
TABLE OF CONTENTS

Introduction	2
• Training Objectives	
Brushcutter Role	3
Personal Protective Equipment (PPE)	4
First Aid and Emergencies	5
Mechanics of Brushcutter Safety	6
Kickout and Rotational Forces	8
Brushcutter Preparation	9
• Installing Blades	
• Adjusting the Harness	
• Fueling/Oiling Procedure	
Brushcutter Operation	12
• Starting Procedure	
Cutting Concepts	14
• Holding and Controlling	
Work Site Hazard Assessment and Safety	16
• Operator Safety	
• Site Hazards	
• Safety of Other Volunteers and Public	
General Workday Safety and Planning	17
• Holding and Controlling	
Brushcutter Care	18
Supplies	20
• Ordering	
• Loaner	
• Repair	
Certification	22
Appendix	23
• Illness/Accident Reporting	Repair Request Form
• Tool/Supply Order Form	Loaner Request Form
• Delivery Locations	

INTRODUCTION

A brushcutter is a line trimmer fitted with one of several different cutting heads. Smaller, lightweight trimmers cannot be used as brush cutters. High powered trimmers can be equipped with a cutting head that can clear small trees and saplings and is then called a clearing saw. The trimmer that is issued in the FPCC volunteer program is in the medium weight and power range and can be equipped as a brushcutter and can be used to clear trees up to about 2" in diameter. Although brushcutters are safer to use than chainsaws, when used improperly by an unskilled operator there is an increased risk of personal injury.

Objectives of this training

- Develop a strong understanding of the fundamentals of safe brushcutter use and maintenance and jobsite safety.
- Understand basic brushcutter safety and operation to help an operator become a competent, safe and professional brushcutter.

All of the maintenance and operation information contained in this manual can also be found in the STIHL user manual, which can be a valuable reference tool. Proficiency with a brushcutter will come with experience. However, it is important to always stay focused and never become complacent while operating a brushcutter.

Know when a situation is beyond your skill level. NEVER cut something you are not comfortable with. Know when to walk away and ask for help. Your safety is ultimately your responsibility and is influenced not just by the protective equipment you wear but by the decisions you make and the attitude you have while working.

VOLUNTEER BRUSHCUTTER ROLE

Originally FPCC included Brushcutter training with Basic Chainsaw training on an optional basis if the students wanted to receive that training. Consequently, not all Chainsawyers have been trained on Brushcutters.

Additionally, some volunteers expressed interest in training only for brushcutter operation and not in chainsaw operation. In Spring 2014, FPCC started offering a separate Brushcutter class.

Brushcutter Operator

This is an individual who has been trained in basic brushcutter safety and maintenance and has a solid understanding of jobsite safety involved with working around others.

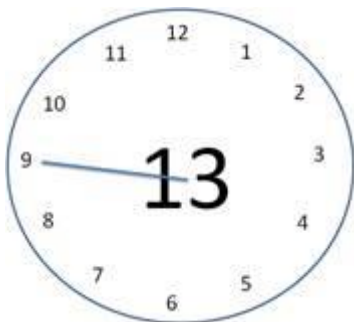
- Obtained by attending the classroom portion of Brushcutter Training and passing the exam
- Participation in the outdoor portion of the class, successfully demonstrating that they can safely operate a brushcutter
- Pre-requisite for taking the class is a minimum of 30 volunteer hours in Ecological Stewardship or Trailkeeper program and hours are logged on Online Volunteer System (OVS).

PERSONAL PROTECTIVE EQUIPMENT (PPE)

There are three items required by OSHA (Occupational Safety & Health Administration) to be worn by the brushcutter operator. These items are designed to prevent bodily injury and are necessary to operate a brushcutter for the Forest Preserves of Cook County. All of them are supplied by FPCC through Volunteer Resources. If you choose to use your own personal equipment, they must still meet the OSHA standards.

See equipment section of text for ordering information.

Hardhat – Only good for five years due to plastic degradation from UV light. Five years is based on moderate to heavy use. Helmets must be replaced if a significant impact is applied to the hardhat or at the 5 year point. Dates are stamped on the underside of the bill. An example is shown below indicating a manufacture date of September 2013 (the year's last two digits are in the center and the month is indicated by the "hour hand").



- **Eye Protection** – Mesh face shields are approved eye protection. Broken shields can be replaced separately from helmet.
- **Hearing protection** – May be either plug (provided by volunteer) or muff plug (part of combination helmet). Broken muff assembly can be replaced separately from helmet.

The above 3 items are ordered as one helmet system.

- **Safety Glasses or Goggles** - Because brushcutters emit a lot of small debris, it is highly recommended that a second layer of eye protection be used in addition to face shield.
- **Boots** – Highly recommended, but not required. Leather or steel toed leather are sufficient for brushcutter work (but Kevlar is required for chainsaw).
- **Leather Gloves** - Highly recommended, but not required.
- **Orange Safety Vest** – Recommended but not required.
- **Long pants** – Required. Sturdy fabric recommended.

