# ACTIVITY: WORKING AT JETTY

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* **Objective** : - Safe and quality maintenance of pump for optimum out put
* **Scope** : - Blast Furnace Accessories
* **Ref.** : - Pumps maintenance manual &

VL/IMS/PID1/MECH/WI/44

* **Responsibility** : - Engineer In charge & Maintenance Fitter on job

**PPE –s to be used :**

 safety Helmet, Safety shoes, hand gloves, safety goggle , and life buoy, safety belt/harness, dust mask and jacket

* **Work No 1**  : Maintenance of Jetty pump
* **Work No 2**  : Changing of pump structure
* **Work no 3** : Submersible tanker filling pump removal and fixing.

# Aspect- impact

Scrap generation Resource Depletion

Oil Spillage Land contamination

Oil traced waste generation Land contamination & Resource Depletion

Fumes Health

|  |  |
| --- | --- |
| Draining of water | Resource Depletion |

**Hazards identified**

**Physical Hazard -** Pressure, temperature, dust inhalation, , congestion, drowning in water

# Mechanical hazard –

* Trapping in between coupling, impeller, guard, dismantled pump and motor, etc.
* Entanglement in between moving parts, guard, coupling.
* Fall of spare parts, rod, slinged items, tools, hammer, wedges etc.
* Fall of person from platform & height.
* Impact of moving/slinged items.
* Injury from slip of pump component while assembly / dismantling.
* Impingement of fingers, hand while fitting assembly of pump, bearing fixing, impeller fixing, flange bolts tightening with spanners.
* Fall of person due to slippery surface in rainy season.

**Electrical Hazard** – electric Shock from welding, electrical cable and machine.

**Chemical hazard -** Fire

**Biological Hazard** - Bee sting

**Human Behavioural aspect of operators**:

Operator nature, alcoholism, casual approach, horse play, use of mobile at workplace, back pain & non usage of PPE?s

# Work No 1 : Maintenance of Jetty pump

1. Take clearance from production department before starting the activities.
2. Ensure full filling of water in other two pump-priming tanks.
3. For priming the tank manually open the manual priming valve, manual air vent & side drain valve. When water is coming from the drain valve it means that tank is full. After filling the tank close the manual priming valve, manual air vent & drain valve.
4. Isolate the tank on which work is to be done. For isolating the tank close all the priming valve & air vent of the tank manually.
5. Take electrical shutdown with LOTO and follow pump-changing procedure.
6. Before starting the job drain the tank water by opening the side inspection door of the tank. There is no need to drain the tank water for alignment job. Open the air vent valve and release the vacuum from inside the tank before starting gas cutting or welding activity.
7. Follow work instruction procedure VL/IMS/PID1/MECH/WI/44 for maintenance of pump
8. For lifting & shifting the pump monorail chain block arrangement is there at the top of the pump. For jetty tanker filling pump, use hydra.
9. After finishing the job take the tank in line & fill the tank as per point no 3.
10. Remove the air from the pump casing by opening the needle valve which is at the top of the pump casing.
11. Then clear the electrical shutdown as per shutdown procedure.
12. Check all the parameters like oil level, gland leakages, flange joint leakage, vibration of pump, current, pressure etc
13. After taking trial give clearance to user department.
14. Carry house keeping as per work procedure VL/IMS/PID1/MECH/WI/91.

**PUMP DETAILS**

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| --- | --- | --- | --- | --- |
| **Description** | **Jetty pump # 1** | **Jetty pump # 2** | **Jetty pump # 3** | **Jetty**  **Tanker pump** |
| **Type** | UP 100/38 | UP 100/38 | CPK NGC 200 – 400 | SP 4L A |
| **Impeller dia** | 370 mm | 370 mm | 365 mm | 292 mm |
| **Discharge (m3/hr)** | 170 | 170 | 440 | 14 L/S |
| **Head** | 40 | 40 | 40 | 20 |
| **Ball bearing** | 6309/C3 – 2 no | 6309/C3 – 2 no | 6411/C3 – 2 no | 6306 DE &  6206 NDE  ZR 2 no |
| **Oil seal** | 65x85x10 | 65x85x10 | 55 X 80 X 10 |  |
| **Coupling** | SW-225 | SW-225 | SWS 295/180 | L-110 |

**LOGIC OF JETTY PRIMING AUTOMATION**

\*\*NOTE - Priming of the all Jetty Pump No 1, 2 & 3 done automatically & operated from the BF 1 control room.

