

EMPLOYERS FIRST INC.

Chainsaw Safety Training

Participant Workbook

WorkSafe Consulting Services

Participant Name: _____



WorkSafe Consulting Services - Chainsaw Safety.

WorkSafe Consulting Services is committed to helping Employers and Employees to take a pro-active approach to loss prevention in the workplace.

Chainsaw Safety

The Chainsaw operation and use has seen some changes happen in the industry. While the chainsaw is relatively easy to use the results and the dangers of using this tool can be serious, even deadly.

Over the years I have spoken with a number of trades people and they have shared some of their stories that have taken place working with a chainsaw and as I recount some of these, realize for the most part, logging, felling, tree trimming happens all day long with homeowners, professional logging companies, construction workers etc.

One gentleman who now teaches the chainsaw course knows firsthand the importance of chainsaw safety. He was working in the woods a number of years ago all by himself, no one around for miles.

He was felling a tree and the tree took a different turn and came crashing down on him trapping his foot and ankle underground with the heavy tree lying on top of him. He was trapped and all alone and no one within yelling distance. What was he going to do?

He wrestled with the tree for hours, tried digging around his foot to loosen the dirt, tugged and pulled, it would not budge; he was stuck.

The longer it lasted the more devastated he became, at one point even contemplating cutting his foot off.

He eventually grabbed a nearby branch started banging on the tree, digging the dirt with his fingers, the ground was hard, and he had to persevere. He worked and worked, eventually he loosened the dirt enough he pulled his foot out, scrapping the skin off as he did. He hobbled out of the woods, his foot survived. But this was the last time he entered the woods alone.

Accident Statistics

Involving Ontario construction workers between 1990 and 1999, 98% of accidents happened while workers were cutting. In 80% of the accident workers were hit by the chainsaw. Two thirds of workers suffered cuts or lacerations to parts of their body.

Chainsaw Safety



Goals

By the end of this module participants will learn how to safely handle and maintain a chainsaw

Objectives

Participants will be able to:

1. Explain the requirements of the *Regulation for Construction Projects* (O.Reg 213/91) chainsaw training and protection.
2. Conduct safe inspections to identify components requiring maintenance and service.
3. Demonstrates techniques to start, transport, handle a chainsaw during a cut.
4. Describe the necessary techniques required to perform basic cutting and felling operations safely.
5. Describe basic saw operations, identifying safety hazards and ensuring all appropriate controls

Chainsaw Safety

Under the Occupational Health and Safety Act

The employer shall: (Full listing of duties are located in Section 25 OHSA)

The equipment materials and protective devices as prescribed are provided;

Such as Hard Hat, Visor, Hearing Protection, Chainsaw Chaps, shall be provided by the employer. Safety Boots - can be a term of employment, which means the employee would provide their own safety boots.

The equipment, materials and protective devices provided by the employer are maintained in good condition;

Such as the chainsaw shall be maintained in good condition.

The measures and procedures prescribed are carried out in the workplace;

Which means the employer is required to *have* safe operating procedures for the employee to follow. The employer passes responsibility to the Supervisor – to ensure the employees are following safe operating procedures and the employee - is required to follow the safe operating procedures.

It also goes on to say the employer shall:

Provide information, instruction and supervision to a worker to protect the health and safety of the worker;

This one means the employer needs to ensure the worker understands how to operate a chainsaw safely and can demonstrate their skills and knowledge in a competent manner.

Chainsaw Safety

Appoint Competent Supervision.

As per the legal definition of a "competent person" found in Section 1 (1) of the Act, competency means a person has all necessary knowledge and skills, understands the Act and Regulations as it pertains to the work and knows the dangers and can ensure those dangers/risks are controlled. Supervisors *have not* always been trained in the Act and Regulations, so they cannot always demonstrate they know legally what is correct or not correct according to what the law says. This will impact a defense in a court of law in showing due diligence.

The Supervisor shall:

(Full listings of duties are located in Section 27 OHSA)

Ensures that a worker.

Works in a safe manner and with protective devices, measures and procedures required by the Act and regulations. This means the Supervisor is responsible to make sure the workers are working safely, wearing the protective equipment for chainsaw use such as safety boots, hard hat, visor, hearing protection, chainsaw chaps and that the worker is following safe operating procedures. The Supervisor must be able to demonstrate that they are enforcing the requirements by keeping following a progressive discipline policy and keeping track in a log book.

Advise a worker of existence of any potential or actual danger to health and safety of a worker for which the Supervisor is aware:

It is important to conduct site inspections, having a system in place to allow workers to identify hazards and a system in place to correct the hazards as soon as possible, and as interim measures, danger tags, safety signs, removing unsafe equipment from use etc.

Chainsaw Safety

Provide employees with written instruction as to measures and procedures to be taken for the protection of a worker.

This section demonstrates the importance of having documented work place specific procedures, communicated, workers trained in them, and the rules are enforced by the Supervisor following a progressive discipline policy.

The Worker shall:

Do, Do and Do

Work in compliance with the Provisions of the Act and the regulations; Employee Handbooks and Worker Orientation programs should always describe the legal requirements for working safely.

Use and wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn; This means, yes you do have to wear your safety equipment this may include, Hard Hat, Visor, Hearing Protection, Safety Boots, and where there is traffic, a traffic vest, just to name a few.

Report to his or her employer or Supervisor the absence of or defect in any equipment or protective device ... This means if the chainsaw is faulty, through your findings of inspecting your equipment, then it must not be used, or if the equipment is missing the guard, then it must not be used. Report to your Supervisor, follow reporting procedures, (ie report form) and tag equipment not to be used until repaired. Regular maintenance - preventative maintenance program to repair equipment prior to being broken is a good control.

Report to his or her employer or Supervisor any contravention of this Act or the regulations or the existence of any hazard for which you are aware: A contravention is anything listed in the Act under a Section, subsection, clause or sub-clause that is not in compliance, the worker has a legal obligation to report that directly to your Supervisor, following reporting procedures (i.e. report form).

Chainsaw Safety

The next three sections are particularly important:

No worker shall:

Remove or make ineffective any protective device required ... This is what we call the jerry rig clause, you cannot remove guards that meant to be there for your protection and you cannot jerry rig things, add to, alter, change or use equipment that is not meant to be used in that way.

Use or operate equipment, machine, device or thing or work in a manner that may endanger himself, herself or another worker.

This is important as chainsaw operators you are responsible for yourself and also your zone, make sure the area is safe, clear of individuals that could get hurt. Engage in a prank, contest, feat of strength, unnecessary running or rough and boisterous conduct.

