



**GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS**

**MAINTENANCE SCHEDULE MANUAL  
FOR  
WORKSITE TAMPING MACHINE  
(METEX MAKE)**

**REPORT NO. TM-141**

**JUNE-2010**

**RESEARCH DESIGNS & STANDARDS ORGANISATION  
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## PREFACE

Maintenance of On-Track Machines is a challenging task. Maintenance of these machines is being done by zonal railways with the assistance of local trade available, zonal track machine workshops, CPOH / Allahabad and RDSO / Lucknow. With experience over the years, the railway engineers have developed adequate expertise in the maintenance of these machines. However, in absence of approved maintenance instructions, different maintenance practices have come into vogue. Therefore, it has become imperative to have a uniform maintenance standard throughout the Indian Railways. Maintenance schedule manuals of CSM (09-32), BCM (RM-80), FRM-80, Unimat, Duomatic machine (DUO), Unomatic machine (UNO), Ballast Regulating Machine (BRM 66-4), Tamping Express (09-3X), Dynamic Track Stabilizer (DGS 62N), Multi purpose track tamping machine (Unimat Compact--M), Plasser's Quick Relaying System (PQRS), T-28, Track Relaying Train (TRT), Phooltas make UTV, FRM-85F and Worksite Tamping Machine (Plasser make) have been issued by RDSO

Maintenance schedule manual of Worksite Tamping Machine (Metex make) have been prepared on the basis of experience and suggestions received from railways.

It is hoped that this manual will be quite useful for the staff maintaining the machines in field.

While every care has been taken to make the maintenance schedules quite exhaustive, there is always scope for further improvement. Suggestions from the railways in this regard will be welcome and may be sent to the undersigned.

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JUNE -2010

## EXPLANATORY NOTES

While preparing text of Maintenance Schedules Manual for Work Site Tamping machine (metex make), the terms used and their meanings are explained below:

- CHECK - Ensure a specific condition does (or does not) exist.
  
- INSPECT - Look for damage and defects including breakage, distortion cracks, corrosion and wear, check for leaks, security and that all items are completed.
  
- CHANGE - Remove old parts by substituting a new or overhauled/reconditioned part. Fit new or overhauled / reconditioned part in place of missing part.
  
- OVERHAUL - Dismantle, examine, recondition or renew parts as necessary against given specifications, reassemble, inspect and test.

## INDEX

<b>S.NO.</b>	<b>DESCRIPTION</b>	<b>PAGE NO.</b>
1.	Schedule I	1-2
2.	Schedule II	3
3.	Schedule III	4
4.	Schedule IV	5
5.	Schedule V	6
6.	Schedule VI	7
7.	Schedule VII	8-9
8.	Annexure-I	10
9.	Annexure-II	11
10.	Acknowledgement	12

**SCHEDULE – I  
(TO BE DONE DAILY)  
DURATION – ONE HOUR**

**1. ENGINE:**

- i) Check the engine oil level and top up if required.
- ii) Check fuel level and top up if required.
- iii) Check water level in radiator and top up if required.
- iv) Check and prevent water and fuel leakage, if any.
- v) Check the air cleaner chocking indicator. If indicator is red, the outer filter is to be cleaned.
- vi) Check the tension and condition of V-belts and do needful.
- vii) Drain the air tanks after the day's work.
- viii) Drain the water separator before starting the engine.
- ix) Record the maximum engine temperature of the day's work.
- x) Check the engine oil pressure:
  - a) at Idle
  - b) On load after two hrs. working
- xi) Clean the engine and premises.
- xii) Check the system of disengaging the main clutch.
- xiii) Check the level of compressor oil.
- xiv) Check the battery charging system.

**2. MACHINE GENERAL:**

- i) Lubricate the arm bearing with grease.
- ii) Check and top up the oil reservoir for lubrication of vibration shaft bearing.
- iii) Check the oil level of tank for lubrication of guide columns and top up if required.
- iv) Check the locking arrangement of tamping units.
- v) Check the worn out tamping tools (limit 20% on area basis), and change if required.
- vi) Check the tightness of tamping tools and infringement with one another.
- vii) Check locking arrangement of lifting/lining units.
- viii) Apply lube oil on bush bearings of feeler rods of shadow board trolley.
- ix) Check the hydraulic hoses and seals for leakage and attend as required.
- x) Top up the air oiler with hydraulic oil.
- xi) Check and top up the hydraulic oil tank. If required.
- xii) Check the brake application.
- xiii) Check the functioning of pneumatic system.

