

DIRECTORATE GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO: 211
ON

DASS JONES 18/20 ROUGH TERRAIN
HYDRAULIC MOBILE CRANE

INTRODUCTION

1. Regular servicing and preventive maintenance are essential to prolong the life DASS JONES MOBILE CRANE. Minor defects if timely repaired can further improve the efficiency of the machine. It saves time and money.

AIM

To enumerate the details of periodical maintenance safety precautions and lubrications in respect of Dass Jones 18/20 mobile crane to achieve maximum life.

ACTION BY

- (a) User unit: - To carry out periodical maintenance task and regular servicing as laid down in this maintenance instruction and also follow safety precautions for optimum utilization.
- (b) Field workshop: - To check the record maintenance and lubrication in logbook of the eqpt during its inspection and repair

Advise user unit in respect of any discrepancy/short coming noticed.

DETAILS

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|-----|---|---|----------|
| (a) | Technical specification Data | - | Appx 'A' |
| (b) | Safety precautions | - | Appx 'B' |
| (c) | Periodical maintenance of Chassis Super structure, Jib and Lubrication. | - | Appx 'C' |

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(US Misra)
SE (E&M) SG
Director (Tech)

For Dir General Border Roads

Dated: 01 Sep 2000

TECHNICAL SPECIFICATION DATA

ENGINE

Type	:	Ashok Leyland 412
Bore	:	107.16 mm
Stroke	:	120.65 mm
Cylinders	:	Six
Capacity	:	6.54 Ltrs
Compression Ratio	:	16:1 (Normal)
Firing Order	:	153524
Cycle	:	4 Stroke
Combustion system	:	Direct injection
Rotation	:	Clock wise (View from front)
Wt	:	630 Kg
Oil sump capacity	:	13 Ltrs
Engine Rating	:	149.0 to at 2400 RPM (Gross)
Torque	:	48.9 Kg Gross & 1800 RPM
Fuel consumption	:	168 gms/per hr
Coolent	:	Water

AXLE

Front	:	Steer/drive with spiral level gear or drive to final hub reductions. Rigidly mounted on the chassis.
Rear	:	Steer/drive axles as front but mounted on leaf springs and fitted with axles lock for crane duty.
Ratio	:	22.79211 over all (Hub & differential)
Wheel Nut Forque	:	500-600 (368-4421.bl.ft)

Starting

Fully Hydraulic power steering to front wheels (Normal use) end Hydraulic power steering to rear wheels (confied use).

SAFETY PRECUATIONS

GENERAL NOTES

- (i) Keep the machine under cover when ever possible when not in use.
- (ii) Secure all doors and covers on completions of work to prevent unauthorized entry.
- (iii) Return all hydraulic rame to the closed position when not in use.
- (iv) Ensure that the machine functions are thoroughly checked before commencing work, especially those appertaining to road and crane safety.
- (v) Should any discrepancies occur in instrument reading or rapid falls in oil levels be noticed. Investigate immediately and rectify before proceeding further.
- (vi) Keep the cab tidy and free of items for which stowage is provided.
- (vii) Do not adjust the sage load indicator except under skilled supervision.
- (viii) Do not use the crane for PILS DRIVING, EXTRACTING OR CRABBING.
- (ix) When leaving the machine unattended, always park on level ground (the parking brake operates on the axles transmissions).

If the crane is not parked on level ground, the wheels should be 'checked' for added safety.

Caution: - The slew system must not be used for the dragging loads sideways. This could damage the slew drive and jib sections.

CAUTION BEFORE STARTING OF ENGINE

- (i) Check all instruments for correct function before starting work each day and frequent intervals throughout each day. This will ensure proper operation of the machine of all times.
- (ii) Ensure that the transmission range selector is natural and the hand brake is applied.
- (iii) Place key in ignition/starter switch and slightly depress accelerator pedal, then full turn ignition/start switch in a clockwise direction. Release If engine does not start within 10 second allow approx 20 seconds before attempting another start.

(iv) When the engine is running, check that the warning light is no longer illuminated.

NOTE: - Check that the brake system air pressure is 7.61 bar (11 OPSI before moving away).

(b) If at any time the low air pressure warning light and Buzzer operates, stop the crane immediately and investigate.

(c) The engine should never be run at full throttles for more than 30 seconds with the transmission in gear and the output stalled.