This one means absolutely no goofing around.

The Act tells you what to do; the Regulations tell you how to do it.

Chainsaw Safety

The Regulations:

As a result of accidents the Ministry of labour enacted changes to the Regulation for Construction Projects (O. Reg 213/91) Section 112 in regards to chainsaw training and personal protective equipment. One of the major changes is that construction workers (including non-logging workplaces) who work with chain saws must be trained in its proper use.

Section 112 (1) Every chain saw shall have a chain that minimizes kickback and a device to stop the chain in the event of a kickback.

(1.1) No worker shall use a chain saw unless he or she has been adequately trained in its use.

(1.2) No worker shall use a chain saw unless he or she is wearing, (a) adequate personal protective equipment and clothing including gloves; and (b) adequate eye protection and hearing protection.

(2) A worker shall hold a chain saw firmly when starting it and firmly with both hands when using it,

(3) The chain of a chain saw shall be stopped when not cutting.

Chainsaw Safety

Injuries: The Main Causes

98% of all Chainsaw injuries happen during cutting - to the worker

Injury	Type	Percentage
Cuts and Lacerations	Worker Activity	60-80%
Cuts to lower body/legs	Worker Activity	50%
Cuts to arm/face	Worker Activity	20%
Cuts to trunk/torso	Worker Activity	11%
Hit by Chainsaw	Kickback	80%
Fall	From Heights	8%
Overexertion	Manual Labour	6%
Slip	Ground	2%
Particle in the eye	Flying particles	5%
Fracture	Bones	5%

Causes of Chainsaw accidents include:

1. Lack of Training to the worker;
2. Defective or poorly maintained equipment;
3. Workers not wearing or using personal protective equipment;
4. Unsafe footwear, lack of grip;
5. No planning, lack of organization or controls;
6. Weather Conditions
7. Lack of - Equipment Maintenance
8. Improper Fitting Chains
9. Kickback
10. Others:

Please list below other hazards that could cause a chainsaw accident, discuss as a group and list your answers below:

Chainsaw Safety

1.1 General Safe Use Instructions:



- Only use chain saws that you have been trained to use properly and safely.
- Read the owner's manual carefully.
- Make sure you understand instructions before attempting to use any chain saw.
- Review pertinent health and safety legislation before operating a chain saw.
- Operate, adjust and maintain saws according to the manufacturers' directions and the CSA Standard Z62.1-95 "Chain Saws" (most recent version 01-Oct-1995) or ANSI standard 8175.1-2000 (Gasoline Powered Chain Saws, Safety Requirements for). Both standards describe safety requirements for the design of chain saws and include recommendations on how to use chain saws safely.
- Operate the chain saw in well-ventilated areas only.
- Wear personal protective equipment and clothing
- Ask questions if you have any doubts about doing the work safely. Safety procedures that you follow will also depend on where the sawing is carried out (e.g., on the ground or at height in a tree or elevating device) and on the presence of trip, slip, snag, and fall hazards.
- Do not use a chain saw in trees unless you have received specific training to do so.

Chainsaw Safety

1.2 Starting a Chainsaw:

DO's

- Use only chain saws that have been manufactured and maintained according to standards like the CSA Standard Z62.1-95 "Chain Saws" that are equipped with a safety chain and chain brake. Check legislation in your jurisdiction for other requirements.
- Know how to use the controls before starting a chain saw.
- Remove the chain guard (scabbard) and inspect the saw and machine for damaged, loose, missing parts, or other signs of wear, or leaks around the engine before starting.
- Ensure that the guide bar is tight and chain fits snugly without binding; adjust the chain tension, if required.
- Inspect the saw chain to ensure it is properly lubricated and is sharp.



- Sharpen and lubricate, as needed.
- Check the air filter and clean when needed.
- Check the muffler spark arrestor screen, if present. Spark arrestor screens help reduce the risk of fire, especially in dry forest conditions.
- Inspect the chain catcher - it helps reduce the risk of injury when a chain breaks or comes off the guide bar.
- Ensure that chain is clear of obstructions before starting.
- Engage the chain brake before starting the chain saw.
- Ensure that you have secure footing and that your stance is well balanced.
- Hold the saw firmly on the ground. Point the chain away from your body and nearby obstructions. Use a quick, sharp motion on the starter cord.
- Warm up the saw prior to cutting. The saw should idle without the chain turning. If the chain continues to turn after the throttle switch is released, stop the saw. Then adjust the idle as shown in the owner's manual.
- Check that the throttle trigger, throttle trigger interlock, master control lever, etc. are operating properly.

Chainsaw Safety

DON'Ts

- Do not use a saw if it has damaged, loose or missing parts.
- Do not "drop start" (starting a saw in hands) or when a chain saw is touching your body. This method leaves only one hand to control a running saw and can result in leg cuts.
- Do not start a saw unless it is at least 3 meters (10 feet) from any approved fuel safety containers.
- Do not make adjustments to the chain or guide bar when the motor is running.

1.2 Fueling a Chainsaw:

- Follow manufacturer's directions for oil/gas mixture to be used.
- Use only safety containers for storing and dispensing fuel that have been approved by standards like the CSA International B376-M1980 (R1992) (R1998) titled "Portable Containers for Gasoline and Other Petroleum Fuels"
- Do not refuel a running or hot saw.
- Use funnel or spout for pouring. Wipe off any spills.
- Mix fuel in a well-ventilated area. Keep a well-maintained fire extinguisher nearby.
- Do not smoke or allow any ignition sources while refueling.

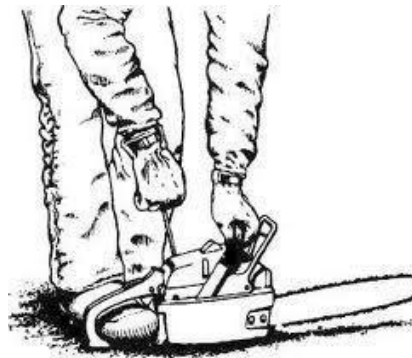


Chainsaw Safety

1.4 Safe Cutting:

DO's

- Plan each job before you start. Arrange to have help.
- Carry the chain saw by its front handle, with the muffler away from your body and the guard bar pointing behind you.
- Know the location of the persons working with you at all times.
- Use the correct saw. The weight, power, and bar length should all be suitable for the job.
- Operate the chain saw in a firm two-handed grip with fingers and thumb surrounding the handles. Keep both feet firmly positioned when operating a chain saw.
- Maintain full power throughout each cut.
- Ensure that the chain does not move when the chain saw is idling.
- Turn off the chain saw before refueling or doing any maintenance.
- Keep your saw clean -- free of sawdust, dirt and oil.
- Wear safety gloves or mitts when sharpening the chain.



