**WORK INSTRUCTIONS FOR** **SLAG GRANULATION & CLEANING OF PIT (BF1 & BF2)**

**Responsibility: Furnace In charge/Foreman/ Sr. Tap hole operator/ Tap hole Operator**

**Identified Hazards:**

1. Fall of a person in to the chamber
2. Contact with hot water
3. Contact with steam & fumes
4. Non use of PPE
5. Improper house keeping
6. Inadequate local lighting
7. Burns due to contact with hot water fumes.
8. Electric shock
9. Flying of hot slag due to improper granulation
10. Impaired vision due to glare of hot slag
11. Entry of hot metal in slagpit
12. Fall of person into the pit
13. Sharp edges of metal plates
14. Loader tyre burst during pit cleaning

**Significant Aspect**:

1. Usage of water
2. Generation of fumes
3. Vehicle emission
4. Spillage of slag

Procedure:-

1. Unauthorized operation or repair of any equipment is a punishable offence.
2. Furnace Incharge /Foreman/Sr.Taphole operator/Tap hole operator ensure that the slag granulation tank is full with water before opening the cast. Preferably water from S pond or Settling pond or lastly Jetty should be used for filling up the tanks depending upon the availability. . Ensure tanks are not overflowing.
3. Furnace Incharge/Foreman/Sr.Taphole operator should ensure that the slag runner is properly made with sand & spout is made up with hydrous clay.
4. The emergency launder and the area in front of the emergency launder should always be kept ready for diverting the slag in case water gets over or the power failure occurs or in case of viscous slag(cold furnace).
5. Furnace In charge/Foreman/Sr. Taphole operator/tap hole operator before opening the cast should see that the wheel loader has cleaned the slag pit & proper barricading/dam at the slag pit entrance is done incase breakdown of slag grab.
6. Board displaying 'Work in Progress' should always be kept on the both stop push button in control room when the granulation pumps are not running.
7. Furnace In Charge/Foreman/Sr. Taphole operator should ensure that the pump is not running during cleaning of slag pit by wheel loader or by slag grab. Main valves also can be closed.
8. Before opening the cast, Furnace In charge/Foreman/Sr. Taphole operator/ tap hole operator should ensure that wheel loader, slag grab bucket or any person is not working inside the slag pit and barricading chain in BF2 and slag dam in BF1is in place at the entrance of the slag pit and also ensure that no person should work outside the slag pit dam area
9. Furnace In charge/Foreman/Sr. Taphole operator / tap hole operator should take load clearance from the electrical dept. through control room engineer for starting the pump if there is load restriction.
10. When the slag comes in the main runner Furnace In charge /Foreman/Sr. Taphole operator/tap hole operator should instruct control room engineer to remove the board 'Work in Progress ' & start the pump.
11. No person should be allowed to go inside the slag pit when the granulation of slag is on.
12. No person should attempt to cross the slag runner when the granulation is on.
13. If cast runs for long time & water gets over Furnace In charge Foreman/Sr. Taphole operator/ tap hole operator should instruct the taphole operator to divert the slag to emergency launder. He must open the water sprays provided in the E.L. area.
14. Whenever there are water draining issues/problem utmost care to be taken to ensure that the pit does not overflows (hot water – causing injury to person) by either stopping the pump or reducing the water flow/level and diverting the slag to EL if required.
15. Furnace Incharge Foreman/Sr.Taphole operator / tap hole operator should check the adequacy of the water sprays provided in E.L area, before Opening the cast.
16. In no circumstances person should be allowed to go inside the granulation hood when the slag granulation is on.
17. Close the cast after draining the furnace, Lower the slag dam so that minimum slag enters the ladle.
18. After closing the cast, back flush the screen by full opening screen valve & closing main valve to ensure water drains from the pit.
19. Care to be taken by any person working in this area regarding rusted, sharp edges of the structure/metal plates due to the corrosive atmosphere at this location.

**Cleaning of choked slag pit screens by Water jet or Bamboo**

1. In cases wherein the slag gets solidified on the screen resulting in choke screen and when it is not getting cleaned by back flushing, cleaning is attempted from the opposite side i.e. EL area/platform.
2. The person engaged in the activity will use the water spray directing it into the choked screens by standing on the EL platform.
3. Care should be taken that the slag grab crane is not in operation and person involved should not position oneself across the pit side plates,
4. Spraying should be done from slag spouts platform and from location where there are no side wall plates.
5. In cases where slag is not falling by the water jet a long bamboo is taken and end is hit directly onto the screens for the slag to fall and clear the choked screens.

**Cleaning of choked slag pit screens entering into Pit**

1. If water draining issues of slag pit are faced due to choked slag pit screens then cleaning of choked screens manually must be carried out.
2. Pit must be emptied to maximum possible extent of slag and water and a bed of granulated slag must be made on the screens side.
3. After ensuring all water is removed from the pit, a granulated slag bed of about 200-300mm height is made in front of all screens along the length and wooden planks or roof sheet should be placed on the slag bed so that the person cleaning the screens does not come in contact with slag or minimum residual water in the pit.
4. The bed made must be checked for compactness manually by prodding with pawda by the person and confirmed by all undertaking the activity before any person steps on the freshly prepared slag bed.
5. Gate valves of slag granulation water lines to the spray box and side screen sprays must be closed/ isolated by LOTO.
6. Slag granulation pumps electrical shutdown should be taken.
7. The furnace in charge or responsible person carrying out the activity should ensure that the pit screen cleaning activity is not carried out during tapping or if slag of a running cast is taken being taken in EL.
8. The persons cleaning the screens should work for a maximum time of 30 minutes.

|  |  |  |
| --- | --- | --- |
| **Prepared By:**  Head – Production PID I | **Reviewed & Issued By:**  Management Representative | **Approved By:**  Head – Pig Iron Division |
| **Signature:** | **Signature:** | **Signature:** |
| **Date: 15.07.2022** | **Date: 15.07.2022** | **Date: 15.07.2022** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Amendment Record** | | | |
| **Revision date** | **Manual Section ref. and para** | **Brief details of revision** | **New Revision No.** |
| 12.07.2021 | Procedure for slag granulation (BF1 &BF2) | Point no,3 | 10 |
| **21.01.2022** | Procedure for slag granulation (BF1 &BF2) | **Cleaning of choked slag pit screens by water jet or bamboo** | **11** |
| **15.07.2022** | Hazard no.14 added |  | **12** |