

**DIRECTOR GENERAL BORDER ROADS**  
**GENERAL MAINTENANCE INSTRUCTION NO. 185**  
**ON**  
**MAINTENANCE AND SERVICE SCHEDULE FOR THE**  
**APOLLO PAVER FINISHER PREMIX ASPHALT**

**INTRODUCTION**

The Apollo Paver Finisher RM-4 / RM-6 is designed to lay a mat of premix material (Bituminous Mix) upto 200 mm thick within a working width of 2.5 mtrs to 4 mtrs. For width more than 2.5 mtrs bolted extensions from 75 mm to 300 mm are provided. It is powered by P4 / P6 (I) diesel engine 43.6 / 65.5 BHP at 2000 RPM.

Due to its pneumatic and rubber tyres, it is especially suitable for street or road constructions in towns as well as highways and runways. The maximum travelling speed is 16 Kmph, for shifting from one site to another.

All controls are grouped for easy operations. Hopper sides and tamping assembly are raised by the hydraulic cylinders. The hopper capacity is 8/10 tons. Hydraulically tilted hoppers ensure complete emptying and continuous feeding of bituminous mix to mechanically driven conveyor chain, while changing feed tippers.

Adjustable tamper and screed are provided for high degree of compaction with the variable working frequency stroke corresponding with RPM.

The foot operated brakes are actuated by hydraulic pullers. A mechanical rod constructed ratchet type hand brake is provided for parking.

In the front, the frame has an oscillating cross member, with push rollers, which pivots around a central, vertical point, thus ensuring that the Paver Finisher travels straight forward even if the supply vehicle is not in perfect alignment with the machine when filling the hopper.

**AIM**

To explain the details of schedule and preventive maint and lubrication of Apollo Paver Finisher RM 4 / RM 6 and to achieve optimal utilization.

**Action by** (A) User Units : To carry out periodic inspection of tasks as laid down.  
(B) Fd Wksps : To check the record of maintenance and lubrication of the equipment during its inspection and repairs whether it has both carried out as per maint schedule given in this instruction.  
Advise user units in respect of discrepancy noted.

Details : Details of specification, maintenance, service schedule and recommended oil to be used are tabulated in appx 'A', 'B', 'C', 'D' & 'E' to this instructions.

Conclusion : These instructions would be followed by operators, workshops personnel to ensure that due attention is given to scheduled and periodic maintenance and there is no lapse.

Adherence to these instructions will ensure smooth operation of the Paver, reduced down time and cost effectiveness of the road construction works.

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(AJS KHALSA)  
SE (E&M) SG  
Dir (Tech)  
For DGBR

SPECIFICATIONS

A. Chassis portion

1.	Length over all	****	****	5.00 Mtrs
2.	Height over all	****	****	2.09 Mtrs
3.	Min operating width	****	****	2.50 Mtrs
4.	Max operating width	****	****	4.00 Mtrs
5.	Wheel base	****	****	2.460 Mtrs
6.	Wheel track	****	****	1.885 Mtrs
7.	Weight	****	****	8000 Kgs (Approx)
8.	Hopper capacity	****	****	4 Cmt (Approx)
9.	Fuel Tank/Hyd Oil Tank	****	****	Diesel 120 Ltrs Hyd Oil 60 Ltrs
10.	Engine	****		Simpson P4/P6 (I) 43.6 BHP/65.5 BHP at 2000 RPM
11.	Travelling speed	****		16 Kmph (Maximum)
12.	Pneumatic tyre (Rear)	****		P4-11.00x20 (16 Ply) 02 Nos P6-12.00x20 (16 Ply) 02 Nos
13.	Wheels (Front)	****		609.6 mm x 178 mm 02 Nos

B. Power Unit

Engine / Model	P4 (I)	P6 (I)
Make	Simpsons	Simpsons
Type	Diesel	Diesel
No of cyls	4	4
Bore	88.9 mm	88.9 mm
Stroke	127 mm	127 mm
Compression ratio	16.5:1	16.5:1
Swept Volume	3.14 Lit	3.73 Lit
Firing Order	1-3-4-2	1-5-3-6-2-4
Valve Clearance in let/ Exhaust	0.25 mm	0.25 mm
Wt of engine	368 Kgs (Approx)	449 Kgs (Approx)
BHP	43.6 at 2000 RPM	65.5 at 2000 RPM

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GENERAL MAINTENANCE AND LUBRICATION

