

NOTE: The safety of the operator is a prime consideration in the design of the G-195 Bush Axe. The user shall be aware of the hazards associated with the use of the mower with deflectors or other safety shields removed.

The information contained herein is general in nature and is not intended for specific application purposes. The Gregory Manufacturing Company, A North Carolina Corporation, reserves the right to make changes in specifications shown herein and improvements or discontinue manufacture at any time without notice or obligation.

SAFE OPERATING PRECAUTIONS

The front of the cutter housing is not guarded, making it imperative that the area being cut be cleared of all debris and objects which are not brush. This is not a grass cutter and operating where the blade may strike the ground will create a hazard. Carrier cab should be protected with a safety shield (see parts section) on the cutter side of the tractor between the cutter and the operator to prevent possible injury to the operator from flying objects. Do not operate the cutter around or near power lines. When using this equipment, it is your responsibility to have protected flagmen 500 feet away from the cutting area.

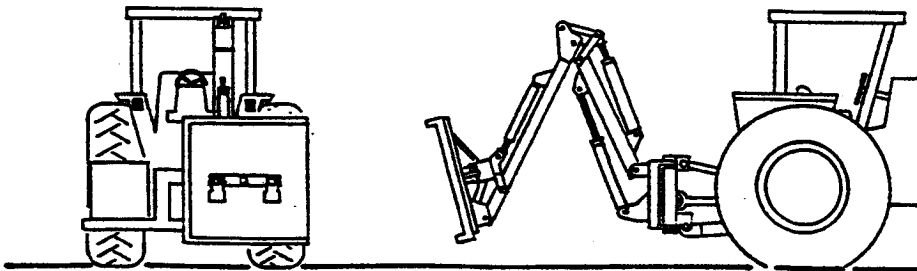


Safety Warnings & Precautions

- (1) The operator should be thoroughly instructed and familiar with the operating and installation instructions before operating.
- (2) Do not operate mower in vicinity of other persons. No Riders.
- (3) Clear off debris before mowing.
- (4) Tractor cab should be shielded with wire mesh or expanded metal screen on right side of operator.
- (5) Keep all shields and guards in place. Keep clear of all drives and belts.
- (6) DO NOT stand under the boom or cutter head under any conditions.
- (7) Know how to stop tractor and equipment quickly in the event of an emergency.
- (8) Be careful when operating equipment on uneven terrain. Decrease speed when making turns.
- (9) Do not allow children to operate equipment.
- (10) Shut off equipment before dismounting from tractor. Remove key before doing any maintenance or service work.

CAUTION: LOOK AND LISTEN FOR EVIDENCE OF ROTATION AND DO NOT REMOVE GUARD UNTIL ALL COMPONENTS HAVE STOPPED.

- (11) All warning decals should be legible, if not legible, they should be replaced. Order decals from The Gregory Manufacturing Company or your local dealer.
- (12) When traveling down road always put cutter in transport position.



- (13) Watch for low clearances such as power lines when operating cutter.
- (14) Block up equipment before repairing any items under the cutter.
- (15) All guards must be kept in place and in good condition to comply with OSHA AG guarding standards 1928.57. Insure protective screens are in place prior to cutting.
- (16) Check all blade bolts, blades, bushings, nuts, and blade bar prior to operating and at least twice daily during operation for tightness and fatigue cracks.

Assembly Instructions

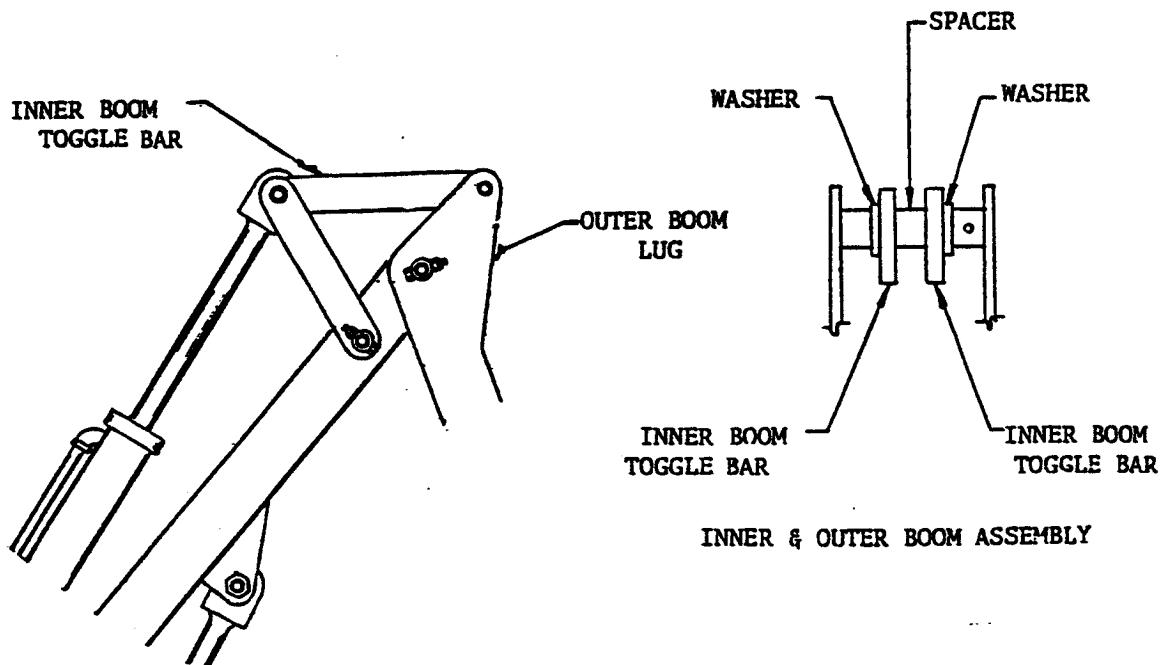
When your Roanoke G-195 Hydraulic Bush Axe arrives you will notice there are three parts: (1) Main Frame and Inner Boom, (2) Outer Boom and Cutter Head, (3) a box of parts.

