PCI Mill

Track

&

Gearbox

Replacement

Made By: Ankit Srivastava
Mechanical Maintenance BF3

❖ Project Overview:

In the April Gunning of 2018, it was planned to **change the track**, **gear-box** and **mill motor** of the grinding mill. The task was challenging as the plant team was not able to change the track in the previous gunning. The project was assigned to **FLSmidth Pvt Limited**.

The work began on 11.04.2018 and was successfully completed on 18.04.2018.

The Team of FLSmidth was led by Mr. Laxman Sharma and Mr. Disu Daniel. FLSmidth team was assisted by the workforce provided by **Janson Enginnering**.

❖ People Involved:

Sr No.	Name	Organisation
1	Parth Kaushal	Vedanta
2	Chirag Gupta	Vedanta
3	Ankit Srivastava	Vedanta
4	Chandan Kumar	Hofincons
5	Senthil Kumar	Hofincons
6	Laxman Sharma	FLS
7	Disu Daniel	FLS
8	Josious Job	FLS
9	Jitesh B	FLS
10	Vaja Ramesh	FLS
11	Mer Sanjay	FLS
12	Dodiya Sandeep	FLS
13	Vadher Vijay	FLS
14	Vaja Bhavesh	FLS
15	Meer Mannubhai	FLS
16	Vaja Rajesh	FLS
17	Vaja Devendra	FLS
18	Vadher Dinesh	FLS
19	Jora Rakesh	FLS
20	Maham Jesingh	FLS
21	Vadha Sanjay	FLS
22	Ramesh Kumar	Janson
23	Guddu Kumar	Janson
24	Tara Chand	Janson
25	Mohi Barban	Janson
26	Chanchal	Janson
27	Anjani Kumar	Janson
28	Mohit	Janson
29	Joseph	Janson
30	Moharram Ali	Janson
31	Rajesh Rai	Janson
32	Santosh	Janson
33	Kundan	Janson
34	SK Saddam	Janson

work was carried out 24 hours in 2 shifts. First shift timing was 8:30 to 20:30 and second shift timing was from 20:30 to 8:30.

❖ Daily Planning and Work Progress Review:

The project was executed between 10.04.2018 and 18.04.2018.Below mentioned are the glimpses of the the daily job target and its status. Also the hurdles faced is highlighted.

