FEDERAL COORDINATING OFFICE

MOUNT ST. HELENS TECHNICAL INFORMATION NETWORK

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BULLETIN #23 - "Farm Equipment 'Ash' Maintenance"

(The following advice is provided by Gary M.Hyde, Ph.D., and James M. Ebeling, Washington State University, and also includes material from the International Harvester Company. It is directed to farmers and those operating field equipment. It does not speak specifically to individual pieces of equipment but does contain information that should be helpful for a variety of equipment.

For more information on off-field vehicle maintenance, see Technical Information Bulletin #2b-"Driving and Vehicle Maintenance in Heavy Ash Areas." TIB #6 also will be helpful.)

CHARACTERISTICS OF THE ASH

The ash consists of pumiceous glass; feldspar, hypersthene, and magnetite crystals; and lithic fragments (igneous rock). These minerals are made up of calcium, sodium, aluminum, magnesium, iron, silicon, and oxygen, just as our soils are.

These materials are abrasive and may be corrosive to untreated or painted metals due to the sulfuric acid and flourides and chloride salts. It is recommended that all vehicles be thoroughly cleaned, inside and out. Vacuum or air-clean vehicle prior to a thorough rinsing with fresh water.

FIELD EQUIPMENT ASH MAINTENANCE

AIR CLEANER FILTERS

Information regarding the filters will be emphasized in this bulletin because some of the most expensive repairs may result if the abrasive ash gets inside engines.

Air cleaner filters in good condition should remove any harmful particles. New air filters are designed to screen out particles

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larger than 20 microns, but remove smaller particles down to 10 microns as opening sizes become restricted. Although a small percentage of particles less than 20 microns in diameter can pass through the filter, they become suspended in the oil film between moving engine parts.

Engines are designed with an oil film that is 25 microns thick. Thus even small concentrations of abrasive ash particles smaller than 20 microns will cause undue engine wear. Contrary to popular opinion, quality dry-type filters are more efficient than oil bath filters. Dry filters remove 99.9 percent of the harmful particles, while oil bath filters remove 98 to 99 percent. The efficiency of an oil bath filter is significantly improved if a paper filter is installed in front of it. Do not place an oil bath filter in front of a paper filter, because oil from the oil bath filter will be carried onto the dry filter, making it difficult to clean.

Both filter and tractor manufacturers recommend that you not change air filters until your restriction indicator tells you to change or you notice a loss of engine power. The reasons are a visual inspection will not give a good reading about filtering ability and partially restricted air cleaner actually is more effective, up to a point where it does not allow enough air through for proper engine performance. Carelessness when changing air filters can also cause engine damage.

Service your air cleaners according to manufacturer's specifications for dusty operating conditions. Make sure, however, that the air filtering system is properly installed and that all connections are tight and leak-free. In addition, it is recommended that the air intake be elevated, making sure that extensions are tight and not so high as to hit wires or other obstructions. Cleaning air filters with low

pressure air is recommended. Replace if necessary only when excessively clogged. Visually inspect air cleaner element seals. When replacing the element remove all seal material from the cannister. If seal material is not removed, the new filter element may not seal properly.

When you replace an air cleaner, follow these steps to avoid damaging your engine:

1. Your engine compartment probably will be covered with a layer of dust. Wash off with water, being careful not to spray water directly into the air intake opening.
2. Before removing the air filter cover, clean it thoroughly by tapping it gently to dislodge any dirt that may have collected under the outer rim of the cover. Now remove the cover, taking care not to get any dust or dirt into the carburetor opening.
3. Place a damp cloth in the carburetor opening to prevent any dirt from getting in while the cover is off. Gently remove the air filter.
4. If you do not have a new filter, clean the old one with a vacuum cleaner. DON'T use high pressure air (use 30 psi or less) because you may blow a hole in the filter. DON'T use water or solvent to clean the paper filter. Be careful not to get any dust on the inside surfaces of the filter.
5. Vacuum the inside of the filter basin and wipe it out with a damp cloth.
6. Replace the cleaned filter or put in a new one. Be sure it is properly sealed!
7. REMOVE THE RAG FROM THE CARBURETOR.

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8. Replace the lid and seat it properly. Put a gasket---cardboard will work---around the wing nut to prevent any air leakage there.
9. Check all fittings in the air filter system to be sure everything is tight and there are no air leaks.
10. Try to perform maintenance work in dust-free areas. Clean around all openings before removing plugs, filters, dip-sticks,etc.

LUBRICATION SYSTEM

Frequent oil and filter changes will be required. Manufacturers of farm equipment are recommending oil changes at least twice as often as normal. Also lubricate ball joints, suspension and other fittings more frequently than normal, using grease to force the grit out of joints.

Engine oil and filters should be changed every 50 hours of operation. Drive train maintenance should be performed at this time.

Service the crankcase breather every 100 hours of operation or as required.

HYDRAULIC SYSTEM

Hydraulic and transmission systems are relatively closed systems and thus the most potential source of ash contamination is through carelessness with remote couplers. Hydraulic filters should be replaced more often than usual (every 100 hours is recommended in ash conditions), and breathers should be checked for ash accumulation. Transmission filters should be inspected and replaced if necessary. Breathers in gear boxes may plug and should be cleaned following manufacturer's specifications. Cooling systems should be routinely checked for ash build-up that could cause overheating.

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FUEL SYSTEMS

In-line filters need to be routinely checked or installed on all engines, even gasoline engines. Seventy gallons of gas means seventy gallons of dusty air as the tank empties. Also check filler cap gaskets routinely.

Fuel filter should be replaced as indicated by lack of power or performance of the engine.

Fuel tank vents and caps must be cleaned more frequently.

Exhaust system should be "capped" when not in operation to prevent ash deposit entry on a static engine.

MECHANICAL PARTS

Sickle knives, wear plates, and similar devices become "ground engaging" as a result of the extreme amounts of dust generated during field operations, resulting in higher wear rates. Chrome plating or hard facing of rasp bars and other similar parts may prove beneficial. Higher rates of wear can be expected for roller and steel chains and sprockets. Whether or not these should be lubricated is left to the individual operator, because no clear guidelines exist. V-belts and pulleys should be checked for alignment and tension. Due to the polishing action on pulleys from the dust on belts, more tension in belts may be needed to deliver the same torque.

SEALS

The ash will wear out seals more rapidly, so bearings should be repacked more often than normal. Positive oil pressure should minimize ash entry into front and rear crankshaft.

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AIR CONDITIONERS AND FRESH AIR SYSTEMS

As expected, filters should be cleaned or changed more often. The compressor is normally well shielded and designed for hostile environments, although the clutch and pulleys may show additional wear.

PAINT AND OTHER SURFACE FINISHES

Some of the ash is very fine and can work its way into any opening or crack. Thus, both the exterior and underbody of vehicles should be washed more frequently, preferably with a high pressure hose. Do not brush or remove the ash with a dry cloth. It may scratch the finish.

OTHER SYSTEMS

Problems with generators, alternators, and starters can be anticipated. Compressed air with 30 psi or less is suggested for dust removal. High pressure could have a sand-blasting effect. Take care not to blow the ash from one spot to another that might be even more susceptible to damage. Radiators, condenser cores, oil coolers and other machinery parts may show accelerated corrosion and wear due to the abrasive ash. Small electric motors in various and sometimes out of the way places could be covered with ash and overheat.