Assemble in these steps:

- (1) Remove main frame and inner boom from pallet and set on storage stands. Chock the inner boom at a right angle to the main frame and parallel to the ground level. You may attach main frame to 3 point hitch of tractor to stabilize unit. Do Not hook up PTO drive shaft at this time.

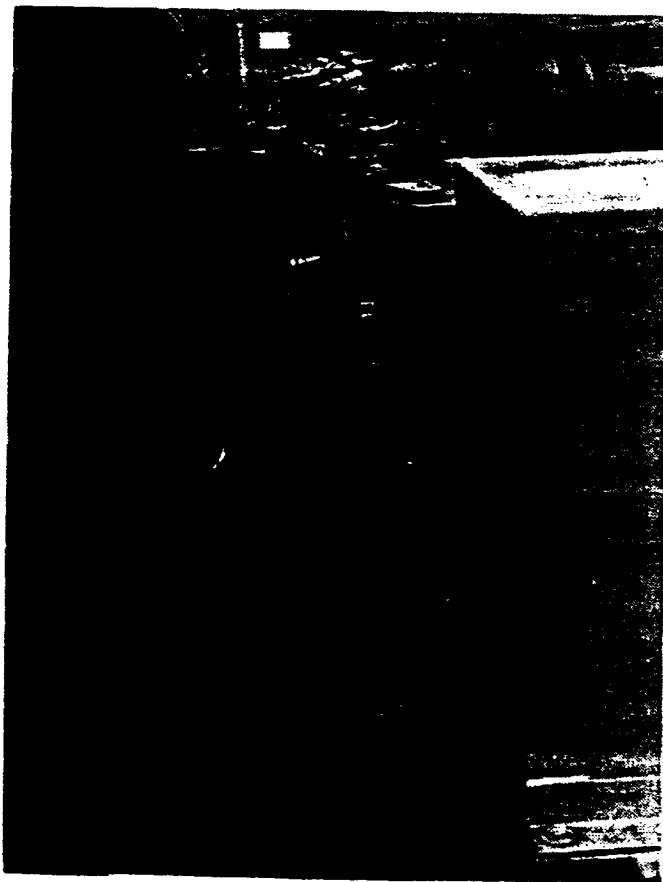
CAUTION: STABILIZE UNIT PROPERLY SO AS NOT TO RESULT IN INJURY.

- (2) Assemble inner boom lift cylinder with the butt end connected to mast with pin supplied. Connect hose. See hose diagram.
- (3) Lay outer boom and cutter head down and assemble to inner boom. Connect the two inner boom toggle linkage bars to the outer boom lugs with the pin supplied. The washers are placed on the outside of the linkage bars and the spacer is located between the two linkage bars. Connect the inner boom and the outer boom with the pin supplied.

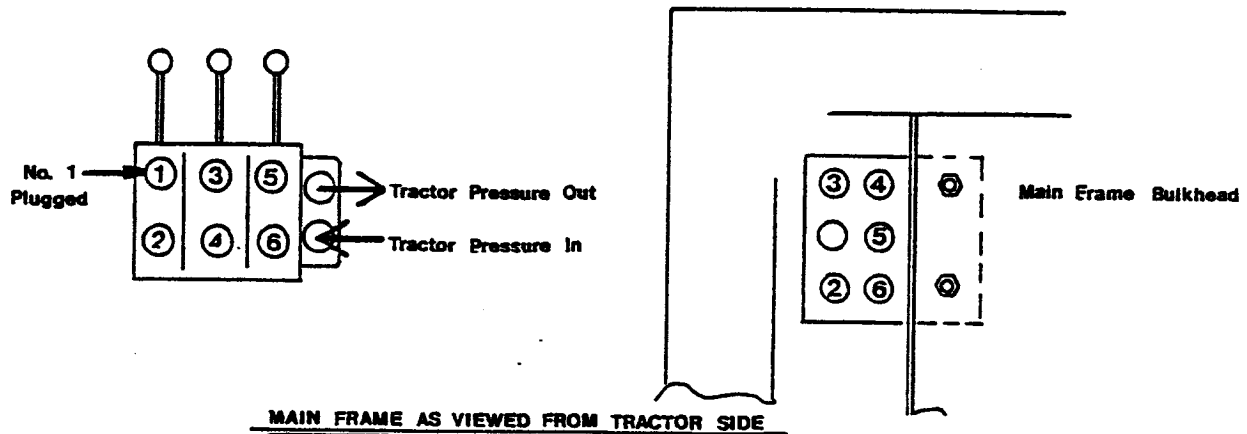


Install the (2) 1" x 30 1/2" and the (2) 1/2" x 30 1/2" hoses. See hose diagram.

NOTE: If you haven't connected to 3 point hitch, do so now. Do not hook up PTO drive shaft.



(4) Mount valve in the tractor at a convenient location on the right hand side with the control handles vertically up. Connect (5) 3/8" x 110" hoses from valve to frame bulkhead as shown in numbered illustration below. Attach (2) 1/2" x 98" hoses to valve and attach to tractor remote.



NOTE: The pressure line from tractor must be connected to the part marked "in" on valve.

(5) Check tractor hydraulic oil level and make sure it is full.

NOTE: Before operating the valve, put the remote control on tractor "in" detent position.

(6) Check all functions of valve as described in the operating instruction #3.

(7) Re-check hydraulic system on tractor. The cylinders require some of the oil, add oil if necessary.

