NEBRASKA FOREST SERVICE

TIMBER TALK

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In This Issue

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The Nebraska Forest Service publishes ***Timber Talk*** four times annually (February 1, June 1, September 1, and November 1) to serve the forest industry of Nebraska. All questions and correspondence concerning ***Timber Talk*** should be directed to: Dennis M. Adams, ***Timber Talk*** Editor, Nebraska Forest Service, University of Nebraska, 203E Forestry Hall, P.O. Box 830815, Lincoln, NE 68583-0815. Phone (402) 472-5822, FAX (402) 472-2964.

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Lumber Market

HARDWOODS

NEWS

Appalachian. Log supplies are tight due to the onset of steady rain. To this point, green lumber output and kiln dried inventories have not been significantly affected. But, there are concerns that production could fall short of the markets needs. However, wood flooring manufacturers anticipate increased demand based on higher residential construction activity. There is uncertainty about future demand from international buyers due to economic problems in Europe and China. But currently, there is no difficulty obtaining orders for the full run of green production.

Northern. Log supplies are a problem. Money, whether lack of or conscious decision to restrict investment, is the critical factor limiting the supply network. Generally, there are no indications of supply-driven price weakness. Even with certain markets being soft, lumber inventories adjusted quickly and avoided residual price pressures. But, for a few items supplies are thin, leading to some moderate price increases. Coupled with much-improved housing construction this year (+25.7% through August) and projections for strong gains next year, there are high expectations for demand to increase.

Southern. This summer saw record setting hot, dry weather, which should have positive affecting logging. However, the supply stream has diminished because of the extended downturn in the wood products industry. There is a low level of purchased timber available for processing, meaning fewer logs for mills. Cash constraints, lack of confidence in sustained demand, and higher costs for raw materials have kept mills from boosting log inventories. Now rains are slowing logging activity further. There are concerns that lumber production could fall below market needs this winter. Current conditions point to even supplies and demand for most species, grades, and thicknesses.

(Source: Condensed from *Hardwood Market Report,* October 19, 2012. For more information or to subscribe to *Hardwood Market Report,* call (901) 767-9216, email: hmr@hmr.com, website: www.hmr.com)

Hardwood Lumber Price Trends—Green

Species	FAS				#1C				#2A			
	9/12	6/12	3/12	12/11	9/12	6/12	3/12	12/11	9/12	6/12	3/12	12/11
Ash	860	860	845	825	625	625	610	600	420	420	410	410
Basswood	715	715	715	705	400	400	400	375	205	205	205	205
Cottonwood	635	635	635	635	435	435	435	435	220	220	220	220
Cherry	1260	1355	1355	1355	640	655	655	655	330	330	330	330
Elm	635	635	635	635	420	420	420	420	245	245	245	245
Hackberry	475	475	475	475	455	455	455	455	265	265	265	265
Hickory	720	720	700	670	545	595	575	560	445	445	430	415
Soft Maple	1140	1115	1020	985	690	675	630	600	385	385	340	340
Red Oak	870	870	835	835	585	585	585	585	480	490	490	490
White Oak	1000	1000	1000	1000	600	600	600	600	440	450	450	450
Walnut	1795	1410	2000	2070	875	965	1015	1075	475	565	655	705

Note: Lumber prices quoted in dollars per MBF, average market prices FOB mill, truckload and greater quantities, 4/4, rough, green, random widths and lengths graded in accordance with NHLA rules. Prices for ash, basswood, northern soft grey elm, unselected soft maple, red oak and white oak from Northern Hardwoods listings. Prices for cottonwood and hackberry from Southern Hardwoods listings. Prices for cherry, hickory and walnut (steam treated) from Appalachian Hardwoods listings. (Source: *Hardwood Market Report Lumber News Letter*, last issue of month indicated. To subscribe to Hardwood Market Report call (901) 767-9126; email: hmr@hmr.com; website: www.hmr.com.)

