



DALMIA CEMENT (B) LIMITED – DALMIAPURAM



MECHANICAL DEPARTMENT

Issue No. 01	Rev. No: 00	Effective Date: 01.03.2016	SOP/Mines/10
Issued By: Maintenance in Charge		Approved By: HOD (Mech)	
SOP for change of Main oil seal in swing motor of Excavator			

SCOPE : change of Main oil seal in swing motor of Excavator

RESPONSIBILITY : Section Engineers

Accountability : Section Heads – Mechanical maintenance

PPE:

1. Safety goggles,
2. Safety helmet,
3. Safety shoe,
4. Mask,
5. Cotton Gloves.
6. Safety harness(Full body)

TOOLS:

1. Spanners set.
2. Lifting tools & tackles.
3. Special tools
4. Wooden sleepers
5. Belt conveyor sheets

Hazard:

Risks associated:

Fall from height,
Fall of tools;
Hit of Hammer in hand;
Slippery due to oil
Spray of coolant to eyes
Battery acid spillage

Mitigating Measures

Use of safety harness
Carry the tools in tool bags
trained to be engaged
wearing shoes and careful walk
using of goggles
using PPE like gloves, goggles and face mosque



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1.0 Purpose:

Change of Main oil seal in swing motor of Excavator and keep the machine available to Deliver the intended performance level.

2.0 Inputs:

- Workshop
- Stores, spares & consumables
- OEM Manuals.
- Tools and Tackles

3.0 Process:

3.01 Safety Precautions during Change of Main oil seal in swing motor of Excavator

To ensure the safety of workers near the machine, always sound the horn to warn them before starting the engine and moving the machine. Be particularly careful to check that the rear is clear before backing the machine.

- Exhaust gas is dangerous. While working inside, be particularly careful to have good ventilation.
- Use only the correct tools for maintenance and repair work.
- When carrying out difficult maintenance work, carrying them out carelessly can cause unexpected accidents.
- During maintenance work, do not allow any unauthorized person to stand near the machine.
- Do not allow any body other than the necessary workers to go near the machine while it is being inspected or maintained. Also be careful of people in the vicinity. It is necessary to exercise particular care when performing grinding or welding or when swinging a hammer.
- Before performing any maintenance work in the machine, make sure that it is parked on a level ground, the ignition key is removed and all needed repairs are reported.
- Unless you have special instruction to the contrary, maintenance should always be carried out with the engine stopped. If maintenance is carried out (Seals/pumps) with engine running there must be two men present: one sitting in the operator's seat and the other one performing the maintenance. In such a case, never touch any moving part.



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3.02 Trouble shooting:

Troubleshooting is a means of locating the source of trouble when problems occur so that repairs can be made.

3.02 4.0 Code of practice for Repair/Maintenance of Main oil seal in swing motor of Excavator

Model:HEME

3.03 For Change of Main oil seal in swing motor of Excavator:

- For carrying out Main oil seal Maintenance work always wear safety gloves, goggles and helmet. Do not wear loose cloths.
- Keep all tools in good condition and learn the correct way to use them. Always don't use the repaired tools.
- Always keep the work area very clean and make sure that there is no unwanted material or oil on the work floor.
- Before starting any repair & maintenance work, Park the Heme on hard level ground and release the internal pressure in hydraulic tank, in addition be sure to "PPC Lock in position"
- Remove all mud, oil and grease from steps or other place used to get on and off the Excavator. Always use the ladders or steps when getting on or off the Excavator. Never jump on or off the Excavator.
- When dismantling or assembling any Hydraulic Pumps /seals of HEME, prepare all necessary spares and tools advance to reduce breakdown time and increase availability of the machine



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- When removing the oil filter cap, cap drain plugs or hydraulic pressure measuring plugs loosen them slowly to prevent the oil from spurting out.
- Before disconnecting or removing components of oil, first remove the pressure completely from the circuit.
- Wait for the oil to be cooled before carrying out any work on the oil or water circuits, because the oil in the circuit are hot when the engine or dumper stopped. So be careful not to get burned.
- When removing Main oil seal, which are under internal pressure or under pressure from a spring always leave the bolts in position on opposite sides, slowly release the pressure, and then slowly loosen the bolts to remove.
- When removing piping, stop the oil from the spilling out. If any oil drops on the floor, wipe it up immediately, Oil on the floor can cause any one to slip or can even start fires.
- When installing Main oil seal make sure that they are not twisted, damaged tubes are dangerous. So be extremely careful when installing tubes for high-pressure circuits. Also check that the connecting parts are correctly installed.
- When assembling or installing Main oil seal parts in Machine always use the specified tightening torques. When installing protective parts such as guards or parts, which rotate at high speed, be particularly careful to check that they are installed correctly. If nuts, bolts, or other parts are not tightened to the specified torque, it will cause looseness, damage to the tightened parts; and this will cause failure of the machine, or problems with operation. Always pay careful attention when tightening parts.
- When measuring hydraulic pressures check that the measuring tool is correctly assembled before taking any measurements.
- When aligning two holes, never insert fingers or hand be careful not to get fingers caught in a hole.



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- Always wear safety glasses when grinding parts with grinder, etc

When carrying out welding works in hydraulic pipe lines always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.

- Before starting any welding work in Machine battery connection should be removed (mainly Earth connection to be removed)
- When removing components are careful not to brake or damage the wiring. Damaged wiring may cause electrical fires.