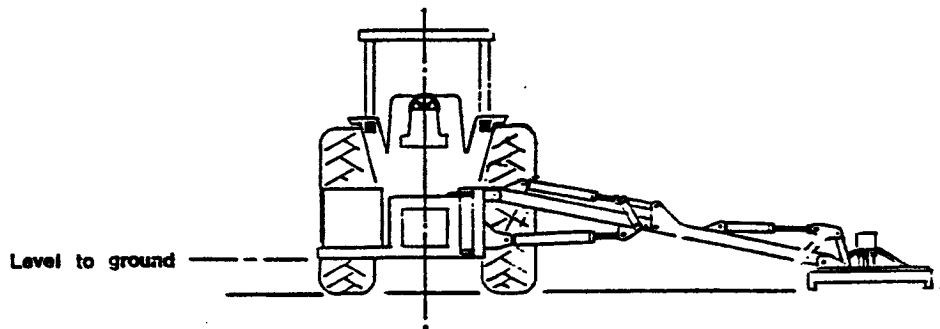
(8) Adjust 3 point hitch until cutter frame is level.

(9) Fill cutter hydraulic tank to level mark with 10 or 20 wt. sc., sd., or se. rated motor oil. (Approximately 34 gallons)

(10) Bring cutter in to about 2 feet from main frame. Pick cutter up from ground about 6 inches. Pull out the storage pin and push cutter out to the side of tractor and hook up the breakaway cylinder with the pin supplied.

CAUTION: DO NOT ALLOW CUTTER TO FREESWING

(11) Extend outer boom and level the main frame.



(12) Connect to the 540 PTO drive shaft.

CAUTION: BE SURE CUTTER IS CLEAR OF OF ALL PERSONNEL AND OBSTACLES.

(13) With the engine at half throttle engage the PTO drive shaft.
Fill all lines

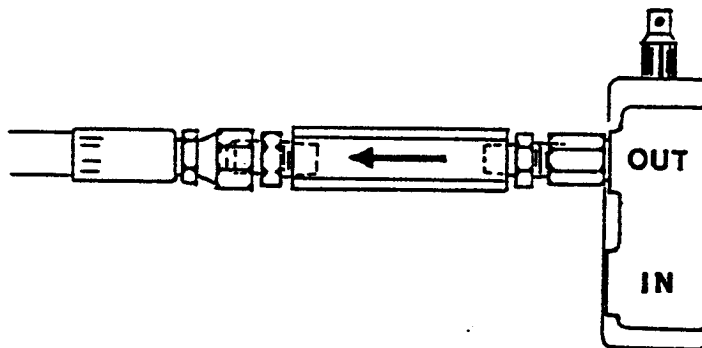
NOTICE !!

1. The standard valve supplied with your G-195 cutter is an open center valve. "Some tractors" have a closed center hydraulic system and require a different valve. (Most John Deere tractors with 80 h.p. or more and most International 1980 models and later have closed center systems).

Make sure you know which hydraulic system your tractor has. Using the wrong valve will cause damage to the tractor's hydraulic system.








2. An in-line check valve is supplied and installed in the port of the valve.

This check is a safety check to prevent pressure from the tractor from entering the out port of the valve. If the hoses are not installed properly, the tractor hydraulic detent will kick out and prevent damage to valve. (See Illustration)



PROPER TORQUE FOR FASTENERS

The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.

SAE Grade No.	2	5	8*
Both head identification marks as per grade NOTE: Manufacturing Marks Will Vary.		  	  
	No dashes	3 radial dashes	6 radial dashes

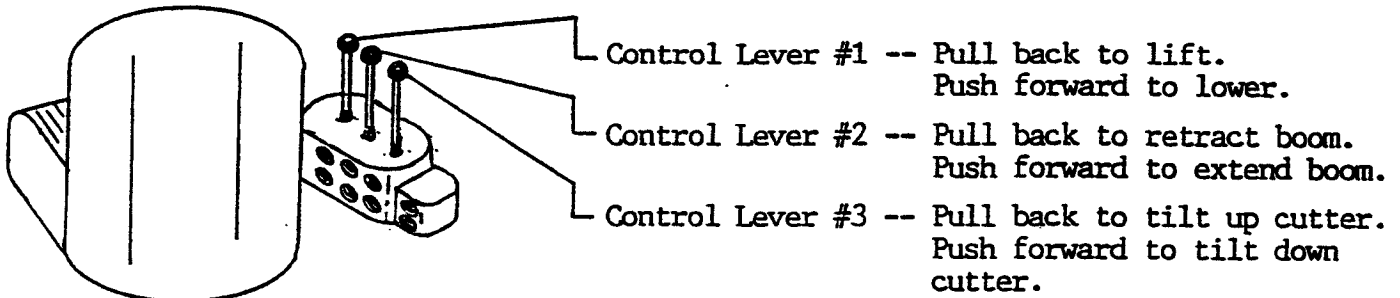
RECOMMENDED TORQUE IN FOOT POUNDS (NEWTON-METERS)

NOTE: These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

Bolt Diameter Inches	SAE Grade 2		SAE Grade 5		SAE Grade 8	
1/4	6	(8)	11	(15)	14	(19)
5/16	13	(18)	21	(28)	25	(34)
3/8	23	(31)	38	(52)	55	(75)
7/16	37	(50)	55	(75)	80	(110)
1/2	57	(77)	85	(115)	120	(165)
9/16	82	(111)	125	(170)	180	(245)
5/8	111	(150)	175	(240)	230	(310)
3/4	200	(270)	300	(410)	440	(600)
7/8	280	(380)	450	(610)	720	(975)
1	350	(475)	680	(924)	1035	(1400)
1-1/8	450	(610)	885	(1200)		

Operating Instructions

- (1) Grease all lube fittings.
- (2) Check all nuts and bolts - especially blade bolts and nuts, for tightness and fatigue cracks.
- (3) Insure storage stands are raised and stored.
- (4) Familiarize yourself with all functions of valve.



