



भारत सरकार
रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

**MAINTENANCE SCHEDULE MANUAL FOR
UTILITY TRACK VEHICLE**

**(Phooltas)
Series No. 202000106-H TO
202208171-H, 202102060-P to
202203067-P**



Report No.TM –TM-286

अनुसंधान अभिकल्प एवं मानक संगठन लखनऊ-226011

RESEARCH DESIGNS & STANDARDS ORGANISATION

LUCKNOW- 226 011

Maintenance Schedule Manual of UTV(Phooltas)

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 Utility Track Vehicle (Phooltas) 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.

(Jainendra Kumar Singh)
Director/Track Machine-VI
RDSO/Lucknow-226011.

EXPLANTORY NOTES

While preparing text of schedules for maintenance of Utility Track Vehicle (Phooltas), 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 Utility Track Vehicle (Phooltas)

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/Zonal 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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SCHEDULE I (To be done Daily)	
DURATION=1 Hour	
	<u>ENGINE ALIN6 TI/5 450 HP AT 2200 RPM</u>
1.	Visual check coolant level in radiator and top up if required.
2.	Visual check the engine oil level and top up if required.
3.	Check fuel level and top up if required.
4.	Visual check the air cleaner chocking indicator. If indicator is red, the outer filter is to be cleaned.
5.	Check the leakage from hoses, water pump seal etc. and do the needful.
6.	Visual Check the leakage from fuel pump, injectors, fuel supply and return pipes and do needful.
7.	Visual check the tension and condition of V-belts and do needful.
8.	Clean the engine and premises.
9.	Check the engine oil pressure at idle.
10.	Check engine oil pressure on load after two hours working.
11.	Check the oil level and leakage of compressor, if applicable.
12.	Check the battery charging system.
13.	Drain the Reservoir after the day's work.
14.	Record the maximum engine temperature of the day's work.
15.	Drain sediments from fuel tank.
	<u>POWER TRANSMISSION AND GEAR BOX</u>
1.	Visual check the oil leakage from all gear boxes and do the needful.
2.	Check supply pressure in transmission in gear box.
3.	Check supply pressure in lubrication system.
4.	Check oil level of axle gear box and do needful.
	<u>CRANE</u>
1.	Check locking and unlocking device of crane.
2.	Level of hyd. oil in tank.
3.	Greasing boom extension sliding pads.
4.	Hyd. system pressure.
5.	Stabilizers are properly working.
6.	Function of control levers.
7.	Greasing of all hinge pins.
8.	Hoses and other components for any leakage.
	<u>HYDRAULIC</u>
1.	Check and top up hydraulic oil tank if required.
2.	Check hydraulic hoses and other components for any leakage and do Needful.
3.	Record the maximum temperature of hydraulic fluid during the day's work.
	<u>PNEUMATIC</u>
1.	Check air brake pressure at locking position.
2.	Check pneumatic system for any air leakage.
3.	Check emergency brake operation.
4.	Check function of horns.
	<u>MECHANICAL</u>
1.	Check the crane operation in all respects.
2.	Lubricating the slewing system and its bushing.

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3.	Greasing of sliding pads.
4.	Greasing of hinge pin.
5.	Greasing of dual slide control.
6.	Apply lube oil on bush bearing.
	<u>GENERAL</u>
1.	Check for any unusual sound from crane, gear boxes, engine & hydraulic pumps.
2.	Check all spares & tools for emergency as per Annexure-1.
3.	Check all the functions of machine before block working.