DON'Ts

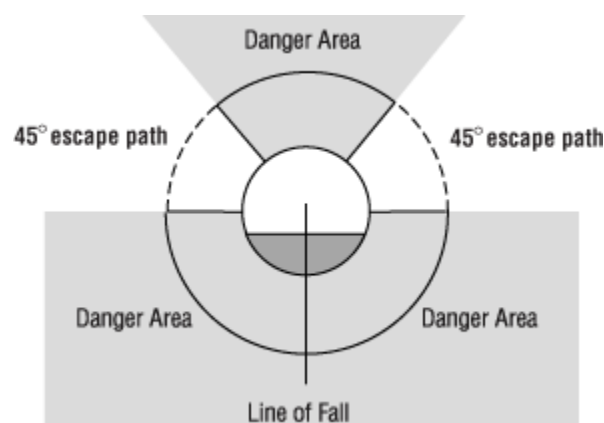
- Do not start a chain saw when it is resting against any part of your body.
- Do not refuel a chain saw within 3 m (10 ft) of a fuel storage container.
- Do not stand directly behind the saw.
- Do not leave a saw running unattended.
- Do not carry chain saws while it is running.
- Avoid contact with the muffler. Serious skin burns may result.
- Working alone - Do not cut alone.

Chainsaw Safety

2.1 Felling - Cutting down a tree:

Application: Felling trees that have a diameter less than the length of the chain saw blade, although some safety instructions will also apply generally to felling larger trees.

- Notify the proper authorities before felling near buildings, power lines, roads or railways.
- Size up tree for diameter and direction of lean before cutting.
- Choose direction of the fall according to the lean and shape of tree (e.g., more heavily branched on one side) and wind direction. Other factors that can affect the direction of the fall include the health of the tree (any signs of decay?), contact or entanglement of branches with other trees, slope of the land, and snow load.
- Check the condition of the tree to see if there are any branches that might fall on you while you are sawing.
- Make sure tree has a clear area to fall into.
- Check the fuel tank to make sure you have enough fuel to complete the job. Running out of fuel, when making a cut, can be hazardous.
- Clear work area of brush and debris before cutting down tree and remove any lower limbs that may interfere with your work.
- Do not overreach or cut above shoulder level.
- Clear two escape paths on the side opposite from the intended direction of fall and at about a 45° angle opposite the line of fall.
- Ensure that equipment and tools are a safe distance from the tree and are not placed in the way of your escape routes.



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2.2 Felling Continued:

Warn persons in area that a tree is falling (and make sure they heard the warning over the noise of the chain saw).

Ensure that co-workers or by-standers are at least 2 tree lengths away - that is the equivalent of the height of the tree that you are felling plus the height of the tree a co-worker may be cutting down.

If you are felling trees on sloping terrain, others workers should not be working downhill from you so that they are not exposed to sliding or rolling material. Move at least 7.5 m (25 feet) away when the tree starts to fall. Turn the chain saw off, and lay it in a safe place.

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2.3 Controlling the direction of the fall:

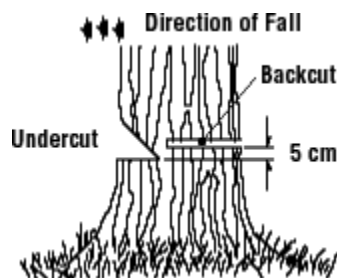
If the tree has large buttress roots, remove pieces by first cutting vertically downward and then cutting horizontally. This will make the tree trunk more "cylindrical" and make it easier to select the direction of fall.

Prepare a felling notch (also called a directional or front notch) that is perpendicular to the direction of fall.

First, cut downward at about a 45° angle so that the bottom of the cut is in about 1 /5 to 1 /4 of the tree trunk diameter.

Next, make an undercut that meets the diagonal cut exactly and *remove* the piece. Ensure that the felling notch is facing the intended direction of fall. Make a back cut or felling cut on the opposite side of the tree that is about 2.5 to 5 cm (1 to 2 in.) above the horizontal undercut. Stop just short of the undercut, leaving about 1/10 of the diameter uncut to make a hinge that will help control direction of fall.

Use ropes or wedges to guide fall in direction other than natural lean. Wedges should be made of wood or plastic (not metal) to prevent kickback or damage to the chain in case of accidental contact.



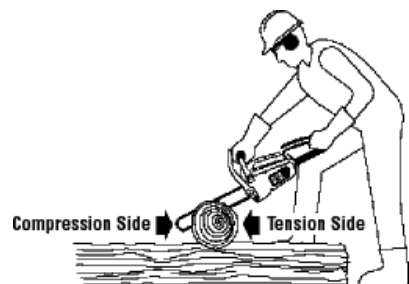
Chainsaw Safety

2.4 Limbing:

- Make sure that the tree is stable before limbing or debranching it.
- Do not cut limbs that are supporting the log -- roll log first and ensure it is stable.
- Stand in a well-balanced position and where the ground is not slippery.
- Stand on uphill side of the log if the ground is sloping.
- Do not stand on the log when limbing - you may slip off or the log may move or roll.
- Do not walk or move your feet when limbing on the same side of the tree where you are standing.
- For those lower branches, bend your knees, not your back.
- Do not let the tip of the guide bar (kickback zone) touch any branches or logs.
- Start limbing branches on the upper side of the tree so the lower ones can help balance it.
- Cut limbs on far side first, then near side.
- Be aware of branches or undergrowth that is under tension - watch out for branches springing back when cut.
- Do not reach over the guide bar to remove any loose branches.

2.5 Bucking:

- Clear the work area.
- Plan the cut. Determine which way the piece will fall or roll after it is cut.
- Saw the log from the uphill side of a slope.
- If possible, prop up the end to be cut off using another log.
- Cut the compression side or zone first and the tension or "stretched" side last to prevent pinching of the blade.
- Keep feet away from trunk while bucking.