- xiv) Observe the leakage from all gear boxes.
- xv) Check the tightness of cordon shaft bolts and do the needful.
- xvi) Check the engaging/disengaging of clutch in travelling and working mode.
- xvii) Check the functioning of intercom system.
- xviii) Check the functioning of computer.
- xix) Check the locking pin of consolidator.
- xx) Record the maximum hydraulic temperature of the day's work.
- xxi) Greasing of connecting rod bearing, vibration shaft, eye and fork end of squeezing cylinders is to be done after two hours of working.
- xxii) Check the unusual sound from machine.
- xxiii) Clean the machine from dust.

## SCHEDULE - II

(TO BE DONE AFTER 50 HOURS OF ENGINE RUNNING)  
DURATION- TWO HOURS

### 1. ENGINE:

- i) Check battery terminals and connection.
- ii) Check specific gravity of battery electrolyte.

### 2. MACHINE GENERAL:

- i) Check the oil level of power shift gear box and top up, if required.
- ii) Check the condition of brake shoe.
- iii) Check the functioning of hand brake.
- iv) Lubricate axle gear box flange cover with grease.
- v) Lubricate the cordon shaft with grease.
- vi) Check tightness of 35mm and 55 mm pin.
- vii) Check nuts and bolts of suspension block of Tamping units.
- viii) Clean the air breather of tamping units and gear boxes.
- ix) Check the oil level of distribution gear box and top up if required
- x) Check the oil level of hydraulic working drive reduction gear box and top up if required.
- xi) Check the oil level of axle gear boxes and top up if required.
- xii) Check the oil level of drive intermediate shaft and top up if required
- xiii) Lubricate the tamping unit frame guide bushes with grease.
- xiv) Lubricate the lifting/lining units with grease.
- xv) Clean and lubricate the front and rear feeler rod with grease.
- xvi) Lubricate the supporting area of slider with grease.
- xvii) Lubricate the guide bushing of front, middle and rear feeler with engine oil.
- xviii) Lubricate the pivot of middle feeler with grease.
- xix) Lubricate all other moving parts except above with oil or grease.
- xx) Check air leakage from pneumatic system.
- xxi) Check all lights for proper functioning.
- xxii) Check the bolts of cover plate of squeezing cylinders for tightness.
- xxiii) Check the tightness of tamping cylinders holding bracket bolts.

**NOTE:** While doing this schedule all works of schedule (I) have also to be carried out.

## **SCHEDULE – III**

**(TO BE DONE AFTER 100 HOURS OF ENGINE RUNNING)  
DURATION- ONE DAY**

### **1. ENGINE:**

- i) Check high engine temperature safety device.
- ii) Check low lube oil pressure safety device.
- iii) Check the functioning of throttle control linkage.
- iv) Examine the mounting bolts of the engine.
- v) Check and lubricate hand brake.

### **2. MACHINE GENERAL:**

- i) Inspect the water separator for proper functioning.
- ii) Inspect the bolts of cardan shafts for tightness.
- iii) Lubricate the tamping unit lateral adjusting cylinder with grease.
- iv) Examine the expiry date of fire extinguisher.
- v) Lubricate the bogie turning king pin pivot with grease.
- vi) Check the oil level of all gear boxes and top up if required.
- vii) Check the condition of lining and leveling chords and clean them in kerosene oil.

**NOTE:** While doing this schedule all works of schedule (I) and (II) have also to be carried out.

## SCHEDULE-IV

(TO BE DONE AFTER 200,400,600 and 800 HOURS OF ENGINE RUNNING)  
DURATION-TWO DAYS

### 1. ENGINE:

- i) Change the engine oil.
- ii) Change the compressor oil.
- iii) Change lube oil filter element.
- iv) Change pre fuel filter element.
- v) Change secondary fuel filter.
- vi) Change the air cleaner elements.
- vii) Lubricate all the engine pulley bearings with grease.
- viii) Check engine cylinder head bolts.
- ix) Change clutch shaft flange locking bolts.

Note : 1. Item no. i) to v) will be done after 250 engine hrs.  
2. Item no. vi) will be done after 500 engine hrs.

