

## MAINTENANCE SCHEDULE MANUAL FOR BALLAST REGULATING MACHINE (USP 2000 SWS)



**Report No.TM - 203**

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**RESEARCH DESIGNS & STANDARDS ORGANISATION**

**LUCKNOW- 226 011**

## 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.

This Maintenance Schedule manual for Ballast Regulating Machine (USP 2000SWS) has been prepared on the basis of Maintenance instruction given by OEM and suggestions received from different railways. The suggestion and feedback from field has been taken and incorporated in this these maintenance schedules. Suggestion/instruction given by OEM time to time also followed in addition to this manual. The manual is prepared for those items which is required day to day maintenance. Apart from these instruction if any part of machine fails/breakdown that shall be attended immediately by the railway. The oiling and greasing shall be done of every moving part where as required in addition to manual depending on discretion of machine in charge. Some time machine modified/alterd on the basis of experience or OEM suggestion that shall be also undertaken in the maintenance practice.

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 for future improvement.

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## EXPLANTORY NOTES

While preparing text of schedules for maintenance of Ballast Regulating Machine (USP 2000 SWS), 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 - Fit new or overhauled or reconditioned part in place of old parts and missing parts.
- OVERHAUL - Dismantle, examine, recondition or renew parts as necessary against given specifications, reassemble, inspect and test.

### **Maintenance Schedule for Ballast Regulating Machine** **(USP 2000 SWS)**

S. N	Schedule	Periodicity	Duration	Location
1.	Schedule I	Daily/ before working and running	One hour	In the track Machine siding
2.	Schedule II	50 Engine hrs.	Two hrs.	-do-
3.	Schedule III	100 Engine hrs.	One day	-do-
4.	Schedule IV	200 Engine hrs.	Two days	-do-
5.	Schedule V	1000 Engine hrs.	7 days	In Satellite Depot/Zona I Workshop
6.	Schedule VI	2000 Engine hrs.	15 days	In Zonal Workshop
7.	Schedule VII	6000 Engine hrs.	1st POH-45 days, 2nd POH-60days	CPOH Workshop

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SR.NO.	ITEM	SCH.I Daily	SCH.II 50HRS.	SCH.III 100 HRS.	SCH.IV 200 HRS.	SCH.V 1000 HRS.	SCH.VI 2000HRS.	SCH.VII 6000 HRS.
<b>1.</b>	<b>Engine KTA-1150L</b>							
I.	Check coolant level of radiator and top up, As required.	√	x	x	x	x	x	x
II.	Check level of engine oil & top up, as required.	√	x	x	x	x	x	x
III.	Check fuel level & top up, if required.	√	x	x	x	x	x	x
IV.	Check the leakage from fuel pump, injectors, fuel Supply and return pipes and do needful.	√	x	x	x	x	x	x
V.	Check the leakage from hoses, water pump seal etc. and do the needful.	√	x	x	x	x	x	x
VI.	Check the physical condition of V belt and do the Needful.	√	x	x	x	x	x	x
VII.	Check air cleaner filter choking indicator.	√	x	x	x	x	x	x
VIII.	Clean the engine & premises.	√	x	x	x	x	x	x
IX.	Check engine oil pressure on load after two hours working	√	x	x	x	x	x	x
X.	Record the maximum engine temperature of the day's Work.	√	x	x	x	x	x	x
XI.	Drain water from air receiver after day's work.	√	x	x	x	x	x	x
XII.	Drain sediment from Fuel tanks.	√	x	x	x	x	x	x
XIII.	Drain sediment from Fuel Filter.	√	x	x	x	x	x	x
XIV.	Drain sediment from Water Separator.	√	x	x	x	x	x	x
XV.	Check charging ammeter of batteries (it should be +ve)	√	x	x	x	x	x	x
XVI.	Check battery terminal and connection for tightness.	x	√	√	√	√	√	√
XVII.	Apply petroleum jelly on battery terminal.	x	√	√	√	√	√	√
XVIII.	Check injector pipes for any rubbing and do needful	x	√	√	√	√	√	√
XIX.	Clean the water separator.	x	√	√	√	√	√	√
XX.	Open and clean dust collector/pan, if applicable.	x	√	√	√	√	√	√
XXI.	Top up air oiler if required.	x	√	√	√	√	√	√
XXII.	Check water temperature safety device.	x	x	√	√	√	√	√
XXIII.	Check lube oil pressure safety device.	x	x	√	√	√	√	√