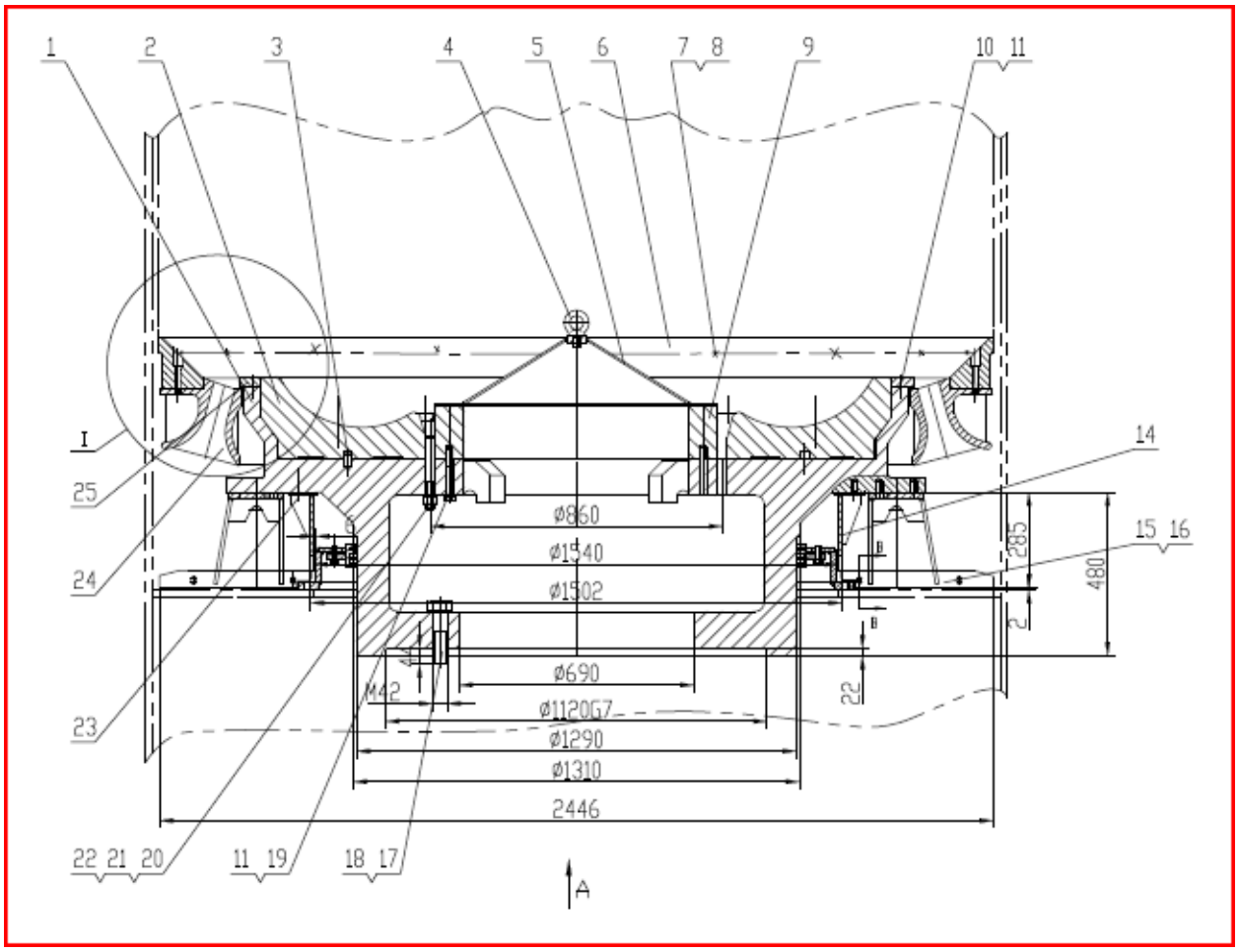
Sr.No	Date	Activity	Status	Date of Completion	Remarks
		FLS Engineer & Associates reached at site on 06.04.2018			
1	7/4/2018 & 09/04/2018	Gate pass preparation & height working tanning	Completed	10/4/2018	
2	10/4/2018	Scaffolding in mill area	Completed	10/4/2018	
3		Material shifting for classifier resting support	Completed	10/4/2018	
4		New mill track shifting near to mill area	Completed	10/4/2018	
		Mill Stop on 11/04/2018 And Handover to FLSmidth on 3:00 pm. after LOTO & work permit			
5	11/4/2018	Power shutdown of mill	Completed	11/4/2018	Work stop for 2 hours due to inproper scaffolding
6		LOTO of mill	Completed	11/4/2018	
7		harmful gas extingusing	Completed	11/4/2018	
8		Work Permit	Completed	11/4/2018	
9		Opening of main door	Completed	11/4/2018	
10		Dismantling of bellow sections over separator	Completed	12/4/2018	
11		Classifier resting support welding	Completed	11/4/2018	
12		Dismantling of transection piece	Completed	11/4/2018	
13		Dismantling of gas line	Completed	11/4/2018	
14		Fixing of dummy in suction line	Completed	11/4/2018	
15		Fixing of dummy in hot gas line	Completed	11/4/2018	
16		Dismantling of main motor coupling distance piece	Completed	11/4/2018	
17		Removal of mill flange bolts	Completed	12/4/2018	
18		Dismantling of seal blower line	Completed	11/4/2018	
19	12/4/2018	Vertical support welding in structure	Completed	12/4/2018	
20		Dummy in N2 line	Completed	12/4/2018	
21		Dismantling of Hydraulic line of cylinders	Completed	12/4/2018	
22		Chain block arrangement for classifier removal	Completed	12/4/2018	
23		Dismantling of mill inside pipe line	Completed	12/4/2018	
24		Dismantling of classifier motor	Completed	12/4/2018	
25		Dismantling of classifier with casing	Completed	12/4/2018	Loss 6 hours due to non-availability of lifting tools
26		locking of classifier after shifting	Completed	12/4/2018	
27		loosening of main motor foundation bolts	Completed	12/4/2018	
28		Holding arrangement of mill roller	Completed	12/4/2018	
29		Dismantling of couplings from motor	Completed	12/4/2018	
30		Dismantling of couplings from old gear box	Completed	12/4/2018	
31		Dismantling of Hydraulic cylinders connecting rod	Completed	12/4/2018	
32		Dismantling of mill Platform	Completed	12/4/2018	
33	13/04/2018	Dismantling of Roller top frame	Completed	13/04/2018	
34		Dismantling of roller (3 nos.)	Completed	13/04/2018	
35		Dismantling of track	Completed	14/04/2018	
36		marking of gear box position	Completed	14/04/2018	
37		losing of base frame bolts of main gear box	Completed	14/04/2018	
38		Dismantling of gear box lubrication line	Completed	13/04/2018	
39		Buffing of new track back side	Completed	13/04/2018	
40		Fixing of coupling in new gear box	Completed	13/04/2018	
41		Fixing of coupling in new motor	Completed	15/04/2018	
42	14/04/2018	Cutting of grinding track at dowel pin area	Completed	14/04/2018	Cutting work delay due to welding machine power failure
43		lifting of Distance piece	Completed	14/04/2018	
44		Dismantling of main gear box	Completed	15/04/2018	
45		Cleaning of gear box seating area	Completed	15/04/2018	

