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## G89-948 Safe Operation of Compact Tractors

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## Safe Operation of Compact Tractors

Follow these safety tips and maintenance procedures for checking, servicing and operating compact tractors to extend their life and reduce breakdowns and accidents.

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### Use Hand Signals



### Types of Grounds Keeping Equipment

Lawn and turf maintenance is easier because of modern compact tractors, but carelessness can spell trouble.

Most tractors used in grounds care can be classified into three size groups: 1) riding lawn mowers (3 to 8 horsepower) which are fitted with a mower and usually do not have other equipment or attachments that could be mounted separately; 2) lawn and garden or compact tractors (7 to 40 horsepower) that can be mounted with a variety of tools and equipment; and 3) large tractors which range from 40 to 80 horsepower and have a low center of gravity for working slopes. These large tractors can be equipped with a variety of attachments.

Regardless of size, you should observe several safety precautions before, during and after tractor operation. All power units are potentially hazardous if improperly maintained or operated.

### Read the Operator's Manual

**Figure 1. Equipment is noisy; use hand signals to communicate between operator and other personnel.**

The most important safety function for an operator is to *frequently* read the operator's manual. It contains safety tips and procedures for checking and servicing the equipment. Following these instructions increases operating life, reduces major breakdowns, and prevents serious accidents.

Grounds care equipment is noisy. It is best to communicate with an equipment operator using the hand signals shown in *Figure 1*. These hand signals could prevent a serious accident if a quick reaction is needed.

Take responsibility for small children in the area and teach them to respect mowing and moving vehicles. Keep children from the mowing area and do not allow passengers on the tractor or dump carts. Explain the harm of sharp blades rotating at high speeds and the potential for thrown objects which may move at speeds of 170 mph. For the safety of others, especially children, never leave a running machine unattended, and always remove the keys.

### Personal Safety Check

- Wear close-fitting, sturdy clothing (*Figure 2*). Avoid clothing with tears, bulging pockets, frayed edges and heavy cuffs that may tangle in revolving equipment parts. Cut-off trousers or shorts offer no protection from flying debris.
- Wear heavy, non-slip shoes, preferably with steel toes. Sure footing is essential to your safety, heels help prevent slipping and good soles reduce dangers of tripping and falling.
- Wear earmuffs in excessively noisy conditions (=85 db) to prevent hearing damage and reduce operator tension and fatigue.
- Wear a respirator in extremely dusty conditions to protect against dust, spray and debris that may be blown about.
- Wear safety glasses or goggles for protection from thrown rocks, pieces of wire, glass or other objects, and from exposure to dust and insects.
- Keep alert. Fatigue, worry, preoccupation, illness and the like are enemies of safety. Drugs and/or alcohol impair an operator's skill and judgment. When you begin feeling tired, too hot or too cold, take a 10-minute break to stretch, walk about, lie down, or snack. A break restores alertness and helps you continue the job accident free.

### Inspect the Equipment



**Figure 2. Safety clothing and equipment provide extra protection in the event of an accident.**

Before starting the equipment, make these final inspections and adjustments:

- Check the fuel level and refuel while the engine is cool and in a well-ventilated area. Wipe off any spilled fuel. Keep sparks and flames away from the fuel tank and engine. Do not smoke while refueling. Store additional fuel in a well-marked, safety storage container. Gasoline storage containers should be colored bright red. Diesel fuel containers should be green. Never use plastic jugs or glass jars for a fuel container.
- Check coolant when the engine is cool on liquid-cooled engines. Do not remove a radiator cap when the engine is hot, and never add cold water or coolant to a hot engine.
- Do not smoke or light a match when checking battery electrolyte level. Hydrogen gas from a battery, even in low concentrations, may explode in the presence of a spark or open flame. Keep the positive battery post covered with a rubber cover to guard against sparks.
- Adjust the tractor seat to fit the operator's needs and comfort. Operator fatigue may contribute to accidents, and a properly adjusted seat helps prevent fatigue. Improper seat adjustment may hinder operation of hand levers and foot pedals in an emergency.
- Adjust the tread width, tire pressure, tractor weights and cutting height so the equipment is properly prepared for operation.

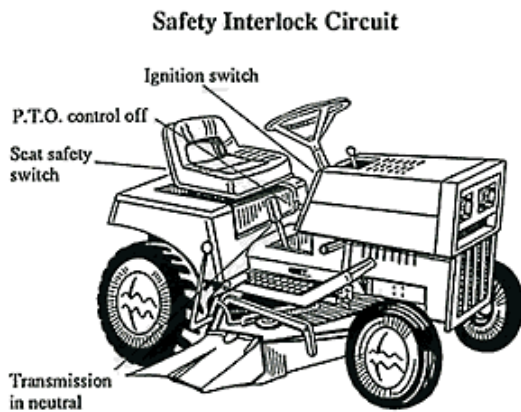
### Starting Procedures

Consult the operator's manual for the correct starting procedures. Remember the following general tips:

- On typical systems (*Figure 3*), before the engine will start, these items must be satisfied: (a) the ignition key must be "ON," (b) the transmission must be in neutral, the clutch pedal depressed, or both, (c) PTO or mower

must be disengaged, and (d) the operator must be properly seated.

