DIRECTORATE GENERAL BORDER ROADS
GENERAL MAINTENANCE INSTRUCTION NO. 205.

TATA SUMO VEHICLE POWERED WITH 483 DL NATURALLY ASPIRATED ENGINE

1.1 INSTRUCTION

Tata Sumo vehicle powered with 483 DL naturally aspirated engine has advanced technology with high maneuverability and economic life cycle cost. It has also ergonomically designed body, easy steer ability, good road hold designed stability, good visually and easy access to the areas of daily maintenance.

1.2. **AIM**

These instructions are issued as guidelines on periodic maintenance to achieve optimum and trouble free performance for the vehicle.

2. **ACTION BY**

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

(b) Field Wksp (GREF)

(i) To check the 'Record of maintenance and lubrication' in the log book of the vehicle during its inspection and repairs, as carried out as per maintenance and lubrication schedules given in this instruction.

(ii) Advise user units in respect of any discrepancy noticed.

3. **DETAILS**

These instructions cover the following:-

(i)	Periodic maintenance	- Appx 'A'
(ii)	Recommended fuels, lubricants coolants with ambient temperature and their filling capacities.	- Appx 'B'
(iii)	Technical specification	- Appx 'C'
(iv)	Do's and Dont's	- Appx 'D'

4. Please ack receipt.

Sd/- x-x-x-x-
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For Dir Gen Border Roads
28 May 1999

Appendix-'A'

PERIODICAL MAINTENANCE

DAILY MAINTENANCE TASK

1. Check coolant level, Top up if necessary.

2. Check oil level in sump, Top up if necessary.

3. Check and rectify if any leakages in fuel system.

4. Check water level in wind screen washer container and top up if necessary.

AFTER EVERY 4000 KMS

1. Carry out all daily maintenance task.

General: - Wash the vehicle.

Engine

2. Change engine oil and engine oil filter.

3. Clean breather and check gasket/hoses for leakage, replace if necessary.

4. Clean air cleaner filter element, change if red band appears on service inductor.

5. Check fan belt, adjust tension if necessary, replace if defective.

Gear box propeller shaft

6. Check oil level in gear box, top up if necessary.

7. Grease propeller shaft U-J cross and sliding yoke suspension and steering.

8. Grease idler arm, tie rod & center link belt joint.

Clutch and Brakes

9. Check level of clutch & brakes fluid container, top up if necessary.

10. Check service & parking brakes, adjust if necessary.

After Every 8000 Kms

Carry out 4000 kms task specified.

Engine

1. Change (Tank side) fuel filter element.

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REAR AXLE (GEAR BOX)

2. Check oil level in rear axle, top up if necessary.

Suspension & Steering

3. Grease steering spindle and sleeve.

4. Tighten all fasteners.

AFTER EVERY 16000 KMS

Engine

1. Change FIP side both fuel filter elements.

Gear box, Rear axle

2. Change oil in rear axle.

3. Change oil rear axle.

4. Check wheel alignment and adjust if necessary.

5. Check shock absorber and its bushes, replace if necessary.

Clutch and Brakes.

6. Check front brake pad and rear brake linings, replaces if necessary.

Electricals

7. Apply graphite grease on starter motor pinion bushing.

8. Grease the wiper motor leakages.

9. Check electrolyte level in battery, add distilled water if necessary.

10. Check head lamp focussing and functioning of other electrical instruments.

11. Check glow plugs for continuity/short circuit, replace if required.

AFTER 33000 KMS

Engine

1. Check injection nozzles for opening pressure and spray characteristics.

2. Check timings belt, adjust tention if necessary, replace if defective.

Rear Axle, Suspension, Steering Clutch and Brake

1. Change grease in rear hubs and adjust bearing play (only for telco axle).

Contd...P/3

2. Change grease in front hub and adjust bearing play.

3. Check oil level in steering gear box, Top up if necessary.

4. Check condition of rubber bushes in the following, replace if necessary.

(i) Top wish Bone
(ii) Bower link
(iii) Antiroll bars
(iv) Rear links
(v) Pan hard rod.

5. Overhaul the following brake components and change the brake fluid in the system:-

(i) Tandam master cylinder
(ii) Front caliper
(iii) Rear wheel cylinders
(iv) Clutch master cylinder and slave cylinder.

Electricals

6. Check specific gravity of electrolyte.

7. Apply grease on tail gate hinges and door lock inner ratchat, lubrication with oil can.

<u>After 50000 kms or two years which ever is earlier:-</u>

1. Change coolant in cooling system.

<u>After 64000 kms</u>

1. Replace timing belt.

<u>After 72000 kms</u>

1. Clean breather of gear box.

Appendix 'B'

RECOMMEDED FUELS, LUBRICANTS COOLANTS WITH AMBIENT TEMPERATURE AND THEIR FILLING CAPACITIES

Fuels: Fuel Tank Capacity: 50 Ltrs.

