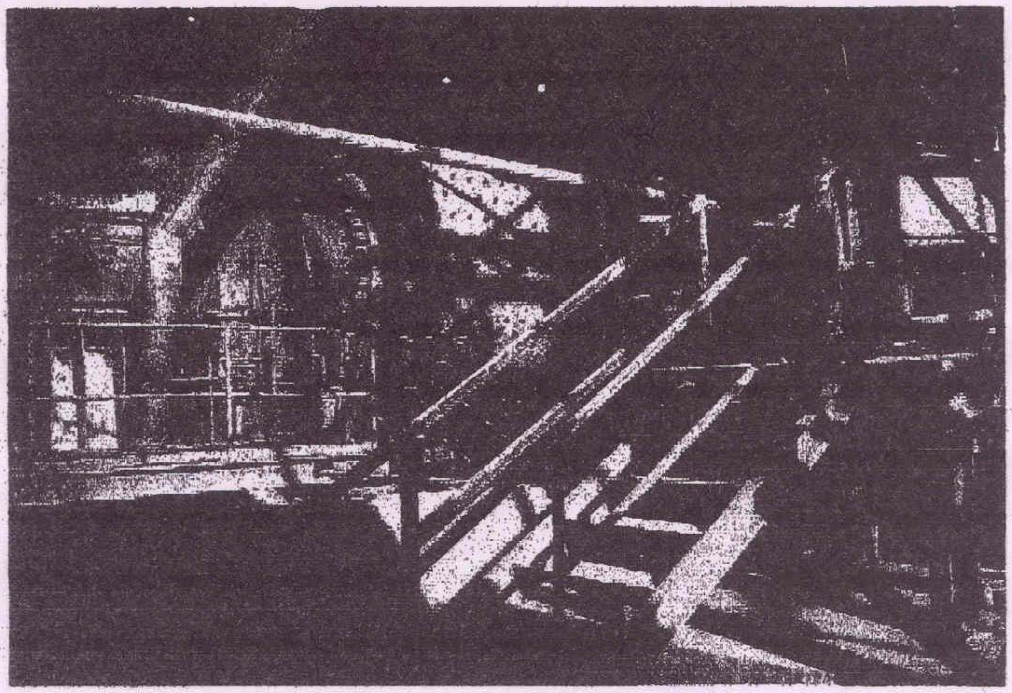
Annex III part 1

NOTE

Dt :-27/11/02

Subject:- Trial of FA feeding in Mill inlet vis-a-vis Mill outlet in PPC-I



The above trial has been carried out in PPC-I to investigate the best possible method of feeding fly ash with improved plant efficiency followed by better product quality. Accordingly the trial was conducted in two phases with 30 & 35% Fly ash addition on different dates. We give below the test result along with our comments.

PPC-I

Date of trial	%FA addition	FA Feeding at mill	Blaine M^2/Kg	Setting time (min.)		CST in MPa		Remarks
				IST	FST	1Day	3 Days	
13/11/02	30	In let	365	170	235	12.9	28.1	~5 Hrs.
- do -	30	Out let	357	190	255	10.1	24.7	~ 5 Hrs.
18/11/02	35	In let	350	210	270	10.9	25.6	~ 6 Hrs.
- do -	35	Out let	368	205	265	8.2	22.3	~ 7 Hrs.

23 & 35

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For the comparison of both the circuits a few plant data of PPC-II running with various dosages of FA are also given hereunder:

