**CONDITION MONITORING IN BF#1/2**

***Objective*:** To develop and maintain a condition monitoring program for critical equipment- in BF1/2 so as to maximize equipment availability and reliability.

**Scope : -** Blast Furnace Accessories

**Ref. : -SP 44** ,WI / MAINT 91

**Responsibility : -** Engineer in charge & workmen on the job

**PPE s to be used:** Helmet, Safety shoes, hand gloves, safety belt, Co monitor, safety goggle,

**Aspect / Impact**

|  |  |
| --- | --- |
| Scrap generation | Resource Depletion |
| Oil Spillage | Land contamination |
| Oil traced waste generation | Land contamination & Resource Depletion |
| Fumes | Health |
| Fire | Air pollution SP 42 |

**Hazards identified :**

**Physical Hazard** -

* Pressure
* temperature
* fall of oil in eyes, ears, mouth
* Explosion while gas cutting/welding

**Mechanical Hazard** -

* Trapping between two objects
* Fall of material, hammer, tools, slinged items, bolts, wedges
* Fall of person from platform,
* Entanglement
* Impact of moving / slinged items, portable tools, chuck,
* Failure of welding hook.
* Toppling of derrick
* Fall of counter weight
* Fall of person through opening of platform

**Chemical hazard** -

* Gas poisoning,
* Fire

**Electrical hazard** -

* electrical shock

**Human Hazards** :

* Alcoholism,
* casual approach of operator
* non usage of PPE?s

***Introduction:***

Condition monitoring of machinery is the measurement of various parameters related to the mechanical condition of the machinery (such as vibration, temperature, oil condition, thickness measurement, current, pressure, flow, etc), which makes it possible to determine whether the machinery is in good or bad condition. By having such knowledge of machine condition, incipient failures can be predicted in advance and maintenance job can be taken up in a planned manner so that it can be carried out efficiently with minimum losses.

***CONDITION MONITORING***

The basic condition monitoring jobs are as follows.

1. Vibration monitoring and trending with IRD.
2. Vibration spectrum and defect analysis with ENPAC; and balancing.
3. Bearing temperature checking with gun.

MC stands for maintenance contractor

The equipment in BF#1/2 have been categorized in to three, based on their criticality as

* Category A equipment: Single line equipment whose breakdown can lead to stoppage of plant.
* Category B equipment: Single line equipment but whose maintenance can be carried out without any significant effect on plant availability.
* Category C equipment: Equipment with spare drive and whose breakdown has no effect on plant availability.

Based on the above mentioned criterion, the equipment- in BF#1 & 2 is been categorized as follows.

***CATEGORY A:***

|  |  |  |  |
| --- | --- | --- | --- |
| ***Sr. no.*** | BF#1 | ***BF#2*** | ***BF#1 & 2 Common*** |
|  | BLOWER 1 | BLOWER 1 | DS ID FAN |
|  | BLOWER 2 | BLOWER 2 | COOLING TOWER FAN 1 |
|  | BLOWER 3 | BLOWER 3 | COOLING TOWER FAN 2 |
|  | BLOWER 4 | BLOWER 4 | COOLING TOWER FAN 3 |
|  | BLOWER 5 | BLOWER 5 | BANDHARA STATION PUMP 1 |
|  | BLOWER 6 | BLOWER 6 | BANDHARA STATION PUMP 2 |
|  | CA FAN 1 | CA FAN 1 | BANDHARA STATION PUMP 3 |
|  | CA FAN 2 | CA FAN 2 | LISBOA PUMP |
|  | HBS ID FAN | HBS ID FAN | NAPOLI PUMP 1 |
|  | BAGHOUSE ID FAN 1 | BAGHOUSE ID FAN | NAPOLI PUMP 2 |
|  | BAGHOUSE ID FAN 2 | LAUNDER COOLING FAN | NAPOLI PUMP 3 |
|  | SDP ID FAN | GCS PUMP 3 | SETTLING POND PUMP |
|  | LAUNDER COOLING FAN | GCS PUMP 4 | DIESEL PUMP FOR FIRE HYDRANT SYSTEM |
|  | GCS PUMP 1 | VENTURI PUMP 1 | JOCKEY PUMP |
|  | GCS PUMP 2 | VENTURI PUMP 2 | MAIN PUMP |
|  | VENTURI PUMP 1 | RETURN WATER PUMP 1 | JETTY PUMP 1 |
|  | VENTURI PUMP 2 | RETURN WATER PUMP 2 | JETTY PUMP 2 |
|  | RETURN WATER PUMP 1 | BAGHOUSE PUMP | JETTY PUMP 3 |
|  | RETURN WATER PUMP 2 | SLAG GRANULATION PUMP 1 | WET SCREENING PUMP 1 PLANT 5 |
|  | SLAG GRANULATION PUMP 1 | SLAG GRANULATION PUMP 2 | WET SCREENING PUMP 2 PLANT 5 |
|  | SLAG GRANULATION PUMP 2 | COOLING TOWER PUMP 1 | PCM RECIRCULATION PUMP 1 |
|  | COOLING TOWER PUMP 1 | COOLING TOWER PUMP 2 | PCM RECIRCULATION PUMP 2 |
|  | COOLING TOWER PUMP 2 | 60 HP Pump 1 | PCM RECIRCULATION PUMP 3 |
|  | BOOSTER PUMP 1 | 60 HP Pump 2 | PCM PIG COOLING PUMP 2 |
|  | BOOSTER PUMP 2 | COOLING TOWER OVERHEAD PUMP | PCM PIG COOLING PUMP 3 |
|  | 60 HP PUMP 1 |  |  |
|  | 60 HP PUMP 2 |  |  |
|  | COOLING TOWER OVERHEAD PUMP |  |  |

***CBM program compliance report***

The following CBM program compliance reports are to be generated *on monthly basis*. Based on the observations from CBM activities, each report should categorize the equipment's in to 3 namely *Good, Satisfactory & Risk.*

The report should contain the details of abnormalities found in the equipment and corrective actions taken. Also, action plan for pending issues to be included.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Sr. No.*** | ***Condition monitoring technique*** | | ***Frequency of report generation*** | ***Format no for report generation*** |
| 1 | VIBRATION | Vibration spectrum analysis report | Weekly | FMT/MAINT/14 |
| 2 | VIBRATION | Vibration spectrum analysis Compliance report | Weekly | FRMT/CBM/VIB rev 1 |

**Amendement Record**

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |