



Through Regd. AD

दूर की सोच®
Date: 02.12.2020

MIN / 2020 -20242

To,
Director
Ministry of Environment & Forests
Regional Office, Western Region
Kendriya Parayavaran Bhavan
Link Road No. 3
E - 5 Ravishankar Nagar,
Bhopal - 462 016

Sub: - Six monthly compliance report of environmental clearance over 1143.41 hect. area in
Sijahatta - Hinauti Limestone Mine of M/s Prism Johnson Ltd.

Ref.: - Your letter No. J-11015/37/96-IA.II (M) dated 31.12.96.

Dear Sir,

This is reference to the above we are enclosing herewith the six monthly compliance report (period April, 2020 to September, 2020) with necessary enclosures of the environmental clearance granted over 1143.41 Hect. Mining Lease areas of M/s Prism Johnson Limited (Formerly Prism Cement Ltd) Satna (M. P.)

We hope you will find the same in order.

Thanking you.

Yours faithfully,

For, Prism Johnson Limited


Mines Manager

Prism Cement Limestone Mines

PRISM JOHNSON LIMITED
(FORMERLY PRISM CEMENT LIMITED)
(Cement Division)

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CIN: L26942TG1992PLC014033



<p>The environmental clearance would be applicable to 1143.41 Ha.</p>	<p>⇒ Initial grant of 1143.41 ha Environment Clearance comprised of mining lease of 791.004 ha + 253.326 ha. + 42.798 ha + 56.282 ha. (PL). Subsequently PL was not converted into ML.</p> <p>Later, 791.004 ha + 42.798 ha were amalgamated and after leaving some restricted area, mining lease was granted for an area of 772.067 ha only. 772.067 ha ML was granted EC vide MoEF letter No. J-11011/949/2007-IA-II (I) dated 22.09.2008.</p> <p>Now the said EC 1996 pertains to only 253.326 ha ML area out of 1143.41 ha for compliances. The copy of the approval letter is enclosed as Annexure 1</p>
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<p>No change in the calendar plan including excavation, quantum of limestone and waste rock /O.B. dumps should be made.</p>	<p>Mining is carried out as per the approved Scheme of Mining vide IBM letter no MP/Satna/Limestone/MPLN/MOD-81/2017-18/ Jabalpur Dtd23.03.2018. The copy of the approval letter is enclosed as Annexure 2</p>
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Production Plan for last five years for 253.326 ha.

SI no.	FY	Production as per SoM	Production as per EC limit	Actual production	Production within EC limits.
1.	2015-16	3000000	2175000	2174591	
2.	2016-17	3000000	2175000	2166122	
3.	2017-18	3000000	2175000	2174813	
4.	2018-19	3000000	2175000	2173643	
5.	2019-20	3000000	2175000	2174244	
6.	2020-21	2175000	2175000	1269041 (till Sep)	

Development Plan for last five years for 253.326 ha.

SI no.	FY	Waste rock as per SoM	Soil as per SoM	Actual W/R	Actual Soil
		Cu M	Cu M	Cu M	Cu M
1.	2015-16	293600	103500	210638	130334
2.	2016-17	76575	343506	38102	343373
3.	2017-18	1596848	624564	1854829	83094
4.	2018-19	162891	1904952	829504	16837
5.	2019-20	2819104	140545	103409	95661
6.	2020-21	2749264	57454	646612 (till Sep)	7067 (till Sep)

<p>The topsoil and O.B. dumps should be stacked in earmarked dump sites.</p>	<p>Waste rock generated during the course of mining is used for concurrent backfilling of the mined out area. Top soil is spread over the backfilled area for carrying out plantation.</p> <p>Soil and OB dumps are maintained separately at earmarked locations as per the scheme of mining approved by the Indian Bureau of Mines.</p>
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	<div data-bbox="727 111 1300 533" data-label="Image"> </div> <div data-bbox="824 552 1213 579" data-label="Caption"> <p>Soil Dump Located in Area 253.326 ha</p> </div> <div data-bbox="727 611 1295 894" data-label="Image"> </div> <div data-bbox="784 930 1253 957" data-label="Caption"> <p>Overburden Dump Located in Area 253.326 ha</p> </div> <div data-bbox="675 976 1364 1029" data-label="Text"> <p>Top soil generated is stored and later spread over backfilled area which is used for plantation.</p> </div> <div data-bbox="675 1047 1364 1123" data-label="Text"> <p>All dumps are temporary in nature and placed within excavated area which will be used for backfilling in future. The relevant pages of the approved mining scheme is enclosed as Annexure No. 4</p> </div>
<p><i>Garland drains should be constructed downstream to the existing nala system to safeguard the mine faces.</i></p>	<p>Garland drain having dimension of cumulative length of 1.2 Km, a width of 2.0 to 3 meters and depth of 0.75 to 1.2 meter already exists. The drain system is continuously developed to safe guard the mine faces.</p> <p>Catch drains around the old OB dumps have been constructed. Picture of the same is displayed.</p>
<div data-bbox="180 1371 721 1749" data-label="Image"> </div> <div data-bbox="435 1766 560 1791" data-label="Caption"> <p>Garland Drain</p> </div>	<div data-bbox="748 1371 1279 1749" data-label="Image"> </div> <div data-bbox="909 1766 1027 1791" data-label="Caption"> <p>Settling Pond</p> </div>

The levels of SPM should not exceed 500 $\mu\text{g}/\text{m}^3$ at any station within the leasehold. Emission of SO_2 , NO_x and CO should be maintained below the levels prescribed by the competent authority. Control

The SPM, SO_2 , NO_x and RPM are well within the prescribed limits.