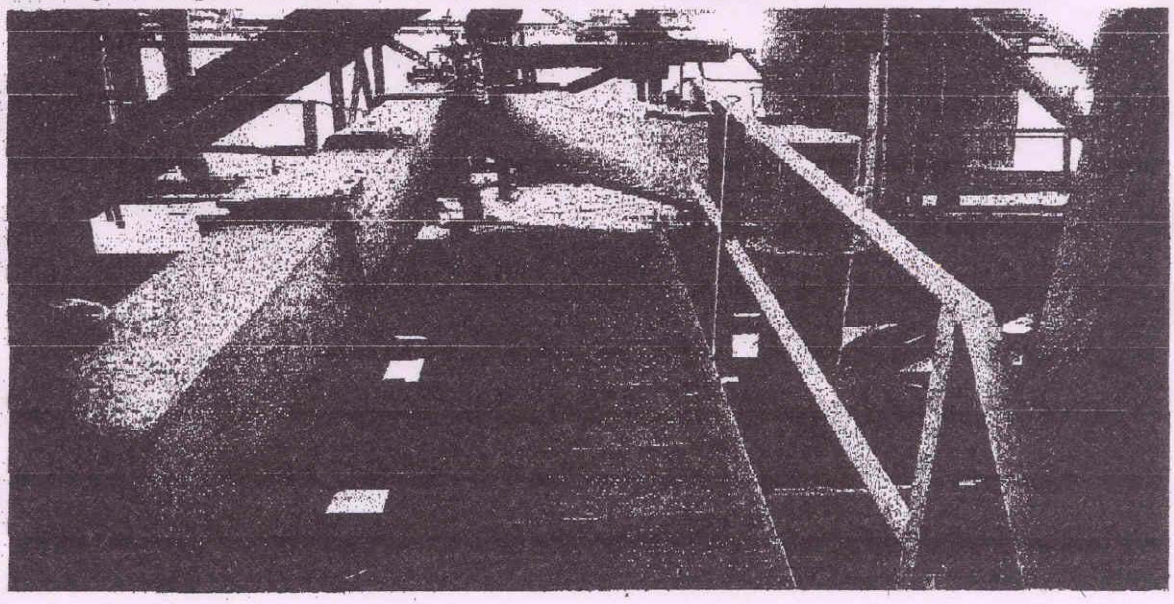
PPC-II

Date of running	%FA addition	FA Feeding at mill	Blaine M^2/Kg	Setting time (min.)		CST in MPa		Remarks
				IST	FST	1Day	3 Days	
21/09/02	30	Out let	356	175	255	7.5	22.4	
27/09/02	30	Out let	347	165	260	6.5	21.7	
18/10/02	30	Out let	359	190	255	9.7	25.6	
15/11/02	30	Out let	351	195	265	8.9	24.9	

PPC-II (Lab ball mill grinding sample from the product from PPC-II)

Day avg.	%FA	Sample details	Blaine	Setting time (min.)		CST in MPa	
				IST	FST	1Day	3 Days
15/08/02	30	As collected from plant	342	175	255	8.5	24.4
-Do-	30	Grinding for 15 min	372	150	230	10.9	26.8
21/10/02	30	As collected from plant	335	180	265	9.1	25.1
-Do-	30	Grinding for 15 min	365	160	225	11.2	27.2

Feeding arrangement of FA in PPC-I (inlet & outlet) after solid flow meter



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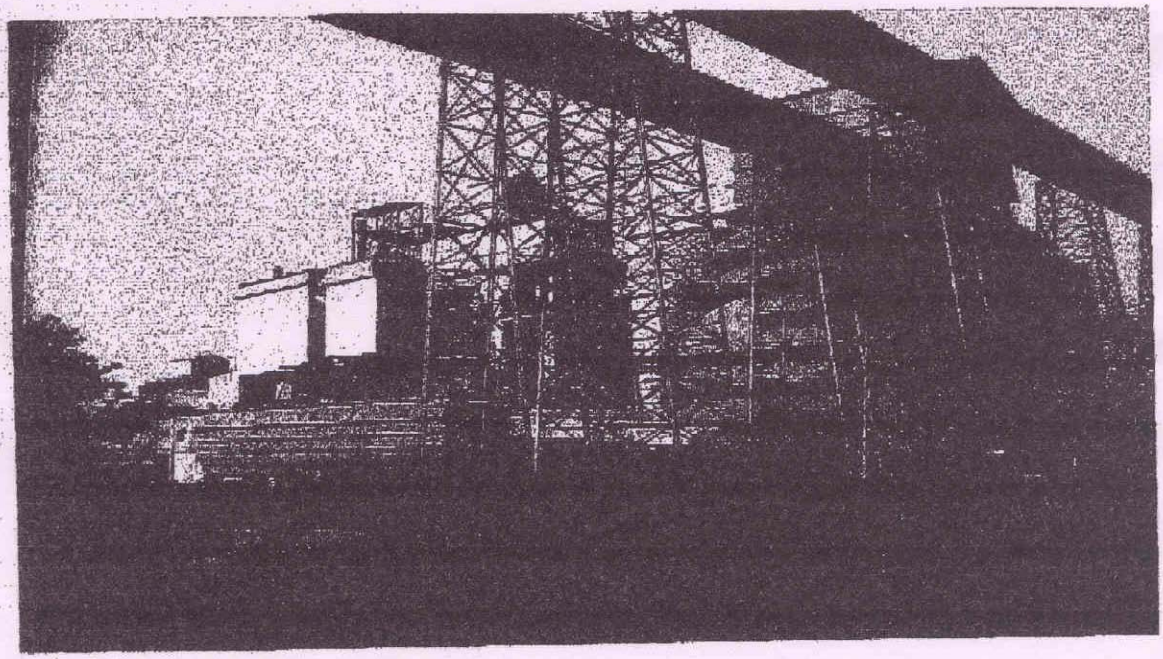
- In case of our existing product characteristic from PPC-II it would be better if we go for feeding FA in inlet based on the recent trial performance of feeding FA in outlet/inlet in PPC-I. But I am not sure about further increase of FA addition similar to our existing PPC-I.
- Existing PPC-II product quality could be improved further by increasing little fineness to generate more data for our study to increase further addition of FA.
- Similar trial with increased fineness – 360 m^2/kg. has been conducted on 22nd Nov. for a period of 6/7 hrs. with 30% FA addition but the TPH has drastically reduced by 30 MT. The power consumption of 360 fineness are on higher side as the TPH has reduced.
- Avg. sample for the particular period of running has been prepared separately and tested for fineness, setting , 1 & 3 days strength.
- So far the report says that the setting has reduced slightly but there is a trend of improvement in strength parameters. 3 days strength is ~ 27 MPa though the average fineness of the particular period sample is ~ 354 m^2/kg.
- We plan to continue this trial frequently.
- Another exercise is done by further grinding of day average product from PPC-II in our Lab ball mill for a period of 10 to 15 minutes. Both the samples were tested for strength & setting parameters. (Report is in the 1st page)We found that there is an improvement of those parameters by doing so.
- This trial has been conducted for a number of sets of sample from the day average product of PPC-II at various situations of the clinker quality.
- This exercise shows that FA requires grinding.

