**PURPOSE:** To describe the procedures for **Safe and quality maintenance of conveyor belt for optimum output**.

**SCOPE: Coke screening plant 1 & 2, Coal handling plant, Plant No.6, Plant**

**No.7, CDGP, and Jetty**

**Ref.: - Conveyor belts maintenance manual**

PPE's to be used:

**Helmet, Safety shoes, hand gloves, safety belts, dust masks and complete sealed goggles**

**1 Scrap generation- Resource Depletion**

**2 Oil Spillage - Land contamination**

**3 Oil traced waste generation - Land contamination & Resource Depletion**

**4 Dust Generation- Air pollution**

**Safety**

**1 Mechanical hazard – Trapping, impact, ejection, falling etc.**

**2 Chemical Hazard – welding Fumes, dust**

**3 Human behaviors- Improper housekeeping, Non-use of PPE, Alcoholism, Height phobia**

**Safety precaution to be taken.**

**Conveyor belts to be kept empty.**

**Shutdown to be taken of individual equipment with LOTO**

**Use of safety belts during work at heights**

**Ensure use of certified chain block, welding machines, cutting sets, grinders.**

**Ensure that after completion of job and before taking trial all the guards are provided (nut bolted)**

**Work No 1: Conveyor belt changing**

**Work No 2: Jointing belt by hot vulcanizing.**

**Work No 3: Changing of conveyor belt drum**

**Work No 4: Changing of Gear box**

**Work No 5: Changing of motor**

**Work No 6: Carrying roller/ bracket changing**

**Work No 7: Working above conveyor belt**

**Work No 8: Working below conveyor belt**

**Work No 9: Changing of Gate**

**Work No 10: Liner plate changing**

**Work No 10: Side skirt changing/adjustment**

**Work No 11: Scrapper installation & adjustment**

**Work No 12: Drive changeover**

**Work No 13: Pulley lagging at site**

1. **PERFORMANCE INDICATORS:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Measure** | **Unit** | **Frequency** | **Acceptance Criteria** | **Responsibility** |
| **Quality** | | | | | |
| 1 |  |  |  |  |  |
| **Environment** | | | | | |
| 1 | Scrap generation- Resource Depletion |  |  |  | Engineer In charge & contract workmen on job |
| 2 | Oil Spillage - Land contamination |  |  |  |
| 3 | Oil traced waste generation - Land contamination & Resource Depletion |  |  |  |
| 4 | Dust Generation- Air pollution |  |  |  |
| **Safety** | | | | | |
| 1 | Mechanical hazard – Trapping, impact, ejection, falling etc. |  |  |  | Engineer In charge & contract workmen on job |
| 2 | Chemical Hazard – welding Fumes, dust |  |  |  |
| 3 | **Human behaviors- Improper housekeeping, Non-use of PPE, Alcoholism, Height phobia** |  |  |  |

1. **PROCEDURE:**
2. **Work No 1: Conveyor belt changing**

* Put belt in manual mode and position the joint of the belt (preferably at the tail end return side).
* Take electrical shutdown.
* Cut old belt and join one end of new and old belt with minimum 6 fasteners and to the other end of old belt tie manila rope. If the belt is having Gravity Take Up (GTU), then take load of GTU using chain block.
* Temporarily clear electrical shutdown to lay the new belt and keep the belt in manual mode.
* Instruct all workmen on the job not to put hand in between rollers, drum and conveyor belt and only pull the belt.
* While laying the belt position persons in the following way
* 2 persons near new bundle to loosen the belt.
* 4 persons to pull the old belt rope side.
* 2 persons to move on either side of conveyor belt to move along with temporary joint to ensure the joint does not get stuck while laying the belt.
* 2 persons that is one near ON/OFF switch and other at tail end for communication while laying the belt.
* 4 persons should pull the belt and after the belt is tensioned on the return side put on the drive.
* Do not keep the drive running for long and ensure that the new belt bundle is getting released.
* Once the laying is over take electrical shutdown of belt
* Remove fasteners of joint, required number of carrying rollers and brackets to clamp the belt.
* Cut sufficient amount of belt to make the joint and use 2 clamps each on either side of joint. Lock clamps of one side firmly to conveyor structure.
* Use pulling and lifting machine to tension the belt and after tensioning put another clamp and lock it firmly to the conveyor structure carrying side.
* Make the joint by vulcanizing.
* After required curing time of belt, remove the clamps and release chain block of GTU. Ensure all clamps from belt are removed and all brackets and rollers put back. Rotate input coupling by hand to countercheck all clamps removed.
* Clear shutdown and start belt in manual mode to take trial.
* Hand over to production.

