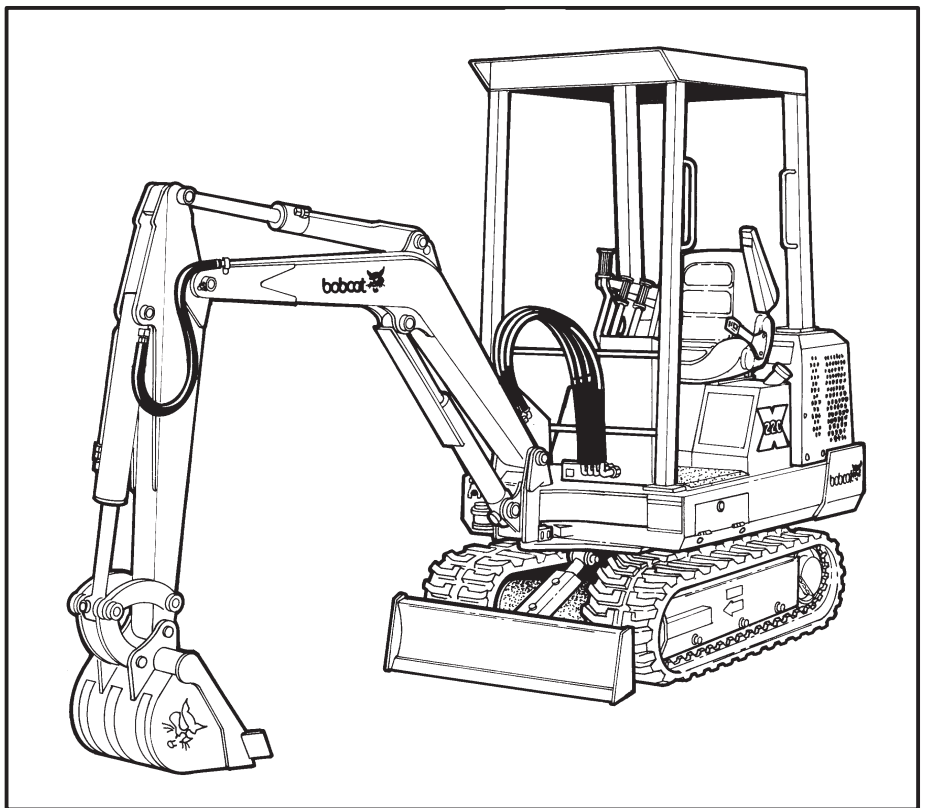


X 220

Excavator

Service Manual

(S/N 508212001 & Above)



MELROE
INGERSOLL-RAND

6720503(6-90)-7.5C

Printed in U.S.A.



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MAINTENANCE SAFETY



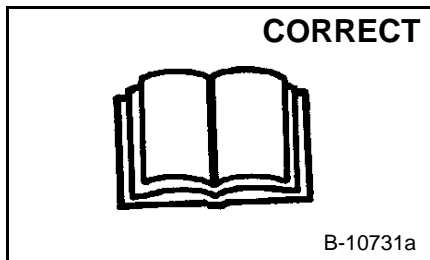
WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0903

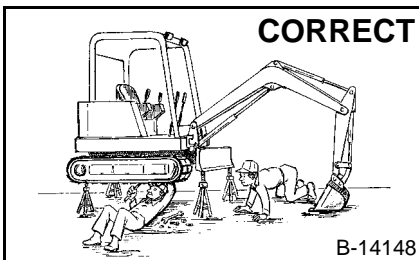


Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



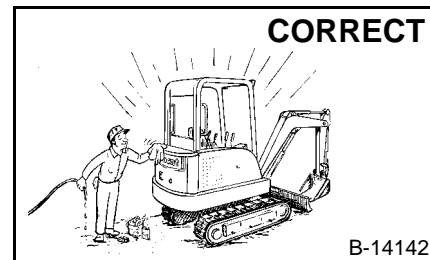
B-10731a

- ⚠ Never service the Bobcat Hydraulic Excavator without instructions.



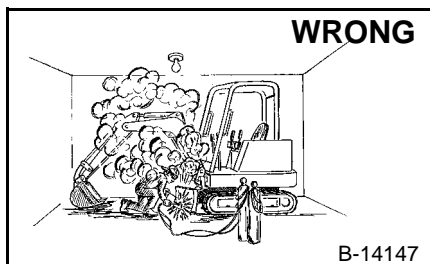
B-14148

- ⚠ Use the correct procedure to lift and support the excavator.
- ⚠ Always lift the blade fully before installing jackstands.



B-14142

- ⚠ Cleaning and maintenance are required daily.



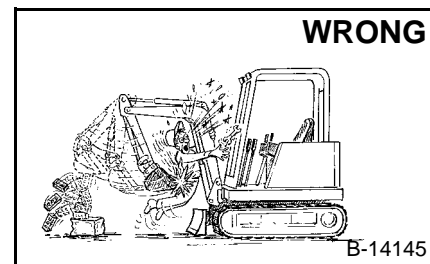
B-14147

- ⚠ Have good ventilation when welding or grinding painted parts.
- ⚠ Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.