Recommendations in PPC-II:-



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- We have conducted trial in PPC-I simultaneously by feeding FA in inlet & outlet to avoid any minor variation of input raw materials.
- Initially trial was conducted by feeding FA with 30% in both the systems, similar to PPC-II at the moment to correlate the quality parameters with same dosage of FA feeding.
- Similar trial was conducted second time in PPC-I with 35% FA addition for a period of approximately 5 Hrs. for each system on the same day.
- Trial report of both the days showed that the feeding of FA is better in inlet than the outlet.
- It is also concluded that the quality parameter of 30% feeding FA in PPC-I out let is much better than the 30 % FA feeding in PPC-II outlet.
- Now-a-days cement grinding operation parameter is monitored with 45 micron residue since lowering of residue increases the cement strength followed by lower energy consumption.
- In case of PPC-I, residue on 45 micron is ~ 10% with 370 fineness but the residue of 45 micron in PPC-II product is ~ 20% with 350 fineness.
- Wide variation of residue on 45 micron from both circuits resulted the quality variation in the product with same dosage of FA on like to like basis.
- PPC-I has an unique operation system since it has RP in the pre-grinding stage followed by recent installation of V-Separator.
- This can be further optimised after frequent running with 35% FA addition by increasing fineness or by lowering 45 micron residue based on the existing quality of clinker from both the plants – SCP/ACP.
- My opinion says that the separator of PPC-II is not allowing us to go further but still we are not sure about the consistency of the product from strength data of our day average routine analysis.
- My opinion also says that the feeding of FA in inlet is better than the outlet for the following few reasons:-

  - ✓ First of all FA requires a little grinding since the product from power plant is not consistent.
  - ✓ Separate mixing is possible provided FA has fineness – 350 m2/kg.
  - ✓ In case of separate mixing of FA with ground clinker it is too difficult than ground slag and ground clinker since specific gravity of FA is just half of the specific gravity of ground clinker.
  - ✓ In the above case it requires high efficiency blender to mix with at least 95% homogeneity .

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NOTE

JJR/QAD/057
Dt:-14/06/01

Subject:- ***Laboratory trial on PPC,prepared with TEC Fly ash and Sonadhi Arasmeta Clinker.***

The above trial has been carried out in a Laboratory scale to find out the suitability of TEC fly ash with both the clinker from Sonadhi & Arasmeta and also to optimise the maximum addition of Fly ash in the process of manufacturing PPC at Jojobera. Before of start the trial TEC has been informed to use one source of Coal in their process as well as to maintain constant ratio of midlines and Coal for few days to collect avg. Fly ash sample being generated . Accordingly we have collected Fly ash for four consecutive days to prepare average sample.

We have been getting clinker form both the plants. We have collected clinker during process of grinding to make the trial more accurate. Accordingly ground clinker sample has been collected consecutively for 5 days from 567/568 separator fine separately, seeing the source of supply.

Now we have avg. Fly ash sample and avg. ground clinker sample of Sonadhi and Arasmeta separately.

We have conducted this trial based on the present clinker quality as receipt during the period from 1st to 15th of May 2001 from both the plants and prepared study note accordingly. If the clinker quality further changes beyond the limit of present value then the study report will differ.

We give below the chemical analysis of avg. Fly ash sample being collected and the same sample is used for the trial with both sources of avg. clinker from the circuits.

ANALYSIS OF AVG. FLY ASH

LOI	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	Blaine(M^2/Kg)
2.7	56.1	27.8	4.5	3.0	2.2	0.28	1.18	297

The above quality of fly ash is commonly generated by TEC and the same is used for last 2/3 months however further improvement is required for higher addition of ash in the blend.

ANALYSIS OF CLINKER WHICH WAS TAKEN FOR THE TRIAL IN LABORATORY BALL MILL.

