

DIRECTORATE GENERAL BORDER ROADS
GENERAL MAINTENANCE INSTRUCTION NO 188
ON
MAINTENANCE AND SERVICING SCHEDULE FOR HOT MIX ASPHALT PLANT 6/10
TPH CAPACITY SAHAYAK

Introduction

1. Sahayak Hot Asphalt Mixer 6/10 TPH capacity is made especially for making fine asphaltic concrete, open graded pre-mix, sand mix or to any other desired specification/design.

Aim

2. The hot mix plant is used to obtain uniform mix of desired specification by drying of aggregates with the binder used through scheduled maintenance as given in this GMI.

Action by

3. (a) User units :- To carry out periodic inspection, regular servicing and routine/periodic maintenance task as laid down.

(b) Fd Wksp :- (i) To check the record of maintenance and lubrication in the log book of the equipment during its inspection and repairs, if carried out as per maintenance and lubrication schedules given in these instructions. (ii) Advise user units in respect of any discrepancy noted

Details.

4. Details of periodic maintenance, lubrication along with the service schedule have been tabulated in Appendix 'A' to this instruction.

Dated : 17 Oct 89'

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1. **Orientation of the hot mix plant:** - Orientation of the hot mix plant in relation to the direction of the wind is very important, since during working of the plant a lot of metal dust and fumes are generated and given away into the atmosphere. It is essential that the dust as well as chimney exhaust is carried by atmospheric wind away from the plant by the wind and hence the plant should be so oriented accordingly. While selecting the plant site sufficient working space for the plant, storage of aggregates, bitumen, diesel oils, water, tools and tackles should be ensured. The work site must be 40 square mtrs approx. At +10°C to -10°C temperature the oil used in the burners have to be heated to 32°C to 33°C, so as to give proper atomization.

2. **Starting – up:** - The mixer drum is put into operation by starting the engine. Simultaneously, feed hopper is fed with cold aggregates. The feed –hopper travels on slip-rails and discharges the aggregates into the drier drum. The burner of the drier drum is lit and fuel flow is regulated by means of fuel release valve to get long blue flame of sufficient width and intensity so that the aggregate cascading over the naked flame get thoroughly dried. The dried aggregates are fed into the pug mill by tilting the discharge chute and manipulating the inclination by means of the lever. Bitumen fed into the pug mill. Thoroughly mixed aggregates after getting the desired consistency are released into the wheelbarrow by opening discharge door of the pug mill.

3. **Maintenance check before starting:-**

- (a) Check diesel oil, lubricating oil and top-up the radiator before starting the engine.
- (b) Do not stop the engine when the mixing drum is fully loaded.
- (c) Check the tightness of V-belts, chains.
- (d) Check all grease points.
- (e) Lubricate drive chains to get maximum performance.
- (f) Keep suitable blocks under the wheels of the wheels of the mixer to prevent any lateral movement during mixing.
- (g) Level mixer before use by adjusting the screw jacks.
- (h) Ensure that there is no water in the bitumen bucket or pug mill before ring bitumen.
- (j) Lubricate the skip-rails and skip guide roll shaft collars to facilitate easy movement of the loading skip.
- (k) Check pug mill drum rotate freely.
- (l) Check whether material is struck on any of the gate openings.
- (m) Drier – drum is free of diesel oil.
- (n) Discharge door is free of operation.
- (o) Loading skip is clean without stuck-up material
- (p) Wire ropes of the skip tensioned equally.

4. **Monitoring operational usages:-**

- (a) Correct size aggregates should be loaded into the skip-loader.
- (b) Do not keep the burner lighted for a long time without aggregates inside the drier drum.
- (c) Do not allow open fire near the fuel oil tanks.
- (d) Do not load the drier drum if the discharge door is not operating.
- (e) Do not allow the bitumen to flow through to flow through the transfer pump till its temperature is raised to about 180°C. Check pump spindle is free before driving the pump.
- (f) Bitumen-kettle should be filled through the transfer pump till its temperature is raised to about 180°C. Check pump spindle is free before driving the pump.
- (g) Never allow bitumen in the kettle to go below atleast 50mm over the top of the fuel tubes as any further drawal of bitumen will result in excessive heating of the pipes resulting in serious accidents.
- (h) Do not allow bitumen level to get low enough for pump to suck air.