Hardwood Lumber Price Trends—Kiln Dried

Species	FAS				#1C				#2A			
	9/12	6/12	3/12	12/11	9/12	6/12	3/12	12/11	9/12	6/12	3/12	12/11
Ash	1290	1290	1290	—	930	930	930	—	745	745	745	—
Basswood	1060	1060	1060	—	650	650	650	—	455	455	455	—
Cottonwood	780	780	—	—	530	570	530	—	—	—	—	—
Cherry	1725	1935	1960	—	990	1065	1065	—	625	670	670	—
Elm	—	—	—	—	—	—	—	—	—	—	—	—
Hackberry	—	—	—	—	—	—	—	—	—	—	—	—
Hickory	1275	1275	1275	—	1065	1065	1065	—	840	840	840	—
Soft Maple	1510	1490	1365	—	960	960	900	—	720	720	670	—
Red Oak	1465	1465	1395	—	1000	1025	1025	—	850	850	850	—
White Oak	1595	1655	1635	—	1045	1045	1045	—	830	830	830	—
Walnut	2915	2295	3145	—	1665	1755	1820	—	900	945	1075	—

Note: Kiln dried prices in dollars per MBF, FOB mill, is an estimate of predominant prices for 4/4 lumber measured after kiln drying. Prices for cottonwood and hackberry from Southern Hardwoods listings. Prices for ash, basswood, northern soft grey elm, unselected soft maple, red oak, and white oak from Northern Hardwood listings. Prices for cherry, hickory and walnut (steam treated) from Appalachian Hardwoods listings. (Source: *Hardwood Market Report Lumber News Letter*, last issue of month indicated. To subscribe to Hardwood Market Report call (901) 767-9126; email: hmr@hmr.com; website: www.hmr.com.)

Wood Products: Good for the Environment

The use of wood from responsibly managed forests offer considerable benefits for both jobs and the environment. Research shows that, in the U.S., forestry is the most jobs-intense industry[1]. The forest products industry as a whole employs nearly 900,000 people, exceeding employment levels in the automotive, chemicals and plastics industries. The wood manufacturing segment accounts for more than a third of those jobs[2], yet this industry is being lost as markets collapse and the economy continues to struggle. According to the Bureau of Labor Statistics[3], employment in the U.S. wood products industry declined from 620,300 in 1999 to 331,000 in 2011, a reduction of 47 percent. But, there are reasons to be optimistic about the industry's future.

As governments seek to improve the environmental performance of buildings and reduce their carbon footprint, there is growing recognition that using North American wood from responsibly managed forests is part of the solution. Wood is produced naturally and is the only major building material that comes from a renewable source. Life cycle assessment (LCA), an internationally recognized method for comparing products, materials, assemblies and buildings over the course of their entire lives, is based on quantifiable indicators of environmental impact. Studies show that wood is better for the environmental than fossil fuel-intensive materials such as steel or concrete in terms of embodied energy, which is the energy required to extract, process, manufacture, transport, construct and maintain a material or product. Air and water pollution, and other environmental impact categories also show less detrimental effects when wood is used.

For example, one study compared environmental impacts of wood-frame and steel-frame homes in the cold climate of Minneapolis and the wood-frame and concrete-frame homes in the hot climate of Atlanta — the framing types most common to each city[4]. The results demonstrated the superior performance of wood with respect to the following environmental attributes.

- *Embodied energy* — The wood-frame homes had 17 percent and 16 percent less embodied energy, respectively, than the homes framed in steel and concrete.
- *Air emissions* — The wood-frame homes had 14 percent and 26 percent less air emissions, respectively, than the homes framed in steel and concrete.
- *Greenhouse gas emissions* — The wood-frame homes performed 26 percent and 31 percent better, respectively, than the homes framed in steel and concrete.

In addition to greenhouse gas emissions avoided by not using fossil fuel-intensive materials, wood lowers a building's carbon footprint because it continues to store carbon absorbed during the tree's growing cycle, keeping it out of the atmosphere for the lifetime of the building—longer if the wood is reclaimed and used to manufacture other products.

According to *The State of America's Forests* report, responsible forest management has resulted in more than 50 consecutive years of net forest growth that exceeds annual forest removals[5].

[1]*How Infrastructure Investments Support the U.S. Economy*, 2009, Political Research Institute.
[2]American Wood Council.
[3]Bureau of Labor Statistics, www.bls.gov/ces/.
[4]Perez-Garcia, J., B. Lippke, D. Briggs, J.B. Wilson, J. Bowyer, J. Meil, *The Environmental Performance of Renewable Building Materials in the Context of Residential Construction, 2005.*
[5]*The State of America's Forests,* M. Alvarez, 2007, Society of American Foresters.