SOURCE	LOI	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	IR	Na_2O	K_2O
SONADIH	1.7	20.7	5.3	3.4	63.1	4.2	0.3	0.2	0.18	0.79
ARASMET	0.4	20.9	5.7	3.8	64.1	4.6	0.6	0.2	0.24	0.88

TRIAL WITH SONADIH CLINKER

(A)Using 25% Fly ash

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 245 M^2/Kg.

Ground clinker + 25% Fly ash mixed and ground to a fineness in Lab ball mill :- 332 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	155	Min 30 min
(In minutes) FST	235	Max 600 min
CST in MPa		
3 Days	26.5	Not less than 16
7 Days	36.3	Not less than 22
28 Days	52.7	Not less than 33

(B) Using 30% Flyash.

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 245 M^2/Kg.

Ground clinker + 30% Fly ash mixed and ground to a fineness in Lab ball mill :- 341 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	165	Min 30 min
(In minutes) FST	245	Max 600 min
CST in MPa		
3 Days	22.1	Not less than 16
7 Days	33.8	Not less than 22
28 Days	50.2	Not less than 33

(C) Using 35% Fly ash

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 245 M^2/Kg.

Ground clinker + 35% Fly ash mixed and ground to a fineness in Lab ball mill :- 329 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	180	Min 30 min
(In minutes) FST	255	Max 600 min
CST in MPa		
3 Days	18.9	Not less than 16
7 Days	30.1	Not less than 22
28 Days	44.8	Not less than 33

TRIAL WITH ARASMETA CLINKER

(A) Using 25% Fly ash.

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 237 M^2/Kg.

Ground clinker + 25% Fly ash mixed and ground to a fineness in Lab ball mill :- 317 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	155	Min 30 min
(In minutes) FST	235	Max 600 min
CST in MPa		
3 Days	31.2	Not less than 16
7 Days	38.2	Not less than 22
28 Days	53.6	Not less than 33

(B) Using 30% Fly ash

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 237 M^2/Kg.

Ground clinker + 30% Fly ash mixed and ground to a fineness in Lab ball mill :- 321 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	165	Min 30 min
(In minutes) FST	245	Max 600 min
CST in MPa		
3 Days	26.2	Not less than 16
7 Days	35.7	Not less than 22
28 Days	51.9	Not less than 33

(C) **Using 35% Fly Ash.**

Ground clinker Blaine being collected (Including 7 % gypsum mixed in it) :- 237 M^2/Kg.

Ground clinker + 35% Fly ash mixed and ground to a fineness in Lab ball mill :- 325 M^2/Kg

PHYSICAL TESTING

CRITERIA	Result obtained	As per IS:1489
Setting time IST	180	Min 30 min
(In minutes) FST	255	Max 600 min
CST in MPa		
3 Days	22.3	Not less than 16
7 Days	30.6	Not less than 22
28 Days	49.2	Not less than 33

Seeing the above result of Lab prepared PPC with various dosages with both the sources of clinker it was decided to go for further optimum dosage where we will try to keep the 3 days strength as per our norms. Accordingly we have selected Sonadih and Arasmeta clinker and ground with addition of 27% and 32% of Fly Ash respectively and results are as follows:-

SONADIH CLINKER WITH 27% TEC Fly Ash

CRITERIA	Result obtained	As per IS:1489
Setting time IST	180	Min 30 min
(In minutes) FST	255	Max 600 min
CST in MPa		
3 Days	24.3	Not less than 16
7 Days	32.2	Not less than 22
28 Days	RA	Not less than 33

RA:- Result awaited

ARASMETA CLINKER USING 32% TEC Fly Ash

CRITERIA	Result obtained	As per IS:1489
Setting time IST	180	Min 30 min
(In minutes) FST	255	Max 600 min
CST in MPa		
3 Days	24.9	Not less than 16
7 Days	32.5	Not less than 22
28 Days	RA	Not less than 33

The above result is well accepted as far as our internal norms of early strength is concerned but it needs further fine tuning at the time of plant scale production . Clinker from Sonadih is mixed with old clinker of 2/3 months (sometimes 5/6 months) as a result it is not possible to increase the ratio similar to Arasmeta clinker. Arasmeta clinker is fresh one and moreover it has some additional properties which is more beneficial for blended cement.

CONCLUSION :-

The present level of Fly ash addition in PPC depends on the source of receipt of clinker. If we blend clinker by receiving both sources alternately then it would be possible to maintain consistent quality and fixed ratio of fly ash. We have already proposed our views of getting clinker as mentioned but presently it is not being streamlined fully.

Clinker quality is not the main criteria for improvement. Other criteria like – Fineness of final PP cement, Fly ash quality and its particle size system of feeding fly ash to the grinding circuits etc. are also responsible for improvement. At the moment we have considered the clinker quality and our next target is to improve the Fly ash quality with consultation with TEC technical staff.