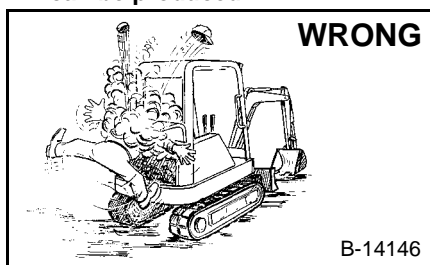
B-14141

- ⚠ Vent exhaust to outside when engine must be run for service.
- ⚠ Exhaust system must be tightly sealed. Exhaust Fumes can kill without warning.



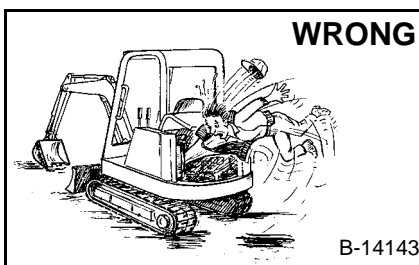
B-14145

- ⚠ Always lower the bucket and blade to the ground before doing any maintenance.
- ⚠ Never modify equipment or add attachments not approved by Bobcat Company.



B-14146

- ⚠ Stop, cool and clean engine of flammable materials before checking fluids.
- ⚠ Never service or adjust machine with the engine running unless instructed to do so in the manual.
- ⚠ Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- ⚠ Never fill fuel tank with engine running, while smoking or when near open flame.



B-14143

- ⚠ Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.
- ⚠ Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protection approved for type of welding.
- ⚠ Keep rear door closed except for service. Close and latch door before operating the excavator.



B-6589

- ⚠ Lead-acid batteries produce flammable and explosive gases.
- ⚠ Keep arcs, sparks, flames and lighted tobacco away from batteries.
- ⚠ Batteries contain acid which burns eyes or skin on contact. Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts. The Service Safety Training Course is available from your Bobcat dealer.

ALPHABETICAL INDEX

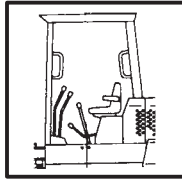
AIR CLEANER SERVICE	1-1	MELROE CONTROL VALVE LEVER	3-1
ALTERNATOR	6-1	MELROE HYDRAULIC CONTROL VALVE	2-1
AUXILIARY COUPLERS	2-1	OIL COOLER	7-1
AUXILIARY FITTINGS	2-1	PEDAL	3-1
BATTERY	6-1	RADIATOR	7-1
BLADE CYLINDER	2-1	SEAT AND MOUNTING FRAME	5-1
BLADE LEVER	3-1	SERVICE SCHEDULE	1-1
BOOM AND DIPPERSTICK	5-1	SPARK ARRESTOR MUFFLER	7-1
BOOM CYLINDER	2-1	STARTER	6-1
BOOM SWING BRACKET	5-1	SWING CIRCLE GEAR	4-1
BOOM SWING CYLINDER	2-1	SWING CYLINDER LOCK VALVE	2-1
BUCKET CYLINDER	2-1	SWING MOTOR	4-1
CENTER SWIVEL JOINT	4-1	TIMING GEAR, CAMSHAFT AND OIL PUMP	7-1
COOLING SYSTEM	1-1	TIMING GEAR COVER	7-1
CONSOLE	3-1	TRACK	5-1
CONTROL AND STEERING LEVERS	3-1	TRACK FRAME	5-1
CRANKSHAFT AND PISTONS	7-1	TRACK IDLER	5-1
CYLINDER HEAD	7-1	TRACK ROLLER	5-1
CYLINDER LINERS	7-1	UPPER WORKS	4-1
DIPPERARM CYLINDER	2-1	USING A BOOSTER BATTERY (JUMP STARTING)	1-1
DRIVE MOTOR (S/N 12001-12929)	3-1	VALVE CLEARANCE	7-1
DRIVE MOTOR (S/N 12930 & Above)	3-1	WATER PUMP	7-1
DUKES HYDRAULIC CONTROL VALVE	2-1		
ELECTRICAL SYSTEM	6-1		
ENGINE	7-1		
ENGINE COMPRESSION	7-1		
ENGINE COVER	1-1, 5-1		
ENGINE FLYWHEEL	7-1		
ENGINE LUBRICATION SYSTEM	1-1		
ENGINE OIL SPECIFICATIONS	8-1		
ENGINE SPECIFICATIONS (KUBOTA)	8-1		
FINAL DRIVE (S/N 12001-12929)	3-1		
FINAL DRIVE (S/N 12930 & Above)	3-1		
FLOOR PANEL	3-1		
FUEL, COOLANT AND LUBRICANTS	8-1		
FUEL FILTER	7-1		
FUEL INJECTOR NOZZLES	7-1		
FUEL INJECTION PUMP	7-1		
FUEL SYSTEM	1-1		
FUEL TANK	5-1		
GLOW PLUGS	7-1		
HOLDING VALVES	2-1		
HORN	6-1		
HYDRAULIC CYLINDER	2-1		
HYDRAULIC EXCAVATOR SPECIFICATIONS	8-1		
HYDRAULIC FILTER	2-1		
HYDRAULIC MOTOR	3-1		
HYDRAULIC PUMP	2-1		
HYDRAULIC RESERVOIR	2-1		
HYDRAULIC SERVICE INFORMATION	2-1		
HYDRAULIC SYSTEM	1-1		
INSTRUMENT PANEL	6-1		
LOCKING LEVER	3-1		
LUBRICATION OF THE EXCAVATOR	1-1		

FOREWORD

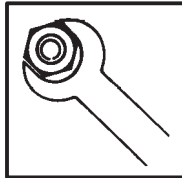
This manual is for the Bobcat hydraulic excavator mechanic. It provides necessary servicing and adjustment procedures for the hydraulic excavator and its component parts and systems. Refer to the Operation & Maintenance Manual for operating instructions, starting procedure, daily checks, etc.