46	15/04/2018	Erection of new gear	Completed	15/04/2018	
47		Alignment of new gear box	Completed	15/04/2018	Gear box position in existing position with same shim packing plates because master level not available
48		lowering of Distance piece & bolting	Completed	15/04/2018	
49		Erection of nozzle ring	Completed	15/04/2018	
50		Erection of new track	Completed	15/04/2018	
51		Erection of grinding roller (3 nos)	Completed	15/04/2018	
52	16/04/2018	Erection of top frame	Completed	16/04/2018	Hydra was not available from morning 6:00am to 8:30am
53		Connection of hydraulic cylinder rod	Completed	16/04/2018	
54		Positioning of classifier assembly	Completed	16/04/2018	
55		Fixing of flange bolts of mill body	Completed	16/04/2018	
56		Erection of main motor	Completed	16/04/2018	
57		Fixing of seal ring of distance piece	Completed	16/04/2018	
58	17/04/2018	Connection of hydraulic cylinder oil line	Completed	17/04/2018	
59		Erection of outlet expansion below	Completed	17/04/2018	
60		Alignment of main motor	Completed	17/04/2018	
61		Erection of classifier motor	Completed	17/04/2018	
62		Re-fixing of mill platform	Completed	17/04/2018	
63		Fixing of classifier top below	Completed	17/04/2018	
64		Oil flashing & new filling in Main gear box & classifier	Completed	17/04/2018	