(Source: *The Market Place*, Spring 2012, published by the Minnesota Department of Natural Resources. Article written by the American Wood Council.)

Opening Faces

Although there may be over a million different ways to saw a log, once the opening face is selected and the position or depth of the saw on this face is established, the options for sawing drop to well under a thousand in most cases. Of the million options available initially, only a few hundred will yield the optimum value of lumber at profitable and practical processing speeds. The proper opening face is key to highest sawing profitability.

A log face is the surface of a log that is 1/4 of the circumference and full length of the log. Four non-overlapping faces will completely cover the log. Of course, everyone will position their four faces differently on the log; that is, they will rotate them to a particular rotational position. The truth is that only a few rotational positions are going to be the most profitable. In fact, studies by the U.S. Forest Service and by Purdue University have shown that when the proper opening face is selected, the value of the lumber produced will be 20% more than if the same logs were sawn using a random opening face position.

When a face is examined, it might be a clear face, a good face, or a poor face. The criteria for judging the face quality is the amount of clearness. To make this judgment for hardwood logs, the face of the log is essentially graded using concepts similar to those used for grading hardwood lumber. So, the best face is one that has a clear area that is at least 10/12 or 83% of the face's area; this face is called a #1 face. A good face is one that has at least 2/3 or 67% of its area clear, which corresponds to the No. 1 Common hardwood lumber grade. A poor face is one that has at least 50% clear in several large clear areas. (The clear areas in all cases must reach from edge to edge of the face; we are looking for one or two areas that make up the percentage of clear required. This clear-area approach is often used for grading logs with different people using different rules and procedures—and that is, as you might guess, another article.)

The Best Face Position

In general, the faces are rotated to give the maximum amount of clear area, assuming that you want as much clear lumber as possible.

For hardwoods, the knots that one can see or notice from bark swirls are positioned, when possible, on the edges of the faces in order to develop the most clearness in the center of the face. When making lumber, any knots on the edge of the lumber could potentially be edged off to raise the grade; if knots are in the center of the lumber, upgrading would not be an option.

For construction grade and knotty lumber products sawn from softwoods, the knots, if not too large, are positioned on the center of the face, as knots on the center of a piece of lumber do not significantly reduce strength, have little effect on most grades, and are round, not spiked, which is preferred for strength and appearance. Knots on the edge of lumber can greatly affect strength and appearance.

It is easier to see face quality while the bark is still on. For this reason, it might be a good idea, if the logs are debarked before sawing, for the log inspector or grader to mark the face positions or mark a clear face with a spot of orange or white paint sprayed on the end of the log. This paint spot will help the sawyer position the log correctly. Certainly, it will cost a few bucks to take this extra step, but the payback is around 20% more valuable lumber (if the sawyer uses the marks to position the log.)

Beginning to Saw

The suggestion below will produce the best lumber and will develop the highest profitability overall, considering lumber value and sawing time. However, if the procedures cannot be followed safely, then it will be necessary to change them in order to avoid unsafe conditions.

Once the optimum face position is determined, the log can be opened by beginning sawing on either the best face or the worst face of the four faces. In the following discussions, it is assumed that the log and the saw are both horizontal and the saw will cut the top face first. (If your sawmill uses a vertical saw, you will have to rotate these instruction by 90 degrees.)

If you choose to open the best face first, it would seem to make sense that this face, which is quite clear, will produce clear lumber. Short lumber, even if clear, is not very valuable, so it is best that a clear face is always sawn parallel to the bark. To do this, if there is any taper to the log, the log is shimmed or the taper sets are used to raise up the small end so that the top face, end to end, is the same height. This means that the first piece of lumber that will be sawn will be full length and fairly uniform in width, as well as clear and valuable. For knotty softwoods, this opening face will have a desired knot pattern, not necessarily clear, and be full length. This approach to taper is called full-taper sawing.