Ambient air quality monitoring reports of different locations from

<p><i>be strictly implemented. The dust pollution in the limestone mine needs to be further controlled by incorporating additional mitigative measures at the sources itself.</i></p>	<p>April 20 to Sep 20 are given in Annexure 5.</p>
	<p>Pollution control measures are strictly implemented. Water spraying is done on the entire haul roads from water tanker.</p> <p>Atomized water spraying arrangement exists at the crusher hopper.</p> <div data-bbox="769 436 1297 913" data-label="Image"> </div> <p style="text-align: center;">Water spraying System in Crusher Hopper</p> <p>Environment Protection Measures are mentioned in EMP, salient features are as mentioned below:-</p> <p><u>POLLUTION CONTROL MEASURES</u></p> <p>The mining operations are not anticipated to raise the concentration of the pollutants any more. However, following measures have been/would be adopted to mitigate the SPM levels in ambient air:</p> <p>i) Measures to prevent Generation and Dispersal of Dust</p> <p>Dust particles, which are normally generated during mining operations become air borne, thus leading to increase in SPM level in the ambient air. Another source of dust generation is the transport of the material by trucks. Adequate control measures are therefore taken by PCL during both mining operations as well as transportation/dumping of Limestone/OB which shall be extended to proposed additional mining area also :</p> <ul style="list-style-type: none"> • Dust suppression systems (water spray) are/would be adopted at loading faces. –fully implements and complied. • Dust generation is/would be reduced by using sharp tooth for shovels. –fully implements and complied • Dust suppression system. (Water spraying) have been/would be adopted on roads which are used for transportation and plying of vehicles — fully implements and complied <p>ii) Measures to Control Air Pollution due to Airborne Dust</p>

	<p>operations, following steps have been/would be taken to prevent air pollution due to air borne dust:</p> <ul style="list-style-type: none"> • More trees have been/would be planted around the dust generation points—fully implemented/complied. • More trees have been/would be planted on both sides of the roads along slopes etc. —fully implemented/complied. • Afforestation around the mine to filter out the dust and preventing it from reaching the residential areas has been / would be undertaken—fully implemented/complied. • Dust masks have been provided to workers, engaged at dust generation points like loading, dumping points etc. —fully implemented/complied. • Afforestation already mined out areas would be done as per schedule with minimum gap between excavation and afforestation to fix the dust and prevent it getting airborne —fully implemented/complied..
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Minimum, Maximum & Average Ambient Air Quality Monitoring Report

Sl. No.	Date	Location (1)					Location (2)					Wind
		PM2.5	PM10	SO2	NOX	CO	PM2.5	PM10	SO2	NOX	CO	Direction
		ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	From
		Mines Activities stopped due to pandemic COVID-19										
1	25.04.20	24.87	52.66	14.17	26.29	BDL	26.45	55.38	13.5	24.27	BDL	N
2	09.05.20	28.16	55.26	16.2	27.5	BDL	25.51	57.85	15.46	26.96	BDL	SW
3	23.05.20	29.85	59.33	17.01	30.05	BDL	26.31	55.33	16.2	27.94	BDL	SE
4	07.06.20	26.78	58.8	17.36	26.29	BDL	24.15	53.49	15.19	25.88	BDL	SE
5	21.06.20	25	19.05	15.46	29.12	BDL	22.83	45.56	14.58	26.96	BDL	SE
6	08.07.20	25.1	57.9	16.2	27.5	BDL	24.87	55.86	15.46	26.96	BDL	SW
7	22.07.20	24.79	53.89	15.19	26.29	BDL	24.39	52	14.58	25.88	BDL	SW
8	06.08.20	25	57.85	15.19	26.29	BDL	23.83	52.54	14.58	25.42	BDL	SE
9	21.08.20	25.53	49.02	15.46	25.17	BDL	24.95	56	13.88	25	BDL	SE
10	07.09.20	25.97	53.11	15.46	25.42	BDL	24.17	51.88	15.19	24.27	BDL	S
11	20.09.20	24.36	50.03	14.58	23.5	BDL	23.8	49.05	13.88	22.92	BDL	NE
	Maximum	29.85	59.33	17.36	30.05		24.87	57.85	16.2	27.94		
	Minimum	24.36	19.05	14.17	23.5		22.83	45.56	13.5	22.92		
	Average	25.9464	51.5364	15.6618	26.6745		24.849	53.1764	14.7727	25.6782		

Sl. No.	Date	Location (3)					Location (4)					Wind
		PM2.5	PM10	SO2	NOX	CO	PM2.5	PM10	SO2	NOX	CO	Direction
		ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	ug/M3	From
		Mines Activities stopped due to pandemic COVID-19										
12	25.04.20	21.55	52.31	11.04	19.77	BDL	22.62	56.05	12.15	20.22	BDL	N
13	09.05.20	24.75	52.4	12.15	22.22	BDL	25.12	50.86	13.5	21.57	BDL	SW
14	23.05.20	23.14	54.87	13.25	22.06	BDL	25	53.44	14.17	24.27	BDL	SE
15	07.06.20	21.64	54.59	12.15	19.12	BDL	23.13	52.24	13.25	20.22	BDL	SE
16	21.06.20	19.93	45.86	11.04	18.87	BDL	20.16	41.36	12.15	21.57	BDL	SE
17	08.07.20	20.72	51.94	10.8	18.2	BDL	22.22	53.61	12.15	19.77	BDL	SW
18	22.07.20	21.09	49.44	9.92	17.52	BDL	21.45	49.64	11.04	18.49	BDL	SW
19	06.08.20	20.24	42.93	11.04	17.52	BDL	22.83	46.81	12.15	19.12	BDL	SE
20	21.08.20	19.41	40.07	10.8	16.18	BDL	20.66	42.93	12.15	20.22	BDL	SE
21	07.09.20	21.75	44.17	12.15	16.18	BDL	22.12	46.81	13.5	19.41	BDL	S
22	20.09.20	18.83	39.51	11.04	14.15	BDL	20.04	40.21	13.25	17.97	BDL	NE
	Maximum	24.75	54.87	13.25	22.22		25.12	56.05	14.17	24.27		
	Minimum	18.83	39.51	9.92	14.15		20.04	40.21	11.04	17.97		
	Average	21.1864	48.0082	11.3982	18.3445		22.3045	48.5418	12.6782	20.2573		