1. **Work No 2: Jointing belt by hot vulcanizing.**

* Put the belt in manual mode and position the joint of the belt.
* Remove required number of carrying rollers and brackets to clamp the belt .
* Clamp the belt with 2 clamps each on either side of the joint. Incase there is more than one joint for the belt than ensure that the distance between them is not less than 6 metres.
* Start preparing the joint by cutting belt parallel to each other. (Do marking with perpendicular scale).
* Fix the heating equipment and keep for required time.
* After required curing time of belt, remove the clamps and release chain block of GTU. Ensure all clamps from belt are removed and all brackets and rollers put back. Rotate input coupling by hand to countercheck all clamps removed.
* Clear shutdown and start belt in manual mode to take trial.
* Hand over to production.

1. **Work No 3: Changing of conveyor belt drum**

         Remove required number of carrying rollers and brackets to clamp the belt.

         If the belt is having Gravity Take Up (GTU) then take load of GTU using 3T chain block.

         Loosen screw take up to minimum.

         Put 2 clamps each on carrying and return side of belt on either side of the drum to be changed.

         Put sling on shaft on either side of the drum.

         Remove top half of plummer block and lift the drum using chain block or hydra whichever is convenient.

         Check the condition of bearing, sleeve, labyrinth seal and change if required

         Place the new drum in position

         Remove the old grease and replace with fresh grease

         fix the plummer block halves after locking the bearing in position.

         Remove all clamps from belt. Put back all removed brackets and rollers. Also release load of chain block from GTU.

         Clear shutdown and start belt in manual mode to take trial.

         Hand over to production.

**Work No 5: Changing of Gear box**

         Decouple input and output side coupling.

         Put sling for gearbox in holes provided on topside.

         Lift using hydra or chain block whichever is convenient.

         Check the input direction before coupling in case of gear box with hold back system

         Place the overhauled gearbox in position and do alignment.

         Couple input and output side coupling.

         Ensure correct quantity of oil is present in gearbox

         Clear electrical shutdown and start belt in manual mode to take trial.

         Hand over to production.

**Work No 6: Changing of motor**

**** Decouple motor from gearbox.

         Put sling for motor in hook provided on top side.

         Lift using hydra or chain block whichever is convenient as per work instruction

         Place the overhauled motor in position and do alignment.

         Couple motor and gearbox.

         Clear electrical shutdown and start belt in manual mode to take trial.

         Hand over to production.

**Work No 7: Carrying roller/ bracket changing**

* + Barricade the area below if job is at height.
  + Lift belt above roller manually, remove roller and insert new roller.
  + For bracket changing, remove roller and then the bracket. Position the bracket and put back the rollers.
  + Clear electrical shutdown and take trial.
  + Hand over to production

**Work No 8: Working above conveyor belt**

* Before starting the job, cover the belt below with wet gunny bags/welding blanket.
* Incase you are doing gas cutting or welding above belt, than ensure presence of water and fire fighting equipment at job site. Also position 1 person to keep watch on the belt.
* Once the job is completed, ensure that all scrap generated is shifted from site and wet gunny bags/welding blankets are removed
* Clear electrical shutdown.
* Hand over to production.

**Work No 9: Working below conveyor belt**

* Ensure availability of proper covering plate below the conveyor
* Clear electrical shutdown.
* Hand over to production.

**Work No 10: Liner plate changing**

* Before starting the job, cover belt below with wet gunny bags.
* Ensure water and firefighting equipment at job site. If working at height, barricade the area below.
* Shift the new liner plates at desired location as per requirement
* Remove the damaged liner plate by by removing bolts /gas cutting wherever applicable.
* Fix new liner plate with countersunk bolts.
* Ensure that liner plate lower edge is in level with gutter chute plate to avoid material getting trapped and damaging the belt
* Once job is completed ensure that all scrap generated is shifted from site and gunny bags are removed
* Hand over to production.

