**WORK INSTRUCTIONS FOR\_** **REFRACTORY WORK IN SLAG DRIER PLANT**

* Objective : - Maintaining healthiness of Refractories in Slag Drier burner area.
* Scope : - Slag Drier plant
* Responsibility : - Operation In-charge, Engineer in charge & workmen on the job

PPE to be used : Helmet, safety shoes Dust mask, hand gloves, safety belt, and complete sealed goggles, CO monitor, safety over coat Face shield

* Activity No 1 : Slag drier plant burner refractory repair

**Aspect – impact**

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| Dust generation | Air pollution |
| Scrap generation | Resource depletion |
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| Oil spillage | Land contamination & Resource Depletion |

**Hazards identified**

**Mechanical**

1. Fall of bricks, steel, hammer, etc. on human body
2. Trapping in between objects.
3. Impact due to object, bricks
4. Snapping of wire rope of slings
5. Tripping of person with compressed air hoses
6. Fall of flange and plate while fixing
7. Failure of hoist and slings
8. Collapse of checker layers
9. Back Pain due to sudden or heavy load like checkers, castable bags.
10. Fall of person inside combustion chamber
11. Fall of person from platform, staircase
12. Failure of platform due to overloading
13. Failure of rope / sling of 5 T hoist
14. Flying of coupling of fan

**Physical**

1. BF Gas inhalation
2. Hot surface
3. Dust
4. Splashing of castable, mortar into eyes
5. Heat
6. Burn injury due to hot exhaust from fan discharge
7. Strain due to carrying heavy weight.

**Electrical**

* 1. Electrical shock
  2. Improper illumination

**Behavioral Hazard:**

1. Workmen under influence of alcohol
2. Violation of procedure
3. Not wearing PPE’s
4. Not concentrating while operating hoist
5. Using mobile while working

**Entering into Kin is confine space activity (REFER CENTRALISED CONFINED SPACE ENTRY SOP-VL/IMS/VAB/SP44 Y).**

Confined Space Checks before job start up:

1. Before Entering in Confined Space ensure –
2. Inside temperature should be less than 40°C
3. CO Level should be 0 ppm
4. Attendant must ensure proper illumination, if illumination not found ok, he must inform concern electrical person to provide hand lamp or halogen.
5. Take the work permit from production-in-charge, Safety, electrical, mechanical for entering Confined Space.
6. The workmen (Entrant) who is trained and certified by SBU Head and having valid confined space gate pass should perform the activity and he can be replaced(in emergency) only by certified entrant .
7. A standby (attendant) who is trained and certified by SBU Head and having valid confined space gate pass should perform the activity and he can be replaced(in emergency) only by certified attendant .
8. Standby person who shall be positioned outside the confined space , must have no other duties other than monitoring people and conditions inside the confined space and coordinating with rescue personnel (he must have contact number of rescue team members) if required.
9. Standby (Attendant) person has to log down the In/Out entry of all entrants and ensure that entrant should be come out after 30  minutes from confined space for normal jobs.
10. In some cases In/Out time may be relaxed /extended based on the risk involved in the particular confined space.
11. Check Internal atmosphere of the space for sufficient oxygen content (19.5% to 23.5 %) flammable gases and vapours, and the potential for toxic air contaminants by the use of multi gas detector, if required use pump with extension before entering. If there is any deviation, do not enter into confined space.
12. Check for the presence of Chemical asphyxiates such as Carbon monoxide (CO gas detector).It should be 0 PPM
13. Check inside temperature and it should be is in the tolerable range (25°C to 40°C). If the temperature is not within limits then appropriate ventilation to be used to normalize the temp.
14. Check for suitability of equipment that is used at the confined space.
15. Check any dust due to which visibility is reduced or respiratory tract is irritated.
16. The sign-in and sign-out of all persons entering into confined Space should be recorded.
17. Use 24V DC supply illumination to avoid electrocution/electric shock.
18. Cutting or welding jobs inside the confined space should be carried out after checking for any explosive environment (LEL should be <10%) and by providing localized suction or heavy duty exhaust systems to prevent accumulation of gases inside the space.
19. Isolation of related equipment of respective confined space with personal LOTO lock to be ensured.

Please note that this area is considered as Confined Space so needs to maintain the checklist of the activity. All in time and out time details of entrants, levels of gases to be logged in checklist (yellow copy) or in any alternate document and to be documented.

***Role of Rescue Team***

***As the work is being carried out inside confined Space, in an emergency victim can be taken out by use of rescue apparatus such as stretcher. However attendant should call ambulance which is fully equipped. However rescue team members should take a charge of the situation.***

**Activity No 1 : Slag drier plant refractory repair**

* 1. Ensure proper isolation & confine work procedure.
  2. Refractory work to be done as per OEM design.
  3. Castable mixing to be done as per standard practice and OEM recommendation or guidance from concern in charge.
  4. SS anchors to be used in areas where old anchors are damaged.
  5. Aluminum grating can be used for proper standing inside burner area while working on top part.
  6. After refractory repair/ casting 04 hrs. setting time is required.
  7. Subsequently 04 Hrs. heating at ~ 150- 200°C required before put into operation.

**DO**

1. Use 2 CO monitors every time. People working inside should carry at least one CO monitor.
2. Maintain good house keeping
3. Take shutdown of all valves & mechanically lock
4. Check hoist for proper rope winding
5. Provide CONFIEND SPACE ENTRY training to workmen.
6. Use 24V AC supply hand lamps.

**DO NOT**

1. Throw bricks down
2. Use of mobiles while working
3. Overload the platform / hoist.
4. Urinate from stoves.
5. Use Nylon socks or clothing
6. Carry flammable liquid/lighters in the stove

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| **Prepared By:**  Head – Production PID I | **Reviewed & Issued By:**  Management Representative | **Approved By:**  Head – Pig Iron Division |
| **Signature:** | **Signature:** | **Signature:** |
| **Date: 10.07.2023** | **Date: 10.07.2023** | **Date: 10.07.2023** |

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