Fire Prevention on Forestry Equipment — SAE J1212

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LAND SEA AIR SPACE

PREPRINT

FIRE PREVENTION ON FORESTRY EQUIPMENT—SAE J1212

SAE Information Report

Report of Off-Road Machinery Technical Committee approved April 1978.

1. Introduction—It is a matter of record that the forestry industry has, for the past few years, experienced a substantial increase in the incidence of onboard equipment fires. An alarmingly high financial loss has resulted from these fires, and in some cases personal injuries have occurred. Efforts have been made to identify the factors contributing to such fires so that proper prevention measures can be taken. For example: In a study conducted by the American Pulpwood Association, accumulation of debris and generally poor housekeeping were listed as major factors in 45% of the fires studied. It was also found that in 39%, no fire extinguisher was available on the machine.

While these are not the only factors, it becomes readily apparent that the fire hazard can only be minimized through combined application of good operation and maintenance techniques and judicious machine design.

2. Purpose—The purpose of this report is to provide general recommendations for the design and operation of mobile forestry machines which can help reduce the possibility of fire.

3. Scope— *Mobile forestry machines* is intended to include those off-road machines which are designed especially for, or adapted to be used in, the planting, site preparation, harvesting, processing, and transporting of trees. The diversity of machines and systems falling within this scope prohibits detailed specifications, and therefore recommendations are of a general nature.

4. Equipment Design Recommendations

4.1 Machines should have a spark arresting capability with a minimum efficiency of 80% for all flow rates when tested in accordance with SAE J350a, Spark Arrestor Test Procedure for Medium Size Engines (August, 1972).

4.2 On all machines, the engine area should be enclosed or shielded with appropriate metal guarding to minimize accumulation of debris. Avoid, where possible, design of pockets which readily collect combustible materials and are difficult to clean.

4.3 Access should be provided for clean-out of debris, particularly in the machine underguarding where saturation of trash with fuel and oil leakage could create a fire hazard.

4.4 Fuel and hydraulic lines should be routed away from hot exhaust parts. Line connections and servicing junctions should be located to minimize accumulation of leakage and spillage. Fireproof or fire-resistant material should be used wherever practicable throughout the design. Fuel and hydraulic hose material should conform to SAE J30d, Fuel and Oil Hoses (February, 1977), or SAE J517c, Hydraulic Hose (June, 1976). An accessible method of terminating fuel flow should be provided at or near the fuel tank.

4.5 Routing of electrical wires and connections should be away from areas of debris buildup and away from fuel and hydraulic lines and hot engine parts. Tie-downs should be of adequate number and size to control motion which might wear insulation.

4.6 Wire insulations and coverings should be durable in accordance with SAE J1127, Battery Cable (November, 1975), or SAE J1128, Low Tension Primary Cable (November, 1975).

4.7 Wires and other electrical components should be of a proper size to prevent overheating with their design service loads. Circuit breakers or fuses should be provided to protect against short circuits and overload. A battery disconnect should be provided which is easily accessible. Unused or disconnected battery lead lengths should be minimized by circuit design or use of insulated ends.

4.8 Brakes should be shielded or enclosed and/or designed with low maximum operating temperature in accordance with SAE J1178, Minimum Performance Criteria for Braking Systems for Rubber-Tired Skidders (March, 1977).

4.9 The standard machine should be equipped with one or more accessible, portable hand extinguishers having a total minimum 2A-10BC Underwriters Laboratories rating. Hand extinguishers should be provided in addition to any fire suppression system already on the machine.

4.10 The machine operation and maintenance instruction manuals should include the nine points listed in this report under Section 5.

5. Equipment Operation and Maintenance Recommendations for the Prevention of Fires

5.1 Machines should be cleaned of debris at least daily, particularly around engine, exhaust, and drive line components.

5.2 Machines should be inspected at least daily for potentia' fire hazards at electrical, exhaust, drive line, fuel, hydraulic, and brake systems. Repairs should be made *immediately*.

5.3 Operating personnel must be instructed on what to do when a fire starts; how to use the fire extinguisher; and must follow such instructions. Operators should be required to demonstrate an ability to use fire suppression equipment.

5.4 Hydraulic leaks, accumulation of grease, fuel, and oil (including spillage) should be eliminated *immediately*.

5.5 The radiator and the engine cooling system should be cleaned and serviced daily to maintain moderate engine temperatures.

5.6 Any portable extinguisher or fire suppression system carried on the machine that has been used should be recharged or replaced before the machine resumes operation.

5.7 Prior to welding or brazing on any part of the machine, the part and the surrounding area should be cleaned and a fire extinguisher should be made readily available.

5.8 Smoking, open flames, etc., should not be permitted around any machine during fueling operations and/or when the fuel system is open to the atmosphere.

5.9 Fire prevention features provided by the manufacturer should be maintained in operational condition and should be used to *supplement* the operator's fire prevention efforts. In no case should the features be used, or assumed, as replacements for diligent operator efforts at preventing fires.

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.