Prolonged operation of this type will cause the transmission oil temperature to become excessively high and result in severe over heat damage to transmission.

(d) Failure to disconnect the drive shafts before pushing or towing the crane can cause serious damage to the transmission.

BEFORE USTWO THE CRNS THAT

(i) The cab windows are clean.

(ii) There is sufficient pressure in the air brake system and the low pressure Warning buzzers is not sounding.

(iii) The tyre pressures are correct.

(iv) The battery electrolyte level is correct.

(v) The cooling system level is correct.

(vi) All indicators and controls function correctly.

(vii) The safe load indicators functioning correctly.

BEFORE CRANING TO CHECK THAT

(i) Hook block receiving is correct for the load to be lifted.

(ii) Ropes, slings, terminal fittings and anchorages are not worn or damaged.

(iii) The jib is not damaged.

(iv) The safe load indicator is correctly adjusted with the appropriate com/manual duty block fitted.

(v) The slow lock pin is disengaged.

(vi) The axle locks are engaged.

STORE LIFTING

- (i) Ascertain the weight of the load and block the crane unless the load is clearly with in the free of wheels duties.
- (ii) Ensure that you have an **unrestricted** view of load, the sign ell and the operating area.
- (iii) Ensure that the operating area is safe and check for any obstacles or hazards, which may impede crane or load movement.
- (iv) Check for overhead power cables and observe a safe distance, which is equal to the length of jib in use plus 6 meters.
- (v) Note the wind speed and direction make adequate allow since, as its effect on the load can be severe.
- (vi) Ensure that the crane is on firm ground, clear, of the any under ground services, hidden culverts or over hanging jetties which could collapse curing craning.
- (vii) Check that the crane is leveled.
- (viii) Manoeuvre the crane do that hook hence over the center of the load.
- (ix) Check that the crane is correctly slung.

BEFORE HIGHWAY TRAVEL TO CHECK THAT

- (i) Fully close the jib and stow it as low as possible over the front of the machine ensuring visibility to the right of the driver.
- (ii) Anchor the hook block to the front of the machines.
- (iii) Operate the slew lock lever to the locked position.
- (iv) Switch off the crane system switch.
- (v) Arrange for a safety escort to accompany the machine to ensure adequate clearance of overhead cololes and other obstructions.
- (vi) Jibs are fully closed and stowed over front of crane.

TRAVELLING WITH LOAD SUSPENDED

It is recommended that when ever possible the load should be slewed to the front of the machine for traveling. This will ensure maximum visibility, safety and traction, particularly for machine with 75% and 65% load rating.

- (i) Use all crane controls gently.
- (ii) Carry the load as near to the round as possible.

NOTE: - The safe load indicator alarm will sound if the jib is slewed more than 5. either side of the crane center line.

TRAVELLING ON INCLINES WITH LOAD SUSPENDED

It is not recommended that the crane is traveled on inclines with the load suspended. If this is unavoidable, the following precaution, in addition to those detailed above, should be taken: -

- (i) On each occasion, consult a competent person to advise on the feasibility of the operation and precautions to be taken.
- (ii) Carry the lode on the uphill side of the slope, regardless of the direction of travel.
- (iii) Do not slow the load expect to maintain its uphill position.
- (iv) Take care to ensure that the crane will remain stable when the load is released.
- (v) A constant monitoring of the transmission oil temperature must be ensured.

TRAVELLING ON HIGH TERRAIN

- (i) When traveling on rough ground, keep the jib of a low angle over the front of the crane, with the slew lock engaged, traveling slowly and cautiously.
- (ii) If a load is to be carried, with the axle lock and keep the jib as possible.
- (iii) Keep the load on the uphill side of the crane and correct the radio us by derricking the jib.
- (iv) Never slew the load from uphill to downhill.

BEFORE LEAVING THE CRANE UNTENDED

- (I) Select the parking brake “ ON “ position.
- (ii) Do not leave the crane jacked up on its outriggers.
- (iii) Ensure that the crane is standing on firm level ground.
- (iv) Remove ignition key.
- (v) Lock the cab to prevent unauthorized entry.
- (vi) Secure the hook block.
- (vii) Never leave the crane with a load suspended. If this is unavoidable, someone should be left in attendance.
- (Viii) Ensure that the jibs are fully closed and stowed in the normal travel order.