GROUND WATER QUALITY REPORT				
Sl No	Tests	Results Mines Site office Hinauti Sijahata	Results Sijahata Village Bore well	Detection Range
1	Colour	<5.0	<5	5-100
2	Odour	Agreeable	Agreeable	Qualitative
3	Taste	Agreeable	Agreeable	Qualitative
4	Turbidity as (NTU)	1.20	1.28	1.0-100
5	pH	7.59	7.09	2.0-13.9
6	Total Dissolved Solid as TDS(mg/l)	486.0	377.0	10-1000
7	Alkalinity (mg/l)	152.0	140.0	10-500
8	Total Hardness as CaCO ₃ (mg/l)	220.0	260.0	10-1000
9	Calcium as Ca (mg/l)	58.4	60.8	10-1500
10	Magnesium as Mg (mg/l)	17.98	26.24	5-1500
11	Chloride as Cl(mg/l)	40.0	74.0	10-1000
12	Fluoride as F(mg/l)	0.29	0.37	0.02-10
13	Sulphate as SO ₄ (mg/l)	48.8	91.1	1.0-200
14	Nitrate Nitrogen as NO ₃ (mg/l)	9.21	8.63	5.0-100
15	Manganese as Mn(mg/l)	BDL	BDL	0.05-5
16	Zinc as Zn (mg/l)	BDL	0.13	0.02-100
17	Lead As Pb (mg/l)	BDL	BDL	0.005-1
18	Cadmium as Cd (mg/l)	BDL	BDL	0.002-2
19	Nickel as Ni (mg/l)	BDL	BDL	0.001-5
20	Arsenic as As(mg/l)	BDL	BDL	0.008-2
21	Total Chromium as Cr (mg/l)	BDL	BDL	0.04-10
22	Mercury as Hg (mg/l)	BDL	BDL	0.001-1
23	Copper as Cu(mg/l)	BDL	BDL	0.04-5
24	Boron as B (mg/l)	0.24	0.26	0.02-2
25	Aluminum as Al (mg/l)	BDL	BDL	1.0-100
26	Free residual Chlorine (mg/l)	BDL	BDL	0.1-5
27	Sulphide as H ₂ S (mg/l)	BDL	BDL	0.04-10
28	Iodide as I (mg/l)	BDL	BDL	0.1-10
29	Iron as Fe(mg/l)	0.09	0.14	0.05-100
30	Total Coliforms (MPN/100 ml)	Absent	Absent	1.8
31	E Coli (Nos/100 ml)	Absent	Absent	1.8

The quality of effluents finally discharged should conform to the standards prescribed under GSR 422(E) dated 19.5.1993 and 31.12.1993.

No industrial wastewater is generated as the cement plant is operated on dry process.

For domestic wastewater, there is a sewage treatment plant of the state-of-art technology. It has the capacity to treat domestic wastewater of 600 KLPD.

Contaminated water generated due to washing of equipment is passed through grease and oil trap tank having separation chambers and pumping arrangement. For separation of oil and grease particles from water, prime mover has been provided. The oil and grease is skimmed and kept in sealed barrels for further disposal to authorized

vendors.

The strained out water left in the tank is stored in tanks, and is re-used for washing of HEMM.

Detailed Report of treated effluent attached as **-Annexure No- 10.**



Regular monitoring of air, water and noise should be made in and around the core-zone. Recorded data should be furnished to this Ministry (Regional Office, Bhopal) and the State Pollution Control Board six monthly. Noise levels should not exceed the limit of 85 dB. Ear plugs/ear muffs, may be provided to the workers engaged in the noisy atmosphere.

Regular monitoring of ambient air quality, water quality and noise level are done at different locations in and around the core zone. Recorded data is submitted to relevant authorities as per schedule. Monitoring reports of the ambient air quality, water quality and noise level are given in **Annexure 5, 10 and 7 respectively**. The noise level is well within acceptable limits.

Noise Monitoring Report

S. No	Date of monitoring	SW (BP No. 18)		Near Western side ML boundary (Pillar No. 14) of ML area	
		Noise level in dB(A)	Noise Level in dB(A)	Noise level in dB(A)	Noise Level in dB(A)
		(Day Time)	(Night Time)	(Day Time)	(Night Time)
1	25.04.2020	50.15	45.25	49	44.27
2	21.05.2020	60.45	52.5	55.55	51.7
3	05.06.2020	62.4	52.2	55.4	51.52
4	17.07.2020	60.87	51.42	55.97	51.07
5	19.08.2020	59.77	52.87	56.32	53.67
6	18.09.2020	60.34	53.02	56.14	49.65
	Maximum	62.4	53.02	56.32	53.67
	Minimum	50.15	45.25	49	44.27
	Average	59.00	51.21	54.73	50.31

S. No	Date of monitoring	Mankahari Village		Hinouti village	
		Noise level in dB(A)	Noise Level in dB(A)	Noise level in dB(A)	Noise Level in dB(A)
		(Day Time)	(Night Time)	(Day Time)	(Night Time)
7	25.04.2020	48.27	43.75	47.3	42.42
8	23.05.2020	55.42	50.07	54.62	49.42
9	08.06.2020	56.3	50.5	54.95	50
10	21.07.2020	54.2	49.7	51.85	48.87
11	21.08.2020	56	51	53.75	51.05
12	21.09.2020	54.38	46.37	56.42	48.05
	Maximum	56.3	51	56.42	51.05
	Minimum	48.27	43.75	47.3	42.42
	Average	54.10	48.57	53.15	48.30

	Ear plugs, dust masks are provided to workmen working in noisy atmosphere.
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Total PPE's April 20 to Sep 20		
Material	Qty.	Amount in Rs.
Dust Mask	185	3434
Goggle Safety Glass PVC,	73	3066
Hand Gloves	730	15430
Helmet Industrial Safety	27	3011
Jacket fluorescent High Visibility Wear	78	9906
Plug Ear muff	-	-
Safety Shoes	420	319200
TOTAL	1513	354047

The anti-pollution measures with regard to environment quality prescribed in the EMP should be implemented schedule in a time bound programme.

The anti-pollution measures with regard to environment quality prescribed in the EMP have already been implemented.

Water spraying is done on the entire haul roads round the clock by water tanker.



Water spraying arrangement has been made at the crusher hopper.

Permanent sprinkler arrangement along the haul road area



EMP Compliance Report is summarized below:

A] POLLUTION CONTROL MEASURES

i) Measures to prevent Generation and Dispersal of Dust

- ☐ Dust suppression systems (water spray) are/would be adopted at loading faces-fully implemented and complied.
- ☐ Dust generation is/would be reduced by using sharp tooth for shovels -fully implemented and complied.
- ☐ Dust suppression system (Water spraying) have been/would be adopted on roads which are used for transportation and plying of vehicles -fully implemented and complied.

ii) Measures to Control Air Pollution due to Airborne Dust

In addition to control measures during mining and transport operations, following steps have been/would be taken to prevent air pollution due to air borne dust: -fully implemented and complied.

- ☐ More trees have been/would be planted around the dust generation points -fully implemented/complied.
- ☐ More trees have been/would be planted on both sides of the roads along slopes etc. -fully implemented/complied.
- ☐ Afforestation around the mine to filter out the dust and preventing it from reaching the residential areas has been / would be undertaken-fully implemented/complied.
- ☐ Dust masks have been provided to workers, engaged at dust generation points like loading, dumping points etc. -fully implemented/complied.
- ☐ Afforestation already mined out areas would be done as per schedule with minimum gap between excavation and

afforestation to fix the dust and prevent it getting airborne -fully implemented/complied.

iii) Surface Water Pollution Control Measures

No surface water bodies are likely to get adversely affected by mining operations. No contamination of surface water source is anticipated as there are no toxic or chemical materials either in the mineral or the top soil cover.