Immediately after the engine is stopped, the coolant is at a high temperature and the radiator is under high internal pressure. If the cap is removed to drain the coolant in this condition, there is a hazard of burns. Wait for the temperature to go down, and then turn the cap slowly to release the pressure before removing it. When standing up or leaving the operator's seat, set the safety lock lever to the LOCK position. There is danger of touching the fan if the undercover is left removed. Never enters behind the machine when the engine is run

4.02 Working on Main oil seal in swing motor

- Whenever it is required to work on the attachment of the shovel the following safety measures should be taken.
- While tightening the bolts of saddle block, use a crane holding cage, the cage should be tied up with boom and use safety belt.
- While working on attachment sheaves always use safety belt.
- Changing of Seal or Pumps sheave should be lowered by lowering the boom.

4.03 Inspect machine

- Inspect machine carefully each day by walking around it before starting.
- Keep all guards and shields in good condition and properly installed.
- Fix damage and replace worn or broken parts immediately.



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- Pay special attention to Seal/hydraulic Pumps

4.04 Never search for leaks with your hands

- Use a piece of cardboard to find location of escaping fluid.
- Stop engine and relieve pressure before disconnecting lines or working on hydraulic system.

4.05 Clean Machine Regularly

- Keep trash, debris, grease and oil from accumulating in engine /Hydraulic compartment, around fuel lines, hydraulic lines
- Never store oily rags or flammable materials inside a machine compartment.

4.06 Maintain oil seal in swing motor

- Replace Seals in swing motor immediately if they begin to leak, and clean up any oil spills.

5.01 Start only from operator's seat

- Avoid unexpected machine movement.
- Start engine only while sitting in operator's seat.
- Ensure all controls and working tools are in proper position for a parked machine.
- Never attempt to start engine from the ground.
- Do not attempt to start engine by shorting across the starter solenoid terminals.

5.02 Park and Prepare for service safely

- Warn others of service work.
- Always park and prepare machine for service or repair properly
- Park machine on a level surface and lower equipment to the ground.
- Place transmission control in neutral and park brake lever in 'On' position. Stop engine and remove key.
- Attach a "Do Not Operate" tag in an obvious place in the operator's station. Securely support machine or attachment before working under it.
- Do not support machine with cinder blocks or wooden pieces that may crumble or crush.



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- Do not support machine with single jack or other devices that may slip out of place. Understand service procedures before beginning repairs. Keep service areas clean and dry. Use two people whenever the engine must be running for service work.

Environmental Aspects: Refer the Aspect Register

Safety Risks: Refer the Risk Register

Emergency Shut- off:

- If body injury is there, First aid will be given and inform to the Safety department or Call Emergency number Maintenance Eng. /HOD

Records/Annexure:

- Refer Line clearance certificates.
- JSA as enclosed below.

Job Safety Analysis	Job: Maintenance and repair of Excavator	Date: 01.11.14	Analysis by:	Reviewed by:
Title of employee doing job: Mechanic/Helper	Supervisor: HEMM Foreman/shift in charge/ Mechanical Engineer	Department: Mines	Section:	Approved by:
Required/recommended PPE: Safety shoes, goggles, ear plug, Gloves, Safety Helmet, Safety Belt, Nose mask				
Sequence of Basic Job Steps	Potential Hazards	Recommended Safe Job Procedure	What Could Go Wrong	Corrective Action
Check the workspace and walkways	Slip/Trip	Workspace should be clean & free from obstructions	Falling on the machines	Good House Keeping
Ensure all guards and safety shields are in position	Contact with rotating parts	Guards and Safety shields should be in position	Physical injury	Ensure all Guards and Safety shields should be in position
Ensure that the working tools are in good condition	Slip/Trip or break	Ensure that the working tools are in good condition	Physical injury	Before start of work ,ensure that the working tools are in good condition



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Ensure that the machine is in level and firm ground	Slip/Skid	Place the machine in level and firm ground	Physical injury	Before start of work ,ensure that machine in level and firm ground
Ensure that “PPC joy stick is in Locked condition” if it is required to check the engine while running	Accidental Functioning of machine	Keep “PPC joy stick is in Locked condition	Physical injury due to accidental Functioning of machine	Before start of work ,ensure that “PPC joy stick is in Locked condition
To Drain/Remove/ change Oil seal in swing motor/ hoses loose the drain plugs /Cap slowly to relieve the internal pressure	Hot splash/ Oil may spurt out	Remove plugs/Caps slowly/Allow the oil and water to get cooled	Physical injury	Ensure that plugs/Caps are loosening slowly When the oil and water to got cooled/
When lifting heavy components/swing motor, use a hoist or crane,	Slip/Skid	For lifting heavy components, use a hoist or crane,	Physical injury/Machine Damage	Ensure that the plugs/Caps are loosening slowly
When working on the Height use safety belt	Fall of object	When working at heights Safety belt should be used	Physical injury	Ensure that safety belt is used when working at height



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Job Safety Analysis	Job: Preventive maintenance	Date: 01.06.2015	Analysis by: Section Engineer	Reviewed by: Section Head
Title of employee doing job:	Supervisor: Sec.Engr	Department: Mechanical	Section: All equipments	Approved by: Department Head

Req'd/recommended PPE:

Sequence of Basic Job Steps	Potential Hazards	Recommended Safe Job Procedure	What Could Go Wrong	Corrective Action
Working at Height	Fall from height	Follow work at height SOP	Not following procedure	Ensure SOP is followed before work is started
Using lifting tools & tackles	Fall from height/ hit injury to body parts	Ensure certified tools & tackles are used. Don't over load	Overloading	Ensure lifting tools are not overloaded
Usage of hand tools	Injury to fingers / hands	Follow SOP for safe usage of hand tools	Not following SOP	Ensure right tools are used right job in right method
Handling the oils	Slippery of persons	Collect the oil in a bucket to avoid the spillage	Not following the system	Ensure the oil to be collected in the buckets and later it is to poured in the old oil barrels