ROPE REEVING SAFETY PRECAUTION

- (i) Always wear gloves when handling wire ropes.
- (ii) Keep hands off moving ropes.
- (iii) Check the all ropes, terminal fittings and anchor have been assembled correctly, and that safety clips are fitted to all pins.
- (iv) Always load the ropes off the rear of the drums.

WARNING

THE CRANE MUST NOT BE USED IF ANY DEFECTS ARE FOUND.

NOTE ON ROPE

If a loop forms in the rope while uncoiling. It must be thrown out otherwise a kink will form a seriously damage the rope. Kinks can reduce the breaking load of the rope by up to sox. Of kink form that portion of the rope must be destroyed.

IDEAL MAINTENANCE OF CHASES, SUPERSTRUCTURE, JIB AND LUBRICATION

EVERY 10 OPERATING HOURS TASK

- (i) Check tyre condition and pressure.
- (ii) Drain water from air reservoir.
- (iii) Check engine oil level and replenish it up to level if required.
- (iv) Check fuel level.
- (v) Check radiator coolant level and replenish it up to level if required.
- (vi) Check hydraulic fluid level and replenish it up to level if required.
- (vii) Check transmission oil level and replenish it up to level if required.
- (viii) Check function of all ganges.
- (ix) Check all function of cab controls ganges and lubricators.
- (x) Check correct spooling of rope on winch drum.
- (xi) Check wind-screen washer reservoir level (if fitted).
- (xii) Check safe load indicator functions (if fitted).
- (xiii) Check and drain water from air systems reservoir.

EVERY 50 OPERATING HOURS TASK

- (i) Check all wheels nuts for correct torque.
- (ii) Check battery electrolyte level and terminals.
- (iii) Grease storing ram pivots.
- (iv) Check for oil and fuel leaks.
- (v) Lubricate all control cables , linkages and pins.
- (vi) Grease axle tie rod joints.
- (vii) Grease outrigger beam sliding surface and pads.
- (viii) Grease slew ring and gear teeth.
- (ix) Change hydraulic system filters.

- (x) Change transmission oil and filters.
- (xi) Change axle differential oil.
- (xii) Check wheel brake linkage and adjust if required.
- (xiii) Check Parking brake.
- (xiv) Check tightness of slew ringbolts.
- (xv) Grease slew pinion bearing, slow ring and gear teeth.
- (xvi) Grease jib telescope ram end roller.
- (xvii) Grease jib pivot bearing.
- (xviii) Grease sheave bearings.
- (xix) Grease derrick ram pivots and check rod.
- (xx) Check oil level in winch gearbox and slow gearbox.
- (xxi) Check slow brake unit oil level.
- (xxii) Grease jib chain pulley.
- (xxiii) Lubricate jib-sliding pads.

NOTE: - FIRST 50 HOURS ONLY.

250 OPEARATING HOURS TASK

- (I) Clean engine air filter element.
- (II) Change engine oil and oil filter.
- (III) Check fan belt tension.
- (IV) Clean fuel lift pump filter.
- (V) Clean fuel pre-filter / water trap.
- (VI) Grease axle hub swivel pins.
- (VII) Grease axle locks (if fitted).
- (VIII) Grease propeller shaft coupling joints.
- (IX) Check end top up brake fluid reservoirs.
- (X) Check flexible hoses and connections.
- (XI) Grease axle hub drive shaft coupling joints.
- (XII) Clean engine compressor filter.
- (XIII) Check hub oil level (Drive axles).
- (XIV) Check differential oil level (Drive axles).

- (xv) Check tightness of slew motor brake and gear box bolts.
- (xvi) Check tightness of winch unit mounting bolts.

500 OPERATING HOURS TASK

- (i) Check exhaust system alternator and starter.
- (ii) Change Hydraulic fluid and system filters.
- (iii) Clean Hydraulic tank filter/ strainers and diffuser.

1000 OPERATING HOURS TASK

- (i) Change transmission oil and oil filter.
- (ii) Change axle differential oil.
- (iii) Check wheel brake linings and adjustment.
- (iv) Check parking breaks.
- (v) Change axle hub oil.
- (vi) Change final fuel filter elements.
- (vii) Change slew gear box oil
- (viii) Change slew brake unit oil.
- (ix) Change winch gearbox oil.