SR. NO.	ITEM	SCH.I Daily	SCH.II 50 HRS.	SCH.III 100 HRS.	SCH.IV 200 HRS.	SCH.V 1000 HRS.	SCH.VI 2000 HRS.	SCH.VII 6000 HRS.
XXIV.	Grease radiator fan drive	x	x	√	√	√	√	√
XXV.	Check the throttle control linkages.	x	x	√	√	√	√	√
XXVI.	Examine the mounting bolts of engine.	x	x	√	√	√	√	√
XXVII.	Change lube oil (engine).	x	x	x	√*	√*	√*	√*
XXVIII.	Change lube oil filter.	x	x	x	√*	√*	√*	√*
XXIX.	Change pre filter element (Diesel).	x	x	x	√*	√*	√*	√*
XXX.	Change secondary filter element.	x	x	x	√*	√*	√*	√*
XXXI.	Check fuel tank breather.	x	x	x	√*	√*	√*	√*
XXXII.	Clean outer air cleaner element.( Cleaned after every 250hrs or on dirt indication)	x	x	x	√	√	√	√
XXXIII.	Check corrosion Resistor Coolant.	x	x	x	√*	√*	√*	√*
XXXIV.	Check Coolant additive concentrate	x	x	x	√*	√*	√*	√*
XXXV.	Clean the centrifuge.	x	x	x	√*	√*	√*	√*
XXXVI.	Check tappet clearance and adjust if required.	x	x	x	√	√	√	√
XXXVII.	Clean crank case air breather.	x	x	x	√	√	√	√
XXXVIII.	Check and change radiator hoses, if required.	x	x	x	√	√	√	√
XXXIX.	Check specific gravity of battery electrolyte.	x	x	x	√	√	√	√
XL.	Check coupling disc of injection pump.	x	x	x	√	√	√	√
XLI.	Clean the compressor breather.	x	x	x	√	√	√	√
XLII.	Change foundation bolts of compressor, if applicable.	x	x	x	√	√	√	√
XLIII.	Clean diesel tank with lint free cloth.	x	x	x	x	√	√	√
XLIV.	Check the RPM of engine radiator fan and do the needful.	x	x	x	x	√	√	√
XLV.	Change the oil of air compressor.	x	x	x	x	√	√	√
XLVI.	Change inner air cleaner element.	x	x	x	x	√**	√**	√**
XLVII.	Change outer air cleaner element.	x	x	x	x	√**	√**	√**
XLVIII.	Overhaul air compressor, if applicable.	x	x	x	x	√	√	√

\*Done after every 300 Engine hours \*\* Done after every 500 Engine hours

SR. NO.	ITEM	SCH.I Daily	SCH.II 50 HRS.	SCH.III 100 HRS.	SCH.IV 200 HRS.	SCH.V 1000 HRS.	SCH.VI 2000 HRS.	SCH.VII 6000 HRS.
XLIX.	Overhaul self starter.	x	x	x	x	√	√	√
L.	Overhaul alternator.	x	x	x	x	√	√	√
LI.	Check engine timing.	x	x	x	x	√	√	√
LII.	Change batteries, as applicable.	x	x	x	x	√	√	√
LIII.	Overhaul the injectors.	x	x	x	x	√	√	√
LIV.	Overhaul the fuel injection pump	x	x	x	x	√	√	√
LV.	Clean the engine radiator.	x	x	x	x	x	√	√
LVI.	Top overhaul or replace the engine on condition basis.	x	x	x	x	x	√	√
LVII.	Check bearing and shaft of radiator fan drive and do needful.	x	x	x	x	x	√	√
LVIII.	Change the engine mounting pads	x	x	x	x	x	√	√
LIX.	Overhaul water pump.	x	x	x	x	x	√	√
LX.	Overhaul the radiator fan drive assembly.	x	x	x	x	x	x	√
LXI.	Check engine damper for any damage.	x	x	x	x	x	x	√
LXII.	Check the RPM of engine radiator fan, if less than the rated RPM, take corrective measures.	x	x	x	x	x	x	√
LXIII.	Clean inner side of diesel tank.	x	x	x	x	x	x	√
LXIV.	Clean/Replace cooling coil.	x	x	x	x	x	x	√
<p>Note: final decision for maintenance of engine may be followed as per OEM guide lines of engine manual. Maintenance of engine shall be exercise as per advice by OEM time to time</p>								