A general inspection of the following items must be made after the hydraulic excavator has had service or repair:

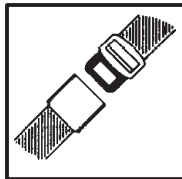
1. Check that the operator canopy is in good condition and is not modified.



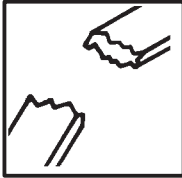
2. Check that the operating canopy mounting hardware is tightened and is Melroe approved.



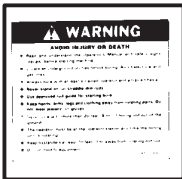
3. The seat belt must be correctly installed, functional and in good condition.



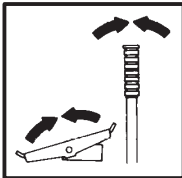
4. Inspect for loose or broken parts or connections.



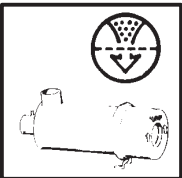
5. Machine signs must be legible and in the correct location.



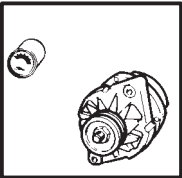
6. Steering levers, control levers and foot pedals must return to neutral. Control lock must lock controls securely.



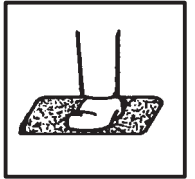
7. Inspect the air cleaner for damage or leaks. Check the condition of the element.



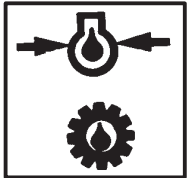
8. Check the electrical charging system.



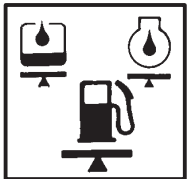
9. Safety treads must be in good condition.



10. Check for the correct function of the the indicator lamps.



11. Check hydraulic fluid level, engine oil and fuel supply.



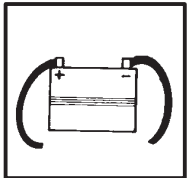
12. Inspect for fuel, oil or hydraulic leaks.



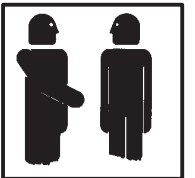
13. Lubricate the hydraulic excavator.



14. Check the condition of the battery and cables.



Recommend to the owner that all necessary corrections be made before the machine is returned to service.



CONTENTS

SAFETY INSTRUCTIONS	i
SERIAL NUMBER LOCATIONS	ii
DELIVERY REPORT	ii
HYDRAULIC EXCAVATOR IDENTIFICATION	iii
PREVENTIVE MAINTENANCE	1-1
HYDRAULIC SYSTEM	2-1
DRIVE SYSTEM	3-1
UPPER WORKS & SWING SECTION	4-1
MAIN FRAME & TRACKS	5-1
ELECTRICAL SYSTEM	6-1
ENGINE SERVICE	7-1
TECHNICAL DATA	8-1

**PREVENTIVE
MAINTENANCE**

**HYDRAULIC
SYSTEM**

**DRIVE
SYSTEM**

**UPPER WORKS
& SWING
SECTION**

**MAIN FRAME
& TRACKS**

**ELECTRICAL
SYSTEM**

**ENGINE
SERVICE**

**TECHNICAL
DATA**

SERIAL NUMBER LOCATIONS

Always use the serial number of the machine when requesting service information or when ordering parts. Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

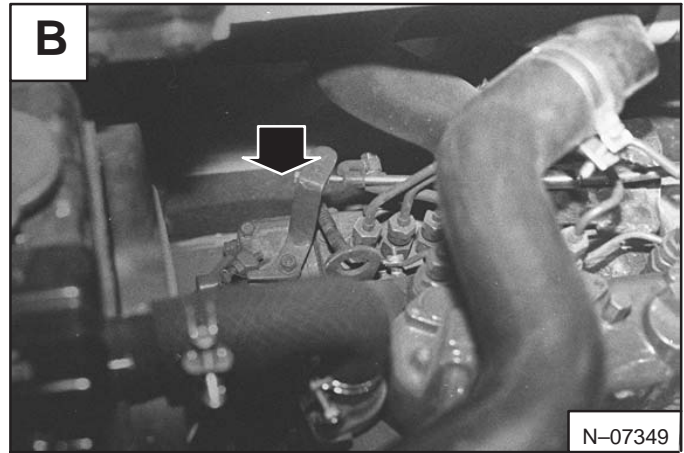
HYDRAULIC EXCAVATOR SERIAL NUMBER

The excavator serial number plate is on the right front side of the machine frame [A].



