

**DIRECTOR GENERAL BORDER ROADS**

**GENERAL MAINTENANCE INSTRUCTION NO. 247**

**ON OPERATION AND MAINTENANCE OF**

**CONCRETE TRANSIT MIXER 2518 TM (6X4) MAKE AMW**

**INTRODUCTION:-**

(a) Concrete Transit Mixer model 2518 TM (6x4) Make AMW (Asia Motor Works) Chassis having Wheel base 4300 mm fitted with Cummins 6BTAA - BSII diesel engine developing 178 HP at 2500 rpm, 6 speed synchromesh gear box, power steering, with separate engine Kirloskar HA 494 diesel engine developing not less than 45 KW for rotating the mixer drum (Truck Mixer) Make LIEBHERR.

(b) This GMI gives the technical specification and know how on the operation, maintenance and repair procedure of aggregates of model vehicles, to ensure maximum performance and safe/satisfactory operation. Assuming that the technicians in the workshop are fully conversant with the repair and maintenance practices of commercial vehicles in general the repair procedures out lined in this GMI emphasizes the special features of this product. Compliance with procedures given in this GMI will enable to desire the maximum service from the AMW diesel vehicles.

(c) To prolong the life of AMW Concrete Transit Mixer, to prevent frequent break downs and to reduce maintenance cost, the periodic maintenance must be carried out according to the '**Periodic Maintenance Schedule**' described in this GMI. Periodic Maintenance is essential for preventing troubles and accidents to ensure satisfaction and safety. Daily care and inspection is also essential for prolonging the operating life of the vehicle and for safe driving. It also reduces the wear and tear on the vehicle, prolongs its life, give more mileage, failure of the guide lines given below can result in personal injury or serious damage to the vehicle. All information and instruction in the GMI is based on the latest owner's manual and service booklet.

**AIM:-**

The instructions are issued as guidelines for schedule of preventive maintenance, lubrication of AMW Concrete Transit Mixer model 2518 TM (6x4) manufactured by M/s Asia Motor Works Ltd for regular attention to keep the vehicle in good mechanical condition which must be strictly followed.

**ACTION BY:-**

(a) User unit: To carryout periodic inspection and monitor regular/periodical Maintenance as laid down in this instruction and to record the tasks done in log book.

(b) Field Workshop :

(i) To carryout and monitor maintenance schedule and oil changes as per periodical maintenance laid down in the maintenance instruction and to check the record of maintenance including lubrication.

(ii) To advise the user unit in respect of any lapse noticed.

- (c) Mobile Maintenance Team: To ensure that proper maintenance is carried out and submit report accordingly to Task Force Commander and OC Wksp for their necessary action.

**DETAILS:-**

This instruction includes the following aspects:-

- (a) Operating Procedure – DO's and Don'ts - Appendix 'A'
- (b) Technical Specification - Appendix 'B'
- (c) Recommended Lubricants with Filling Capacity and oil change frequency/periodicity - Appendix 'C'
- (d) Periodic Maintenance schedule - Appendix 'D'

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**OPERATING PROCEDURE**

**MIXER DRUM**

1. **Drive System – Front, NMV, Camshaft and Separate Motor**

- (a) The mixing drum is driven by the engine via cardan shaft and axial-piston variable pump.
- (b) The axial-piston pump supplies oil in a closed circuit to axial-piston motor and causes its input shaft to rotate
- (c) The axial-piston motor is flanged to the planetary gear which drives the mixer drum
- (d) The direction and speed of rotation can be altered by adjusting the pitch direction and angle.
- (e) The driving force for the mixing drum, acting in a direction from the vehicle engine to the variable displacement axial-piston pump, is transmitted by a cardan shaft
- (f) The variable displacement axial-piston pump delivers the oil in a closed circuit to the radial piston motor integrated in the planetary gear which puts the drive shaft of the planetary gear in to a rotary motion.
- (g) The sense and speed of rotation can be changed by adjusting slewing device.

2. **Warming up the Hydraulic System**

- (a) If the ambient temperature falls temporarily below the lower limit of the temperature range specified for the oil in use (approx 10<sup>0</sup>C), the system must be warmed up.
- (b) Run the engine at idling speed for approx 15 minutes with the mixing drum at a standstill.
- (c) When the ambient temperature is in a range from -10 <sup>0</sup>C and -30 <sup>0</sup>C, the rotational speed of the empty mixing drum is to be adjusted to approx 3 rpm and the pumping speed (vehicle engine) / drive motor to about 1000 rpm. Warm up time of the unit: about 5 to 10 minutes.