- (j) Do not run the pump idle.
- (k) Do not heat the bitumen above 180°C.
- (l) Inspect frequently the oil levels in the oil tanks and for leaks, if any.
- (m) Do use clean and correct grade lubricating oil in engine and check all oil levels daily.
- (n) Do check at intervals readings of all gauges on engine dashboard.
- (o) Do not start skip-hopper until the drier – drum burner has been ignited.
- (p) In case of rain during pervious night ensure water logged in skip- loader and pug – mill is drained.
- (q) Before starting the plant, the nozzle and burner should be cleaned with kerosene.
- (r) Before starting drier- drum there should not be any aggregate inside it, since a very high starting torque is required to start drier-drum with aggregate.
- (s) If the diesel oil used in fire burners is pre-heated viscosity gets reduced which ensure better automation of the fuel.
- (t) If fuel pump delivery is irregular or negligible prim the pump and see that pump does not suck air through joints on suction side.
- (u) Record entries regarding hours run, fuel/oil consumed in log books and machineries history card.
- (v) When lighting burner never allow excessive fuel to be sprayed into drier drum.
- (w) Watch exhaust smoke, if it is black, it would mean excess fuel is being fed and white smoke means excess moisture.

5. **Daily maintenance:-**

- (a) Lubricate all parts daily as instructed in the lubrication chart (attached).
- (b) Top-up oil and water in the diesel engine.
- (c) Air filter on diesel engine must be clean.
- (d) Tighten all bolts after the day's operation especially that of mixer arms, tips and liners, bearing blocks.

6. **Maintenance during operation:-**

- (a) Bitumen cocks, which are operated during production of every batch of the mixed material, should be lubricated every 2 hours. Other cocks require lubrication daily.
- (b) Make a general check on bearings to see that overheating do not occur.
- (c) Be alert for undue noises, which might indicate loose bolts as the plant settle down

7. **Maintenance Monthly (200-250 hours):-**

- (a) Burner nozzle should be cleaned and re-inserted.
- (b) Check all cables for loss of insulation or loose contacts.
- (c) Clean air cleaner of the engine.
- (d) Clean the lub oil filter bowl and filter discs of the engine.
- (e) Force grease with the help of grease gun into the volute body of water circulating pump to lubricate ball bearings fitted inside the body.
- (f) Drain fuel-tank of the engine, diesel oil tank of burners to remove sediments which accumulate at the bottom. Ensure that the breather hole of the tank is not blocked.
- (g) Check electrolyte level in each cell of the battery after unscrewing caps.
- (h) Check cable connection at starter, battery and dynamo. Loose connection lead improper contact and damage to the terminals.

8. Three monthly maintenance (800-1000 hours):-

- (a) Change engine oil every 400 hours, Change engine oil when engine is hot since oil drains freely when hot.
- (b) Wash air breather of the engine pump thoroughly with petrol and blow dry with compressed air.
- (c) Drain the radiator and clean it with fresh water adding rescaling compounds. Similarly, drain the water from jackets of the cylinder block, cylinder head of engine and clean them.
- (d) Knock out soot from exhaust silencer.
- (e) Check and tighten-up if necessary the following of the engine:-
 - (i) Fuel connection (ii) Oil pump bolts (iii) All external bolts and nuts (iv) Engine and radiator mountings and (v) Radiator hose connections.
- (f) Re-place the pre-filter insert of the fuel filter.
- (g) Change the micro filter insert of the fuel filter.
- (h) Change lub oil filter seals of engine.
- (j) Check and adjust valve tappet clearance.
- (k) Check nozzle spray of fuel injector of engine.
- (l) Inspect liner plates of pug mill and mixer blades of drier-drum.

