

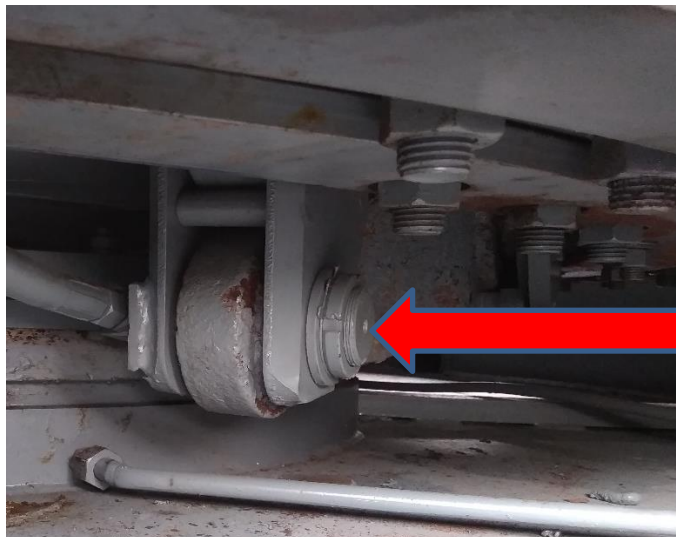
BELL-LESS TOP DISTRIBUTOR REPLACEMENT JOB

Problem Statement:-

There were two breakdowns of BLT distributor, first for 6 hours on 24.03.2019 and second for 9 hours on 25.03.2019 respectively. The links which are connecting the alpha drive gave away due to ageing & wear & tear. These were repaired temporarily & alpha limit was set as 30 degree that means no distribution would have taken place beyond 30 degree which is not recommended for smooth functioning of furnace.

Therefore it was decided to replace the distributor in the coming Gunning S/D of BF3.

Below figure showing the location of distributor breakdown



Breakdown of Alpha drive connecting pin was the reason behind the replacement of distributor

Project Overview:-

In the April Gunning Shutdown of 2019, it was planned to **change the BLT distributor**. The task was challenging as the plant team was replacing the distributor for the first time since inception of the plant.

Tenders were floated for execution of the job & following vendors showed interest:

- Front Tech Engineers and contractors
- Sterling Boilers & Erectors
- Simec Engineering

After checking the credentials & evaluation the contract was awarded to **M/s. Simec Engineering Contract.**

Preparatory jobs:-

Dimensional Check :-

| Measurement | Spare | Existing |
|---------------------------------------|---------|----------|
| Height | 1020 mm | 1010 mm |
| No of holes (M36 x 130) | 40 | 40 |
| Above height | 485 mm | 490 mm |
| Bellow Flange PCD | 910 mm | 910 mm |
| No of bolts(bellow flange) (M24 x90) | 24 | 24 |
| PCD distributor(hole to hole) | 200 mm | 200 mm |

Beta drive Gear Box was installed & the spare distributor was made to run for trails, following is the current trend of the same.

| Date | Start Time (hrs) | Current (Amp) | Stop Time (hrs) | Current (Amp) |
|------------|------------------|---------------|-----------------|---------------|
| 04/04/2019 | 14:55 | 8.3 | 17:00 | 7.8 |
| 05/04/2019 | 11:40 | 7.5 | 17:00 | 6.5 |
| 08/04/2019 | 10:45 | 7.5 | 12:45 | 6.7 |

Spare Distributor was placed on Stand for trial:-



Following schedule was made for execution of the job in MSP :

| Task Name | Duration | Start | Finish |
|--|----------|--------------------|--------------------|
| Chute removal | 5 hrs | Sat 13-04-19 08:30 | Sat 13-04-19 13:30 |
| Stock rod #01 assemble removing | 6 hrs | Sat 13-04-19 08:30 | Sat 13-04-19 14:30 |
| Stock rod #02 assemble removing | 6 hrs | Sat 13-04-19 08:30 | Sat 13-04-19 14:30 |
| Distmantling of instruments - Alfa & beta drive | 6 hrs | Sat 13-04-19 14:30 | Sat 13-04-19 20:30 |
| Beta drive motor and Gearbox removing | 4 hrs | Sat 13-04-19 22:30 | Sun 14-04-19 02:30 |
| Alfa drive motor and Gearbox removing | 4 hrs | Sat 13-04-19 22:30 | Sun 14-04-19 02:30 |
| Distributor all lubrication line removing | 2 hrs | Sun 14-04-19 02:30 | Sun 14-04-19 04:30 |
| Distributor all water line removing | 2 hrs | Sun 14-04-19 02:30 | Sun 14-04-19 04:30 |
| Distributor all N2 line removing | 2 hrs | Sun 14-04-19 02:30 | Sun 14-04-19 04:30 |
| Expansion bellow removing and kept at crown platform | 4 hrs | Sun 14-04-19 02:30 | Sun 14-04-19 06:30 |
| BFRV Drive motor and Gearbox removing | 6 hrs | Sun 14-04-19 04:30 | Sun 14-04-19 10:30 |
| Lower seal valve Hyd. Cylinder and hoses removing | 6 hrs | Sun 14-04-19 06:30 | Sun 14-04-19 12:30 |
| Distributor removing out side and taken at Crown platform throughout SGP side | 12 hrs | Sun 14-04-19 20:30 | Mon 15-04-19 08:30 |
| Distributor taken Zero level through 200T Crane | 4 hrs | Mon 15-04-19 08:30 | Mon 15-04-19 12:30 |
| New distributor taken at Crown platform through 200T Crane from zero level | 4 hrs | Mon 15-04-19 12:30 | Mon 15-04-19 16:30 |
| New distributor taken on crown ring through chain pulley block and all base bolt tightning | 12 hrs | Mon 15-04-19 16:30 | Tue 16-04-19 04:30 |