3. **Mixer Control Unit**

- (a) Loading from a ready mixed plant: The mixing drum speed required for successful loading depends on the type of batching plant in use and the specification of the concrete consistency. Optimum drum speed must be determined in accordance with site conditions. For reasons of economy, use the minimum speed necessary for successful loading.
- (b) Veh Mixture - wet load: All aggregates including cement and water are added in charges to the mixer. Mixer is performed directly in the mixer.
- (c) Adjusting mixing drum contents in transit: Adjust the mixing drum speed with the pump control lever so that the mixing drum does not rotate at more than 4 rpm at maximum diesel engine speed.
- (d) Gear Mixer operation from rear mixer control stand, if EDC is installed: The speed step switch is released by actuating (pulling) the hand brake. The speed now be adjusted. If you forget the reset the speed with the step switch, the engine speed is automatically reset to idling speed if you release the hand brake or actuate the clutch.

(e) Discharge Process when driving: Set the change over switch in the drivers cabin to position I. The fixed working speed 900 rpm is automatically set. The regulating function (RQV) is operational here and is independent of the clutch and brake position. Vehicles without a step switch for speed adjustment are equipped with plus (for increase)/minus (for decrease) buttons.

4. **Mixing Drum and Mixing Drum Bearing**

(a) Spiral Mixer Blade: The Spiral mixer blades are subject to wear at a rate depending on mixer operation and the nature of aggregates used. Wear is usually greatest in the central zone of the mixing drum.

(b) As the upper edge of the blades becomes sharper, there is a tendency for radial cracks to occur which can spread to the drum jacket, with the risk of section of the blades be torn out. To prevent, cut away the sharp edge of the mixer blade periodically, complete with the radial cracks. Any remaining crack must then be filled by welding.

5. **Re-adjustment of the guide rollers**

(a) The groove nut is used to set and readjust the bearing play of the guide rollers. There is no need to dismount the mixing drum for readjustment purposes, but it will suffice to lift up the drum just likely in the support ring area to check the bearing play.

(b) The circular pressed steel strip segments are welded from the side on to the inside edge of the spiral blade, in the direction of mixing drum base. This wear protection prevents radial fissures from developing and the spiral blade from braking away.

6. **Points to achieve maximum durability of mixing drum/Spiral blade**

(a) Always travel with a low mixing drum speed selected. If possible, do not rotate the mixing drum during travel.

(b) At least one inspection once a year with preventive repairs should be carried out.

(c) Visual check of mixing drum and mixing spiral blade once in six months be carried out.

7. **Concrete intake and discharge**

(a) The bottom part of the ladder must be raised and locked in the transport position before beginning a journey (Traffic safety).

(b) The concrete is drawn in to the drum from the inlet hopper by rotating the mixing drum in the 'mix' direction.

(c) The concrete is discharged via the discharge hopper and swivel discharge chute by rotating the drum in the 'discharge' direction.

(d) Up to two extensions chutes can be attached to the swivel discharge chute. (Further Chutes must be supported).

(e) While underway, make sure the swivel chute be latched and safely held in place by the locking hooks. Use push-in connector, if any, to additionally lock the swivel chute in place (road safety).

## **Do's**

### **Vehicle Side**

1. Check for engine oil pressure at engine idling condition minimum oil pressure should be  $0.5 \text{ kg/Cm}^2$
2. Idle the engine for 2 minutes after starting the engine.
3. Idle the engine for 2 minutes before switching off the engine.
4. Periodic cleaning of crank case breather is necessary to allow free flow of oil from turbo charger outlet.
5. Close the entire turbo charger opening with protective plugs when it is not in use.
6. Before applying the exhaust brake, change to appropriate gears suitable to the vehicle speed and road condition.
7. While exhaust brake is in use remove the leg from the accelerator pedal for reducing the fuel supply and engine speed.
8. Service brake can be used in conjunction with the exhaust brake. Check for air and exhaust leaks and arrest suitably for ensuring efficient operation.
9. Exhaust brake to be used only during down hill operation.
10. Pause a few seconds after depressing the clutch pedal before shifting PTO into mesh.
11. Whenever PTO has been installed and lubricant has been replaced run the PTO for 5-10 minutes.
12. Check for leaks and noises as the PTO is shifted both in and out of mesh.
13. If the PTO units are operated pneumatically, care to be taken that the PTO drive is disconnected when vehicle is standing idle for a prolonged period.
14. Start the engine and wait until pressure in the air system reaches 6 bar (87 PSI)
15. Never drive the truck with the PTO engaged.
16. Always use approved lubricants as recommended

### **Mixer Drum Side**

1. If the V Belt fails, lever of automatic belt tension actuates the pressure pin of electrical switch. An audible/visual alarm is initiated. Shut down the engine immediately to prevent engine overheating.
2. Increase oil change frequency when operating below minus  $10^0 \text{ C}$ .
3. For use of any recommended Lub oil in engine other than specified, Lub oil change period will be 250 hrs
4. If the engine runs fewer hours in a month or year, oil should be changed at least once in a year.
5. Drain the sludge from the fuel tank once in a week ( unscrew the drain plug)
6. No Auxiliary parts may be welded on or mounted, and no additional holed drilled, without the approval of the manufacturer.
7. Start of the machine only by means of the prescribed command systems and control devices.
8. Prior to driving the machine, ensure that the mixing drum is not rotating faster than specified limit, if mixing is to be done in transit.

