEMBERSHIP GIFT FUND = 329.00**

**No new sponsors**

**Payments are to be made to: Camille  
Newton/Club Account**

## EDITORS COLUMN

**THIS MONTH I'M STARTING 2 NEW INFORMATION COLUMNS.**

**I'M EXPLORING ALL THE DIFFERENT OIL'S USED IN WOOD FINISHES**

### BOARD MEETING NOTES

- ❖ Recovery Wood – Need to inform members when the next wood cut will be. Pete is seeking a grant to help with the project.
- ❖
- ❖ The project to revitalize the Crislip Arcade is proceeding. A tour was taken by Joe and Pete. A proposal needs to be developed to detail the guild's involvement.

### Important dates for the Florida State Fair

**Dec 11, 2009:** Fine Furniture competition  
Entry forms must be received by the state fair

**Jan 29, 2010** 10AM-6PM: Delivery of furniture to state fair

**Jan 30, 2010** 10AM-2PM: Delivery of furniture to state fair

**Jan 31, 2010** 9:30AM: Fine Furniture Judging.

**FEB 10-13:** Days when the SPWG is manning the booth at the fair

**FEB:** Fair open to the public

**FEB 16:** Entries to be picked up from the fair.

## Shop safty

### Article Submitted by member Bruce Hickman

#### **How much risk are you willing to take?**

Many of us are in agreement that shop safety is more about attitude than it is about a set of "hard and fast" rules. So many of the common safety rules are difficult, if not impossible to abide by.

A good example is "never reach behind the blade of a table saw." In fact, many of the owner's manuals clearly state that this should never be done. And yet, anyone who has ever actually used a table saw will tell you that, in many cases, placing a hand behind the blade is essential to safe operation. You may need to keep the stock pressed down on the table to prevent the blade from lifting it as the teeth come up through the kerf. Or you may need to feed the last bit of a rip cut from the outfeed side.

Another safety rule is to never remove the blade guard. But again, most of us have found ourselves in situations in which it is impossible to use the saw at all, much less use it safely with the guard in place. So we always have to come back to the most important safety rule of all which is to stay focused on the task at hand and never do anything that does not feel comfortable to you.

There are some things that are so inherently risky that most of us would never attempt them. Freehand cutting on the table saw, for example. That's something I have done maybe three or four times in over 35 years of woodworking because I always feel at risk when attempting it. Even contemplating it gives me the heebie jeebies. The chance of a brutal kickback is the least of the unpleasant possibilities. But there have been a few times when it was the only way I could accomplish the task at hand and, those few times, I capitulated to necessity. But I did so with a full understanding that the danger was well beyond my level of comfort, my attention was in fully focused mode and I was completely prepared to bail out at any moment. Even so, I had to take the rest of the day off after those operations to let my nerves calm down again!

There are woodworkers who are willing to take much greater risks than I am. It's hard for me to understand how a person can justify doing things that I would consider too risky to even attempt. But I know guys who make freehand cuts on their table saws without a second's

hesitation. I have to admit that I'm not the kind of guy who enjoys leaping out of airplanes, jumping off of bridges with a big rubber band tied to my ankle, sliding down a steel handrail on a skateboard or flying off a snow covered cliff with a plank strapped to my feet.

Any of those things could result in serious bodily harm. And many of the things we do everyday in the shop might seem just as risky to the guys who do things I would never even consider. But I don't work with dangerous machines because I enjoy the adrenalin rush or because I get off on feeling fear. I truly dislike feeling fear and any time I feel fear in the shop, I immediately stop what I am doing and start looking for another method.  
D.D.

## Guild Sponsors:



**RON SYLVESTER**  
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## WOOD Of The Month:

# TUNG OIL

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Scroll Saw	Randy Watson
Carving	XXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXX
Turning	
Furniture	Ernie Barta 727-866-2670 <a href="mailto:anbarta@verison.net">anbarta@verison.net</a>
Cabinet Making; and Safety	Joe Pettit <a href="mailto:jpettit@ix.netcom.com">jpettit@ix.netcom.com</a>

The word **Tung** is an ancient Chinese term for heart. Today, the term also refers to the large, dark green, heart shaped leaves of the Tung tree. This is a fast growing, deciduous tree that reaches a height of about forty feet when mature. The life span of a Tung tree is about thirty years. Fruit bearing begins in the third year of tree growth.

