

Backyard Woodsman

by
James A. Marusek

Disclaimer: This article documents my experience as a backyard woodsman. Felling trees, cutting logs, splitting firewood and burning wood have inherent dangers. Safe practices must be followed to minimize these dangers. Use of the information in this paper is AT YOUR OWN RISK. It is meant as a public service and represents the author's personal knowledge and approach, not to replace your own experience, common sense or instinct.

Introduction

History

I have heated my home solely with wood heat for the past 35 years. This wood comes from my 30-acre backyard. I cut and split the wood with the help of my wife. I heat primarily with hardwoods. I heat the house with wood between 5 and 6 months out of the year. The first and last months are intermittent, only heating when the weather turns cold. Sometimes we will light off the woodstove in the morning just to take the chill out of the air. I would estimate that we currently spend less than 50 hours per year cutting, splitting, storing and moving firewood for each winter season.



Stihl Model MS-441 Chainsaw and the larger Stihl Model MS-660 Chainsaw.

I purchased my first chainsaw in 1979. It was a Stihl Model 041AVEQ. It had some of the best safety features at the time and a good reputation. I was very happy with the chainsaw over the years and finally retired it after almost 30 years. I then replaced this chainsaw with a Stihl Model MS-441, which was very similar to the original chainsaw in weight and performance and a Stihl Model MS-660, which is larger and more ruggedized. The model MS-660 is the chainsaw that most loggers in this area use. Generally I use a 20-inch bar on the chainsaw, which seems to be a good working length. After the tornadoes of 3 June 2008, I purchased a 36 inch bar for the MS-660 Chainsaw because I had 3-foot diameter logs on the ground that had to be cut.



Jøtul Firelight Model 12 Woodstove

I purchased my first woodstove in 1979. It was a Jøtul Combi 4, manufactured in Norway. At that time, there was very few high efficiency wood stoves produce in the world on the market. Jøtul made one of these. Today that picture has changed significantly and there are a large variety of high efficiency wood stoves to choose from, many produced in the United States. I retired this stove 17 years later and replaced it with a Jøtul Firelight Model 12 Woodstove. The Combi 4 had a couple problems. It was hard to maintain the woodstove rope gasket seal and the expensive Bakelite handle kept breaking.

The Firelight Woodstove in my opinion comes very close to being the most ideal woodstoves ever built. It is a beautiful stove that was engineered for ease of use. It is very easy to load firewood and to remove ash. But it has one major flaw and that is probably why this wood stove is no longer on the market. The Firelight is very energy efficient and very attractive. The ceramic layer over the cast iron keeps the stove very clean. My Firelight is now 17 years old and looks like the first day I brought it home. The woodstove has a removable ashbin located under the stove, which allows the ashes to be removed cleanly. It has a foot pedal that lifts up the door for loading firewood. I walk into the house carrying several logs and step on the foot pedal. This lifts up the top door and at the same time opens up the damper. This prevents billows of smoke from filling the room. I load the firewood. I then close the top door and after the stove warms up to its operating temperature, I close the damper. The rope gaskets on the top and front doors are easy to replace. The windows on the front doors allow a lovely view of the fire, which is both calming and pleasing.

In my opinion, the main defect in this stove is the catalytically converter built into the middle of the stove. This ceramic honeycomb catalytic combustor helps to burn the creosote gases efficiently providing a little more heat out of the wood and a cleaner exhaust up the chimney. The ceramic converter is held in place with a back burn plate that is held by one large bolt (removable with a large Allen wrench). The original directions on this stove asked me to remove and clean the ceramic converter once each year. The first year I tried this and the ceramic converter literally crumbled in my hands. I purchased a replacement converter. They are expensive. Currently they run around \$120 each. So I never took the back burn plate off again. The stove worked fine for over a dozen years without any problems. Then the back plate began to crack and the stove lost its efficiency. I decided to replace the converter but this turned into a major tasks. The large bolt over time was almost welded to the stove. I had to cut the back plate off with a small diamond tipped grinding wheel to remove it. That gave me some space to use oils to free up the bolt and remove it. Fortunately, technology has improved and there are new catalytic converters on the market today. I purchased a STEELCAST Steel Honeycomb Catalytic Combustor (CS-552) manufactured by Condar for our stove. They are more ruggedized and heats up faster than the ceramic type. They are more expensive than the ceramic, costing around \$200. But if they make this woodstove more functional, it's worth it. I suspect this defect is the reason why this stove is no longer on the market. What a shame! Today's stoves mount the catalytic converter near the exhaust flue. [I was later told that the main reason why Jøtul discontinued this stove was that the average consumer could not run the catalytic stove without encountering problems. Apparently, their number of service calls due to improper use or maintenance was much higher on this stove, than on any of their non-catalytic stoves.]

Our house also has two fireplaces. In one of the fireplaces, we have a Lopi XL Fireplace Insert mounted. The insert accepts very large logs and burns for a long time. It produces so much heat that it

literally drives me from my home. We use it once or twice per year, generally when we have company over during Christmas/New Years or when the temperature falls below -10°F outside.



Lopi Fireplace Insert

Topography

I live in southern Indiana on 30 acres of land. Approximately 90 percent of my land is covered in woods. My property starts at a county road, then falls about 15 feet in elevation to a gentle creek that runs across my property. This gentle creek can turn into a raging river during heavy downpours. This creek will expand almost 300 feet in width and 6 feet in depth during these flash flood events. The property then rises over 125 feet in elevation to a ridgeline and then begins to drop off on the other side. My house is located about half way up the ridge. The ridge acts like a berm for tornadoes approaching from the southwest.

A variety of trees grow on my property including: hard maple, hickory, white oak, red oak, black oak, black walnut, poplar, ash, wild cherry, cottonwood, and beech. Beech trees are large and have a tendency to be hollow inside. Hickory wood is hard and the fibers twist and therefore difficult to split.



An aerial view of my property in early spring before the leaves budded

We also have smaller trees like ironwood and pawpaw trees. Ironwood is extremely dense. Pawpaw trees are the only tropical fruit trees that naturally grow in Indiana. When my wife first stumbled over this fruit lying on the ground, she ran into the house and said “Come quick, I found a dinosaur egg.” I went outside and first moved it with a stick to make sure it wasn’t some large snake or lizard egg, and then I picked it up by hand. I took it to work and the old-timers knew exactly what it was. We also have wild blackberries, poison ivy, poison oak and wild grapes. The wild grape vines are old. They can be six inches thick. They hang from the top of tall trees like in a Tarzan movie. The wild grape vines can form a lattice canopy that holds the tops of the trees together.

