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DIRECTORATE GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTIONS

No.7

OPERATOR'S MAINTENANCE FOR ALL 'C' VEHICLES

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GENERAL MAINTENANCE NCB INSTRUCTION

No 7

Operators 'Maintenance for All 'C' Vehicles.

General

1. This instruction lays down the policy and the procedure to be adopted by drivers for the periodic maintenance of 'C' Vehicles.
2. This General Maintenance Instruction is written in general terms and designed to cover the full range of 'C' vehicles in use. Certain aspects included therefore, may not be applicable to some of the 'C' vehicles (and where this is so, should be omitted) while others required should be included based on similarity of component.
3. Maintenance is divided under the following heads:-
 - (a) Running Maintenance
 - (i) First Parade
 - (ii) Last Parade
 - (b) Weekly Maintenance
 - (c) Monthly Maintenance
 - (d) Maintenance based on hours run.

Running Maintenance

4. *First Parade* (To be done before the vehicle goes on duty) :
 - (a) Check fuel oil, and cooling water. Bleed fuel system if aerated.
 - (b) Check lubricating oil in all lubricating oil reservoirs, e.g., engines, transmission, final drives, etc. and top up if deficient.
 - (c) Start engine as per starting procedure laid down.
 - (d) Check readings of oil pressure gauge, temperature gauge and ammeter.
 - (e) Look for obvious leaks of fuel oil, water and lubricating oil.
 - (f) Listen for unusual knocks, rattles, or uneven running of engine (after engine has warmed up)
 - (g) Check track tension for obvious looseness and bolts, nuts, pins and cutting edges of dozer equipment for looseness, wear and damage.
5. *Last Parade* (To be carried out at end of day's work, or approximately 10 hour intervals) :
 - (a) After using correct procedure for stopping engine, refill fuel tank.
 - (b) Check condition of oil in air cleaner-if thick or cloudy change oil.
 - (c) Carry out Frost Precautions, if required (General Maintenance Instruction No 2 refers).
 - (d) Report any defects found during operation.
 - (e) Lubricate the following points :-
 - (i) Main clutch bearings and connections.
 - (ii) Steering clutch bearings and connections.

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- (iii) Dozer suspension arms and piston rod shafts.
- (if) Winch clutch, levers and joints (if used).
- (f) Track, frame bearings, track rollers and idlers.

- (f) Check and tighten all external nuts and bolts and check condition of cutting edges.
- (g) Record in log book (and if applicable in 'C' Vehicle History Card) details of tasks carried out, hours run, etc.
- (h) Cover ports to avoid rain, dew, etc., entering over night.

Weekly Maintenance

6. This consists of four weekly tasks to be carried out strictly in the order shown, one each day on the first four days of the week. If for any reason a task cannot be done on a particular day, two or more tasks may be carried out on subsequent days, so that the maintenance cycle is completed.

Task No I

7. *General*

- (a) Clean exterior and interior of vehicle thoroughly.
- (b) Check all fitting, and all external bolts, nuts and welded joints for tightness and secureness.

8. *Starting Engine and Main Engine*

- (a) Check oil levels.
- (b) Check all engine mountings and brackets for tightness (especially of air-cleaners).
- (c) Start engine, check for gas leaks, water leaks and fuel / oil leaks, at spark plugs, in injection valve. joints, cylinder heads, inlet and exhaust manifolds.
- (d) Listen for unusual knocks (other than diesel knock), uneven firing, and examine exhaust for black smoke, blue smoke and white vapour smoke.
- (e) Check if controls are functioning satisfactorily.

9. *Cooling System*

- (a) Inspect radiator, radiator guard, water joints for leaks and looseness of holding bolts and clips.
- (b) Check if drain cocks, water pump and gland seals show signs of leakage.
- (c) While engine is running check circulation of water, cleanliness of water and water temperature gauge.
- (d) inspect fan, for belt tension and bent blades, loose bolts.

10. *Fuel System and Injection System*

- (a) Check secureness of fuel tank, fuel filters, fuel pump and injectors and carburetor.
- (b) Check for leakage of fuel at taps, drain cocks, unions, joints and over flow lines.
- (c) Check all controls, yokes pins for free operation and lubricate where necessary.
- (d) Check governor and fuel injection coupling.

Task No 211. *Lubrication System*

- (a) Inspect for oil leaks throughout system especially at crank case joints, drain plugs, valve gear, cover plate, timing gear, joints oil cooler, oil pipes and unions.
- (b) Check all oil levels and top up where necessary using the correct grade of oil as laid down in General Maintenance Instruction No 5.
- (c) Clean all lubricating nipples and grease.
- (d) Check if any mileage task is due, and if so, carry it out.

