**ACTIVITY: STRUCTURAL INSPECTION**

**Objective: -** Safe work procedure for structural inspection

**Scope: -** Blast furnace & Accessories and contractor shed

**Responsibility: -** Engineer In Charge & workmen at job or external party

**PPE -s to be used:**

* Helmet, Safety shoes, Ear plug, Dust masks, Hand gloves, full body safety harness, and goggles

**Work No 1:** Visual Inspection

**Work No 2:** Ultrasonic Inspection

**Aspect / Impact**

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| --- | --- |
| Scrap generation | Resource Depletion |
| Dust/Fumes generation | Air pollution |

**Hazards identified**

**Mechanical hazard -**

 Trapping of hand between two objects

 Falling of material like hammer, tools, bolts, trolley, cylinder and steel items

 Fall of person from height below 10 meters

 Fall of person from height above 10 meters - 30 meters

 Entanglement of material

* Impact of moving / slung items, overturning / slipping of steel items
* Human behaviour aspect of workmen

 Skidding of person due to poor housekeeping, oil spillage, uneven surfaces, broken bricks etc

 Cut injuries from sharp edges of items

 Hitting of moving vehicles, and machinery in the plant

 Sliding/rolling of the material from vehicle

 Getting hurt because of poor visibility

 Getting trapped due to collapse of stacked material

* Getting trapped / skid material stacked

 Failure of the workmen basket structure, temporary platform

 Fall of person from height due to unbalance from workmen basket, temporary platform

 Trapping of the person between basket and structure

 Scaffold collapse caused by instability or over loading

 Failure of full body harness due to improper clamping, damaged rope, hooking on weak structure

**Physical hazard**

 Burns

 Vehicle emission

 Pressure due to failure of air /hydraulic system

Temperature

**Human behavior: -** workmen nature, alcoholism, casual approach, horseplay & non usage of correct tools & PPE.

**Chemical hazard** –

 Fire & Explosion

* Gas poisoning

**Electrical hazard**

 Electric shock from overhead lines or welding

 Short circuit due to failure of electrical system

 Electric shock from battery terminal

**General guideline**

1. Take work permit from user department
2. Cordon the area where inspection to be carried out.
3. Concerned engineer responsible for the area should be present during structural inspection activity been carried out.
4. In case of any work where rotating equipment is involved, ensure to take the electric shutdown of the machine.
5. Use tested grinders, welding machines, grinding machine, electrical portable units.
6. The engineer should assess the skill of workmen prior to job
7. Refer WI/MAINT/70 for grinding and welding
8. Refer WI/MAINT/91 for house keeping
9. Refer WI/MAINT/69 for use of ladder
10. Refer WI/MAINT/25 for usage of hand tools
11. Refer SP45 for work permit & electrical shutdown
12. Gouging and grinding has to be carried out in such a manner that persons working nearby are not affected.
13. Full body safety harness should be worn & hooked to a good structure to work at height
14. Fall arrestor, steel wire rope life line has be used as safety to work at height (engineer to review where ever applicable)
15. 24 v Hand lamps used should be used to avoid electrical shocks.
16. Proper illumination to be provided wherever there is poor visibility.
17. All hand operated tools should be provided with proper earthing.
18. Workmen basket/cherry picker should be used wherever the approach is not present.
19. Wooden planks in suspended platforms etc should be inspected for cracks, splits, burns, or other damage. Ropes used for suspended platform should be inspected frequently for cuts, wear, bums, or other unsafe conditions:
20. No material should be thrown / dropped from height
21. Certified Ladders may be used for climbing to heights. The ladder should be secured properly
22. The men should be advised to clean their shoes of mud, grease, oil or other slippery material before climbing a ladder or going on steel or a planked floor, so that they will not slip or drag slippery material for other to slip on.
23. Tools or material should not be carried while climbing though ladders
24. Workmen executing the jobs should be aware of the fire fighting procedure. They should know the emergency telephone number of plant
25. Proper housekeeping should be done after completion of the jobs.

**Work No 1:** Visual Inspection

**Objective: -** Visual Inspection of structure

**Scope: -** Blast furnace & Accessories and contractor shed

**Responsibility: -** Engineer In Charge & workmen at job or external party

Procedure:

* Electrical shutdown or work permit to be taken to carry out any work electrically driven machines
* In case of any work where rotating equipment is involved, please ensure that the machine is under shutdown or the job is carried out in the presence of the concern engineer
* Clean the required structure to be inspected properly and do chipping of the structure if required..
* Check for the condition of paint and corrosion effect at the surface where pilling of paint has taken place
* Check for the level of corrosion taken place on the surface of the structure
* Check the foundation plate, base plate and the condition of bolts.
* Check for the welding joints of the two members and cracks present if any.
* Check for the sagging or bending effect of the structure, column etc.
* Visual inspection points of the structure to be noted and observations to be identified as high or low criticality.
* Recommendations for the said observations to be noted along with the details of the area.

**Work No 2:** Ultrasonic testing of structure

**Objective: - Thickness** checking of the structure

**Scope: -** Blast furnace & Accessories and contractor shed

**Responsibility: -** Engineer In Charge & workmen at job or external party

Procedure:

* Electrical shutdown or work permit to be taken to carry out any work electrically driven machines
* Ensure that the grinding machine is certified by electrical department.
* In case of any work where rotating equipment is involved please ensure that the machine is under shutdown or the job is carried out in the presence of the concern engineer
* Surface area of the structure to be identified where thickness needs to be checked. Cleaning of the area to be done if required with use of wire brush.
* Make use of grease for checking of thickness with ultrasonic thickness machine.
* Details of the readings taken to be noted and cross checked with the original thickness of the structure from drawings.
* At any point thickness of the structure should not be less than 25% of the original thickness.
* Recommendations for the said observations to be noted along with the details of the area.

**Don’t**

* Use mobile phone

**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** |