### 2. MACHINE GENERAL:

- i) Change the suction filter.
- ii) Change oil of funk gear box.
- iii) Change oil of transmission gear box.
- iv) Change the oil of axle gear boxes.
- v) Change the oil of intermediate shaft.
- vi) Change the hydraulic oil of reservoir for lubrication of vibration shaft main bearing.
- vii) Change oil of reservoir for lubrication of vertical guide rod of tamping units
- viii) Replace silica gel of Pneumatic system.
- ix) Lubricate the torque arm pivot of powered bogie with grease.
- x) Lubricate the brake linkages of powered bogie with grease.
- xi) Change the servo filter element.
- xii) Change the return line filter element.

Note: Item no. i),,iii),iv),v) and ix) will be done after 500 engine hrs.

**NOTE:** While doing this schedule all works of schedule (I),(II)and (III) have also to be carried out.

**SCHEDULE-V**  
**(IOH)**  
**(TO BE DONE AFTER 1000, 3000, 5000 HOURS OF ENGINE RUNNING)**  
**DURATION- 7 DAYS**

**1. ENGINE:**

- i) Change worn out water hoses.
- ii) Check coolant for PH value.
- iii) Overhaul the self starter.
- iv) Overhaul the alternator.
- v) Overhaul the injectors.
- vi) Overhaul the fuel injection pump.
- vii) Overhaul the air compressor.
- viii) Clean the engine radiator externally.
- ix) Change the batteries on condition basis.
- x) Clean the diesel tank.
- xi) Clean the cooling coil.

**2. MACHINE GENERAL:**

- i) Overhaul/ Replace the tamping units, if required.
- ii) Overhaul/Replace the lifting units, if required
- iii) Send the hydraulic oil for chemical testing for viscosity, water content, purity and acid content etc.
- iv) Clean the hydraulic oil through 10 $\mu$ , if found OK in chemical testing otherwise fill the new oil.
- v) Clean the hydraulic oil tank.
- vi) Check the bearings of all the axles and lubricate with grease.
- vii) Check the condition of meggi springs and replace them if required.
- viii) Recondition the worn out wheels of all sensing trolleys, if required.
- ix) Check bearing of sensing trolley wheels and lubricate them with grease.
- x) Change the hydraulic hoses, which are damaged.
- xi) Change the seals of leaking hydraulic cylinders, If any.
- xii) Overhaul all the transducers.
- xiii) Change the defective transducer fork.
- xiv) Thoroughly clean all the panel boxes with pressurized air.
- xv) Change defective or missing lights.
- xvi) Calibrate the sensing trolleys for level.
- xvii) Strengthen the machine frame where cracks have been developed.
- xviii) Change the brake shoes.
- xix) Change lubricant of hand brake gear.
- xx) Calibrate the machine on track for all functions.

**NOTE:** While doing this schedule all works of schedule (I),(II),(III) and (IV) have also to be carried out.

**SCHEDULE-VI**  
**(IOH)**  
**(TO BE DONE AFTER 2000 AND 4000 HOURS OF ENGINE RUNNING)**  
**DURATION - 45 DAYS**

**1. ENGINE:**

- i) Overhaul the engine, if required.
- ii) Change all the water hoses.
- iii) Overhaul the water separator and air oiler.
- iv) Overhaul the air unloader.
- v) Check crank shaft end clearance.
- vi) Check the vibration damper for dynamic balance.
- vii) Change fuel pump screen filter.

**2. MACHINE GENERAL:**

- i) Change the seal of brake cylinders.
- ii) Inspect functioning of limit switches.
- iii) Clean and repair the hydraulic oil cooler, if it is blocked more than 20% or badly leaking.
- iv) Change the damaged pneumatic pipes.
- v) Overhaul the pneumatic valves, if required and change unserviceable ones.
- vi) Change the seals of all pneumatic cylinders.
- vii) Check the machine wheels for tyre defects. Reprofile or replace if required.
- viii) Change the defective switches and potentiometer.
- ix) Change the cartridge of air dryer.

**NOTE:** While doing this schedule all works of schedule (I),(II),(III),(IV)and (V) have also to be carried out.

**SCHEDULE-VII**  
**(POH)**  
**(TO BE DONE AFTER 6000 HOURS OF ENGINE RUNNING)**  
**DURATION-90 DAYS**

**1. ENGINE:**

- i) Overhaul or replace the engine.
- ii) Overhaul the radiator fan drive assembly.
- iii) Change the engine mounting pads.
- iv) Check the engine damper for dynamic balance.
- v) Change the water separator and air oiler.
- vi) Change the air unloader.

