Upgradation of VRPM Cement Grinding

After the upgradation of VRPM circuit at Maihar Cement Limited, Satna, cement grinding capacity increased from 170 TPH PPC to 226 TPH PPC at blaine of 3300 cm2/gm and savings were witnessed in specific power consumption of 3.17 kwh/t.

In recent years, there have been success stories associated with VRPM for upgradation of the existing Ball Mill system for capacity enhancement and reduced specific power consumption in clinker grinding. The upgradation of the VRPM system at Maihar Cement Limited is one such example of a successful installation. AMCL has been supplying VRPM from the past 18 years based on technology supplied by Nihon Cement Company, Japan. VRPM machines are very sturdy and proven for stable operations.

At Maihar Cement, VRPM was installed along with Vibrating Screen in pre-grinding mode with the existing Ball Mill system. The vibrating screens were prone to heavy maintenance, hence these circuits have now been converted to semi-finish mode by installing Static Separator.

VRPM in pregrinding mode

At Maihar Cement, the VRPM project was commissioned with VRPM in pregrinding mode. The Vibrating Screen was used in close circuit with VRPM. The average particle size of (-) 3mm clinker was sent to the Ball Mill.

The circuit is shown in figure 2.1.

After installation of VRPM, the increase in capacity was around 30-40 per cent and reduction in specific power consumption was 3 – 4 kwh/ton. The Vibrating Screen was prone to heavy maintenance which also affected the availability of the plant.



With a view to improve the existing



VRPM installed in year 2004



Mogensen sizer (Vibrating Screen)

grinding capacity and to increase the availability of the plant; Maihar Cement has contacted AMCL to carry out a feasibility study for converting VRPM system from pre-grinding mode to semi-finish mode. The scheme finalised by AMCL in semi-finish mode is shown in figure 2.2.

In the upgradation project, the vibrating screen was removed, and in place of that, static separator system was added. The details of additions and deletions of major equipment are given below in Table 1:

Engineering and layout

With the efforts of both Maihar Cement and AMCL, the layout was

VRPM is one of
the appropches
for capacity
enhancement and
reduced power
consumption.

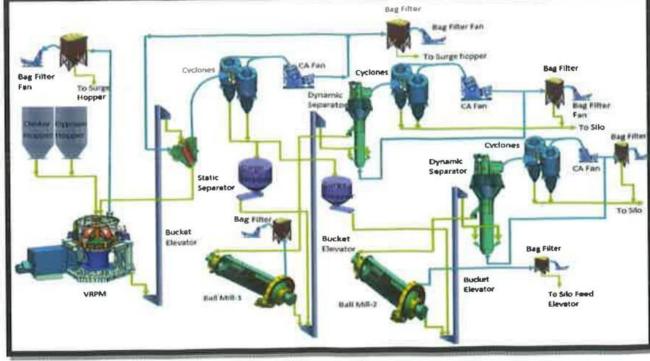


Figure 2.1

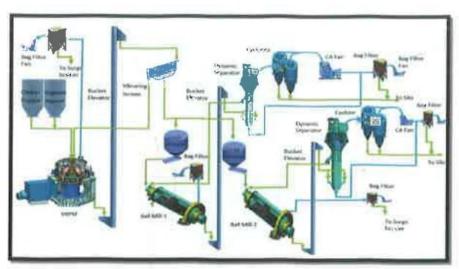


Figure 2.2

developed wherein it was possible to fit new a static separator in the existing building. For the Cyclone Separator and Circulating Fan, a new civil structure was made near the existing building.

Project Management

The downtime was curtailed to a

maximum of 14 days.

Upgradation Results

After
upgradation, the
capacity of Ball
Mills has increased
by 30 per cent and
additional savings
in specific power
consumption is

around 3.17 kwh/tonne. The results are tabulated in Table 4;

Conclusion

After upgradation of grinding circuit from pre-grinding mode to semi-finish mode, Maihar Cement Limited has achieved the desired results. Further improvement in



Fresh feed to VRPM

Cement Mill no.2 is possible.

It has been clearly demonstrated that by the proper co-ordination between the user and the supplier it is possible to make best use of existing equipment to achieve substantial savings in power consumption and increase in production capacity.

Table 1

Equipments	Equipment Specifications	After Up-gradation
VRPM	Model: AVM 230-3	Existing
	Table Dia.: 2300mm	The same of the same
	Roller Dia. X Width: 1400mm X 500mm	
	No. of Rollers: 03	
	Motor: 1200 kW/ 980 RPM	Removed
Vibro Feeder & Mogenson Sizer	Model: SL-3048	
	Capacity: 300TPH	
Static Separator	Air Volume: 165000 m3/hr	Added
	Capacity: 240 TPH	The State of the S
Circulating Air Fan	Volume: 200000 m3/hr	Added
	St. Pressure: 400 mmWG	(4)
	Motor: 300KW/1000RPM	
Separator Bag Filter Fan	Volume: 35000 m3/hr	Added
	St. Pressure: 330 mmWG	
and the second second	Motor: 40 KW	
Ball Mill	3.8 M Dia. X 11 M Long	Existing
(2 nos.)	Motor: 2 x 1250 Kw	
Sepax separator	Make: L & T / FLS	Existing
(2 nos.)	Model: 375-M-222	A STATE OF THE PARTY OF THE PAR
	Motor :250 Kw	
Circulating Air Fan	Volume: 200000 m3/hr	New
(2 nos.)	St. Pressure: 550 mmWG.	
	Motor : 425 KW	

Fresh clinker to VRPM				
seive (mm)	Cum. Wt % (Retained)			
40	2			
25	9			
20	23			
16.3	49			
12.5	65			
6.3	90			

Product from Static Separator to Ball Mill outlet				
sieve (mm)	Cum. Wt % (Retained)			
2	2			
1	8			
0.5	22			
0.212	40			
0.09	67			
0.045	90			



VRPM product sent to Ball Mill

Table 3

Cement Mill Grinding Media (BefoGrinding Media loading pattern re Up-gradation)					Cement Mill Grinding Media (After Up-gradation)		
Ball Size, mm	CM 1		CM 2		Ball Size, mm	CM - 1 / 2	
	1st Chamber	2nd Chamber	1st Chamber 2nd Chamber			1st Chamber	2nd Chamber
50 mm	6	11122	18		50 mm	17	#
40 mm	24	+	14	# :	40 mm	26	5-1-2-1
30 mm	15	4	10	4	30 mm	10	13
25 mm	5	53	8	53	25 mm	-	21
20 mm	21	47	-	45	20 mm	14-3	29
17 mm		-	7- T		17 mm	-	25
15 mm	1 2	1 2	1=		15 mm	-	8
Total	50 TON	100 TON	50 TON	98 TON	Total	53 TON	96 TON

Plant availability has been increased due to elimination of downtime on account of maintenance on the vibrating screen.

This article has been authored by R K Vaishnavi (President, Works - Maihar Cements Limited), and AMCL Machinery Ltd.



Circulating air fan for VRPM Circuit



Static separator

Table 4									
Performance of Cement Mill at M/s Maihar Cement Limited (CM 1 + CM 2 + VRPM)									
	CM 1	CM 2	Total	CM 1	CM 2	Total			
Product		PPC	PPC	PPC	PPC	PPC	PPC		
Output	TPH	90	80	170	123	103	226		
Fineness	Blaine	3300	3300	3300	3280	3120	3200		
Sp. Power	kW/h/t	31.09	31.09	27.92	27.92				