SCHEDULE II	
(TO BE DONE IN ADDITION TO SCH.I AFTER 50 HOURS OF ENGINE RUNNING)	
DURATION=2 Hours	
<u>ENGINE ALIN6 TI/5 450 HP AT 2200 RPM</u>	
1.	Apply petroleum jelly on battery terminal.
2.	Open and clean dust collector/pan.
3.	Lubricate the radiator fan shaft with grease.
4.	Check the leakage from fuel line.
5.	Drain water separator.
6.	Check electrolyte level of batteries, top up if required.
7.	Check battery terminal and connection for tightness.
8.	Check injector pipes for any rubbing and do needful.
9.	Top up air oiler if required.
<u>POWER TRANSMISSION AND GEAR BOX</u>	
1.	Greasing the cardon shafts.
2.	Grease axle gear box flange cover of bogies.
3.	Check oil level of cardan shaft power divider/power distribution.
4.	Check nut bolts of transmission gear box.
5.	Lubricate all dirt repelled with grease (shell Alvania RL-2).
6.	Check air breather of gear boxes and clean if required.
7.	Check leaking oil lines or wet split lines of transmission gear box.
8.	Check oil level of Pump drive gear box (at 1000 rpm), and top up after stopping engine if required.
9.	Grease all brake linkages.
10.	Lubricate the axle torque support with grease.
11.	Change the oil of transmission gear box.
12.	Change the filter of transmission gear box.
<u>CRANE</u>	
1.	Lubricate all lubrication points of crane.
2.	Check bolts/welding of holding brackets of crane.
3.	Clean the jib extension ram and grease it properly.
<u>HYDRAULIC</u>	
1.	Check hydraulic system operating pressure.
2.	Check wear of sliding pads of telescopic cylinder.
<u>PNEUMATIC</u>	
1.	Clean & lubricate all link rods, pivots and rocker bearing of brake assemblies.
2.	Check the operation of SA-9 valve and reset, if required.
<u>MECHANICAL</u>	
1.	Check oil level of all gear boxes and fill-up to the mark, if required.
2.	Check condition of hook.
3.	Adjust the clearance of all brake shoes.
4.	Check brake linkage and oil the pivots.
<u>ELECTRICAL</u>	
1.	Clean alternator and check connections.
<u>GENERAL</u>	
1.	Clean the complete machine

SCHEDULE III**(TO BE DONE IN ADDITION TO SCH.II AFTER 100 HOURS OF ENGINE RUNNING)****DURATION=1 Day****ENGINE ALIN6 TI/5 450 HP AT 2200 RPM**

1.	Apply petroleum jelly on battery terminal.
2.	Open and clean dust collector/pan.
3.	Lubricate the radiator fan shaft with grease.
4.	Check the leakage from fuel line.
5.	Drain water separator.
6.	Check electrolyte level of batteries, top up if required.
7.	Check battery terminal and connection for tightness.
8.	Check injector pipes for any rubbing and do needful.
9.	Top up air oiler if required.
10.	Check engine temperature safety device.
11.	Check lube oil pressure safety device.
12.	Examine the mounting bolts of the engine.
13.	First time change of lube oil is being done, 100 hrs after commissioning.
14.	First time change of lube oil filter and by pass filter is being done after commissioning.
15.	Change engine lube oil.
16.	Replace lube oil filter & bypass element.
17.	Replace fuel filters.
18.	Inspect the water separator for proper functioning.
19.	Check the throttle control linkages.
20.	Check fuel tank breather and clean if required.
21.	Check/add Coolant additive concentrate.
22.	Clean/change crank case air breather.
23.	Check air piping.
24.	Check hyd. Governor oil.

POWER TRANSMISSION AND GEAR BOX

1.	Check the tightness of cardon shaft bolts.
2.	Greasing the cardon shafts.
3.	Grease axle gear box flange cover of bogies.
4.	Check oil level of cardan shaft power divider/power distribution.
5.	Check nut bolts of transmission gear box.
6.	Lubricate all dirt repelled with grease (shell Alvania RL-2).
7.	Check air breather of gear boxes and clean if required.
8.	Check leaking oil lines or wet split lines of transmission gear box.
9.	Check oil level of Pump drive gear box (at 1000 rpm), and top up after stopping engine if required.
10.	Grease all brake linkages.
11.	Lubricate the axle torque support with grease.
12.	Check the transmission shift control linkage and the Directional linkage.
13.	Change the oil of transmission gear box.
14.	Change the filter of transmission gear box.

CRANE

1.	Lubricate all individual parts of crane after cleaning.
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2.	Greasing of slew system bushing, hinge pins and sliding pads.
	<u>HYDRAULIC</u>
1.	Change return line filter element.
	<u>PNEUMATIC</u>
1.	Clean & lubricate all link rods, pivots and rocker bearing of brake assemblies.
2.	Check the functioning of backup system.
3.	Check the operation of SA-9 valve and reset, if required.
	<u>MECHANICAL</u>
1.	Check universal joints for play and replace, if required.
2.	Check oil level of all gear boxes and fill-up to the mark, if required.
3.	Check condition of hook.
4.	Adjust the clearance of all brake shoes.
5.	Check brake linkage and oil the pivots.
6.	Check foundation bolts of brake cylinder.
7.	Check the condition of brake shoes, replace if required.
	<u>ELECTRICAL</u>
1.	Clean alternator and check connections.
2.	Check all lights and do needful.
	<u>GENERAL</u>
1.	Clean the complete machine.