* + When the Jetty pump is stopped the priming of pump begins. Low level is detected by low level switch which opens the priming solenoid actuator valve (50nb) and solenoid air vent. Priming takes place till high level is attained. Once, high level is attained, priming actuator valve closes and pump is ready for start command.

Once, when the start command is given for jetty pump from control room, the following hierarchy is followed

* + Pump can start only when the water level in tank is high, which is sensed by high level switch of selected pump mounted on tank.
  + After the pump senses high level, there is a time delay of about 1 min for selected pump to start.
  + When the selected pump is started discharge valve actuator will get opened.
  + Pump delivers 4.5 kg pressure. If pump is not developing pressure, the pump trips on low pressure in 3 min’s and the jetty pump discharge actuator gets closed.
  + In rainy season the motors of pump no 1 and 2 are removed and kept as water of river rises and motor gets submerged in water.
  + After rainy season is over same to be fitted back and alligned.
  + Motors are removed by chain block 3T/5T or hydra.

# Work No 2 : Changing of pump structure

1. Inform production department before starting the activities.
2. Take electrical shutdown, ask electrical to disconnect the required motor.
3. Remove the pump, motor, discharge line, suction line and priming tank in such a way that two pumps are ready for operation.
4. Replace the structure. Possibly it should be sand blasted for longer life.
5. Take in service the pump, which was removed after changing structure.
6. Check all the parameters like oil level, gland leakages, flange joint leakage, vibration of pump, current, pressure etc.
7. Follow same procedure for other pump.
8. Check grating, hand railing, pipeline support, clamps, etc. and paint.
9. Give clearance to user department.
10. Follow work procedure VL/IMS/PID1/MECH/WI/94 for fabrication, erection & dismantling work
11. Carry house keeping as per work procedure VL/IMS/PID1/MECH/WI/91.
12. Workmen working in suction pipe line should know swimming and should wear life jacket.
13. Life jackets and life buoys are available in electrical control room.

**Work activity no 3: Submersible tanker filling pump removal and fixing.**

1. Take electrical LOTO of pump. Disconnect the cable from junction box so as to avoid snapping while lifting the pump.
2. Put a belt sling on hose pipe connecting pump and with help of hydra crane hold it.
3. Loosen all flange bolts of hose end connecting pipeline before the valve and lift the pump up along with electric cable slowly. Care to take while lifting as it may get stuck in concrete structure of jetty and get damage if lifted.
4. Place the pump besides jetty pump no 3 and check the pump or do maintenance.
5. Once maintenance is done fit the pump in place again by hydra.
6. Take trial and hand over after clearing shutdown.
7. Suction of pump to be cleaned as coke pieces get stuck in impeller before fixing back.
8. Safety belt to be used by person while putting sling on hose to avoid slip and falling in water.care to be taken more in rainy season due to slippery surface.

# DO’s

* Ensure house keeping
* Clear all scraps & unwanted structures from platforms / work area. Use lifebuoy whenever it is required to work in the water.
* Ensure that the people working near water knows swimming
* Ensure monorail trolley is parked at one end and chain properly tied to avoid entanglement on rotating parts of pump
* Report damaged / corroded structures immediately

# Don’t

* Work under the influence of alcohol
* Indulge in the Horse Play

**Amendement Record**

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| **Date** | **Manual Section Ref. & Para** | **Brief details of Revision** | **New Rev.** |
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| --- | --- | --- |
| **Prepared By:**  Area Engineer | **Reviewed & Issued By:**  Management Representative | **Approved By:**  Mechanical Head |
| **Signature** | **Signature:** | **Signature:** |
| **Review Date: 12.12.22** | **Review Date: 12.12.22** | **Review Date: 12.12.22** |