

STIHL®

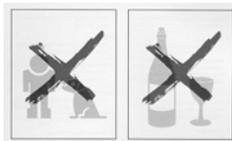
Safety & Maintenance Seminar

What we'll cover today...

- ◆ History of Stihl
- ◆ Protective Clothing
- ◆ Safety Features of Chain Saws
- ◆ Starting Procedures
- ◆ Safe Operating Procedures

Safety Basics

- ⚠ Minors
- ⚠ Alcohol & Drugs
- ⚠ Fatigue
- ⚠ Read Owners Manual



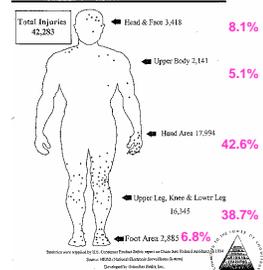
Protective Clothing

Why?

@ 14,000 rpm, each cutter passes 20 times per second. The chain is running @ approx 65mph.

- ◆ Head
- ◆ Face
- ◆ Ears
- ◆ Hands
- ◆ Body
- ◆ Feet

Accident Location and Frequency as Related to Chain Saw Use (1994)



Head & Face Protection

- ◆ Limit use to 3,500 hours or 5 years of intermittent use
- ◆ Face shields & visors are considered secondary protection - always wear safety glasses behind screen

3,418 yearly injuries - 8.1%



OSHA Required

Ear Protection

- ◆ Noise induced hearing loss is the #1 occupational injury
- ◆ Hearing loss develops over a long period (5-15yrs)
- ◆ Level of hazard=85 dBa
- ◆ Poor comfort = poor utilization

3,418 yearly injuries - 8.1%



OSHA Required

Upper Body & Hand Protection

Upper Body:
2,141 yearly
injuries
5.1%

Hand:
17,994 yearly
injuries
42.6%

Leg Protection

16,345 yearly
injuries - 38.7%

OSHA Required



Foot Protection

OSHA Required

For more information
call OSHA
1-800-582-1708



2,885 yearly
injuries - 6.8%

Safe Starting Procedures

- ◆ 10 feet or more from fuel can
- ◆ Visually inspect saw
- ◆ Chain Brake ON
- ◆ Starting Stance
- ◆ Firm grip with thumbs & fingers encircling saw handles
- ◆ Unsafe Methods
- ◆ Check Operation of Chain Brake

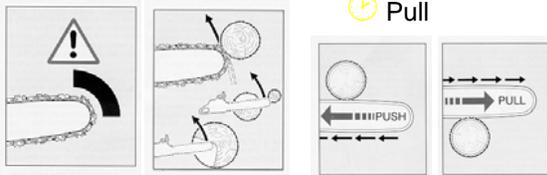


3 Reactive Forces of the Saw Bar

☆ Kickback

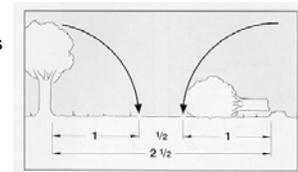
⌚ Push

⌚ Pull



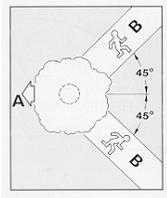
Safe Operating Procedures

- ⚡ Control & Safety
 - ◆ Never work closer than 2 tree lengths
 - ◆ Clear work area



Safe Operating Procedures

- ◆ **Control & Safety**
 - Observe Lean of tree
 - Plan an Escape Route
 - Observe & remove hazards



Safe Operating Procedures

- ◆ Do not overreach or cut above shoulder height
- ◆ Do not operate a chain saw with one hand
- ◆ Do not operate a chain saw in a tree unless you have been specifically trained to do so
- ◆ Engage the chain brake when walking with the saw



Safe Operating Procedures

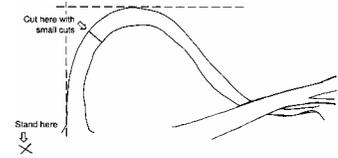
- ◆ **Beware of wood under strain: Risk of pinching!**
 - Always start relieving cut (1) at compression side (A)
 - Then cut (2) at tension side
 - If saw pinches, stop the engine and remove saw from log



Safe Operating Procedures

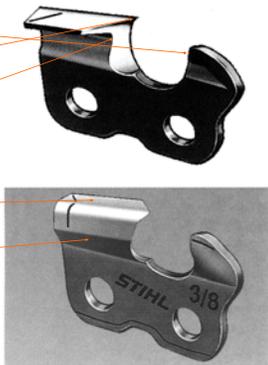
- ◆ **Beware of wood under strain:**
 - ◆ **Springpoles**

When cutting a limb that is under tension be alert for springback so that you will not be struck when the tension in the wood fibers is released



Parts of the Cutter

1. Depth Gauge
2. Working Corner
3. Chisel Angle
4. Top Plate
5. Side Plate



Rapid-Micro (RM)

Great Fire Department Chain in 3/8 pitch

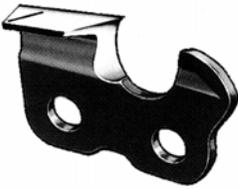


- Ideal for general use including professional
- Round cutter shape stays sharper
- Easy to maintain



- Special carbide tipped cutter
- Best for abrasive cutting conditions
- Increased durability and stays sharp

Rapid-Super (RS)



- Best for higher power saws
- Fast cutting for professionals and those with special needs
- Square corner cutter

POWER TRAINING

Picco-Micro (PM)

Picco-Micro Mini (PMN)



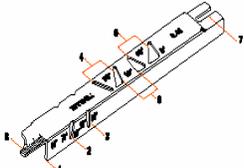
- All-round low profile chain for small saws
- Smooth cutting
- EXCLUSIVE PMN Narrow kerf chain

STIHL File and Filing Device Recommendations

Chain Type	File	File Profile
1/4" Micro	5/32" (4.0 mm)	Round
3/8" Picco Mini	5/32" (4.0 mm)	Round
3/8" Picco Micro	5/32" (4.0 mm)	Round
.325" Micro, Super	3/16" (4.8 mm)	Round
3/8" Micro, Super	13/64" (5.2 mm)	Round
3/8" Square Grnd		Tapered
404" Micro, Super	7/32" (5.5 mm)	Round
404" Square Grnd		Tapered
Depth Gauge File		Flat

STIHL File and Filing Device Recommendations

Filing Gauge



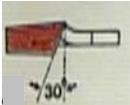
- 1 = 85° sighting edge for Micro cutter (RM, PM, PMN)
- 2 = 60° sighting edge for Super cutter (RS)
- 3 = 80° sighting edge for special ripping chain
- 4 = Sighting edge for 30° filing angle
- 5 = Sighting edge for 35° filing angle
- 6 = Sighting edge for 10° filing angle
- 7 = Cut-out for depth gauge setting
- 8 = Bar groove cleaner and scale for groove depth

How A Cutter Works

There are three basic angles which determine how efficiently your chain will cut.

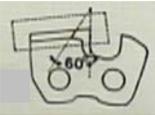
TOP PLATE ANGLE

The top horizontal angle controls the kerf or width of cut the cutter makes in the wood, the angle being increase, the width of cut or kerf being greater.



TOP PLATE CHISEL ANGLE

The top plate chisel angle feeds the cutter into the wood. This splits the cross grain of the wood fibers.



How a Cutter Works

SIDE PLATE CUTTING SURFACE

This is the vertical surface of the cutter, which forms the side cutting edge, of the cutter. This joins the top plate cutting surface to form the working corner.

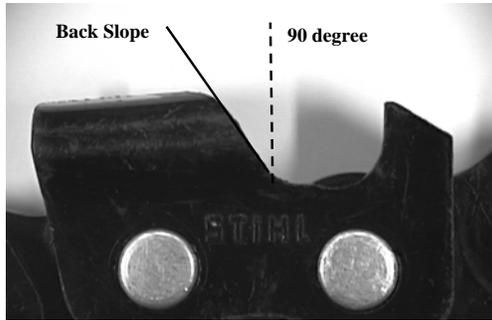


WORKING CORNER

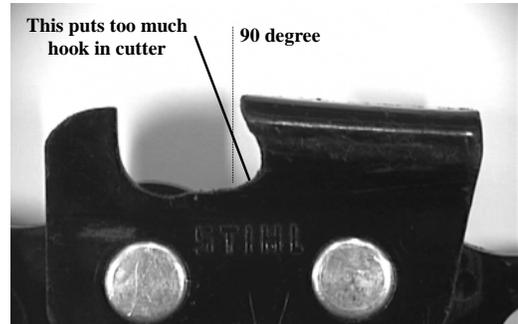
The top and side plates join, forming the working corner, this severs the cross grain of the wood.



Cutter has too much back slope



Side plate should be 90 degree



The cutter becomes smaller as it is filed back



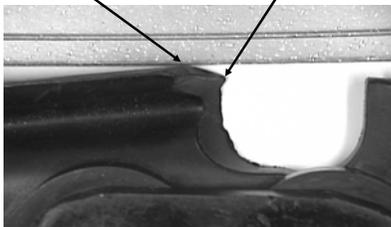
When filed back the cutter also gets smaller on the side as well.



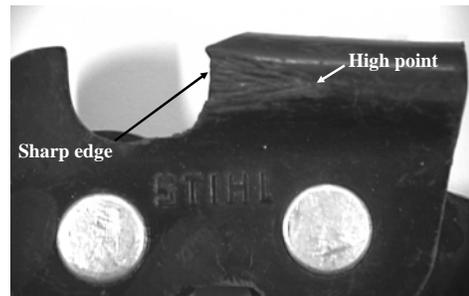
The high point of the cutter and the Sharp edge must be together

High point

Sharp edge

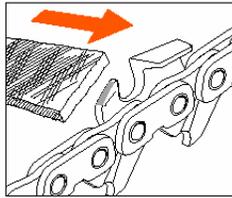
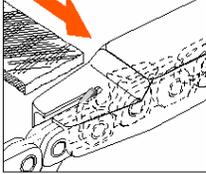


Damage to the side of the cutter must be removed, this will put the high point and the sharp edge together



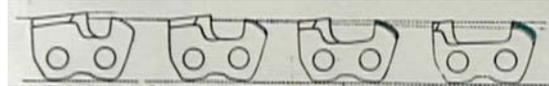
Safety Seminar

Filing depth gauges. Check the depth gauge for the correct height every time you sharpen the cutters. If the depth gauge sticks up above the filing gauge, first file it level with a flat file. Then make sure that all the other depth gauges are filed to the same height. Finally, slightly file each leading edge to round the corner back to its original shape.



Use a depth gauge tool for accurate measurement and filing. These tools, to fit different gauges of saw chain, are available from your STIHL dealer.

The depth of cut on a cutter tooth is adjusted by lowering the depth gauge lower than the cutters top cutting edge.



When the cutter bites into the wood it is tilted and lifted up, shivering the shaving.

The extent the cutter tilts is determined by the depth gauge adjustment.

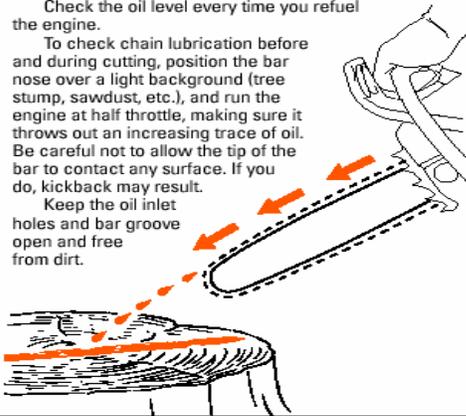
The depth gauges must be progressively lowered as the cutters are filed back.