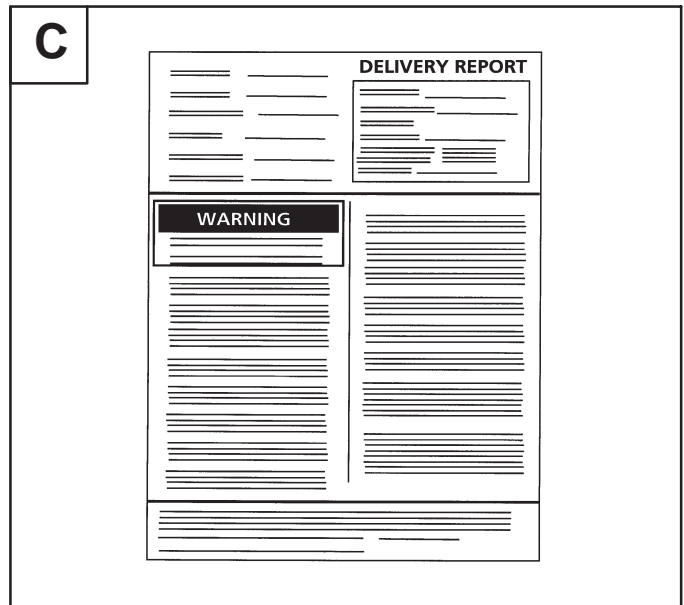
ENGINE SERIAL NUMBER

The engine serial number is located on the engine block, near the fuel injection pump [B].

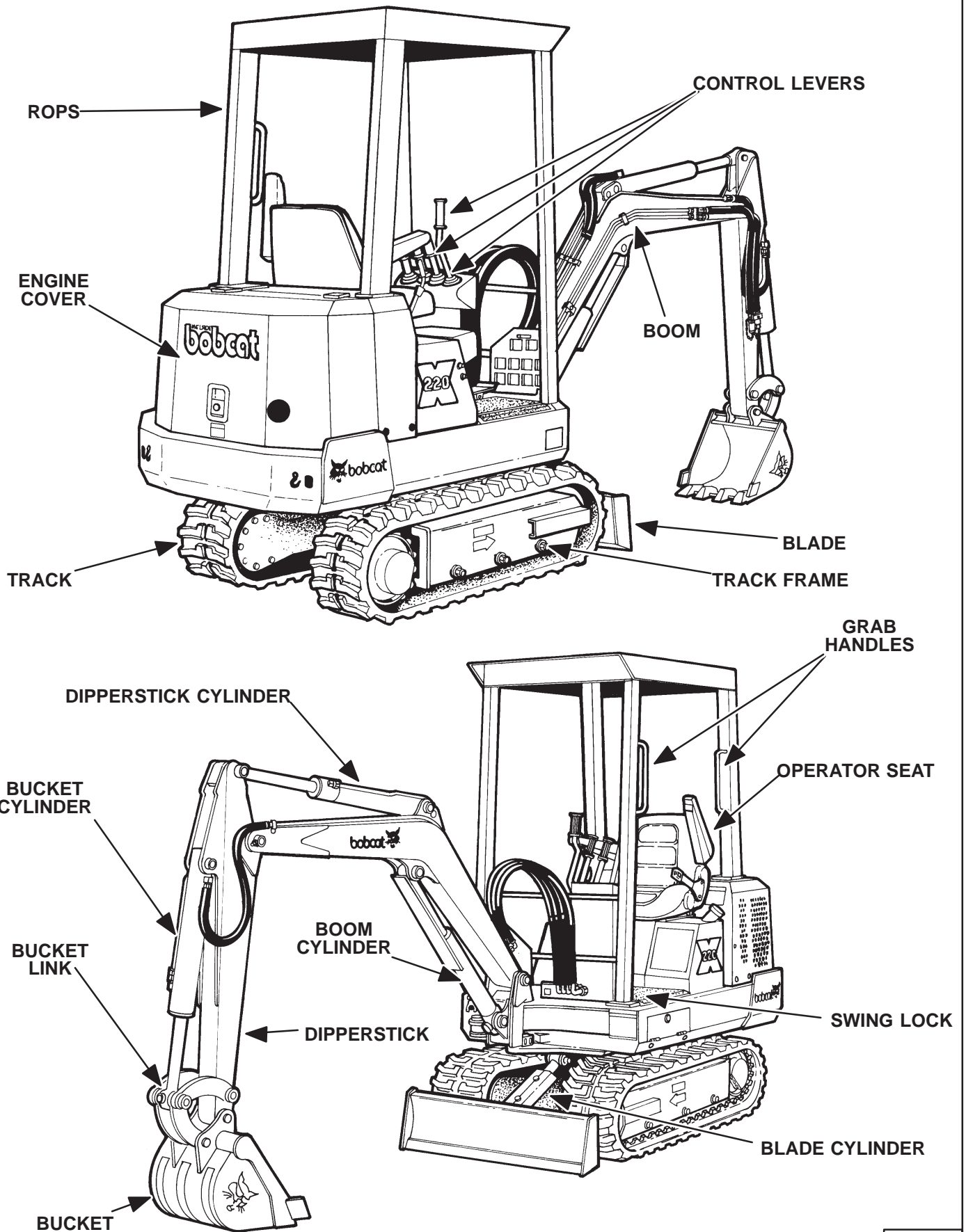


DELIVERY REPORT

All Delivery Report items must be explained to the owner/operator by the dealer. The dealer is to fill out the form and the owner/operator signs the form to indicate his understanding [C].



