



WARREN

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## Flood Damaged Machinery Analysis and Repair (Part 2)

### Machinery and Equipment Damage Appraisal Guideline No. 300

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#### **CLEANING AND REPAIR OF VEHICLES POWERED BY GASOLINE AND DIESEL ENGINES SUBJECTED TO FLOODING**

If you must use a vehicle with a gasoline or diesel engine immediately, use the following procedure and be aware that this procedure isn't thorough enough to prevent possible damage or need for overhaul in the future. Complete disassembly of the engine and drive train may be required.

- Clean exterior thoroughly with a hose. Scrub greasy deposits with solvent.
- Remove spark plugs or fuel injectors, air cleaner, intake manifold and carburetor. Clean these parts thoroughly with solvent.
- Drain the crankcase. Flush the crankcase with oil and refill with clean oil. Also disconnect fuel lines, blowing them out with compressed air.
- Crank the engine slowly with spark plugs or fuel injectors removed to force water out of cylinders. Squirt light lubricating oil into each cylinder and let it stand for about five minutes. Then crank the engine slowly to lubricate cylinder walls and rings.
- Replace all filters: engine, fuel, hydraulic.
- Completely flush out the fuel system tank and pump the fuel lines with No.1 diesel fuel. Be extremely careful to avoid fire danger.
- Remove the starter and generator and have an expert service them.
- Drain and flush the transmission and final drive with solvent. Refill with new, clean oil.
- Remove and clean unsealed wheel and track bearings with solvent. Lubricate and replace the bearings. Factory-sealed bearings should not need cleaning if the seal is unbroken.
- Flush the cooling systems with fresh water, and clean the radiator fins.
- Replace the battery, if necessary. If it was submerged, it will probably need to be replaced.

- Examine the machine and turn it over by hand after you have cleaned and replaced all parts. If it turns freely, it is probably ready for operation. Turn on the engine and operate the machine at low speed until you are sure all parts are working smoothly.
- If there is a substantial amount of dirt in the crankcase, transmission or gear train, change the oil and oil filter after operating the machine for a few hours. Using fresh lubricant is cheaper than paying for additional repairs.
- Remove inside door panels. Clean and lubricate latches and window raising mechanisms.
- Remove seats and floor mats. Brush and vacuum thoroughly. Clean washable surfaces with soap and water. Use rug or upholstery shampoo on non-washable areas. Dry thoroughly.
- Disassemble leaf springs. Clean or replace spring pads if necessary.
- Have brakes and steering mechanism checked before you drive the vehicle.

