1. **PURPOSE:** To Describe safe replacement of wear shoe(Rear) of Ground Pusher
2. **SCOPE:** MCD -Battery 2
3. **RESPONSIBILITY:** Engineer in charge and Maintenance fitter on the job.
4. **SAFETY PRECAUTIONS:**

* Ensure all Electrical & Mechanical isolation prior to starting work on equipment. Follow documented isolation procedure as per Vedanta approved isolation standards.
* Take Electrical shutdown of Ground Pusher & work permit before attending any electrically operated units.
* Safety briefing / Toolbox talk to be carried out and to be documented
* Follow *one man one lock* system and use of LOTO box.
* Check availability of valid DCP fire extinguishers, if not available then inform shift in charge.
* Check and ensure safety of man and equipment before starting operations.
* All unwanted material from the area to be removed before releasing the equipment electrical isolation.
* Follow proper documented procedure for releasing the electrical isolations as per Vedanta approved isolation standards.
* *Certified lifting Tools & Tackles* to be used for the job.

1. **PPE to be used :**

* Safety Helmet
* Safety shoes
* Safety Goggles
* Hand gloves
* Dust mask

1. **Activities**

* Activity No 1 : Replacement of *Rear wear shoe*
* Activity No 2 : Replacement of *Front wear shoe*
* Activity No 3 : Replacement of *Pusher shield*
* Activity No 4 : *Brake drum coupling* replacement (CSP side)
* Activity No 5 : Replacement of *Planetary Gear* Box
* Activity No 6 : *Oil replacement* & inspection
* Activity No 7 : *Preventive* Maintenance.

1. **Aspect-Impact:**

* Scrap generation Resource Depletion.
* Dust Generation Air Pollution.

1. **Hazards** **identified**
2. Physical Hazard

* Fall of Hot coke , flying of coke dust and fines
* Slip due to Oil/grease

1. Mechanical Hazard

* Impact, Entrapment, Slip and fall

1. Chemical Hazard

* Fire and explosion, fumes.

1. Human behaviour aspect of operators:

* Alcoholism.
* Casual approach.
* Horse play.
* Non usage of PPE’s
* Improper Housekeeping
* Height Phobia

PROCEDURE:

**Activity No 1: Replacement of *Rear wear shoe***

        Shift the new *Wear shoe* just below the equipment, tools and tackles required to area of maintenance

        Check the tightness of the *brake shoe* of the brake drum to ensure the arrest of ram movement during work.

        Align the HCM to the ground pusher and forward the ram such that wear shoe of rear just aligns below the scorpion tail structure from where Chain block could be suspended.

        Trained workmen should execute the job.

        2T ton chain block is fixed by taking the support of scorpion tail

* Lock the old *Rear wear Shoe* with the chain block.
* Dismantle the shoe by removing the bolts and release by gradual lowering of shoe to the ground.
* Replace the same with new one and assemble the same with adequate packing.
* Housekeeping needs be done at the area of repair by removing the tools, tackles and scrap.
* Electrical Shut down to be released as per Standard procedure.
* Trials to be taken, Check for the ram movement, check for the gap between the HCC tray and Wear Shoe , it is to be ensured for minimum gap. Check for any odd noise or jerks in the Tray of HCC.
* Hand over the equipment for the operation department for starting the production.
* Close the work permit of the activity from the respective shift in charge and User department.

**Activity No 2: Replacement of *Front wear shoe***

        Shift the new *Wear shoe* just below the equipment, tools and tackles required to area of maintenance

        Check the tightness of the *brake shoe* of the brake drum to ensure the arrest of ram movement during work.

        Before taking electrical shutdown of Ground pusher, *move the pusher shield forward by around 1.5 m by inching so that ram shoe moves out of supporting structure and aligns below the mechanical front stopper*

        Trained workmen should execute the job.

        Certified 2T ton chain block is fixed by taking the support of mechanical front stopper.

