



**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**INSPECTION CHECKLIST
FOR
SHOULDER BALLAST CLEANING MACHINE
(FRM - 80)**

REPORT NO. TM-91

SEPTEMBER --2005

**RESEARCH DESIGNS & STANDARDS ORGANISATION
LUCKNOW-226011**

Name of Inspecting Officer:

Designation :

Date of Inspection :

Machine No. & Make :

Base Station :

Items To Be Checked

S. No.	Item	Agent/Description	Prevailing Condition
1.	Oil/Water Levels Of Tanks:		
i)	Hydraulic oil	HLP – 68 or equivalent	Ok / less
ii)	Diesel tank	HSD	Ok / less
iv)	Axle gear box	Servo System – 68	Ok / less
v)	Pump gear box	API CF4 15W40	Ok / less
vi)	Engine lube oil	API CF4 15W40 or equivalent.	Ok / less
vii)	Main Conveyor gear box	SAE-90 / C-90	Ok / less
ix)	Turn table for waste conveyor	Grease/ MP2.	Ok / less
xii)	Vibration drum	OMALA 150	Ok / less
xiii)	Cutting chain gear box	C-90/ EP-90/ SAE-90	Ok / less

S. No.	Item	Prevailing Condition
2.	Engine: As per maintenance schedule	
	Engine Model & No.:	Engine hours:
i)	Starting problem	Yes / no
ii)	Condition of smoke	White/black/normal/Grey
iii)	Maximum engine temperature during working	°C
iv)	Leakage in Head gasket	No/ Yes (Head no.)
v)	Electrolyte level in batteries	Ok / less
vi)	Specific gravity of electrolyte (min 1.24)	Ok / less
vii)	Compression leakage	Yes / no
viii)	Belt tension	Ok / To be tightened
ix)	Condition of Engine Hoses	Ok / To be attended
x)	RPM of the Engine	
xi)	Battery charging	Yes / no
xii)	Whether working gauges are in order:	
a)	RPM	Yes / no
b)	Oil pressure	Yes / no
c)	Temperature	Yes / no
d)	Battery charging	Yes / no
xiii)	Engine oil pressure	
	Actual:	
	Rated at :	
	Idle speed : 1.5 kg/sq cm	
	Rated speed : 2.5 kg/sq cm	
xiv)	Last change of Air Cleaner filters done on	Dated Engine hrs
xv)	Last change of engine oil done on	Dated Engine hrs
xvi)	Last change of engine oil filters done on	Dated Engine hrs
xvii)	Last change of diesel filters done on	Dated Engine hrs

S. No.	Item	Prevailing Condition
xviii)	Last change of batteries done on	Dated Engine hrs
xix)	Last change / repair of	
a)	Self starter done on	Dated Engine hrs
b)	Alternator done on	Dated Engine hrs
xx)	Last over-hauling of the Engine done on	Dated Engine hrs
xxi)	Last calibration of fuel injection pump	Dated Engine hrs
xxii)	Last calibration of Fuel Injectors done on	Dated Engine hrs
xxiii)	Engine temperature safety device	Working / not working
xxiv)	Water/ coolant level in radiator	Ok/less
3.	MACHINE GENERAL :	
i)	Oil leakage in gear boxes	No/Yes (location)
iii)	Clutch pressure in axle gear boxes	Ok / To be adjusted
v)	Greasing of all Cardan shaft	Done / Not done
vi)	Condition of Wear plates	Satisfactory /To be attended
vii)	Condition of excavating chain	Ok / To be attended
viii)	Last changing of cutting chain cap done on	Dated
ix)	Last change of wear plates done on	Dated
xi)	Function of outer collision device of waste conveyor	Working / not Working
xii)	Working of ballast distribution chute	Working / Not working
xiii)	Vibration pressure of the screening unit	Ok / To be adjusted
xiv)	Greasing of screen pads	Done/Not done
xv)	Last change of screen meshes done on	Dated
xvi)	Last change of oil in screen drive drum done on	Dated
xvii)	Last change of wing plate done on	Dated
xx)	Condition of conveyor belts	Ok / To be replaced
S. No.	Item	Condition
xxi)	Tension in the conveyor belts	Ok / To be adjusted
xxv)	Proper positioning of waste conveyor belts on locking position	Yes/ No