FIRST AID AND EMERGENCIES

First Aid Kit

A standard first aid kit is required at every work site when brushcutting is occurring. These kits are available through Volunteer Resources. (As opposed to a logger first aid kit for chainsaw work.)

CPR/First Aid Training

OSHA requires that everyone participating in a logging operation is trained in CPR and First Aid. The volunteer operation may not be a true logging operation but we do encourage volunteers to take the CPR/First Aid classes. They are offered by FPCC once a month on a weekday and four times a year on Saturdays. Registration is via OVS. There also is a wait list on OVS for the Saturday dates so that you are automatically notified when a date is set.

Emergencies

It is important on every workday (with or without chainsaws) to know where the nearest medical facility is and to know how to give directions to your worksite. Since street addresses cannot typically be given to 911 for FPCC sites for an emergency responder, volunteers must be prepared to provide other information and use other means to help direct emergency personnel to the worksite.

- Know the name of the closest intersection
- Know closest access to the site by vehicle
- Know directions on further access by foot

- Send scouts out to significant points like driveway entrances or trailheads to flag down emergency responders
- Give GPS coordinates if known
- Give the dispatcher your cellphone number to help locate the site if it can't be easily found

Reporting

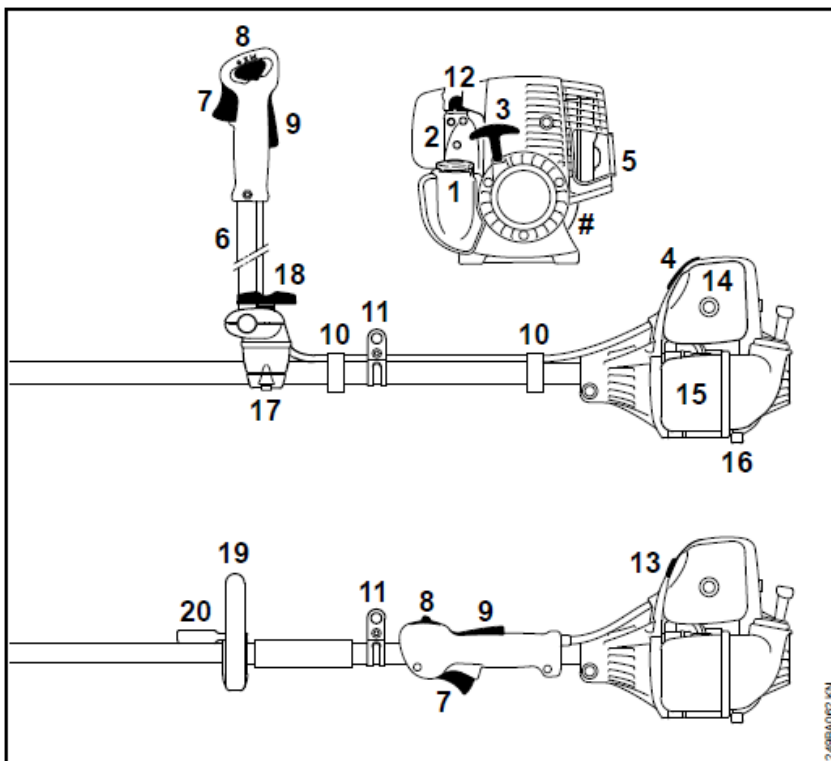
After the well-being of the injured has been addressed, it is important to complete the Accident/Illness Report (see appendix). Have witnesses write their account of the accident and then send it in to Volunteer Resources. Minor incidents don't require a phone call. For major incidents (anytime a 911 call or emergency room visit is made), call the Stewardship Program Coordinator or Volunteer Resources Manager to apprise them of what happened.

MECHANICS OF BRUSHCUTTER SAFETY

Brushcutter Safety Features

Every brushcutter is equipped with safety features that function to minimize the potential for injury to the user. Proper functionality of these features is necessary for safe operation and should be inspected at the beginning of each work day.

Main Parts



- 1 Fuel Filler Cap
- 2 Carburetor Adjusting Screws
- 3 Starter Grip
- 4 Spark Plug Boot
- 5 Muffler with Spark Arresting Screen
- 6 Bike Handle
- 7 Throttle Trigger
- 8 Slide Control
- 9 Throttle Trigger Lockout
- 10 Throttle Cable Retainer
- 11 Carrying Ring
- 12 Fuel Pump
- 13 Choke Knob
- 14 Air Filter Cover
- 15 Fuel Tank
- 16 Machine Support
- 17 Handle Support
- 18 Wing Screw
- 19 Loop Handle
- 20 Barrier Bar
- # Serial Number

Throttle Trigger Lockout - (#9) This device must be depressed in order to allow the throttle to function. Test this feature, with the brushcutter NOT running, by attempting to pull the throttle without depressing the throttle trigger lockout. The throttle should not be able to move if the lockout is functioning properly.

Bike Handle – (#6) This style handle must be used for brushcutting as opposed to a loop handle which is used for line trimming. Brushcutting requires that both hands be used during operation as opposed to one hand use for trimming. The bike handle is attached via a Wing Screw (#18) and Handle Support (#17).