Chainsaw Safety

2.6 Pruning:

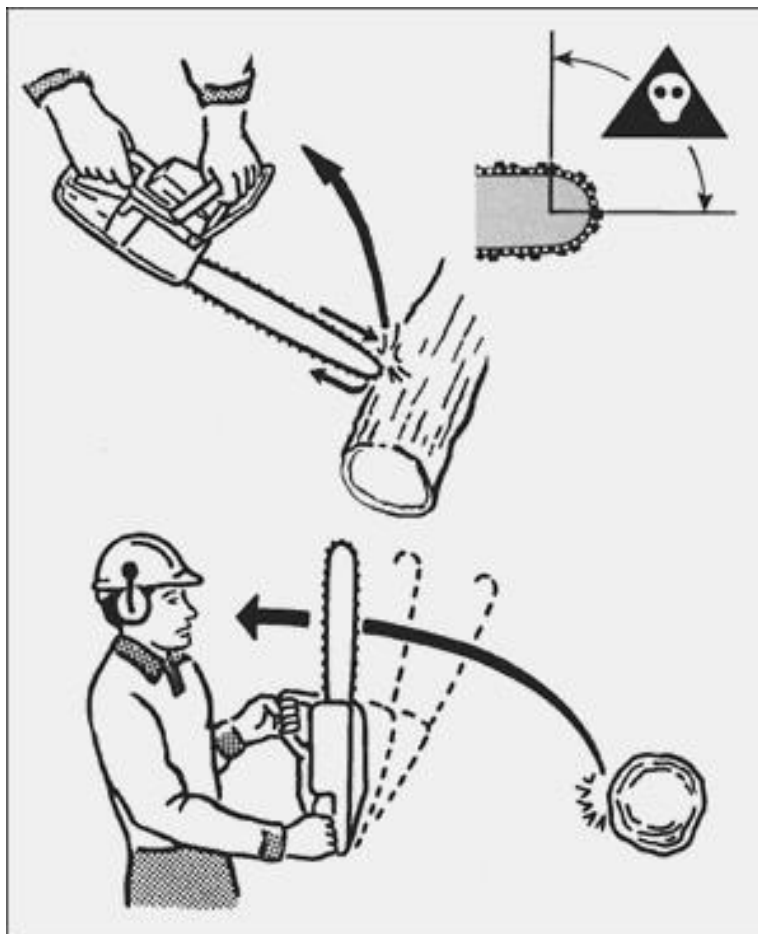
Keep both hands on the saw, both feet on the ground and maintain balance at all times.

Work at shoulder height or below.

Undercut limb first -- then cut from top (that is, cut in the compression zone first and then the tension area).

2.7 Kickback:

What is Kickback? It is a term used to describe UNEXPECTED UPWARD MOTION OF THE GUIDE BAR. Kickback occurs when the end portion of the nose of the bar strikes an object and the chain momentarily snags.



Chainsaw Safety

2.7 Kickback Continued:

Results of Kickback:

The most common and probably most violent kickback occurs when contact is made, either accidentally or intentionally, in this "kickback zone." In some cases the blade tip may move upward and back toward the operator who could suffer a very serious or fatal injury.

Severe Cuts, Broken Bones, Critical Injuries, and Fatalities.



Chainsaw Safety

Reduce the risk of kickback:

DO's

- Select a chain saw that is equipped with kickback-reducing devices (e.g., chain brake, low kickback chain, reduced kickback bar) that are designed for the chain saw that you are using and meet standards like the CSA
- Standard 262.3-96: Chain Saw Kickback, or ANSI Standard B175.1-1991: Safety Requirements for Gasoline Powered Chain Saws. These devices will reduce but will not prevent kickback.
- Watch the guide bar nose. Do not let it touch logs, branches, or the ground when saw is running.
- Cut only one piece at a time.
- Run the saw at full power when cutting.
- Keep the chain sharpened to specifications.
- Match chain and bar for exact pitch and gauge.
- Set depth gauges to manufacturer's settings.
- Maintain correct chain tension
- Hold the saw securely with both hands.
- Ensure that you have firm footing before starting to saw.
- Stand to side of the cutting path of the chain saw.
- Position yourself so that you are not near the cutting attachment when the chain saw is running.
- Know where the bar tip is at all times.
- Make sure the chain brake functions and adequately stops the chain. The stopping power of a chain brake can be greatly reduced by wear, or by oil, dirt or sawdust in the brake parts.
- Install a safety tip that covers the nose of the guide bar on the saw to prevent contact with the kickback zone. The tip must be removed for making bore cuts (pocket cuts) or for cutting wood thicker than the length of the guide bar.



Chainsaw Safety

DON'Ts

- Do not stand directly behind the saw.
- Do not cut in the kickback zone.

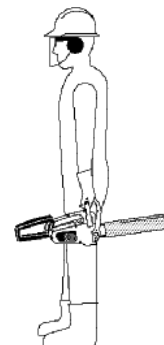
Handling, transportation, and storage:

- Handle chain saws safely to prevent injury to yourself or others.
- Shut off the chain saw motor before setting it down or carrying it for more than a very short distance. It is extremely dangerous to carry a chain saw when the engine is running.
- Let the chain saw cool before transporting.
- Use a scabbard or bar guard to cover the chain when carrying or transporting a chain saw.



Chainsaw Scabbard

- Carry the chain saw with the bar to rear. Ensure the scabbard is on and the muffler is away from the body.
- Use a carrying case to prevent damage to the saw during transit and storage. The case also provides convenient storage for the owner's manual and tools.
- Secure the chain saw and carrying case during transportation to prevent them from moving.
- Carry saw with bar to rear. Ensure scabbard is on and muffler is away from the body,



Chainsaw Safety

Handling, transportation and storage:

- Drain all fuel into an approved safety container before storing the chain saw for long periods including starting the motor to empty fuel from the carburetor.
- Store your chain saw in a cool, dry place.
- Do not carry a chain saw on your shoulder unless the chain is properly guarded or removed.
- Do not transport a chain saw in the passenger compartment of a vehicle.



Chainsaw Safety

Personal protective equipment

Use proper safety clothing and personal protective equipment (PPE) that are appropriate for the tasks being performed, to reduce the risk of injury. Clothing should be well-fitting to prevent any entanglement with the chain saw. The following personal protective equipment and clothing are recommended when operating a chain saw.

The standards that are referenced below are the most recent editions. You should consult legislation or the local occupational health and safety agency in your jurisdiction to confirm which version is used or is referenced in legislation that applies to your workplaces.

Eye Protection PPE

Safety glasses with side shields, safety goggles, and face shields approved by standards like CAN/CSA Standard Z94.3-99: Industrial Eye and Face Protector, or ANSI Standard Z87.1-1989(R1998): Practice for Occupational and Educational Eye and Face Protection.