HYDRAULIC EXCAVATOR IDENTIFICATION



B-14810
B-14811

PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE

	Page Number
AIR CLEANER SERVICE	1-2
COOLING SYSTEM	
Coolant Level	1-6
Coolant Replacement	1-6
ENGINE COVER	1-2
ENGINE LUBRICATION SYSTEM	
Engine Oil And Filter Replacement	1-5
FUEL SYSTEM	
Fuel Filter	1-4
Fuel System Service	1-3
Removing Air From The Fuel System	1-4
HYDRAULIC SYSTEM	
Checking And Adding Fluid	1-7
Diagnostic Couplers	1-7
Hydraulic Reservoir	1-8
Replacement Of The Hydraulic Filter	1-8
LUBRICATION OF THE EXCAVATOR	
Procedure	1-10
SERVICE SCHEDULE	
Chart	1-1
USING A BOOSTER BATTERY (JUMP STARTING)	
Procedure	1-9

SERVICE SCHEDULE

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule is a guide for correct maintenance of the Hydraulic Excavator.



WARNING

Instructions are necessary before operating or servicing machine. Read Operation & Maintenance Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Failure to follow instructions can cause injury or death [A].

W-2003-0797

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	8-10	50	100	250	500	1000
Engine Air Cleaner	Check & empty dust cup as required.						
Engine Oil	Check the oil level & add oil as needed.						
Engine Coolant System	Check radiator coolant level.						
Indicator Lights	Check for correct operation.						
Operator Canopy	Check the fastening bolts, nuts, & condition of cab.						
Seat Belt	Check the condition & that fasteners are tight.						
Safety Signs (Decals)	Check for damaged signs (decals) replace as needed.						
Tracks	Check & adjust tension.						
Hydraulic Reservoir	Check fluid level.						
All Machinery Pivot Points	Lubricate 20 grease fittings						
Fuel Tank	Drain water and sediment from fuel tank.						
Swing Circle	Lubricate two grease fittings.						
Swing Pinion	Lubricate one grease fitting.						
Engine Oil & Filter	Replace oil & filter element.						
Alternator Belt	Check & adjust tension.						
Hydraulic Filter	Replace filter element.						
Fuel Filter	Replace filter element.						
Battery	Check & clean cable ends & check electrolyte level.						
Air Cleaner	Replace the filter element.						
Cooling System	Clean the radiator fins.						
Alternator & Starter	Check the condition.						
Engine Valve Clearance	Check & adjust valve clearance.						
Cooling System	Drain, flush & add new coolant to the cooling system.						
Hydraulic Tank	Change the fluid, clean fill neck strainer & suction strainer.						

After the first 250 hours of machine operation do the following procedures:

- Change oil in final drive case.
- Check and adjust engine valve clearance.

ENGINE COVER



WARNING

Never service or adjust the machine when the engine is running unless instructed to do so in this manual

W-2012-1285

Keep the engine cover closed when operating the machine.

