

DIRECTOR GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO. 240

**ON OPERATION AND MAINTENANCE OF
VIBRATORY SOIL COMPACTOR L&T 1107 D**

INTRODUCTION:

(a) L & T Case make and 1107 D model Vibratory Soil Compactor having hydrostatic drive on both front drum and rear drive axle, with high strength main frame/chassis, with dual amplitude setting and having dual frequency of 30 and 33 Hz in the front drum, hydraulic steering mechanism, hydrostatic service brake, powered by Kirloskar HA 694 air cooled 6 cylinder diesel engine developing 112 HP @ 2500 rpm and with 12 V starting system.

(b) This GMI gives the technical specification and know how on the operation, maintenance and repair procedure of Vibratory Soil Compactor L&T 1107 D to ensure maximum performance and safe/satisfactory operation. Compliance with procedures given in this GMI will enable to desire the maximum service from the equipment.

(c) To prolong the life of Vibratory Soil Compactor L&T 1107 D, to prevent frequent brake 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 equipment and for safe operation. All information and instruction given in this GMI is based on the latest owner's manual and service booklet provided by the firm.

AIM:

The instructions are issued as guidelines for general, preventive maintenance schedule and lubrication of Vibratory Soil Compactor L&T 1107 D manufactured by M/s Larsen & Toubro Case Equipment Pvt Ltd for regular attention to keep the equipment 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 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 | - Appendix 'A' |
| b) | Periodic Maintenance schedule | - Appendix 'B' |
| c) | Technical Specification | - Appendix 'C' |
| d) | Recommended Lubricants/Filling Capacities | - Appendix 'D' |

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OPERATING PROCEDURE

Daily Pre Operation Checks before starting the engine:

1. Check fuel level in the fuel tank and top up if required.
2. Fill in diesel fuel in time so as to avoid unnecessary bleeding of the fuel system.
3. Do not spill diesel fuel on the engines.
4. If the fuel tank has been run empty it is necessary to bleed the fuel system.
5. Check hydraulic oil level in the tank and top up, if required.
6. Check engine lub. Oil and top up if required.
7. Visually check for leakages and damages to electrical components and connections.
8. Visually inspect and ensure that all the doors and covers are closed and locked. No tools like spanners, screw drivers should be left on the machine.

Starting the engine :

1. Check whether the Articulation joint arrester is removed.
2. Ensure that all the miniature circuit breakers (MCBs) are switched ON at the MCB Box below Operators Platform (RH).
3. The drive lever and the exciter switch must be in their neutral positions.
4. Push the accelerator lever back to the low idling position.
5. Switch OFF the parking brake switch if it is in ON position.
6. Insert the ignition key into the ignition switch and turn clockwise by 45 degrees and check all indicators.
7. Low lub. Oil pressure indicator and Battery non-charging indicator will glow.
8. Turn and depress the ignition key to start the engine.
9. Do not actuate the ignition switch for more than 5 seconds. While attempting to start the engine, wait for one minute before trying again.
10. After the Engine has picked up and warning lights like Low lub. Oil pressure indicator and battery non-charging indicator have gone off, the engine should be run on idling speed for 2-3 minutes. Thereafter rotate the throttle lever to increase the rpm of the engine. At the maximum position the engine will be operating in full speed.
11. Machine must be operated (Travel & Vibration) in high engine rpm only.

Operating the machine (Travel) :

1. Drive the machine with the drive lever (FNR) into the desired driving direction (forward/back word from neutral). The speed will increase, the more the lever is moved forward or backward.
2. For braking, move the drive lever out of the respective forward or reverse driving position to the neutral position.
3. During parking in slope, put on parking brake switch (P)
4. Parking brake is to be operated only when machine is in neutral. Electrical system is designed in such a way that parking brake will be engaged only when FNR lever is in neutral. And when parking brake switch is ON engine can't be started.

Setting the exciter into operation :

1. Start the engine according to the procedure given above.
2. Start traveling (Moving forward or reverse direction) the M/C iin working speed (Put OFF high speed switch).
3. Turn vibration frequency selector rotary switch to left to select low frequency & high amplitude or to right to select high frequency & low amplitude.

Setting the other features available in the machine:

1. Switch ON/OFF front head lamps, Rear working lamps, side indicators, parking lamps, if necessary.

Setting Machine out of operation :

1. Rotate frequency selector switch to neutral (at centre) to stop vibration.
2. Then bring FNR lever to neutral to stop traveling.
3. Put on parking brake toggle switch during parking the M/C on slope to prevent the M/C roll back.
4. Bring Throttle lever to low idle position.
5. Pull the stop cable knob until Engine stops. Low lub. Oil pressure indicator & battery non charging indicator should glow.
6. Turn ignition key anticlockwise. All indicators should go off.
7. Switch off all the MCBs.
8. Secure the machine by means of wheel chocks and/or stone/rocks if necessary.
9. Do not stop the Engine suddenly from full load, but allow it to run sometime with no load.