Rain water which is accumulated shall be guided down to suitable drains after passing through reservoirs used as settling tanks--fully implemented/complied.

iv) Ground Water Pollution Control Measures

- ☐ The ground water table in the mine area is not likely to be affected. No control measures to prevent ground water have, therefore been recommended. -Agreed

v) Noise Pollution Control Measures

The noise level monitoring carried out in area has indicated the present noise levels are generally below 65(average) dB(A) which also includes impact of noise of deployment of various machines for excavation, transport, dumping, other auxiliary operations and plant operation. The following measures have been/would be taken to keep the noise levels well below the limits:

- ☐ A thick green belt has been/would be provided around the periphery of the mine to screen the noise. -fully implemented/complied.
- ☐ Trees are/would be planted on both sides of roads used for transportation vehicles. -fully implemented/complied.
- ☐ Proper maintenance of noise generating machinery including the transport vehicles. -fully implemented/complied.
- ☐ Provision of silencers to modulate the noise generated by machines. -fully implemented/complied.
- ☐ Provision of protective device like ear muffs/plugs. -fully implemented/complied.
- ☐ Provision of sound Insulated chambers for the workers deployed on machines producing higher level of noise like bulldozers, drills etc., --fully implemented/complied.
- ☐ Confining the noise levels by isolating the source of noise. -fully implemented/complied..
- ☐ Reducing the exposure time of workers to higher noise levels -fully implemented/complied.

vi) Measures To Reduce Ground Vibrations

- ☐ Peak particle velocity or Ground Vibrations for safety of nearby structures and residential buildings is well within 12.5mm/sec. -fully implemented/complied.
- ☐ For safe permissible charges per delay initially guidance was taken from the empirical propagation equation $V=313.22(D/Q^{1/2})^{1.67}$ but now it is firmed up by monitoring studies during the development stage for existing mines--fully implemented/complied.
- ☐ Use of short delay detonators and non-electric detonators -fully implemented/complied.
- ☐ To contain fly rocks, stemming column shall not be less than burden of hole. -fully implemented/complied.
- ☐ As per the practice, each blast is carefully planned, checked, executed and monitored. Charge sheets and blasting data is recorded. -fully implemented/complied.
- ☐ Electric detonators are used. Covering the detonating fuse Blasting is carried out in daylight hours only. -fully implemented/complied.
- ☐ Care is taken to ensure that the effective burden is not excessive -fully implemented/complied.
- ☐ Number of blasts per delay are kept to the minimum. -fully implemented/complied.
- ☐ To adopt multi row blasting & "V" pattern of firing. -fully implemented/complied.

B] MEASURES TO IMPROVE SOCIO-ECONOMIC CONDITIONS

After Commissioning of Existing Project

- ☐ 2.5 km WBM road to connect the villages -fully implemented/complied.
- ☐ Repair of existing connecting roads in villages -fully implemented/complied.
- ☐ Repair of drainage system in Hinouti village -fully implemented/complied.
- ☐ PCL has constructed 1.6 km long & 10 m wide WBM road connecting plant to State Highway. Construction cost was Rs. 12.0 lacs and annual maintenance cost is Rs. 3.0 lacs per annum. -fully implemented/complied. The road is now fully concreted.
- ☐ PCL is contributing an amount of Rs. 13000/- per annum towards sports in the surrounding villages. -fully

implemented/complied.

- ❑ Provide drinking water to villagers in any social & religious gathering, -fully implemented/complied..

Proposed Welfare Measures

In addition to welfare measures carried out, PCL shall continue the efforts to improve the socio-economic status of the local habitants, PCL shall review the various welfare schemes going on in the area from time to time and take decisions of modification/addition of welfare schemes as per the requirement of local habitants,

Medical facility

- ❑ A dispensary has been provided in the township area for the employees and same service is extended to local populations. A mobile clinic for rural medical health care has already been provided which visit the nearby villages twice every week. -fully implemented/complied.
- ❑ Medical Centre is well equipped with all types of emergency medical equipment's e.g. emergency medicines, oxygen cylinder, electrically and manually operated suction pumps, statures etc. one well equipped ambulance containing arrangements for carrying 3 patients at a time is also provided to deal with emergencies. -fully implemented/complied.
- ❑ Medical Centre is provided full time medical officer, three nursing assistants, three helpers, & other staff. Special arrangements have been made for regular visits of child specialists and gynecologist from Satna. -fully implemented/complied.
- ❑ PCL is planning to provide pathological facility for testing of blood and urine at Medical Centre in coming year. -fully implemented/complied.

Bank & Police Station

- ❑ PCL-has-provided land & building and requisite facility to -a Nationalize (Bank & Police Station at village Mankahari. -fully implemented/complied.

Employment: most of the workers belong to the local area. **In addition to this most of the local people are engaged in indirect employment like casual labour, dhaba, supply of local items, local mechanical works-** -fully implemented/complied..

Communication

- ❑ PCL has also provided land & building to telephone exchange at village Mankahari. With the establishment of Telephone Exchange, other business opportunity for local population is widened. -fully implemented and complied.



Extensive plantation has been taken up covering the areas on either side

the lease area should be provided. The density of the trees should be at least 1600 sapling/ha. Mixed species of sapling should be selected for enhancing the bio diversity programme in the lease hold area as mentioned in EMP and supplementary note should be implemented phase wise as envisaged.

of the crusher ramp, haul roads, sides of reservoir, dump slopes and in non- mineralized areas etc. as well as some part along the lease boundary. Plantation is going on in the backfilled areas cumulative plantation(Nos.) till September 2020 is **105,468** covering 36.41 Ha



Plantation 253.326 Ha for the last 8 years

Sl. No.	Year	Total No. of Plants
1	2013-14	2500
2	2014-15	2500
3	2015-16	9000
4	2016-17	10000
5	2017-18	6000
6	2018-19	6000
7	2019-20	9073
8	2020-21 (till September)	11190

105,468 since inception

The socio-economic / community development measures including health care need to be augmented. A detailed annual action plan / time bound scheme for the socio-economic development should be submitted to the Ministry within three months.