If you choose to put the best or better face down to the ground and put the worst of the four faces upward, then, because this worst face will not produce high-quality lumber, there is no need to taper set the log. Rather, position the saw to saw a piece of lumber that will be the shortest piece that you can sell—perhaps 4 feet, 5 feet, or 6 feet in length. By opening the worst face first without taper sets, when we rotate the log 180 degrees to saw the opposite face, it will automatically result in sawing this good face parallel to the bark. This is called no-taper sawing. (Remembrance: In the mill I used to manage and where I sometimes was the sawyer, when I used the taper sets, a bright red light on the control panel would come on to remind me that the sets were on. I do not know how many times, when I rotated the log, that I missed seeing the light and forgot to shut the taper off. So I like opening the worst face first as I can skip taper setting.) The main risk of this sawing pattern is that because the bottom side cannot be seen, it may happen that if the log had been rotated a few degrees in one or the other direction, the bottom face would have been better (clearer); hence, it may happen that a slight loss in lumber value will occur. Marking the face positions with paint on the end of the log before sawing would eliminate this risk, but I do not know anyone who does this.

A few people will taper set all the faces, rather than going parallel to the bark on any face. They take out half of the taper on each face. Studies have shown that half-taper sawing (also called split-taper sawing) reduces overall lumber value in hardwoods by about 10%, compared to full-taper or no-taper.

Sometimes, but rarely today it seems, a log may have three or four good faces. It is prudent to saw all these faces initially parallel to the bark. This means 1) a lot of clear, long, wide lumber ($$$), and 2) that the cant left after the good lumber is removed will be tapered. A cut to remove the taper after the better lumber is removed is a much better idea than a cut to remove the taper in the clearer lumber out near the bark.

On the other hand, a log with no good faces can be sawn in any safe manner as long as the method is fast. We need to get rid of the low-value log and spend our sawing time on the better, more profitable logs.

Face Width

In most cases for hardwoods, if the face being sawn will produce higher-grade lumber, then the first piece of lumber produced should be as close to 6 ½ inches wide as possible. This can be a tough goal to achieve for a newer sawyer, but with experience, a sawyer can hit this target fairly well. If one does miss the mark, it is better to be a bit wider (maybe 1/4 inch) than a bit too narrow. If the mill is out of the sun, a laser light in line with the saw can help with positioning.

For lower-grade hardwood faces (which will likely be the norm for logs under 15 inches in diameter), the target for the first piece of lumber produced should be 4-1/2 inches wide.

For softwoods, we usually have a nominal target width of 4 inches or 6 inches in the final size of a piece of lumber (actual width is 3.5 inches or 5.5 inches). To allow for shrinkage and sawing variation, the opening face can be 4 inches or 6 inches.) However, if you see that this width is a bit too wide when the final piece is dried and planed, a smaller target can be adopted.

You may have a customer that has a particular desire for lumber width, usually wider; you may have a poor opportunity to sell 4-inch-wide pieces. Appreciate that wider opening faces mean a significant drop in lumber volume and value from the log. But if the customer is willing to pay, even though we are wasting our natural resource, most mills will follow the customer's wishes. Certainly, one might question this wasteful approach, but if you do not have customers, you cannot stay in business, so it is a tough issue indeed.

Thickness

The opening piece of lumber is almost always 4/4. In a few cases, it is 5/4, but this is rare. Then once the log is opened and this knottiness is more easily seen, a decision can be made as to whether to saw thicker lumber in the subsequent pieces from the log. Basically, knotty, thick pieces of hardwoods are not easily sold.

Sometimes for softwoods being sawn into 2-inch-thick construction lumber, the opening faces is 4 inches or 6 inches and thickness is 2 inches.

Leaving a Face

The general rule is to saw the opening face until the adjacent faces (not the opposite face) is judged to have the potential to produce higher-grade lumber. Of course, for safety reasons or because of a requirement for a certain size cant—especially with softwoods—the log may be sawn longer, but such a decision impacts lumber value quite a bit. The width of lumber from the adjacent pieces will be narrowed. Sawing too much on the opening face will also often lead to thick-and-thin lumber in the same piece due to the stress in the log. Nevertheless, it is common with softwoods, to see that the sawing on the opening and opposite faces is done deeply enough so that the resulting cant has a desired width, such as 6 inches or 8 inches. This facilitates the resawing of the cant into specified width lumber.

It is strongly encouraged that when leaving the opening face that the next face to be sawn is the opposite face. This rotational pattern will balance log stress, will make lumber that is less likely to warp (especially side bend) in drying, and will make wider pieces of lumber overall. Further, for hardwood, the number of pieces that will require edging will be reduced by 1/3.