1. Engine - GMI for P4 (I) and P6 (I) engines fitted to eqpt have already been laid down vide GMI No 45. However, schedule of maintenance is given as per Appendix 'C'.
2. Working operation
  - 2.1 Observe
    - 2.1.1 Check the water level in radiators
    - 2.1.2 Oil quality
    - 2.1.3 Lubrication
    - 2.1.4 Disengage all the clutches
    - 2.1.5 Move transmission gear levers forward and back to give travelling speeds
    - 2.1.6 Start the engine and let it to warm up
    - 2.1.7 Check the brakes operation.
  - 2.2 Operation
    - 2.2.1 When the engine is warm up engage the transmission clutch and engage the levers to required gear for travelling speed simultaneously engage the gear by levers of 2 speed gear box for the high range or low range and also the forward or reverse gear.
    - 2.2.2 Engage the conveyor auger clutches.
    - 2.2.3 Engage the tamping clutch
    - 2.2.4 Tighten the adjusting bolt lock nuts.
    - 2.2.5 Tighten the sub-frame holding bolts.
3. Jack shaft and 'V' belt drive
  - 3.1 Lubrication : There are two grease nipple provided in the jack shaft plummer blocks and there in the universal drive shaft.
  - 3.2 Adjustment : Adjustment of the 'V' belt tension is carried out by altering the position of the jack shaft sub frame. To adjust the tension :-
    - 3.2.1 Slacken the adjusting screw lock nuts.
    - 3.2.2 Adjust the 'V' belt by means of adjusting screws until the correct tension of  $\frac{1}{2}$  inch (12.7 mm) free movement is obtained.
4. Traction main clutch
  - 4.1 Lubrication : The clutch operation gluts are lubricated with an oil and operating by oil gum. The clutch pulley bearings are packed with greases on assembly and should not require any attention. If, however, the need arises to dismental the pully the bearing and cavities should be packed to 80% capacity with a recommended grade upon reasonably.

4.2 Adjustment - As the initial setting of the clutch is an important contribution to its efficient functioning, the following procedure should be carried out whenever is necessary to re-adjust the clutch either when slip has been noticed through wear of the spinning plates, or if the clutch has been disturbed during overhaul. Reference to figure will identify the components referred. All adjustments should be carried out with engine.

4.2.1 The locking spring should be depressed and the plunger fully withdrawn from its hole in the locking ring. The operating collar should then be moved up to engage the clutch so that the clutch finger is (3 mm) clear off the clutch front place. When in this position the adjusting nut should be rotated in the direction marked on the clutch to tighten. This can must easily be effected by engaging a low gear and using a short 9.5 mm dia, tommy bar in the holes of the adjusting nut. When tight, the operating collar should be withdrawn and the adjusting nut, further tightened until the plunger is opposite the next hole. The hole is to be considered as the datum hole and correct operating pressure will be obtained by further tightening the adjusting nut a further holes. Reengaged plunger in this hole. If the plunger should fail opposite a hole, consider the next hole as the datum, and select 2 further holes and reengage plunger.

4.2.2 During the running the stage, one or two adjustment will be necessary, after which further adjustment will not be required for some considerable time. In each case, the above procedure for adjustment of the clutch should be carried out.

4.2.3 Excessive slipping of the clutch will cause over heating and excessive wear of the clutch plates, together with the possibility of breakages. Every thing should be done to avoid this happening and necessary adjustment made after the clutch has been allowed to cool.

## 5. FOUR SPEED GEAR BOX

Lubrication : The lubrication of this gear box is by splash feed from the level of the oil in the gear case, and is no way connected to the main transmission gear box. Filter level and drain plugs are provided to maintain the correct level. Grease points for grease gun are provided on the operating levers and bell crank. All other points such as rod end bearings to be lubricated by oil bun.

6. MAIN TRANSMISSION GEAR BOX

Lubrication : The lubrication is by splash feed from oil contained in the bottom of the gear case. Filler level and drain plugs are provided to maintain the correct level. Grease points are provided on the brake drum hubs, Plummer lock bearing and control levers. Rod end bearing are lubricated by oil gun.