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<b>2.</b>	<b>Power Transmission and Gear box</b>							
I.	Record the maximum temperature of hydraulic fluid during the day's work.	√	x	x	x	x	x	x
II.	Check the oil leakage from all gear boxes and do the needful.	√	x	x	x	x	x	x
III.	Grease king pin pivot of driving & idle bogies.	x	√	√	√	√	√	√
IV.	Grease axle gear box flange cover of driving bogie.	x	√	√	√	√	√	√
V.	Check oil level of intermediate drive shaft.	x	√	√	√	√	√	√
VI.	Check oil level of cardan shaft power divider/power distribution.	x	√	√	√	√	√	√
VII.	Check the tightness of cardon shaft bolts.	x	√	√	√	√	√	√
VIII.	Lubricate all dirt repelled with grease (shell Alvania RL-2).	x	√	√	√	√	√	√
IX.	Check oil level of Pump drive gear box (at 1000 rpm), and top up after stopping engine if required.	x	√	√	√	√	√	√
X.	Visual check of oil leakage and level of all gear boxes.	√	√	√	√	√	√	√
XI.	Grease all brake linkages.	x	√	√	√	√	√	√
XII.	Grease hand brake gear.	x	√	√	√**	√	√	√
XIII.	Check oil level of axle gear box.	x	√	√	√	√	√	√
XIV.	Grease king pin pivot, torque arm pivot and gear box flange cover of driving & idle bogies	x	x	√	√	√	√	√
XV.	Greasing the cardon shafts.	x	x	√	√	√	√	√
XVI.	Inspect distributor gear box cover through inspection window.	x	x	√	√	√	√	√

\*Done after every 300 Engine hours \*\* Done after every 500 Engine hours



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<b>3.</b>	<b>PLOUGH &amp; BROOM UNIT</b>							
I.	Check locking and unlocking of Broom units.	√	x	x	x	x	x	x
II.	Change worn out Grader Blade (20% maximum wear on area basis)	√	x	x	x	x	x	x
III.	Check tightness of Grader Blade.	√	x	x	x	x	x	x
IV.	Check for any unusual sound from Grader Blade & hydraulic pumps.	√	x	x	x	x	x	x
V.	Check and tighten shoe plate bolts of guide column.	x	√	√	√	√	√	√
VI.	Check and tighten Plow cylinder cover plate bolts.	x	√	√	√	√	√	√
VII.	Grease hinge of Plow unit up/down cylinder	x	√	√	√	√	√	√
VIII.	Grease crank pin.	x	√	√	√	√	√	√
IX.	Check Plow unit cylinder holding bracket bolts for tightness (LHS).	x	√	√	√	√	√	√
X.	Check Plow unit cylinder holding bracket bolts for tightness (RHS).	x	√	√	√	√	√	√
XI.	Check the nuts of 55 mm and 35 mm pin for tightness (LHS).	x	√	√	√	√	√	√
XII.	Check the nuts of 55 mm and 35 mm pin for tightness (RHS).	x	√	√	√	√	√	√
XIII.	Check Plow unit locking device (LHS).	x	√	√	√	√	√	√
XIV.	Check Plow unit locking device (RHS).	x	√	√	√	√	√	√
XV.	Overhaul/replace Grader Blade, if required.	x	x	x	x	√	√	√
<b>Note :All movable parts other than not mentioned in this schedule to be lubricated with grease/ oil</b>								

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<b>4.</b>	<b>Hydraulic</b>							
I.	Check and top up hydraulic oil tank.	√	x	x	x	x	x	x
II.	Record the maximum temperature of hydraulic fluid during the day's work.	√	x	x	x	x	x	x
III.	Check the leakage from hydraulic hoses and do Needful.	√	x	x	x	x	x	x
IV.	Change return line filter element.	x	x	x	√	√	√	√
V.	Change oil of intermediate drive shaft.	x	x	x	√	√	√	√
VI.	Change oil of axle gear boxes and pump drive gear box.	x	x	x	√	√	√	√
VII.	Change filter of axial piston pump.	x	x	x	√*	√*	√*	√*
VIII.	Change suction filters.	x	x	x	√*	√*	√*	√*
IX.	Check all pressure controls for rated settings.	x	x	x	√	√	√	√
X.	Change oil of distribution gear box.	x	x	x	√	√	√	√
XI.	Send sample of hydraulic oil for physical & chemical test.	x	x	x	x	√	√	√
XII.	Clean the hydraulic reservoir and fill laboratory Tested /new oil as required.	x	x	x	x	√	√	√
XIII.	Replace the hydraulic hoses which are damaged by external abrasion.	x	x	x	x	x	√	√
XIV.	Provide the missing clamps	x	x	x	x	x	√	√
XV.	Check the hydraulic motors for proper function and do needful.	x	x	x	x	x	√	√
XVI.	Check the D.C. valves for leakage and do needful.	x	x	x	x	x	√	√
XVII.	Replace the seals of all hydraulic cylinders along with gland bushes /piston.	x	x	x	x	x	√	√
XVIII.	Change all hydraulic pumps and motors.	x	x	x	x	x	x	√
XIX.	Overhaul/Replace all hydraulic cylinders. If required	x	x	x	x	x	x	√
XX.	Replace all hydraulic hoses.	x	x	x	x	x	x	√
*Done after every 300 Engine hours								