SOURCE OF CLINKER	25%FLY ASH			30%FLY ASH			35%FLY ASH		
	3D	7D	28D	3D	7D	28D	3D	7D	28D
ARASMETA	26.5	36.3	52.7	22.1	33.8	50.2	18.9	30.1	44.8
SONADIH	31.2	38.2	53.6	26.2	35.7	51.9	22.3	30.6	49.2

NOTE:- *We have not carried out any chemical analysis of Fly ash since it has significant effects on its quality.*

KAMAL CHANDRA PIPLAI
Sr.Manager(QA)

Annex III part 2

JJR/QAD/059
Dated 28th May, 2002

Mr N. Kar

Sub: Lab scale trial for PPC with grinding aid

We received two grinding aid samples from Arasmeta through our Mr S.R.Joshi and started trial for PPC grinding in our laboratory ball mill. We prepared 4 set of samples with same dosages of grinding aid as suggested by you. In all the cases 32% Fly ash and 3.25% gypsum (chemical & mineral blend with 30:70 proportion) were maintained while %clinker varied as per the dosage of grinding aid. Given below the results of the set of trials:

Sample description	PPC without grinding aid	PPC with CEMAX 303 with dose at 0.02% by weight of clinker	PPC with CEMAX 303 with dose at 0.04% by weight of clinker	# PPC with SONADIH GRINDING AID with dose at 0.02% by weight of clinker	# PPC with SONADIH GRINDING AID with dose at 0.04% by weight of clinker
Grinding time (minutes)	50	45	40	40	40
Sp. Surface (m^2/kg)	330	328	326	330	328
% N.C.	36.0	34.0	35.0	34.3	35.0
I.N.T	225	210	205	260	290
F.N.T	295	275	285	320	350
C.S.T in MPa					
3 Days	25.8	26.3	27.9	23.6	24.8
7 Days	35.3	35.9	36.5	34.4	36.2

 # We have taken the similar dosage with Sonadih grinding aid as it was suggested in case of CEMAX since Sonadih dosage was not known to us.

Comments: Our manufacturing system of PPC is different than that of other Plant where PPC is manufactured in compound grinding. It is very difficult to conduct the trial in the Lab. scale on identical basis as of our process manufacturing system. However the same is conducted by taking a blank sample (without grinding aid) where we have considered same quality of clinker , fly ash & gypsum for the sets as stated above so that it can be co-related with the effects by using grinding aid. The above results show the

comparison of two different grinding aid vis-à-vis sample without addition of such aid at all.

- In all the cases grinding time is reduced as compared to the sample with "0" addition of grinding aid, it gives the indication of easy grinding of material which will lead to increase the fineness in the existing time or to increase TPH.

- No significant change in setting time is observed in the CEMAX trial. Interestingly IST/FST has increased drastically in case of Sonadih grinding aid. Normally manufacturer of this type of grinding aid use small quantity of Phosh. solution which is responsible for lowering setting time and increase early strength. Excess of Phosh in the solution is not advisable in case of concrete. In our LD slag trial the above phenomena observed for manufacturing LD slag cement ie.,. Lower IST/FST and high early strength. But it gives adverse effect in reinforcement as well as it will react with acid & alkali since it is amphoteric in nature.

- The % of dosage is so small that it would be very difficult to regulate at the time of commercial use in the process of manufacturing PPC.

- Usually manufacturer of grinding aid supply better material to the users in the beginning for conducting Laboratory trial for the satisfaction of the particular product. Since the same was collected from the commercial supply of Sonadih & Jojobera hence the improvement or the effects are not up to mark of our satisfaction .

- It is cost effective and should give us the result as desired by us towards the critical parameter of setting and strength. Workability and durability will come after words after getting feed back from the technical users of our cement.

- It also depends on the characteristic of Clinker and Fly ash. Since clinker is same for the both the places hence FA would be the reason with regard to its effect on the grinding aid which is not known to us because of limitation of our scope of knowledge.

- We have not satisfied with the trial result of grinding aid being conducted by us .

28/5/02

Sub:- Lab trial with various dosages of slag, FA & chemical Gypsum

In this year during the period of March-June we have been using ~ 30% Chemical gypsum with mineral gypsum in PPC since the setting and strength – both were optimised based on the norms as desired by Sales. Presently we are planning to go for 40% in PPC and PSC where the setting and strength will differ from the exclusive use of mineral gypsum. The trial was conducted in our Lab ball mill to optimise the dosages followed by various combinations with mineral gypsum and the same is stated here under in a tabulated form:-

We have taken the same raw material like clinker, chemical gypsum, mineral gypsum ,slag and fly ash for the trial. Table shows the results of PSC/PPC from Lab ball mill at different dosages of slag, FA & chemical gypsum.