- A face shield attached to the hard hat without safety glasses does not provide the adequate eye protection.

Gloves & Mitts

Leather gloves with ballistic nylon reinforcement on the back.

- They offer a good grip on the saw and absorb some vibration that provides some protection for the hands.
- Leather gloves can also prevent cuts when sharpening the saw.

Chainsaw Safety

Personal protective equipment Continued

Foot Protection PPE

Heavy, well-fitted, safety work boots approved by standards like CAN/CSA Standard Z195-M92: Protective Footwear, or ANSI Standard Z41-1999: Personal Protection - Protective Footwear.

- In addition to the regular requirements for safety boots, chain saw operators should wear boots made from cut-resistant materials that offer protection from contact with running chain saws.
- Boots made of ballistic nylon offer the best cut protection.
- Rubber soles for wet weather and snow, and hobnail boots, grip soles or cork soles for rough terrain.

Head Protection PPE

Hard hat, highly visible in colour, approved by standards like CSA Standard Z94.1-92: Industrial Protective Headwear (Reaffirmed: 1998-05-27), or ANSI Standard Z89.1-1997: Industrial Head Protection).

Hearing Protection PPE

Hearing protection devices, approved by standards like CSA Standard Z94.2-94: Hearing Protectors. (Chain saws create high noise levels of up to 95 to 115 dBA.)

Ontario Standards as per 213/90 Construction Regulations and Industrial Regulations (O.Reg 851) acceptable noise levels 85DBA based on TWA following Regulated formula. See Regulations for further details.

Chainsaw Safety

Personal protective equipment Continued

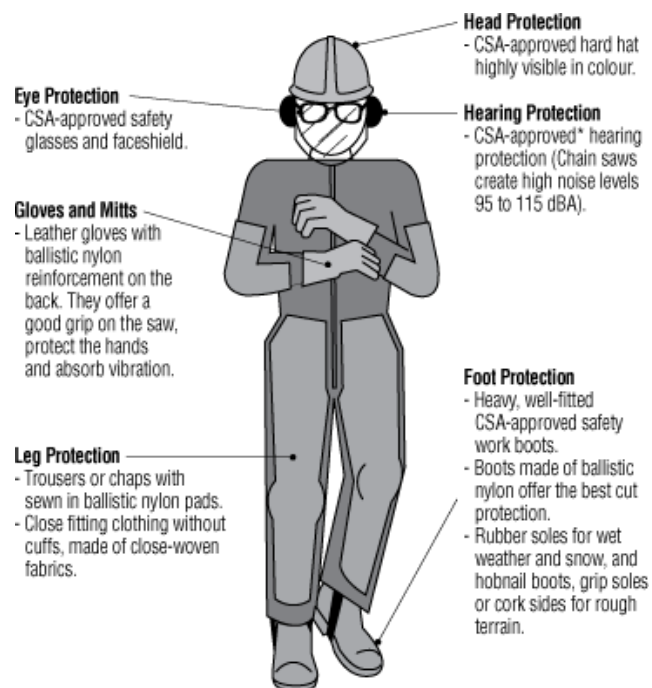
Leg Protection Clothing

- Trousers or chaps with sewn-in ballistic nylon pads.
- Close fitting clothing without cuffs, made of close-woven fabrics.
- The American Society for Testing and Materials Standard has published

"Standard Specification for Leg Protection for Chain Saw Users" (ASTM F1897-98). This standard specifies the

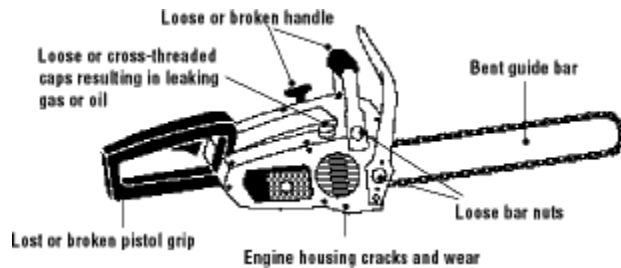
"Minimum requirements for the design, performance, testing, and certification of protective garments and protective devices designed to provide cut resistance protection to the legs of operators of power chain saws."

The object of this specification is to prescribe fit, function, and performance criteria for protective garments and protective devices that, when worn by chain saw operators that are intended to reduce leg injuries caused by contact with a running power saw chain.



Chainsaw Safety

Problem Areas to be Aware of:



- Loose or Broken Handle
- Loose or cross threaded caps - gas or oil cap leaking
- Bent guide bar
- Bent cutters
- Clogged air intake filter and vent
- Loose bar nuts
- Engine housing-cracks and wear
- Loose or broken pistol grip
- Worn starter cord
- Loose or broken handle

Engine:

- Keep the muffler, air intake filter clean and the spark arrester in place.
- Remove and service the starter if starter-cord does not fully retract.
- Use the correct fuel (gasoline or a gas/oil mix) recommended by the manufacturer. For fuel mixtures, mix gasoline and engine oil according to manufacturer's recommendations. Too much oil will make the saw run "dirty"; too little oil will damage the engine parts.
- Do not use a saw in need of repair. Remove and replace any damaged parts.

Chain and Guide Bar:

Check the chains for excessive wear, and replace when necessary.

Inspect the drive links, sprockets, cutters and track for damage:

- Repair or replace badly hammered links
- If cutters need replacing, file them to the same length as the existing cutters.
- Replace the bar if nicked or distorted
- Replace bar and chain if bar is damaged
- Replace worn or damaged drive sprocket before it damages chain

Chainsaw Safety

Sharpening and Filing:

Use the proper size files to sharpen the chain. Two files are necessary:

- a) A flat file for adjusting depth gauge.
- b) A round file of uniform diameter for sharpening cutters and maintaining drive links.



Adjust the tension of the saw chain after it has been in use for five to ten minutes.

The chain stretches as it heats up and requires adjustments at intervals throughout its operation.

- Keep chain lubricated.

Chainsaw Safety

Adjust the chain tension:

Loose chains increases wear on drive sprockets, drive links and bar, and endanger the operator if it climbs out of the track. A chain that is too tight will increase wear on components.

- When adjusting chain tension follow the manufacturer's instructions. General tips include:
- Shut off the saw.
- Wear gloves to avoid cuts.
- Loosen bar nuts.
- Rest tip of bar on small piece of wood to hold tip up.
- Tighten chain by turning adjustment screws until the chain is snug against the bar but able to be turned freely.
- Tighten bar nuts for correct chain tension by pulling on bar upwards with gloved hand or supporting it firmly from below.
- Check tension frequently and adjust as required.
- Ensure chain rotates smoothly after tensioning.
- Clean out the chain-oil portal when maintaining the guide bar. Sawdust can block delivery of oil to the cutting chain.