The Tung fruit occurs in clusters, each of which bear four or five nuts. When the nuts are dried and pressed they yield about twenty percent oil. Under favorable conditions an acre of Tung trees will produce about two tons of nuts and eight hundred pounds (one hundred gallons) of raw Tung Oil annually. Successful cultivation of Tung trees requires exact climatic conditions, including the proper ratio of warm and cool days. The major growing areas include China, Argentina, Paraguay, and parts of Africa.

The first record of Tung Oil appears in the writings of Confucius dated about 400 B.C. . Even then, the Chinese recognized the amazing qualities of Tung Oil. Throughout their history, the Chinese have used Tung Oil to waterproof the masts and sails of junks (boats), to finish furniture of royal families and according to legend, to seal the Great Wall! When Marco Polo returned from China, he brought tales of the wonderful "China Wood Oil". But Tung oil was unable to capture the attention of the West until this century.

In 1912, the American Ambassador to China shipped Tung trees to California, but they died due to lack of proper growing conditions. Successful Tung plantations were established in the Gulf Coast states during the 1930's because of the perfect growing conditions. The U. S. automobile industry began using Tung Oil to prevent rust and reduce friction on engine parts. Soon Tung Oil was used to coat the insides of cans, to insulate electric circuits, and to make high-quality paints. In 1969, hurricane Camille destroyed the Tung plantations of the Gulf states and stopped the domestic production of Tung Oil. Even though Tung Oil is now an imported commodity, it remains a vital part of American industry.

### TUNG OIL VERSUS OTHER FINISHES

In recent years, those who appreciate the warm richness of beautiful wood have begun to realize what the ancient Chinese knew; *when turned into a finishing product, Tung Oil is the finest natural wood finish in existence and has yet to be duplicated synthetically!*

Man's ingenuity has created many synthetic finishes, including lacquer, shellac, and varnish all of which protect wood with a hard impervious layer. But these surface finishes prevent the development of patina, the lovely depth and tone

that only natural aging can produce. Eventually synthetic finishes will break down and discolor, when that happens the entire surface must be removed by labor intensive stripping and sanding before another coat is applied.

Penetrating finishes formulated with linseed, soy or paraffin oils actually go into the wood and enhance its natural beauty, but these oils often dry incompletely and fail to form a hard and durable surface. Furthermore, they develop a gummy build-up when additional coats are applied. Linseed oil, the most commonly used penetrating finish, darkens and changes color with time and finally disintegrates.

A Polymerized Tung Oil finish is hard yet flexible, waterproof and impervious to alcohol and many food acids. Polymerized Tung oil as a penetrating oil allows wood to continue its aging process and to develop its patina. The wood's rich color and grain are enhanced by the natural ambering (coloring) of Polymerized Tung oil over time. Any sign of wear disappears when a thin "maintenance" coat of oil is rubbed in. The maintenance coats, rather than cause a build-up, actually improve the patina as they protect and preserve the wood. A floor, a piece of furniture, or any other wood object finished and maintained with Polymerized Tung Oil will never have to be stripped again. The finish will become more beautiful with time.

## **POLYMERIZATION AND FORMULATION**

As Tung Oil dries and cures, the molecules join together in a tight complex formation. This process is the secret to Tung Oil's effectiveness as a finish. The cross linking of the oil's molecules makes the surface waterproof and impervious to many chemicals. The bonding also gives flexibility to the surface, making it capable of withstanding wear and tear.

**Sutherland Welles Ltd.®** uses a process called polymerization to intensify Tung Oil's natural cross-bonding tendency. Polymerization is essentially a cooking process that enhances the molecular structure of the oil and further improves the natural cross-bonding reaction of raw Tung Oil.

Many other manufacturers of Polymerized Tung Oil will claim they polymerize Tung Oil, but their "cook" is not as extensive as ours and requires formulation which includes additives such as varnishes and urethanes to improve the hardness, durability, and lustre of the finish. This adds to the toxicity of the finish and inhibits the penetration of the oil into the wood fibers as well as slowing the drying and curing time.

The polymerization process used by Sutherland Welles Ltd.® is very sophisticated and "cooks" the pure, raw Tung Oil to its "maximum thermal threshold." Controlling the "cooking" and the "cooling" is an expensive process

that at its perfect point produces an oil that has maximum durability and a gorgeous sheen. If the process isn't well controlled the oil solidifies to the consistency of a rubber eraser and the entire batch is lost. The intricacy and therefore expense of the process is what leads most companies to formulate with modifiers. They believe they can achieve the same results with a cheaper process and formulation. In time, the varnishes and urethanes discolor and deteriorate and with it the finish.