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XXI.	Clean the hydraulic tank, inside to be painted with approved quality of paint.	x	x	x	x	x	x	√
XXII.	Fill new oil after replacing return line and suction filters.	x	x	x	x	x	x	√
XXIII.	Replace all pressure filters, proportional valve and servo valve filters.	x	x	x	x	x	x	√
XXIV.	Clean hydraulic oil cooler.	x	x	x	x	x	x	√
XXV.	Check the hydraulic accumulators and recharge, if required	x	x	x	x	x	x	√
XXVI.	Change all the direct acting and pilot operated D.C. valves.	x	x	x	x	x	x	√
XXVII.	Change all the pressure control valves.	x	x	x	x	x	x	√
XXVIII.	Replace all the stop cocks and flow control valves.	x	x	x	x	x	x	√
XXIX.	Flush the complete system.	x	x	x	x	x	x	√
XXX.	Overhaul all pressure controls and replace their kits, if required.	x	x	x	x	x	x	√
XXXI.	Change all Hydraulic pumps and motors only on need basis.	x	x	x	x	x	x	√
XXXII.	Replace all Hydraulic cylinders on condition basis.	x	x	x	x	x	x	√
XXXIII.	Replace all hydraulic hoses.	x	x	x	x	x	x	√
<b>5.</b>	<b>PNEUMATIC</b>							
I.	Check air brake pressure at locking position.	√	x	x	x	x	x	x
II.	Check pneumatic system for any air leakage.	√	x	x	x	x	x	x
III.	Top up the air oiler.	√	x	x	x	x	x	x
IV.	Clean cooling coil.	x	x	x	√	√	√	√
V.	Check air unloader for proper functioning.	x	x	x	√	√	√	√
VI.	Clean the air reservoir.	x	x	x	x	√	√	√
VII.	Overhaul the air unloader.	x	x	x	x	√	√	√
VIII.	Overhaul water separator and air oiler.	x	x	x	x	x	√	√

SR. NO.	ITEM	SCH.I Daily	SCH.II 50 HRS.	SCH.III 100 HRS.	SCH.IV 200 HRS.	SCH.V 1000 HRS.	SCH.VI 2000 HRS.	SCH.VII 6000 HRS.
IX.	Fill new oil after replacing return line and suction filters.	x	x	x	x	x	x	√
X.	Clean Hydraulic oil cooler. If it is blocked more than 20% during service or badly Leaking, then replace it.	x	x	x	x	x	x	√
XI.	Change all the direct acting and pilot operated directional valves. only on need basis	x	x	x	x	x	x	√
XII.	Manufacturer on their recommendation, these may be condemned and provide the new valves	x	x	x	x	x	x	√
XIII.	Change all the pressure control valves. only on need basis	x	x	x	x	x	x	√
XIV.	Replace the seals of all hydraulic cylinders along with gland bushes /piston and hone the cylinder barrel, required	x	x	x	x	x	x	√
XV.	Change pneumatic pipes leading to brake cylinders.	x	x	x	x	x	√	√
XVI.	Overhaul all pneumatic valves and change The unserviceable ones.	x	x	x	x	x	√	√
XVII.	Change the seals of all pneumatic cylinders.	x	x	x	x	x	√	√
XVIII.	Change the seals of brake cylinders	x	x	x	x	x	√	√
XIX.	Change Granulate cartridges after 2 years.	x	x	x	x	x	x	√
XX.	Replace air unloader.	x	x	x	x	x	x	√
XXI.	Test air tanks for rated pressure.	x	x	x	x	x	x	√
XXII.	Replace water separator and air oiler.	x	x	x	x	x	x	√
XXIII.	Change all pneumatic hoses.	x	x	x	x	x	x	√
XXIV.	Change all pneumatic valves.	x	x	x	x	x	x	√
XXV.	Change all pneumatic cylinders.	x	x	x	x	x	x	√