Chain brakes?

Always test the saw before cutting.

- Apply the chain brake with the saw held firmly in both hands and the engine running at operating power. If the chain does not stop running immediately, have the saw serviced.
- Remove the brake housing periodically and clean out any dirt, oil or sawdust.



Safe Work practice:

- Test your chain brake at least once per shift. Run the saw at full throttle and then activate the brake.
- Repeat the test if the chain does not stop almost instantly.

Pull the saw out of service and have the brake inspected and repaired if repeated testing of the chain brake fails to immediately stop the chain.

Chainsaw Safety

Maintenance Chart

Please note that the following maintenance intervals apply for normal operating conditions only. If your daily working time is longer than normal or cutting conditions are difficult (very dusty work area tropical wood etc.) shorten the specified intervals accordingly.		before starting work	after finishing work or daily	after each refueling stop	weekly	monthly	if faulty	if damaged	as required	see page:
Complete machine	Visual inspection (condition, leaks)	x		x						
	Clean		x							
Throttle trigger, throttle trigger interlock, Master Control, depending on model	Check operation	x		x						
Chain brake	Check operation	x		x						28
	Clean by STIHL dealer								x	28
Filter in fuel tank	Check					x				26
	Clean, Replace filter element							x		
Fuel tank	Clean					x				26
Chain oil tank	Clean					x				
Chain lubrication	Check	x								27
Saw chain	Inspect; also check sharpness	x		x						45
	Check chain tension	x		x						24
	Sharpen								x	45
Guide bar	Check (wear, damage)	x								37
	Clean and turn over				x		x			
	Deburr				x					
	Replace							x	x	
Chain sprocket	Check				x					38
Air filter	Clean	x					x			35
	Replace							x		35
Cooling inlets	Clean		x							
Cylinder fins	Clean					x				
Carburetor	Check idle adjustment -- chain must not turn	x		x						39
	Readjust idle								x	
Spark plug	Replace						x			41
All accessible screws and nuts (not adjusting screws)	Tighten								x	
Rubber vibration buffers	Have replaced by STIHL dealer						x			
Muffler	Inspect					x		x		42
	Inspect spark arresting screen	x								42
	Clean or replace spark arresting screen							x	x	42
Chain catcher	Check	x								
	Replace							x		

Chainsaw Safety

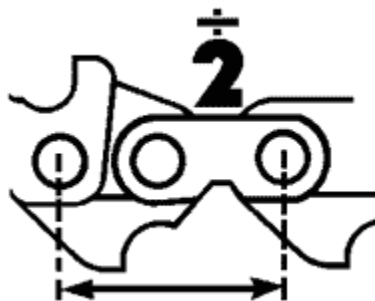
What is kickback?

Kickback is the violent backward and/or upward motion of the chain saw guide bar occurring when the chain near the nose or tip (see picture) of the guide bar contacts any object, such as another log or branch, or when the wood closes in and pinches the cutting chain in the cut.



What is chain pitch?

Chain pitch is the distance between any three consecutive rivets divided by two. Pitch defines the size of the chain. OREGON® chain is made in several pitches - 1/4" is the smallest, 3/8" is the most popular. Other parts of the cutting elements are pitch-related. The drive sprocket must be the same pitch as the chain, and so must the nose sprocket in sprocket-nose bars.



Chainsaw Safety

What is chain gauge?

Chain gauge is the drive link's thickness where it fits into the guide-bar groove. The gauge of the chain and the gauge of the guide bar must match.

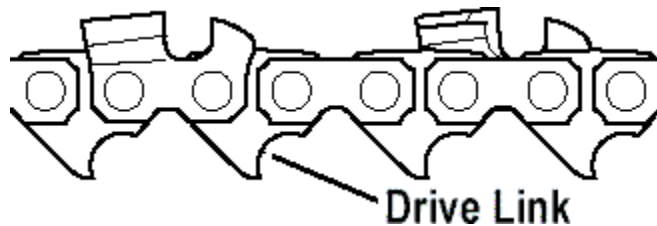
OREGON® has several gauges - such as .050", .063", etc.



How do I measure the length of my chain?

The length of your chain is determined by counting the number of drive links.

Common examples are 70 for "D" or "72" chain and 56 for "S" or "91" chain.



Chainsaw Safety

How tight should I tension my chain?

For a sprocket nose bar, turn your saw's tension-adjustment screw until the bottoms of the lowest tie straps and cutters come up and contact the bottom of the bar rails, then turn your tension-adjustment screw an additional 1/4 turn. Also, on sprocket nose bars, the snap test should be performed. Grasp the chain along the bottom of the bar, pull down, and let go. The chain should snap back to its original position, solidly contacting the bottom of the bar rail.

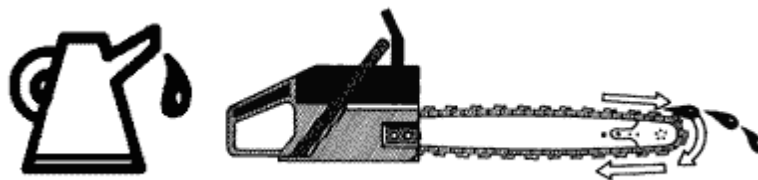


For a solid-nose bar, turn your saw's tension-adjustment screw until the bottoms of the lowest tie straps and cutters come up and contact the bottom of the bar rails. Chain tension on a solid-nose bar should be adjusted looser than on sprocket nose bars. Regardless of your bar type, your chain should move freely around the bar.

NEVER TENSION CUTTING CHAIN WHILE IT'S HOT!

How often and what type of lubrication should I use in my saw?

Keep your saw's chain-oiling system filled with clean bar-and-chain oil. Never put used oil or old motor oil in your saw or on your chain. Be sure your chain, bar, and sprocket are always receiving oil from the saw during operation. Fill your oil reservoir each time you fill your gas tank.



Chainsaw Safety

Why would my chain pull or cut to one side?

Several things can make a chain cut crooked or pull to one side. The following are the causes and the remedies:

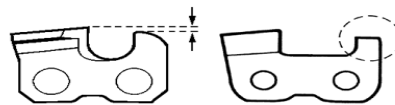
- Uneven top plates can cause a chain to cut crooked. It's important to keep all top plates equal length.



