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|  | **VEDANTA LIMITED –**  **VALUE ADDED BUSINESS** | **Format No.:** | **FRMT/MR/10** |
| **INTEGRATED MANAGEMENT SYSTEM** | **Revision Date:** | **10.07.2022** |
| **HAZARD IDENTIFICATION** | **Revision No.:** | **03** |
| **Page No.:** | **1 of 1** |

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| **Departmental Use Only** | |
| **Revision No: 02** | **Unit: PID1** |
| **Revision Date: 10.07.2023** | **Dept.: Production** |

A. Work activity information

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| **Sr.No.** | **Details** | **Remark** |
| 1) | Task being carried out, their duration and Frequency: | Drilling machine operation  Every 1 to 1.5 hr  12 casts per day |
| 2) | Location (s) where the work is carried out. | BF-Cast house |
| 3) | Who normally/occasionally carried out the task? | Company employees, & supervisors |
| 4) | Who else may be affected by the work (For example visitors, subcontractors? the public) | Maint. Staff, contract labours & Visitors |
| 5) | a) Has the personnel trained for performing the task  b) Any special training required | Yes  No |
| 6) | Is the written systems of work mandatory? If yes state, the procedure no. | VL/IMS/PID1/PROD/WI/08A |
| 7) | Is the work permit required for the task? | No |
| 8) | Plant and machinery that may be used:  Eg : crusher, conveyor, crane, heavy earthing equipment, Truck etc, | Drill machine |
| 9) | Any electrically operated hand tools are used | NIL |
| 10) | Manufacturers or supplier’s instructions for operation and maintenance plant machinery and powered hand tools are available or not: | NIL |
| 11) | Chain block, tools and shackles such as wire rope, hydraulic jack etc are used. | No |
| 12) | What materials are handled? Size, shape, surface character and weight of materials that may be handled: | Liquid metal & slag |
| 13) | Is the material is required to be moved by hand. If yes Distance and heights of the place where materials have to move by hand. | NIL |
| 14) | Services used Eg: compressed air, oxygen, acetylene,  LPG gas, hydraulic oil, welding electrode for welding | NIL |
| 15) | Physical form of substances encountered during the work (For example fume, gas, vapour, liquid, dust/powder, solid): | Liquid metal & slag. |
| 16) | Content and recommendations of safety data sheets relating to substances used or encountered:  (this is applicable in case of chemical material) | NA |
| 17) | a) Relevant acts, regulations and standards relating to the work being done, the plant and machinery used, and the materials used or encountered:  b) Is the activity is reviewed for compliance to statutory requirement | Factory Act  Yes |
| 18) | What is the data (s) required to be monitored during the activity and the frequency of monitoring? | Dry and wet bulb temperature of the  Working environment |
| 19) | Any information available from within and outside the organization on incident, accident and ill health experience associated with the work being done, equipment and substances used: | Yes |

2. From the above activity information hazards are to be identified and recorded below using Appendix 'A' of SP/41

1. On 25.12.07 in BF#2-cast house, Sajjan Pillay workers, came in the swiveling area of drill machine while it was moving, the machine touched his buttocks.
2. Recently at KCM – KIBU-1 Shaft, a contract employee met with an accident and succumbed, on 24th March-2014 at 23.00 hrs, victim (Drill Rig Operator) along with his colleague are engaged in drilling of slyping holes in the 3700mN connection crosscut to ventilation drive using boomer number 282-01. In the process of drilling, the machine has developed an oil leak on the percussion. In order to verify the oil leak, victim went in front of the machine to show the artisan where the leak was, during the process inadvertently the Lock Out Cylinder broke, causing the boom to swing which struck victim’s chest and injured him Fatally. (Investigation is in process).

It is advised to all sites that they shall review their existing practices to ensure the following:

1. Never allow personnel to stand in the area between the drilling compartment and the zone being drilled.

2. A person can only go and examine the drilling zone when the machine is switched off and the operator had permitted him /her.

Process of conducting periodic “Task Audits” to understand the deviations against SOP’s

1. 28th June 2014 In Bf1 while closing cast no 7862 Drill machine swivelling metallic pipe got burst and heavy oil got splashed. Luckily Oil got splashed on machine only and not in runner. No fire catched on machine. metallic pipes of D/M require to change.

Probable Causes: • Coming in contact with the 5T cast house crane hook when the drill machine is in parked position. • Due to external force or fall of some heavy object on the pipe.

CAPA.: Avoid usage of 5T hoist over the drill machine when the machine is in resting position. Usage of 3T hoist for runner cleaning to be initiated. Providing a plate guard over the MS pipes to protect from external impact/load. Usage of detachable platform provided behind drill machine to be used for checking tuyere no.8 or opening the flanges of tuyere no.8. Problems related to loading the pipe to be explained to both production and maintenance workmen and cast house engineers.