* Lock the front wear Shoe with the chain block.
* Dismantle the shoe by removing the bolts and release by gradual lowering of shoe to the ground.
* Replace the same with new one and assemble the same with adequate packing.
* Housekeeping needs be done at the area of repair by removing the tools, tackles and scrap.
* Electrical Shut down to be released as per Standard procedure.
* Trials to be taken, Check for the ram movement, check for the gap between the HCC tray and Wear Shoe , it is to be ensured for minimum gap. Check for any odd noise or jerks in the Tray of HCC.
* Hand over the equipment for the operation department for starting the production.
* Close the work permit of the activity from the respective shift in charge and User department.

**Activity No 3: Replacement of *Pusher shield***

* Ensure availability of *new M20x130* HT bolts, nuts & washer before start of job.
* Shift the new *Pusher shield* near to the equipment, tools and tackles required to area of maintenance.
* Ensure lifting hooks(MS plate eye) are welded on new shield & 3 holes are made for evacuation of heat
* Loosen all mounting bolts at mating plate( 4 nos) of shield and Ram
* Suspend and hold the *old Pusher shield* with help of certified 15T Crane and remove all 32 bolts.
* Remove and park the old shield away from the equipment at a safe location
* Place the new shield in position with help of crane and fasten 2 bolts at every mating plate.
* Check & confirm whether the shield front face is perpendicular to ground with spirit level and then tighten the bolts
* Fix the remaining bolts & tighten appropriately.
* Retighten the bolts after 24 hrs of normal operation
* Housekeeping needs be done at the area of repair by removing the tools, tackles and scrap.
* Electrical Shut down to be released as per Standard procedure.
* Trials to be taken, Check for the ram movement, check for the gap between the HCC tray , it is to be ensured for minimum gap. Check for any odd noise or jerks in the Tray of HCC.
* Hand over the equipment for the operation department for starting the production.
* Close the work permit of the activity from the respective shift in charge and User department.

**Activity No 4: *Brake drum coupling* replacement (CSP side)**

* Take work permit of the activity from the respective shift in charge
* Shift the material, tools and tackles required to area of maintenance.
* Align HCM near Ground pusher and position the ram into tray so as to make scorpion tail portion horizontal.
* Take Electrical shutdown of Ground pusher before attending job.
* Trained workmen should execute the job.
* Disconnect the motor from electrical supply.
* Certified 2T chain block to be suspended from the canopy above the motor.
* Motor to be locked by means of chain block – 2T.
* Dismantle the coupling by removing the coupling bolts.
* By loosening the motor foundation, decouple the motor and the inner race of the brake drum.
* Replace with the new coupling , assemble the same
* Check for motor alignment, Maximum allowance of 0.1mm is acceptable.
* Adjust the thrust brake setting
* Housekeeping needs be done at the area of repair by removing the tools, tackles and scrap.
* Complete the electrical Terminations to the motor.
* Shut downs to be released as per Standard procedure.
* Trials to be taken, Check for the Brake system action, Check for any wobbling, Check for tightness of the coupling bolts once the operation is done.
* Hand over the equipment for the operation department once the check points found normal.
* Close the work permit of the activity from the respective shift in charge

**Activity No 5: Planetary Gear Box replacement (Bonfiglioli-318)**

* Ensure spare Gearbox is fixed with Half input coupling
* Take work permit of the activity from the respective shift in charge
* Shift the material, tools and tackles required to area of maintenance.
* Take Electrical shutdown of Ground pusher before attending job.
* Trained workmen should execute the job.
* Disconnect the motor from electrical supply.
* Decouple the *output coupling* (between pinion shaft & gearbox) by removing the coupling bolts. Keep all bolts at safe location below motor base frame.
* Decouple the input drum coupling(between Drive motor & gearbox) ) by removing the coupling bolts, bush & washers.
* By loosening the motor foundation bolts, decouple the motor and the inner race of the brake drum.
* Remove the old gear box with help of F-15 crane & certified slings.
* Place the new Gearbox in position & carry out alignment on input & output side
* Fasten the coupling bolts of input & out coupling of Gearbox
* Check for motor alignment, Maximum allowance of 0.1mm is acceptable.
* Adjust the thrust brake setting
* Housekeeping needs be done at the area of repair by removing the tools, tackles and scrap.
* Complete the electrical Terminations to the motor.
* Shut downs to be released as per Standard procedure.
* Trials to be taken, Check for the direction of ram movement , Brake system action, Check for any wobbling, Check for tightness of the coupling bolts once the operation is done.
* Hand over the equipment for the operation department once the check points found normal.
* Close the work permit of the activity from the respective shift in charge