9. Prior to driving the machine, ensure that all drives for the super structure are switched off and that moveable devices (stabilizer, mixer chute etc) are secured. If the mixing drum of the truck mixer concrete pump is to rotate while the machine is being driven, switch on the mixing drum rive only.
10. Prior to driving the machine, ensure that any lose accessories (couplings, cleaning agents, extension chutes etc) are safely secured such that there is no risk of accident.
11. Carryout cleaning works using the water hoses provided for concrete-adhesive parts from the ground for servicing platform or steps only. Never direct the water jet towards electrical system.
12. When returning from the construction site with cleaning water in the mixing drum, ensure that the prescribed mixing-drum direction of rotation (“MIXING”) and the prescribed mixing-drum speed are maintained.
13. When using a water hose to carry out the cleaning work, allow only the water jet but not the hose end to enter opening and moveable machine parts.
14. Only use a brush with and elongated handle when cleaning the mixing drum by rotating the drum from the bottom to the top.
15. Before driving the machine always take care that all locking, fixing and clamping devises are put on to “moving position” and are checked with regarded to working order.
16. Check all gear mounting bolts from time to time for their specified torque value (initially after the first 50 hours of operation).

### **Don'ts**

#### **Vehicle Side**

1. Do not run the engine with low oil pressure and low oil level.
2. Do not put the engine under full load immediately after starting
3. Do not switch off the engine under full load.
4. Do not run the engine with blocked, punctured, aged, deformed hose/ pipe connections from the air cleaner to the turbo charger and turbo charger to the inlet manifold.
5. Do not repair the turbo charger, contact AMW dealer/authorized service centre.
6. Do not start the engine when the air cleaner indicator shows ‘RED BAND’. Clean air cleaner and start.
7. Do not depress the clutch as this will make the exhaust brake ineffective.
8. Do not press the accelerator pedal.
9. Do not allow exceeding the recommended speeds for respective gears. (Never raise engine speed with exhaust brake applied during actual driving)
10. Do not repair by welding on any steering component.
11. Never mix power steering fluids.
12. Never make any modification or interchange to steering system components.

#### **Mixer Drum Side**

1. Do not actuate the starter for more than 10 sec. If the engine does not start, wait a minute then try again.
2. Never drive the machine along slopes in transverse directions.
3. Don't carry passengers on the truck mixer and ladder platform etc.
4. Compressed air must not be passed through meter provided in the Water supply system. Maximum filling pressure 5 bar.

**TECHNICAL SPECIFICATION**

<b>Description</b>	<b>Transit Mixer 2518 TM (6x4)</b>
<b><u>a) VEH SIDE:</u></b>	
<b>Chassis Frame</b>	HSLA Steel, Ladder Type bolted cross members
Cross Member thickness	6 mm
Frame Dimension	256 x 75 x 7 mm
<b>Wheels and Tyres</b>	
Rim	B 7.5 x 20 – 10 Bolts spigotted
Front Tyre	10.00 x 20 – 16 PR - 02 Nos
Rear Tyre	10.00 x 20 – 16 PR - 08 Nos (highway)
Spare	11.00 x 20 – 16 PR - 01 No
<b>Cab details</b>	
Overall height	2700 mm
Overall Width	2475 mm
<b>Performance data</b>	
Maximum speed	78 Km/hour
Maximum gradeability (%)	Crawler : 39%, First gear : 26%
<b>Unladen weights</b>	
Front Axle	3130 kg
Rear Axle	4130 kg
Total	7260 kg
<b>Laden weight</b>	
Front Axle	6000 kg
Rear Axle	19000 kg
Total	25000 kg
<b>Major dimensions</b>	
Wheel base	4300 mm
Front overhang	1370 mm
Rear overhang	1435 mm
Overall length	7100 mm
Overall Height (Cab)	2725 mm
Overall width (Cab)	2470 mm
Overall width (Rear Tyres)	2494 mm
Wheel Track Front	2020 mm
Wheel Track Rear	1856 mm
Front Axle to Back of Cabin	790 mm
Approach Angle	19 <sup>0</sup>
Departure Angle	41 <sup>0</sup>
Width over Frame	864 mm
Minimum ground clearance Front	285 mm
Minimum ground clearance Rear	270 mm
<b>Engine</b>	
Type	Cummins 6BTAA – BS II
Bore x Stroke (mm)	102 x 120
Displacement (litre)	5.88
Compression ratio	17.6:01
Max output	178 BHP @ 2500 rpm
Max torque	680 Nm @ 1500 rpm