Early Days

I never had any classes on being a backyard woodsman. Nor did I have anyone who showed me the ropes. When I was growing up, we never heated our house with firewood. So everything I learned, I learned the hard way, in the school of hard knocks. The first few years, I thought my family would freeze to death. But eventually I picked up this knowledge – sometimes by trial and error, but mostly trying hard to figure out what I was doing wrong.

When I first started, all I thought I needed was a chainsaw and a woodstove to become a backyard woodsman. Was I wrong!

My first try at cutting up a log was a disaster. After 5 or 6 cuts, the blade became dull and the saw began to smoke. So after 15 minutes of cutting, I took the chainsaw to town and had the blade professionally sharpened. Thirty minutes later and \$5.00 less in my pocket, I went back home with a sharp blade. An hour lost in the process (travel time + sharpening time). I repeated this cycle with the same results, over and over again. After several months, I was beginning to come to the conclusion that I would never make a good woodsman. I experimented with a do-it-yourself sharpening approach using a small circular file. But I could never get the angles right and I was always dissatisfied with the sharpness. After a couple years, life started to look up. First, I learned how to minimize the wear and tear on the chainsaw blade. Second, I stumbled onto a small electric chain saw sharpener. This was a hand held electric rotary grinder with a grinding stone sized for the teeth of the chain. This little device worked miracles. Some models run off A/C power. Others can plug into the cigarette lighter in a car/truck. I have used this method for over 30 years and I have always been happy with the sharpness of the chainsaw teeth.



Chainsaw Sharpener

Cutting Up a Tree into Firewood

Approach

Wood is a renewable natural resource. Within a small forest are downed trees and tree limbs that would normally rot away on the ground. An acre of forest will produce around a half cord of this type of firewood each year. A cord of wood is firewood stacked 8 foot long by 4 feet high by 4 feet deep and weighs a ton. My 30 acres of woods provides me with an ample, continuous, abundant supply of firewood. By cleaning up my woods, I turn my woodlands into a well-manicured forest similar to a park like setting. The leaves on the top of the tall trees become so dense that they filter the light below. As a result, the dense undergrowth dies away naturally. For me, my woods are my little piece of America. They are my refuge of tranquility and wonderment. It is quite natural to have deer walk right next to the house in the fall and winter months.

Over the years, I have developed the following guideline in woodcutting. Cutting firewood should be quick, efficient, safe and with as little physical exertion as possible. I do not want to make being a backyard woodsman a laborious chore because then I might decide to give it up. I have been cutting firewood for 35 years now and I hope that if I every reach the ripe old age of 80 or 90, I will still be out there heating my home with wood.

Working with a Partner

When things go wrong, a partner can render immediate first aid and call in emergency personnel. My wife helps me with felling trees, cutting up logs, splitting and burning firewood. We are a team. She is my second set of hands and eyes.

Stripping off Branches

The first step of cutting firewood is stripping off the branches from fallen trees. The best device for removing small branches up to an inch and a half in diameter from a tree is a machete. They are ideal tool. The machete should be sharp. A bench grinder will restore a sharp edge quickly on a machete. It is a good idea to wear gloves when handling a machete, otherwise expect blisters. For larger branches, the best tool for removing branches is the chainsaw.



Machetes

A good type of machete is called a U.S. Ontario Knife. These machetes have been manufactured under U.S. Government specifications by the Ontario Knife Company for 60 years. They are made of 1095 carbon steel, which has been hardened to 50-55 HRC on the Rockwell scale. Two of my machetes are Ontario Knives.

Creating a Shrub Pile

Before I begin to cut the tree apart, I drag the branches to a shrub pile. These I will burn at a later time after the branches have had a chance to dry out. The shrub pile should not be close to structures that can burn, such as houses, barns or trees. Removing branches from the cut site is important because I do not want to trip over this debris while I am cutting. Sometimes in the deep parts of my forest, I will simply drag these branches off to the side and let them decay in place.

Cutting Trees into Logs

Cutting firewood is dictated by the wood stove. The logs should be cut to a length and split to a width that allows the firewood to fit within the stove.

Generally, I cut up downed timber that is accessible. If the timber has set on the ground for several years, it begins to rot. This wood makes very poor firewood with little heat content.

In the beginning, I didn't know how to cut up logs. After about 15 minutes, my chainsaw blade was dull and my chainsaw was smoking. This was caused by two problems. The first problem was that I was cutting into leaves, earth and debris, which quickly dulled my blade. The second problem was that as I cut into the logs, sometimes the logs would pinch my blade causing friction, heating up the blade causing it to stretch on the bar and become loose and the metal to lose it's temper.

I learned to correct these problems and become a good woodsman. This is the process that I use. I look at the downed tree and find the end that is raised slightly in the air. I begin cutting up logs here. (These initial logs are very useful later during the cutting process.) It is important not to cut into the dirt, leaves and other debris. This should be avoided. After I have a few logs, I use them to prop up parts of the tree near where I will continue to cut. Sometimes I can lift the tree by hand at one end and slide a log underneath to raise the tree off the ground. Other times I use a timberjack to raise the tree so that I can slide a log underneath. I then make as many cuts as possible and then reposition the log, working my way down the length of the tree.



Timberjacks

I have three types of timberjacks. The newest one I bought is called the Woodchuck. It has an advantage of being self standing, making it suitable for a one-man operation. It worked well on medium size trees. I am not sure how it would do with larger diameter trees, where the other timberjacks are better suited.

Sometimes the trees are just too large or unwieldy. For these trees, I might make several partial cuts, cutting through 80% of the tree each time and then roll over the tree and finish the cuts from the other side.

If the log is not raised, it has a tendency to pinch the blade during the cut. This damages the bar and blade. If I don't pull out the chainsaw quickly enough, then the log clamps down on the bar and the chainsaw is stuck in the log. Generally, when this happens I have to dismantle the blade and bar from the chainsaw. Then drive in steel wedge into the log cut to relieve the tension, which allows me to pull the blade and bar out. Then I have to reassemble the chainsaw. This is very time consuming.

There is a method that professional loggers use to address this problem on large trees (greater than say 1½ feet in diameter). They use plastic wedges. As they make their cut and they reach the point where the log begins to clamp, they drive in a plastic wedge and then continue on with the cut. The plastic wedge keeps the log from clamping shut. Also because the wedge is made out of plastic instead of steel, if the chainsaw was to inadvertently cut into the wedge, it would cause no damage to the chainsaw.



Plastic Wedge

Chainsaw Maintenance

After about an hour of use, the chainsaw needs maintenance. I take it to the pole barn. First I tighten the chain on the bar. Then I sharpen the blade. For me a little handheld electric chainsaw-sharpening tool works best. And finally I refill the chainsaw with oil and fuel (a gasoline/oil mixture). This process takes about 5 minutes.

Generally chainsaws are designed to run out of fuel before they run out of oil. This is to prevent damage to the chainsaw's bar and chain.

Sometimes bars will go bad. Chainsaws cut straight but when the bar goes bad they will cut in a curve. The chainsaw bar can be damaged by overheating, the result from allowing them to be pinched when cutting logs.

Metal gas cans will begin to rust after a few decades. The rust particles are small to the visible eye but they can clog up carburetors in small engines, such as chainsaws. When I began to run into this problem, I switched over to plastic gas cans and that solved the problem.

Gasoline comes in different flavors. Many contain ethanol. Over the past few years the percentage of ethanol content in gasoline has been creeping upwards. This is both true for regular gasoline and also in the creation of new blends of gasoline. Generally regular gasoline is limited to 10% ethanol by volume. Newer blends such as E10 have 10% ethanol content and N15 have 15% ethanol content.

Ethanol in gasoline is a small engine killer. Gasoline with ethanol, especially after it sits in the chainsaw for a couple weeks creates a white powder that damages the rigidity of the diaphragm in the carburetor. This white powder cannot be flushed out of the carburetor. I had a number of small engines that died over a short time due to this problem. As a result, I now buy only pure gasoline with no ethanol. Luckily, I have a gas station in town that sells the stuff. It is around 10 or 20 cents more per gallon, but after the switch over, I no longer have this problem. There is even a website that list the location of gas stations that sell pure gasoline. The address is <http://pure-gas.org/>

Sometimes I dream about buying a professional bench mounted chainsaw blade sharpener (such as an Oregon Chain Grinder with Hydraulic Assist). This would give me an unbelievably sharp edge, just like new right out of the box. But they run around \$500. With a 10 years supply of firewood on hand, I wouldn't start using it until my 75th birthday. So it is more like a pipe dream, but if I had to do it all over again, this would be the way I would go.

Moving Logs to Split Site

If the land is flat, most people use pick-up trucks to move logs and firewood. My property is anything but flat. It is very rugged, steep terrain that is for the most part inaccessible. In the early days, when we cut up trees on the ridgeline, we would let them roll down the hill several hundred feet like hundred pound snowballs. Then we moved them by hand using Garden Way carts, and small metal or wooden wagons to the split site.

I found the Big Red Mule Wagon to be extremely useful in hauling and storing firewood. The Big Red Mule is a heavy wagon capable of hauling $\frac{3}{4}$ tons. It's like an adult version of a Radio Flyer All Terrain Wagon. I purchase mine 14 years ago in 1999 and it continues to hold up very well. The only modification I have made is to install inner tubes in the tires. The tires would periodically go flat over time, and I don't like the hassle of have to fill them up with air. That fixed the problem. I like the wagon ready for use whenever I need it.



Big Red Mule

Later, I build a hidden road (a road to nowhere) that gave me access to the ridgeline.

I purchase a John Deere "Gator" in 2008 shortly after the tornadoes struck. And it has been a godsend. I would never have been able to clear up my tornado damage without it.



Gator

The John Deere XUV “Gator” Utility Vehicle is 4-wheel drive and a diesel. I equipped the Gator with Cargo Box Side Extensions. This allows me to haul a large load of logs and firewood. The Gator really makes my life easier. This vehicle allows me access to my woods for transporting cut logs, firewood and during winter for moving the firewood from its long-term storage in the pole barn to the short-term storage in my garage.

Splitting Logs into Firewood

In the beginning, I split all my firewood by hand. I used a variety of flat and cone shaped wedges and hammers. I would generally look for a weak spot in the log such as a crack or split and this is where I

drive in the first wedge with a small sledgehammer. Once the wedge is set, I would switch over to a larger sledgehammer. This approach uses a lot of elbow grease and sweat. This does not fit my definition of “as little physical exertion as possible”. So I transitioned to hydraulic log splitters as soon as they became commercially available.



Wedges and Sledgehammers

When using a sledgehammer, sometimes one misses the strike and the wooden handle comes down hard on the wedge. Needless to say this damages and weakens the handle. I found rubber protectors that prevented this damage so I began to use these.

Later I found an unusual mallet called the Chopper, which was capable of splitting logs easier. In using the Chopper, I would begin by locating one of the larger diameter logs from the log pile and use it as a base. I stood this log upright. On top this base log, I would place the splitting logs one at a time upright and then with all my might drive the chopper into the log. Generally the log would split in two with a single strike and each piece would fly off in the air several feet in opposite directions. The Chopper uses the vertical motion to drive into the log and then converts the rest of the force into a horizontal motion to split the wood. But not all logs would split. Generally softwoods and some hardwoods would be an easy split but some types of hardwoods with knots and twisting fibers would not. For those logs, I went back to using wedges and hammers.



Chopper

Later I began to use a log splitter. Once I purchased my first gasoline powered hydraulic log splitter, it has become the main method I use to split firewood. A log splitter is the easiest way to split wood. The greater the rated tonnage, the better the log splitter will be able to split the more difficult woods (stringy woods, logs with knots). I recommend a rated 20-ton log splitter or better. Another desired feature in a log splitter is one that can split wood in both the horizontal and vertical position. In the horizontal position, the log splitter is very stable to transport. In the vertical position, the logs can easily be positioned onto the log splitter without breaking your back.



Splitting Logs into Firewood

Splitting a month's supply of firewood with a log splitter takes around an hour or two. So it is very efficient. In this photograph, logs are being split with my 20-ton Log Splitter MTD Model 245-630-000. They are then loaded onto a Big Red Mule Wagon and then moved into the pole barn for seasoning and long-term storage.

Burning Shrub Piles

The shrub pile should be away from houses, pole barns, vehicles, trees and other combustibles. The flames from a burning shrub pile can go straight up 30 feet in the air. They can damage the leaves high above in the trees. The shrub pile should be cleared to allow access completely around the pile. Sometimes there are dry leaves near the shrub pile that can cause the fire to spread uncontrollably.

These must be raked away before starting the fire. Generally I do not burn when there is a drought condition and a no-burn order is in place or when there are strong winds that can spread the fire quickly.

In my neck of the woods, it is a requirement of the county to call the Police/Fire Department Non-Emergency telephone number and notify them, when I am about to start burning a shrub pile. They collect my name, address and phone number. Then they wish me a good day. Also when the burn is complete, they request that I call them back and let them know that I am done. This approach makes a lot of sense. I don't want the volunteer fire department rushing to my house to put out a fire that doesn't need to be put out. I want their services applied to real emergencies.

After the fire has burned down to ash, there is one more ritual that we perform. The wife wraps polish sausages and potatoes in tinfoil and places them in the hot coals. When the children were small and now when the grandchildren visit we also pull out the marshmallows and roast them. There is nothing like a campfire meal.

Felling a Tree

Generally I harvest downed trees and branches for firewood. But there are times when I need to cut down a tree because it is injured or dying. I stay away from dead standing trees that are rotten to the core and dead-fall trees. Cutting these type of trees are inherently very dangerous. So I have just learned to avoid them. They will come down on their own terms. A tree that is dead, without bark and very rotten is very dangerous to cut down. They are very unpredictable and seem to have a mind of their own. The tree may not fall in the desired direction. It may also break up into pieces as it falls to the ground. Also wood from this type of tree produces little wood heat. Dead-fall trees are trees that are snapped in two by tornado winds and form an inverted "V". These trees are like spring-loaded snares. The main trunk still stands upright several feet in the air. But the tree has been snapped and the top of the tree is touching the ground. I call them dead-fall trees because you cut them, they fall and then you're dead. There is no easy safe way to cut these trees down.



Dead Fall Tree

Sometimes I encounter a tree with imbedded metal, such as barbed wire. In years gone past, some farmers would use trees instead of poles to string barbed wire. They would wrap barbed wire around

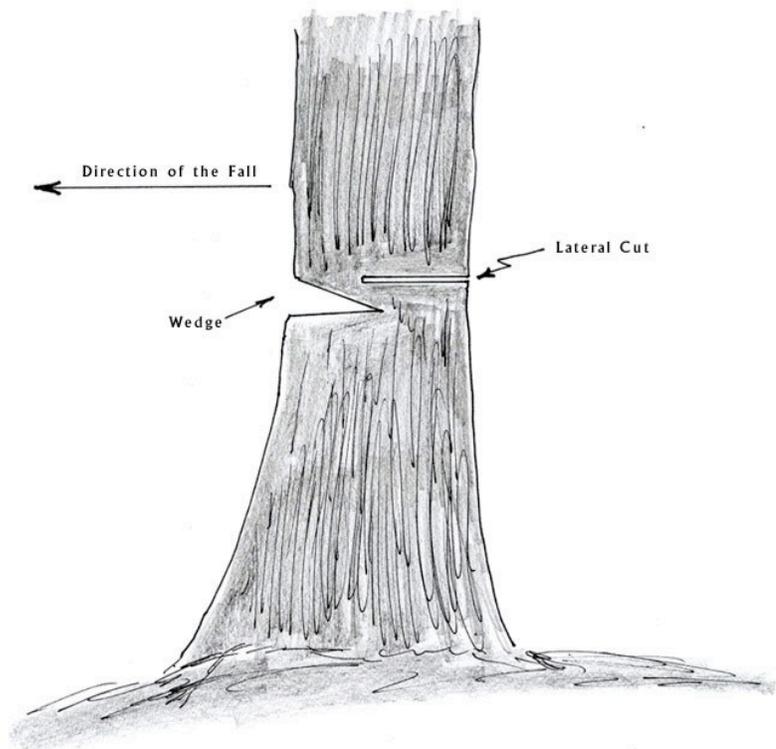
the tree. As the year went by, the tree would grow and totally encapsulate the barbed wire, except for the wire that would stick out from both ends of the tree. Cutting this wire with a chainsaw will damage the blade and can be unsafe. When I encounter a tree like this, I try and cut above or below the affected area.

The first step to felling a tree is to scope out the area. Estimate the tree height. If there is a chance that the tree might fall on a vehicle (such as a car, truck or tractor), its best to move it out of harms way. If the tree might fall on a structure (such as a house or barn) consider hiring a professional tree service to remove the tree. These services can run between \$150 to \$1,500 or more. They will cut the tree down one piece at a time starting from the top. They may use a bucket truck or cherry picker or even climb the tree and lower the logs by rope. Most are bonded and insured.

Then I determine which direction I desire the tree to fall. I also pick a spot where I can take cover when it falls. Generally, a tree falls slow enough near the base that I can easily walk out of the way. The need for a safe area is due to the fact that sometimes the tree will not fall in the desired direction, sometimes the tree will snap at the hinge and the base of the cut tree can hit me. Also sometimes the branches can snap and strike me on the head. Generally a safe spot can be another large tree to the rear or the side.

In the direction I wish the tree to fall, I cut a wedge. On the opposite side about two or three inches above the wedge, I cut a lateral cut. I do not cut all the way through to the wedge cut. Using a sledgehammer, I drive a metal wedge deep into the lateral cut. Generally the tree cracks and slowly starts to lean in the direction of the fall. The tree is held to the trunk by a thin piece of wood called a hinge (think of a door hinge). The tree tends to fall along the hinge line in the direction of the wedge cut. After the tree cracks; it will begin to fall slowly and then pick up speed. Since I am at the base of the tree, generally all I have to do is take one or two quick steps like a matador to move out of its way. Whereas if I was 20 feet away; I would have to run for dear life. It may take 5 to 10 seconds for a tree to fall. As the tree cracks, I check the

CUTTING DOWN A TREE



direction the tree is falling, put the chainsaw down and run to the safe area. I do not run into the path of the fall.

Sometimes things will go wrong. One common problem occurs during the lateral cut. The tree will shift and pinch off the saw and the chainsaw will come to a stop imbedded in the middle of the tree. This is very precarious and unsafe. In this case, I first remove the bar and the chain from the chainsaw and move the chainsaw to safety. If there is room, I drive a flat wedge into the lateral cut in order to remove the pressure. I try to move the bar back and forth and remove it if possible. I drive the wedge in a little deeper and try to remove the chain. But this approach doesn't always work.

To prevent this from happening, professional loggers will drive a plastic wedge into the lateral cut before the tree binds. They then finish the cut. Plastic wedges will not damage the chainsaw if you accidentally cut into them. But this only works on larger trees, those greater than a foot and a half in diameter.

One method I use to bring down a tree in this state is to use logging chains and a come-a-long to pull the tree down. To do this, it is important to have one long log chain, longer than the tree is tall. I have a 65 feet long chain for this purpose. I connect this long log chain to the tree above the cut. Then I connect the chain to a come-a-long. Then I connect another shorter chain to the other end of the come-a-long. And finally I wrap this short chain around the base of another tree. The base tree acts as an anchor and should be located in the direction of the hinge. The tree I use as a base is at least the diameter of the tree that I am felling. Next, I ratchet tight the come-a-long, slowly pulling the tree over. Because the chain is longer than the height of the tree, when the tree comes down, I am out of harm's way. As I ratchet the come-a-long tight, pressure will be relieved so that the bar and chain can easily be removed. If the tree doesn't come down at this point, I can reassemble the chainsaw and continue cutting.

The second method that I sometimes employ is called "patience". My land is remote. If the tree has leaves and there is a little wind, the tree will toss slightly with the breeze and may fall down of its own accord. Generally this will occur within 24 hours. I simply restrict everyone from entering the area and wait for the tree to come down.

It is good to have a variety of heavy log chains including one long one. I install hooks on each end of the chain. It is important to use log chain hooks, not steel cable hooks. I not only use these log chains to fell trees but they are also very useful as drag chains when disasters (such as floods, hurricanes and tornadoes strike.) Log chains seem to last forever.



When it comes to purchasing a come-a-long, this is no place to skimp a few pennies. I recently purchased a Tuf-Tug Dual Capacity Cable Hoist/Puller. It costs about 3 times the cost of the cheap come-a-longs available on the market today. I have to be able to stretch a come-a-long to its limits and rely on it to effectively perform. Once a gravel truck got hung up on my property. I used my chains and come-a-long to pull the front end of the heavy truck sideways a couple feet and free it. When I need to pull a tree over during the felling process, I want to do it safely without any problems and minimal risks.



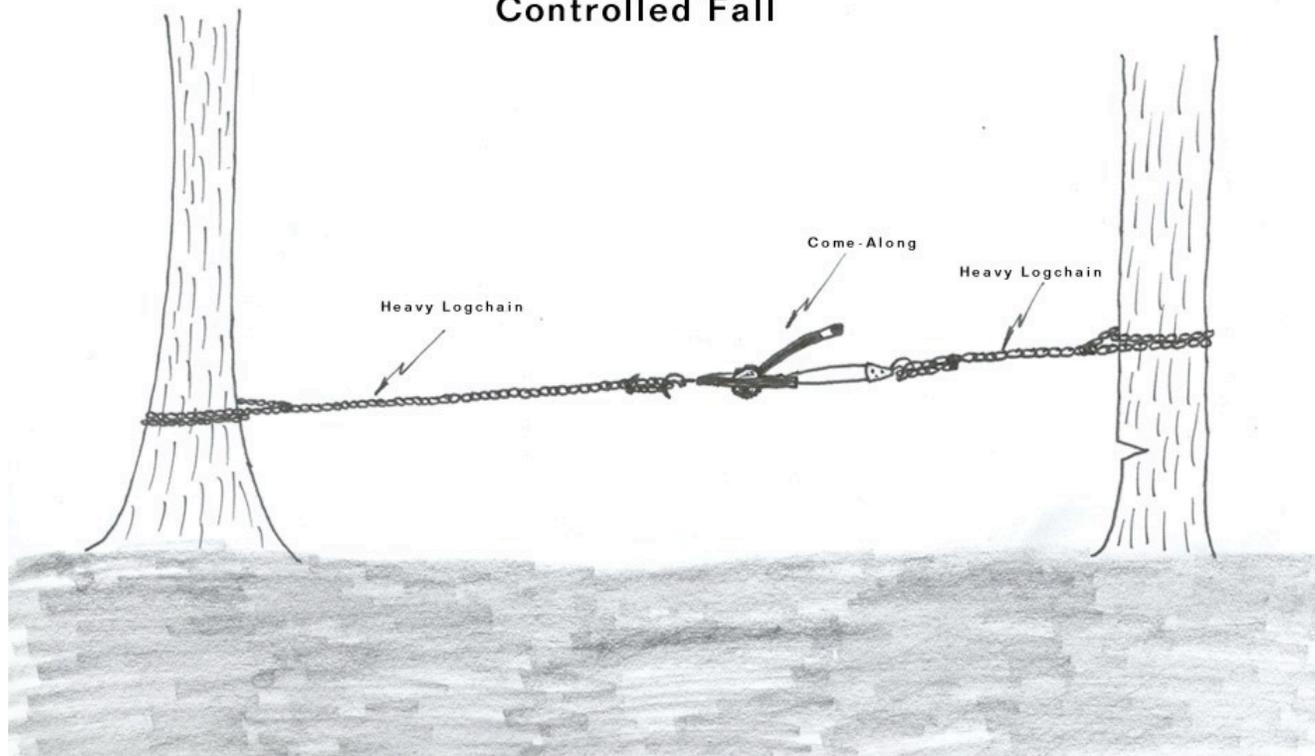
Come-A-Long

Entangled trees can also make cutting down a tree difficult. Vines can grow onto the trees and these can form a net connecting the tops of several trees together. When the tree begins to fall, the vines can act like ropes, suspending the tree in midair. Sometimes I can completely cut through the hinge and the tree will remain upright. Probably the best approach is to back off and let the tree fall when it's ready. Generally this will take around an hour. If I can safely cut some of the vines with a machete, this will accelerate the process.