- Dull cutters damaged by rocks can cause a chain to cut crooked. It's important to remove all damage from cutters prior to cutting. Cutting with a dull chain can accelerate wear to the bar and chain.



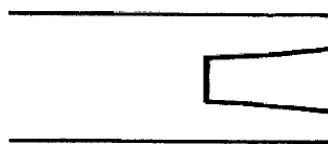
- Different depth gauge settings from left to right. Keep all depth gauge settings equal from left to right.



- Different top-plate angles from left to right. If you sharpen your chain at a 25° setting on your left hand, your right hand cutters should match.



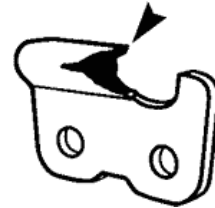
- A worn guide bar. A badly worn bar cannot be repaired. If your system is cutting crooked and you have narrowed it down to the bar, more than likely the rails or the inside of the bar are damaged beyond repair.



Chainsaw Safety

How do I know when my chain is dull, and when should I sharpen it?

Keep in mind that a sharp chain will cut large-size chips. A chain that is dull or has abrasive damage will create sawdust. It's time to sharpen when you have to push on the saw or the saw is no longer self-feeding.



How do I sharpen my chain?

Always inspect your chain prior to sharpening. Check for the following:

1. Bent or burred drive links
2. Broken cutters or tie-straps
3. Loose rivets or broken rivet heads

If broken parts are detected, take it to a servicing dealer for replacement of parts or replace the entire chain. The following steps will help you correctly sharpen (with a round file) a saw chain:

1. Be sure to have the correct size file and file guide.
2. When hand filing it's important that 1/5, or 20 percent, of the file's diameter is always held above the cutter's top plate. Using the correct file guide is the easiest way to hold the file in this position.

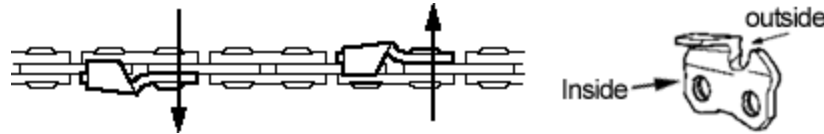


Chainsaw Safety

3. Keep the correct top-plate filing angle line on your file guide parallel with the chain. Many cutters have a guide mark stamped near the rear edge of the top plate that can also be used as a guide for filing angle.



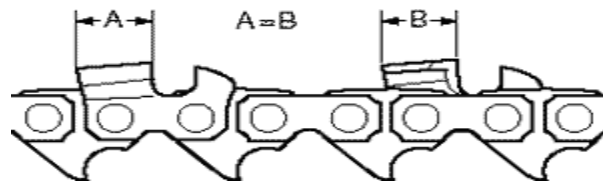
4. Sharpen cutters on one side of the chain first. File from the inside of each cutter to the outside. Then turn your saw around and repeat the process for cutters on the other side of the chain.



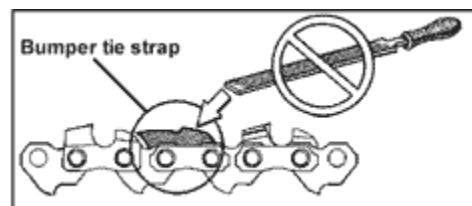
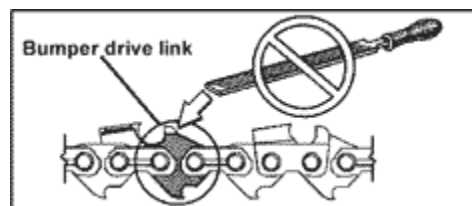
5. If damage is present on the chrome surface of top plates or side plates, file back until such damage is removed.



6. Keep all cutters equal. Start with the cutter with the most damage and hand file all cutters back equally.



Note: Do not file or alter the tops of kickback-reducing bumper tie straps or bumper-drive links, except on 33SL, 34SL and 35SL chains. Only on 33SL, 34SL, and 35SL will the bumper tie straps be filed down while the cutter depth gauges are filed.



Chainsaw Safety

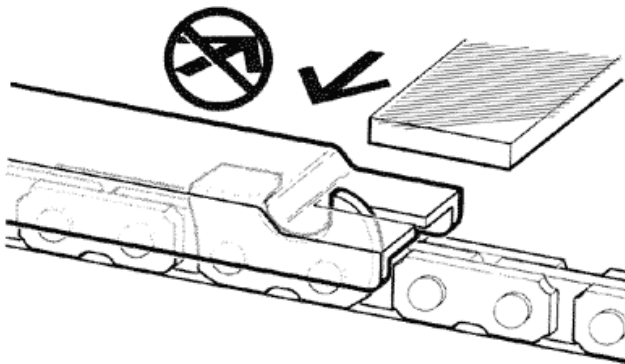
How do I set my depth gauges?

Prior to setting your depth gauges it's important to have the correct depth gauge tool. Most chains have a number stamped on each cutter located on the depth gauge indicating the correct depth gauge setting. If unsure of your chains depth gauge setting, ask your saw chain dealer. The following steps will help you correctly set your depth gauges:

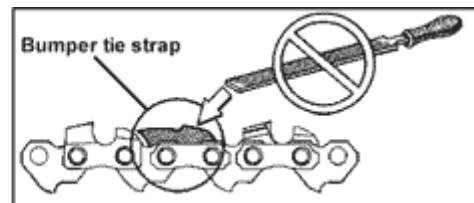
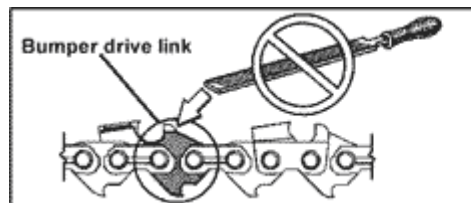
1. Use a depth-gauge tool with the correct built-in setting for your chain and check your depth gauges after every third or fourth sharpening.



2. Place the tool on top of your chain so one depth gauge protrudes through the slot in the tool. If the depth gauge extends above the slot, file the depth gauge down level with the top of the tool using a flat file. Never file the depth gauge down enough to exceed the depth gauge setting specified



Note: Do not attempt to file or alter tops of kickback-reducing bumper tie straps or bumper drive links, except on 33SL, 34SL, and 35SL chains. Only on 33SL, 34SL, and 35SL will the bumper tie straps be filed down while the cutter depth gauges are filed.



Chainsaw Safety

Should I do anything special with a new chain?