**Activity No 6: Gear Box oil replacement & Inspection**

* Take work permit of the activity from the respective shift in charge
* Shift the material, tools and tackles required to area of maintenance.
* Take Electrical shutdown of Ground pusher before attending job.
* Trained workmen should execute the job.
* Procedure for Bonfiglioli make – Model 318 Planetary Gearbox
  + - 1. **Inspection *of oil level-* Model 318 Planetary Gearbox**
    1. The Gearbox is equipped with 3 ports equally placed at 90 deg to each other-1st one at top for oil filling, 2nd one at 90 deg to check level and 3rd one at bottom for drain
    2. Open the top port, then gently open the port plug at 90 deg slowly without fully removing the plug, if the oil starts coming out, tighten the plug
       1. **Replacement *of oil level-*** **Model 318 Planetary Gearbox**

1. Place the waste oil collection container below the Gearbox drain port
2. Open all 3 ports & collect the waste oil in container
3. Now plug the bottom drain port firmly & fill the gearbox with new Omala-320 Gear oil till it starts overflowing from 2nd port
4. Once oil starts overflowing, close the 1st & 2nd port plug firmly

* Procedure for INDIAN make – Gearbox (CSP SIDE)
  + - 1. **Inspection *of oil level-*** Gearbox (CSP SIDE)

1. The Gearbox is equipped with *dip stick* to check oil level
2. Remove the dip stick and check whether the dip stick is minimum half covered with oil else oil top is required
   * + 1. **Replacement *of oil level-*** Gearbox (CSP SIDE)
3. Place the waste oil collection container near to drain plug of gearbox
4. Open top flange cover & then drain the full waste oil into container
5. Inspect the gearbox internals for dust settlement and teeth wear/abnormality
6. Clean the gearbox internals with soft clean cloth
7. Now plug the drain port firmly & fill the gearbox with new Omala-320 Gear oil till half of gearbox.
8. Cross check the level with dip stick for minimum 50% wetting of stick

* Shut downs to be released as per Standard procedure.
* Trials to be taken, Check for the any oil leakage and carry out complete housekeeping at site
* Close the work permit of the activity from the respective shift in charge

**Activity No 7: Preventive Maintenance**

Preventive Maintenance of Ground Pusher is covered under

* Monthly Preventive maintenance.
* Quarterly Preventive Maintenance.

**Procedure for Preventive maintenance**

* Check the preventive maintenance schedule in SAP.
* Take system generated print of generated PM and hand it over to maintenance crew for execution.
* Isolate the Ground pusher with proper isolation procedure as per the Vedanta isolation standard.
* Carry out all tasks mentioned in the checklist as per guidelines and update the job completed and actual conditions with the time taken for completion of the job.
* Ensure all the jobs are completed and in case of any abnormality or pending jobs in the list, a separate notification has to be raised in SAP for ensuring the compliance.
* All unwanted material from the area to be removed before releasing the equipment electrical isolation.
* Follow proper documented procedure for releasing the electrical isolations as per Vedanta approved isolation standards.
* After completion of PM activity, the generated order needs to be closed within 24 hrs of the execution.

1. **REFERENCES:**

OEM Manuals

1. **RECORDS:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Record No.** | **Record Title** | **Maintained by** | **Soft/Hard form** | **Retention Time** |
| 1. | HI/MAINT/75 | Hazard Identification | IMS | Soft | 1 Yr. |
| 2. | RA/MAINT/75 | Risk Assessment | IMS | Soft | 1 Yr. |
| 4 | - | PM Checklist | Area in Charge | Hard | 1 Yr. |
| 5 | - | Notification Data | Area in charge | Soft | - |

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