A note on Socio economic development action plan has already been submitted to MoEF, Delhi / Bhopal vide our letter no. MIN / 0701 / 990628 dated 03.2.2000. **Annexure no. 09**

The CSR programme is common for PCL. Expenditure made during 2019-20 (Oct to March) for socio – economic / community development has been given in **Annexure No. 3.**



Uniform distribution at School Village ,Hinauti



Renovation of Hr. Sec. School at Sijahata



Cataract Operation	Toilet - Swachha Bharat
	

Pickle & Papad Making Training	
<i>Mining operations should be carried out in such a manner that inhabitants of the villages Sihata and Hinouti should not be shifted and adequate measures for socio-economic development be carried out.</i>	Mining operations are carried out taking utmost care as per Scheme of Mining approved by Indian Bureau of Mines. All blasting operations are carried out as per permissions by the DGMS and guidelines of CMFRI. Report attached as- Annexure no. 8
	The habitation of Hinauti and Sihata villages are not affected. Adequate measures for socio-economic development are carried out as per details in sl no. 9

CSR ACTIVITIES ROADMAP FY 2020-21			
S.N.	Particulars/Activity	Estimated Exp. In Lacs	Till Date
A.	INFRASTRUCTURE DEVELOPMENT	40.08	31.03.2021
B.	HEALTH & HYGIENE	32.26	31.03.2021
C.	EDUCATION	82.73	31.03.2021
D.	ENVIRONMENT CONSERVATION	106.61	31.03.2021
E.	WATER CONSERVATION & DRINKING WATER	6.28	31.03.2021
F.	EMPOWERMENT & SKILL DEVELOPMENT	24.25	31.03.2021
G.	PROMOTION OF SPORT ACTIVITIES	16.40	31.03.2021
H.	SOCIAL WELFARE	17.50	31.03.2021
I.	Grand Total	326.10	
<i>Environmental Management Cell has to be established to carry out functions relating to environmental management action plans. The Head of the Cell should directly report to the Chief Executive.</i>		Environmental Management Cell is functioning effectively, Annexure 11	
<i>Adequate fund provision (capital and recurring expenditure) should be provided for implementation of all safeguards including socio-economic programme as above. The funds should not be diverted for any other purpose (an amount of 1062.0 lakhs earmarked for pollution control measures and afforestation). Separate account would be kept for implementation of EMP measures.</i>		Adequate fund provision has been made for implementation of socio-economic programs and environment management plan and accordingly spent. The fund for pollution control measures has not been diverted to any other purposes.	

2020-21 Expenses for Environment Management (Common for the plant)	
	Year
Heads	2020-21(Rs in Lacs)
Maintenance of APCEs	14.65
Env. Monitoring, STP Operation & Maintenance, Plantation Etc.	21.02
APCE Power Consumption	207.97
Total (Rs in Lacks)	243.65

13	<i>The Ministry reserves the right to stipulate any other conditions, as may be required based on feedback etc. in the interest of environmental protection</i>	Agreed. The Ministry may provide, as it may see fit, additional conditions for protection of environment.																																																					
14	<i>The project would be monitored by the regional office of this Ministry, Bhopal / the Central Pollution Control Board / the State Pollution Control Board. The project authorities should extend full cooperation to the officers of the Regional Office by furnishing the requisite data / information / monitoring report and all provide full access to the works / records etc.</i>	Full coordination is provided to the officers of Regional Office in furnishing the requisite data/ information/ monitoring report and all access to the works/ records etc.																																																					
15	<i>Environmental compliance status vis-à-vis project implementation report specifically giving the progress of the implementation of afforestation programme, social welfare activities, including health care facilities should be submitted for the scrutiny of this Ministry and Regional Office once in 6 months regularly for regular monitoring purpose.</i>	Six monthly compliance report is submitted to RO MoEF, Bhopal and respective authorities regularly. The details are as given below:																																																					
	<table border="1"> <thead> <tr> <th rowspan="2">Year</th><th colspan="2">Lease 253.326 ha.</th></tr> <tr> <th>Dispatch no.</th><th>Date</th></tr> </thead> <tbody> <tr> <td rowspan="2">2010</td><td>MIN / 2010 – 10137</td><td>26.07.2010</td></tr> <tr> <td>MIN / 2010 – 10246</td><td>20.12.2010</td></tr> <tr> <td rowspan="2">2011</td><td>MIN / 2011 – 11193B</td><td>20.07.2011</td></tr> <tr> <td>MIN / 2011 – 11413</td><td>31.12.2011</td></tr> <tr> <td rowspan="2">2012</td><td>MIN / 2012 – 12186</td><td>20.07.2012</td></tr> <tr> <td>MIN / 2013 – 13033</td><td>15.01.2013</td></tr> <tr> <td rowspan="2">2013</td><td>MIN / 2013 – 13260</td><td>18.07.2013</td></tr> <tr> <td>MIN / 2014 – 14011</td><td>10.01.2014</td></tr> <tr> <td rowspan="2">2015</td><td>MIN / 2014 – 14202</td><td>10.07.2014</td></tr> <tr> <td>MIN / 2015 – 15017</td><td>10.01.2015</td></tr> <tr> <td rowspan="2">2016</td><td>MIN / 2016 – 16226</td><td>29.09.2016</td></tr> <tr> <td>MIN / 2017 – 17052</td><td>07.02.2017</td></tr> <tr> <td rowspan="2">2017</td><td>MIN / 2017 – 17192</td><td>09.08.2017</td></tr> <tr> <td>MIN / 2018 – 18071</td><td>09.03.2018</td></tr> <tr> <td rowspan="2">2018</td><td>MIN / 2018 – 18209</td><td>16.08.2018</td></tr> <tr> <td>MIN / 2018 – 19019</td><td>22.01.2019</td></tr> <tr> <td rowspan="2">2019</td><td>MIN / 2019 – 19125A</td><td>01.06.2019</td></tr> <tr> <td>MIN / 2019-19277</td><td>05.12.2019</td></tr> <tr> <td>2020</td><td>MIN / 2020-20112</td><td>01.06.2020</td></tr> </tbody> </table>		Year	Lease 253.326 ha.		Dispatch no.	Date	2010	MIN / 2010 – 10137	26.07.2010	MIN / 2010 – 10246	20.12.2010	2011	MIN / 2011 – 11193B	20.07.2011	MIN / 2011 – 11413	31.12.2011	2012	MIN / 2012 – 12186	20.07.2012	MIN / 2013 – 13033	15.01.2013	2013	MIN / 2013 – 13260	18.07.2013	MIN / 2014 – 14011	10.01.2014	2015	MIN / 2014 – 14202	10.07.2014	MIN / 2015 – 15017	10.01.2015	2016	MIN / 2016 – 16226	29.09.2016	MIN / 2017 – 17052	07.02.2017	2017	MIN / 2017 – 17192	09.08.2017	MIN / 2018 – 18071	09.03.2018	2018	MIN / 2018 – 18209	16.08.2018	MIN / 2018 – 19019	22.01.2019	2019	MIN / 2019 – 19125A	01.06.2019	MIN / 2019-19277	05.12.2019	2020	MIN / 2020-20112	01.06.2020
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16.	<i>The implementation of these conditions and safeguards will be enforced inter alia under the water (Prevention and Control of Pollution) Act, 1974 and the Environment (Protection) Act 1986 and the Public Liability Insurance Act 1991.</i>	All these conditions as prescribed in the water (Prevention and Control of Pollution) Act, 1974 and the Environment (Protection) Act 1986 and the Public Liability Insurance Act 1991 are complied. Annexure 4 to 6.																																																					