Yes. Taking these few simple steps prior to using it can extend the life of your new chain:

1. If possible, soak the chain in oil to allow oil to penetrate all chain components.



2. Never run any chain on an over-worn drive sprocket, especially a new chain. Replace drive sprocket system after every two chains, or sooner.

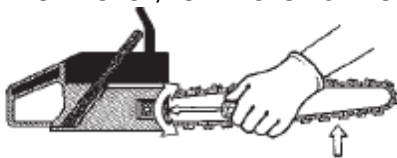


3. Adjust chain (see Chain Tension)

4. Run new chain at half throttle for several minutes before doing any cutting; this allows oil to reach all parts of the bar and chain. Let sprocket, bar and chain warm up fully.



5. Stop the motor, let the chain cool, then check and adjust tension.



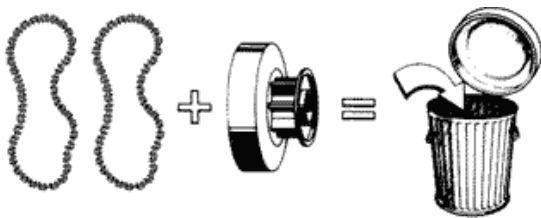
6. Keep the first several cuts light. Keep extra oil on the bar and chain during these first cuts, and do not apply heavy pressure. Check chain tension often during the first half hour of use.



Chainsaw Safety

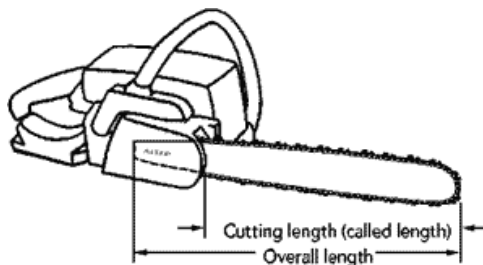
How long should the drive sprocket on my saw last?

It's important not to run a new chain on a badly worn drive sprocket. Replace drive sprocket systems after every two chains, or sooner.



How do I know what size bar I have?

Your bar's cutting length (or "called length") is different from its overall length. The cutting length is the distance from the front of the saw to the tip of the farthest cutter rounded to the nearest inch.



Name: _____ Date: _____

Basic Chain Saw Safety Quiz

1. The chain should be sharpened on a grinder after every how many hand filings?
 - a.) Two
 - b.) Three
 - c.) Four

2. You should move how many feet away from the fueling area before trying to start the chainsaw?
 - a.) Ten Feet
 - b.) Fifteen Feet
 - c.) Twenty Feet

3. Before storing the saw, you should...
 - a.) Leave the gas/oil mixture in the tank
 - b.) Drain the gas/oil mixture from the tank
 - c.) Refill the tank with the gas/oil mixture

4. Probably the best place to purchase a chainsaw is at a?
 - a.) Local Hardware Store
 - b.) Large Discount Store
 - c.) Chainsaw Dealer

5. The proper footwear when using a chainsaw is?
 - a.) Above the ankle leather boots
 - b.) Low top Sneakers
 - c.) Sandals

6. The first thing to do after turning off the chainsaw is?
 - a.) Put the Chain guard on
 - b.) Engage the chain break
 - c.) Drain the gas/oil mixture

7. To cut 10 inch diameter trees, you should get a chainsaw with at least a...
 - a.) 12inch bar
 - b.) 10inch bar
 - c.) 11inch bar

8. Which of these is NOT an option you need to consider when purchasing a chainsaw?
 - a.) Chain speed
 - b.) Horsepower
 - c.) Colour

9. Almost all chainsaws are made for?
 - a.) Right-handed people
 - b.) Left-handed people
 - c.) Taller people

10. If you do not drain the gas/oil mixture from the chainsaw before storage, what will happen?
 - a.) Absolutely nothing
 - b.) The gas mixture will evaporate over time
 - c.) The gas mixture will eventually turn into varnish and will plug up the carburetor

11. Which of these would be considered protective gear?
 - a.) Hard hat
 - b.) Denim Jeans
 - c.) Lace Aless boots

12. Which of these are factors that you should be aware of while using a chainsaw?

- a.) Weather
- b.) Saw Colour
- c.) Saw brand

13. Which of these starting techniques is NOT acceptable?

- a.) Ground starting
- b.) Air drop starting
- c.) Groin starting

14. Another name for professional starting is?

- a.) Sling starting
- b.) Step starting
- c.) Stand-over starting

15. For a well tuned saw, how many pulls of the starting rope should be enough?

- a.) Five
- b.) Three
- c.) Seven

16. Which of these is not a way to lessen the effect of a kickback?

- a.) Release the saw
- b.) Proper stance
- c.) Turning your head

17. Which is not a factor in causing saw bind?

- a.) Daylight
- b.) Pressure
- c.) Gravity

18. Internal bind is caused by?

- a.) Twisting the saw in the cut
- b.) A dull saw
- c.) Internal Forces within the tree

19. You should "size-up"?

- a.) Before cutting the tree
- b.) During the cut
- c.) After cutting the tree

20. When limbing a downed tree you should usually start at the?

- a.) Butt
- b.) Top
- c.) Middle

Answers For Review

1. B
2. A
3. B
4. C
5. A
6. A
7. A
8. C
9. A
10. C
11. A
12. A
13. B
14. B
15. B
16. C
17. A
18. B
19. A
20. B

Please complete the training feedback form.

Thank-You

Training Course Feedback Form

Course: _____ Course Date: _____

Instructor: _____ Company: _____

Rating: 1 = Very Poor 5 = Very Good

Administration

Category	Rating				
Course was scheduled at a good time	1	2	3	4	5
Course started on time	1	2	3	4	5
Course finished on time	1	2	3	4	5
Trainer took periodic breaks	1	2	3	4	5

Course Content

Category	Rating				
Course workbook was easy to understand	1	2	3	4	5
Course workbook was informative	1	2	3	4	5
Presentation was easy to understand	1	2	3	4	5
Presentation was informative	1	2	3	4	5

Instructor

Category	Rating				
Instructor presented material in ways that were easy to understand	1	2	3	4	5
Instructor answered questions clearly	1	2	3	4	5
Instructor encouraged active participation	1	2	3	4	5

Technology

Category	Rating				
I could clearly hear what the instructor was saying	1	2	3	4	5
I could clearly see what the instructor was doing	1	2	3	4	5
The technology was beneficial to the learning process, not a hindrance	1	2	3	4	5

**** Over All, This was a positive experience: 1 2 3 4 5**

Comments: _____
