GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
Research Designs and Standards Organisation
LUCKNOW

MAINTENANCE SCHEDULE FOR SELF PROPELLED ULTRASONIC RAIL TESTING CAR (SPURT CAR).

TECHNICAL REPORT NO. TM-18 A

TRACK MACHINES & MONITORING DIRECTORATE

FEBRUARY, 2000

This maintenance manual is based on experience gained in the day to day maintenance of SPURT Car under Track Machine and Monitoring (TMM) Directorate of RDSO. Although every care has been taken for incorporating all the necessary instructions and guidelines with supporting information for effective maintenance, these are subject to modification from time to time in the light of experience in future.

R.K.Mehta
Director/TM-V

Dharm Singh
Executive Director/TM

CONTENTS

08672

SCHEDULE -I (DAILY)

1. ENGINES (Drive Engine and DG set)

- Check level of lube oil and top up.
- Check and correct belt tension.
- Check air compressor for any leakage.
- Check leakage or fuel and lube oil from engine and pipes junctions/pipes.
- Check engine oil pressure.
- Record the maximum engine temperature of the day.
- Check and correct bolt tension.
- Check starting of engine/accelerator from either cabin.

2. POWER TRANSMISSION

- Check oil level and top up of ZF gear box at 80 C temperature.
- Check oil level and top up of axle gear box and distributor.
- Check tightness of cardon shaft bolts.
- Check leakage from gear box and correct it.

3. BODY FRAME AND UNDER GEAR

- Check axle bearing boxes for any abnormalities.
- Check braking of the car and brake pressure.

4. TESTING SYSTEM

i) Mechanical

- Disassemble and check probes.
- Clean probe holder beams and holders.
- Clean guiding system and check condition of guide wheels.
- Visual inspection of skids.
- Check wear of pads of rail cleaners.
- Check probe beam lifting device.
- After calibration, checking assembly of probe in position.
- Test operation of various movements and sensors and check pressure.

ii) Pneumatic

- Clean water separator.
- Check any air leakage.
- Check system pressure (7 bars)

iii) Hydraulic

- Check oil level in tank.
- Check operation of hydraulic jack movements.

iv) Paint System

- Check paint in paint drum. If required, fill it.
- Priming the system till continuous stream of paint with the same diameter as the pipe escapes from the return pipe (as long as 15 minutes).
- Check stroke of the pump.
- Check all paint guns and spray width.

v) Water System

- Check water level
- Check water coupling system.

vi) Electrical

- Check 3 phase power supply (Voltage 440/220, 50 HZ).
- Check/Clean battery terminals and supply 24 volts.
- Check circuit breakers and sensor led.

SCHEDULE-II (WEEKLY)

All items of schedule-I will also be attended along-with this schedule.

1. ENGINE

- Clean air filter assembly.
- Drain water/sediments etc from drain plug of pre-filter.
- Check foundation and bracket bolts of engine and air compressor.

2. POWER TRANSMISSION

- Grease axle gear box flange cover of driving bogie.
- Check foundation bolts of brake cylinder.
- Check function of air oiler.

3. BODY FRAME AND UNDER GEAR

- Check tightness of bolts.
- Clean under gear.

4. TESTING SYSTEM

i) Mechanical

- Check and clean testing trolley/probe beams.
- Check tightness of bolt and screw of trolley and beam.
- Clean vertical and lateral pins of probe beams.
- Overhaul probe holders.

ii) Pneumatic

- Check pipes, hoses and clamps for any leakage.

iii) Hydraulic

- Check pipes, hoses and clamps for any leakage.

iv) Paint system

- Clean paint drum.
- Priming paint system/cleaning by H.S.D oil.
- Check paint gun function, repair if necessary.

v) Water System

- Clean water filter.
- Check water flow at outlet point.

08675

5. ELECTRICAL

- Clean all battery terminals and put petroleum jelly.
- Check all electric panels and fuses.
- Check gravity of batteries, if required top up with distilled water.
- Any other electrical problem should be attended.