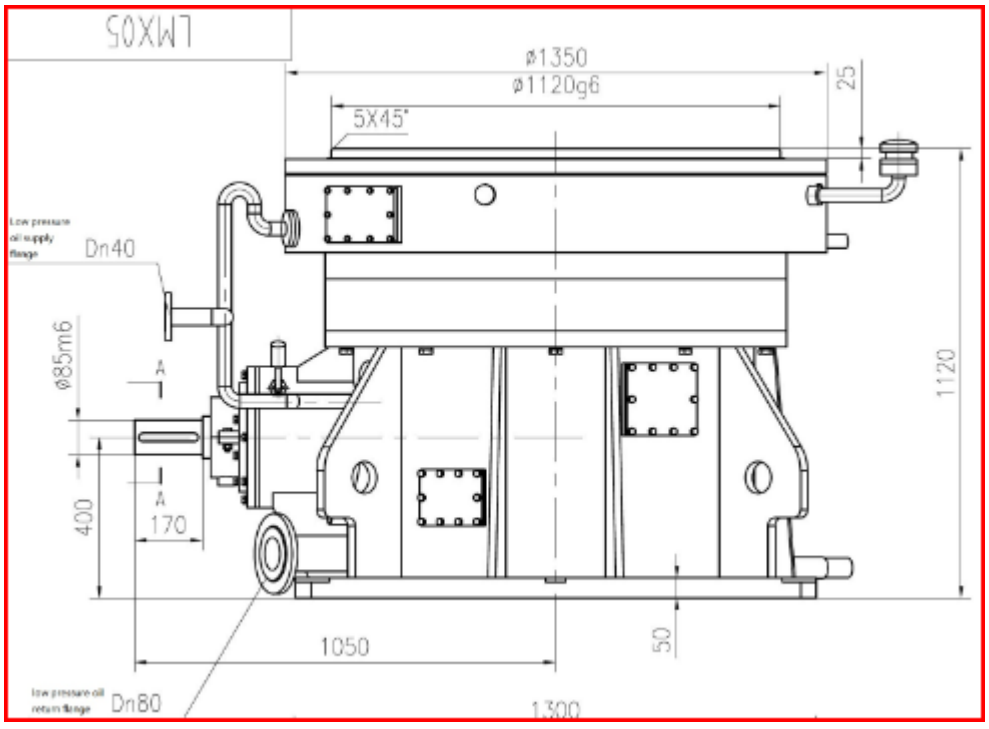
FITTING TOOLS LIST FOR COAL MILL JOBS AT VEDANTA , GOA

Sr No.	Item	Uom	Qty
1	Ring Spanner 10 - 32	set	2
2	Fix Spanner 10 - 32	set	2
3	Right Angle	No.	2
4	Center Punch	No.	2
5	Small Hammer	No.	4
6	Big Hammer	No.	2
7	Screw Spanner 12"	No.	5
8	Screw Driver	No.	2
9	Measuring Tape 5 Mtr	No.	4
10	Measuring Tape 15 Mtr	No.	1
11	Line Dori	No.	4
12	Chalk pen	Box	1
13	Shim Cutter	No.	1
14	Allen Key up to 10mm	Set	1
15	Allen Key As per requirement	No.	
16	Steel Scale 12"	No.	1
17	Steel Scale 1M	No.	1
18	Spirit Level	No.	2
19	Feeler Gauge 150mm	No.	1
20	Dial Gauge complete with magnetic stand	Set	2
21	Verniar Calipar 300mm	No.	1
22	Box Spanner set with Handle 1 & Goti 2 & Distance Piece 1	No.	1
23	Box Spanner as per site requirement	No.	
24	Marker Pen	No.	2
25	Taflon Tape	No.	4
26	Insulation Tape	No.	2
27	Plier	No.	2
28	Hammering Spanner Ring 36	No.	1
29	Hammering Spanner Fix 36	No.	1
30	Hammering Spanner Ring 46	No.	1
31	Hammering Spanner Fix 46	No.	1
32	Hammering Spanner Ring 50	No.	1
33	Hammering Spanner Fix 50	No.	1
34	Hammering Spanner Ring 60	No.	1
35	Hammering Spanner Fix 60	No.	1
36	Hammering Spanner Ring 65	No.	1
37	Hammering Spanner Fix 65	No.	1
38	Hammering Spanner Ring 75	No.	1
39	Lighting Switch Board	No.	5
40	Water Level Tube	No.	1
41	Pipe Wrench 12"	No.	1
42	Pipe Wrench 18"	No.	1
43	Marking Cloth	Mtr	100
44	Cotton Waste	Kg	50
45	Diesel	Lit	50

❖ Drawings of track-table setup and gearbox:

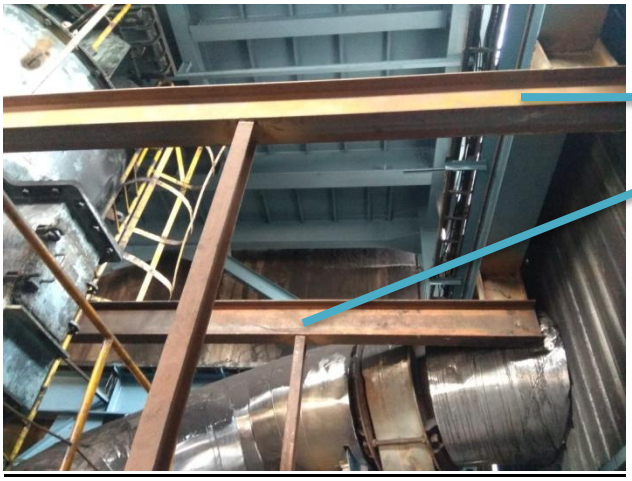


Track and table setup



Mill Gear-Box

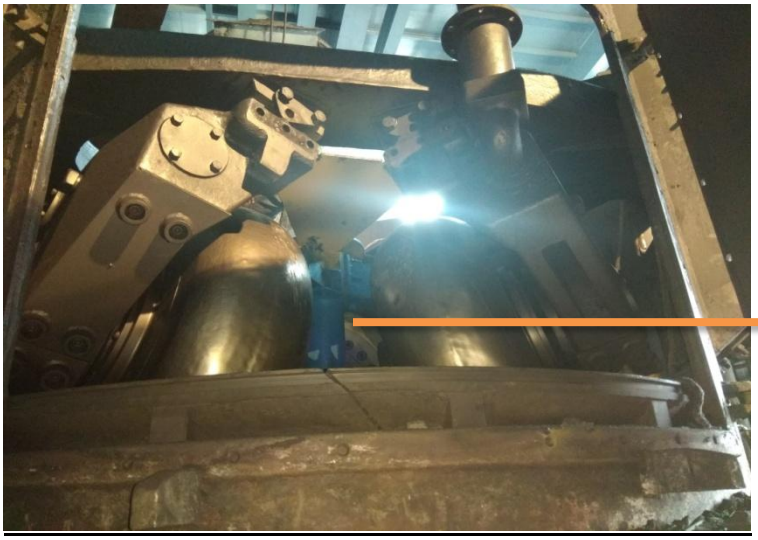
❖ Work Snaps:



Classifier resting platform erected in the HAG side.

Classifier shifted to the platform with the help of 2 5t hoists and 2 5t chain blocks. The classifier was moved by slowly lifting and then sliding it ahead. Once it reached the desired location, at was rested and freed from hoists and chain blocks.

Classifier reached the desired location. To be freed from hoists and chain blocks next.

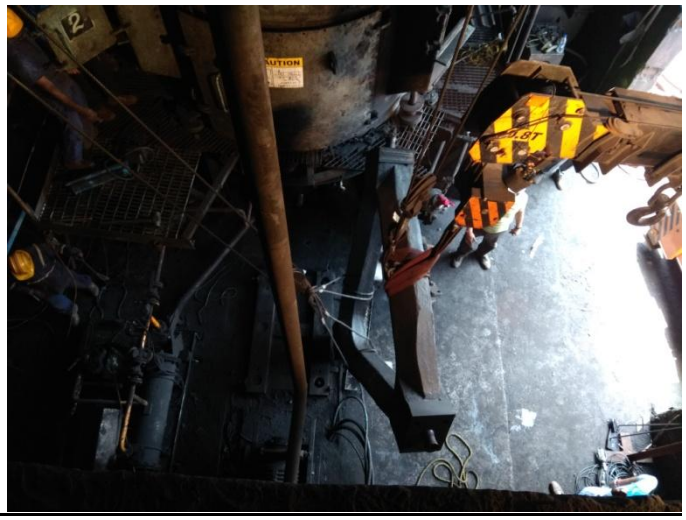


Support for rollers placed and rollers locked by welding. Also rollers getting freed from the upper triangular frame by removing the bolts.

Here, the workers are removing the bolts to detach the triangular frame and grinding rollers. Once the frame is free from the rollers, it can be lifted and removed.

All the bolts are removed.

Triangular frame is getting lifted with the help of 2 hoists.