मध्य प्रदेश शासन
खनिज तथा भू विभाग
"संसाधन"

253.326
3/9/96

क्रमांक 3-29/95/12/ भोपाल, दिनांक
प्रति.

कलेक्टर,

जिला- सतना [मोड़ो]

विषय:- जिला सतना के ग्राम हिनोती, तिजहटा के रकबा 309.608 हेक्टर
क्षेत्र पर लाईम स्टोन खनिज हेतु मैसर्स प्रिन्स लीमिटेड लि.

संदर्भ:- आगका हा.क्र. 11एम/30/एमएल/94 दिनांक 9.3.95

मैसर्स प्रिन्स लीमिटेड लि० ने जिला सतना के ग्राम हिनोती -तिजहटा
के 309.608 हेक्टर क्षेत्र पर लाईम स्टोन खनिज के लिये खनिजदाता आवेदन पत्र
प्रस्तुत किया।

2. आवेदन पत्र का परीक्षण करने पर पाया गया कि मैसर्स प्रिन्स लीमिटेड
लिमि. द्वारा आवेदित 309.608 हेक्टर क्षेत्र में 56.282 हेक्टर क्षेत्र ऐसा नया
क्षेत्र है जो कि आवेदक को पूर्वोक्त अनुज्ञप्ति में स्वीकृत नहीं था अतः खान एवं
खनिज विनियमन एवं विकास अधिनियम 1957 की धारा 5(1) के अन्तर्गत
ऐसा क्षेत्र जो पूर्वोक्त में स्वीकृत न हो खनिजदाता में स्वीकृत नहीं किया जा सकता
अतः आवेदक को ग्राम हिनोती का 240.746 हेक्टर एवं तिजहटा का 12.580
हेक्टर कुल 253.326 हेक्टर क्षेत्र खनिजदाता में स्वीकृत हेतु उपलब्ध पाया गया।

3. आवेदित खनिज अनुसूची "एक" का खनिज होने से खान एवं खनिज
विनियमन एवं विकास अधिनियम 1957 की धारा 5(1) के अनुसार स्वीकृति
के पूर्व केन्द्रीय शासन से उनके पत्र क्रमांक 4/97/95/एम-4 दिनांक 8.8.95 द्वारा
उनका अनुमोदन प्राप्त किया गया।

4. अतः राज्य शासन द्वारा आवेदक को नीचे द्योर्हित शर्तों पर खनिजदाता
स्वीकृत किया जाता है :-

1. आवेदक का नाम

मैसर्स प्रिन्स लीमिटेड लिमिटेड

12] स्वीकृत क्षेत्र का विवरण - ग्राम हिनौली 240.746 हेक्टर

ग्राम तिजहटा 12.580 हेक्टर

कुल - 253.326 हेक्टर

13] खनिज का नाम

लाईम स्टोन

14] स्वीकृति की अवधि

20 वर्ष [जीत वर्ष] बिना नवकरण कण्डिका के

15] आवेदक कंपनी द्वारा स्थानीय क्षेत्रीय विकास कार्य हेतु स्वेच्छिक योगदान दिये जाने के संबंध में अपने पत्र दिनांक 22.7.96 से दी गई अडरटेकिंग के अनुसार जिस प्रकार अन्य बदलेधारियों से लिया जावेगा, आवेदक कंपनी को देय होगा।

16] रायल्टी / डेडरेंट अधिनियम में प्रस्तावित दर से।

17] थिपीडोलार्ड तब आदि आवश्यक हो तो किया जावे।

18] चुनावत्थर [मार्बल] डोलोमार्ड की स्थिति में -

खनि रियायत नियमावली 1960 के अन्तर्गत निर्धारित अनुबंध पत्र "के" खंड तात में शर्त क्रमांक 21 के बाद मध्य प्रदेश शासन, नैतर्गिक साधन विभाग के पु.क्र. 8814-6384/12 दिनांक 24.11.1962 द्वारा तृपित शर्त "ख" 21 "क" जोड़ी जावे।

19] आवेदक खनन किये गये चुनावत्थर का उपयोग स्थापित तीमेंट संयंत्र में करेगा।
5/- यदि आवेदक को उपरोक्त शर्त मान्य हो तो नियमानुसार जमानत राशि जमा कराकर आदेश प्राप्त होने के 6 माह के भीतर अनुबंध का निष्पादन किया जाकर अनुबंध की एक प्रति भेजी जावे।

कृपया अनुबंध निष्पादन के पूर्व यह सुनिश्चित कर लें कि आवेदक के ऊपर कितनी प्रकार का खनिज राजस्व की राशि बकाया तो नहीं है।

मध्य प्रदेश के राज्यपाल के नाम से तथा
आदेशानुसार.

र.कै. शिबेदी

अवर सचिव

मध्य प्रदेश शासन, खनिज साधन विभाग

11/3/1

पु050 3-29/95/12/1

मोपल. दिनांक 31/9/96

प्रतिलिपि:-

- 11] तथिब, भारत सरकार, ज्ञान मंत्रालय, शास्त्री ज्ञान नई दिल्ली ।
- 12] तथिब, मौखिकी तथा खनिज, रायपुर ।
- 13] डायरेक्टर जनरल आक माइन्स सेव्टी धनबाद [बिहार]
- 14] कन्ट्रोलर जनरल इन्डियन कूपरों आक माइन्स नागपुर ।
- 15] क्षेत्रीय ज्ञान निर्वहक भारतीय ज्ञान कूपरों जयपुर ।
- 16] मेसर्स प्रिन्स सीमेंट लि. राजेन्द्र नगर ततना
की ओर सूचनार्थ एवं आवश्यककार्यवाही हेतु अग्रिम ।

॥ र. के. त्रिवेदी ॥
अवर तथिब

गद्यकृदेश शासन, खनिज साधन विभाग

प्रतीवास्तव

कार्यालय कलेक्टर (खनिज-शाखा) जिला, सतना (म.प्र.)