<u>SCHEDULE IV</u>	
(TO BE DONE IN ADDITION TO SCH.III AFTER 200,400 and 800 HOURS OF ENGINE RUNNING)	
DURATION=2 DAYS	
<u>ENGINE ALIN6 TI/5 450 HP AT 2200 RPM</u>	
1.	Clean outer air cleaner element (cleaned after every 200 hours on dirt indication).
2.	Check air cleaner element restriction .Clean/Change air cleaner element ifrequired.
3.	Check lube oil pressure safety device.
4.	Examine the mounting bolts of the engine.
5.	First time change of lube oil is being done, 100 hrs after commissioning.
6.	First time change of lube oil filter and by pass filter is being done after commissioning.
7.	Change engine lube oil.
8.	Replace lube oil filter & bypass element.
9.	Replace fuel filters.
10.	Inspect the water separator for proper functioning.
11.	Check the throttle control linkages.
12.	Check fuel tank breather and clean if required.
13.	Check/add Coolant additive concentrate.
14.	Clean/change crank case air breather.
15.	Check air piping.
16.	Check hyd. Governor oil.
17.	Clean outer air cleaner element (Cleaned after every 200 hours or on dirt indication).
18.	Lubricate all the engine pulley bearings with grease.
19.	Clean crank case breather.
20.	Check and change radiator hoses, if required.
21.	Check specific gravity of battery electrolyte if applicable.
22.	Check coupling disc of injection pump.
<u>CRANE</u>	
<u>To be done after 500 Hours</u>	
1.	Cleaning of crane and greasing of all individual parts after cleaning.
<u>HYDRAULIC</u>	
1.	Change return line filter element.
<u>PNEUMATIC</u>	
1.	Check the mounting bolts of all valves.
2.	Check the functioning of auto drain valve.
3.	Clean cooling coil.
4.	Check the operation of SA-9 valve and reset, if required.
5.	Check air un-loader for proper functioning.
<u>MECHANICAL</u>	
1.	Check oil level of all gear boxes and fill-up to the mark, if required.
2.	Inspect all cardon shafts for any crack.
3.	Inspect all cardon shafts for any crack.
4.	Grease torque arm pivot.
5.	Check shock absorbers and do needful.
6.	Check Allen bolts of clapper bracket distance piece for tightness.

SCHEDULE V	
(TO BE DONE IN ADDITION TO SCH.IV AFTER 1000,3000 and 5000 HOURS OF ENGINE RUNNING)	
DURATION=7 DAYS	
<u>ENGINE ALIN6 TI/5 450 HP AT 2200 RPM</u>	
1.	Change worn out water hoses.
2.	Check coolant for PH value.
3.	Overhaul the air compressor. If required.
4.	Clean the engine radiator externally.
5.	Clean the diesel tank with lint free cloth.
6.	Clean the cooling coil.
7.	Replace the outer and inner engine air cleaner element.
8.	Check the condition and tightness of V-belt for radiator fan.
9.	Replace minor repair kit for air compressor.
<u>POWER TRANSMISSION AND GEAR BOX</u>	
1.	Change transmission oil filter.
<u>HYDRAULIC</u>	
1.	Send sample of hydraulic oil for physical & chemical test & if found 'OK' refill through 10 u sieve filter otherwise with new oil.
2.	Clean the hydraulic reservoir and fill laboratory tested/new oil as required.
3.	Replace the hydraulic hoses which are damaged by external abrasion.
4.	Clean the hydraulic tank, inside to be painted with approved quality of paint.
<u>PNEUMATIC</u>	
1.	Check air un-loader for proper functioning.
2.	Overhaul the air un-loader.
<u>MECHANICAL</u>	
1.	Replace the bushing of the hinge pins on condition basis.
2.	Check bearings of all axles and lubricating with grease.
3.	Grease draw and Buffing gear at both ends.
4.	Check grease filling of parking brake and do as required.
<u>ELECTRICAL</u>	
1.	Replace the missing or defective lights.
<u>GENERAL</u>	
1.	Strengthen the machine frame, where cracks have developed on condition basis.