Carrying Ring – (#10) Connects the brushcutter to the shoulder strap or harness. The ring can be adjusted to match the height needed to cut the particular specimen with the appropriate blade (grass blades and knives adjusted to ground level; circular saw blades to approximately 2- 8” above ground).

Shoulder Strap – A single shoulder strap comes with the Brushcutter and can be used if line trimming.

Harness – A harness is supplied separately by FPCC so that the operator has both hands free to operate the brushcutter.

Machine Support – (#16) To safely rest machine on the ground. Since motor is hot, it is important not to rest it directly on dry grass, which could start a fire.

Barrier Bar – (#20) Helps keep the operator’s feet and legs clear of the cutting tool.

Muffler – (#5) The muffler functions to reduce the noise output and contains a spark arrestor screen. The screen prevents sparks from exiting the muffler, reducing the potential for ignition of vegetation near the work site.

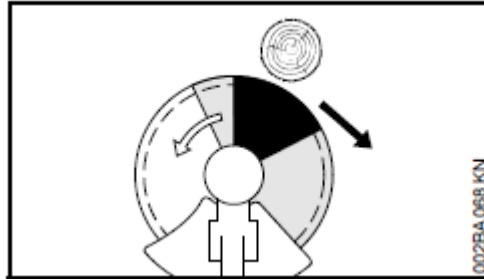
Slide Control - (#8) - This is the off switch and is intended to easily be operated by the thumb of your right hand.

KICKOUT AND ROTATIONAL FORCES

Understanding the forces involved with a blade spinning around the axis is important to the safety of the operator. The blade will respond in a motion that is directly opposite the direction of the blade's travel.

Kickout

Kickout (Blade Thrust) is the sudden, uncontrolled motion towards the operator's right or rear that can occur when the shaded area of the blade comes in contact with a solid object. This force poses the greatest risk from objects such as rocks, walls, etc. but can also occur from sudden motion into trees, shrubs, etc.

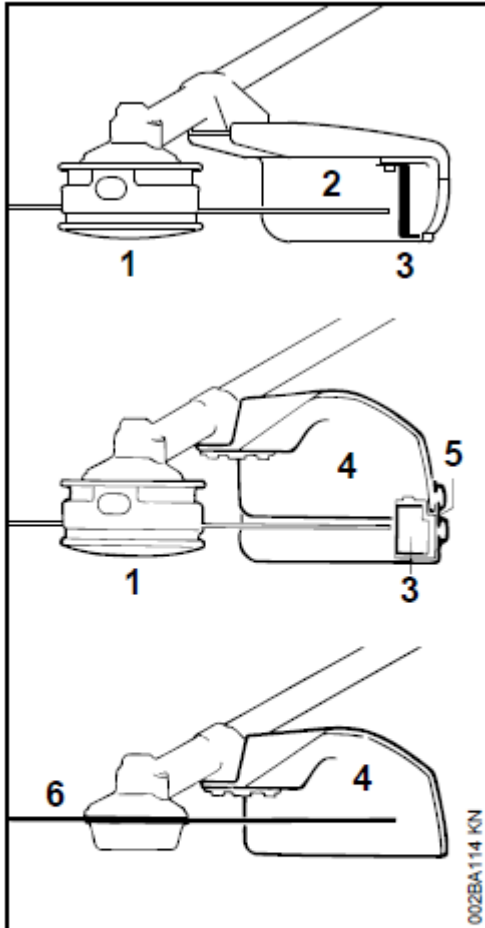


Effects of Vibration

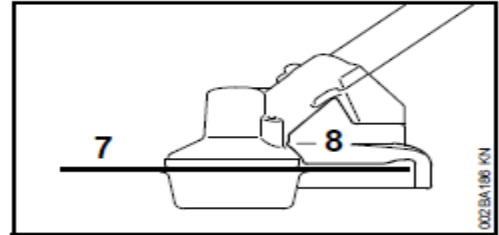
Normal vibration loosens the blade as well as the Fuel Filter Cap. It is important to check the cap at the beginning of each workday. Blades should be tightened periodically throughout the workday. If a blade becomes loose with greater frequency, the retaining nut may need to be replaced.

BRUSHCUTTER PREPARATION

Mower Head Parts



- 1 Mowing Head
- 2 Deflector for Mowing Heads
- 3 Line Limiting Blade
- 4 Deflector with Skirt for all Mowing Attachments
- 5 Skirt
- 6 Metal Mowing Tool