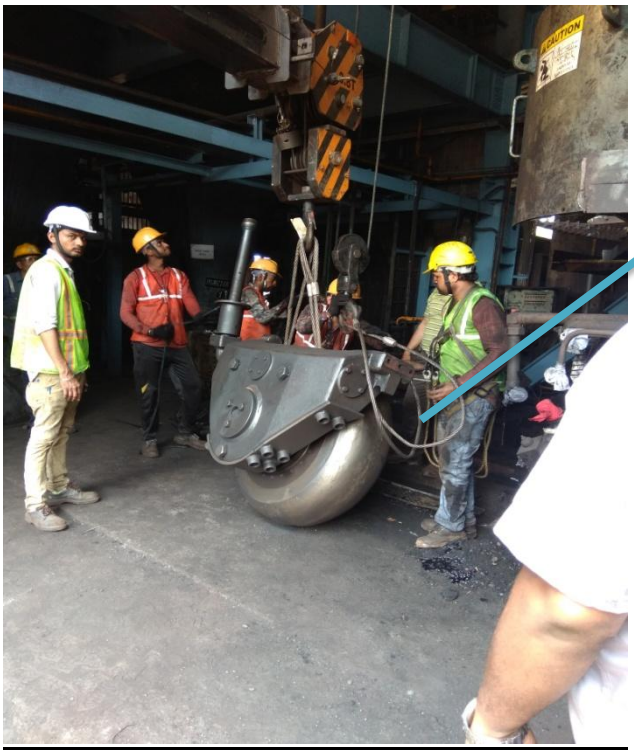


Triangular framed removed and rollers locked in position by locking shaft

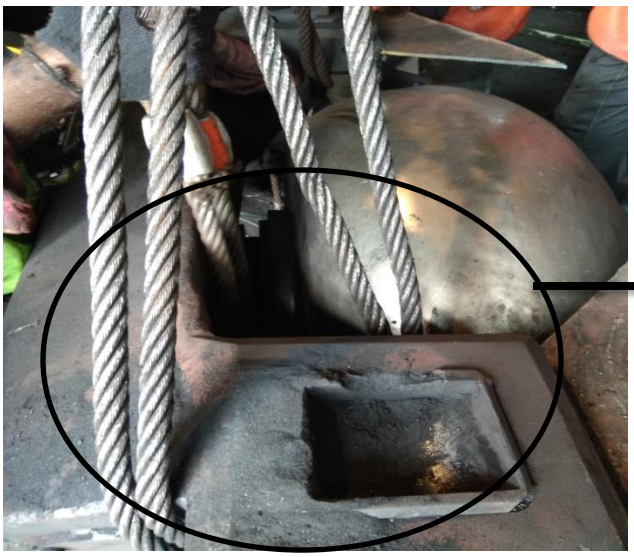
Preparing to remove the rollers. Roller towards inspection door 1 is held with the help of hoist. Weight of one roller is around 3 tonne. The next step is to free the rollers individually and remove them one by one.

Roller towards door No.1 is freed by cutting the holding plate of locking shaft. Post this step the roller will be lifted using hoist.