9. Every 1200 hours:-

- (a) Clean the fuel tank thoroughly after every 1200 hours running with diesel. Do not use water for cleaning. It will lead to rusting and scale formation.
- (b) Check for play of shafts and replace bush bearings, ball or other bearings, if necessary.
- (c) Check for sag in chains and V belts and tighten, replace worn-off/damaged V belts..
- (d) Check paddle tips for wear and tear.

10. Burner:-

- (a) Drier drum- New standard Brand L>A>P.3 burner with fuel consumption of 6-25 litres per hour.
- (b) Bitumen Kettle - New standard Brand L/A/P/1 burner with fuel consumption of 1 to 06 litres per hour.
- (c) Centrifugal Blower – To deliver 500 Cfm or 840 Cum/hour is provided to supply air to drier drum burner and bitumen kettle burner.
- (d) Exhaust Fan – It is capable of delivering 2250 Cfm at 1440 KPM.
- (e) Tyres- Pneumatic wheel of tyre size 7.5 x 16 x10 ply.
- (f) Loading Hopper – Loading skip is of 0.283m³ for 0.283 Cum capacity (10 Cft).
- (g) Drier-drum – Length 1120 mm diameter 1300 mm.
- (h) Pug mill mixer – Length 1240 mm width 756 mm.

Type of lubricant	Indian oil	Bharat petroleum	Hindustan petroleum
A	Servo grease WB	Bharat WB grease special	HP wheel bearing grease
B	Servo gear grease	Bharat universal	HP multipurpose grease
C	Servo gear HP 80 oil	Bharat special 90 EP oil	Gervil EP 68

S/No	Parts to be lubricated	Periodcity	Nos of point	Lubricant recommended
1	Front axle hubs	Once in 6 month	4	A
2	Rear axle hubs	-do-	4	A
3	Drum gear	Once in 50 hours	1	B
4	Drum pinion	-do-	1	B
5	Bush discharge door	-do-	2	C
6	Bearing rope drum supports	-do-	2	B
7	Bearing blower	-do-	1	B
8	Bush guide roll skip	Once in 8 hours	4	C
9	Bearing seal master type	-do-	2	B
10	Bearing guide pulleys dryer drum	Once in 50 hours	4	B
11	Bush bearing pug mill	Once in 4 hours	4	C
12	Link junction pug mill discharge door	Once in 50 hours	3	C
13	Turn table	Once in 6 month	1	B
14	Sprocket, gear pump bitumen	Once in 50 hours	1	B
15	Bearing seal master	Once in 8 hours	2	B
16	Bearing plumber block	-do-	2	B
17	Bush bearing block	-do-	4	C
18	Pug mill gear 52 teeth	-do-	2	B
19	Pug mill pinion 14 teeth	-do-	1	B
20	Drive sprocket bitumen pump	Once in 4 hours	1	B
21	Driven sprocket bitumen pump	-do-	1	B
22	Drive sprocket oil pump	-do-	1	B
23	Driven sprocket oil pump	-do-	1	B
24	Sprocket 15 teeth 3 rd counter shaft	-do-	1	B
25	Sprocket 15 teeth 2 rd counter shaft	-do-	1	B
26	Drive sprocket 15 teeth 1" pitch	-do-	1	B
27	Sprocket 52 teeth 1.1/4" pitch	-do-	1	B
28	Clutch sprocket	-do-	1	B
29	Bearing block split collar dog clutch	Once in 2 hrs	1	C
30	Bush dog clutch	-do-	1	C
31	Bush dog lever	-do-	1	C
32	Bush split bearing block	Once in 50 hrs	2	B
33	Connecting eye	Once in 2 hrs	1	C
34	Crank clutch lever	-do-	1	C
35	Coller locking	-do-	1	C
36	Guide roll skip	Once in 4 hrs	4	C
37	Coller hopper bracket	-do-	2	C
38	Draw-bar hinge pin	Once in 50 hrs	2	C

39	Brake engage lever	-do-	3	C
40	Coller brackets brake	-do-	3	C
41	Joint coller with link to connecting bar brake	-do-	1	C
42	Joints, brake rod connecting lever	-do-	1	C