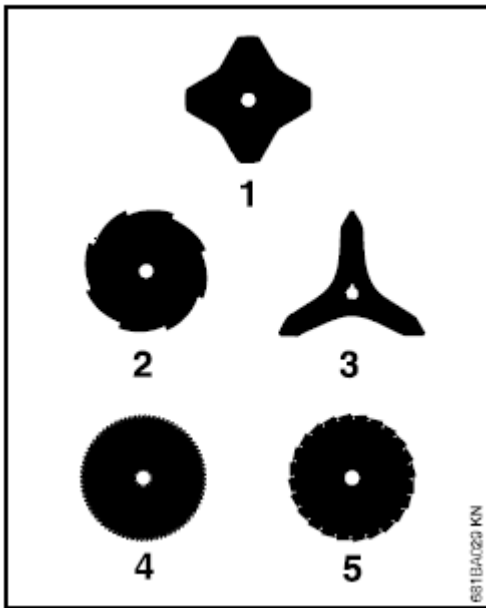


- 7 Circular Saw Blade
- 8 Limit Stop for Circular Saw Blade

Deflector (#2) – Used when line trimming or with grass cutting blades

Deflector with Skirt (#4) – Used with other mowing heads (not required for grass and brushcutting blades)

Limit Stop (#8) – Used with circular saw blades



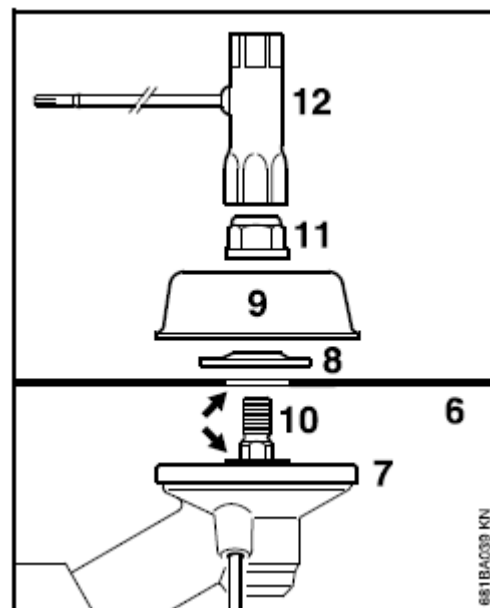
Grass cutting blades - (#1 & 2) Used to cut herbaceous grasses

Brush Knife (or Tri-Blade) – (#3) Used to cut stiffer grasses, forbs and light woodies

Circular Saw Blades – (#4 & 5) Used to cut small trees and woody resprouts up to 2" in diameter

Installing blades

- Block the drive shaft for support and to prevent bending or other damage.
- Determine appropriate rotation direction of blade. Direction of rotation is indicated by an arrow on the inside of the deflector or limit stop.
- Determine if deflector or limit stop is needed.



- Place the desired cutting blade (#6) on the thrust plate (#7) engaging the collar of the shaft (#10) properly.
- Fit the thrust washer (#8) and rider plate (#9) on the shaft (#10).
- Use the combination wrench (#12) to screw the mounting nut (#11) counterclockwise and tighten firmly.

Always wear gloves when handling the blades. The cutting edges and teeth are very sharp!

Grass Cutting blade (4 tooth)

- Rotation direction doesn't matter
- Deflector without skirt
- No limit stop

Grass Cutting blade (8 tooth)

- Cutting edge must point clockwise
- Deflector without skirt
- No limit stop

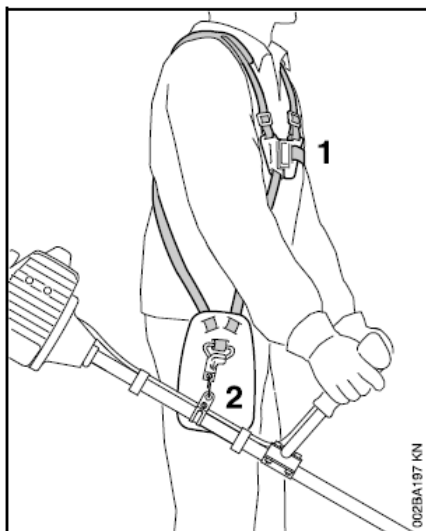
Brush Knife

- Rotation direction doesn't matter
- Deflector without skirt
- No limit stop

Circular Saw Blades (both styles)

- Cutting edge must point clockwise
- No deflector
- Must have limit stop
- Only sawtooth can be hand sharpened

Adjusting the harness



The brushcutter should be adjusted based on the type of blade and the best position for the target specimen.

Fueling/oiling procedure

All STIHL products run on a 50:1 fuel to oil mix ratio. 2-cycle oil comes in premeasured bottles which indicate how many gallons of gasoline the bottle of oil should be mixed with.