Description	%Gypsum		% of blended material	Setting time (min.)		CST in MPa	
	Chemical	Mineral		IST	FST	3 D	7 D
PPC	0	100	32	185	260	25.1	34.7
PPC	25	75	32	195	275	25.3	33.9
PPC	30	70	32	215	295	24.9	34.1
PPC	35	65	32	240	310	21.7	30.3
PPC	40	60	32	250	315	21.4	29.5
PSC	0	100	52	170	255	25.9	41.2
PSC	25	75	52	210	310	24.2	38.9
PSC	30	70	52	225	335	23.9	37.7
PSC	35	65	52	255	360	22.8	35.4
PSC	40	60	52	275	385	21.7	34.8

Description	%Gypsum		% of blended material	Setting time (min.)		CST in MPa	
	Chemical	Mineral		IST	FST	3 D	7 D
PPC	0	100	34	195	270	24.1	32.3
PPC	25	75	34	205	280	23.7	31.7
PPC	30	70	34	220	310	22.8	33.4
PPC	35	65	34	220	325	22.0	30.9
PPC	40	60	34	270	320	20.7	30.3
PSC	0	100	54	180	260	24.3	40.5
PSC	25	75	54	220	300	23.9	39.4
PSC	30	70	54	225	315	23.9	38.1
PSC	35	65	54	260	375	21.9	36.9
PSC	40	60	54	280	390	20.1	33.9

COMMENTS:

From the above exercise it appears that the strength and setting is directly related to the increased dosage of chemical gypsum and blended material but its effect towards PPC in the lower dosages is negligible. In case of PSC even at the lower dosages it is badly affecting both strength and setting.

It is a fact that there is an extensive cost saving if we substitute mineral gypsum with chemical gypsum, since the landed cost of Mineral gypsum is Rs.1710/- and chemical gypsum is Rs.990/-. But it is only possible to use chemical gypsum in the process provided marketing accepts the IST as found above during our Lab trial. However it can be further optimized during the period of actual use in the process. As far as the market demand for lower setting is concerned, it is suggested to use chemical gypsum to the extent of maximum 35% in the period of April to August in PPC only. For rest of the months it is not advisable to blend chemical gypsum since the ambient condition is not favourable for the setting.

(K C PIPLAI)

30 9 3

NOTE:-

JJR/QAD/64
18th July 2003

Subject:- Plant scale trial with Grinding aid in PPC-I up to 12th July 03

We have conducted first time plant scale trial during the period 30th September 2002 to 2nd October 2002 by procuring Grinding aid at the supplier's cost . But the trial was failed in terms of the benefit as claimed by the supplier for a substantial reduction of initial setting followed by increase in strength. Though we achieved a reduction of setting to the extent of 20 minutes (which is a negligible reduction), this could not be justified for the additional cost of GA.

After this trial we met MD of M/S Fosroc in Kolkata along with VP (Cementitious Materials) for a discussion regarding the trial result vis a vis expected benefit which was claimed prior to the trial. During the discussion it was told to us that to conclude for the actual benefit there should be another trial for minimum 30 days with GA. Apart from the 30 days trial it was also said by the supplier that they will reformulate for suitability of GA to our requirement and requested us for Laboratory trial for the performance indication before final despatch for plant scale trial so that they will sure about the benefit which we are looking for the future trial.

It was also discussed about bearing the cost of the material for the 30 days trial since it is not justified to bear entire cost by either of us. However lastly it was decided to go for sharing the cost of GA in a ratio of 65:35 (earlier by us).

We have received the reformulated sample in the month of January for laboratory trial and the trial was carried out successfully in the Laboratory scale. Based on encouraging results we asked the supplier to supply GA for the quantity to meet the total PPC production in a month.

Finally we received the material in the last month to carryout the trial in PPC-I & II, but unfortunately due to sudden breakdown of PPC-II, trial could not be started in the PPC-II circuit as per the plan. Hence we have started the trial in PPC-I from 1st July'03. All of us aware that there is a limitation for continuous running of PPC-I as it's running is dependent on PSC production. Because of this we observed that we are hardly getting any scope for conducting the trial continuously and analyse the effect. Trial could be analysed better if it would have been running at least 12 hrs continuously in a day. We have so far got limited scope for few days to run PPC-I at a stretch of 12 Hrs. We have also decided to use GA in PPC-I till PPC-II operates with full load at the end of this month.

We have been monitoring all relevant data during the period of running of PPC-I with GA and the same is reported date wise. We have also collected avg. sample from the running of the circuit for last 4 days . A part of this sample was sent to marketing for the blind test and the counter sample is tested at JCP & ACP.

While the trial started on 1st July'03, representatives from M/S Fosroc were also present to guide us regarding dosages etc. to carry out the trial successfully and they were here with their cost up to 5th July.