Firing order	1-5-3-6-2-4
Engine Dry Weight	410 – 440 kgs
<b>Emission standard</b>	Bharat Stage II
<b>Cooling system</b>	
Drive and Drive ratio	Water pump driven by Engine, Water pump drive ratio: 1.982, Fan V-Belt drive, Fan drive ratio : 1.1
Fan	Sucker Type with viscous drive
Fan belt max deflection (mm)	9.5 – 12.7
Thermostat type	Progressively lifting type
Deaeration tank coolant capacity (litre)	6 (8 Litres Total)
<b>Lubrication System</b>	
Oil pump type and Drive	Gear type and Drive from Engine
Oil filter	Spin on, full flow paper type
Oil Cooler	Plate type
<b>Fuel System</b>	
Injection pump	Rotary Pump
Fuel filter	Single, Spin on type with water Separator
<b>Tappet clearance</b>	
Intake	0.25 mm at cold condition (0.010 inch)
Exhaust	0.5 mm at cold condition (0.020 inch)
<b>Air filter</b>	Dry type, remote mounted
<b>Air compressor</b>	Reciprocating Type
<b>Clutch</b>	
Type	Valeo, single dry plate diaphragm type
Actuation	Hydro pneumatically operated
Facing diameter (mm)	380
Thickness (mm)	10
<b>Gear Box</b>	
Type	Synchromesh type (Crawler & Reverse – Constant mesh)
Gear Ratio (ZF)	
Crawler	13.16
1 <sup>st</sup>	8.91
2 <sup>nd</sup>	6.5
3 <sup>rd</sup>	4.67
4 <sup>th</sup>	3.5
5 <sup>th</sup>	2.55
6 <sup>th</sup>	1.86
7 <sup>th</sup>	1.33
8 <sup>th</sup>	1
Reverse	11.74
<b>Propeller Shaft Series</b>	
Gear Box to rear axle	1810 Series
Inter axle	DIN 165 Series Inter Axle
<b>Rear Axle</b>	
Type	Fully floating Tandem Rear Axles-both driven, Hypoid bevel gears with inter axle differential lock-air operated
Axle Ratio	6.17:1 (Meritor) & 6.72:1 (Hande)

<b>Front Axle</b>	
Type	Forged section – Reverse Elliot type
<b>Suspension</b>	
Front	Semi Elliptical leaf springs with shock absorber. Span : 1650 mm
Rear	Fully articulated inverted Semi elliptical leaf springs on tandem Bogie Trunnion and with torque rods. Span : 1350 mm
Leaf width	Front – 90 mm & Rear 100 mm
Shock absorber	2 Nos Heavy duty, double acting hydraulic shock absorbers on front suspension
<b>Steering</b>	
Type	Internal Power Steering, with double UJ adjustable. Ratio: 20.4, Wheel dia : 475 mm
<b>Electrical system</b>	
Alternator (Max. output)	75 Amps, 24V
Starter Motor	24 Volts
<b>Brakes</b>	
Service brakes	Dual circuit full air
Parking Brake	Spring actuated on rear axles
Eng exhaust Brake	Butterfly type
Battery	12Volt qty 02 Nos
<b><u>b) MIXER DRUM SIDE:</u></b>	
Drum Nominal capacity	6 Cum
Geometric mixing drum Volume	11 Cum
Filling ratio	50 %
Mixing Drum Speed	0 to 12 rpm, infinitely variable (maximum 14 rpm)
Drum Inclination	12 to 15°
Discharge open diameter	1140 mm
Rotation direction	Clock wise and Anti clock wise
Material of Drum	ST-52 High wear resistant steel
Drum shell thickness and thickness of spirals and spirals 3 to 5 thick	Discharge end: 6 mm & Main body: 4 mm
Thickness Drum shell at bottom	Discharge end: 6 mm
Oil Cooler tank capacity	18 ltrs
Water delivery system	180° - Horizontally 30° - Vertically
Water tank	190 to 2000 ltrs compressed air reservoir up to a maximum of 650 ltrs
Discharge Chute Swivel range	1 No fixed and 2 Nos extension suitable of suitable length with supports arrangement for their fixing on mudguards
Power input for Front, NMV and Cam shaft drive system	Approx. 1500 rpm
Power input with separate engine	49.2 kw at 2300 rpm
Discharge Chutes	1 No fixed and 2 Nos extension suitable of suitable length with supports arrangement for their fixing on mudguards