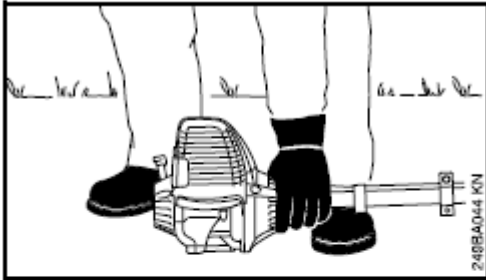
Important fueling/oiling points are:

- The fuel tank is near the base of the brushcutter(#15)
- Do not fuel the brush cutter within 10 feet open flames
- Do not smoke while fueling the brushcutter
- Do not start the brushcutter within 10 feet of fueling site
- Use at least 89 octane (higher is preferred) gasoline mixed with 2-cycle oil
- Avoid using fuel older than 3 months
- Mix fuel and 2-cycle oil in an approved fuel container prior to gassing the brushcutter (Volunteer Resources supplies 1gal approved containers)
- Clean area around fuel cap (#1) prior to removal
- Ensure fuel cap is fully seated and secured before resuming work (some of these are tricky and can easily be broken if not done correctly)

BRUSHCUTTER OPERATION

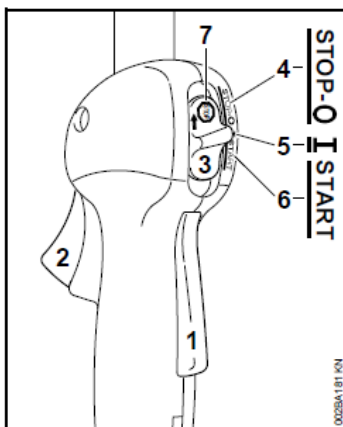
Starting procedure

Place the unit on the ground resting securely on the engine support and the deflector.



Always make sure that the blade is not touching the ground or other objects.

Control handle on drive tube



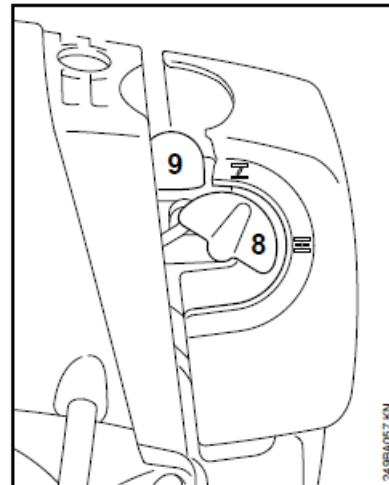
- 1 Throttle trigger lockout
- 2 Throttle Trigger
- 3 Slide Control

Slide Control

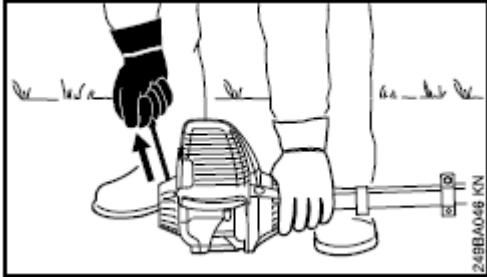
- 4 STOP – ignition is off
- 5 I – normal run position
- 6 START – ignition is on
- 7 Arrow indicating direction to turn brushcutter off

To Start

- Press down the trigger lockout lever and squeeze the throttle trigger and hold in that position
- Move the slide control to START
- Release the throttle trigger, next the slide control, next the trigger lockout. This is the starting throttle position.



- Set the choke knob (#8) to closed for cold or open for warm start
- Press fuel pump bulb at least 5 times



- Support the shaft with your left hand being careful to not apply downward pressure. Supporting the shaft with your boot will help to prevent bending the shaft.
- Hold the starter grip in your right hand
- Pull the started grip until it engages
- Give a brisk strong pull
- Crank engine until it begins to fire and turn choke to open
- When engine begins to run, blip the throttle trigger and move slide to normal run position (I)

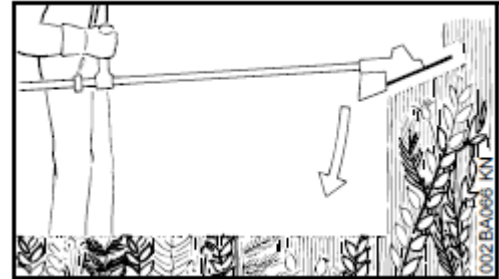
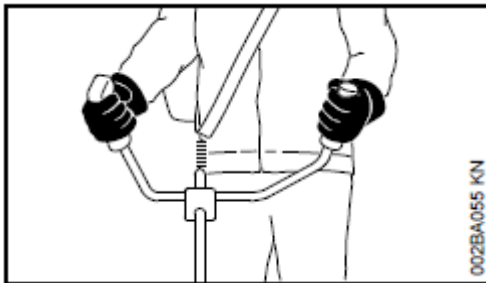
To Stop

To turn the brushcutter off, slide control in direction of arrow to STOP

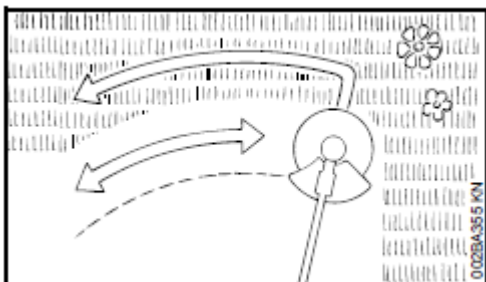
CUTTING CONCEPTS

Holding and Controlling the Brushcutter

Always hold the brushcutter with two hands on the handles while you are working with any of the cutting blades.