In any case, the rule for turning a log to a new face is always done using the same general rule—if a adjacent face promises better grade, turn the log.

Summary

There have been many studies on actual mills to develop the best sawing procedures. Unless you have x-ray vision and a computer to calculate all the potential sawing patterns, the previous rules will yield the highest-quality lumber. I encourage a mill that is not doing it this way to try this approach for a few days. There are many people who have switched because they are able to see the benefits. Be safe, whatever you do.

(SOURCE: *Independent Sawmill and Woodlot Management* magazine, May-June 2010. Article written by Gene Wengert, Professor Emeritus, University of Wisconsin-Madison and President of the Wood Doctor's RX. LLC, in Madison Wisconsin. For more information or to subscribe to IS&MW, call 1-800-762-8476, on website: www.sawmillmag.com.

Sawing for Grade Increases Value

How to produce the most value from a hardwood log is always an interesting topic of discussion at trade shows and field days.

There are many different ways to produce value when sawing. One can focus on producing the maximum amount of volume in a day's time, cutting grade, or value boards with each pass of the saw, or some combination – such as taking time to get the value and then sawing the remaining material quickly.

The method used should be based on the raw material you are sawing and the market for which you are sawing. Keep in mind: you should always be able to justify how you saw, based on your market.

Sawing Methods

There are typically three methods of sawing a log. The first is "live sawing" or "through-and-through sawing", the second is "cant sawing"; and the third is "grade sawing".

In live sawing, cuts are made into the log until the center is reached. Then the log is rotated 180 degrees, and the remainder of the log is sawn by the same method.

In cant sawing, slabs and one or two jacket boards are removed until a cant is produced. The cant is then sold "as is", or live sawn into boards.

The final method is grade sawing, where the log is sawn and turned in a manner that produces the highest possible grade return.

Most custom sawmills charge their customers based on production rate, hourly rate, share basis, or they sell lumber based on the grade. The sawing strategy you use should depend on your pricing method. Do not spend time grade sawing, if you are being paid based on a production rate.

The main idea behind sawing for grade is that while the defects on the log cannot be moved, using your knowledge of lumber grading rules, you can rotate the log to place the defects where you want them to appear in the boards sawn. This requires that you have some knowledge of lumber grading rules. A good sawyer is an expert grader. Most lumber is graded using the National Hardwood Lumber Association's Grading Rules. I encourage anyone attempting to saw for grade to obtain a copy of these grading rules and attend a lumber grading class. If you are selling lumber based on custom lumber grades, and then use those for sawing decisions.

Selecting the first face to saw, or the opening face, is of great importance. This first saw line will determine the grade of boards produced from the remaining cuts. If there are few defects on the logs, try to place the defects at the edge of the flitches to be produced. This will give you the opportunity to cut the defects out when the board is edged.

When sawing for grade keep in mind the potential sawing faces. The deeper you saw into one particular face; you remove potential volume from the two perpendicular faces. Since random width boards are used in hardwoods, the extra width you can place into a high-grade face will increase its volume and value. Be careful because if you cut too deep into a face with a lower grade, then you may remove volume from a potentially higher valued board on one of the other faces. This is the second most important concept of grade sawing.

Determining the best face to cut is a lot easier with the bark on the log; knots and low to medium bumps are easy to identify. Since most portable sawmills saw logs with the bark, grade sawing is easier. On debarked logs, it can be very difficult to see defects, especially when the surface is rough. If you are curious about how to identify defects in logs, I would recommend that you check out The Hardwood Defect Trainer website at the Michigan Tech Forest Resources and Environmental Science Program (http://forest.mtu.edu/research/hwbuck/hardwood_defects/index.html).

Turning Logs

Whether to turn a log 90 degrees or 180 degrees has always been a topic of great debate. Turning logs 180 degrees results in less edging and greater stress relief when sawing. However, it requires more time for turning logs.