**2. MACHINE GENERAL:**

- i) Change all hydraulic pumps.
- ii) Change all hydraulic motors.
- iii) Check and recharge the hydraulic accumulators.
- iv) Change the hydraulic cylinders on condition basis otherwise replace all the seals.
- v) Change all the D.C. and pilot operated valves.
- vi) Get calibrated the proportional valve, if possible; otherwise replace it with new one.
- vii) Change all pressure control valves.
- viii) Check the functioning of all stopcock and flow control valves, if anyone found defective then replace it with new ones.
- ix) Change all hydraulic hoses along with crimped fittings.
- x) Clean the hydraulic tank. Inside to be painted with approved quality paint.
- xi) Flush the complete hydraulic system.
- xii) Change all pneumatic hoses.
- xiii) Check and clean the cooling coil.
- xiv) Test the air tanks for rated air pressure.
- xv) Change all pneumatic valves.
- xvi) Change the pneumatic cylinders on condition basis, which were creating the frequent trouble during work. Otherwise replace seals only.
- xvii) Renew the complete wiring of the machine if existing wiring found more than 40% damaged otherwise replace only the damaged circuits.
- xviii) Overhaul the brake cylinders and replace the seals if cylinder is o.k.
- xix) Overhaul the sensing trolleys.
- xx) Re-profile all the trolley wheels.

- xxi) Change the axle bearings.
- xxii) Overhaul all the gear boxes.
- xxiii) Overhaul the cardan shafts.
- xxiv) Check the limit switches and replace on condition basis.
- xxv) Overhaul the pendulums.
- xxvi) Overhaul the panel boxes and provide thimbles as required.
- xxvii) Change the defective switches and indicator lights.
- xxviii) Check and replace the defective LED's of solenoids if required.
- xxix) Calibrate all the potentiometers for zero correction.
- xxx) Check the machine frame for crack and strengthen as necessary.
- xxxi) Paint the complete machine with approved quality paint.
- xxxii) Calibrate the machine in all respects.

**NOTE:** While doing this schedule all works of schedule (I),(II),(III),(IV), (V) and (VI) have also to be carried out.

## Annexure- I

### IMPORTANT DATA AND INSTRUCTIONS FOR MAINTENANCE OF MACHINE

1. Working pressure 130-140bar
2. Tamping unit vibration pressure 150 bar
3. Squeezing pressure 90-135 bar
4. Minimum thickness of brake block 13 mm
5. Minimum clearance between brake block and wheel 3-5mm
6. For examination of fire extinguisher check the instruction of manufacturer (seal should be intact and nozzle should be free from obstructions).
7. Oil used as damping oil in pendulums silicon oil (M200/12500)
8. Never operate the engine with oil level below low mark or above the high mark.
9. Keep the engine oil level as near high mark as possible.
10. Check the oil level of power shift gear box at 1200 RPM  
For lower level at 40°C  
For upper level at 80°C
11. When greasing and lubricating, remove excessive grease or oil before re-greasing and re-lubrication the machine parts.

### GENERAL SAFETY NOTES.

1. The machine has to be operated according to existing Indian Railways Rules & Regulations.
2. The safety of yourself and other people is most important consideration in the operation and maintenance of the machine.
3. Remember, the machine is a working unit, carrying delicate instruments. Therefore, the machine should not be driven at excessive speed over bad track or crossing.
4. Always keep your eyes open for other men working close to the machine.
5. Do not forget to look out for signals, switches and track obstructions.
6. Make sure that all protection equipment and safety devices are in place on the machine and in working order especially when it is being driven from site to site.
7. Always keep the machine clean. Excessive oil or grease on the machine can cause you to slip and fall and is also to potential fire hazard.
8. Always lock the machine before you leave. Make sure that the machine is protected in accordance with railway regulations.
9. Whenever you have the opportunity while waiting to get out on a job, do some of the smaller maintenance job, such as tightening loose nuts and bolts and cleaning the machine.
10. Do not permit unauthorized persons to operate the machine.
11. It is prohibited to use fire on or near the machine.
12. When ever going for working on or near the tamping bank area, operate the emergency push button and ensure latching position.
13. Do not tow the machine if the final drive is engaged.

## ACKNOWLEDGEMENT

Following officers and staff have made their valuable contributions in finalization of Maintenance Schedule manual for Worksite Tamping Machine (Metex make).

### RAILWAYS

1. Shri	I.K.Gupta	SE/TMC/NCR/JHS
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