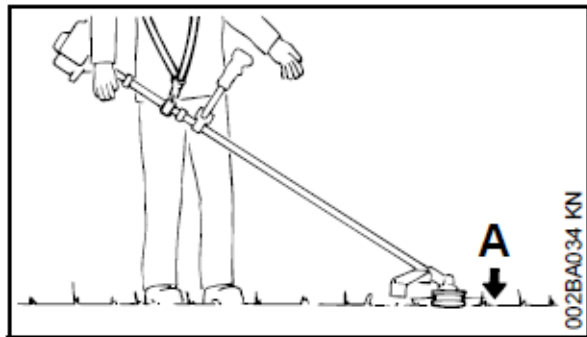


Grass Cutting Blade All types of grasses can be cut with the 4tooth or 8tooth grass cutting blade. The brushcutter is swept in an arc similar to using a scythe.

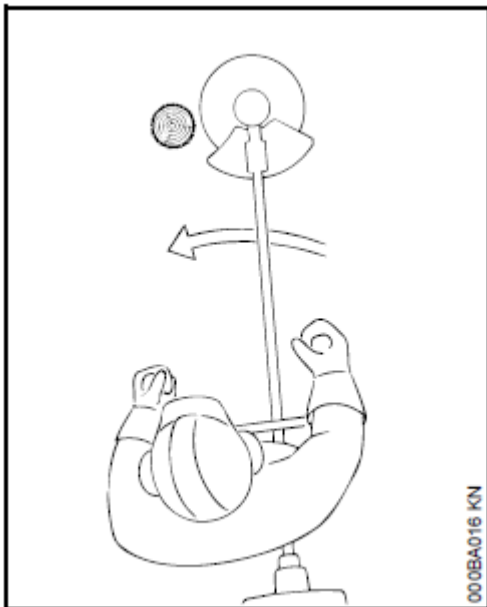
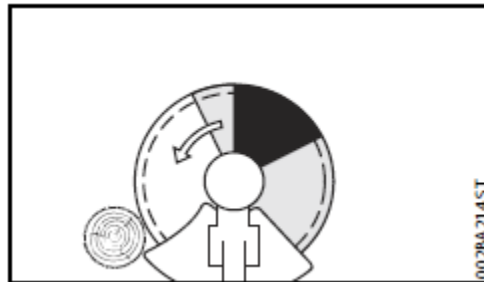


Brush Knife To cut dense, matted grass growth or scrub, a brush knife can be used with a chopping effect. Starting at waist height, lower the cutting head on to the growth.

Both Grass blades and brush knives should be held in a floating position just touching the ground.

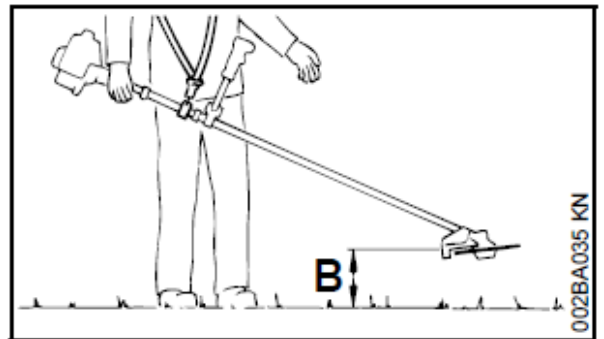


Circular Saw Blade To cut small trees (up to 2" diameter) and woody resprouts, a circular saw blade can be used. Although larger trees can be cut, it increases the risk of the blade catching or binding and could result in injury. Larger trees are best cut by chainsaw.



The limit stop should be used to allow the cutting head to be held against the tree being cut. Before starting the cut, accelerate up to full throttle and apply the blade to the right side of the tree.

Circular saw blades should hover 2-8" above the ground.



WORK SITE HAZARD ASSESSMENT AND SAFETY

Safety Considerations for the Operator

Minimizing the potential for personal injury is the highest priority of a brushcutter operator. Key points to always follow when operating a brushcutter are:

- Always wear the required PPE
- Never work alone. FPCC policy requires that another volunteer be present when using a brushcutter
- Know your skill level
- Recognize when to ask for help
- Do not cut something you are not comfortable with
- Do not cut above waist level
- Make sure blade is tightened
- Ensure brushcutter is working properly
- Keep good hand position and footing while working
- Keep your work site free of debris and congestion
- Work at a comfortable pace
- Take breaks when needed to stay hydrated and to prevent fatigue
- Know where other individuals are in relation to you and your saw
- Maintain good communication with other people on the jobsite
- Stand on the uphill side if working on a slope
- Carry the brushcutter in a horizontal position with the cutting head behind you.

Site Hazards

The hazardous zone is more contained and overhead hazards are of less concern for brushcutters than for chainsawyers but it still is important to assess the hazards.