| | | | |
|---|--------|--------------------|--------------------|
| Lower seal valve Hyd. Cylinder and hoses connecting | 4 hrs | Tue 16-04-19 12:30 | Tue 16-04-19 16:30 |
| BFRV Drive motor and Gearbox placement | 4 hrs | Tue 16-04-19 12:30 | Tue 16-04-19 16:30 |
| Expansion bellow placement | 2 hrs | Tue 16-04-19 16:30 | Tue 16-04-19 18:30 |
| Stock rod # 1& 2 assemble placement | 8 hrs | Tue 16-04-19 18:30 | Wed 17-04-19 02:30 |
| Distributer all water line connection | 6 hrs | Wed 17-04-19 02:30 | Wed 17-04-19 08:30 |
| Distributer all lubrication line connection | 6 hrs | Wed 17-04-19 02:30 | Wed 17-04-19 08:30 |
| Distributer all N2 line connection | 6 hrs | Wed 17-04-19 02:30 | Wed 17-04-19 08:30 |
| Beta drive motor and Gearbox placement | 4 hrs | Wed 17-04-19 08:30 | Wed 17-04-19 12:30 |
| Alfa drive motor and Gearbox placement | 4 hrs | Wed 17-04-19 08:30 | Wed 17-04-19 12:30 |
| Electrical cable connection | 2 hrs | Wed 17-04-19 12:30 | Wed 17-04-19 14:30 |
| Installation of all Instruments - Alfa & Beta Drive | 6 hrs | Wed 17-04-19 12:30 | Wed 17-04-19 18:30 |
| All equipement trail to be taken | 2 hrs | Wed 17-04-19 18:30 | Wed 17-04-19 20:30 |
| Removal of rebound losses | 10 hrs | Wed 17-04-19 23:25 | Thu 18-04-19 09:25 |
| Distributer chute fixing | 8 hrs | Wed 17-04-19 23:25 | Thu 18-04-19 07:25 |

Procedure:-

1. Clearance was taken from production for working at furnace top by taking the work permit.
2. CO detector test was carried out and monitored continuously.
3. Electrical shutdown for Alpha and Beta drive Gear box,CB1 , lubrication pump and BLT power pack, BFRV and stock rod 1 and 2 was taken and cables were disconnected.

4. Isolation of all water and nitrogen valves of distributor.
5. After clearance from production top hatch was opened and top firing was carried out.
6. Using chain pulley block the distributor chute was removed.



Setup of Existing Distributor Removal



Arrangement Done For the Chute Replacement



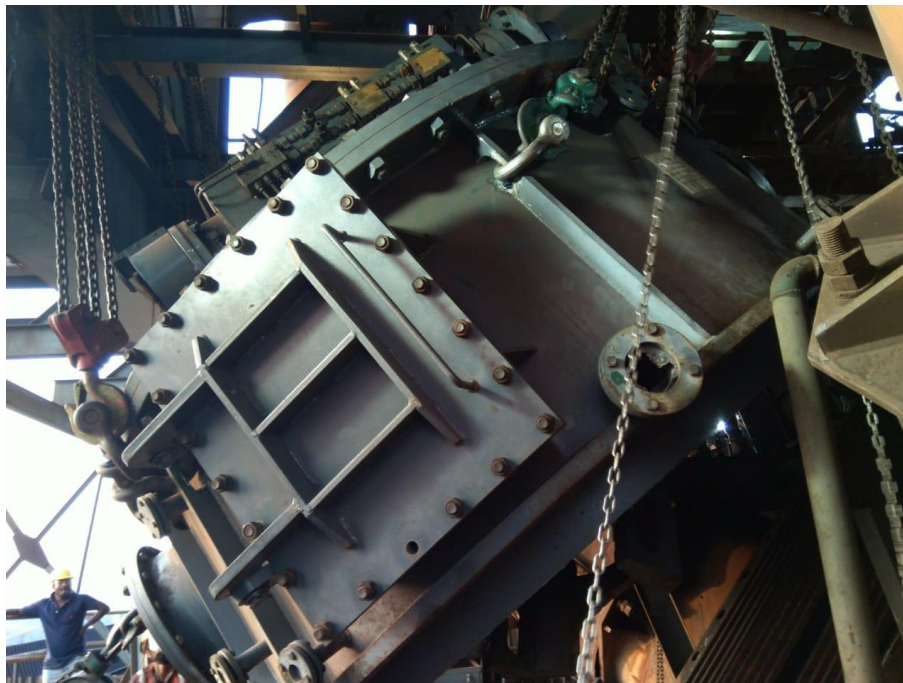
Chute Removal

7. Expansion bellow was removed by using chain pulley block.
8. Isolation of LSV hydraulic lines was done and hydraulic cylinder was removed.