SCHEDULE-III (Monthly)

All items of schedule I and II will also be attended along this schedule.

1. ENGINES (Drive Engine and DG set)

- Clean engine externally.
- Clean fuel pre filter.
- Check visually fuel injector pump coupling bolts.
- Check compression mounting bolt.
- Check tension in V-belt.

2. POWER TRANSMISSION

- Check visually the universal joints.
- Grease all cardan shaft.
- Examine the splines for any fracture, distortion or any abnormalities.

3. BODY FRAME AND UNDER GEAR

- Check sliding surface and parts of the axle.
- Check rubber element of torgue, plate suspension.
- Check all brake leakage.
- Check swivelling system.

4. TESTING SYSTEM

08677

i) Mechanical

- Check the holding bolts and screws of the trolley.
- Grease/Lubricate all the moving parts.
- Check and clean of probe beam, repair if required.

ii) Pneumatic

- Check any leakage of pipe, hoses and coupling and repair if required.
- Clean pneumatic cylinder and mountings.
- Check daily and weekly operations more extensively.

iii) Hydraulic

- Check all pipe work for leakage.
- Check various components securely mounted on trolley.
- Check movement of hydraulic cylinder.

iv) Paint System

- Clean paint guns and paint filter.

v) Watering System

- Check the pipe and hoses of the system.

5. ELECTRICAL

- Clean EPC Cabinet by using vaccum cleaner.
- Check connection in EPC and junction boxes tight.
- Check lighting system of the car.

SCHEDULE-IV IOH-(Annual)

To be done after 60,000 Kilometers of testing or 4000 engine-hours or 1 year which ever is earlier.

1. ENGINES (Drive Engine and DG set)

- Decarbonise the engine heads.
- Overhaul the fuel injector pump.
- Overhaul the injectors.
- Replace the crank case breather.
- Adjust the timing of gear box.
- Rewire the engine wiring with temperature proof wires.
- Check engine timings.
- Overhaul self starter.
- Check and clean air reservoir.
- Change dry type air filter elements.
- Check the air compressor, overhaul if necessary.
- Replace `V' belts.
- Clean water separator and air lubricant.
- Renew fuel filter cartridges and lube oil cartridges.
- Check alternator..
- Clean turbo-charger and check for end and radial play.
- Cleaning of diesel tank.
- Change batteries if required.
- Test cylinder head warning system and engine-temperature sensor.
- Check/replace engine safety items viz. stop- solenoid and lube oil pressure switch.
- Clean engine cooling lube oil cooling system.
- Check tightness of pipes.
- Change anti-vibration mounting of the engine.
- Check r.p.m. of engine cooling fans.
- Check of fuel pump.
- Check accelerating mechanism.

2. POWER TRANSMISSION

- Check universal joints for play and replace if required.
- Grease all cordon shafts and tighten all bolts and nuts.
- Change the filter of axle gear box clutch.
- Visual inspection of any breakage, cracks, any distortion or any abnormalities.
- Change the pinion support bearing and check the adjustment of pinion shaft bearing.
- Clean and change oil of the axle gear box and distribution gear box (SAE-90).
- Change oil and filter cartridge of ZF gear box.
- Check shaft coupling cordon, shaft and universal joint flange for cracks and change if required.
- Check roaring (abnormal sound) of axle gear box, distribution gear box and ZF gear box.

3. BODY FRAME AND UNDER GEAR

- Check/repair of cracks of body frame.
- Check bogie pivot.
- Check /grease axle bearing of bogies.
- Check the bogie coil springs,shock absorbers and replace if required.
- Check meggi springs and replace if required.
- Check wheel tyre defect.
- Check complete brake assembly and change the breake shoes.
- Check wiper assembly. Replace wiper blade if required.
- Check buffer assembly and train coupling arrangement.
- Check of Parking brake system. Repair if necessary.
- Check and clean all pneumatic pipes, KE valve, air unloader, water separator etc.
- The leading dimension of the wheels and axles should be carefully checked.
- Spring seats to be checked.
- Side bearers to be renewed if worn out.
- Check bogie pivot and grease.

