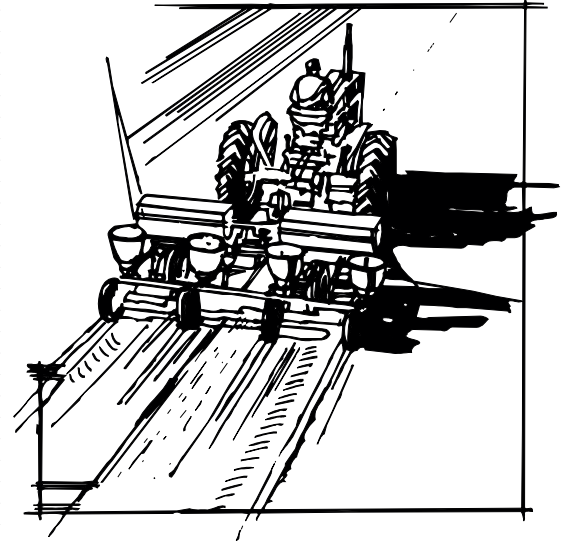


Reconditioning Flood-Damaged Tractors

Tractors submerged in floodwater can suffer serious damage if they are not properly cleaned and reconditioned prior to use. Do not attempt to start a flood exposed tractor until it has been properly cleaned and serviced. The engine may start and run, leading you to believe it has escaped damage. Unfortunately, water and dirt can get into bearings and accelerate wear. The real damage will start to show up after a few hours of use. Avoid towing the tractor for any significant distance before it has been cleaned and serviced. Towing will cause transmission wear if water and dirt have gotten inside the transmission.

How extensive the reconditioning effort will be depends on how much of the machine was submerged. You may wish to obtain professional service for tractors that have serious potential damage. If you choose not to seek professional service, the following guidelines will help minimize damage to the tractor.

Thoroughly wash off all dirt, oil and grease from the outside of the tractor. This helps prevent getting dirt inside the engine or transmission during further reconditioning work. If you use a pressure washer, be careful



not to damage the seal around bearings.

If the water rose no higher than the bottom of the engine or transmission, the potential for damage is relatively minor. On two-wheel drive tractors, damage is typically limited to the front wheel bearings and kingpins or to the pin and bushing in the axle pivot. For front wheel bearings, remove the wheel and bearings from the spindle. Thoroughly clean the spindle with solvent.

Also clean the bearings and repack with fresh grease. If the bearings are old or you doubt their durability, take this opportunity to

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replace them with new bearings. Reassemble the bearings and hub onto the spindle. Follow the recommendations in your service manual for proper torque on the spindle. For kingpins and other pins and bushings, flush the fitting with fresh grease to force any contaminated grease, water, or dirt out. Clean off any excess grease.

On front wheel assist (FWA) tractors, the front axle drive shaft, axle pivot, the steering knuckle, and the universal joints need to be cleaned and inspected. If the front axle has a breather, there is a chance water may have gotten inside the axle housing. Drain the axle and clean the inside as thoroughly as possible. Refill with fresh lubricant. Clean the universal joints and lubricate with fresh grease. You may want to over lubricate the joint to be sure any water contaminated grease is flushed out. Seals around drive axles should protect the units from water and dirt damage if the seal was intact. If you had a leak around a seal before the flood, there is a possibility that water and dirt have leaked past the seal. Thoroughly clean the exterior of the axle to remove any dirt that may wear against the seal. Avoid spraying high-pressure washers directly into seals as they may push dirt past the seal.

If the water rose as high as the middle of the engine or transmission, the potential for damage is greater. Any engine or transmission seal or gasket is a potential point for water and dirt to leak inside, especially if you noticed an oil leak in that area before. Drain the lubricant from the engine or transmission and inspect for signs of water. If you do not see any water in the oil, you did not have a leak. Refill with fresh lubricant and change the filter. If you observe signs of water in the lubricant, remove the oil pan and clean the engine crankcase or transmission housing thoroughly. Remove and replace all oil filters. Reassemble and refill with fresh lubricant. After a few hours of use, drain and refill again, replacing the filter as well.

If the tractor was completely submerged by floodwater, the potential for damage is high. It is highly likely that water has gotten inside the engine or transmission. The tractor will need a complete overhaul to be absolutely certain that further damage will not occur. If you do not have the shop facilities or expertise to perform these repairs, you may wish to have your dealer provide the service. If you choose to perform the repairs yourself, follow the recommendations below to reduce the risk of damage.