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<b>6.</b>	<b>MECHANICAL</b>							
I.	Apply lube oil on bush bearing.	√	x	x	x	x	x	x
II.	Check universal joints for play and replace, if required.	x	x	√	√	√	√	√
III.	Grease all brake linkages.	x	x	√	√	√	√	√
IV.	Check oil level of all gear boxes and fill up-to the mark, if required.	x	√	√	√	√	√	√
V.	Grease flange covers of gear boxes.	x	√	√	√	√	√	√
VI.	Check foundation bolts of brake cylinders.	x	√	√	√	√	√	√
VII.	Check foundation bolts of brake cylinder.	x	x	√	√	√	√	√
VIII.	Grease bogie turning pin.	x	x	√	√	√	√	√
IX.	Check the condition of brake shoes, replace if required.	x	x	√	√	√	√	√
X.	Check the condition of brake shoes and change, if required.	x	x	√	√	√	√	√
XI.	Grease all cardon shafts.	x	x	√	√	√	√	√
XII.	Inspect all cardon shafts for any crack.	x	x	x	√	√	√	√
XIII.	Grease torque arm pivot.	x	x	x	√	√	√	√
XIV.	Grease hand brake gear.	x	x	x	√	√	√	√
XV.	Check allen bolts of clapper bracket distance piece for tightness.	x	x	x	√	√	√	√
XVI.	Check shock absorbers and do needful.	x	x	x	√	√	√	√
XVII.	Check bearings of all axles and grease them.	x	x	x	x	√	√	√
XVIII.	Change the brake shoes.	x	x	x	x	√	√	√
XIX.	Grease draw and Buffing gear at both ends.	x	x	x	x	√	√	√
XX.	Check grease filling of Parking brake and do as Required.	x	x	x	x	√	√	√
XXI.	Replace the missing and defective hand tools.	x	x	x	x	x	√	√
XXII.	Strengthen machine frame where cracks have Developed.	x	x	x	x	x	x	√

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XXIII.	Check the wheels for tyre defects re profile or replace.	x	x	x	x	x	x	√
XXIV.	Check the axle bearings and grease them.	x	x	x	x	x	x	√
XXV.	Overhaul all the gear boxes except ZF gear box.	x	x	x	x	x	x	√
XXVI.	Replace the shaft coupling and holding nuts & bolts.	x	x	x	x	x	x	√
XXVII.	Overhaul the driving and idle bogies and replace the defective parts.	x	x	x	x	x	x	√
XXVIII.	Complete machine may be painted with approved paint.	x	x	x	x	x	x	√
XXIX.	Check the bogie coil springs and replace, if broken.	x	x	x	x	x	x	√
XXX.	Change all the brake shoes.	x	x	x	x	x	x	√
<b>7.</b>	<b>ELECTRICAL</b>							
I.	Clean alternator and check connections.	x	√	√	√	√	√	√
II.	Check function of horns	x	√	√	√	√	√	√
III.	Check all lights and do needful.	x	x	√	√	√	√	√
IV.	Replace defective switches and potentiometers.	x	x	x	x	x	√	√
V.	Repair or replace the defective PCBs.	x	x	x	x	x	x	√
VI.	Replace defective indicative instruments.	x	x	x	x	x	x	√
VII.	Get insulation test of main cables and replace the defective ones.	x	x	x	x	x	x	√
VIII.	Overhaul the panel boxes.	x	x	x	x	x	x	√
IX.	Defective switches and indicative lights may be replaced.	x	x	x	x	x	x	√
X.	Check the LED of all the solenoids.	x	x	x	x	x	x	√
XI.	Check the calibration of digital potentiometers and Replace the defective ones.	x	x	x	x	x	x	√
XII.	Replace the missing or defective lights.	x	x	x	x	x	x	√