7. FINAL DRIVE

7.1 Lubrication : Lubrication of the roller chain is by oil can. Grease nipples are provided on each sub axle.

7.2 Adjustment : To adjust the final drive chain tension proceed as follows :-

7.2.1 Apply parking brake and fully block wheel on the side not to be adjusted.

7.2.2 Place jack under suitable jacking point on the side to be raised jack up machine and remove rear wheel.

7.2.3 Slacken the securing bolts holding hub assembly to main frame.

7.2.4 Slacken lock nut on chain tightener rod

7.2.5 Turn adjusting nut until required tension is obtained (1.½ inc. 38.8 mm) free movement.

7.2.6 Tighten securing bolts and lock nut firmly

7.2.7 Replace rear wheel and lower machines.

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PERIODICAL MAINTENANCE TASK OF P4(I) AND P6(I) ENGINES

1. DAILY
  - (i) Check oil level in sump
  - (ii) Check water in radiator
  - (iii) Check fan belt tension
  - (iv) Check brake operation
  - (v) Check leakage of oil and fuel
2. WEEKLY
  - (i) Check the electrolyte in the battery at the proper level.
  - (ii) Check the clutch operation
  - (iii) Check the tension of the 'V' belt
3. EVERY 50 HOURS
  - (i) Check fan belt adjustment
  - (ii) Top up batteries with distilled water.
4. EVERY 100 HOURS
  - (i) Clean pre filters and fuel lift pumps
  - (ii) Examine air cleaner and replenish oils
5. EVERY 250 HOURS
  - (i) Drain oil from sump and refill
  - (ii) Renew element in lubricating oil filter
  - (iii) Clean belt element of dual fuel filter
  - (iv) Clean and treat battery terminals
  - (v) Refill greaser on dynamo
6. EVERY 500 HOURS
  - (i) Remove, clean and attend to air cleaner
  - (ii) Clean sump and strainer in sump
  - (iii) Clean and check atomizers
  - (iv) Clean gauge trap in fuel oil filter
7. EVERY 1000 HOURS
  - (i) Clean fuel tank
  - (ii) Remove both element of dual fuel filter
  - (iii) Inspect commutator and brushes in dynamo
  - (iv) Check oil flow to valve rocker shaft assembly
  - (v) Examine valve springs and tappets
  - (vi) Clean & adjust injector for the reqd pressure.

Note : The time period for cleaning the air cleaner depends on operating conditions, therefore, under extremely dusty conditions, the time limit recommended above for cleaning should be decreased.

The correct maintenance of the air cleaner will greatly assist in inducting bore wear, thereby extending the life of the engines.

**LUBRICATION OF CONVEYOR, HOPPER GATES, CHAIN AND STEERING**

S/N	Name of the components	Grease or Oil	Time in Hrs
1	Conveyor sprocket shaft	Grease	Every 8 hrs
	Auger bearing	"	"
2	Steering	"	"
	Rack Pinion	Oil	"
	Tamper drive bearing	Grease	"
	Auger drive shaft bearing	"	"
	Conveyor drive idler sprocket	"	"
	Transmission clutch	"	"
	Pulley bearings	"	"
	All the chains	Oil	"
	All the shaft bearing	Grease	"
3	Chain case driving auger screw	Oil / Lub of Greases	Every 24 Hrs
	Clutch levers	Oil	"
	All Universal joints	"	"
4	Hopper gates opening screws	Grease	Every 48 Hrs
	Front push rollers	"	"
	Booster	Brake Oil	"
	Hydraulic oil tank	Oil	"
	Gear Box	"	"
	Conveyor Rollers	Grease	"
5	Check tension of roller chains in final drive	Adjust	Every month
6	Change Lubs, from the gear boxes	Oil	Every 4 months

**Recommended Oil and Grease**

Hydraulic Oil	Bharat Petroleum ENKLO-37
Gear Boxes	Bharat Petroleum BCC a40 OGMEX
Engine	Bharat Petroleum T-40
Grease	Bharat Petroleum WB-SPL

DO'S AND DON'T'S

- 8 Accidents can be prevented by following rules for safe paver operation.
- 8.1 Make sure that all clutches are disengaged before starting engine.
- 8.2 If it is necessary to have engine and machinery running for inspection or adjustment, make sure that all parts of the body or clothing are free, of any moving shaft, belts and pulleys.
- 8.3 Do not put machine in motion with any one standing on top of machine, in the hopper or on the side arms.
- 8.4 Make sure that no one is in front of the machine when truck are backing into hopper.
- 8.5 When working on streets or highways, do not step in traffic lane before making sure that no cars or trucks are approaching.
- 8.6 Keep brakes properly adjusted.
- 8.7 Keep face and hands away from burner inspection door while heater is being lit.

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