Safety Features:

1. Electrical circuit protected by MCBs
2. Machine cannot be started when Forward-Reverse lever is not in neutral
3. Machine cannot be started when parking brake switch is on.
4. Parking brake automatically disengage when m/c is not in neutral
5. No vibration in high speed (Transport) mode of travel.
6. Automatic engine cut off in case of Engine belt failure
7. Neutral indicator
8. 2 speed indicator
9. Battery Non-charging indicator
10. Low lub oil pressure indicator
11. Air filter clog indicator (Mech.)
12. Hydraulic oil filter clog indicator
13. Parking brake indicator
14. Fan belt failure indicator
15. Engine lub oil Pressure & Temperature gauge
16. Service hour meter
17. Rigid Rear Axle with inboard planetary drives

Precautionary measures:

1. Uphill driving is impermissible, if the gradient exceeds the permissible gradient of the machine during operation.
2. The machine is equipped with an infinitely variable hydrostatic propulsion so that a jerky take off or a jerky reversal in the opposite direction should be avoided.
3. Before starting to drive uphill, check at the beginning of the gradient in the driving direction envisaged, whether the wheels and drum have a sufficient frictional engagement and ground contact with the track way.
4. While taking off the machine and while reversing the travel direction, take care of a smooth and uniform acceleration and deceleration so as to avoid unevenness of the layer placed.
5. For compacting, select the drive range and move into the loose material using forward and reverse gears.

PERIODIC MAINTENANCE SCHEDULE

Maintenance work	Maintenance Instants							
	After first 50 hours	Daily	Regularly every (Hours)					In case of need
			10	50	100	200	500	
<u>CHECKING</u>								
<u>MACHINE</u>								
Visual inspection for damage		*						*
Visual inspection for leakages		*						*
Visual indicator for contamination (Hydraulic filter choke indicator)		*						*
Air intake system		*						*
Air cleaner chock indicator		*						*
Exhaust pipe	*			*				*
Engine mounting (AVMs/bolts)	*			*				*
Roller mounting (AVMs/Screws)	*			*				*
Scrapper		*						*
V-belt tension		*						*
Battery charge (Red/White/green in "Magic Eye")		*						*
<u>FUNCTIONS</u>								
Engine oil temperature gauge		*						*
Engine oil pressure gauge		*						*
Low engine oil pressure indicator		*						*
Parking brake (In m/c neutral)		*						*
Electrical system		*						*
Vibration with low & high frequency		*						*
Steering		*						*
Tyre pressure (adjust if required)	*	*						*
<u>CLEANING</u>								
Clean machine		*						*
Air intake system		*						*
Hydraulic oil cooler		*						*
Water separator		*						*
Fuel tank (Drain water)					*			*
Fuel tank							*	*

Maintenance work	Maintenance Instants								In case of need
	After first 50 hours	Daily	Regularly every (Hours)					1000	
			10	50	100	200	500		
<u>LUBRICATION</u>									
Oil level in the engine (top up if required)		*							*
Oil level in hydraulic Tank (top up required)		*							*
Greasing at Steering Cylinder rod &head end		*							*
Greasing at articulation joint pins		*							*
Greasing at travel bearing						*			
Battery electrolyte level					*				*
Clean & apply petroleum jelly at battery terminals						*			*
<u>TORQUING</u>									
Roller mounting	*				*				*
Articulation joints	*				*				*
Roller AVM mounting screws	*				*				*
Engine AVM mounting Screws	*				*				*
Axle mounting bolts	*						*		*
Wheel nuts	*				*				*
<u>REPLACE</u>									
Hydraulic oil filter element							*		*
Hydraulic Oil								*	*
Exciter Oil								*	*
Axle oil								*	*
Reduction Gear Housing Oil								*	*
Auxiliary Drum oil								*	*
<u>ENGINE</u>									
Engine oil change	After every 250 hrs run								
Engine oil filter change	After every 250 hrs run								
Fuel filter insert (Pre filter)	After every 500 hrs run								
Fuel filter insert (Micro filter)	After every 750 hrs run								
Fuel strainer (Bottom filter at feed pump inlet)	Clean after every 125 hrs run								