4. TESTING SYSTEM

i) Mechanical

- Check testing trolley, carrying wheels, Guide wheels and skids.
- Overhaul of Probe holding beam.
- Check/replace carrying wheel axles and bearings and Guide wheel bearings.
- Gauge adjustment of Guide wheels and skids.
- Repair slide rail and slide rollers of testing trolley.
- Check of clearance between probe beam and rail. Adjustment of meggi springs and beam holding system and accurate wheel dia. if necessary.
- Overhaul of rail cleaning system and replace rail cleaning pads.
- Overhaul the pre- moistening system.
- Change bushes of Probe holding beam.
- Change vertical pins and bore accordingly.
- Grease all the points of testing trolley and probe beam.
- Check freedom of Probe beam movement in vertical and lateral planes in reference of lateral and vertical pins.
- Check there should not exist any rotational movement in probe beam.

08680

ii) Pneumatic

- Check and clean all pneumatic pipes/hoses.
- Check all pneumatic valve (electro-magnetic servo valves) and replace if necessary.
- Check all the pneumatic cylinder and stroke.
- Check/replace of all the pneumatic jack's eye.

- Check pneumatic pressure of Guide wheel for in and out position.
- Clean all pneumatic jacks and seals.
- Check no leakage of pneumatic system.
- Check and clean of all flow regulator and pressure regulator with gauge.
- Check all pneumatic coupling and replace if necessary.

iii) Hydraulic

- Clean hydraulic tank and replace oil (Hydro-68).
- Check hydraulic motor and pump and repair if necessary.
- Check high pressure outlet filter assembly and change if required.
- Check in let filters.
- Overhaul of Electro-Magnetic Hydraulic Servo Valve.
- Check and clean all hydraulic pipes and hoses and distribution blocks.
- Check and clean hydraulic jacks.

iv) Paint Marking System

- Overhaul of paint pump.
- Clean all pipes and hoses of paint system and change if necessary.
- Overhaul of paint guns.
- Clean Paint drum and change filter.
- Overhaul air valve assembly and check system stroke and repair if required.

v) Watering System

- Clean water tank.
- Clean /replace water gauges.
- Clean water pipes and filters. Replace filter if required.
- Check water motor, pump and regulator and repair if required.
- Check and clean water jacket and water outlet.
- Check of water sensor and hydro meter and change if required.
- Check water solenoid valve.

5. ELECTRICAL

- Check and clean of three-phase 40 KVA alternator, bearing and rubber coupling of generator set.
- Check battery terminals and jumpers.
- Rewire the engine wiring/Gear box wiring with temeperature proof wires.
- Change coach grounding jumpers.
- Check water motor and pump and repair if necessary.
- Check system electrical grounding/short circuiting and repair if required.

- Check all cab lights,head lights, search lights and parking lights. Repair if required.
- Check all circuit brakers of 220 V/24V, replace if required.
- Check all electrical switches and replace if required.
- Change all fuses and clean fuse holders.
- Check all relays and change if necessary.
- Check all meters and led on driving desk and change if required.
- Check throttle control and gear selector. Repair/replace if required.
- Check all AC/heaters system and fans. Repair if required.
- Check all PCBs of driving system and repair if required.
- Check battery charger and alternators.
- Check all electrical connections of testing system like pneumatic, hydraulic, paint and beam etc.
- Check all electrical connection of electronic cabinet (Regarding testing) in the direction of electronic person of RDSO.

SCHEDULE-V (POH)

To be done after 2,00,000 kilometers of testing or 6,000 engines hours or 3 years which ever is earlier.

1. ENGINES (Drive Engine and DG set)

- Overhaul the engines.
- Overhaul the self-starter.
- Change mounting assembly of the engine.
- Check and clean of diesel tank and pipes.
- Change all the high pressure fuel lube oil pipes, pipe clamp, flexible hoses and rubber hoses.
- Overhaul the turbo charger assembly.
- Overhaul the cooling system of the engine and oils.
- Overhaul the air compressor and change the pipes.
- Overhaul the blower assembly.
- Change engine safety items.
- Change stop-solenoid valve.
- Overhaul air cleaner system.
- Change all engine filters and lube oil.
- Check engine throttle system and replace if required.
- Change air filters.