E-mail modgmsat@mp.gov.in

पत्र क्रमांक 233/खनिज/2016

सतना दिनांक 23/11/2016

प्रति,

मेसर्स ग्रिज्म सीमेंट लिमिटेड,
तहसील रामपुर बघेलान
जिला-सतना (म0प्र0)

विषय :- खनिपट्टा ग्राम हिनौती, सिजहटा तहसील रामपुर बघेलान, जिला सतना के रकबा 253.326 हेक्टेयर क्षेत्र पर खनिज चूनापत्थर खनिपट्टा में समय वृद्धि।

संदर्भ :- आपका आवेदन पत्र दिनांक 22.01.2016 कार्यालयीन पत्र पृ0 पत्र क्रमांक 1750/खनिज/2015 दिनांक 26.10.2015।

—00—

विषयांतर्गत आपके पक्ष में जिला सतना अंतर्गत तहसील रामपुर बघेलान के ग्राम हिनौती, सिजहटा में रकबा 253.326 हे0 पर चूनापत्थर खनिपट्टा अवधि 28.09.1996 से 27.09.2016 तक स्वीकृत है। खान एवं खनिज (विकास तथा विनियमन) अधिनियम 1957 में हुए संशोधन 2015 व राज्य शासन के पत्र दिनांक 12.03.2015 के पालन में मूल स्वीकृति दिनांक से 50 वर्ष अथवा कैप्टिव माइंस हेतु 31.03.2030 समय वृद्धि का प्रावधान किया गया है। उक्त खनिपट्टे का अनुबंध निष्पादन 28.09.1996 को किया गया था जिसका एम.एम.डी.आर. 2015 के अंतर्गत अवधि 27.09.2046 तक प्रस्तावित है एवं अनुबंध निष्पादन की कार्यवाही प्रचलन में है।

उपरोक्त बावत् आपको सूचित किया जाता है कि संशोधित खनिज नियम 2015 व म0प्र0 शासन खनिज साधन विभाग भोपाल के पत्र दिनांक 12.03.2015 व चेकलिस्ट अनुसार माईनिंग प्लान/माईनिंग स्कीम व अन्य समस्त आवश्यक औपचारिकताएं पूर्ति करावे, जिससे शासन आदेशानुसार आवश्यक कार्यवाही की जा सके।

f खनि अधिकारी 23/01/16

कृते कलेक्टर जिला-सतना (म0प्र0)

भारत सरकार
खान मंत्रालय
भारतीय खान ब्यूरो
क्षेत्रीय खान नियंत्रक का कार्यालय



GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
O/O THE REGIONAL CONTROLLER OF MINES

फा0 सं0 - MP/Satna/Limestone/MPLN /MOD-81/2017-18

जबलपुर, दिनांक : 23/03/2018

सेवा में,

मे0 प्रिज्म सीमेंट लिमिटेड,
राजदीप, रीवा रोड, सतना
जिला- सतना (म0प्र0) 485001

विषय:- म0प्र0 राज्य के सतना जिले में स्थित आपकी प्रिज्म सीमेंट (ग्राम- हिनौती एवं सिजहटा)
लाइमस्टोन खान (क्षेत्र 253.326 हे0) के एमसीआर-2016 के नियम 17(3) के अंतर्गत जमा किए
गए अनुमोदित माइनिंग प्लान के लिए प्रस्तुत संशोधन का अनुमोदन।

- संदर्भ :-1) आपके द्वारा जमा किये गये प्रक्रिया शुल्क की रसीद संख्या J/661, दि0 09/02/2018,
आपका/क्यू0पी0 का पत्र, दि0 05/02/2018 एवं 15/03/2018।
2) इस कार्यालय का समसंख्यक पत्र दि0- 08/03/2018।

महोदय,

In exercise of the powers conferred by the Clause (b) of Sub-section (2) of Section 5 of Mines and Minerals (Development and Regulation) Amendment Act, 2015 read with Government of India Order no. S.O.1857(E), dated 18/05/2016, I hereby **approve** the above said Modification in approved Mining Plan including Progressive Mine Closure Plan submitted under Rule 17(3) of Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2016. This approval is subject to the following conditions:

- 1 The Modification in approved Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
- 2 The proposals shown on the plates and /or given in the document is based on the lease map /sketch submitted by the applicant/ lessee and is applicable from the date of approval.
- 3 It is clarified that the approval of aforesaid Mining Plan does not in any way imply the approval of the Government in terms of any other provision of Mines & Minerals (Development & Regulation) Amendment Act, 2015, or the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under, Mines Act, 1952 and Rule & Regulations made there under.
- 4 Indian Bureau of mines has not undertaken verification of the mining lease boundary on the ground and does not undertake any responsibility regarding correctness of the boundaries of the leasehold shown on the ground with reference to lease map & other plans furnished by the applicant / lessee.
- 5 At any stage, if it is observed that the information furnished, data incorporated in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
- 6 The Financial Assurance submitted by you for Rs. 6,83,84,100/- (Rs. Six Crore Eighty Three Lakh Eighty Four Thousand One Hundred only) is valid up to 31/03/2021 and next Financial Assurance shall be submitted on or before 31/03/2021.
- 7 This approval is restricted in respect of proposals given in the document for the period from 2018-19 to 2020-21 with validity up to 31/03/2021, subject to all other statutory clearances.
- 8 If the approval conflicts with any other law or court order/direction under any statute, it shall be revoked immediately.
- 9 The modification in approved mining plan is approved subject to extension of period of mining lease as per Mines and Minerals (Development and Regulation) Amendment Act 2015.
- 10 This approval is restricted to Major Mineral only and any reflection of minor mineral in the document is under purview of State Government.
- 11 As per Madhya Pradesh State Government's order dated 10/08/2011 if there is enhancement of production proposed from that in the approved scheme of mining under such circumstances additional stamp duty has to be paid by the lessee for the enhances quantum of production and also a supplementary agreement has to be made by the lessee.