Sometimes I desire to control the fall of a tree. I cut the wedge in the tree. Then I connect my long log chain above the wedge cut, as high as I can reach. I extend the come-a-long (cable hoist puller) to its full length. Then I connect the long log chain to the come-a-long. Then I connect the come-a-long to a short log chain. I connect the short log chain to the base of a tree, which I will use as an anchor. This chain should be positioned as low as possible on the base tree. The base tree should be at least as large as the tree I am cutting. I then tighten the ratchet on the come-a-long until the tree I am about to fell begins to bend. I then make the lateral cut using the chainsaw. Generally I am able to fell the tree to within a 10-degree arc of the log chain line.

Sometimes a tree will fall where it decides to fall and there is nothing I can do about it. And sometimes I will make a mistake in cutting the tree (for example – cutting so deeply in the lateral cut that I slice into the wedge cut, effectively cutting the standing tree in two.) Caution is the general rule.

Controlled Fall



Storing Firewood

Seasoning is the process of letting the wood dry out for several seasons.

Green (unseasoned) wood has a higher water content and will be more difficult to burn and will produce less heat in the process. Green wood also produces significantly more creosote than seasoned wood, which increases the odds of a chimney fire.

It is unwise to stack firewood next to a home because they attract termites and wood beetles that can decide to make your home theirs.

During the early years, after splitting and stacking the firewood, we would cover it with a large waterproof canvas tarp. Generally we covered the wood at the beginning of the fall before the rainy season started. Then as winter set in, we would haul the wood using a small wagon or wheelbarrow into the garage from which we feed the wood stove.

One of the problems we encountered was that the canvas after several years would degrade its waterproof ability. Therefore during the summer months we generally applied a water sealant and preservative to the canvas. Another problem was that mice, snakes and wasp hives would sometimes make their nests in the log pile. It is a little disconcerting trying to load firewood only to have mice or snakes suddenly appear as you are reaching for a log or be stung by wasps. What was worse was that

the mice liked to eat holes in the canvas. Another problem with this approach was the fact that you might have to move a lot of snow or ice as winter set in, in order to get to the wood under the canvas.



Amish Built Pole Barn

When the pole barn was built, we began to store around a 3 years supply of firewood in it. This was a dramatic improvement. The wood was always dry and accessible. During these times we used the Little Red Mule Wagon to transport the wood the 300 feet into the garage. One large wagonload would last us for 5 days of continuous burning. The only problem was moving a fully loaded wagon into the garage was a feat in itself. The wagon can hold $\frac{3}{4}$ tons. It took all the strength from the two of us. I would pull and my wife would push.

Today, in accordance with my stated guideline (with as little physical exertion as possible), I have evolved the following approach. The wood is stored in the pole barn. During the winter, I use the Gator Utility Vehicle to move a load of firewood to the garage where I offload it onto the Little Red Mule Wagon and a wheelbarrow. This provides a week of firewood at a time. This is an easy one-man operation.

Burning Firewood

We start the wood stove by first loading the firebox with wood through the top door. Then we open the front metal/glass doors and using some old newspapers and some kindling, start the fire using matches (diamond strike on box matches). After splitting the firewood, we collect the small scrap

pieces of firewood and bark from the ground and place these in 5-gallon plastic buckets and store them in the pole barn. This becomes our kindling during the winter.

The wood stove must get hot before the damper is closed. The STEELCAST Steel Honeycomb Catalytic Combustor (CS-552) within the woodstove requires the stove reach around +500° F before the damper is closed. Otherwise the fire might go out and the firewood will just sit and smolder. In this state, the woodstove generates almost no heat but a lot of smoke. This is hard on the combustor.

Once the woodstove comes up to temperature, I don't operate the stove for too long with the damper open. Otherwise the woodstove will become searing hot. The metal in the woodstove will begin to creak and crack, as if it were in pain, as the metal expands. This is hard on the woodstove. This woodstove is designed to produce a constant warm heat and does so with great efficiency. A blazing fire is not energy efficient.

When the woodstove is burning continuously, it is just a matter of filling the firebox with more fresh firewood before the hot coals on the bottom burn out.

The rope gaskets on the top door of the woodstove must be periodically replaced. Normally this is once every winter season.

Wood heat along with many other forms of heating will dry out a house. This state of low humidity can lead to a greater incidence of colds, flu and sore throats. To counteract this we place a cast iron kettle or steamer pot on the wings of the woodstove. We fill this with water and white vinegar.

Our wood stove ties into a masonry chimney. This chimney runs through the middle of the house instead of against an outside wall. It rises only a couple feet above the roofline. Creosote tends to form as the woodstove gases cool. Because the chimney has little exposure to the outside cold air, there is generally little creosote produced. Once each year, we get up on the roof with a chimney brush and clean it out. The black creosote ash falls to the bottom of the chimney where there is a trap door. We remove about a 5-gallon bucket each winter.

Our chimney is beginning to show its age. Someday I will have to replace it. I was very impressed by a triple wall venting system. These pipes thermally insulate the gases in the flue, which inhibits the formation of creosote. I purchased the needed pipes and other supplies so that someday in the future I can replace my existing chimney.

This photograph shows one of the pieces of the triple wall venting system. This is the connecting T-Joint. It



is inverted in this picture. The lid is used for vent cleaning. I position a bucket under the lid and remove the lid. As I clean the pipe using a chimney brush, the ash will fall directly into the bucket. When done, I simply put the lid back on for another year.

Wood Heat: Advantages/Disadvantages

Advantages

Heating with firewood has several advantages. Today's wood stoves are energy efficient. My Firelight woodstove has a 71% energy efficiency rating which is comparable to other types of furnaces such as oil and gas. In my opinion wood heat is one of the most pleasing forms of heat. Wood heat is also very cost effective. The fuel is essentially free, right from my backyard. I am more self-sufficient because I heat my home with firewood. Heating with wood is reliable in blizzards when many other forms of heat are shut down as power lines break and power blackouts occur. The tools of a woodsman are almost essentials for recovering from several types of natural disasters including flash floods, hurricanes and tornadoes. Cutting, splitting and moving firewood is also very good exercise.

Warm Heat

I feel that wood heat is one of the most enjoyable forms of heating. There is nothing like sitting besides a fire and watching the flickering flames. It can even be described as romantic. If you're cold, you can move closer to the fire. If you're warm, you can move further away.

Cost Efficiency

Heating with wood is very cost effective. This is a list of my actual expenses incurred over the past 35 years.