1. On 27-6-2014 at around 12.15 pm maintenance fitter prior to changing the drill bit removed the key of the drill machine. But the machine was still in on condition while the key was removed  
   Cause: Wear & tear of the locking levers of the lock causing key to come out without switching it off  
   CAPA: Providing high quality of locks from which key cannot be removed without switching off the lock. 2. Checking the condition of the lock during every shift.3. Providing a parallel arrangement near drill machine so that fitter doesn't have to climb the staircase to remove the lock. 4. Training the cast house engineers, operators and mechanical fitter regarding the changes done on the control panel of the drill machine and mudgun.
2. On 27th May 15, In Bf1 cast house, while drilling 3rd cast, air hose of drill machine came out from nut and hose started wobbling due to air pressure. Immediately valve was closed. No one got hurt.

Cause: Hose getting loosened during vibration hammering Constraints in checking the hose tightness

CAPA: Provide connector to the scavenging assembly and extend the hose

Additional Locking chain on hose

Clamp to be provided at the top end of the hose.

Check hose with cam lock arrangement.

1. 5th May 2016 at around 20:25 pm at BF 1 after opening the cast while rotating drill for removing, drill bit twisted and failed at welding joint and drill hit on the waist of baiganath tudu of Mahadev Gawas which resulting into minor abrasion.

CAPA: 1. Weld joint to be avoided within 1.5m from the tip of drill bit pipe.

2. Opening of tap hole on drill bit should be avoided as far as possible.

3.Explore the possibility of providing provision of lowering and raising of drill machine boom.

4. If at all there is a bend/twist in the pipe in front of the face plate hole then the pipe to be removed from the shank manually by spanner

5. Solid rod to be used for poking in case manual poking is not effective.

6. Ensure, other workmen in cast house at far end/ back side while doing reverse operation of drill bit.

1. On 31.03.2019 At 21:30 hrs while removing jammed drill bit using spanner from the drill machine, spanner flew and hit Mr. Rajesh Paste [ Furnace in charge] forehead above right eye. He was standing near consumable storage area. He was immediately sent to dispensary and further refereed to Vision Hospital at Mapusa.

CAPA: 1)    Each improvement initiative to be reviewed with documented MOC

2)  Responsibility matrix to be clearly defined for each activity

3) Drill bits to be removed manually only after isolating the drill machine and not by hydraulic energy

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Root cause:

Requirement of MOC not highlighted during trails of initiative at site/ team of the month review session.

CAPA:

1) Each improvement initiative to be reviewed with documented MOC

2) Responsibility matrix to be clearly defined for each activity

3) Drill bits to be removed manually only after isolating the drill machine and not by hydraulic energy.

1. On 20.08.2019 it was reported that during night (C-Shift) in BF-02 Cast House around 14:00 hrs drill bit pipe was detached from joint while removing drill bit by hammering & flew over control desk cabin & hit the glass screen result in shatter, no one was injured.

Root cause:

1. Violation of SOP (VL/IMS/PID1/PROD/WI/08A – hydraulic drill machine operation, line 5) by rotating of drill pipe bend away from face plate

CAPA:

1) Briefing to all cast house workmen regarding the incident and SOP

2) SOP and HIRA revision of drill machine operation

3) Fiber glass/impact resistant cabin glass to be used for drill machine & mud gun operation cabin/ a mesh protection to the glass.

1. On 26.06.2020 at around 15:00 hrs while changing the drill bit from drill machine Mr Ramchandra Mandal belong to Vaaman Engineering got cut injury to his right-hand index finger. He was immediately sent to PIP dispensary for first aid and after first aid refer to public health Centre Sanquelim where he was applied four stiches. Person resumed work after medical treatment. He was wearing all require PPE.

Root cause:

IP was claiming that he was wearing hand gloves while doing but could not be confirmed due to non-availability of any eyewitness or video footage at site, but circumstantial evidence suggest that the IP was rotating drill bit pipe for disengaging from shaft by his right hand at blade tip end, instead of rotating the pipe at the middle. Suddenly, Drill bit pipe got disengaged from shaft end and IP wasn’t able to hold drill bit pipe. IP right hand index finger got pinched between face plate and drill bit pipe blade.

Contributory causes /circumstances

Incorrect practice of removing drill bit pipe

CAPA:

Re training of workmen on removing drill bit pipe and incorporating the same in SOP

2. Providing Cameras in critical area to instill discipline

**Hazards identified**

1. Contact with hot metal& slag
2. Fall of Person
3. Impact with drill machine
4. Human Behavior -Nonuse of PPE &WI
5. Human Behavior -Improper house keeping
6. Inadequate local lighting
7. Misjudgment of swiveling area of drill machine
8. Hose pipe bursting & fire.
9. Cleaning of sand from the runner during drilling operation
10. Viewing whether tap hole drilling is straight or not by stepping on the skimmer plate.
11. Slipping on Oil spillage
12. Flying of red-hot drill bit if it is rotated in red hot condition.
13. Bursting of hydraulic oil pipes
14. Panel remaining ON even when key is removed
15. Hit of spanner while removing from drill machine
16. Fall of Material
17. Human Behavior -Use of non-standard tool
18. Power trip during drill operation

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| **Prepared By:** | **Reviewed By:** |
| **Signature:** | **Signature:** |
| **Review Date: 10.07.2023** | **Review Date: 10.07.2023** |