CARE AND MAINTENANCE IN ELECTRICAL SYSTEM

The following precautions must be taken when under taking maintenance of the machine: -

- (i) Exercise extreme care to ensure that the correct polarity is maintained when connecting battery leads.
- (iii) Do not disconnect battery terminals when the engine is running.
- (iv) Do not use circuit boosting services for starting.
- (vi) If the battery is discharged, preventing normal starting. It should be re-charged using an external battery charger. The battery may be changed without removing it from the machine provided the supply to the vehicle electrical system is disconnected.
- (v) Do not use "Jumper loads" for starting the engine when crane battery is discharged. At the instant the jumper leads are removed a rapid voltage rise within the alternator could damage the alternator diodes.

(v) When welding any parts of the crane ,ensure that the battery earth leads should be disconnected.

(vii) It is not recommended that the Crane structure is used for earthing a welding set.

(viii) When welding a suspended load. Isolate the welding circuit from the Crane by ensuring that the job being welded is connected (earthed) directly to the welding equipment.

(ix) It is safer to lower the road to be welded to the ground and disconnect the lifting hook before commencing welding.

NOTE :

If the event of any electrical maintenance witch requires removal of there units, always ensure that the each cable is full insulated immediately it is removed and before the cable is removed.

BRAKES

Type	:	Drum brakes to all wheels, hydraulically operated.
System	:	Air over Hydraulic operated service brakes to all wheels.
Air system	:	pressure – 7.6 bar (110 Lbf/in ²)
Safety Value	:	Pressure – 11 bar (169 Lbf/in ²)
Parking brakes	:	An air operated fixed disc mounted on front drive axis.

FUEL SYSTEM

Tank capacity	:	325 Ltrs.
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HYDRAULIC SYSTEM

Tank capacity	:	325 Ltrs.
Pump	:	Gear type output at 2400 engine revs/ min 198 Ltrs/min (44 gali/min).
Circuit pressure	:	172 bar (2500 Lbf/in ²).
Min pressure relief value Setting	:	179 bar (2600Lbf/in ²)

WINCH

Max Line pull	:	3.0 Tonnes.
Line speed	:	61m/Min.

ELECTRICEL SYSTEM

Type	:	24 volt negative earth .
Engine starting	:	3 position start switch.
Circuit	:	OFF/AUXILIARIES & RUN/START.
Charging Circuit	:	Starter – 24V with built in solenoid Alternator 24V With built in generator Battery –12V/125A/h (Qty 2)

RECOMMENDED LUBRICANT AND THEIR FILLING CAPACITIES

Ser No	Maintenance Job	Peridicity of chenge	Aubinent temper erature	Lubricants to be use	Capacity In littres	Remarks
1.	Engine Ashok Leyland 412	Ist Change 50 Hrs There after every 250 Hrs	-15 to 20° C -10°C to 40°C	<u>Multi grade oil</u> Servo super No 10W30 Servo premium CP-4 15W40	13.6	
2	Transmission Unit/TT Trarnsmission oil Filtor and cooling System Drive Axle CASI Differential Drive Axle hub Gears Slew Gear Box Hydraulic Tank Air Lubricators (If fitted)	Ist Change 50 Hrs There after every 1000 Hrs Ist Change 50 Hrs There after every change 1000 Hrs At operating 500 Hrs	- - - - -	Servo Transmission C 39 AE 10 W cr C39 AE 30 HP Gear oil Servo gear HP 90 Servo system HLP46 or HPC ENXLC 46 or HMA Cil servo system 314	25 Ltrs 8 Ltrs each (fron & rear) 1.5 Ltrs each (front &rear) 1.6 Ltrs 325 Ltrs 0.5	

Ser No	Maintenance Job	Peridicity of chenge	Ambient tempererature	Lubricants to be usee	Capacities in litres	Remarks
	Winch Gear Box	Ist Change 50 Hrs There after every 1000 Hrs	-	HPC GREVIL EP 150 Gear oil or Servo Mech 150	2.5 Ltrs	-
	Grease Application	-	-	Grease servo Grease HP 3	As required	-
	Jib sliding pads	-	-	RO Col RD 105 Grease	-do-	-
	Hydraulic Brake Axle	-	-	Girling Universal Brake : Clutch Fluid		