- (5) The tractor PTO engages the cutter blade.
- (6) It is normal, with the Dennison Motor, to require 2-4 minutes at 540 RPM for the blades to start rotating.
- (7) Operate at full 540 RPM before cutting.
- (8) Tractor ground speed should be governed by the work that is being done.
- (9) The operator should exercise caution when the cutter meets an obstacle that it cannot pass over or get around. The boom will break back until all travel is used up, then it becomes a rigid structure and damage will occur. The breakaway allows time for the operator to stop the tractor and make the proper adjustments to pass the object.

CAUTION: WHEN CUTTING IN THE BACKING UP POSITION, THE BREAKAWAY HAS LESS TRAVEL.

- (10) When cutting large brush it is recommended to position cutter head to strike bush in the center most part of the housing.
- (11) When mulching trees and limbs, tilt cutter head slightly up and away from tractor and start at the top and work down. Do not mulch down on stump.
- (12) The cutter is designed to cut normal hedgerows and ditches difficult to reach, plus trim overhanging smaller limbs from trees along roads and around fields. When material larger than 1 1/2" to 2" in diameter is being cut, extreme care and caution should be observed. Slow forward progress and check blades and blade bar more often. Watch for flying debris. Make sure area is well clear of personnel.
- (13) Always check blades, bolts, bushings, nuts, and blade bar for fatigue and tightness prior to each days operation and at least twice daily during operation.
- (14) Insure protective screen is in place on right side of tractor whenever cutting is performed.

The following precautions are suggested to help prevent accidents. A careful operator is the best operator. Most Accidents can be avoided by observing certain precautions. Read and take the following precautions before operating this cutter. Equipment should be operated only by those who are responsible and instructed to do so.

THE CUTTER

1. Read this manual carefully to acquaint yourself with the Roanoke Rotary Cutter. Working with unfamiliar equipment can lead to accidents.
2. Do not alter your cutting equipment.
3. Keep all shields in place and properly tighten all mounting hardware.
4. Periodically inspect all moving parts for wear and replace with authorized service parts if an excessive amount of wear is present.
5. Replace all missing, illegible, or damaged safety and warning decals. See List of Decals in Safety Decals Section.
6. Do not modify or alter or permit anyone to modify or alter this equipment or any of its components or any equipment function without first consulting The Gregory Manufacturing Company.
7. Keep safety decals clean of dirt and grime.

OPERATING THE CUTTER

1. Never allow anyone to ride on the cutter.
2. Clear the area of people and debris before commencing cutting operation.
3. Always keep the discharge side of the cutter directed away from people and objects which could be struck by debris thrown from the cutter.
4. Do not operate the cutter in the transport position.
5. Never leave the cutter in the raised position.

6. Never wear loose clothing when operating the power take-off, or around other rotating equipment.

7. Never clean or adjust PTO-driven equipment with the tractor engine running.

8. The operator should never get off the tractor while it is in motion.

9. When operating PTO-driven equipment, always shut off the engine and wait for the PTO to stop turning before getting off the tractor and before disconnecting the equipment.

10. Watch for traffic when crossing or cutting near roadways.

THE TRACTOR

1. Read the Operator's Manual carefully before using tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved rollbar and seat belt for safe operation. Overturning a tractor without a rollbar can result in death or injury. If your tractor is not equipped with a rollbar and seat belt, contact The Gregory Manufacturing Company.
3. Always use the seat belt when the rollbar is installed. Do not use the seat belt if the rollbar has been removed from the tractor.
4. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
5. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.

OPERATING THE TRACTOR

1. Never start the engine while standing beside the tractor. Always sit in the tractor seat while starting the engine.
2. Never run the tractor engine in a

closed building without adequate ventilation, as the exhaust fumes are very dangerous.

3. Always set the hydraulic selector lever in Position Control when attaching equipment, transporting equipment, and when no equipment is attached.
4. Never allow an open flame near the fuel tank or battery.
5. Use the flasher warning lamp when traveling on public roads, day or night, unless prohibited by law in your state.
6. Make sure the PTO shield is installed when using PTO-driven equipment, and always replace the PTO shield if damaged.
7. Always bring the tractor to complete stop and shut off the engine before getting off the tractor.
8. Never park the tractor on a steep incline.
9. Use care when operating on steep grades to maintain proper stability.
10. Keep the tractor in gear when going downhill.
11. If the front end tends to rise, install front end or front wheel weights. Do not continue to operate with a light front end.
12. Always drive the tractor at speeds compatible with safety, especially when operating over rough ground, crossing ditches, slopes, or when turning.

The safe operation of this machine is the responsibility of the operator. The operator should be familiar with the cutter and tractor and all safety practices before starting operation. This cutter is designed for use in medium to heavy brush shredding, pasture clipping, and shredding of stalks and stubble. This cutter is equipped with suction blades. Optional shredder kits are available for finer pulverizing of stalks and stubble. Recommended cutting

speed for most conditions is from 2 to 5 MPH. Always operate tractor PTO at 540 RPM.

IMPORTANT: To avoid damage to bolts, tighten after the first 10 hours of operation. Retorque blade carrier retaining nut on gear box lower shaft after 25 to 50 hours of operation.

ATTACHING CUTTER TO TRACTOR

When attaching the Roanoke Rotary Cutter to your tractor follow the steps outlined in the tractor manual for attaching a trailer hitch implement.

1. Back the tractor to the cutter and secure the cutter to the tractor draw bolt with a suitable pin or bolt.

2. Attach a safety chain to the tongue of the cutter through a clevis attached to the draw bar of the tractor and secure the end of the chain to the tractor.

3. The height of the front hitch assembly is adjustable through the ratchet jack that is provided with the cutter.

With the Roanoke Rotary Cutter attached to the tractor's draw bar and safety chain attached, proceed to connect the PTO as follows:

1. Depress the locking button on the Roanoke Rotary Cutter's PTO shaft yoke and slide yoke onto the tractor PTO shaft.

2. Move yoke back and forth until locking button "clicks" out, locking the PTO in place.



WARNING: A loose shaft could slip off and result in personal injury or damage to cutter. When attaching PTO yoke to tractor PTO shaft, it is important that spring activated locking pin slides freely and is seated in groove on PTO shaft.