2. POWER TRANSMISSION

- Overhaul the axle gear box, distribution gear box and ZF gear box.
- Overhaul the propeller shaft, and replace if required.
- Replace shaft coupling and holding bolts and nuts.
- Overhaul all universal joints.
- Change shaft seals and bearings of the clutch drive shaft assembly.

3. BODY FRAME AND UNDERGEAR (3 YEARS)

- Check chassis side members, cross frames, buffer beams and welded joints etc. if damaged it should be repaired.
- Overahul the driving bogie and measuring bogie.
- Check bogie side frame, bolster, springs, shock absorber, wheel torque supports, meggi spring, shackels. If any damage or abnormalities found should be changed.
- Check bogie pivots.
- Old axles should be used only after reprofiling of wheels. Axles may be replaced if bearing or journals are loosened.
- Check the wheel, wheel dia. if required repair or replace.
- Check all pipes, pressure regulator of air brake assembly, if required repair or replace.
- Overhaul the brake assembly, KE valve, air reservoir with drain, water separator and safety valve, and parking brake.

08683

- Overhaul buffer assembly, KE Valve air reservoir, with drain, water separator and safety valve, and parking brake.
- Overhaul buffer assembly and train coupling arrangement.
- Check body frame. If required repair it.
- Complete machine may be painted by approved paint scheme at alternate POH of 3 years.
- Overhaul parking brake and emergency brake system.
- The leading dimension of the wheels and axles should be carefully checked and turn the wheels or replace.
- Spring seats to be checked.
- Side bearers to be renewed if worn out.
- Check bogie pivot and grease.
- Check the buffer height after wheel turning and adjust it.
- Overhaul axle and centre pivot bearings and replace if required.

4. TESTING SYSTEM

i) Mechanical

- Overhaul of testing trolley and repair if crack, damaged or abnormalities found.
- Overhaul of probe beam and replace all bushes and pins.
- Changing of Guide wheel and bearing.
- Repair skid and gauge adjustment.
- Reprofile of carrying wheel and repair/ replace of carrying wheel if required.
- Overhaul carrying wheel bearings.
- Check/repair Guide wheel and rollers of testing trolley.

ii) Pneumatic

- Change all pneumatic jacks (old serviceable may be returned to RDSO).
- Replace water separator.
- Change all pneumatic hoses and pipes if required.
- Overhaul/change pneumatic servo-valve.
- Overhaul rail cleaner and change the pad.

iii) Hydraulic

- Overhaul hydraulic motor and pump.
- Replace all the hydraulic hoses and pipes alongwith clamps.
- Check all hydraulic jacks, change if necessary.
- Check hydraulic tank, inside surface is to be painted with approved type of paints.
- Check all the hydraulic electro-servo valve and distributor block.

08684

iv) Paint System

- Overhaul paint pump, change all rubber nylon item.
- Replace all pipes and hoses.
- Overhaul the air valve assembly . Worn part should be changed.
- Replace the paint gun.
- Clean paint drum and its accessories.
- Replace paint filter.

v) Watering System

- Overhaul the water motor, pump and requlgator. Repair if required.
- Clean water tank and paint the inner surface with approved paint.
- Check and clean water pipe. Replace if required.
- Clean water jacket and replace outlet nozzles.

5. ELECTRICAL SYSTEM

- Complete check electric circuit of the car. (Cab, head lights, 24 V supply to various testing system, AC 220 V supply :
- Replace defective PCB's.
- Change all fuses of 24 V circuit and 220 V circuit.
- Rewire the engine wiring with temperature proof wire.
- Check LED's of all solenoids.
- Change all defective switches and lights.
- Overhaul the panel boxes.
- Arrange insulation test of main cables and replace the defective one.
- Replace batteries.
- Change car body, grounding strips.
- Check all driving desk meter and replace if required.

08685