

**DIRECTOR GENERAL BORDER ROADS**  
**GENERAL MAINTENANCE INSTRUCTION NO. 243**  
**ON OPERATION AND MAINTENANCE OF**  
**HYDRAULIC EXCAVATOR MAKE JCB MODEL JS 80**

**1. INTRODUCTION:**

(a) The Hydraulic Excavator make JCB model JS 80 with an upper structure capable of 360<sup>0</sup> rotation, having operating weight 7 to 8 Ton (approx) and mounted on Crawler fitted Tractor type under carriage powered by Kirloskar make 4R 1040 model, 4 cylinder, 4 stroke, water cooled, inline, direct injection diesel engine developing 65 HP at 1800 rpm, with 0.30 cum capacity general purpose bucket and Rock Breaker attachment.

(b) This GMI gives the technical specification and know how on the operation, maintenance and repair procedure of Hydraulic Excavator JCB model JS 80 to ensure maximum performance and safe/satisfactory operation. Compliance with procedures given in this GMI will enable to get desired maximum service from the equipment.

(c) Maintenance of Hydraulic Excavator JCB model JS 80 will lead to long life, trouble free operation and less frequent break downs and also to reduce maintenance cost. The periodic maintenance must be carried out according to the '**Periodic Maintenance Schedule**' described in this GMI. Daily care, inspection and Periodic Maintenance are essential for preventing troubles and accidents to ensure satisfaction and safe operation for prolonging the operating life of the equipment. All information and instructions given in this GMI is based on the latest Operator's manual and service booklet provided by the firm.

**2. AIM:**

The instructions are issued as guidelines for general, preventive maintenance schedule and lubrication of Hydraulic Excavator JCB model JS 80 manufactured by M/s JCB (India) Ltd for regular attention to keep the equipment in good mechanical condition which must be strictly followed.

**3. 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 instructions 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.

**4. 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 with filling capacity and periodicity for change | - Appendix 'D' |

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**OPERATING PROCEDURE**

1. Walking or working under raised boom and dipper is hazardous.
2. Take care when the cab is swung around so that it is facing the rear/track motor end of the under carriage, the action of the tracking controls, steering and transmission direction will be reversed.
3. Take care when carrying out deep digging it is possible that part of the boom structure may contact the undercarriage.
4. Keep all the controls of the eqpt clean and dry.
5. An incorrectly parking eqpt can move without an operator.
6. Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully.
7. Going uphill, reverse when unloaded or travel forwards when loaded. Going downhill, travel forwards when unloaded or reverse when loaded.
8. Take special care when moving across a slope. If the slope is too steep eqpt could roll over. Keep the attachments close to the ground while driving across a slope.
9. All the warning lights should go out when the engine is started. Rectify any faults immediately.
10. When not travelling, do not place your feet on the travel pedals.
11. Always stop the eqpt to select a different speed range and do not change the speed mode while travelling.
12. Never excavate directly beneath the machine itself. Excavating beneath the eqpt can weaken the ground and cause the eqpt to tip over.
13. Protect the eqpt when not in use.
14. Always Keep the Radiator clean to avoid Eng overheating.
15. Always thoroughly clean grease nipples before applying grease on pins/bushings.
16. Frequently check air cleaner elements and, if necessary replace the elements irrespective of the periodicity.
17. Always de-pressurize the system before removing any hoses or pipes. Make sure the Eng can not be started while the hoses are open / dismantled.
18. Before doing any maintenance make sure eqpt is correctly parked on level ground.

### **Do's**

1. Always use correct grade of Engine oil & other Lubricants.
2. Always use clean diesel and before filling diesel to tank, filter it with fine cloth.
3. Check lifting equipments before using.
4. Always face machine when entering to cabin and descending from cabin.
5. Secure all moving parts of the machine when not in use.
6. Always ensure electrics are switched off before leaving machine.
7. Always drive carefully and avoid any sudden stops and changes of direction including Zig-zag driving.
8. On leaving the machine always stop the machine and lock cabin.
9. Always operate machine and services smoothly.
10. Operate the control levers when you are correctly seated inside the cab.
11. Understand the electrical circuit before connecting or disconnecting an electrical component to avoid injury/damage.
12. Before disconnecting or connecting hydraulic hoses stop the engine and operate the controls to release pressure trapped in the hoses.
13. Inspect the hoses regularly for any damage/leakage.
14. Clean the eqpt on completion of work.
15. Protect the eqpt when not in use.

### **Don'ts**

1. Do not open the engine cover while the engine is running and avoid using eqpt with engine cover open.
2. Do not operate the eqpt beyond its designed limits.
3. Do not carry passengers as the eqpt is a one man machine.
4. Do not overload the eqpt which can damage and make the eqpt unstable.
5. Do not walk or work under raised attachments (Boom & Dipper) unless they are safely blocked.
6. Do not operate controls from outside cab.

7. Do not remove the Boom from the eqpt as it would severely upset the eqpt's balance and will lead to backward tilting.
8. Do not search for any oil leakage with the hand.
9. Do not work under a machine when on soft ground.
10. Do not attempt to remove counterweights from the eqpt.
11. Do not drive the eqpt with the door unlatched. It must be correctly closed or secured fully open.
12. Do not use the machine controls as handholds when entering or leaving the eqpt.
13. Do not travel with the track motors leading, particularly on hard or rocky ground. The recoil units will not be able to absorb the shocks and damage could be caused to the track mounting gear. Track chain wear could also be increased.
14. Operator should not rest his feet on the foot pedals when excavating. Even light pressure on the pedals can cause the brake to be released.
15. Do not excavate on hard or rocky ground with the boom positioned diagonally across the under carriage so as to avoid damage to Track gear box sprocket.
16. Do not refuel with the engine running.
17. Do not touch hot hydraulic hoses.
18. Do not over tighten hose clamps.
19. Do not wear loose clothing that can get caught up in moving machine.
20. Do not drive or work near the edge of a hole or trench or bank when there is danger to collapse.
21. Do not permit operation of the eqpt controls while refueling.
22. Do not remove the hydraulic tank filler cap or cover plate when the engine is running.
23. Do not remove/dismantle check valve provided on Track frame under any circumstances or avoid any attempt for removal of grease nipple from the check valve.
24. Do not run the eqpt if any oil leakage found in the top or bottom rollers or idler wheels.
25. Do not disconnect the Alternator, Battery or any part of the charging circuit with the engine running.



**PERIODIC MAINTENANCE SCHEDULE**

Maintenance work	Service intervals in hours							
	Daily	50	100	500	1000	2000	4000	5000
<b>CHECK</b>								
<b>ENGINE</b>								
Engine oil level and condition	*	*	*	*	*	*	*	*
Coolant/Water level in radiator	*	*	*	*	*	*	*	*
Exhaust for excessive smoke	*	*	*	*	*	*	*	*
Fuel system for leaks/contamination/Fuel level	*	*	*	*	*	*	*	*
Fan belt for tension			*	*	*	*	*	*
Exhaust system security			*	*	*	*	*	*
Radiator & Oil cooler for damage			*	*	*	*	*	*
Fan belt (V-belt) tension			*					
Eng mounting security			*					
Fasteners for Lub oil Sump			*					
Air Cleaner Maintenance	*							
<b>ELECTRICAL</b>								
Battery electrolyte level			*	*	*	*	*	*
Operation of electrical eqpt	*	*	*	*	*	*	*	*
For disconnected or shorted wiring, loose terminals	*	*	*	*	*	*	*	*
<b>HYDRAULICS</b>								
Hydraulic Oil level/Cleanliness	*	*	*	*	*	*	*	*
Hydraulic System for leakage	*	*	*	*	*	*	*	*
Condition of ram piston rods			*	*	*	*	*	*
Auxiliary circuit hyd oil filter visual indicator (if using a Rock Breaker)	*	*	*	*	*	*	*	*
Hoses and pipe work for damage/chafing			*	*	*	*	*	*
<b>MISCELLANEOUS</b>								
Operation of Warning lights and audible alarm	*	*	*	*	*	*	*	*
Track and Running gear			*	*	*	*	*	*