IMPORTANT: Before operating cutter check to make sure the driveline will not bottom out or become disengaged.



WARNING: To avoid personal injury, be sure tractor engine is off and key is removed before making any adjustments.

IMPORTANT: Avoid very low cutting heights. Striking the ground with blades gives the most damaging shock loads a cutter can encounter, and will cause damage to cutter and drive.

To achieve maximum cutting efficiency and provide the most uniform cut, the cutter should be operated with the rear slightly higher (1/2" - 3/4") than the front.

1. Place tractor and cutter on level surface.
2. Raise the cutter to appropriate desired cutting height with optional hydraulic cylinder or rear ratchet jack.
3. Use the ratchet jack on the front of the cutter tongue to lower cutter until it is 1/2" to 3/4" lower at front than at rear.
4. If using hydraulic cylinder on rear, set stops.
5. Check air pressure in tires. Make sure air pressure is equal in both tires.

STARTING AND STOPPING CUTTER

Power for operating the cutter is supplied from tractor PTO. Refer to your tractor manual instructions for engaging and disengaging the PTO. Always engage the PTO at low engine RPM. Always operate the PTO at 540 RPM. Learn how to stop tractor and cutter quickly in case of an emergency.

IMPORTANT: Stop cutter and tractor immediately upon striking an obstruction. Inspect the cutter and repair any damage before resuming operation.



WARNING: Avoid personal injury. When attempting to stop a tractor which does not have live PTO, the momentum created by the blade carrier of a Roanoke Rotary Cutter can cause the tractor to be pushed forward.

The installation of an overrunning clutch is recommended if the operating tractor does not have live power take-off. See your dealer for additional information.

To commence operation, reduce engine speed and engage the tractor PTO lever in engine PTO position. Before starting to cut, gradually increase engine speed to develop 540 RPM at the PTO.

DANGER: Install chain guards if operating with people or livestock in the area or close to highways or buildings.

IMPORTANT: Do not attempt to operate the Roanoke Rotary Cutter in Ground Speed PTO.

Enter the area to cut with the cutter operating at 540 RPM and, if it becomes necessary to regulate engine speed during operations, increase or decrease the throttle gradually---never exceed 540 RPM for extended periods.

To transport, disengage the PTO and raise the machine to full transport height.

CUTTING SPEED

Proper ground speed for cutting will depend upon the height, type, and density of material to be cut.

Normally ground speed will range from 2 to 5 MPH. Tall dense material should be cut at low speed, while thin medium height material can be cut at a faster ground speed.

CUTTING TIPS

Always operate PTO at 540 RPM when cutting. This is necessary to maintain proper blade speed and to produce a clean cut.

Under certain conditions, tractor tires may roll some grasses down and prevent them from being cut at the same height as the surrounding area. When this occurs reduce the tractor ground speed but maintain 540 PTO RPM. The lower speed will permit grasses to at least partially rebound and be cut. Taking a partial cut and/or reversing the direction of travel may also produce a cleaner cut.



WARNING: Avoid personal injury. Pick up all rocks and other debris before cutting. Enter new areas carefully. Cut material higher the first time to allow cutter to clear unseen objects. Never assume an area is clear. Always check.

EXTREMELY TALL GRASS SHOULD BE CUT TWICE. Raise cutter and cut half the desired height. Cut the second time at desired height at 90° to first pass.

Remember, sharp blades produce cleaner cuts and use less power.

Before cutting, analyze the area to determine the best cutting procedure. Consider the height and type of material and the terrain type: hilly, level, or rough.

UNEVEN TERRAIN



WARNING: To avoid tractor roll-overs, be careful when operating tractor and cutter on uneven ground.

In extremely uneven terrain, rear wheel weights, front tractor weight and/or front tire ballast should be used to improve stability. Pass diagonally through sharp dips and avoid sharp drops to prevent "hanging up" the tractor and cutter. Practice will improve your skills in maneuvering on rough terrain.

Avoid sudden starts and stops while traveling up or down hills.

Always cut down slopes. Never across the face. Avoid operation on steep slopes. Slow down on sharp turns and slopes to prevent tipping or loss of control.

Before operating your Roanoke Rotary Cutter make sure it is properly lubricated and thoroughly inspected. Only a minimum of time and effort is required to regularly lubricate and maintain this machine to provide long life and trouble free operation.



WARNING: Always disengage the PTO before raising the Roanoke Rotary Cutter for transporting or making adjustments.

PERIODIC SERVICE CHART

As Required

COMPONENT	DESC. OF SERVICE	CAP. OR PROCEDURE	DESC. OF LUBRIC.
Safety Chains.	Check for missing links.	All chains must have at least four links.	

Twice Daily Or Every 5 Hours

Blade Bolts.	Check tightness.	Torque to 480 lbs-ft.	
Blade Bar.	Check tightness and evidence of fatigue.	Torque to 670 lbs-ft.	

Daily Or Every 10 Hours

Fasteners.	Check tightness.		
Cutter Motor braces.	Check tightness.		
Hydraulic Oil.	Check sight gauge.	Between high & low marks.	SAE 10 Wt. API Services SE Or SC.
Pins-Cylinder and hinge.	Lubricate with grease gun.	Several strokes of grease gun.	Multipurpose grease NLGI #2 or #3.
Drive Shaft.	Lubricate with grease gun.	Several strokes of grease gun.	Multipurpose grease NLGI #2 or #3.

Weekly Or Every 50 Hours

Control Valve handles.	Lubricate with oil.		Engine oil.
Hydraulic hoses.	Check for worn or cracked hoses.	Replace with new hoses.	

Twice Yearly Or Every 1000 Hours

Hydraulic Tank Strainer.	Check	Replace if needed.	
Hydraulic Return Line Filter.	Replace Element.		