TECHNICAL SPECIFICATION

Description	Soil Compactor L&T 1107 D
Vibration	Dual Mode
Propulsion	Front drum drive and Rear Axle drive
Steering	Hydraulic Steering with Articulation
Brake	Service Brake (Hydrostatic) and Parking brake
Operating weight	11, 300 kg
Axle Loads	Front : 6450 kg Rear : 4850 kg
Static linear load (front)	30 kg/cm
Vibration frequency	Stage 1 : 30 Hz Stage 2 : 33 Hz
Nominal Amplitude	Stage 1 : 1.8 mm Stage 2 : 0.8 mm
Centrifugal Force	Stage 1 : 25, 530 kg Stage 2 : 13, 820 kg
Travel speed	Work Mode : 0 – 6 Kmph Travel Mode : 0 – 14 Kmph
<u>Gradeability</u>	
Continuous	Degrees : 19.8 Percent : 36
Intermittent	Degrees : 21.8 Percent : 40
Internal Turning Radius	3.45 m
Drum Oscillation Angle	15 degrees
ENGINE	
Make	Kirloskar Oil Engines Ltd, Pune
Type	4 Stroke, 6 Cylinder, inline, Direct Injection Air Cooled Engine
Model	HA 694

Nature of Aspiration	Naturally Aspirated
Power rating	112 HP @ 2500 rpm as per std DIN 6271 IFN
Bore	100 mm
Stroke	120 mm
Displacement	5652 cc
Direction of rotation	Anticlockwise when viewd from flywheel end
Type of fuel pump	In line
Type of Air Filter	Dry type with dual element
Type of governing	Mechanical
Starting system	Electrical 12 V
Lubrication system	Forced feed
Dry weight of the engine	530 Kgs
PROPULSION (TRAVEL):	
Type	Hydrostatic system acting on front drum and rear wheel
Travel Pump	Variable displacement pump with manual displacement control
Drum drive Motor	Low speed, High torque (G3/G4 type) Radial piston Motor with brake
Wheel drive Motor	High speed, Low torque motor mounted on Rear axle input shaft
EXCITER DRIVE:	
Type	Hydrostatic system acting on the front and rear exciter shafts
Kind of Exciter	Single shaft with two floating masses for dual amplitude
Vibration Motor	Fixed displacement axial piston motor
EXCITER CONTROL:	
Stage 1 (30 Hz)	High Exciter force, Low frequency, High Amplitude
Stage 21 (33 Hz)	Low Exciter force, High frequency, Low Amplitude

STEERING SYSTEM:	
Type	Hydrostatic system acting via the steering wheel, steering unit and steering cylinder on the articulated joint
Steering Pump	Gear type
ELECTRICAL SYSTEM:	
Battery	12 V, 120 AH
Alternator	12 V, 35 Amphs
HYDRAULIC OIL FILTER:	
Type	Paper Element
Filter Rating	10 Micron (Nominal)
Number of Filters	1
BRAKES:	
Service Brake	Hydrostatic
Parking Brake	Spring applied, hydraulic release
RELIEF VALVE SETTINGS:	
Travel circuit	430 bar
Vibration Circuit	320 bar (Rexrath Pump), 350 bar (SD Pump)
TRANSPORT DIMENSIONS:	
Length of the machine	5344 mm
Width of the machine	2300 mm
Height of the machine up to Optr cabin top	3150 mm
Height of the machine up to Silencer top	2410 mm
Wheel base	3000 mm
Ground Clearance	395 mm
Diameter of Rear wheel	1528 mm
Diameter of front wheel	1500 mm

RECOMMENDED LUBRICANTS

S/No	Item	Brand Name	Manufacturer
a)	Engine oil * (SAE 40)	CRD 40 SERVO SUPER 30/40 Hylube Milcy 30/40 BHARAT ACTUMA SUPER OIL 40 HYLUBE HDX 40 VEEDOL HDB 40	Castrol India Ltd IOCL HPCL BPCL HPCL TIDE WATER OIL CO.
b)	Hydraulic Oil (Tropical)	HYSPIN 68 HYSPIN –AWH 100TP SERVO HYDREX 100 HP Power Fluid LTP 100 BHARAT HYDROL P 100	Castrol India Ltd Indrol Lubricants & Specialities Ltd IOCL HPCL BPCL
c)	Exciter Oil	Hypoi EP 90	CASTROL INDIA LTD
d)	Grease (For greasing drum, steering cyl, displaceable steering part)	SERVOGEM EP-2	IOCL
e)	Rear Axle and Reduction Gear Housing	M2C-134-D AGRI TFD NAS9	CASTROL INDIA LTD
f)	Auxiliary Drum	HYSPIN 68	CASTROL INDIA LTD

* Recommended Eng oil for atmospheric temp above 25⁰ C and for below 25⁰ C, please refer engine side operator's manual supplied by M/s KOEL.

FILLING CAPACITIES

Engine Oil	14 Ltrs
Rear Axle oil	27 Ltrs
Rear Axle Reduction Gear Housing Oil	0.5 ltrs
Exciter Chamber	19.5 Ltrs
Auxiliary Drum (for STD model)	4 Ltrs
Hydraulic oil tank	70 Ltrs