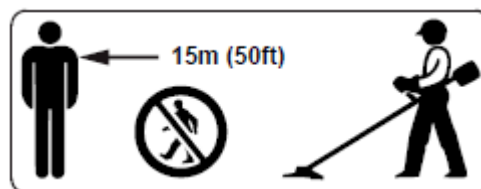
Identifying the work to be done along with any hazards that are present on a work site prior to beginning work is critical for reducing the potential for injury both to the brushcutter operator and any other individuals present at the work site. The scope of the work to be done should be understood by all individuals involved and is defined by the volunteer running the workday - Site Steward, Steward or Stewardship Workday Leader. This helps prevent confusion and accidents and keeps the jobsite running efficiently.

Hazards can include:

- Rough terrain, rocks
- Bees, hornets and wasps
- Poisonous plants
- Foreign material (glass, metal, garbage etc.)
- Pedestrians (the public)
- Traffic
- Weather
- Smoke/Fire and Burn/Brush Piles
- Unskilled volunteers

Safety of other Volunteers and Public

The brushcutter can throw pieces of cut debris a distance of 50 ft, so it is important that other volunteers or the public are not working in that zone. Other volunteers should assist in keeping that zone free of others.



GENERAL WORKDAY SAFETY AND PLANNING

Establishing and maintaining a safe worksite is a major priority. Working with large groups of volunteers while brushcutters and chainsaws are being operated and brush piles are burning presents a unique set of hazards. Care should be made to establish a worksite staging area where everyone can gather at the beginning and end of the day.

The staging area should:

- Contain tools not being used
- Have water and personal belongings
- Provide a place to take a break
- Have a First Aid Kit and a charged cellphone.
- Be located a safe distance from the work area

Depending on the type of volunteer expected at the workday, brushcutting and chainsawing may be planned to occur at different times.

On one end of the spectrum is the goal of getting the most cut as possible and at the other end is enjoying a peaceful day with nature. The point on that spectrum that is appropriate is decided by the site's leadership.

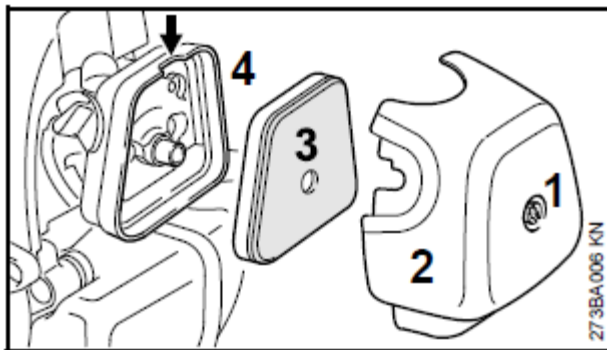
Some options are:

- Do the cutting before the workday starts and have the volunteers lop or saw it into smaller pieces, haul it away and burn it
- Do periods of cutting (maybe 15 minutes every hour) so people can walk away from the noise if they wish
- Cut at a distance from the group and then switch locations for non cutting volunteers to remove the brush
- Do most of the workday with hand tools and then cut to flush cuts after a workday

BRUSHCUTTER CARE

Basic cleaning and blade sharpening should be done by the volunteer. Anything more involved than that should be done at a small engine shop. FPCC has an engine shop to do these repairs.

Cleaning the Air Filter Can be done in the field if brushcutter seems to be losing power.



- Turn the choke to closed
- Take out the screw and remove the filter cover taking care not to lose screw (use helmet)
- Clean away dirt from around filter (#3)
- Grip the filter (#3) at the arrow and remove from housing
- Knock out dirt in palm of hand or blow air through it. Do not wash.
- Air Filters should be replaced regularly and are available through Volunteer Resources.

Lubricating Gearbox Check lubricant about every 25 hours of operation.

Regular Maintenance

Maintenance and Care

The following maintenance intervals apply in normal operating conditions. The specified intervals must be shortened accordingly when working for longer than normal or under difficult cutting conditions (extensive dust, etc.).		before starting work	at the end of work and/or daily	whenever tank is refilled	weekly	monthly	yearly	if faulty	if damaged	as required
Complete machine	visual inspection (condition, leaks)	X		X						
	clean		X							
Control handle	check operation	X		X						
Air filter	clean									X
	replace								X	
Fuel pick-up body in fuel tank	have checked by a specialist dealer ¹⁾							X		
	have them replaced by a specialist dealer ¹⁾						X		X	X
Fuel tank	clean							X		X
Carburetor	check idle adjustment, cutting attachment must not turn	X		X						
	readjust idle speed									X
Spark plug	adjust electrode gap							X		
	replace after every 100 hours of operation									
Cooling air intakes	visual inspection		X							
	clean									X
Valve clearance	check and adjust if necessary, one time after 139 hours of operation, by servicing dealer ¹⁾									X
Combustion chamber	decarbonize after 139 hours of operation, subsequently after every 150 hours of operation									X
Spark arresting screen in muffler	check		X					X		
	clean or replace								X	X
All accessible screws, nuts and bolts (not adjusting screws)	retighten									X
Antivibration elements (rubber buffers, springs)	check	X						X		X
	have them replaced by a specialist dealer ¹⁾								X	
Cutting attachment	visual inspection	X		X						
	replace								X	
	check for secure fit	X		X						
Metal cutting attachment	sharpen	X								X
Gear lubrication	check				X					
	top up									X
Safety information sticker	replace								X	

SUPPLIES - ORDERING, LOANERS & REPAIR

Tool/Supply Ordering

Volunteer Resources provides and loans most of the tools and all of the herbicide needed to run successful workdays. Supplies are delivered to various Preserve facilities across the county. The catalog of available tools can be found on the Resources section of the Online Volunteer System (OVS) at www.fpdcc.com/volunteer. The Volunteer Supply Order form and the Supply Loaner form are available in the appendix of this manual and also can be found in the Resources section of the website.