LUBRICATION & PERIODIC SERVICE

Effective lubrication is the most important step toward low maintenance cost, long life, and satisfactory service. Without oil and grease you can ruin important working parts of your cutter in a very short time.

NOTE: LUBRICATION RECOMMENDATIONS ARE BASED ON NORMAL OPERATIONS. SEVERE OR UNUSUAL CONDITIONS MAY REQUIRE MORE FREQUENT LUBRICATION.



Grease every ten (10) hours of operation with a multipurpose lubricant having a NLGI #2 or #3 consistency.

Lubricate the indicated points thoroughly but avoid excessive lubrication. Dirt collects on excessively greased parts and increases wear. Wipe dirt from fittings before greasing. Immediately replace those fittings that are lost or damaged.



CAUTION: TO AVOID POSSIBLE INJURY AND TO INSURE BEST RESULTS, STOP OPERATION AND LOWER ALL UNITS BEFORE LUBRICATION.

BREAK-IN PERIOD

For safety, long life and satisfactory performance of your cutter, the following lubrication and periodic service procedures are recommended. The chart is a condensed list of components to be serviced and the interval that they should be serviced under normal operating conditions.

At the end of the first hour and again after five (5) hours of operation, check blade bolts and blade bar nut for tightness. Check for allowable bearing tolerance on spindle bearings. Repeat this inspection every five hours or twice daily.

HYDRAULIC FLUID

<u>HYDRAULIC SYSTEM OPERATING RANGE</u>	<u>SAE VISCOSITY</u>	<u>API RATING</u>
<u>MINIMUM TO MAXIMUM</u>		
0 Degrees to 180 Degrees F	10W	SC,SD,SE
16 Degrees to 210 Degrees F	20W	SC,SD,SE
32 Degrees to 230 Degrees F	30W	SC,SD,SE
0 Degrees to 210 Degrees F	10W-30	SC,SD,SE

LUBRICATION INFORMATION

Do not let excess grease collect on or around parts, particularly when operating in sandy areas. The accompanying illustrating shows lubrication points. The chart gives the frequency of lubrication in hours, based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.

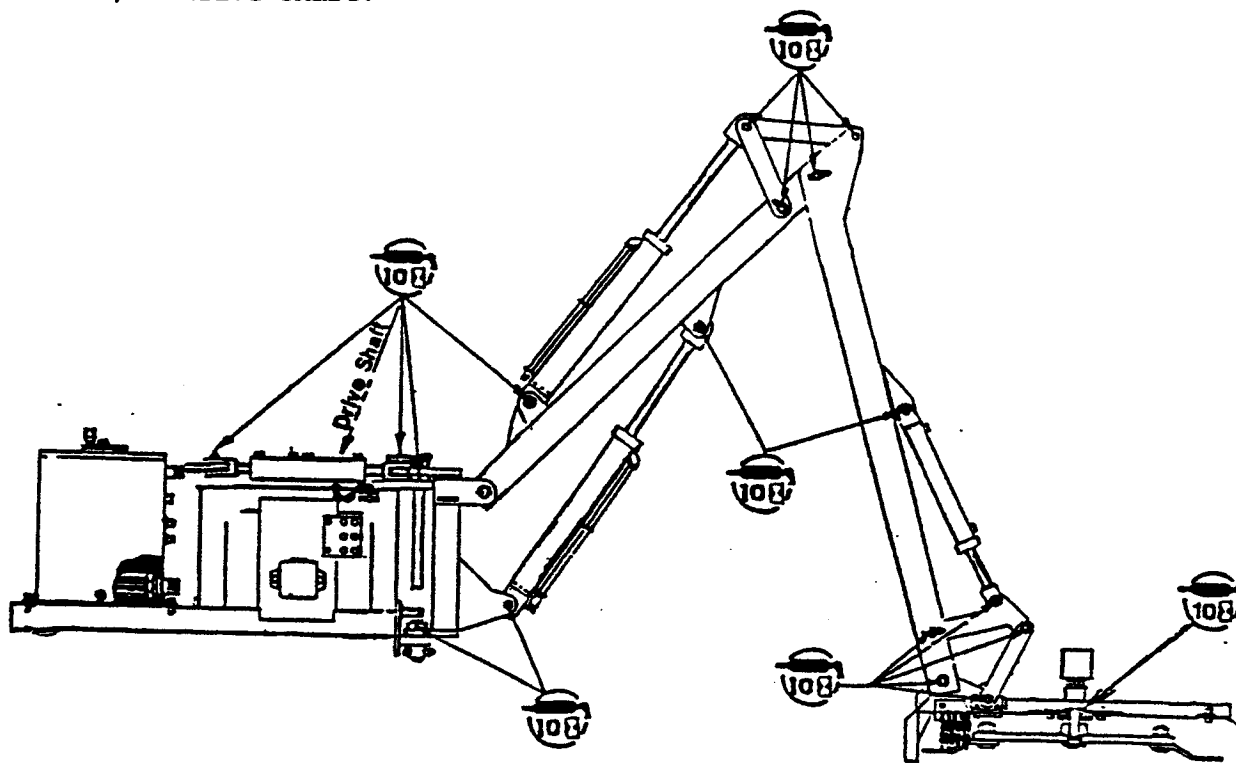
Use an SAE multi-purpose lithium type grease for all locations shown. Be sure to clean the fittings thoroughly before using grease gun.

Reconnect PTO shaft to tractor. Raise and lower cutter after applying grease to spread over joint working area. Failure to maintain proper lubrication will result in damage to U-joints, gear box and/or drive shaft.