A detail data on addition and quality being followed during the trial period is given hereunder:

Dosages of Fosroc GA :- 0.03%
Quantity of GA used in the process :- 1100 ml/minute ie 66.00 ltrs /Hr. against feed of 250 TPH
Clinker used in the process:- :- Arasmeta clinker for most of the period

Gypsum ratio-
Chemical Gypsum :- 25%
Mineral Gypsum :- 75%

Raw material ratio from Laboratory:-
Clinker- 61.0%
FA - 35.0%
Gypsum- 4.0%

Date	FOSROC Used/No	R. Hrs.	Avg.TPH	%FA	%R-45μ	Fineness (m^2/kg)	IST (min)	3 Days (MPa)
29.6.03	No	10.58	256.43	33.03	15.3	365	190	24.7
30.6.03	No	8.07	253.04	33.01	16.1	373	205	24.2
01.7.03	Used	10.57	253.36	34.47	10.9	393	150	25.3
02.7.03	Used	5.37	252.70	34.71	11.7	367	120	25.9
03.7.03	Used	7.03	250.92	34.81	10.8	365	155	27.3
04.7.03	Used	2.28	239.04	34.68	12.1	360	145	24.3
05.7.03	Used	10.45	252.54	34.71	9.8	353	135	27.6
06.7.03	Used	3.93	219.85	34.72	11.7	350	110	24.9
07.7.03	Used	8.93	253.19	34.72	10.2	365	145	26.1
08.7.03	Used	5.90	253.05	34.83	11.3	379	150	25.1
09.7.03	Used	9.63	253.06	34.71	11.1	365	155	26.2
10.7.03	Used	2.77	253.07	34.66	13.5	375	145	24.1
11.7.03	Used	6.42	253.27	34.75	12.7	350	135	24.9
12.7.03	Used	9.78	253.78	34.73	10.3	353	155	26.2
13.7.03		Nil	Nil	Nil	Nil	Nil	Nil	Nil
14.7.03		Nil	Nil	Nil	Nil	Nil	Nil	NA
15.7.03		Nil	Nil	Nil	Nil	Nil	Nil	NA

COMMENTS:

- There was improvement towards reduction of initial setting time, ~ 50 minutes which is mostly desired at the moment. It can be further reduced by optimization of dosages in the long run.
- Circuit was running with 25% chemical gypsum. It will be further increased gradually with the optimized dosages of grinding aid in the second phase trial.
- Residue on 45μ was not yet improved what we have expected since the running of the PPC circuit is restricted to maximum 12 Hrs. due to PSC running. However we will try to establish in PPC-II when it is ready to start with full load.
- From the trial it appears that the addition of GA has an effect towards lowering of initial setting and gradually on residue (R-45μ) after 2 to 3 hours of running of the circuit followed by slight reduction of fineness without any change of operational parameters.
- As such there is no significant increase of TPH but it is too early to comment since we have the opportunity to run the circuit for a longer period ie, at least more than 24 hours at a stretch.
- This could also be concluded in PPC-II when it will run continuously for more than 24 hours at a stretch.
- From the results obtained so far, it shows that there is no deterioration in the early strength even after increase of ~ 3% FA addition.
- Since BIS permits us to go for maximum 35% addition of FA hence we can't increase the addition beyond the upper limit.
- Trial sample had been collected for three consecutive days and a composite sample was prepared for field trial by the marketing department. Sample was delivered to marketing on 13th July at EOO and awaiting the feed back for further action/optimization from our end.
- We have also recorded all the relevant data for calculating overall benefit even after paying extra cost for the grinding aid.
- We are confident that there is a direct saving of 2% addition of FA over above clinker (earlier it was ~ 33%). Lowering of setting is another intangible benefit which will add value in the long run as it will be preferred by the customer.

ACTION PLAN:-

- ✓ We are on the way to establish in our PPC-II circuit when it will be in operation with full load during the end of this month.
- ✓ Awaiting feed back from marketing after carrying out the blind test so that further optimization would be done based on the maximum use of chemical gypsum keeping the IST target within the limit of 150-160 minutes.
- ✓ We will also try to implement in the clinker circuit while manufacturing slag cement and the benefit to be adjudged since the supplier says that the GA is especially meant for PPC only.
- ✓ We have to plan for the continuous use of GA in the plant through PLC to reduce manual operation for the feeding.
- ✓ We have to think for the bulk storage of GA by installing some Fiber tank.
- ✓ We have to think for bulk carrying in place of drums from Bangalore to Jojobera by procuring material in a Tanker.
- ✓ After using the entire quantity of GA in PPC-I & II the overall benefit is to be assessed. If it is attractive towards cost effectiveness, then similar exercise will be done by procuring same quantity of GA and conclude for its regular use.
- ✓ Once we are sure to go for regular use in the process then we have to plan for its permanent feeding arrangement in the circuit.

(K C PIPLAI)
Sr. Manager (QA)

LAFARGE

Dated: 9th Nov'05

NOTE:

REPORT ON SIKA TRIAL

TRIAL HISTORY

- We procured 2 MT of SIKA grinding aid as per our action plan for plant scale trial in both PSC and PPC circuits. 2 nos. dosing pump were supplied by M/S SIKA to dose the material continuously.