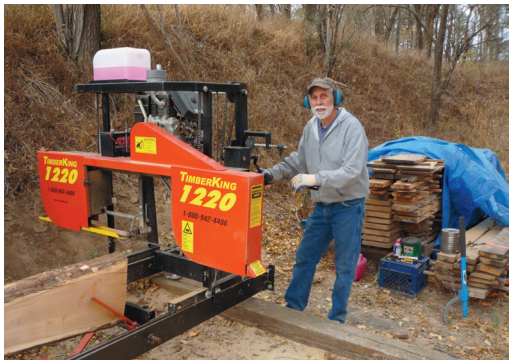
This take less time on large mills with rapid turners, but on small portable mills it can significantly reduce production

(continued on page 6)

Nebraska Forestry Industry Spotlight

Bertrand Sawmill

William (Willie) Bertrand is like most band sawmill owners in northeast Nebraska. He is not a full-time sawmill operator. Willie's profession and calling is as a Lutheran pastor and he currently serves three congregations. In between his obviously busy weekend schedule, Wednesday night confirmation classes, visitations to sick and shut-in congregation members, and other community commitments, he still finds time to cut lumber for himself and friends. Willie has been sawing with his TimberKing 1220 mill for three years. He cuts mostly as a hobby and for his own woodworking needs which includes quite a few wooden Christmas presents for grandkids and family members. He also does some custom cutting for people who bring logs to him and will usually cut on a share basis since he can then use the wood for his projects.



William (Willie) Bertrand working his TimberKing 1220 mill.

Most of the logs that end up on Willie's sawmill are from "salvaged" trees that are being taken down in town, farmstead or a windbreak being removed within a 30 mile radius of the mill. Willie says he "just hates to see trees and wood go to waste". In fact after cutting out the boards from the logs on his mill, the slabs and non-lumber material is burned for home heat so nothing is "wasted". In the future he would like to get a chipper to utilize the twigs and smaller branches that will not fit on his mill. These chips would then be used to develop walking trails through his trees. He has cut lumber from green ash, pines, black walnut, bur oak, basswood, maple and eastern redcedar. He says cedar is his favorite because of the aroma and the color when the boards are first cut. The boards are air dried in sheds and barns on the farm. One of the more unusual requests has been for ash blanks for baseball bats.

The Bertrand mill is set up on a nicely wooded acreage (Morning Cloak Farm) three miles east of Concord on a farm site where Willie's father-in-law planted many trees years ago. In fact some trees that were planted with the Conservation Reserve Program in the 1980s are now going to be cut on the mill. In addition, Willie has over 60 fruit trees in an orchard and a black walnut plantation that is growing well. With several old windbreaks on the property, Willie will not run out of trees to cut and lumber.

Contact information for Bertrand Sawmill is: Willie Bertrand, 86628 580 Ave., Concord, NE 68728; phone: (402) 584-2408; email: willie.bertrand@gmail.com.

Sawing for Grade Increases Value *(continued from page 5)*

time, so many portable mills turn 90 degrees. If you did not buy a log turning option on your mill, then I would highly recommend turning 90 degrees!

When logs are larger on one end that the other, they have taper. Taper settings are methods to handle the taper that occurs in the log to maximize volume and grade recovery. When working with taper settings on a portable sawmill, I have always found it easier to keep track what my taper sets are with turning 180 degrees.

When it comes to log turning, there is no definite right or wrong solution. Each has advantages and disadvantages. Use what works best for your situation.

Stop Turning When?

Usually, a log is turned when the grade of one of the remaining faces is higher than the face you are currently sawing. This will result in maximum value return for the sawyer.

The sawing cost in time (turning the log, slower production) will reach a point when — considering the value of the lumber — it is best to saw through-and-through or leave the remaining material in cant form. When do you stop turning the log for grade? It will depend on your local market.

When you saw deep into a log, the grade drops. In certain species, this is rapid, and in some, you can saw quite deep. In my opinion, when the grading faces drop to Grade No. 2, it is time to saw through-and-through. The difference in value usually is not enough to warrant the time for continued turning and decision-making.

I find that most of my decision-making in turning logs comes with mid-grade saw logs. High-grade logs are easy since they usually contain few defects. Mid-grade logs are usually where the largest value gains or losses are made. Sawing for grade can help increase the value produced in any hardwood sawing operation. Follow some of these basic suggestions and you will be on your way to making higher grade lumber.

If you are interested in more information about grade sawing, I would suggest downloading a copy of "A Simplified Procedure for Developing Lumber from Hardwood Logs," available from the Forest Products Laboratory at www.fpl.fs.fed.us/documnts/fplrm/fplrn98.pdf. While somewhat dated, the basic concepts have not changed.