<b>Dimensions</b>	
Drum diameter	2200 mm
Length of frame	6000 mm or more
Maximum length	5743 mm
Width	2300 mm
Height	2432 mm (from frame level)
Weight	4.55 Ton (mixer and Accessories)
<b>Engine</b>	
Type	Kirloskar HA 494 (4 stroke DI Diesel eng)
Bore x Stroke (mm)	100 x 120
Displacement (cc)	3770
Compression ratio	18:01
Max output	66 BHP (49.2 KW) @ 2300 rpm
Max torque	20.56 Nm @ 2300 rpm
Firing order	1-3-4-2
Engine Dry Weight	421 kg
Valve clearance in cold condition	0.15 mm
Injector opening pressure	260 ± 10 Kg/cm <sup>2</sup>
Fuel timing	14 <sup>0</sup>
Bumping clearance	0.9 to 1.1 mm
Direction of rotation	Counter clock wise looking from FWE
Starting arrangement	Electric start
Emission standard	Bharat Stage II
<b>Lubrication System</b>	Forced feed 'G' rotor pump
Lube oil temp	90-125 <sup>0</sup> C
Oil pressure	1.5 kg/cm <sup>2</sup> at idle 3 to 4.5 kg/cm <sup>2</sup> at rated speed

**RECOMMENDED LUBRICANTS WITH FILLING CAPACITY  
AND OIL CHANGE FREQUENCY/PERIODICITY**

Particular	Grade of Lubricants	Filling capacity	Periodicity/Frequency
<b><u>Vehicle side</u></b>			
Engine (with Oil filter)	Servo Pride TC 15W 40 or Servo Pride XL 15W 40	16 ltrs	First change at 18000 Kms & thereafter every 18000 Kms
Engine Coolant	Servokool ST or Servokool Plus	23 ltrs	First change at 9000 Kms & thereafter every 45000 Kms
Gear box /Transmission ZF 9S75	Servo Gear HP 90 (T) or Servo Gear Super 80W 90	9.5 ltrs	First change at 3000 to 3500 Kms & thereafter every 36000 Kms
<b><u>Rear Axle (Meritor)</u></b>			
Rear Front	Servo Gear Super 140	17 ltrs	First change at 3500 to 4000 Kms & thereafter every 36000 Kms
Rear Rear	Servo Gear Super 140/Servo Gear Super 85W 140 (T) or Servo Gear Axle 85W 140	18 ltrs	
Steering System	Servo Trans Fluid 'A'	3 ltrs	After every 36000 Kms
Clutch Hyd System	Servo Brake fluid super HD	1 ltr	
Hydraulic Cab lifting mechanism	Servo System 68 or Servo System HLP 68	300 ml	-
Hub Greasing	Front - 0.5 kg/hub Rear-1.25 kg/hub	Servo Grease MP or Servo Gem RR3 or EP3 Grease	After every 36000 Kms
Complete Veh washing & Chassis Greasing	2 Kg – Bogie veh 1.25 Kg – Non Bogie veh		Weekly
Clutch release bearing greasing	4-6 gm		First change at 3500 to 4500 Kms & thereafter every 9000 Kms
<b><u>Mixer Drum side</u></b>			
Engine (Mixer Drum)	Servo premium XHP 15W 40	12.5 ltrs	First change at 50 Hrs and there after every 500 Hrs
<b><u>Hydraulic System</u></b>			
ZF-Gear PLM7/PLM 9	SAE 5W-40W (-15 <sup>0</sup> C to + 50 <sup>0</sup> C)/SAE 10W-40 (-12 <sup>0</sup> C to + 50 <sup>0</sup> C)/SAE 15W-40 (-8 <sup>0</sup> C to + 50 <sup>0</sup> C)/SAE 10W-30/10W-40/15W-30/15W-40	18 ltrs	After every 200 hrs of operation
Pump and lines	-do-	04 ltrs	
<b>OR</b>			

Particular	Grade of Lubricants	Filling capacity	Periodicity/Frequency
Planetary Gears (Gear Oil)			
HPM 51.2	Gear oil SAE 80W-85W/ 80W 90/85W 90/ 85W 140/90 or Motor oil SAE 10W 40 (-12 <sup>0</sup> C to + 50 <sup>0</sup> C)/15W 40 (-8 <sup>0</sup> C to + 50 <sup>0</sup> C)	12 ltrs	After every 200 hrs of operation
HPM 61.2	- do -	16 ltrs	
Trasmital 560-L	- do -	4 ltrs	
Trasmital 570-L	- do -	5 ltrs	
Motor oil for ZF-P6300/7300	SAE 10W 40 (-12 <sup>0</sup> C to + 50 <sup>0</sup> C)/15W 40 (-8 <sup>0</sup> C to + 50 <sup>0</sup> C)	11.5 ltrs	
Hydraulic oil Cooler	Hyd oil HLP 32 or Motor oil SAE 10W (-10 <sup>0</sup> C to + 15 <sup>0</sup> C)/Hyd oil HLP 46 or Motor oil SAE 20W-20 (0 <sup>0</sup> C to + 30 <sup>0</sup> C)/Hyd oil HLP 68 or Motor oil SAE 20 (+10 <sup>0</sup> C and up)	10 ltrs	

**Note:** Do not mix different types of oil

### **TYRE PRESSURE CHART**

Tyre size	Ply Rating	Position	Qty	Tyre Pressure
10.00 x 20	16	Front Axle	2	7.25 bar
10.00 x 20	16	Rear Axle 1	4	7.75 bar
10.00 x 20	16	Rear Axle 2	4	7.75 bar
10.00 x 20	16	Spare	1	