Roller getting lifted



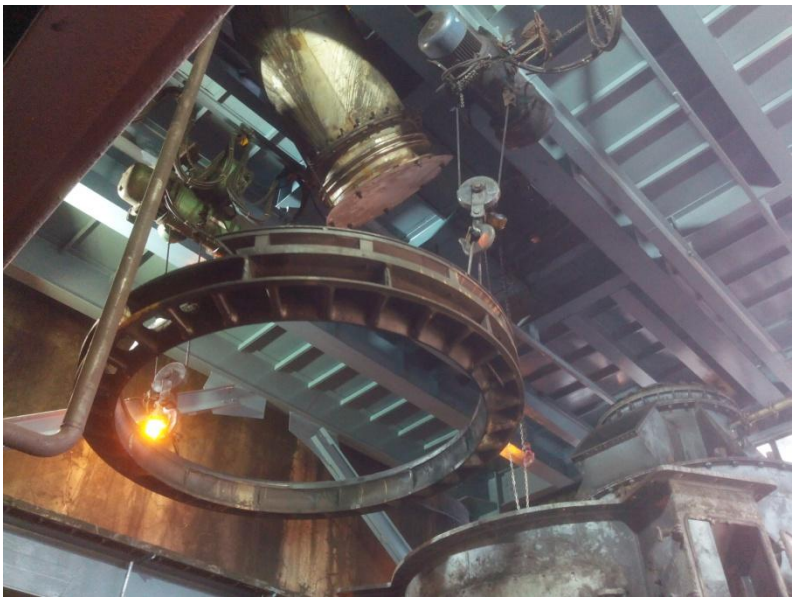
Rollers removed out of the mill safely



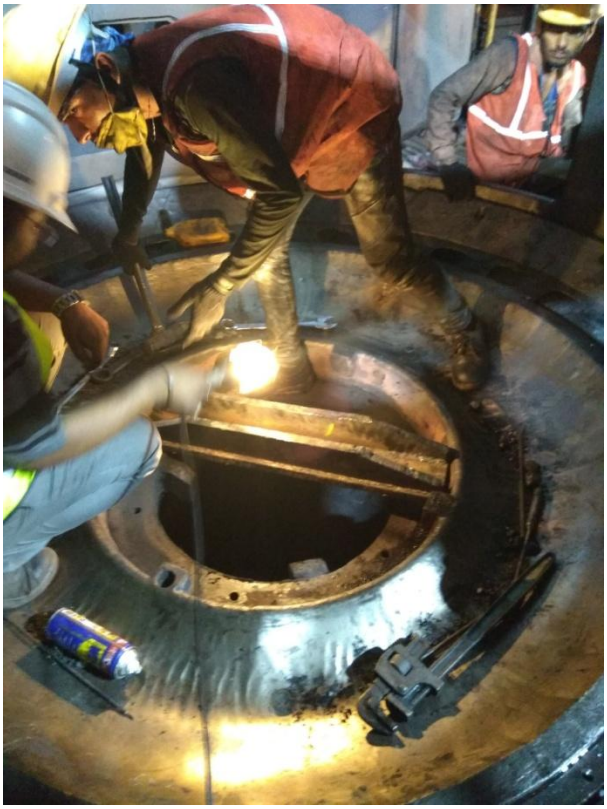
Picture showing how the rollers are fastened with the help of wire ropes

Removing Nozzle Ring

Preparing to remove the nozzle ring surrounding the track

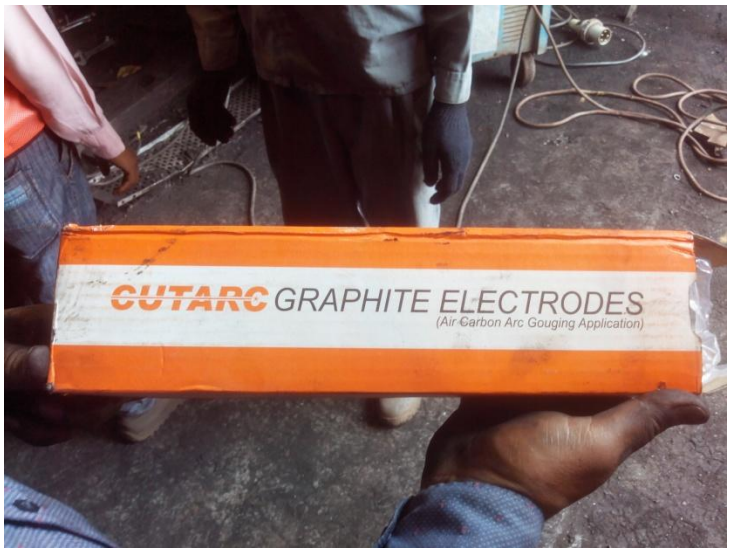


Puller fabricated for removing the track. 25mm plate was used to attempt track removal. 3 pullers were fabricated but all of them failed to pull the track out. Finally, decision was taken to cut the track with the help of cut rods.