(Source: *Timberline*, October, 2007. Article written by Dr. Brian Bond, Assistant Professor Virginia Tech University. Dr. Bond may be contact at 540-231-8752 or e-mail: bbond@vt.edu.)

The Trading Post

The Trading Post is provided as a free marketing service for forestry industry. Only forestry-related advertisements will be accepted with the exception of products manufactured in the normal course of your business. Please submit written ads to the *Timber Talk* editor at least 15 days before scheduled *Timber Talk* publication dates. Ads may be edited to meet space constraints.

For Sale

Sawmill. Mighty Mite band sawmill. 20 horse electric motor, tandem axles with brakes on one axle, 36" x 24' log capacity, (I have cut 46" beams) hydraulic operation includes winch, knees, taper, near arm, dogging arms, far arm, dogging spike, log loading arms, and electric clutch and blade lift. Also includes automatic blade sharpener, setting machine, 12 used blades and 4 new blades. Excellent condition. Never been used commercially. $17,500. Contact: Gary Fisher, Crawford, NE. Phone: (308) 665-1580; email: fisher@bbcwb.net.

Tree Shear. 14" Dymax Model 2135D1, Double grapple. Used very little. Excellent condition. Fits universal skid loader mounts. $4,000. Contact: Gary Fisher, Crawford, NE. Phone: (308) 665-1580; email: fisher@bbcwb.net.

Sawmill. Circular sawmill. Includes power unit and two 48-inch insert tooth blades. Contact: Monte Reynolds, R&R Sawmill, 75455 Rd 409, Farnam, NE 69029. Phone: (308) 569-2345.

Lumber. Rough cut. Air dry. Approximately 500 bf – Black Walnut, 290 bf – Pecan, 100 bf – Poplar, 500 bf – Cherry, 500 bf – Soft Maple, 100 bf – Hickory, 300 bf – Ash. Contact: R&R Sawmill, 75455 Rd 409, Farnam, NE 69029. Phone: (308) 569-2345.

Walnut Lumber. All dimensions. $3.00 per board foot. Falls City, NE. Contact: Bruce Walker at (402) 245-2031.

Wanted

Logs and Slabwood. Cottonwood, cedar and pine. 4" to 26" diameter and 90"-100" lengths. Below saw grade logs acceptable. Contact: American Wood Fibers, Clarks, NE at (800) 662-5459; or email: Pat Krish at pkrish@AWF.com

Cottonwood Logs. Veneer-quality cottonwood logs, 16" to 36" diameter, 7' and longer. Pick up service available. Contact: Barcel Mill & Lumber, Bellwood, NE 68624. Ask for Barton or Megan. Phone: (800) 201-4780; email: bj@barcelmill.com.

Horse-drawn or Tractor-drawn grader. With front wheel dolly. Contact: Carl Hinds, S. Sioux City, NE. Phone: (402) 494-2127 or cell (712) 281-1472.

Services and Miscellaneous

Woodshop Services. Millwork made from your lumber on my planer/molder. Chris Marlowe, Butte, NE (402) 775-5000. Marlowepasture@nntc.net.

Sawmill Service and Supplies. Saw hammering and welding. Precision knife and saw grinding. Certified Stihl chainsaw sales and service. Contact: Tim Schram, Schram Saw and Machine, PO Box 718, 204 E. 3rd St., Ponca, NE 68770, (402) 755-4294.

Used Portable Sawmills. North America's largest source of used portable sawmills and equipment. Contact: Sawmill Exchange (800) 459-2148, website: www.sawmillexchange.com.

The 2 X 4 Revolutionized Construction

The invention of the 2 x 4 is widely attributed to Augustine Taylor; a little-known Chicago builder who decided about 1833 that if mills could cut lumber of fixed dimensions (say two inches by four inches) it would make it possible to build houses with hollow walls and more or less standardized shapes.

By 1839, he was building whole churches on 2 x 4 frames.

Sawmillers of the day had few objections to dimensional cutting because it permitted them to get much more usable lumber out of a single log. Cutting dimensional lumber required more control of the carriage, but millwrights were early innovators of such technology, and Taylor seems to have had little trouble getting mills to provide what he wanted.