LUBRICATION FITTINGS

<u>REF.</u> <u>NO.</u>	<u>DESC.</u>	<u>FREQ.</u>
1	U-joints	8 Hours
2	Gear Box-1/2	Check Daily
3	Driveline	
	Slip Sleeve	8 Hours
4	Wheel Hub & Bearings	Yearly

WARNING: When attaching PTO yoke to tractor PTO shaft it is important that spring activated locking pin slides freely and is seated in groove on PTO shaft. A loose shaft could slip off and result in personal injury or damage to cutter.



GEAR BOX


The gear box es should not require additional lubricant unless they are cracked or a seal is leaking. It is recommended that the oil level check plugs be removed after 8 hours of operation. If required, oil should be added until it runs out hole.

NOTE: Make sure cutter is level checking oil in the gear box.

BLADE SERVICING


Inspect blades before each use to determine that they are properly installed and in good condition. Replace any blade that is bent, excessively nicked, worn, or has any other damage. Small nicks can be ground out when sharpening.

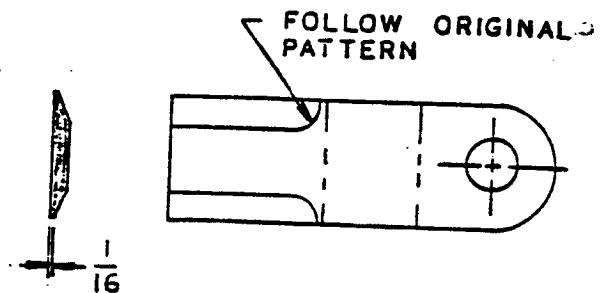
IMPORTANT: When sharpening blades grind each blade the same amount to maintain balance. The difference in blade weights should not exceed 1 ounce. Unbalanced blades will cause excessive vibration which can damage gear box bearings. Vibration may also cause structural cracks in cutter housing.


 WARNING: Use only original equipment blades on this cutter. They are made of special alloy steel. Substitute blades may not meet specifications and may be dangerous.


BLADE SHARPENING

Always sharpen both blades at the same time to maintain balance. Follow original sharpening pattern as shown in the figure. Always sharpen blades by gringing. DO NOT heat and pound out edge. Do not sharpen blade to a razor edge, but leave a 1/16" blunt edge. Do not sharpen side of blade.

 WARNING: Avoid personal injury. Always block the cutter up to prevent it from falling when the blades and/or carrier are being serviced.



 WARNING: Avoid personal injury. Blade and/or blade carrier removal should be done only with the tractor engine shut off, key removed, in neutral, parking brake on, and PTO disengaged.

 WARNING: Avoid personal injury. Do not work under cutter without support blocks to keep frame from falling.

STORAGE

Your Roanoke Rotary Cutter represents an investment from which you should get the greatest possible benefit. Therefore, when the season is over, the cutter should be thoroughly checked and prepared for storage so that a minimum amount of work will be required to put it back into operation for the next season. The following are suggested storage procedures:

1. Thoroughly clean the cutter.
2. Lubricate the cutter as covered in Maintenance Section.
3. Tighten all bolts and pins to the recommended torque.
4. Check the cutter for worn or damaged parts. Make replacements immediately.
5. Store the cutter in a clean, dry place with the cutter housing resting on blocks.
6. Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the cutter.

DEALER SET-UP INSTRUCTIONS

Set up cutter, as received from factory, with these instructions. Refer to complete Check List when set-up is finished.

Select a suitable working area. Open parts box and lay out parts to make location easy. Refer to Parts List and exploded view drawing in Repair Parts Section.

Cut all wire ties including those on knives.

This cutter is shipped partially assembled. Assembly will be easier if components are aligned and loosely assembled before tightening hardware. Refer to Proper Torque. All bolts are Grade 5 unless otherwise specified.

WARNING: To prevent personal injury, chainshielding or deflectors must be installed.



IMPORTANT: Do not attempt to operate the Roanoke Rotary Cutter in Ground Speed PTO.

Enter the area to cut with the cutter operating at 540 RPM and, if it becomes necessary to temporarily regulate engine speed during operations, increase or decrease the throttle gradually -- never exceed 540 RPM for extended periods.

To transport, disengage the PTO and raise the machine to full transport height.

DANGER: Install chain guards if operating with people or livestock in the area or close to highways or buildings.



TROUBLE SHOOTING GUIDE

<u>TROUBLE</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
Excessive Vibrations	1. Check gear box bolts.	Tighten if loose.
	2. Check for loose nuts on bladeholder and blades.	Tighten if loose.
	3. Check for bent output shaft. If shaft is bent, oil will normally leak from bottom seal.	Replace if bent.
	4. Check to see if blades are free swinging.	Free blades so they swing.
	5. Check for even wear on each blade tip. Were both blades changed at the same time?	Weigh blades. Weight should be within 1 oz. Always replace both blades.
	6. Blade broken.	Replace blades, in sets.
	7. Blade carrier bent.	Replace carrier.
	8. Blade hub not properly seated on shaft.	Remove hub, check tapered spline shaft, clean and replace.
	9. New blade or bolts matched with worn blade or bolts.	Replace blades or bolts in sets.
	10. Drivelines not phased correctly. Implement and Tractor yokes must be in line.	Replace driveline.
Gearbox Overheating	1. Low on lubricant.	Fill to level plug.
	2. Improper type lubricant.	Replace with proper lubricant.
	3. Excessive trash build up around gearbox.	Remove trash.
	4. Bearing or gears set up improperly.	Consult your Dealer.