Polymerization increases the viscosity of the oil making it difficult to work and reduces penetration into the wood. The Polymerized Tung Oil must be formulated with solvents to thin the oil to maximize its workability and penetration and driers to shorten the drying and curing time. Sutherland Welles Ltd.® has researched and implemented driers with the lowest toxicity available. We also use solvents that are "cleaner" reducing the environmental impact and minimizing a finisher's exposure to toxic fumes and chemicals.

We at Sutherland Welles Ltd.® are proud of our commitment to improve product performance while reducing its environmental impact both to the earth and to wood finishers using our products. We will continue to make changes in our formulations that achieve that goal!

## **THE LOC-LAMIN® WOOD FINISHING SYSTEM**

The Sutherland Welles Ltd.® polymerization process and formulations are the core of what we call the **Loc-Lamin® Finishing System**. This system is based on the application of several thin coats of our Polymerized Tung Oil each fusing to previously applied coats. This creates a durable finish that bonds completely to the wood as if it were one solid coat. Microscopic examination of the finish shows a three-dimensional molecular locking of the finish into the wood fibers. The Loc-Lamin® System does not deteriorate over time. The molecular locking of the finish into the wood remains stable indefinitely eliminating the multiple layers from peeling apart.

The process begins by applying Polymerized Tung Oil Sealer to new or stripped wood. This thinner formulation penetrates deep into the wood pores. As it dries, the Polymerized Tung Oil molecules join together creating a tough, interlocking network. This hardened sealer acts as a base for the finish coats of Polymerized Tung Oil whether a finisher uses a penetrating or surface application. As the first finish layer dries, the Polymerized Tung Oil molecules bond with those already in the wood. Successive coats of thinly applied Polymerized Tung Oil will fuse with each other and are firmly locked into the wood.

Regardless of which Polymerized Tung Oil product is used, it is important that it be applied as multiple, thin coats rather than as one thick coat! Thin applications ensure that each

layer dries and cures completely; this is essential for the Loc-Lamin® Wood Finishing System to perform.

The Loc-Lamin® Wood Finishing System also contributes to the ease of maintaining a Polymerized Tung Oil finish. Abrasions are sure to occur on any piece of wood over its lifetime. Temperature and humidity changes cause expansion and contraction of the wood eventually causing small cracks in the finish. When a piece of wood is routinely treated with Sutherland Welles Ltd.® Polymerized Tung Oil Wood Care product or periodically given a thin coat of Polymerized Tung Oil finish product, the Polymerized Tung Oil molecules in the fresh coat bond with those in the existing finish, forming a new, smooth uninterrupted surface. Sutherland Welles Ltd.® Penetrating Stains can be added to new finish coats to renew the color of the finish and help hide small scratch lines.

One of the really great finishes available today (and under rated in my opinion), is tung oil. Most of the tung oil products on the retail market today are not pure tung oil. They have tung oil as a major component but have other additives, primarily varnish. Pure tung oil is available from refinishing supply houses, but don't expect the product you buy across the retail counter to be pure. And please don't be fooled by the phrase "contains pure tung oil." If this line is on the can, you can bet money it contains something else in addition to the "pure" tung oil.

The positives of tung oil include ease of application, ease of repair (when necessary) and overall durability. Minor scratches can usually be repaired simply by applying another coat of the finish, whether it's next month or next year. The major drawback is its lack of grain filling ability. Unless you're working on a very smooth and grain free wood such as maple, you're not going to get a smooth finish with tung oil. If, however, you like the "feel" of the wood and don't mind having the texture of grain showing, tung oil may be just what you're looking for.

Tung oils are usually applied in a wipe-on wipe-off method with a short drying time in between. After the wipe off and the coat has dried completely, 0000 steel wool is used to remove surface irregularities, and the process is repeated. Depending on the look you're trying to achieve, you'll apply anywhere from 3 to 6 coats in this manner.

Tung oil is more durable than lacquer and is impervious to water stains. As mentioned before, minor scratches are easily repaired. It's readily available and an ideal finish for butcher block tops in kitchens, as well as wooden salad bowls and other wooden food preparation surfaces. Furniture in areas of high use (or abuse) could also benefit from a tung oil finish.