Little is known of Augustine Taylor's personal life. Chicago in the 1830's was a mean, muddy town with few careful record keepers, so it is not even known for sure if his first name was Augustine or Augustus Deoat Taylor.

Of course, his invention would have been worthless if inexpensive nails had not become available by the early 1830s in America. Jacob Perkins invented a practical nail-making machine in 1795, but it wasn't until the 1830s that refinements to the original machine made nails widely available, and at attractive prices.

The "balloon" construction method that the 2 x 4 allowed, began a whole new concept of house construction. The dead space between the walls actually insulated houses better than the solid lumber framed construction methods that had been used previously.

Two-by-four construction methods made is possible to build a house faster, because adjustments for variations in the thickness of each log did not have to be calculated and accommodated. Furthermore, the house built with balloon construction methods could be built with fewer workers, since heavy beams were replaced by lightweight 2 x 4s, which could be moved by a single man. Fewer construction accidents occurred and enough lumber to build a house was lighter and easier to transport.

Ironically, balloon construction at first required a closer adherence to designed plans, since the stress loads built into a house were easier to calculate on paper than on the site. Later on, balloon construction permitted mass building on a single plan, but at first new methods had to be discovered with time and practice. A heavy beam could carry a load either vertically or horizontally, but 2 x 4s required more care to see that individual pieces were not overloaded, especially in walls or floors.

According to some accounts, the first houses that Taylor made by this method resulted in some awkward-looking structures. Over-optimistic projections of the load-carrying capacity of the 2 x 4 led to bowed floors and sagging walls. Methods had to be discovered that avoided putting shearing pressure on nails. Thinner exterior walls and the truer dimensions that 2 x 4 construction permitted probably looked funny at first to

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Timber Sales

The following listings are for stands of timber or logs being offered for sale by owners or persons of delegated authority. Timber was cruised and/or marked for harvest by Nebraska Forest Service or other professional foresters. Volumes in board feet (Doyle scale unless otherwise indicated) are estimates by the forester. If no volume is listed, the trees or logs were not marked by a forester and the listing is included only as a marketing service to the owner. Listings are prepared according to information at the time of publication.

Item	Forester/Date	Contact
1. **Black Walnut** (26 trees) 2,925 bf Lumber 1 - 322 bf Lumber 2 - 1,374 bf Lumber 3 - 1,229 bf	Karloff 10/2012	Elizabeth Spilker 227 W. Mulberry Ave. Beatrice, NE 68310 (402) 520-1003 Location: Gage County
2. Black Walnut (59 trees) 7,559 bf Veneer 3 - 493 bf Lumber 1 - 1,587 bf Lumber 2 - 2,605 bf Lumber 3 - 2,874 bf	Karloff 10/2012	Joyce Kisling 900 Dorsey Street Beatrice, NE 68310 (402) 223-4643 Location: Jefferson County

The 2 X 4 Revolutionized Construction *(continued from page 7)*

those accustomed to the more solid feel of a thicker wall, but today the 2 x 4 is so common that it is hard to conceive of anyone actually inventing it.

In 1871 when the Chicago fire leveled 17,000 structures in just two days, the importance of the 2 x 4 became quickly evident. Chicago was rebuilt so quickly after the fire in no small measure because of the speed of balloon construction methods. The use of 2 x 4s also caused the development of other 2 x boards (such as 2 x 6s and 2 x 8s) for studs, plates, joists, rafters, etc.

An alternative method of construction with dimensional lumber was called "plank construction." With this method, one- to two-inch boards were stood up vertically around the exterior perimeter of a house framed up with 2 x 4s.

In this kind of construction, the sawmill operators did not have to worry about the width of boards, only the thickness. Doors and windows were simply cut into the exterior skin of the building. There are whole towns in Pennsylvania build with this type of construction.

Some people preferred to call the new building method the "basket" frame method, because it described more accurately how a house built with 2 x 4's was supported. Inverting a woven split ash basket, one could readily see that even light weight members, properly bound together, could make a very sturdy structure indeed.

The 2 x 4 gained relatively quick approval. It was efficient, inexpensive and easy to use. Nowadays, we have a hard time even conceiving of house construction without it.

(Source: *The Northern Logger and Timber Processor*, April 1998. Article written by Gary Lehmann)