Stihl Model 041 AVEQ Chainsaw	\$ 428.00
Stihl Model MS-441 Chainsaw	\$ 827.00
Stihl Model MS-660 Chainsaw	\$ 1,137.00
Jøtul Combi 4 Wood Stove	\$ 753.00
Jøtul Firelight Model 12 Wood Stove	\$ 1,931.00
Lopi XL Fireplace Insert	\$ 824.00
MTD Model 245-630-000 Log Splitter (20 Ton)	\$ 840.00
Big Red Mule Wagon	\$ 336.00
John Deere XUV Gator Utility Vehicle	\$ 13,109.00
Metal 30' x 80' Pole Barn	\$ 10,324.00
Fireplace Triple Wall Venting System	\$ 1,384.00
Miscellaneous * approximately	\$ 3,300.00
TOTAL COSTS	\$ 35,193.00

(* Miscellaneous costs include chainsaw bars, splitting wedges, timberjacks, logger chains, chainsaw blades, filters, small files, file guides, log splitting sledgehammers, hooks, machetes, come-a-longs, electric chainsaw sharpeners, replacement catalytic converters for Firelight wood stove, maintenance repair costs, fuel and oil.)

I have included several items in my cost analysis. Items like the construction of my pole barn, purchase of a Gator Utility Vehicle and the purchase of a triple wall flue system to eventually replace my existing wood stove chimney. Some of these items might reasonable be construed as dual use or infrastructure items. For example, I only use a small portion of the pole barn to store a 3-year supply of firewood. In my mind based on my theoretical cost avoidance, I am investing money back into the wood cutting/wood burning process. These items have made the process profoundly easier and allow me to continue on for many years. Even though I have included these large ticket items, as you will soon see, I am still way ahead on theoretical cost avoidance.

The next step is to look at a cost comparison. If I heated my house solely with electric heat each year, it would cost me approximately \$ 2,000 per winter season. I have been heating my home with firewood for 35 years now. But I also currently have a 10-year supply of firewood cut, split, stacked and ready to go, compliments of the recent tornadoes. Therefore I estimate the comparison cost as (35 years + 10 years) x \$ 2,000 per year or \$ 90,000.

Therefore my theoretical cost avoidance to date (or at least after I finish burning my existing firewood) is approximately \$ 55,000.00

Self Sufficiency

I always valued being as self-sufficient as possible. When I moved my family from California to the back hills of Southern Indiana that was one of my goals. Wood heat was an integral part of this equation. We built a very energy-efficient home decades before most people understood what an energy-efficient home was. My water comes from the ground, from a drilled well next to my home. My sewage goes to an environmentally friendly septic system. I heat my house solely with wood that I cut in my own backyard. We grow a garden each year and can the food we gather from it. When our children were growing up, we typically had 500 quarts of food in canning jars on the shelves of our home. My water heater and dryer are run off liquid propane stored in a tank next to the house. Electricity is the primary utility that we use and rely upon.

Exercise

Cutting firewood can be good exercise. This is not part of my mindset. It sort of goes against my primary guideline that cutting firewood should be quick, efficient, safe and with as little physical exertion as possible. The reason why I mentioned this advantage is because one of my colleagues at work, Barry Newman, views it in this light. Each year he splits firewood by hand using an axe just for the exercise. He refuses to use a log splitter.

Blizzards

Heating with firewood is very useful in blizzards. Six months before I moved to Indiana, the region was hit with a devastating blizzard. A colleague at work, Tom Bishop, was at home with his family when it struck. He heated his home with an oil furnace. When the blizzard hit, the temperatures fell below -10° F. Around 2 o'clock in the morning, he lost electricity. He only lost it for about an hour. But the fuel coagulated into a gel in the cold during that time and he could not relight his furnace. The house was beginning to get cold. He gathered up his wife and young children into the car and began to drive to his grandmother's house. About a mile down the road he blew two tires. He saw a light on in a nearby house and took his family and walked up to the house and luckily they took him in. Shortly afterwards he purchased a wood stove.

When Disaster Strikes

When it comes to several types of natural disasters (flash floods, tornadoes and hurricanes), a chainsaw is one of man's best friends. It is almost indispensable. The tools I use for wood cutting are the same tools I use for disaster recovery.

During heavy downpours, our gentle creek will flashflood and turn into a raging river. Logs, debris and even whole trees roots-and-all will float down the river and hang up on my bridge. As a result, I am forced to undo the logjam before it can cause permanent damage to the bridge. Sometimes these logs are waterlogged and weigh several hundred pounds each. Sometimes I have to cut up the logs with my chainsaw while the river is raging, cutting into waterlogged trees, water and mud.

Today, I am better prepared to handle this type of disaster. I created a long 50 foot heavy-duty steel cable with hooks on each end that I can tie into the back of my Gator using a C-Joint and pull the larger logs upstream and out of the riverbed and onto a burn pile.



Wire Rope



This photograph shows the flash flood of 17 January 2012 after the water level dropped about two feet. The driveway bridge at this point is five feet underwater. On the other side of the walking bridge between two trees is a couple of logs from an earlier flood pulled out the creek by the Gator.

When disaster strikes, sometimes it is necessary to cut into leaves, dirt, mud, partially submerged logs and water. A man does what a man has to do. If you need to free up a logjam in a flood, you may not have any other choice. (I do not put the chainsaw into water, only the bar and chain.) Because this can be very destructive to the chainsaw, I will shortly afterwards perform a total cleanup on the chainsaw. This includes (1) removing the chain and the bar, (2) cleaning the groove in the bar to completely remove any sand, dirt or mud [using a small screwdriver and a rag], (3) oiling the bar, (4) removing debris from the clutch/brake assembly and oil ports, (5) reassembling, (6) sharpening the blade. As a result, I can recover well with minimal permanent damage done to the chainsaw.

A few years ago, three tornadoes over a span of a couple months struck my town. The first and last struck the city itself. The middle one which struck on 3 June 2008 hit the countryside and my property. This was 2 months after I retired.

I had chosen the location of my homesite at the bottom of a steep ridge, to protect against possible tornadoes. Most (95%) of the tornadoes that strike my area come from the southwest. The high ridge stood in a direct path between the southwest and my home, acting as a burm to the strong winds. At least that was the theory. But tornadoes are very powerful and very chaotic. They have a mind of their own. At least in this instance, theory ruled the day.