Brushcutter related items are:

- Brushcutter – Stihl FS130 is the current model (starting in 2014) and FS110 was a very recent model. Number of brushcutters per site depends on the management schedule for the site not the number of certified brushcutters. Volunteer Resources, the regional ecologist and the work schedule all factor into the decision on number of brushcutters
- 4 Tooth Grass Blade
- 8 Tooth Grass Blade
- Brush Knife
- Chiseltooth Circular Saw Blade
- Sawtooth Circular Saw Blade
- Limit Stop
- Harness
- Two cycle Oil – For 1 gallon mix - Additive for gasoline for power tools
- Helmet with Face Shield & Ear Muffs – Stihl helmet with face shield and ear protection. Suggested number is one per every brushcutter machine (not

one per brushcutter operator) assigned to site

- Face Shield – Replacement for damaged face shield for Stihl helmet only. We are not special ordering other types so if you need a new face shield for another helmet, just order a new Stihl helmet
- Gas Can – 1.25 gallon gas can for power tool use. Suggested number is one per site
- Round bastard file – Small 3/16" file to repair tooth damage
- Flat File
- Gearbox Lubricant
- Air Filter
- Orange Safety Vest

Ordering Procedure

- Site Stewards download the most up to date copy of the *Supply Order Form, Herbicide Order Form or Loaner Form* available on the resources page of the www.FPDCC.com/volunteer
- Complete the fields in the top portion of the appropriate form: name, email/phone, site and need by date, and delivery location (options are identified in the *Facilities Directions and Hours*)
- Select the items needed
- Send completed form and any questions to Volunteer.fpd@cookcountyil.gov. A representative Volunteer Resources may contact you with questions or to inform you that one or more the items in your request are on backorder.

Delivery Procedure

Volunteer Resources can deliver requested items to one of twenty different FPCC facilities located around the county. We can also deliver to schools or places of business that have front desks to drop supplies off at but cannot meet people, wait for them, etc. Drop-off site options are on the *Facilities Directions and Hours* on OVS. There is a special Steward *Facilities Directions and Hours* in your appendix that has additional agreed to drop-off spots for Stewardship only (individual garages, special storage units, etc.) that are not available to the general public.

Pick-up Another option is for the volunteer to come to the Volunteer Resource Center to pick up the items. All items to be picked up will be waiting for them in the Room Rental office (unless too large).

Deliveries are typically conducted each Thursday and Friday. To insure timely delivery of your items, please submit your Supply Order form no earlier than one week prior to their intended use.

Loaner Tool Requests

Stewardship groups and FPCC facilities typically have enough supplies for most projects and workdays. However, for larger projects or workdays, Stewardship groups may need additional tools. Volunteer Resources loans out tools for these purposes. The order and delivery process is the same as for tools, supplies and herbicides except that arrangement for the pickup of the items after done using must be defined.

Brushcutter loaners will be available when a brushcutter is being repaired and/or when additional brushcutters are available for a large workday.

Given that loaner items are used for short periods, it is imperative that loaner items be returned to Volunteer Resources by the agreed upon return date, typically 1-5 days after the workday. Arrangements should be made with Volunteer Resources if the loaner items will be returned to a location other than the original delivery location.

Repair Process

FPCC has a small engine repair shop at its Central Garage. Although basic cleaning is expected of the volunteer, any other repairs to the brushcutter should be made by a professional. If your brushcutter is in need of repair, call the Stewardship Program Coordinator to arrange repair. He/she will need basic information about the problem to give to the Repair Shop; a location where the saw can be picked up and whether or not you need a loaner dropped off.

Volunteer Resources will take the brushcutter in for repair. When it is ready, the reverse will happen and we will drop it off to you and pick up the loaner, if any.

CERTIFICATION PROCESS

Test

You must pass the exam with a 90% or higher score for certification.

Certification

Designation will be reflected on the volunteer's OVS profile and ID card.

Field Observation

Field Observations are done immediately after the class by Resource Management Staff. If the student does not pass the first time, they do have the ability to come back a second time to be observed again.

Know when a situation is beyond your skill level. NEVER cut something you are not comfortable with. Know when to walk away and ask for help. Your safety is ultimately your responsibility and is influenced not just by the protective equipment you wear but by the decisions you make and the attitude you have while working.

APPENDIX

- Accident Reporting Form
- Tool and Supply Order Form
- Loaner Request Form
- Repair Request Form
- Facilities Directions and Hours