<u>TROUBLE</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
Gearbox Noisy	1. Rough gears.	Run in or change gears.
	2. Worn bearing.	Replace bearing.
Gearbox Leaking	1. Damaged oil seal.	Replace seal.
	2. Bent shaft.	Replace oil seal and shaft.
	3. Shaft rough in oil seal area.	Replace or repair shaft.
	4. Oil seal installed wrong.	Replace seal.
	5. Oil seal not sealing in the housing.	Replace seal or use a sealant on OD of seal.
	6. Oil level too high.	Drain oil to proper level.
	7. Sand hole in casting.	Replace casting or gearbox.
	8. Gasket damaged.	Replace gasket.
	9. Bolts loose.	Tighten bolts.
Clutch Slips Excessively	1. Not operating at 540 RPM.	Operate at 540 RPM.
	2. Too much load for clutch.	Reduce ground speed and material intake.
	3. Oil on facings.	Replace facings.
	4. Friction facings glazed.	Clean with emory cloth.
	5. Clutch linings badly worn or plates warped.	Repair clutch per maintenance section of manual.
Blade Wears Too Fast	1. Cutting in sandy conditions.	Increase cutting height.
	2. Cutting in rocky conditions.	Increase cutting height.
Not Cutting Clean	1. Blades dull.	Sharpen or replace blades.
	2. Carrier RPM too low.	Use correct PTO speed and check for correct gearbox ratio.
	3. Cutter not level.	See cutting height adjustment.
	4. Tractor tires mashing down grass.	Reverse direction of cutting and drive with one tractor tire out of cutter overlap area. Conditions too wet to cut.

TROUBLE

Streaking Conditions In Swath

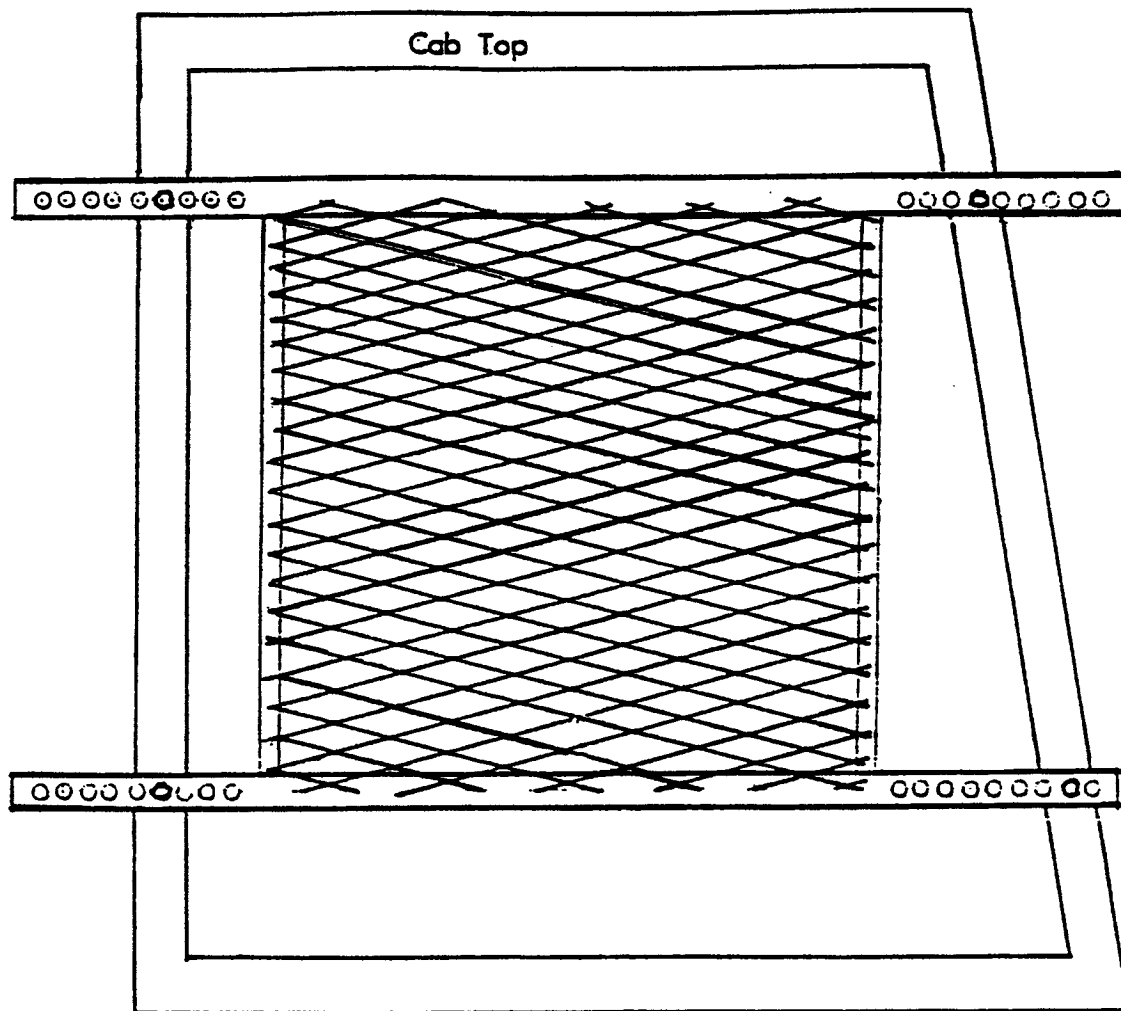
POSSIBLE CAUSE

5. Ground speed too fast.
6. Blades locked back.
7. Blades riding up due to blade bolt wear or loose bolts.
8. Knives not close enough in center.
1. Conditions too wet for cutting. Blades unable to cut that part of grass pressed down by path of tractor tires.
2. Dull blades.
3. Height of cutter lower at rear or front.

POSSIBLE REMEDY

- Reduce ground speed maintaining 54' PM at PTO.
- Free blades.
- Replace blade bolts.
- See Gearbox Adj.
- Install center grass divider. See optional equipment.
- Allow grass to dry before cutting. Slow ground speed of tractor but keep engine running at full PTO RPM. Cutting lower may help.
- Sharpen or replace blades.
- See Cutting Height Instructions.

CAB SHIELD



CAB SHIELD PART NUMBER- 33961

**** IMPORTANT ****

Safety shield should be placed on the cutter side of the tractor cab between the operator and the cutter to prevent possible injury to the operator from flying debris.

Shield can be bolted or wired in place.