Maintenance work	Service intervals in hours							
	Daily	50	100	500	1000	2000	4000	5000
Track plate condition			*	*	*	*	*	*
Top/Bottom track rollers and Track idler wheels for oil leakage			*	*	*	*	*	*
Teeth and side cutters			*	*	*	*	*	*
Operation of all services (Transmission, Excavator Track & Slew Brake)	*	*	*	*	*	*	*	*
All pivot pin grease seals			*	*	*	*	*	*
Track Tension	*	*	*	*	*	*	*	*
Track wear					*	*	*	*
Oil and coolant leakage	*	*	*	*	*	*	*	*
Operation of throttle system			*	*	*	*	*	*
Operation of stop control			*	*	*	*	*	*
Operation of overload warning				*	*	*	*	*
Seat belt condition and security				*	*	*	*	*
Security of bolts & nuts			*	*	*	*	*	
Accumulator operation			*	*	*	*	*	
Hour meter operation	*							
<b><u>CLEAN</u></b>								
Machine generally	*	*	*					
Battery terminals			*					
Radiator, grille & Oil cooler fins		*	*					
Drain water & sediments from fuel tank		*	*					
Drain fuel water separator		*	*					
Fuel lift pump strainer			*		*			
Air Cleaner Dust valve				*				
Hydraulic fluid suction strainer					*			
Drain Fuel filter Bowl			*					
Fuel tank (Every 6 months/1200 hrs)								
<b><u>GREASE</u></b>								
All pivot pins (Bucket/Dipper) (Daily)								
Slew Ring teeth (Every 250 Hrs)								
Door & Canopy hinges (Every 250 Hrs)								
Slew Ring bearing(first after 100 Hrs & thereafter 250 Hrs)								
Slew gear box (Every 2000 Hrs)						*		

Maintenance work	Service intervals in hours							
	Daily	50	100	500	900	1000	2000	4000
<b><u>CHANGE/REPLACE</u></b>								
<b>ENGINE</b>								
Engine oil (first after 100 hrs and thereafter every 400 Hrs)			*	*				
Engine oil main filter element (first after 100 hrs and thereafter every 400 Hrs)			*	*				
Fuel filter element (Every 250 Hrs)			*					
Engine oil filter by-pass element (Every 100 Hrs)			*					
Air filter-Primary							*	
Air filter-Secondary						*	*	
<b>HYDRAULICS</b>								
Return filter element (First after 100 Hrs and thereafter every 1000 Hrs)			*			*	*	
Servo oil filter element (First after 100 Hrs and thereafter every 1000 Hrs)			*			*	*	
Suction strainer (First after 100 Hrs and thereafter every 4000 Hrs)			*		* Clean			*
Air Breather element (first change at 900 Hrs and then every 5000 Hrs)					*			
Nephron/Plexus filter (Every 1000 Hrs)						*	*	
Hydraulic system oil (Every 4000 Hrs)								*
<b>TRANSMISSION</b>								
Track gear box oil (First after 100 Hrs and thereafter every 1000 Hrs)			*			*	*	

**TECHNICAL SPECIFICATION**

<b>Description</b>	<b>Hydraulic Excavator JCB JS 80</b>
<b>ENGINE</b>	
Model /Type	Kirloskar 4R1040, 4 cylinder, 4 Stroke, water cooled, inline, direct injection Diesel engine.
Cylinder bore x stroke	105 mm x 120 mm
Compression ratio	19 : 1
Piston displacement	4160
Firing Order	1-3-4-2
Direction of rotation	Anti clock wise from flywheel side
Governor Type	Mechanical
Maximum output	65 Hp @ 1800 rpm
Maximum Torque	272 N-m @ 1400 rpm
Engine weight with flywheel, flywheel housing and Radiator	522 kg
Aspiration	Naturally Aspirated
Starting Arrangement	Electric start
Lub oil consumption	Less than 0.3% of fuel consumption
Valve clearance	Inlet – 0.25 mm Exhaust – 0.30 mm
Air Cleaner	Dry Type
Lubrication System	Forced feed Lubrication
Lub oil pressure	Min- 1.5 Kg/Cm <sup>2</sup> Max- 5.5 Kg/Cm <sup>2</sup>
<b>ELECTRICAL SYSTEM</b>	
Battery	12 V 135 AH
Alternator	Lucas 35 Amp, 12 Volts