- After receiving the dosing pump, the trial started on 25th Oct'05 for PSC. Accordingly feeding of GA started in both the clinker circuits.

- We made a plan to dose the GA @ 0.030% of PSC and accordingly set the dosage in both the clinker circuits.

- We decided to observe the trend of some specific parameters like Fineness, %residue on 45 micron, Initial setting and early strength with the existing slag addition.

- The trial was continued for 4 hrs only from 2.30 hrs to 6.30 hrs and could not be continued further because of severe dust emission and bag filter choking during the trial period.

- A second trial was started on 27th Oct'05 in clinker circuit at 12.05PM in presence of SIKA representative and Mr R Khamparia, however the same was stopped at 12.15PM due to heavy dust generation in the grinding area. Observing the failure of dosing in clinker circuit for PSC due to heavy dust generation, we decided to carry the trial in PPC-II. Accordingly trial in PPC–II started at 1PM and continued up to 7 PM at a stretch. Though it was observed that dp of bag filters increased from 130-140 to 160-170 during the trial period, but because of sufficient margin in bag filters of PPC-II circuit, we could continue the trial.

- Based on the above observation, it was further decided to feed the SIKA at ball mill inlet and accordingly the GA feeding was started at 2.30PM on 29th Oct'05 in the ball mill inlet airside in presence of SIKA representative with a dosage @0.04% of PSC. But unfortunately the trial could not be continued due to Ball mill feeding air

slide clogged with lump formation at 3.30PM. No abnormal dust generation observed during the trial period.

- On dated 5th Nov'05, we further conducted the trial in PSC by inserting a pipe so that the GA can be directly fed inside the ball mill so as to avoid the clogging of mill feed air slide as faced on 27th Oct. However we observed substantial fall of mill outlet draft from 275 mm to 42 mm & increase in the material temperature from 108 deg C to 130 deg C as a result the mill tripped. Simultaneously the process bag filters choked and finally GA feeding stopped. The trial could be carried out for 3 hrs. only.

TEST DATA OF SIKA TRIAL IN PPC:

Time	% FA	SIKA/ FOSROC	Blaine m2/kg	%R on 45 mic	%NC	IST min	FST min	ID MPa	3D MPa	7D MPa
12.00 Hr	34	0.025% F	380	11.4		195	260			
Avg. Composite PPC with Fosroc GA	34	0.025% F	395	10.6	34.3	185	240	10.6	25.7	36.3
14.00 Hr	35	0.04% S	396	13.8		145	200			
15.00 Hr	34	0.04% S	367	9.6		135	180			
16.00 Hr	30	0.04% S	364	10.8		155	185			
17.00 Hr	34	0.04% S	333	17.2		165	225			
18.00 Hr	34	0.04% S	351	11.3		165	210			
19.00 Hr	34	0.04% S	333	15.6		175	250			
Avg. Composite PPC with SIKA GA	34	0.04% S	340	11.5	35.0	160	225	12.2	25.9	37.6

TEST DATA OF SIKA TRIAL IN PSC.

Trial date & Time	% Slag	% SIKA	Blaine m2/kg	%R on 45 mic	% NC	IST min	FST min	ID MPa	3D MPa	7D MPa
25/10/05 7.00 Hr	55	NIL	338	17.4		190	245			
25/10/05 8.00 Hr	56	NIL	341	16.8		200	260			
Day Avg.(25/10) Composite PSC Without SIKA	56	NIL	340	16.8	30.6	190	245	10.6	25.7	41.3
18.00 Hr	56	0.03	350	16.1						
19.00 Hr	55	0.03	353	15.5		195	255			
20.00 Hr	55	0.03	356	15.2		190	240			
Avg. Composite PSC With SIKA, 25/10	56	0.03	353	15.5	30.6	190	240	12.2	25.6	42.9
5/11/05 12.00 Hr	55	NIL	361	14.8		190	240			
5/11/05 16.00 Hr	56	NIL	338	18.2		210	255			
Day Avg.(5/11) Composite PSC without SIKA GA	56	NIL	355	15.8	30.6	200	270	12.6	RA	RA
5/11/05 17.00 Hr	56	0.04	335	18.5		210	270			
5/11/05 20.00 Hr	55	0.04	347	17.1		195	255			
5/11/05 21.00 Hr	57	0.04	350	15.8		195	260			
Day Avg.(5/11) Composite PSC with SIKA GA	56	0.04	344	16.6	31.0	200	260	13.5	RA	RA

COMMENTS:

- Satisfactory trial could not be carried out in PSC for a longer period due to process instability, frequent start and stop of circuits, choking of bag filters and other associated problems. The trial data for 2/3-hrs sample does not show any positive improvement and hence unless the trial is carried for a longer duration with stable process operation, it is difficult to conclude the effects of GA in case of PSC.

- In case of PPC, there is a significant improvement of IST and the process was stable during the trial period.

(A N Das)
Asstt. Manager (QA)