



DALMIA CEMENT (B) LIMITED – DALMIAPURAM



MECHANICAL DEPARTMENT

Issue No. 01	Rev. No: 00	Effective Date: 01.05.2016	SOP/Mines/18
Issued By: Maintenance in Charge		Approved By: HOD (Mines)	
SOP for change of Engine water pump assembly in Mines vehicles			

SCOPE : Change of Engine water pump assembly in Mines vehicles

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

Mitigating Measures

Use of safety harness
Carry the tools in tool bags
trained to be engaged
wearing shoes and careful walk
using of goggles



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1.0 Purpose:

Change of Engine water pump assembly in Mines vehicles 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 Repair/Maintenance of Engine water pump assembly in Mines vehicles

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 (Change of Engine water pump assembly) 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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○ Coolant is toxic. Keep away from Coolant. If not reused, dispose of in accordance with local environmental regulations.

3.02 Trouble shooting:

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

4.0 Code of practice for Repair/Maintenance of the Change of Engine water pump assembly in Mines vehicles

Model: vehicle

4.01 For Maintenance of the Change of Engine water pump assembly in Mines vehicles:

For carrying out any Engine water pump assembly 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 Vehicle 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.



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- When dismantling or assembling any Maintenance of the Engine water pump assembly prepare all necessary spares and tools advance to reduce breakdown time and increase availability of the machine
- When removing the oil filter cap, cap drain plugs or pressure measuring plugs loosen them slowly to prevent the Coolant from spurting out.
- Before disconnecting or removing components of Coolant, first remove the pressure completely from the circuit.
 - Wait for the Coolant and water to be cooled before carrying out any work on the water circuits, because the water and Coolant in the circuit are hot when the engine stopped. So be careful not to get burned.
 - Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50C [120F] before removing the pressure cap. Heated coolant spray or steam can cause personal injury.
 - If installed, remove the Belt Guard. Refer to Belt Guard Removal/Installation in this section. If installed, remove the Drive Belt. Refer to Belt .Removal/Installation in this section
 - Remove the two cap screws and water pump
 - Clean the sealing surface on the cylinder block.
- When removing Hoses, 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 Coolant from the spilling out. If any Coolant drops on the floor, wipe it up immediately, Coolant on the floor can cause any one to slip or can even start fires.



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- When installing hi hoses make sure that they are not twisted, damaged tubes are dangerous. So be extremely careful when installing hoses in cooling circuits. Also check that the connecting parts are correctly installed.
 - When assembling or installing Hose parts of the Engine water pump assembly 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.
- Always wear safety glasses when grinding parts with grinder, etc
- Before starting any welding work in vehicle 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,



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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 Maintenance of Engine water pump assembly

If the Engine water pump assembly, coolant used in the radiator gets into your eyes or on your hands, it may cause loss of sight or frostbite. Do not touch the coolant. Never loosen any part of the cooling circuit.

5.01 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.
- Pay special attention to hydraulic hoses

5.02 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.

5.03 Clean Machine Regularly

- Keep trash, debris, grease and oil from accumulating in Engine water pump assembly
- Never store oily rags or flammable materials inside a cabin compartment.

5.04 Maintain Engine water pump assembly

- Replace Engine water pump assembly immediately if they begin to leak, and clean up any coolant spills.

5.05 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.



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- Never attempt to start engine from the ground.
- Do not attempt to start engine by shorting across the starter solenoid terminals.

5.06 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.
- 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:

1. 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:

1. Refer Line clearance certificates.
2. 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:



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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
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/ Maintenance of the Engine water pump assembly /Hoses loose the drain plugs /Cap slowly to relieve the internal pressure	Hot splash/ coolant may spurt out	Remove plugs/Caps slowly/Allow the coolant or gas and water to get cooled	Physical injury	Ensure that plugs/Caps are loosening slowly When the coolant and water to get cooled/



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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
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 coolant	Slippery of persons	Collect the coolant in a bucket to avoid the spillage	Not following the system	Ensure the coolant to be collected in the buckets and later it is to poured in the old coolant barrels



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