xxvi)	Greasing of main conveyor bearing	Ok / To be done
xxvii)	General condition of conveyor belts	Ok/To be replaced
xxviii)	Condition of idle rollers of waste and distributing conveyor if provided.	Ok / To be replaced
xxx)	Condition of conveyor roller chain, if provided	Ok/not ok
xxxi)	Lubrication arrangement for conveyor roller chains	Working/Not working
xxxii)	Condition of driver and driven shaft Sprocket of conveyors	Ok/To be replaced
xxxiii)	Any rubbing in hydraulic hoses	Yes / no
xxxiv)	System pressure for rated settings (380 Bar)	Ok / To be attended
xxxv)	Axle clutch pressure (12-15 bar)	Ok / To be attended
xxxvi)	Charging pressure (30 Bar)	Ok / To be attended
xxxvii)	Cutting chain pressure (350-390 bar)	Ok / To be attended
xxxvii i)	Driving pressure (310 bar)	Ok / To be attended
xl)	Heavily leaking of hydraulic oil.	No/Yes / (location)
xliii)	Stock of hoses with the machine	Adequate / less
xliv)	Stock of hose fittings	Adequate / less
xliv)	Requirement of PCB if any	Part no.
xlvi)	Defective/Released PCB available with machine	Part no.
4.	General:	
i)	General cleanliness of the machine	Ok / not ok
ii)	Spares available on the machine as per Annexure— II	Sufficient/deficient
iii)	All the safety item are present as per annexure –I	Yes / no
iv)	Log books & Schedule registers are filled	Properly / Improperly
v)	Function of locking devices	Working / not working
vi)	Condition of screen meshes & chute plates	Ok / To be replaced
vii)	Clearance between brake shoe and wheel	Ok/ To be adjusted
viii)	Electrical lights	Working / not working
x)	Hydraulic Oil Temperature after 2 hours of machine working	°C
xii)	Competency Certificate of Operator	Current / expired
xiii)	All safety system provided on machine	Functioning/Not functioning
xiv)	Condition of brake shoes	Ok/ To be replaced
5.	During Block Working:	
i)	Location of working	
ii)	Pre and Post ballast cleaning operation being done	Yes / no

iii)	Duration of block	
iv)	Output of work	
v)	Machine protection is being done by PWI / machine	Yes/no
vi)	Warning hooter	Working/ Not working
6.	Staff:	
i)	Strength of staff	Full / deficient
ii)	Group Performance	Excellent / Very Good / Good/ Average
iii)	Cost awareness amongst staff	Excellent / Very Good / Good/ Average
iv)	Safety awareness amongst staff	Excellent / Very Good / Good/ Average
v)	Staff due for Medical	
vi)	General condition of the machine.	Excellent / Very good / Good / Average
vii)	Control Chart of Output	Upward / Normal / Down ward
viii)	Pending maintenance schedules & reasons	
ix)	Any other remarks by Inspecting Officer	

Signature of Inspecting Officer

LIST OF SAFETY TOOLS

S.No.	Description	Quantity
1	Detonators	1 Box
2.	Hand Signal Flag Red	2 Nos
3.	Hand Signal Flag Green	1 Nos
4.	Hand Signal Lamp	2 Nos.
5.	Chain and Pad Lock	02 Set
6.	Terfor (2 tonne capacity)	1 No.
7.	50t Jack with traverser	2 Nos.
8.	Crow bars	2 Nos.
9.	Wooden blocks off sizes	8 Nos.
10.	Field Telephone	1 set
11.	Skids	4 Nos.
12.	Working Time Table	1 No.
13.	G&SR Book	1 No.
14.	Banner Flag	2 Nos.
15.	Warning hooter	1 Nos.
16.	LV board/ Tail Lamp	01 No. Each

LIST OF ITEMS TO BE KEPT ON FRM-80 MACHINE

S. No.	Item	Part No.	Qty. Reqd.
I.	ENGINE		
3.	Fuel filter 5 lit. capacity paper type	316655	2 No.
4.	Lube oil filter	316654	2 No.
5.	By pass filter	3873576	01 No.
5.	Set of fuel injection pipes		1 Set
6.	Set of water radiator hoses		1 Set
7.	Set of fuel hoses	i) 6.234.0.939.045.4.L = 700 mm ii) 6.234.0.939.048.4.L = 300 m iii) 6.234.0.939.040. L = 700 mm	1 No. each
8.	V - Belts	A.61, A.52, A.45	2 each
9.	Air cleaner filter (outer)		2
10.	Air cleaner filter (Inner)		2
11.	Set of copper washers		1 Set
12.	Banjo bolts		4
13.	Fuel filter~O~Ring ,fuel filter		2 each
14..	Self starter		1
II.	HYDRAULIC		
1.	Hyd. suction filter	HYS 501.360.150 ES	1
2.	Hyd. suction filter	HYS 501.160.P19 ES	3
3.	Hyd. suction filter	HYS 501.460.150	4
4.	Hyd. return filter	HYR.501.330.104	2
5.	Clutch filter	62.05.1000.113	4
6.	Clutch filter	62.05.1000.293	4
7.	Piston ring for clutch shaft	A.302943	3
8.	Modified piston ring for clutch shaft (if modified)		3
9.	Bush for clutch shaft	64.02.2107.00	2
10.	Seal set for hyd. cylinders (for each cylinder)		1 Set
11.	Hyd. hoses with end connection (length 5 mtrs each)	No. 4,6,8,10,16,20	1

S. No.	I t e m	Part No.	Qty. Reqd.
12.	Hyd. Return hoses with end connection (5 metre length) dia. 24		1
III.	PNEUMATIC		
1.	Pneumatic Hose ¼" dia		10 Mts
2.	Pneumatic Hose ½" dia		10 Mts
3.	Pneumatic Hose clamp 1/4" & 1/2" dia		6 each
4.	Brake cylinder seal		1
5.	Hose connection (compressor to cooling coil)	90291	1
6.	Brake shoe		4.
IV.	ELECTRICAL/ELECTRONICS		
1.	Head light bulbs		2
2.	Working light bulbs		4
3.	Tail lamp bulbs		4
4.	Micro fuse	5A/272	6
5.	Limit switch complete		2
7.	Battery terminals heavy duty		4
8.	Thimbles off sizes		10
9.	Power supply card	Ek.813 SV002	1
10.	4 Way toggle switch for waste conveyor and cutter unit operation	EL-T1058-24	1
V.	MECHANICAL AND GENERAL		
1.	Hex bolt with nylon nut 12 x 65 MM		50
2.	Rivets with washer		50
3.	Cutter chain showels		4
4.	Shovel pin	656 080 1050	2
5.	Roller	SU 127.21.4.1.6B	4
6.	Bush	SU 127.21.4.1.5	4
7.	Clamping bushing	656.080.1040	2
VI.	TOOLS		
1.	Standard Tools provided on the machine		1 set
2.	Mechanical jacks 5 t & 20 t. cap. with traverse		2 each
3.	Drilling machine - Small size		1
4.	Riveting machine		1
5.	Chain hoisting device		1
6.	Multimeter		1
7.	Hand grinder & Bench grinder		1
9.	Bench vice		1
10.	Adjustable wrench		1set
11.	Needle file		1 set
12.	File set big		1 set
13.	Circlip pliers (inner and outer)		01 no.each
14.	Screw driver		01 set

Important Items For Shoulder Ballast Cleaner.

1. Longer blocks should be stressed for effective working.
2. Track should be surveyed thoroughly for broken sleepers & rail pieces etc., which may obstruct the working.
3. Signal cables and rods passing under the track must be attended by S&T official at site.
4. Muck wagon to be arranged on through ballasted bridges and cuttings, where disposal is not possible on sides.
5. Ballast train should be available immediately after cleaning the ballast, to relax speed restriction in shortest period.
6. Preferably, Tie Tamping Machine and Dynamic Track Stabiliser should follow FRM - 80 working.
7. Level Crossings should be opened in advance of deploying FRM - 80 for continuous working.
8. Frequent shifting of FRM - 80 from one location to another should be avoided to achieve good work and adequate progress.
9. Normally, FRM - 80 should be deployed on concrete sleepers.
10. Adequate stock of cutter chain wear plates and other fast wearing parts should be procured in advance.
11. A set of gas cutting machine should be readily available with the machine.

Precautions To Be Observed During Movement Of The Machine

- All parts which are not connected to the machine must be secured against tilting and shifting.
- Waste conveyor belt should be secured in central position against tilting.
- Upper part of waste conveyor should be secured in lower position.
- Both chain troughs are to be completely lifted, retracted and secured with chain.
- Chain tensioning cylinder should not be extended by more than 25 cm.
- Excavation chain must be secured against sliding down the chain troughs.
- The end of cutter chain must be received with brackets.
- Retract ballast distributing conveyor and secure by safety chains.

General Safety Notes

- ◆ The machine has to be operated to existing Indian Railways rules and regulations.
- ◆ The safety of yourself and other people is a most important consideration in the operation and maintenance of the machine.
- ◆ Remember the machine is a working unit, carrying delicate instruments. Therefore the machine should not be driven at excessive speed over bad track or turnouts.
- ◆ Always keep your eyes open for other men working close to the machine.
- ◆ Do not forget to look out for signals, switches and track obstructions.
- ◆ Remember to 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.
- ◆ Always, keep the machine clean. Excessive oil or grease on the machine can cause you to slip and fall and is also a potential fire hazard.
- ◆ Always lock the machine before you leave. Make sure that the machine is protected in accordance with railways regulations.
- ◆ Do not permit unauthorised persons to operate the machine.
- ◆ It is prohibited to use exposed light or fire on or near the machine.
- ◆ Do not tow the machine if the final drive is engaged.

ACKNOWLEDGEMENT

The following officers and staff have made valuable contribution in finalising of the Check list for inspection of Shoulder Ballast Cleaning Machine (FRM-80) of M/s Plasser.

Railways:

1. S/Sri M.L. Chaudhary SSE/TMC/NR

RDSO:

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- 2." " Neerendra Prasad ARE/TM
- 3." " M.N. Siddiqui SE/Engg./TM
- 4." " A.N. Srivastava JRE/I
- 5." " Prem Kumar JRE/I