High speed diesel confirming to IS 1460 DIN 51601 or equivalent is recommended to be used as fuel. At very low temperature diesel may, become insufficient due to paraffin separation. It is therefore , necessary to mix supplementary fuel with summer or winter grade diesel. The supplementary fuel to be used is kerosene or aviation turbine fuel.

Ratio for mixing of supplementary fuel and diesel are shown below :-

Ambient Temperature Up to Deg C	Percentage	
	Summer Grade Diesel	Supplementary Fuel
Up to O	100	0
O to -10	70	30
-10 to -15	50	50
	Winter Grade	
Up to -15	100	0
-15 to -20	70	30
-20 and below	50	50

Note: - Care should be taken that diesel and supplementary fuel are thoroughly mixed before filling and changing fuel filter element period recommended in maintenance schedule should be adhered.

Lubricants

Engine oil capacity: 6.8 ltrs.

Grade of engine oil MIL –L-2104C/APICD specification and range of ambient temperatures at which these can be used are given in tables:-

Ambient Temperature Deg C	Engine Oil Grade
-5 and above	SAE 30
-10 to +20	SAE 20W-30
-20 to 0	SAE 10W
-10 and below	SAE 5W/20

Gear Box: - General Motors, Types A, Suffix A specifications.
Capacity – 1.5 ltrs.

Rear axle and Mechanical steering gear box.

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Filling Capacity -1.9 ltrs

Ambient Temperature	Grade
Upto -9° C	SAE 90
- 9° C to 40° C	SAE 75

Brake and Clutch fluid

Filling capacity – As required
Equivalent Brand/Grade – HP

(a) HP Super Duty brake fluid
(b) Castrol – Castrol universal (Crimson)
(c) IOC – Servo Brake fluid Super HD

Wheel bearing Propeller Shaft . 'U' Joint & Sliding Yoke:-

Filling capacity - As required

Equivalent Brand/Grade: -

(a) Bharat Petroleum – Bharat Univex – A
(b) HP-Multi Purpose Grease
(c) Castrol – Castrol AP Grease consistency No. 2.
(d) IOC – servo Grease MP

Note : The changes period of engine oil/oil filter element should be adhered as per preventive maintenance schedule.

Cooling System

Filling capacity – Total capacity 9 to 10 Ltrs (Approx)

Recommended antifreezing agent :-

(a) IOC – Servo Kool
(b) Castrol – Long life coolant
(c) Sun Star Lubricants Ltd – Golden Cruiser 1200
(d) Ancol Ahesive - Purecool

To prevent rust formation and freezing of water inside water Jackets of Crank case , cylinder head and radiator mix antifreez agent as recommended under :-

Ambient Temperature Up to Deg C	Water	Anti Freeze
Upto – 15	70	30
- 20	60	40
- 40	50	50

Note :- Coolant should be drained and filled with fresh mixture anti freeze agent and water in ratio as shown above. Take at even two years or 50,000 Kms whichever is earlier.

TECHNICAL SPECIFICATION

1.	Engine	- Naturally aspirated
2.	Model	- Tata 483 DL
3.	Type	- Water cooled indirect injection Diesel Engine.
4.	No of cylinders	- 4 in line
5.	Bore/Stroke	- 83mm x 90mm
6.	Capacity	- 1948 CC
7.	max engine output	- 68 PS at 4500 rpm as per DIN 70020 - 45KW at 4500 rpm as per CMVR
8.	Max torque	- 12 MKG at approx 2500 rpm as DIN 70020
9.	Compression Ration	- 22.1
10.	Firing order	- 1-3-4-2
11.	Air filter	- Dry (paper) Type
12.	Oil filter	- Spin on full from paper type
13.	Fuel filter	- Two stage, fine filteration
14.	Fuel injection pump	- Rotary type with electric stop solan
15.	Governor	- Mechanical
16.	Weight of engine	- 200 kg (Dry)
17.	Cooling capacity	- 9 to 10 ltrs
18.	Clutch	- Single plate dry friction diaphram type.
19.	Cut side diamaster of clutch lining	- 228 km
20.	Friction Area	- 463 sqcm (approx)

Gear Box Type

Type	- Synchromesh on all forward gear and constant mesh on reverse gear.
Rear axle	- Single reduction salisbury to rear axle with Hypoid gears semi floating axle shafts.

Contd..P/2

Front	- Independently suspended
Steering type	- Mechanical steering optional Hydraulic power Assisted.
Ratiex	- 22.5:1
Steering wheel	- 420 mm dia

Brake

Service Brakes	- Vaccum assisted independent hydraulic brake on Front and rear through tandem master cylinder. Vaccum pump mounted in alternator.
Parking Brake	- Cable operated mechanical linkage acting or rear Wheels.