**Work No 10: Side skirt fixing/adjustment**

* Fix the side skirting plate such that lower edge of the plate is in level with gutter chute plate to avoid material trapping.
* Fix the skirt pads such a way that there is no gap between belt & pad
* Skirt pads to secured firmly by fasteners
* In case of wearing of pads loosen the pad bolt adjust the pads by lowering to desired position & tighten the bolts
* Clear the shut down & take trial

**Work No 11: Scrapper installation & adjustment**

* Fix scrapper mounting bracket as per manufacturers recommendation
* Fix the scrapper & adjust it as per manual & as per requirement
* Clear the shutdown & take trial

**Work No 12: Drive Changeover**

* Decouple output side coupling.
* Check the motor direction of the spare drive
* Couple input and output side coupling of spare drive.
* Ensure correct quantity of oil is present in gearbox
* Clear electrical shutdown and start belt in manual mode to take trial.
* Hand over to production.

**Work No 13: Impact pad installation & changing**

* Loosen the conveyor belt at impact pad location
* Fix impact pad mounting bracket as per manufacturers recommendation
* Fix the Impact pad & adjust it as per manual & as per requirement
* Ensure use of nylock nut for pads
* Clear the shutdown & take trial

**Work No 14: V -plough installation & changing**

* Fix V-plough mounting bracket as per manufacturers recommendation
* Fix the V-plough & adjust it as per manual & as per requirement
* Ensure use of nylock nut for pads
* Clear the shutdown & take trial

**Work No 15: Bearing inspection of conveyor drums**

* If the belt is having Gravity Take Up (GTU) then take load of GTU using 3T chain block to remove load on concerned drum.
* Loosen screw take up to minimum.
* Put 2 clamps each on carrying and return side of belt on either side of the drum wherever applicable to loosen the load on the drum
* Remove top half of plummer block Check the condition of bearing, sleeve, and labyrinth seal and change if required.
* Remove the old grease and replace with fresh grease
* Fix the plummer block halves after locking the bearing in position.
* Remove all clamps from belt. Also release load of chain block from GTU.
* Clear shutdown and start belt in manual mode to take trial. Hand over to production.

**Work No 16: conveyor input coupling checking/changing**

* Decouple input side coupling.
* Check the condition of tyre, side plates and bolts incase of tyre coupling and replace if damaged
* Check the oil level, multidisc, resilient plate ,input/output hubs, spherical collar seats condition and replace if necessary
* Check the alignment between motor and gearbox with dial guage and rectify if necessary
* Couple input coupling.
* Clear electrical shutdown and start belt in manual mode to take trial.
* Hand over to production.

**Work No 17: conveyor output coupling checking/changing**

* Decouple output side coupling.
* Slide the gear hub and check the condition of gears .if gear teeth are damaged replace the coupling
* Remove the old grease and provide fresh grease
* Check the alignment and rectify if necessary
* Couple output coupling. Replace coupling bolts if necessary
* Clear electrical shutdown and start belt in manual mode to take trial. Hand over to production

**Work No 18: conveyor drive v belts changing**

* Loosen the motor foundation and with jack bolts loosen the v belts.
* Remove the belt and replace with new belt
* Do the alignment.
* Clear electrical shutdown and start belt in manual mode to take trial. Hand over to production

**Work No 19: Pulley lagging at site**

* Remove required number of carrying rollers and brackets to clamp the belt.
* If the belt is having Gravity Take Up (GTU) then take load of GTU using 3T chain block.
* Loosen screw take up to minimum.
* Put 2 clamps each on carrying and return side of belt on either side of the drum to be changed.
* Loosen the belt around the pulley to create space.
* Make single phase connection available for grinding of pulley surface.
* Lagging job shall be carried by third party services
* Remove all clamps from belt. Put back all removed brackets and rollers. Also release load of chain block from GTU.
* Clear shutdown and start belt in manual mode to take trial.
* Hand over to production.

**Safety precautions:**

* Take shutdown permit before attending any electrically operated units.
* 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.
* Check no unauthorized personnel are working in and around the compacting box or above compressor and hydraulic room.
* Check all lights/electrical appliances, Ensure proper illumination at compacting station during dark hours. In case of any issues the same should be highlighted to the Production shift in charge.
* Ensure Use of all relevant PPEs. (Safety shoes, safety helmet, Dust mask, safety goggles)

In case of BF gas leakage is detected, immediately vacate the area, along with persons working nearby and inform Production shift I/C of the same.

1. **REFERENCES:**

**7. RECORDS:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Record No.** | **Record Title** | **Maintained by** | **Soft/Hard form** | **Retention Time** |
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