**PERIODIC MAINTENANCE SCHEDULE**

**VEHICLE SIDE**

S/No	Operation	Daily	3000	9000	18000	27000	36000	45000	54000	63000	72000
<b>A</b>	<b>ENGINE</b>										
1	Check oil level in the sump and top up if necessary. Check oil leakage and rectify if any	*	*	*	*	*	*	*	*	*	*
2	Check coolant level in Auxiliary tank radiator and top up if necessary. Check coolant leakage if any	*	*	*	*	*	*	*	*	*	*
3	Lubricate with oil can : FIP, Accelerator lever and stop lever		*	*	*	*	*	*	*	*	*
4	Change oil in sump. Drain off while hot. Change oil Filter				*		*		*		*
5	Check, if necessary tighten the following		*	*	*	*	*	*	*	*	*
	Injector pressure line, Leak of fuel line banjo bolt, Oil Cooler bolt, Oil sump screw, Exhaust manifold mounting bolt, Turbo charger mounting fasteners and Clutch housing mounting bolts										
6	Check and tighten, if necessary the following			*	*	*	*	*	*	*	*
	Cylinder head cover, Radiator Hose connection, Radiator mounting, Fuel tank connection, Fuel filter head bracket, Engine mounting, Air induction hose connection & Engine breather hose clamp										
7	Remove strainer in fuel tank. Clean & refit						*				*
8	Drain Cooling system, reverse flush, Check thermostat for proper operation							*			
9	Refill system with fresh Coolant Water. Use mixture of clean water and freeze agent in specified ratio			*				*			
10	Remove & clean exhaust outlet elbow, exhaust brake valve shaft and refit it. Do not lubricate it										*
11	Check end play of Turbocharger shaft and radial clearance between turbine wheel & housing										*
12	Check and drain trap in water separator	*	*	*	*	*	*	*	*	*	*
13	Check fan and fan belt visually and replace if damaged			*	*	*	*	*	*	*	*
14	Check air intake piping, Hoses, Clamps, replace damaged hoses			*	*	*	*	*	*	*	*

S/No	Operation	Daily	3000	9000	18000	27000	36000	45000	54000	63000	72000
15	Check service Indicator. Change primary filter, if RED band is in raised position			*	*	*	*	*	*	*	*
16	Check charge air cooler for frontal area dirt and damages- clean with air in reverse flow			*	*	*	*	*	*	*	*
17	Remove the air cooler, wash and clean with water and solvent. (and also when the complaint of eng oil carry over through intake side of Turbocharger is observed)										*
18	Check Antifreeze concentration						*				*
19	Change fuel filter, Bleed the fuel system if necessary				*		*		*		*
20	Check fan hub and drive belt tensioner bearing						*				*
21	Check valve clearance and adjust if necessary						*				*
22	Check vibration damper and replace if necessary										*
23	Remove the Injectors, check and reset the pressure								*		
<b>B</b>	<b>CLUTCH</b>										
1	Check Clutch function	*	*	*	*	*	*	*	*	*	*
2	Pedal free play and stroke			*	*	*	*	*	*	*	*
3	Check clutch fluid, top up if necessary			*	*	*	*	*	*	*	*
4	Clutch fluid change – if necessary, replace the repair kit in M/cylinder & clutch booster							*			
<b>C</b>	<b>TRANSMISSION</b>										
1	Check oil level			*	*	*	*	*	*	*	*
2	Check oil leakage			*	*	*	*	*	*	*	*
3	Change gear box oil		*				*				*
4	Check and tighten the gear linkages			*	*	*	*	*	*	*	*
<b>D</b>	<b>PROPELLER SHAFT</b>										
1	Check and tighten the flange mounting nut				*		*		*		*
2	Check wear of universal joint and splines and replace if necessary						*				*
3	Check looseness in bearing and related parts						*				*
4	Lubricate propeller shaft bearing and universal joint		*	*	*	*	*	*	*	*	*
<b>E</b>	<b>FRONT AND REAR AXLE</b>										
1	Check looseness in front wheel bearing and adjust if necessary				*		*		*		*
2	Check looseness in rear wheel bearing and adjust if necessary				*		*		*		*
3	Check looseness in axle shaft mounting nut				*		*		*		*
4	Check axle oil leakage			*	*	*	*	*	*	*	*
5	Change rear axle oil		*				*				*