SCHEDULE VI-2000 HOURS	
(TO BE DONE IN ADDITION TO SCH.V AFTER 2000,4000 and 6000 HOURS OF ENGINE RUNNING)	
Duration-15 Days	
<u>ENGINE ALIN6 TI/5 450 HP AT 2200 RPM</u>	
1.	Decaling cooling system.
2.	Change coolant of radiator.
3.	Replace fuel pump filter screen and magnet.
4.	Check fuel pump calibration.
5.	Replace aneroid bellows & calibrate.
6.	Clean turbocharger compressor wheel and diffuser if required.
7.	Check turbocharger bearing clearance.
8.	Replace the batteries on condition basis.
9.	Replace the rocker cover gaskets (after 1000 hrs. of commissioning/POH).
10.	Adjust injectors and valve (after 1000 hrs. of commissioning/POH).
11.	Change all the water hoses.
12.	Overhaul the air un-loader.
13.	Check crank shaft end clearance.
14.	Overhaul self starter.
15.	Overhaul alternator.
16.	Clean and calibrate injectors if required.
17.	Overhaul the engine, if there is lack of compression on low lube oil pressure otherwise de- carbonize the engine.
18.	Check bearing and shaft of radiator fan drive and do needful.
19.	Check turbocharger compressor and turbine wheels. Check radial and end clearances & do needful.
20.	Overhaul water pump.
21.	Tightened manifold nuts or cap screws.
22.	Overhaul or replace the engine.
23.	Overhaul the radiator fan drive assembly.
<u>POWER TRANSMISSION AND GEAR BOX</u>	
1.	Grease king pin pivot of driving & idle bogies.
2.	Change transmission oil filter.
<u>CRANE</u>	
1.	Replace bushing, hinge pins and sliding pads.
<u>HYDRAULIC</u>	
1.	Replace the seals of all hydraulic cylinders along with gland bushes /piston.
2.	Provide the missing clamps.
3.	Clean and repair the hydraulic oil cooler, if required.
4.	Overhaul all pressure controls and replace their kits, if required.
5.	Replace all the stop cocks and flow control valves.
6.	Check the D.C. valves for leakage and do needful.
<u>PNEUMATIC</u>	
1.	Clean the air reservoir.
2.	Overhaul the air un-loader.
3.	Overhaul water separator.
4.	Change the seals of all pneumatic cylinders.
<u>MECHANICAL</u>	

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1.	Check the wheels for tire defects re profile or replace, if required.
	<u>ELECTRICAL</u>
1.	Replace defective switches.
	<u>GENERAL</u>
1.	Thoroughly clean all panel boxes with pressurized air.
2.	Check the function of all assemblies after IOH.
3.	Calibrate the machine on track for all functions.
4.	Replace the missing and defective hand tools.

SCHEDULE VII-6000 HOURS (1ST POH-45 Days, 2nd POH-60 Days) (TO BE DONE IN ADDITION TO SCH.VI AFTER 8000,14000 then 4000 HOURS OF ENGINE RUNNING)	
Duration:1ST POH-45 Days,2nd POH-60 Days	
	<u>HYDRAULIC</u>
1.	Change all hydraulic pumps on condition basis.
2.	Fill new oil after replacing return line and suction filters.
3.	Change all the pressure control valves.
4.	Flush the complete system.
	<u>PNEUMATIC</u>
1.	Overhaul water separator.
2.	Change the seals of all pneumatic cylinders.
3.	Change all pneumatic hoses.
4.	Manufacturer on their recommendation, these may be condemned and provide the new valves.
5.	Overhaul the brake cylinder and replace the seals if cylinder is O.K
6.	Replace air un-loader.
7.	Replace water separator.
8.	Change all pneumatic cylinders on condition basis, which were creating the frequent trouble work. Otherwise replace seals only.
	<u>MECHANICAL</u>
1.	Change the all cardon shafts on condition basis.
2.	Grease torque arm pivot.
3.	Check shock absorbers and do needful.
4.	Check Allen bolts of clapper bracket distance piece for tightness.
5.	Check bearings of all axles and lubricating with grease.
6.	Overhaul the suspension assembly.
7.	Grease draw and Buffing gear at both ends.
8.	Check grease filling of parking brake and do as required.
9.	Check the wheels for tire defects re profile or replace, if required
10.	Overhaul all the gear boxes.
11.	Replace the shaft coupling and holding nuts & bolts.
12.	Overhaul the bogies and replace the defective parts.
13.	Complete machine may be painted with approved paint.
14.	Check the bogie coil springs and replace, if broken.
	<u>ELECTRICAL</u>
1.	Replace defective indicative instruments.
2.	Overhaul the panel boxes and provide thimbles as required.
3.	Defective switches and indicative lights may be replaced.
4.	Check the wire connections in panel boxes.
	<u>GENERAL</u>
1.	Check the function of all assemblies.
2.	Check the expiry of first Aid box.
3.	Check the expiry of fire extinguisher/ may be done on regular basis.

Annexure - I

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.	Walki talki	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.

ACKNOWLEDGEMENT

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