<b>TRACK</b>	
Track tension soft sand/sticky mud	250-275 mm third roller centre from idler centre
Track tension hard strata/ground	180-205 mm
Track Shoe	450 mm Tripple Grouser
Travel Speed	High - 4 km/hr. Low - 2.7 km/hr.
<b>Standard machine consists of</b>	
Boom	3.7 m
Dipper	1.74 m
Bucket	0.30 cum, 950 mm(width)
<b>MAIN RELIEF VALVE PRESSURE SETTING</b>	
Boom/Arm/Bucket	284 bar
Swing circuit	190 bar
Travel circuit	284 bar
Boost to	300 bar
Pilot circuit	40 bar
<b>STATIC DIMENSIONS OF EQPT</b>	
Track length on ground	2200 mm
Undercarriage overall length	2830 mm
Counterweight clearance	767 mm
Tail swing radius	1460 mm
Overall width of superstructure	2220 mm
mm Height over cab	2625 mm
Ground clearance	363 mm
Track gauge	1700 mm
Width 0/tracks (450 mm shoes)	2150 mm
Width 0/tracks (600 mm shoes)	2300 mm
Transport length (Standard boom)*	2465 mm
Transport height (Standard boom)*	2640 mm
Track height	665 mm
Max. height (above ground)	375 mm
Dig depth (below ground)	235 mm
Approach angle	26°
Width	2320 mm
Height	460 mm
Reach in front of tracks	480 mm
Operating weight	7500 kg
Ground Bearing pressure	0.34 kg/cm <sup>2</sup>

**Appendix 'D'**

**RECOMMENDED LUBRICANTS WITH FILLING CAPACITY AND PERIODICITY**

S/No	Item	Grade of Lubricant		Filling Capacity	Periodicity for change
		IOC	CASTROL		
a)	Engine Kirloskar 4R 1040	Servo pride XL 15W 40	Castrol FleetMax 15W 40	11.5 ltrs (Max - 14 ltrs)	First oil/filter change after 100 hrs and thereafter every 400 hrs
b)	Hyd System	Servo System HLP 46	Castrol JCB HVI Hyd oil	92 ltrs	Hyd Tank cap – 55 ltrs. First change Air breather element at 900 hrs and then at 5000 hrs. Clean Suction Strainer every 900 hrs and first change at 4000 hrs. Hyd oil change after every 4000 hrs
c)	Track Gear oil (Track reduction gear)	Servo Hydrex TH-46	Castrol Hypoy-B	3.4 ltrs (2x1.7 each side)	First filter change 100 Hrs and then every 1000 Hrs
d)	Centre Pivot (Lower/upper) Dipper & Bucket	Servo Gem RR3	Castrol LCG 2 Grease	-	Daily/weekly/fortnightly/monthly as required
e)	Fuel Tank	-	-	164 ltrs	
f)	Fuel filter	-	-	-	Change fuel filter with every engine oil change or 250 Hrs depends on working condition
g)	Engine coolant	-	-	23 ltrs	
h)	<u>Hydraulic Filter</u> (a) Main Return filter  (b) Servo filter  (c) Nephron filter	-	-	-	First filter change 100 Hrs and then every 1000 Hrs  First filter change 100 Hrs and then every 1000 Hrs  First filter change 1000 Hrs and then every 1000 Hrs
j)	Eng oil filter by-pass element	-	-	-	Change after every 100 Hrs

k)	Air filter Inner (Primary)	-	-	-	Change after every 2000 Hrs
l)	Air filter outer (Secondary)	-	-	-	Change after every 1000 Hrs