## [Tung Oil Tree,](#)

Tung oil comes from the seeds of several species of **Aleurites**, primarily **Aleurites fordii**, a deciduous shade tree native to China. It belongs to the Euphorbia Family (Euphorbiaceae) along with the candlenut tree (**A. molucana**), another species with seeds rich in unsaturated oils. For centuries tung oil has been used for paints and waterproof coatings, and as a component of caulk and mortar. It is an ingredient in "India ink" and is commonly used for a lustrous finish on wood. In fact, the "teak oil" sold for fine furniture is usually refined tung oil. Some woodworkers consider tung oil to be one of the best natural finishes for wood.



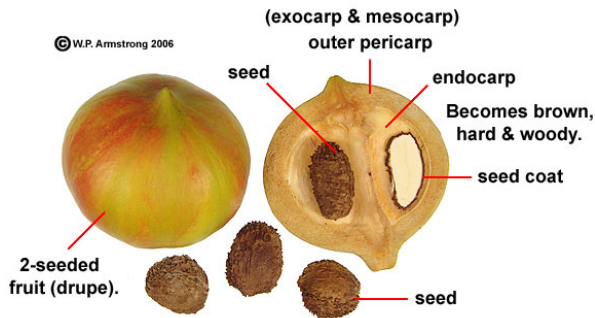
Tung oil tree (**Aleurites fordii**) showing two male flowers and one female flower (left) in which the petals have fallen off exposing the pistil.

Other unsaturated plant oils, such as castor oil and linseed oil, take longer to dry and leave an oily residue until they soak into the wood surface. Tung oil's ability to dry quickly and polymerize into a tough, glossy, waterproof coating has made it especially valuable in paints, varnishes, linoleum, oilcloth and printing inks.



Drupaceous fruit and seeds of the tung oil

tree (**Aleurites fordii**). The oil-rich seeds are produced inside a thick, woody endocarp layer and are the source of tung oil used on fine furniture.



Tung oil tree (**Aleurites fordii**). The fruit structure shown in the above image is conclusive evidence that it is indeed a drupe and not a true nut or tryma.

## How to Use a Tung Oil Finish

A pure or polymerized tung oil finish is easy to use and will produce beautiful results on any type of wood. **Usually applied to unfinished wood, but can be used over oil base stain.**

Existing finishes must be removed, as this is a penetrating oil. It needs to penetrate deeply into the wood fibers and pores.

### Preparation

New wood needs to be sanded smooth prior to application.

**This finish will not build a film like varnish**, so most of the sanding should be done before any tung oil finish is applied. If the wood is rough start with medium grit sand paper and then finish with a fine grit, always sand in the direction of the grain.

After sanding, all repairs can be done. Any holes or cracks can be filled with a wood filler. If a wood stain is to be used choose a stainable filler.

For wood without any stain choose a colored wood filler that approximately matches the wood's color. Do a final sanding if necessary and remove all dust with tack rags.

### Staining

Any oil base wood stain can be applied. A tung oil finish has an amber color that will change or enhance the stain color. Choose traditional colors that will be subtle and still enhance the wood grain.

When in doubt **apply the stain and finish to a scrap piece of similar wood before staining.**

### Applying Tung Oil

A tung oil finish can be applied pure or thinned up to 50% with mineral spirits or turpentine. Thinning the first coat will increase penetration, decrease the drying time and produce better results.

A typical application is by **hand rubbing**. Dip a soft cloth or rag into the finish and rub onto the wood. Keep applying until the wood is saturated. Use a natural bristle brush for hard to reach areas. Allow each coat to remain on the surface for 20-30 minutes. Wipe all areas to remove any excess. Check for drips or runs after another few minutes.

**Drying is a slow process and will occur between 24-48 hours.** This depends on the porosity of the wood and whether you thinned the finish. It will take 3-4 coats to achieve a waterproof surface. You can lightly sand or buff with extra fine steel wool between coats.

For exterior use, brushing will be the best method for application. The first application should be thinned to increase penetration. Pick up all drips and runs after 30 minutes. Apply 4-6 coats on new, very porous woods like cedar.

### Maintenance

Maintenance is very easy. Light scratches can be gone with a light sanding and the addition of another coat of tung oil finish. Interior wood surfaces might need another coat every 2-4 years and exterior wood 1-2 years depending on exposure to sun light and wood species.