SR. NO.	ITEM	SCH.I Daily	SCH.II 50 HRS.	SCH.III 100 HRS.	SCH.IV 200 HRS.	SCH.V 1000 HRS.	SCH.VI 2000 HRS.	SCH.VII 6000 HRS.
XIII.	Grease link rods.	x	√	√	√	√	√	√
XIV.	Adjust the clearance of all brake shoes.	x	√	√	√	√	√	√
XV.	Check brake linkage and oil the pivots.	x	√	√	√	√	√	√
<b>8.</b>	<b>GENERAL</b>							
I.	Check for any unusual sound from Wing lift unit, broom units, gear boxes, engine & hydraulic pumps.	√	x	x	x	x	x	x
II.	Check all spares & tools for emergency as per Annexure - I.	√	x	x	x	x	x	x
III.	Check all the functions of machine before block working.	√	x	x	x	x	x	x
IV.	Clean the complete machine	x	√	√	√	√	√	√
V.	Thoroughly clean all panel boxes.	x	x	x	x	x	√	√
VI.	Check the function of all assemblies after IOH.	x	x	x	x	x	√	√
VII.	Test the machine for one week near the workshop, Before it is put for work in regular section.	x	x	x	x	x	√	√
VIII.	Strengthen the machine frame, where cracks have developed on condition Basis	x	x	x	x	x	x	√
IX.	Replace the missing and defective hand tools.	x	x	x	x	x	x	√
X.	Check the function of all assemblies	x	x	x	x	x	x	√
XI.	Check the expiry of first Aid box.	x	x	x	x	x	x	√
XII.	Overhaul the A.C. unit.	x	x	x	x	x	x	√
XIII.	Check the expiry of fire extinguisher./ may be done on regular basis.	x	x	x	x	x	x	√

**Note-During CPOH, Machine Supervisor and CPOH Inspecting Authority jointly inspect the Machine. Any part of Machine is to be repaired or replaced; this decision is taken by CPOH Inspecting authority.**

### List of Safety Equipments

S.No.	Description	Quantity
1.	Detonators in a tin case	1 box
2.	H.S. flag red	2 nos.
3.	H.S. flag green	1 nos.
4.	H.S. Tri colour lamps	2 nos.
5.	Chain & Padlock	1 set
6.	Clamp with Padlock	2 nos.
7.	20 t jack	1 no.
8.	Crow bars	2nos.
9.	Wooden blocks off sizes	8 nos.
10.	Gauge cum level	1 no.
11.	Rail thermometer (dial type)	1 no.
12.	Banner flag	2 nos.
13.	Walky talky	2 nos.
14.	First Aid Box	1 no
15.	Skids	4 nos.
16.	Working time table of section where machine working	1 copy
17.	G&SR book with up to date amendment slips	1 copy
18.	4 cell flasher light/ LED torch,6watt	1 no.
19.	LED Petromax	1 no.
20.	Safety helmets	Machine staff
21.	Protective clothing, safety shoes and safety gloves	Machine staff
22.	Track Machine Manual	1 no.
23.	Accident Manual	1 no.
24.	Fire extinguisher	1 no.
25.	Hooter (Manual/ Remote)	2 nos.
26.	Hydraulic Hand Pump	1 no.
27.	Emergency pneumatic/Hydraulic hose of sizes suiting to different machines(complete with end fittings)	1 no.



## IMPORTANT

- i) CUMMINS VOLVOLINE 15W40 lube oil to be used in engine.
- ii) Engine oil pressure should be minimum 1.5 kg/sq.cm at idle & 2.5 kg/sq.cm on load at rated RPM after two hours working.
- iii) Gear oil for all gear boxes will be 80W 90.
- iv) Pump gear box oil will be 15W 40.
- v) Air brake pressure should be Min. 4 bar at lock position.
- vi) Adjust the brake shoe clearance between 3 to 5 mm.
- vii) Brake shoes will be changed when minimum thickness at any point will become 13 mm or less.
- viii) RPM of engine radiator fan should not be less than 1600 for proper cooling.
- ix) The length of the hoses between clamps or adapters should be 4% more than required to provide allowance for shortening of hose under pressure.
- x) Radiator may be replaced if it is blocked more than 20% during service or badly leaking and not economical to repair.
- xi) Tension of V-belt will be checked at center of belt and it should not be more than 15mm.
- xii) Hydraulic oil should be sent for physical and chemical test after every 1000hrs.

## ACKNOWLEDGEMENT

Following officers and staff have made their valuable contributions in finalization of the Maintenance schedule manual of Ballast Regulating Machine (USP 2000 SWS)

### RAILWAYS

- |    |        |               |               |
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| 1. | S/Shri | U.V. Dalvi    | AEN/TM/KYN/CR |
| 2. | “ ”    | M.M Pathare   | SSE/TM/KYN/CR |
| 3. | “ ”    | Sunil Sarokar | SSE/TM/KYN/CR |

### RDSO

- |    |        |              |         |
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| 2. | “ ”    | Ravi Kumar   | SSRE/TM |