When I saw the damage that was wrought in a heartbeat by this tornado, I was awestruck. The main tornado came over my ridge. It first took down high voltage electrical power lines along my ridge. These power lines transported electricity from the main generators located in Terre Haute, Indiana and fed power to the city of Louisville, Kentucky. The tornado as it jumped the ridge split into a half dozen tornadoes which passed directly over my house. When these tornadoes reached the bottom of my property, they really dug in hard, twisting numerous trees in two or pulling them over by the roots. My property went from a beautiful park-like forest into something that resembled a major war zone in a matter of seconds. In all I probably lost over 50 trees that were between one and three feet in diameter. But the house and pole barn were spared, even though trees were down in all directions around them.

When it was over, I had a half dozen trees down blocking my driveway. My power and telephone lines were wrapped around them. After looking at the damage, I went to my pole barn, retrieved my chainsaw and began the cleanup. I was probably a little in the state of shock at the time, so all I could do is focus on one task. My wife was away at work. This was midday. I felt that if I could clear a path through my driveway before she arrived home, that somehow I could make things right. I could restore life back to normal. So that was my task. And I went about doing just that. Before I began, I made sure that the power lines were inert. It was pretty obvious because the heavy steel cables were literally pulled apart in several areas. The neighbor's boy, Jeffry Rogers, came by with his chainsaw and gave a hand. Several hours later, someone stopped by and asked if there was any message he could take to my wife. I told him "tell her that I am O.K. and the house is O.K.". After several hours

of cutting, my driveway was open. When my wife came home from work, she didn't know what to make of my cryptic message. Driving home, there were very little signs of tornado damage on our country road. But when she reached our property, she sighed "Oh My God!"



My Driveway after Tornado Struck on 3 June 2008

When she arrived home, we sat down in our darkened home and in cold hard logic began to plan our recovery. Most people operate under the illusionary belief that when disaster strikes, that the federal and state governments will spearhead the recovery process. Having lived through a major earthquake in California and the tornadoes that struck our home, this is not my experience. The recovery process begins with the individual (my shoulders). Sometimes neighbors will chip in with a helping hand. The real heroes in the process are the utility workers that move heaven and earth to restore the infrastructure that we desperately rely upon.

During major medical emergencies, doctors rely upon a triage system to prioritize treatment based on clinical urgency. Utility companies perform a similar process after a major natural disaster. Their first step is to visit and inspect the areas of damage. After which they prioritize the repair process. On one hand there is a single power line break that could be repaired quickly and easily and fixing it would restore power to a thousand homes. On the other hand there is a single house that would require a several work crews to spend an entire day to bring back online. It is only natural that the utility company will place the most difficult, localized repairs at the bottom of the list for restoration. There was so much damage in my yard that I knew I was bottom on the list. I was probably looking at a one-month power outage. I reasoned that if I could clear the area beneath what once was our electric power

line that I could speed up the repair process. This was our plan, as we went to bed that night, to clear the area east of our driveway. My wife would skip work for a couple days and give me a hand.

As morning light broke, we began clearing the trees. We stripped the branches off the trees and made 6 large burn piles, each 10 feet high and 15 feet wide. Then we cut up the trees into logs and moved these logs up the hill to near the pole barn where we would later split them into firewood. For 2 days I followed the same routine. I would cut the trees into logs for one hour, then bring my chainsaw up to the pole barn where I tightened the chainsaw blade on the bar, sharpened the blade, refill the chainsaw with oil and fuel, went into the house and put on a new tee-shirt because my old one was drenched in sweat and then back down to cutting wood. I had installed a solar panel system in the pole barn several years earlier as an experiment. This little bit of A/C was all I need to use my electric chainsaw sharpener. We worked continuously from morning light until sunset. At the end of two days that piece of our land was now clear.

I am an introvert and my wife is an extrovert. Over the years she developed a wide variety of friends in our little town. So when we reached this stage, she called a friend at the power company and the utility workers showed up within the hour and restrung our power lines.

We had our electrical power back which also meant our refrigerators/freezers were back on line and none to soon because they were beginning to warm. It also meant we had water, even hot water, our toilets were back online. Life was good at least for a couple of hours until the power went out again. For the next full week we were in an intermittent blackout. Power would come on around 2 o'clock in the morning and then go out two hours later. Well we could work with this. I left the lights on in my bedroom so that when the power came on, the lights would wake us. We jumped out of bed and maximized every second. It is surprising what can be accomplished in just 2 hours. We cooked hot meals, took a hot bath, washed the clothes and dishes, flushed the toilets, watched a little television, and used the Internet.

Over the next year, I continued the cleanup process but at a slightly more leisurely pace. After cutting and splitting over 10 years of firewood, I stopped. I just didn't see the point to cutting anymore because it would probably rot before I could use it.

Disadvantages

Potential for House Fires

Wood stoves can cause house fires. But so also can other forms of heating such as electric, propane, and fuel oil. Heating fires (fireplaces, wood stoves and other fuel fired appliances) account for 36% of residential home fires that occur in rural areas each year. Often these fires are due to creosote buildup in the chimney stovepipes. Much of this danger can be minimized. It is important to ensure that the stove is away from flammable material. The backwall of our woodstove is made of stone. The floor beneath our stove is ceramic tile laid on a concrete floor. Our chimney is short and there is little exposure to cold outside air and thus little creosote formation. We inspect the chimney regularly and clean it, so that the creosote will not build up in the chimney. The Jøtul woodstove by its very design produces a warm gentle heat. Some less efficient stoves can generate tremendous amounts of heat all at once. Our wood stove doesn't. I can place and hold my hand on the triple wall metal flue pipe

between the wood stove and the chimney without burning it, when the stove is in full operation. We replace the gaskets on the doors of the stoves regularly. We burn only seasoned wood, which minimizes the quantity of creosote generated during the burn process.

Potential for Injury

There is always a danger of injury when felling trees, cutting up logs and splitting firewood. Caution should be exercised to keep this process safe.

Ash and Smoke

When loading firewood or cleaning the ash out of wood stoves, some ash will fall on the floor. On our ceramic tile floor this is easily cleaned with a shovel and whisk broom. The wood stove will sometimes release some smoke into the house, especially during the firewood loading operation or when the wood stove door rope seals need replacement.

Even though I have asthma since my youth, wood smoke and ash does not seem to affect this condition. When I step outdoors, I would describe the smoke from my chimney as having a pleasing outdoor campfire aroma.