# ACTIVITY: Saturator and drip pot pipe changing in gas cleaning system

* Objective : - Safe Saturator cone and drip pot pipe changing in gas cleaning system for optimum output and Quality job during relining
* Scope : - Gas Cleaning System
* Ref. : - VL/IMS/PID1/MECH/WI/15, SP 44 & SP 45
* Responsibility : - Engineer In Charge, operator & workmen

**PPE –s to be used:**

Safety Helmet, Safety shoes, Dust masks, Hand gloves and safety goggles,full body safety harness (working at height)

**Aspect – impact**

Scrap generation Resource Depletion

Draining of water Resource Depletion

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| --- | --- |
| Fire | Air pollution SP42 |
| Explosion | Air pollution SP42 |

Usage of LPG / oxygen Resource Depletion

Fumes of welding Air pollution & health

**Hazard Identified**

# Mechanical hazard

1. Impact of material while shifting outside main column
2. Falling of material from height
3. Trapping of hand between the structures.
4. Failure of lifting tools and tackles
5. Fall of Person from Height

6. Failure of the lifting / guiding manila rope.

7. Impingement of fingers, hand while fitting assembly of drain pipe, flange bolts tightening.

8. Impact of moving/slinged items.

# Physical hazard

1.Pressure of water

2.Congestion

3. Temperature (hot water).

4. dust inhalation

**Electrical hazard**

1. Shock while welding, electrical cable

**Human Behavior aspect of operators**:

Operator nature, alcoholism, casual approach, horse play, use of mobile at workplace, back pain & non usage of PPE?s

# Chemical Hazard

1. CO gas poisoning.
2. Fire
3. Explosion while gas cutting and welding activity.

**Biological Hazard** - Bee sting

1. Take clearance from production and work permit for the starting of the jobs on Gas cleaning system. Ensure that the saturator water seal is broken and saturator drip pot water is emptied.
2. In order to remove the saturator drip pot the side wall (27 mt sides) requires to be broken. Follow work instruction VL/IMS/PID1/MECH/WI/22 for civil jobs
3. Gas cut the drip pot (1000 mm dia) bottom portion above inspection doors up to 1 m height for the easy removal of external pipe.
4. Ensure that before starting gas cutting operation all the inspection doors of the saturator are opened and proper steam purging is been done from production.
5. Dis-engage drip pot internal pipe from the 300 NB bottom valve by removing the flange bolts.
6. Remove all the bottom drain valves (250nb and 200nb) before removing out the drip pot bottom pipe.
7. Bottom portion of drip pot to be removed out with the help of certified 3T/5T chain pulley block and hook attached to the portion of drip pot. Pull the drip pot portion out of the basin by slowly pulling the same with chain pulley block.
8. For removing of the top portion of drip pot use two chain blocks on two opposite sides of drip pot on top tied to the hooks welded to it.
9. Remove the horizontal support of the drip pot after confirming that the load is resting on both the chain blocks. Follow procedure SP 44 for gas cutting.
10. Slowly lower the drip pot by operating the chain pulley block simultaneously. Use chain pulley block mounted in horizontal position to remove the drip pot out of the basin.
11. Rest the removed drip pot horizontal on ground and shift the same for repair with the help of hydra. Ensure that the drip pot is properly balanced while lifting of the same.
12. For removing of the saturator cone follow below procedure after drip pot is removed.
    1. Use two no chain pulley blocks to support the saturator cone from top. Check the welding of hooks provided on saturator cone for any cracks or deformation.
    2. Remove all the horizontal supports provided to the cone on main column beams.
    3. Remove all bolts (M20) on cone flange by gas cutting of the same. Ensure that before gas cutting operation to begin all the inspection doors related saturator are opened.
    4. Lower the cone slowly by simultaneously operating both the chain pulley blocks.

Ensure that cone is not getting deflected due to the side columns and bracings.

* 1. Before lowering the cone ensure that bottom area is completely barricaded with no access to any manpower.
  2. Rest the cone in the basin. Remove the bottom side support and bracing of main column in order to remove the cone out for repair. Use hydra for the shifting of cone for repair.
  3. Follow same procedure as of lowering for the lifting of cone for fixing of the same.
  4. Ensure that at least three rounds of gasket rope provided for the flange on cone side.
  5. While matching the flanges ensures that the gasket rope is not deformed in any position.
  6. Tighten the bolts and check for the leakage if any.

1. Once the saturator cone is installed, place the 300 NB drip pot isolation valve with the chain pulley block.
2. Place the new drip pot with the 300 NB pipe inside it beneath the saturator cone and take the load of the drip pot on 2 nos chain pulley blocks.
3. Position the drip pot and lock it in position by welding supports.
4. Lift the inside pipe with chain pulley block and bolt it with bottom flanges of the 300 NB isolation valve
5. Fit the 250 NB drain valve at bottom of the drip pot by lifting it with chain pulley blocks
6. Close the inspection doors of the saturator and drip pot and fill it with water and check for leakages.
7. Clear the work permit and give clearance to production

FIX PADLOCK WITH LOTO LOCK ON DRAIN VALVE OF WATERSEALS TO ENSURE ISOLATION OF GAS LINE.

**Saturator gas line replacement in gas cleaning system during relining**

1. Take clearance from production and work permit for the starting of the jobs on Gas cleaning system.

2. Open all the inspection doors in the gas line, ventury and saturator, before starting the job.

3. . Ensure that the line is properly steam purged. Check the presence of CO gas inside the gas line, with the help of a CO detector.

4. Make pemporary platform on near venturi 1 top flange

5. Place the crane below CB5 in case of BF#1 and in case of BF#2,place the crane on road adjacent to cast house, for better reach of the gas line top platform. Follow the procedure VL/IMS/PID1/MECH/WI/12 and SP 44 for material handling.

6. Use 16mm dia x 4 mts long certified sling for lifting of the gas line section.

7. Ensure that the sling is attached at the central part of the bent portion. Use 2 slings for good balance

8. Lock the gas line end pieces on both sides, with a manila rope, to prevent sliding of the same after removing the bolts.

9. Lift the gas line slightly & check if the load is properly balanced. Slowly detach the section from the line, ensuring that both sides (27 mt and furnace side) are totally barricaded, from any human movement in this area.

10. The opening on top of saturator should be covered with screen cloth/plate to prevent fall of person

11. Ensure that the section of the gas line being dismantled, is secured with manila ropes, to guide the lowering.

12. Take help of the production dept. for cleaning of the gas line from inside. After the gas line is cleaned, check the thickness of the plate. Repair/replace, if needed.

13. Carry out the required maintenance job on the gas line like painting, cleaning and patch plate fixing.

14. While bolting, ensure that a minimum of two rounds gasket rope needs to be provided on both sides of the flanges. Ensure that all the flanges are properly cleaned before fitting of the gasket rope.

15. Follow the same procedure (used for lowering of gas line) for lifting of the gas line. While matching the flanges ensure that the rope is not deformed.

16. Tighten all the bolts to prevent any leakage during process operation.

17. Steam purge the line and check for leakages

18. Clear the work permit and give clearance to production

DO

* Ensure steam is purged thoroughly and relief valves are kept open.
* Monitor Co levels continuously.
* Use two CO monitor while carrying out the activity.
* Ensure that the cutting set cylinder trolley, is away from the line of cutting.

DO NOT

* Work after taking the alcohol
* Stand below the hanging load

**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** |