Perform a lubrication checkup:

Check the oil level every time you refuel the engine.

To check chain lubrication before and during cutting, position the bar nose over a light background (tree stump, sawdust, etc.), and run the engine at half throttle, making sure it throws out an increasing trace of oil. Be careful not to allow the tip of the bar to contact any surface. If you do, kickback may result.

Keep the oil inlet holes and bar groove open and free from dirt.



Safe Operating Procedures

Read your
Chain
Saw
Safety
Manual!



STIHL®

SAFETY & MAINTENANCE SEMINAR

PRESENTED BY:

Bryan

EQUIPMENT

SALES 457 Wards Corner Rd., Loveland, OH 45140

**For More Information on the Full Line of Stihl
Outdoor Power Equipment Visit Our Website at**

www.stihlusa.com

Or

Call 1-800-GO-STIHL

Sharpen Your Skills

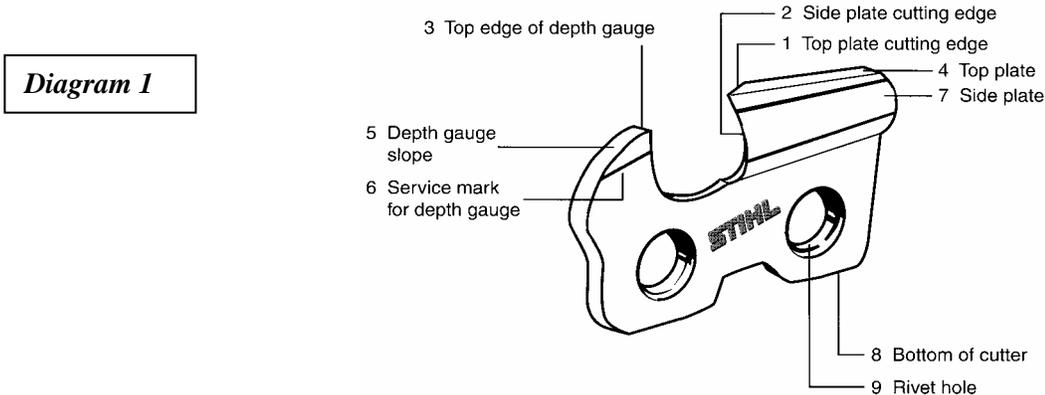
“To change and to improve are two different things.” *German Proverb*

Chain sharpening tips from the only chain saw manufacturer in the world that produces their own saw chain and guide bars - STIHL.

The cutting speed of a chain saw basically depends on three factors:

1. The design and power of the Chain Saw.
2. The condition of the cutting attachment.
3. The cutting technique of the operator.

The factor, which has the greatest influence on the speed of our cutting, is the part that is actually cutting, the saw chain. For an extremely accurate sharpening it is vital to understand all of the components that make up the cutter and chain.



The chain works by removing chips just like a hand plane. Refer to diagram 1. The top plate cutting edge (1) lifts the chip off the bottom of the kerf while the side plate (2) separates the chip from the wall of the cut. The depth gauge (3) determines the height at which the cutter enters the wood and the thickness of the chip. The distance between the top edge (3) and the front edge of the top plate (4) is called the depth gauge setting. For optimum performance the depth gauge must slope upward over the whole length, parallel to the service mark (6). The top plate (4) and side plate (7) have a thin coating of chromium, which forms the tooth cutting edges. They also taper to the rear to form our clearance angle, so the cutter does not jam in the kerf. This taper makes it essential that we adjust our depth gauges to correspond with each cutter.