Hydraulic Cylinder Removal

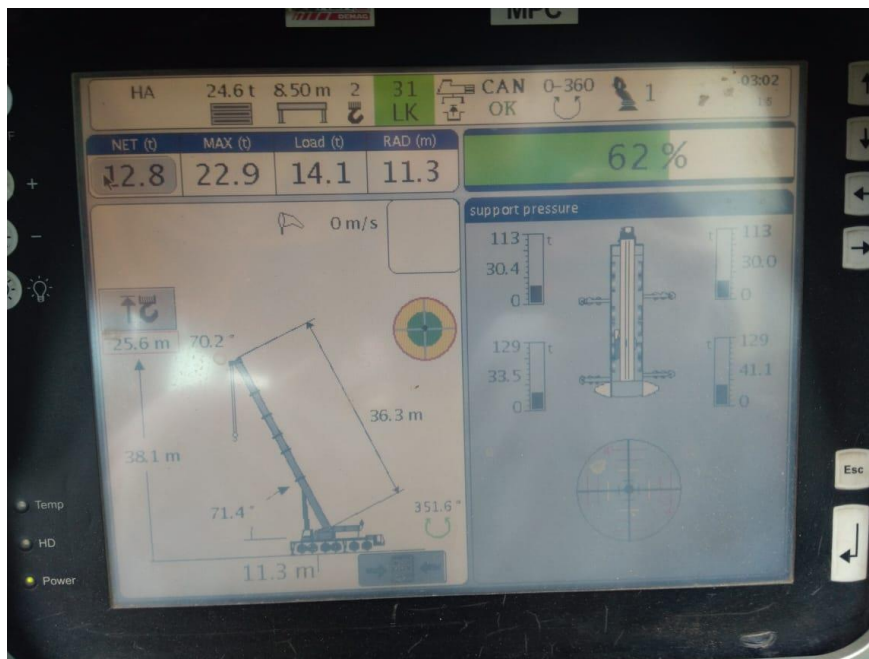
9. Base bolts of Distributor were loosened and distributor was removed using chain pulley block.
10. The top hedge & crown ring area was covered with meshes to prevent fall of material / person inside the furnace.



11. Further the distributor was shifted to ground level towards SGP side using AC – 350 Terex crane with appropriate counterweight making the crane capacity of 200T after making a proper lifting plan.



200T Crane being used for lowering the Existing Distributor to Ground Level



Lifting details of distributor

11. New Distributor was shifted from ground level to 27.4 m platform using the same crane.



New Spare distributor being taken up from ground level to 27.4 meter height





Arrangement made at 27.7 meter to place distributor

The two ISMB-400 beam of 3 meter long were placed parallel to each other on the 27.7 meter platform as shown in above figure.

The distributor was shifted from ground level to 27.7 meter with the help of AC-350 Terex crane and was placed on ISMB-400 beam.

Altogether 6 chain blocks of 10T and 2 chain blocks of 5T were used to lift and place the distributor at its original position.

Care taken while shifting the distributor:-

All the activities for shifting and placing the distributor on its original position from ground level to 27.7 meter platform were done under supervision of concern Vedanta team. Also the workmen's team working over the project were given necessary safety training along with complete PPE'S.



NEW DISTRIBUTOR ERECTION

Above figure show the complete orientation and installation of new distributor.

12. Tightening of base bolts of distributor and expansion bellow was done.
13. Stock rod 1 & 2 assembly drive gear box and motor was positioned using chain pulley block.
14. LSV hydraulic cylinder was placed and positioned as per requirement and the hoses were connected.
15. Alpha and Beta drive gear box and motor was positioned and ensured sufficient oil is available in Alpha and Beta gearbox.
16. All the Water, Nitrogen and lubrication lines were connected to the distributor as per Circuit requirements.
17. Electrical and Instrumentation departments were informed to connect power supply cables for Alpha and Beta drive, Stock rod drive 1 & 2 and BFRV.

18. Electrical shutdown was cleared for taking trials and stock rod 1 & 2 calibration was done.
19. All water and lubrication valves were inspected so that they are in open position.
20. Trial was taken of distributor and was checked for any abnormal sound during operation.
21. Again shutdown of distributor was taken and assembly of chute was done.
22. Top firing hatch cover was closed and all the work permits were cleared.