Cut-rod and Holder

Gouging Torch/Holder

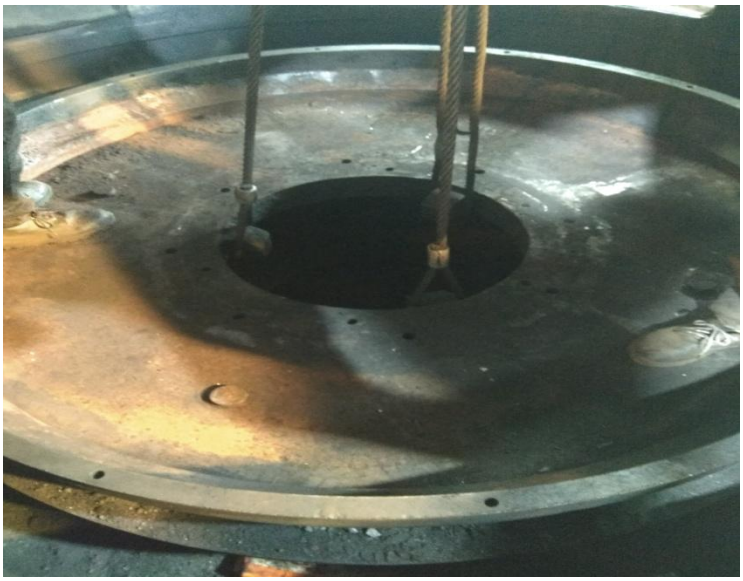


Cutting Electrode

Starting the gouging of grinding track

Track cut into 2 halves and removed with the help of hoist

Layer of coal all around the track was preventing it to come out with pullers



After removing the track, below table/distance piece was held by hoists to free the bolts attaching it to the gear-box.

After removing the main motor, the gear box is to be removed. For this, 2 channels are laid in front of the gear box to form a track on which it can slide. With the help of hoists, it is slowly lifted and pulled out. Additional force can be given from the rear end of the mill.

After removing the gear box, the sump at the bottom is to be cleaned properly. The foundation is to be cleaned properly.

Foundation being cleaned with the help of buffing wheel

Top of the new gear box is to be cleaned properly, with buffing wheel and then with diesel.

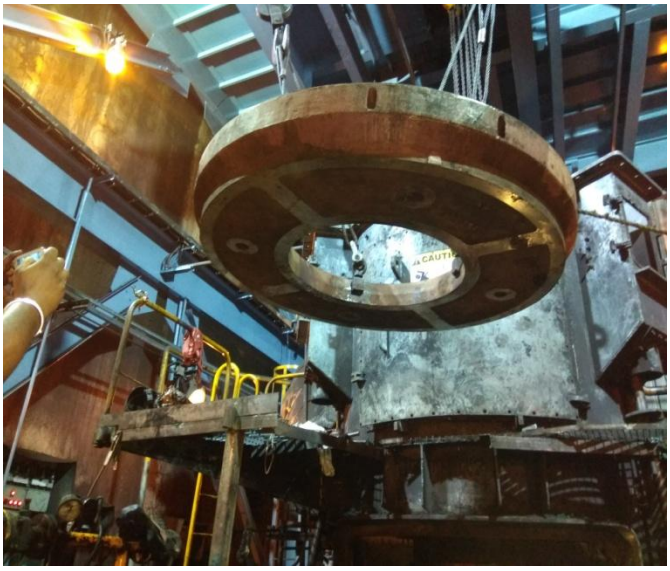
Trial of new motor (185KW ,991 RPM) being taken before putting it in use.

New gear box being put inside the mill. Post its installation and leveling, the distance piece is put on the gear box and bolting is done. Nozzle ring follows the distance piece. After the distance piece/ table is bolted on the gear box, new track is put and locked.

The gear box level was done with the help of spirit level. Master level preferred for this job. Since it was not available at any of our sites, so spirit level was used.

New grinding track ready to put inside the mill

Wire ropes to be anchored properly with 4, 5 tonnes D-shackles.



Track lifting done with two hoists

- After installing the gear box, track and nozzle rings, the rollers are again put back into the grinding mill. Triangular frame follows post that step.
- Next is to connect the hydraulic cylinder rod. Once it is done, classifier is shifted back and flange bolting of the mill body is done.
- Oil lines of hydraulic cylinder is to be connected next.
- Alignment of the main motor, erection of classifier motor, fixing of classifier top bellow to be carried out in parallel.
- Once all is done, re-fixing of mill platform is done.
- Before starting the lubrication system, flush the gear-box with one barrel new oil. Empty the oil tank of all the old oil and clean the tank completely. Fill the tank then with 6 barrels on Omala 320 gear oil.

Here, the old oil is drained by manual pump. Electric pump should be used to empty the tank faster. Since no electric pumps were working so the manual pump was used. We lost some of the time which could have been saved.