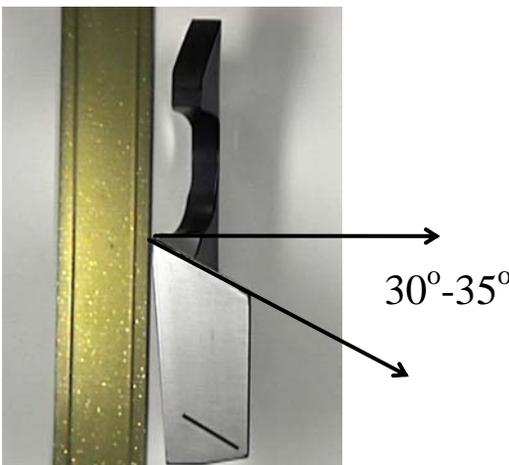
Filing

Proper file size will improve your filing and the performance of your chain. There are four common file sizes that will fit most chain.

5/32" for 1/4 pitch chain	3/16" for .325 pitch chain
13/64" for 3/8 pitch chain	7/32" for .404 pitch chain

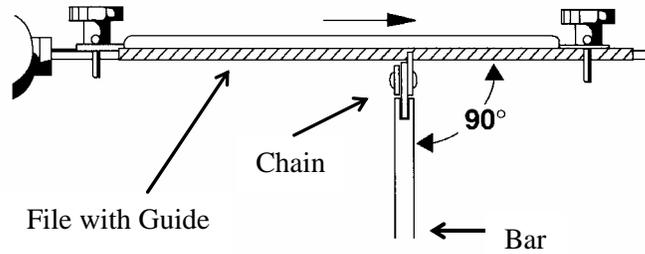
Sharpening must be done from the inside towards the outside, cutting the tooth on the forward stroke only, knocking the shavings out of our file after every couple of strokes. Preferably, we will use a file guide to help us maintain correct angles and file depth, but if not we need to keep 1/10 to 1/5 of the file above the top plate. Next we need to maintain two angles, the filing angle which is measured from the top plate cutting edge at right angles to the guide bar. For most chains this angle will be 30 in hardwood and 35 in softwood.

Diagram 2



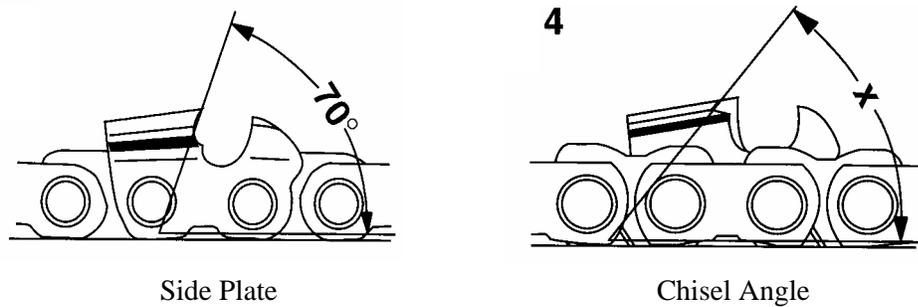
We must keep all of our filing angles uniform to obtain maximum performance. The second angle is to hold the file perpendicular to the guide bar.

Diagram 3



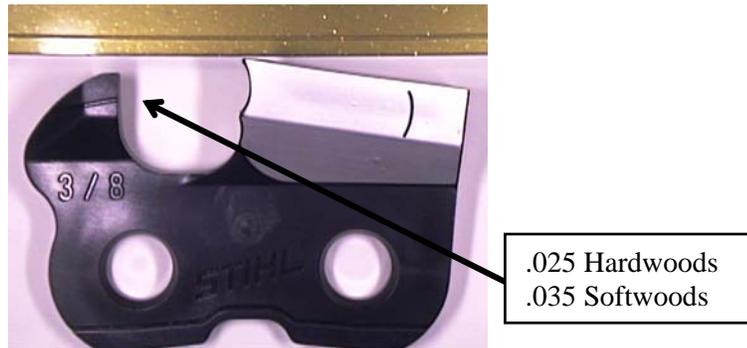
The other angles will automatically fall into place if the right size file and correct filing procedures are being used. The side plate angle and the chisel angle.

