**WORK INSTRUCTIONS FOR** **LANCING OPERATION (BF1 & BF2)**

**Responsibility: Furnace in charge / “Tap hole” operator**

**Identified Hazards:**

1. High Pressure in the oxygen line
2. Fire & Explosion in the Oxygen line
3. contact with hot metal /slag during lancing
4. Nonuse of PPE & WI
5. Improper house keeping
6. Inadequate local lighting
7. Not shifting people from the PCM platform or PCM tail end before starting the lacing operation
8. Dust
9. Backfire while lancing
10. Bending while lancing//Muscular strain
11. Rolling down of oxygen trolley
12. Fall of trolley during transportation/positioning
13. Entanglement with loose lancing pipes
14. Bursting of Lancing hose pipe
15. No coordination between the person lancing and the one who opens the oxygen valve

**Significant Aspect:**

1. Generation of fumes
2. Generation of heat & dust

Oxygen source for BF1 & 2 shall be supplied from O2 PSA generator installed at PCI area at 5 bar g pressure and as alternate standby trolley shall be kept ready to use.

In the beginning of the shift mud gun operator should check the oxygen pressure from O2 PSA generator is available for lancing application or alternate in oxygen trolley as a standby. In case no trolley available he must bring oxygen cylinders from the stock yard to the oxygen bank with the help of wheel loader after proper securing to avoid rolling of the cylinders. All cylinders which are in use and all empty cylinders from the bank should be stacked properly and secured by chain or rods in the area demarcated to prevent them from getting dislodged. Mud gun operator with the help of the shift fitter should connect the filled cylinders in the bank and secure them properly with chains provided for the purpose.

In case oxygen trolley is available then the same may be connected to the oxygen header. Disconnect it after ensuring trolley cylinder pressure has dropped below 50 Kg/cm2 or less.

1. Before starting the lancing operation furnace in charge should ensure that there are no personnel on the PCM platform, ladle placement area, on EOT crane and near desulphurization unit of BF2. Inform the PCM Engineer about the lancing activity.
2. Unauthorized operation or repair of any equipment is a punishable offence
3. Ensure that the personnel involved in the activity should use safety appliances viz. safety helmets, safety shoes, hand gloves, safety goggle, leg guard, woolen Patti, full sleeve cotton/jean shirts and tap hole operators should wear safety overcoat & helmet with screen while lancing
4. Handle for operating the oxygen valve in cast house should not be kept in position (in case of ball valve) and use only when it is required.
5. Furnace in charge or tap hole operator should operate the valve at the time of lancing, Oxygen pressure should be controlled by the person opening the valve in coordination with the person carrying out the lancing operation, to facilitate proper lancing. Activity should be carried out keeping the safe distance from the main runner to avoid burn injuries.
6. Start lancing only after indication on pressure gauge is shown. One pressure gauge has been provided at trolley connector head also.
7. Oxygen pressure should always be monitored during lancing process.
8. Cylinders connected at bay (all 4) needs to be opened all together to avoid pressure drop and backfire during lancing and to maintain pressure in line.
9. Before keeping the lancing pipe into the tap hole, oxygen should be opened to avoid back fire. Flush the line before inserting the pipe into the tap hole.
10. Ensure that, the lancing holder is kept away from the body, while lancing.
11. Ensure operator doesn’t place his hand on the holder opening during lancing, to avoid burn injury due to backfire.
12. Burnt lancing pipe should be kept separately and sent to the mechanical (if length is more than 2m). Workshop on 27m level.
13. Ensure that loose lancing pipes are not kept on walkways.
14. The condition of the lancing hose & holder should be checked by Furnace- in-charge once in a shift. Ensure the spare set of lancing hose and holder in working condition all the time.
15. If any external damage in the line is noticed, the same should be immediately intimated to mechanical engineer concerned for replacement.
16. After the job is completed, the hose should be coiled and kept in its proper place.
17. Ensure that the crimped oxygen hoses with the end connector are only in use.
18. Ensure that the hoses are replaced once in every 06 months. (Record maintained by mechanical/ operations.)
19. Ensure oxygen supply to lancing pipe is not abruptly closed.
20. Normal operation O2 PSA generator shall supply & inject O2gas at HBS i.e., outlet of Bf1 blower along with steam & only during lancing of tap hole at BF1 or Bf2 time, HBS valve should close automatically or if required shall be closed by manually.

**Care to be taken in oxygen trolley use:**

1. Oxygen trolley should be transported to site on even surface road and parked on level ground to rule out any chances of toppling on side
2. Pressure regulator installed between trolley & lancing station.

2. After trolley is disconnected from tractor it should be ensured that the locking pin of the tractor jacking leg is rested on the ground in vertical position and locked so that the trolley does not move when resting on the ground. The person who is engaged for locking and disengaging the bolt of the tractor/ trolley should stand away from the tractor and stand more towards the trolley to avoid getting struck by the tractor in case of any tractor movement.

3. There is no need of fitting of stopper for the trolley after parking it as it is always parked on a locked jacking leg always tilted slightly downwards the jacked end.

4. In case of abnormal furnace condition it is be ensured that the oxygen trolley with cylinders is covered with a roof sheet to avoid coke falling out from bleeders onto the cylinders in case of furnace slip.

5. Always ensure that there are no oxygen leakages from cylinders or the lines when receiving the trolley or when it is connected for use. Leakages if any should be arrested.

6. Ensure that the pressure gauge mounted on the trolley is in working condition.

7. Ensure that the trolley pressure is minimum 100 bar when receiving a new trolley at site and minimum when it is sent back for refill.

8. Ensure that cylinder key fits in all the spindle valve heads and it does not slip at the time of opening valves.

9. Ensure that only one trolley is opened at any given time. Changeover to be done only after one trolley is empty.

10. Ensure that the pig tail lines on trolley discharge end are not held with bare hands or human body comes in contact with the line when oxygen is opened to avoid frost bite.

11. Ensure that flashback arrestor at header is in place at all times.

12. Ensure that hose connecting the trolley is in good condition to avoid rupture on sudden release at high pressure oxygen from trolley.

13. Ensure that full trolley is always parked at designated locations in furnace area. If any change in location will be done, then prior intimation/ permission may be taken from

HOD –Production.

14. Hose has to be replaced within six months. (Or before depending on its condition).

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