S/No	Operation	Daily	3000	9000	18000	27000	36000	45000	54000	63000	72000
6	Change grease in Front & Rear hubs, adjust the bearing pre load						*				*
<b>F</b>	<b>SUSPENSION FRONT &amp; REAR</b>										
1	Check U bolt & nut tightness	Weekly					*				*
2	Check spring damage/crack						*				*
3	Check looseness & damage of mounting of spring/shock absorber				*		*		*		*
4	Check shock absorber for leakage/damage			*	*	*	*	*	*	*	*
<b>G</b>	<b>WHEELS &amp; TYRES</b>										
1	Check wheel nut tightness (after every 100 Km)			*	*	*	*	*	*	*	*
2	Check wheel disc damage (visually)	*	*	*	*	*	*	*	*	*	*
3	Check tyre pressure and inflate as recommended	*	*	*	*	*	*	*	*	*	*
<b>H</b>	<b>STEERING SYSTEM</b>										
1	Check power steering oil level and top up if necessary			*	*	*	*	*	*	*	*
2	Change power steering oil						*				*
3	Check looseness and excessive play of steering wheel			*	*	*	*	*	*	*	*
4	Check looseness of mounting of steering, gear, drag link & tie rod			*	*	*	*	*	*	*	*
5	Check steering linkage for wear and damage						*				*
6	Check wheel alignment						*				*
7	Check oil leakage from steering, gear box, pipe line, pump etc			*	*	*	*	*	*	*	*
<b>J</b>	<b>SERVICE BRAKE</b>										
1	Check brake function	*	*	*	*	*	*	*	*	*	*
2	Check brake pedal free play			*	*	*	*	*	*	*	*
3	Check air leakage from brake system	*	*	*	*	*	*	*	*	*	*
4	Check wear of brake lining through inspection window		*	*	*	*	*	*	*	*	*
5	Check wear and damage of brake drum						*				*
6	Check leakage & damage of hoses & piping- rectify/repair if necessary			*	*	*	*	*	*	*	*
7	Change air dryer cartridge										*
8	Remove all pneumatic valves, replace all the rubber parts with repair kits, reassemble & refit, check for proper function	Once in a year									
9	Check parking brake functioning	*	*	*	*	*	*	*	*	*	*
<b>K</b>	<b>ELECTRICAL EQUIPMENT</b>										
1	Check battery charging			*	*	*	*	*	*	*	*
2	Check starter motor function	*	*	*	*	*	*	*	*	*	*
3	Check Alternator & Regulator function	*	*	*	*	*	*	*	*	*	*
4	Check damage of wiring			*	*	*	*	*	*	*	*

S/No	Operation	Daily	3000	9000	18000	27000	36000	45000	54000	63000	72000
5	Check lights for proper functioning (Internal & external)	*	*	*	*	*	*	*	*	*	*
<b>L</b>	<b>AIR CONDITIONING SYSTEM</b>										
1	Clean A/C air filter (to be done more frequently in dusty area)			*	*	*	*	*	*	*	*
2	Change A/C air filter						*				*
3	Check leak of gas/oil from pipe			*	*	*	*	*	*	*	*
4	Clean condenser with high pressure water						*				*
5	Clean evaporator from its face to remove dust, foreign objects etc						*				*
<b>M</b>	<b>CABIN &amp; CABIN TILTING SYSTEM</b>										
1	Oil change interval			*	*	*	*	*	*	*	*
2	Check leakage & rectify	*	*	*	*	*	*	*	*	*	*
3	Lubricate door hinges, driver seat, wiper arm linkages			*	*	*	*	*	*	*	*
4	Check condition of body mounting rubber pad, replace if necessary			*	*	*	*	*	*	*	*
5	Check condition of gaiters at gear lever and steering column			*	*	*	*	*	*	*	*
6	Check and tighten all body/cabin mounting fasteners			*	*	*	*	*	*	*	*
<b>N</b>	<b>CHASSIS FRAME</b>										
1	Check all joints and unions for oils, fuel, water or air leaks	*	*	*	*	*	*	*	*	*	*
2	Check the tightness of cross members to frame side members mounting bolts		*	*	*	*	*	*	*	*	*
3	Wash the veh	Weekly	*	*	*	*	*	*	*	*	*

**PERIODIC MAINTENANCE SCHEDULE**

**MIXER DRUM SIDE**

S/No	Operation	Daily	250	500	750	1000	1250	1500	1750	2000	2250
<b>A</b>	<b>ENGINE</b>										
1	Check oil level in engine & Air cleaner	*	*	*	*	*	*	*	*	*	*
2	Change engine oil & filter			*		*		*		*	
3	Check Battery and lead connections			*	*	*	*	*	*	*	*
4	Clean cooling system			*	*	*	*	*	*	*	*
5	Check fuel strainer			*	*	*	*	*	*	*	*
6	Check V Belt tension			*	*	*	*	*	*	*	*
7	Change V Belt					*				*	
8	Change Fuel filter element/cartridge			*		*		*		*	
9	Safety system			*	*	*	*	*	*	*	*
10	Fasteners				*			*			*
11	Starter & alternator					*				*	
12	Valve clearance					*				*	
13	Injector					*				*	
14	Flame heater					*				*	