Diagram 4



Finally, we need to set our depth gauges, for hardwoods we should maintain a .020”-.025”, for softwoods .030”-.035”

Diagram 5



As we file back the cutter we will need to periodically file down the depth gauge because of the slope of the cutter. Too high a depth gauge and the chain will not cut properly. Too low of a depth gauge and we risk serious personal injury and destruction of our chain saw from excessive vibration.

Ideally, we should use two new chains in rotation on a new sprocket. When the chains are replaced we replace our sprocket with them. Turn the guide bar over every time a chain is switched, clean the guide bar groove and oil inlet hole at regular intervals. Tension a new chain until you can pull on it and see just the bottom of the chain and it rotates freely. Run it with no load for three minutes to break it in, making sure that we are getting proper lubrication by holding the tip of the chain saw close to a light background that will show us if oil is coming off the chain.

There is process to effectively file saw chain, and with practice you will find that your sharpening skills will improve. Carry a new chain around and compare it to the one you are working with. This will be your true test and goal. Stay sharp avoid the rock!!

The Power of the Five

Knowledge can be passed along, person to person, generation to generation,
but wisdom can never communicated.

It has to be experienced.

Job Brief

1. Call for Help/Exit.
2. First Aid/CPR Person.
3. First Aid Kit.
4. Allergies to Medications/bees.
5. Fire Extinguishers.

Cutter

1. Depth Gauge.
2. Cutting Corner.
3. Top Plate.
4. Side Plate.
5. Chisel Angle.

Limbing Hazards

1. Overhead Hazards.
2. Springpoles.
3. Butt Twist.
4. Butt Movement.
5. Butt off the ground.

PPE

1. Foot Protection.
2. Leg Protection
3. Eye Protection.
4. Ear Protection.
5. Head Protection.

Carburetor

1. Clean Air Filter.
2. Balance Settings.
3. Rollover Test.
4. Acceleration.
5. Wide-open-throttle.(WOT)

Felling

1. Hazards.
2. Good-side/Bad-side.
3. Escape Route.
4. Hinge Thickness.
5. Cutting Plan.

Chainsaw*

1. Kickback.
2. Pushback.
3. Pull-in.
4. Chain Brake.
5. Throttle Interlock.

Starting

1. Inspect Saw.(loose chain etc.)
2. Use name brand fuel. 89⁺
3. Ten Feet from fuel can.
4. Chain brake on.
5. Saw secured.(ground or leg lock)

Operating

1. Use chain brake-two step rule.
2. Thumbs under handles.
3. Never one handed or above shoulder.
4. Operate at WOT.
5. Avoid **Fatigue**.

Safety

1. Pride.
2. Professionalism.
3. Teamwork.
4. Respect.
5. Knowledge.

*Alternative safety features AV mounts, chain catch peg, and rear hand guard.

Rick Bryan
Applications Instructor

Increase Your Profits through Personal Protective Equipment

"The better you understand, the better you will perform." RB4

We want to stress our theme of safety before operation; by using the number five to identify five pieces of personal protective equipment (PPE) that are mandatory when operating a chainsaw. Personal protective equipment has been a major focus recently, for a good reason. Proper use will make your company more profitable! Money- the number one reason to enforce proper PPE use. It will increase production by decreasing lost time due to injuries. It will also decrease insurance and medical expenses. Everything about PPE equates to increased revenues, which if you point out to reluctant employees equates to increased wages. The penalties for not wearing PPE are severe both financially and bodily.

All PPE is vital to a safe work environment for woods workers. However, our most vital piece of safety equipment is our head protection, which falls under OSHA Regulation 29 CFR 1910.135 for those of you keeping score. Please inspect your hard hat visually for any cracks or holes that would make it unsafe. Gently squeeze your hard hat; if it feels mushy or begins to crack it is time to put it out of service. Sunlight will weaken the polymers in our hard hats and after several years in service they should be replaced. The final inspection is to check the webbing on the inside for excessive wear. Hard hats have been engineered to be worn in one direction, with the bill forward. Worn improperly, you risk several different types of injuries to your nose and cheeks from falling objects and increase the chance of getting cut by a chainsaw in a kickback situation. Statistically, woods workers will find that approximately 85% of their fatalities occur within fifteen feet of the stump and of those fatalities approximately 65% are head injuries.

Recently, I read an article that stated the number one workman's compensation claim was hearing loss related. Pursuant to OSHA Regulation 29 CFR 1910.95, Occupational Noise Exposure, if exposure is higher than 85 decibels per hour, earmuffs or plugs must be worn. A chainsaw operates at 110 decibels, so our exposure is quite

a bit higher and caution must be used. After thirty minutes of operating a chainsaw without protection you damage your ears, but the time you notice that damage will not be for years down the road. One other very important reason to be strict in your hearing protection enforcement is noise-related fatigue. You will actually get fatigued 30% quicker when exposed to over 85 decibels. Myth buster- you can hear with the muffs on. You can hear people talk, the wind blowing and the tree cracking. Be careful if you are an operator with established hearing loss, have a co-worker talk to you in a normal tone with the ear protection on. If you can not hear them you may need to reevaluate your hearing protection or operating options.

Obviously, with chips and dust flying all around us when we operate a chainsaw it just makes common sense to protect our most important sense- eyesight. Eye and face protection is required under OSHA regulation 29 CFR 1919.135 "the employer shall provide, at no cost to the employee, and assure that each employee wears the following" eye protection from falling or flying objects and face protection where applicable. Now, under the logging operations rules we have a different twist that allows chainsaw operators to wear logging mesh screens without safety glasses underneath. However, safety glasses are highly recommended, but if you fog up or sweat a lot, you have an option when operating a chainsaw. This allowance does not comply with the ANSI Standards that manufacturers must abide by. ANSI is not OSHA. OSHA is the enforcement agency that can fine you for non-compliance of their regulations.

Leg protection is probably the most controversial piece of personal protective equipment. Under OSHA regulation 29 CFR 1910.133, when paid to operate a chainsaw, the employer shall provide at no cost, leg protection made from a cut resistant material that covers the full length of the thigh to the top of the boot. The Engtex material found in all Stihl chaps and pants meets this requirement by jamming the chain and sprocket with long strands of cloth.



Approximately 35% of all chainsaw accidents occur in the left knee area. This occurs because the chainsaw handles are slanted to make the unit safer and more comfortable to operate. It forces the operator to hold the saw off to the right, (yes, chainsaws are only made for right handers) so that when a kickback occurs the saw rotates up and over our right shoulder instead of towards our face. This feature puts our left leg in front of our right leg making it more susceptible to getting injured. Chaps will also save you money in the amount of work clothes you go through in a year, because of their tough Cordura nylon outer layer. If cut, most chaps must be rendered out of service and thrown away for two reasons. First, you have pulled all of the protective material out of the chaps and second; chances are better than 50% that you will cut yourself in the same spot. Please read the care labels on your chaps. The newer Stihl chaps should be machined washed and dried. This will fluff the material back up and increase the protective capabilities by approximately 15% while decreasing the fire hazard. Some chaps may not call for machine washing, so please read your labels.

The last piece of PPE is the only one that the employer does not have to provide at no cost to his/her employees. Foot Protection 29 CFR 1910.136, is a confusing regulation for the logging community, because we fall under a stricter requirement than general industry. General industry is only required to wear steel-toed boots made of rubber or leather above the ankle when operating a chainsaw. Loggers are required to have an additional layer of cut-resistant material incorporated into their foot protection like the two-layers of Kevlar found in the Stihl Safety Boots. Another good reason to protect this vital area is that 10-15% of chainsaw injuries occur in the left foot.

Five steps to preventing loss of money and body parts when operating a chainsaw.

1. Head Protection.
2. Ear Protection.
3. Eye and Face Protection.
4. Leg Protection.
5. Foot Protection

***Cut safe
Rick Bryan***