W-2141-0189

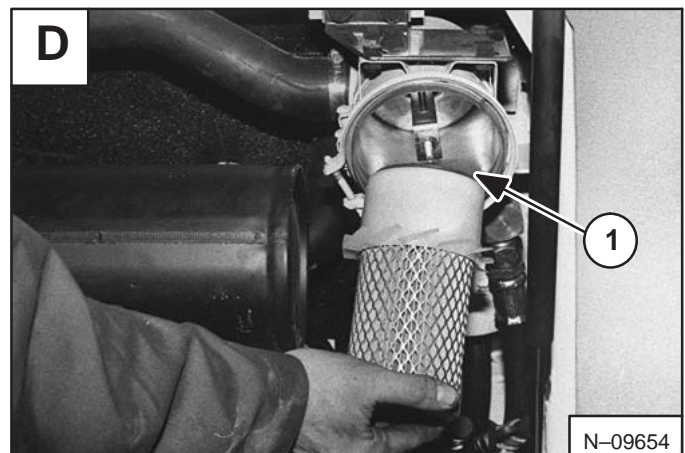
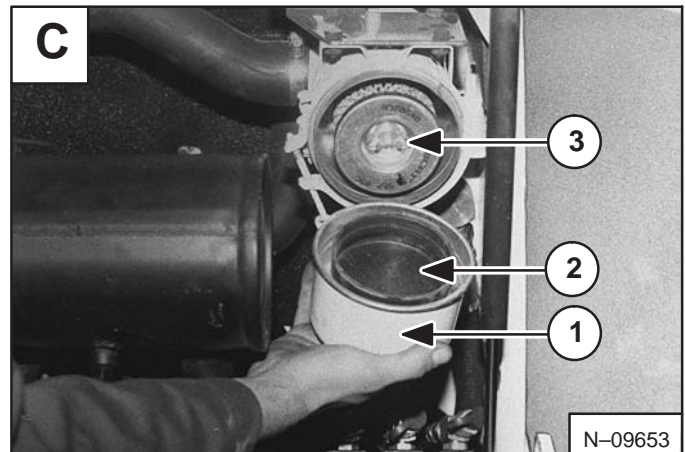
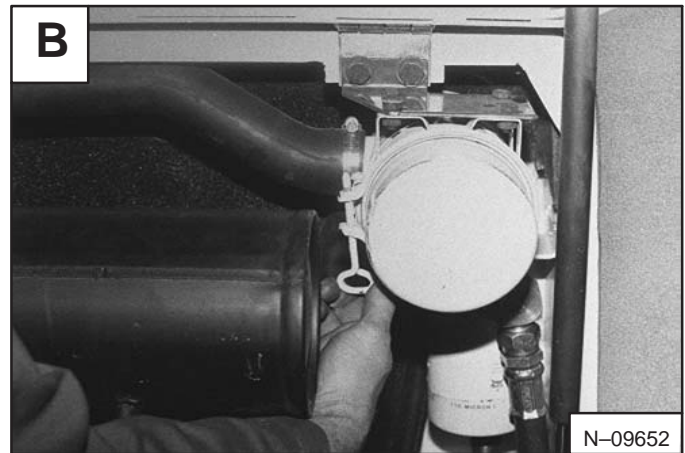
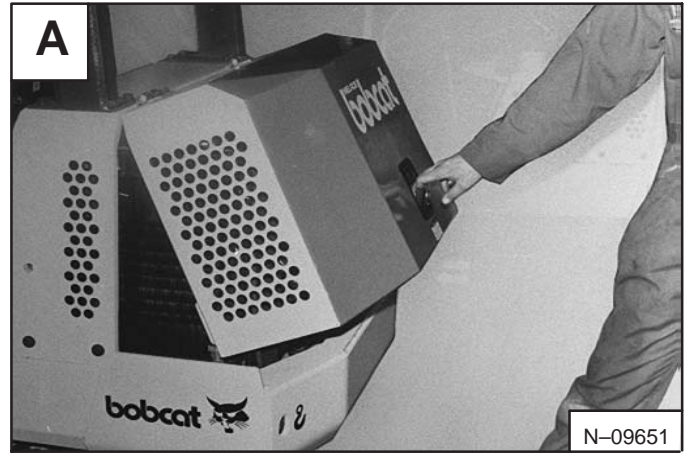
Open the engine cover to service the engine. Pull on the latch and lift the engine cover up until it is fully raised [A].

AIR CLEANER SERVICE

See the *SERVICE SCHEDULE* (See Page 1-1) for the correct service interval.

Service the air cleaner as follows:

1. Loosen the clamp on the air cleaner [B].
2. Remove the cover (Item 1) [C] and the dust cup (Item 2) [C].
3. Remove the wing nut (Item 3) [C].
4. Remove the filter element [D].
5. Check the air cleaner housing for damage.
6. Check the condition of the element replace if necessary.
7. Check the seal (Item1) [D].
8. Install a new air filter element. Install and tighten the wing nut.
9. Install the dust cup and cover so the arrow points up.
10. Check that the air cleaner hose clamps are tight.



FUEL SYSTEM

Use Number 2 diesel fuel in the engine. During very cold temperatures, Number 1 fuel can be used.



Fuel System Service

The fuel level in the tank is indicated by the plastic tube (Item 1) [A] on the side of the tank.