Task No.312. *Electrical System*

- (a) Check starter motor, magneto and/or dynamo for mountings, secureness of terminals and functioning.
- (b) Check battery for secureness in holder, level of electrolyte, corrosion of terminals, clear vents. Clean, top up, vaseline terminals if necessary.
- (c) Check all wiring for frayed insulation tight connections, and continuity of circuit. Tighten insulate with tape where required.
- (d) Check serviceability of lamps, switches electrical accessories and fuses. Replace where required.

Task No 413. *Hydraulic System*

- (a) Check hydraulic tank for fluid, and secureness. Check all pipes for leaks, and hydraulic cylinder and pump for operation. Report if operation is noisy.
- (b) Check blade cutting edges, swivels pins, lock nuts for looseness, wear, breakage.
- (c) Check oil seals, grease fittings for leakage/breakage.
- (d) Where high pressure pipes show signs of leakage, get workshops to check control valve for correct functioning. (Do not attempt to adjust control valve-as this can only be done by workshop personnel.)

Monthly Tasks

14. The following monthly tasks will be carried out in strict rotation, one task being done each week and after completion of the cycle of weekly tasks.

Task No 515. *Transmission*

- (a) Check oil level, oil filters, drain plugs, joints of transmission casings and final drive casing Tighten top up where required.
- (b) Check linkages, pins, bushings, of steering clutch, brake pedal, master clutch, brake pedal locking mechanism, for wear and lubrication.
- (c) Check all thrust collars, sliding collars, clevis pins, split pins, bolts and nuts for wear and lubrication.

- (d) Report any grinding of gears, or humming noises from bearings.

Task No 616. *Track Group*

- (a) Inspect and tighten, loose bolts, nuts, cap screws, on track roller brackets, sprocket guard nuts, track adjustment spring cover bolts.
(b) Check for damage to grease fittings and replace where necessary.
(c) Check for damage to idler rollers, and idler.
(d) Examine for excessive wear of link pins and broken track chain.
(e) Check track tension, and adjust if necessary.

Task No 717. *Chassis*

- (a) Examine and tighten all bolts and nuts of brackets, body fittings, fenders, floor plates, tool box, and inspection cover plates.
(b) Check for tightness and leakage of all drain plugs and level plugs.
(c) Inspect draw bar bolts, guides, stop latches and pins.
(d) Layout tools, check deficiencies against tool list, clean, lightly oil and return to tool box.
(e) Check all external welding for cracks.
(f) Check all cushions, seats, control levers and fittings.

Task No 818. *Attachments and Miscellaneous*

- (a) Inspect, tighten bolts and make adjustments where necessary to deck sheaves, linkages swivels, and guards of PCU and winch.
(b) Check oil level, grease fittings of PCU, and winch.
(c) Check cables for secureness at splines, and clevis, and grease cables if required.
(d) Carry out any special maintenance peculiar to the vehicle.

Maintenance based on hours run

19. The following tasks will be carried out as they become due on an hour's basis, or when a replacement engine is fitted.

20. Where the tasks specify a change of oil, the correct type of oil specified in General Maintenance Instruction No.5 will be used.

21. The hour-figures given below are a general guide for normal working conditions of equipments of various makes and types. Where conditions of working such as terrain, and climate call for variation in these hour-figures, workshops will be consulted. The latter are authorised to stipulate a higher frequency of oil-change and maintenance.

- (a) New and reconditioned engines:-
Change engine oil on completion of first 50 hours.
(b) New and reconditioned Transmissions and Final Drives:
Change oil after first 100 hours.

(c) *Every 50 hours* (or approximately weekly).
Lubricate or check lubrication of

- (i) Water pump.
- (n) Speed governor. .
- (iii) Change air cleaner oil.
- (iv) Hour meter.
- (v) Starting clutch.
- (vi) Clutch fork.
- (vii) Starting engine gear case.
- (viii) Starter motor and generator.
- (ix) Steering clutch.
- (x) Brake pedal shaft.
- (xi) All grease points of track and suspension.
- (xii) Clean filters and strainers.
- (d) *Every 100 hours*.

Change engine oil

(e) *Every 200 hours*.

- (i) Change oil in speed governor.
- (ii) Change starting engine oil.

(f) *Every 500 hours*.

- (i) Change oil in gear box and final drives.
- (ii) Change oil in all bevel box gears.

Conclusion

22. It is only by *strict* attention to the principles of maintenance embodied in the above procedure that continued efficiency of operation of equipment is possible.

23. It may appear that as the time consumed in such maintenance is non-productive, and with so lengthy a drill, several hours of useful work is needlessly consumed. This in reality is not so, as once operators get accustomed to the drill, most of the tasks take only a few minutes to carry out. Besides it is not obligatory to blindly carry out a task where it is obviously not required under certain Conditions. It is sufficient in such cases, however, to ascertain that a particular point is lubricated.

24. The continued maintenance of equipment will be an important aspect that will be commented upon, and adjudged, in grading the maintenance efficiency of a unit, during CsEME annual inspection of Unit equipment.