- Do not operate an electric starter for more than 30 seconds at a time because of heat build-up in the starter motor. If the engine will not start, turn the key to "OFF" and wait for a minute or two before trying again.
- Provide good ventilation if you must start an engine indoors. Such engines give off carbon monoxide, a poisonous, odorless and colorless gas.



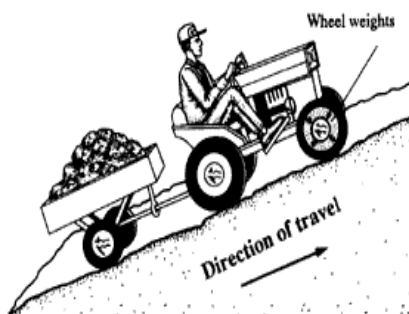
**Figure 3. Many compact tractors have an interlock safety system. Do not remove these devices; they are for your protection.**

After the engine has started, make a final check to be sure all persons, pets and obstructions are out of the area. Move the gear shift lever to the desired gear and engage the clutch slowly, following the manufacturer's recommendations for shifting. On most tractors, start out in the gear you intend to use for driving or operating. Smooth starts are essential both for equipment and operator safety. Apply power gradually to the drive wheels. Do not "pop" the clutch by letting it out too fast. Engaging the clutch too quickly can result in overturning the tractor

backward. Bring the tractor to a full stop before changing gears.

### **Be Alert While Operating!**

- Before starting to mow, check the area and remove any debris (rocks, cans, wire, toys, etc.) that might be thrown if struck by a rotating mower blade.
- Locate solid obstacles that might be hidden in the grass or overgrowth (large rocks, boundary stakes, irrigation heads, stumps, etc.). Avoid low-hanging branches, electric lines and guy wires that can cause costly equipment damage, tractor upsets and operator injuries.
- While maneuvering the tractor, be alert and watch the area ahead for moving vehicles, people or animals that might cross the path of the tractor. Be prepared to change course or stop.
- Avoid mowing too close to trees. The equipment may damage a tree, and low branches may distract you and lead to an accident. Wood chips placed at the tree's base will keep the turf neat and trimmed and will keep the mower away from the tree base.
- Reduce speed while operating on embankments; a hole, bump, or quick turn may result in tragedy. Use the widest possible wheel spacing and keep the tractor properly ballasted (*Figure 4*). Mow up and down the slope with a lawn tractor. If you must climb a steep slope, go up in reverse to reduce chance of a backward overturn.



**Figure 4. Downshift to a lower speed when climbing steep grades. Loads on the rear increase the chance of backward upset. Add front wheel weight for balance.**

Stay clear of ditches, embankments and ponds. Apply power carefully when driving out of a ditch; a tractor upset happens easily under these circumstances. A roll bar and seat belt will protect the operator, but cautious operation should be the first priority.

Leave the tractor in gear when going downhill. The engine acts as a brake.

- While backing, look behind to be sure the way is clear. Some lawn and garden tractors have a forward/reverse lever that reverses the tractor with a short pause. Be sure to bring the tractor to a full stop; look and be alert as you reverse directions.
- Stop mower blades before crossing gravel patches.
- Do not drive lawn and garden tractors on streets or highways. Their small size can make them difficult to see.
- Never dismount from the operator's seat while attachments are running.
- If a mower becomes clogged, be sure the rotary blades are turned off and completely stopped. **Never put your**

*hands under a mower deck if there is any possibility blades are still rotating.*

## **Stopping Procedures**

Proper stopping procedures can influence the ease with which the equipment starts the next time. An operation is not successful until the operator has safely dismounted and the equipment is properly put away. Remember to:

- Remove the load from the engine to lessen shock on the bearings and reduce wear.
- Place the transmission in park or neutral. Set the brakes, and lower any mounted implements to the ground. Serious injury may result if raised equipment accidentally drops.
- Reduce engine speed, and allow engine to cool one or two minutes at one-third throttle speed and no load. This allows hot spots to cool and prevents possible damage to seals and valves.

## **Shutting Down**

- Reduce engine speed. Turn the switch to "OFF." Leaving the ignition switch "ON" causes the battery to discharge. Do not dismount from the operator's platform until the engine and all implements are no longer in motion.
- Dismount carefully; falls are a leading cause of accidents.
- Close the fuel tank shut-off valve to take the pressure off the carburetor diaphragms and/or float. A closed valve prevents fuel leaks and potential fires.
- If the engine has an ignition lock and key, remove the key before leaving the engine as a safeguard against unauthorized operation. If the engine has no ignition key, remove the spark plug wire from the plug.

## **Summary**

These safety tips and maintenance procedures for checking, servicing and operating compact tractors extend equipment life and reduce breakdowns and accidents.

## **Additional Reading**

Colvin, T.S. 1974. *Grounds Keeping Equipment Vol. 1; Operating Tractors for Ground Keeping and Ornamental horticulture*. AAVIM. Athens, GA pg 95.

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**File G948 under: HEALTH AND SAFETY**

**A-10, Accident Prevention**

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