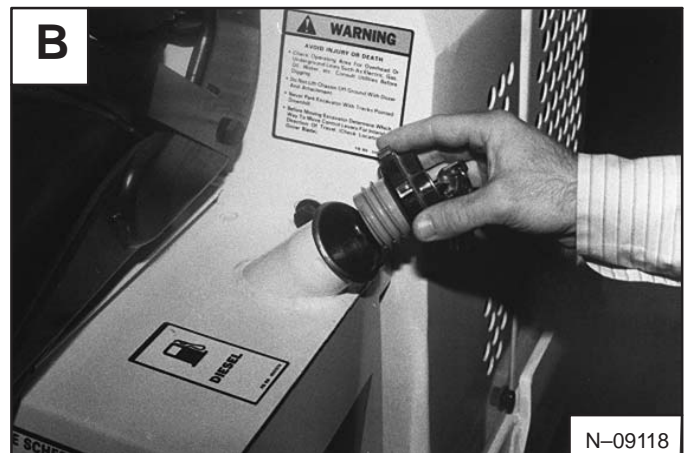
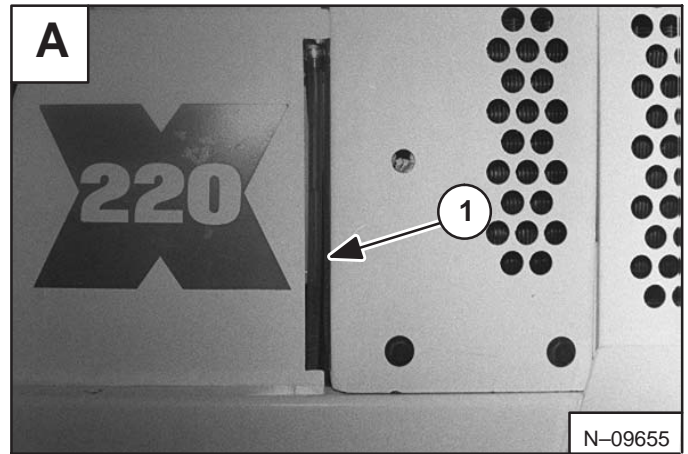
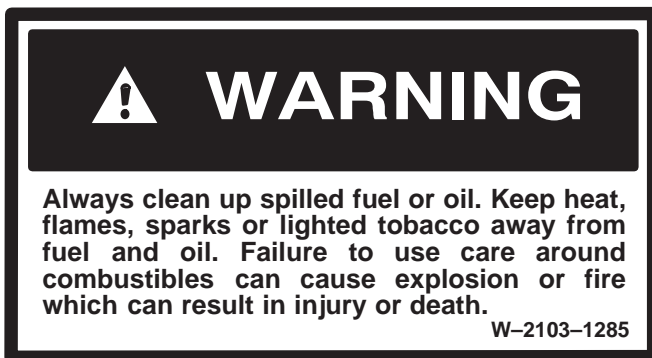
Use the key to unlock the fuel fill cap [B].

Turn the fill cap to remove [B].

Use a clean, approved safety container to add fuel to the tank.

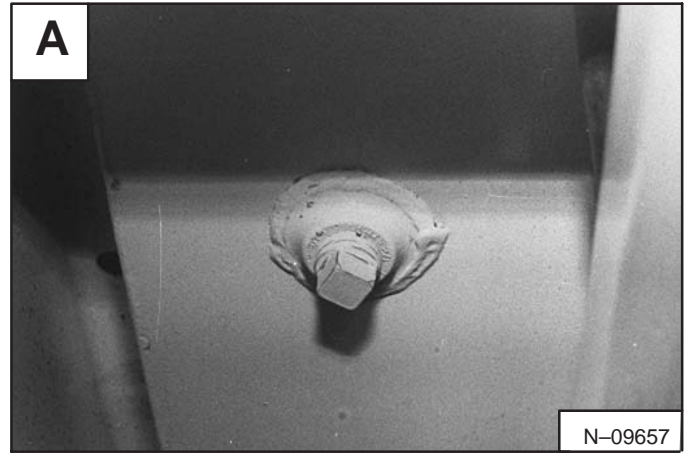
Add fuel only in an area that has a free movement of air and no open flames or sparks. **NO SMOKING!**

After the tank is full, install and tighten the fuel fill cap.



FUEL SYSTEM (Cont'd)

To remove water and sediment from the fuel tank, remove the plug from the bottom of the tank **[A]**.



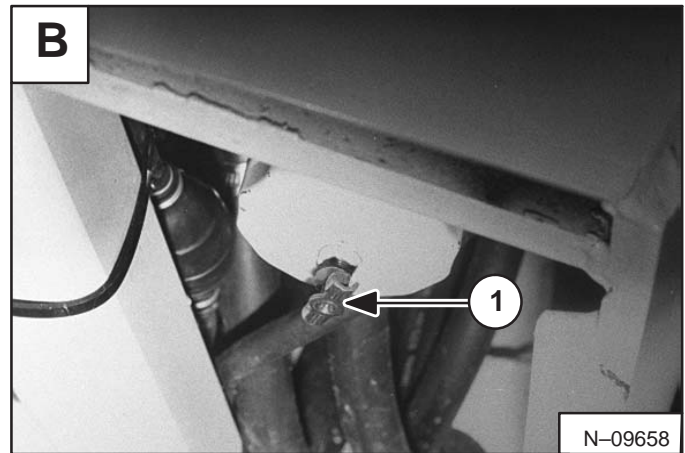
Fuel Filter

See the *SERVICE SCHEDULE* (See Page 1-1) for the correct service interval.

To remove water from filter open drain valve (Item 1) **[B]**.

Use a filter wrench to remove the final fuel filter **[B]**.

Replace the element and hand tighten only.



Removing Air From The Fuel System

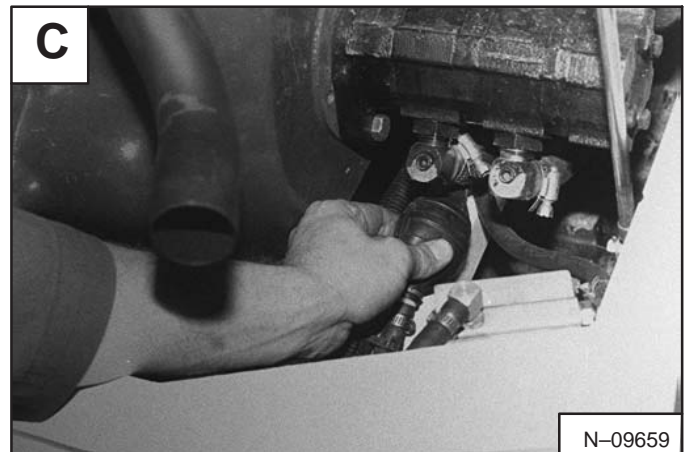
After replacing the fuel filter(s) or after running out of fuel, air must be removed from the fuel system.