<b>B MIXER</b>							
S/No	Operation	Initial inspection after max 200 hrs or 3000 Kms	Daily	Weekly	Monthly	At least every 6 months or 15000 Kms	At least every 12 months or 30000 Kms
1	Grease thrust ring	*		*			
2.	Grease support rollers`	*		*			
3	Grease drive shaft	*		*			
4	Grease chute adjusting spindle and chute slewing bearings	*		*			
5	Check Meflex cables and rack transmitter for free movement and correct adjustment	*				*	
6	Check correct function of electrical eqpt	*				*	
7	Change dry filter for separate engine						*
8	Check water system for leaks	*				*	
9	Check correct function of safety valve	*				*	
10	Clean dirt trap	*				*	
11	Check V belt tension	*				*	
12	Clean pressure relief valve	*				*	
13	Check water tank retaining bracket	*				*	
14	Take up slack at tensioning straps for water tank	*				*	
15	Check super structure attachment	*				*	
16	Check mixing drum bearing mounts and retaining bolts for planetary gear	*				*	
17	Visual check for cracks and fatigue fractures on auxiliary frame and mixing drum bearing mounts					*	
18	Check inlet /outlet funnels and slewing chute for wear					*	
19	Screw-supporting block-hopper	*				*	
20	Check mixing drum jacket for wear					*	
	<u>Hydraulics /planetary gear</u>						
21	Check spiral mixer blades for wear					*	
22	Check oil level for separate oil cooler	*	*				
23	Check oil cooler for contamination	*	*				
24	Check that oil cooler functions correctly	*			*		
25	Change oil and renew filter	*					*
26	Check axial piston variable pump, axial piston motor and oil cooler for leaks	*			*		
27	Check hydraulic lines and screwed connections for tightness	*			*		
28	Oil level check-gear	*			*		
29	Oil change	*					*

1. **Drive System (Front, NMV, Camshaft and Separate Motor) and Hydraulic System**

Checking before starting up

- (a) Check the oil level in the hydraulic oil Cooler and Planetary gear daily and add oil, if necessary.
- (b) The pump and accelerator control levers/cables must be in neutral position.
- (c) Lubricate all oiling points listed in the Lubrication schedule with grease.

Maintenance

- (a) Lubricate the cardan shaft at least once in a week.
- (b) Inspect all the lines and screwed connections/joints daily. Tighten or replace, if necessary.
- (c) Check axial-piston variable pump and axial-piston motor for leaks at least every six months.
- (d) Filter cartridge must be replaced every time the oil is changed or at least every 12 months.
- (e) Suction Filter has a closure valve so that the oil cannot be lost from the hydraulic oil tank when the filter is replaced.
- (f) Check operation of fan motor and thermostat every six months. Inspect the cooling fins of the hydraulic oil cooler every day. If blocked, clean with compressed air or water.
- (g) Regularly check oil cooler for cleanliness in order to ensure continued heat rejection.

Changing the oil

- (a) The machine comes with a drain hose and valve for changing the oil.
- (b) The drain valve is opened when the valve is screwed on to it, thus providing a drip-free oil change perfectly compatible with the environment.
- (c) Always change the hydraulic oil when the system is at operating temperature.
- (d) After every oil change the entire hydraulic system must be checked for leaks. Tighten all screw connections, outlets screw and hoses when the system is at zero pressure again. If necessary insert new seals.

2. **Water Supply System**

- (a) On the version with water meter, the built-in dirt trap must be cleaned at least every six months.
- (b) Clean dirt trap as follows:
  - (i) Close stop valve leading to water meter
  - (ii) Open stop valve to the spray hose
  - (iii) Remove screw plug and take out & clean sieve insert. Clean the inside of the dirt trap housing and flash it through.
  - (iv) Install the sieve insert again
  - (v) Replace and tighten screw cap.
- (c) Check complete water supply for leaks at least every six months.

- (d) Check V-Belt tension at least every six months and adjust, if necessary. If no further adjustment is possible, the V-belt must be replaced.

### **Winter operation**

- (a) If there is a danger of freezing, the water system must be drained out by opening all stop valves, all cocks to drain the plant completely.
- (b) With separate engine drive, only run the engine
- (c) With front, NMV or camshaft drive start the truck mixer engine and set the mixing Drum to “Discharge”.

### 3. **Mixer Control unit**

- (a) Check the pump control cable and accelerator control cable regularly for smooth functioning. In the event of stiffness, check the cable run and reposition if necessary. If the stiffness cannot be eliminated, replace the cable.

### 4. **Mixing drum and Mixing drum bearings**

- (a) Nipples on guide rollers should be greased weekly with high pressure grease.
- (b) Grease the support ring daily. Use high adhesion grease which is insoluble in water.

### 5. **Concrete delivery**

- (a) Grease weekly the chute adjusting spindle and pivoting console at grease points with high pressure grease.
- (b) Check inlet funnel, outlet funnel and swivel chute for wear at least every six months.