Engines

1. Thoroughly clean the exterior of the engine. Use a water hose, pressure washer, or steam cleaner. Scrub away any grease deposits with an appropriate engine cleaner.
2. Disconnect and remove the battery. The battery may need to be replaced.
3. Disconnect the starter and alternator or generator. Disconnect any other electrical wiring and other components connected to the engine. On gasoline engines remove the distributor. Mark all wires so you will know where and how to reconnect them.
4. Clean the starter and alternator or generator thoroughly inside and out. Disassemble, wash all components properly, then bake to dry. Your local electric motor repair service can help you with this or may be able to do the service for you. Reassemble when dry and finished. Disassemble and clean the distributor, regulator and any other serviceable component.
5. Disconnect the fuel lines to the engine. Remove and discard the fuel filter. Drain all fuel from the tank and dispose of it properly. Rinse the tank with fresh fuel or kerosene and dispose of the rinse. Clean out the fuel lines

with compressed air to be sure they are clean.

Be very careful to avoid fire hazards when working with the fuel or fuel systems.

6. Clean the radiator cooling fins. If the cooling system was unsealed, drain the radiator, flush with water, and replace the coolant.
7. Remove the spark plugs or fuel injectors. Remove the air cleaner, air cleaner housing, and intake manifold. On gasoline engines remove the carburetor. Remove the muffler and exhaust manifold.
8. Drain the engine crankcase, remove the oil pan and oil filters. Wash out the crankcase with engine cleaner, diesel fuel or kerosene.
9. Check to see if you have water in the cylinders. A borescope is a handy tool to inspect the inside of a cylinder. Slowly turn the engine to push any water out of the spark plug or injector holes. You may have to remove the cylinder head to thoroughly clean the inside of a cylinder.
10. Coat the cylinder walls, engine bearings, and any other wear surface exposed with a light oil. Let stand a few minutes then slowly turn the engine crankshaft a few times. This will spread oil on the cylinder walls and bear-

ings and help push any fine dirt away. Allow this oil to drain away. Repeat as necessary to fully clean the cylinder walls.

11. Reassemble the engine, refill with oil and replace all filters. As you reassemble, be sure to replace all seals and gaskets with new ones. Thoroughly inspect the engine to be sure you have covered everything.
12. Start the engine and let it run slowly at first, then bring it up to speed. After a few hours of use, drain the engine oil and refill with fresh oil. Change the filter again.

Transmission (Including Clutch, Differential, Final Drive, and Hydraulic Systems)

1. Thoroughly clean the exterior of the transmission. Use a water hose, pressure washer, or steam cleaner. Scrub away any grease deposits with an appropriate cleaner.
2. Drain the fluid from the transmission housing. Inspect for signs of water or dirt. Remove and discard the oil filter.
3. Remove the transmission oil pan or cover. Thoroughly clean the inside of the transmission housing. If you have the equipment, remove the axles for better access. Do not attempt this if you do not

have the proper equipment or training.

4. Remove the access panel and inspect the clutch. Carefully clean the clutch if necessary. Most tractors have a dry clutch; be careful not to get oil or grease on it. On some tractors, you must separate the engine and transmission to get access to the clutch. Do not attempt this if you do not have the proper equipment or training. Seek professional help.
5. Reassemble the transmission and refill with fresh lubricant. Replace the filter.
6. After a few hours of use, drain the lubricant again. Change the filter and refill with fresh lubricant.

Other Concerns

1. Go over the tractor and lubricate all bearings. Unsealed bearings may require cleaning first. Sealed bearings should not need to be cleaned if the seal is still good.
2. Remove any carpet or upholstery from the cab or seat. Wash thoroughly and allow to dry. Remove the lining from the cab, wash and dry completely.
3. Wash the inside of the cab with soap and water. Leave open to dry thoroughly.
4. Inspect the brakes. Brake pads may need to be replaced.

5. Check and lubricate the steering linkage.
6. Check any moving part for rust. This includes door hinges and latches, hood latches and hinges, lift arms, movable shields, and any other moving or wear part.
7. Remove the fuses and check each circuit for shorts. Electrical wiring must be allowed to dry out. If it appears damaged or corroded, replace. Coat

the contacts with a corrosion preventative where appropriate.

Keep a Close Watch!

Once equipment has been reconditioned and returned to service, pay very close attention to its performance over the next few months. If there is any sign of poor performance, have the tractor inspected immediately.

The guidelines provided in these pages are intended to help minimize equipment damage and personal injury. There are no guarantees that the procedures described here will address all potential problems. If you have any doubts about the reliability or safety of a piece of flood damaged equipment, seek trained professional assistance from your equipment dealer.