Open the vent valve on the injection pump.

Squeeze the primer bulb to fill the filter **[C]**.

Leave the vent open slightly.

Start the engine. When the engine runs smoothly, close the vent valve.



ENGINE LUBRICATION SYSTEM

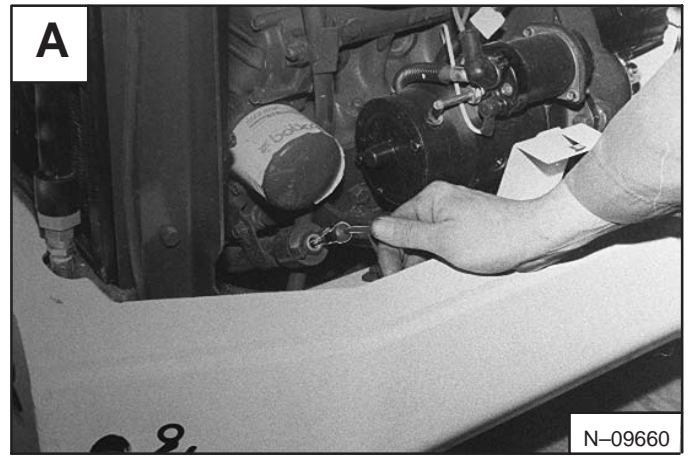
Check the engine oil every day.

Stop the engine. Open the engine cover.

Remove the dipstick **[A]**.

Keep the oil level between the marks on the dipstick.

Use a good quality motor oil that meets API Service Classification of CC-CE or CD. (See *FUEL, COOLANT AND LUBRICANTS Chart*, Page 8-1.)



Engine Oil And Filter Replacement

See the *SERVICE SCHEDULE* (See Page 1-1) for the correct service interval.

Use the following procedure to change the oil and filter:

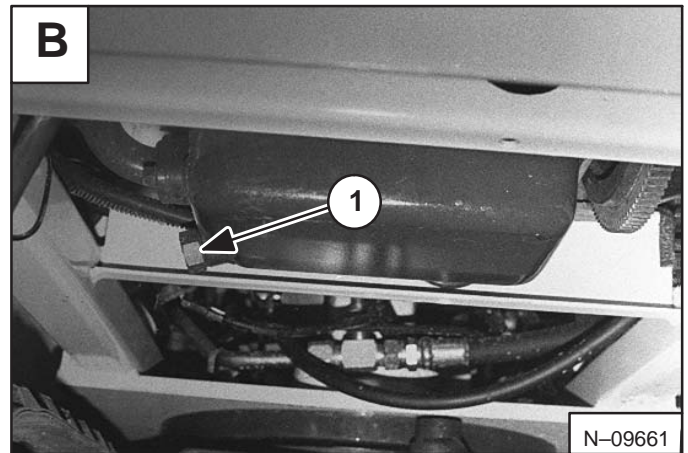
1. Run the engine until it is at operating temperature.
2. Turn the upper works so there is clearance for the engine oil drain plug. Stop the engine.

3. Remove the drain plug (Item 1) **[B]**. Drain the oil into a container.

4. Remove the oil filter (Item 1) **[C]**, using a filter wrench.

5. Clean the filter housing surface. Put clean oil on the filter gasket. Install the new filter and hand tighten only.

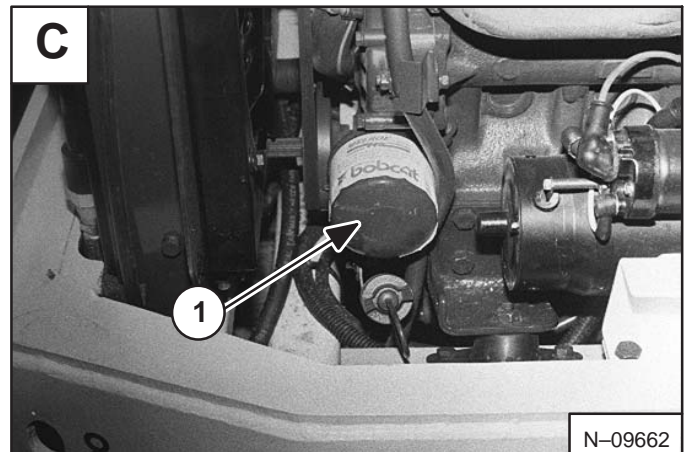
6. Install and tighten the oil drain plug.



7. Remove the oil fill cap **[D]**. Put 4.5 quarts (4,3 L) of oil into the engine. (See *FUEL, COOLANT AND LUBRICANTS Chart*, Page 8-1).

8. Start the engine and let it run for several minutes. Stop the engine. Check for leaks at the oil filter.

9. Check the oil level and add oil as needed to bring it to the *top* mark on the dipstick.



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