Suspension

Front	- Double with bone type with coil springs.
Rear	- Seal elliptic leaf springs.
Shock absorbers	- Hydraulic double acting telescopic type at front and rear.
Anti role bar	- At both front and rear.
Fuel tank capacity	- 50 ltrs 5 ltrs (for some types)

Electrical System

System Voltage	- 12 Volts (-Ve earth)
Alternator capacity	- 40 Amps
Battery	- 12V N 70Z
Instruments	- Speedometer (Km/hr and odometer (km) fuel Gauge Water temperature gauge
Indicator Lamps	- For Battery charging low oil pressure, Hand brake, Direction indicators, Main beam Brake fluid lever and glow plug timer
Passenger Capacity	- 9 + Driver.

Appendix-'D'

DO's AND DONT's

(a) Use recommended lubricants only.

(b) Change oil in engine, gear box and rear axle at prescribed intervals with recommended grade and brand only.

(c) Use only genuine oil filter and fuel filter elements. Replace them at regular intervals.

(d) Clean air filter elements regularly. Replace filter element when service indicator shows red band even after cleaning the filter element.

(e) Ensure periodic servicing as per maintenance schedule.

(f) Insist on use of genuine spare parts for all replacements.

(g) Ensure that caps of auxiliary tank and radiator are firmly fitted to keep cooling system pressurized and to maintain water level. Always use radiator cap only of 150 kg/cm (14PSI), if required to be replaced.

(h) Check tyre for damage from time to time and remove any foreign bodies embedded in treads.

(j) When replacing tyres, have the wheels balanced. Keep grease, oil and fuel away from the tyres. In case of uneven tyre wear, got the vehicle attended by any of out authorised service set ups.

(k) Maintain correct tyre pressure.

(l) Check battery every week and top up electrolyte level. Keep battery terminals clean and cable joints tight. Apply vaseline/petroleum jelly in terminals. Use distilled water only for a topping up.

(m) Observe correct polarity when connecting battery terminals.

(n) Disconnect alternator terminals while carrying out any welding on the vehicle.

(o) Avoid panic breaking. Use lower gear while descending gradients.

(p) Start the vehicle always in the 1st gear to avoid premature clutch wear.

(q) Keep both feet and parking brake properly adjusted.

(r) While engaging reverse gear, make sure that the vehicle is stationary. Declutch, wait for a few second and then engage reverse gear.

Contd...P/2

(s) When perking on slopes, use wheel chocks, apply parking brake and keep vehicle in low gear.

(t) In case of emergency parking or break down on road, pull the hazard warning switch to flash all the blinker lights to warn other road users.

(u) Release parking breaking before driving off.

(v) Crank the engine only when glow plug indicator light is 'OFF'.

(w) Release the ignition key as soon as engine starts.

(x) Retighten wheel mounting nuts after 100 kms of every wheal change.

(y) Use only recommended FUSES and always keep spare fuses in the box.

(z) In case of engine not starting first check the fuse of fuel injection pump solenoid.

(aa) In aspect the engine timing belt at every 32,00 km and replace, if found torn, cracked, worn or soaked in oil.

(ab) Ensure doors are properly closed.

(ac) Insulation in the cab room should be kept in good condition.

(ad) Where Turbochargers engine is fitted, keep engine in idling condition for at least 30 seconds just after starting the engine and also before stopping it, to protest the turbo charger against damage due to oil starvation.

(ae) Insulation of the cab room should be kept up in good condition.

(af) After parking in the sun, drive with windows rolled down for a few minutes to below off hot air before switching on AC.

(ag) Keep all windows rolled up when AC system is working.

(ah) During stop and go city driving use lower gear to obtain efficient cooling.

(aj) Ensure ventilations in re-circulation mode for more effective cooling performance.

(ak) If you feel irritation in the eyes due to smoke or during long drive, ventilate for half a minute by using fresh air level.

(al) Before stopping the engine switch off AC first and then the blower.

(am) During off seasons operate the air condition a few times every month to lubricate components.

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DONT’s

(a) Do not crank the engine when glow plug indicator light is ‘ON’.

(b) Do not start the vehicle if brake fail indicator is ‘ON’.

(c) Do not use clutch pedal as feet rest. This will reduce clutch life.

(d) Do not coast vehicle in neutral when engine is in switched off position. This is safety hazard.

(e) Do not run engine without radiator cap. Use genuine cap only. Keep system pressurized.

(f) Do not over tighten engine oil filter.

(g) Front and rear suspension shock absorbers fitted on this vehicle are within built rebound stop. There is no separate rebound stopper fitted on the vehicle. Hence, do not run the vehicle either without shock OR with non-genuine shock absorber.

(h) Do not put your hand inside the condenser fan when the grill is removed, Disconnect power supply to fan and switch off engine before any maintenance work where applicable.