संलग्न:-अनुमोदित संशोधित माइनिंग प्लान की एक प्रति के साथ।

भवदीय

23rd March, 2018

(रजनीश पुरोहित)
क्षेत्रीय खान नियंत्रक
भारतीय खान ब्यूरो, जबलपुर

PRISM JOHNSON LIMITED
CSR ACTIVITIES EXPENSE SUMMARY FY 2019-20 (CEMENT+HRJ)

SR.	PARTICULAR	DESCRIPTION OF CSR ACTIVITY	AMOUNT BUDGETED IN LAKH	AMOUNT EXPENSED IN LAKH
1	Infrastructure Development	Construction and repairing of roads, bus shelters, cremation sheds and other rural infrastructure development activities in nearby villages	50.25	49.91
2	Health & Hygiene	Health Check-up, Medical Camps and construction of toilets at nearby villages	34.69	34.93
3	Drinking Water	Availability of potable water through Installation Hand pumps with bore well and water tanker	14.72	6.88
4	Education	Repairing & Maintenance School Buildings and providing sitting facilities for school children in villages near the plants, repairing of Anganwadies	27.17	28.99
5	Environment	Plantation in nearby villages, construction of water harvesting structures, deepening of ponds, construction of stop dam etc	94.85	104.05
6	Skill Development / Empowerment	Vocational training programs organization & Farmers Training	27.10	24.33
7	Promotion of sports activities	Development of Playground	19.04	18.54
8	Social Welfare	Providing equipment and other assistance required as per development activity and Disaster required as per development activity and Disaster relief during natural calamity	12.60	12.29
	TOTAL		280.42	279.92

PRISM JOHNSON LIMITED, MANKAHARI, SATNA (M.P.)
CSR ACTIVITY EXPENSE SUMMARY FY 2019-20 (CEMENT+HRJ)

AS on 31-03-2020

AS on 31-03-2020										
(1)	(2)	(3)	(4)		(5)	(6)		(7)	(8)	(9)
Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementing agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overheads:			
INFRASTRUCTURE DEVELOPMENT (CSR ACT SCHEDULE VII - X)										
1	Construction of WBM road at Mallahan Tola Chulhi (150 meters)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.00	0.88		0.88	Direct	
2	Levelling of road near Chulhi turning with display board (600 M3)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.00	1.23		1.23	Direct	
3	Construction of concrete wall for protection of River Bank East side along stair case (33 meter)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	4.00	4.30		4.30	Direct	
4	Construction of bus shelter at village Kadaila	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Mahurachh Kadaila	Satna Madhya Pradesh	2.50	2.13		2.13	Direct	
5	Construction of bus shelter at village Bairiha	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bairiha	Satna Madhya Pradesh	2.50	2.27		2.27	Direct	
6	Construction of bus shelter at village Narsinghpur (Chhibaura Turning)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh	2.50	2.13		2.13	Direct	
7	Repairing and white wash of Primary health Centre at Sijahata (2000 sqft)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Sijahata	Satna Madhya Pradesh	2.50	1.08		1.08	Direct	
8	Repairing and white Veterinary health Centre at Sijahata (2000 sqft)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Sijahata	Satna Madhya Pradesh	2.50	1.57		1.57	Direct	
9	Renovation of bahuuddeshiya Bhavan at Rampur Baghelan	Rural Infrastructure Development Schedule VII (X)	Rampur Baghelan	Satna Madhya Pradesh	8.05	12.87		12.87	Direct	
10	Construction of cremation shed at Bairiha	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bairiha	Satna Madhya Pradesh	4.50	4.02		4.02	Direct	
11	Construction of cremation shed at Majhiyar	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Majhiyar	Satna Madhya Pradesh	4.50	1.88		1.88	Direct	
12	Construction of cremation shed at Chulhi village (Continue work from FY 18-19)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Majhiyar	Satna Madhya Pradesh	1.60	1.95		1.95	Direct	
13	Repairing & Whitewash of cremation shed at village Hinauti	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	0.20	0.11		0.11	Direct	
14	Repairing & Whitewash of cremation shed at village Bathiya	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bathiya	Satna Madhya Pradesh	0.20	0.21		0.21	Direct	
15	Repairing & Whitewash of cremation shed at village Baghai	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Baghai	Satna Madhya Pradesh	0.20	0.28		0.28	Direct	
16	Repairing of community centre at Baghai	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Baghai	Satna Madhya Pradesh	2.00	1.53		1.53	Direct	
17	Repairing of community centre at Chulhi village	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Malgaon	Satna Madhya Pradesh	2.50	2.17		2.17	Direct	
18	Repairing of culvert at Baghai on Sijahata Deviji road	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Baghai	Satna Madhya Pradesh	4.00	4.70		4.70	Direct	
19	Construction of culvert near Semaliya Baba Mallahan Tola Chulhi	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Malgaon	Satna Madhya Pradesh	3.00	3.17		3.17	Direct	
20	Construction of parapet at Chulhi Culvert	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.00	1.43		1.43	Direct	
			SUB TOTAL		50.25	49.91		49.91		

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementin g agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overhea ds:			
HEALTH & HYGIENE (Health & Hygiene Schedule VII (i))										
1	Organisation of mega medical camp at village Bairiha (Attended 656 patients on 19.10.2019)	Health & Hygiene Schedule VII (i)	Gram Panchayat Bairiha	Satna Madhya Pradesh	0.70	0.75		0.75	Direct	
2	Organisation of mega medical camp at village Majhiyar (Attended 378 patients on 21.12.2019)	Health & Hygiene Schedule VII (i)	Gram Panchayat Majhiyar	Satna Madhya Pradesh	0.70	0.66		0.66	Direct	
3	Organisation of mega medical camp at village Chormari (Attended 539 patients on 30.11.2019)	Health & Hygiene Schedule VII (i)	Gram Panchayat Chormari	Satna Madhya Pradesh	0.70	0.69		0.69	Direct	
4	Organisation of mega medical camp at village Badhaura (Attended 480 patients on 18.01.2020)	Health & Hygiene Schedule VII (i)	Gram Panchayat Badhaura	Satna Madhya Pradesh	0.70	0.67		0.67	Direct	
5	Organisation of mega medical camp at village Mahurachh Kadaila (Attended 286 patients on 05.03.2020)	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	0.70	0.82		0.82	Direct	
6	Organisation of mega medical camp at village Sijahata (Attended 365 patients on 02.01.2020)	Health & Hygiene Schedule VII (i)	Nearby Gram Sijahata	Satna Madhya Pradesh	0.70	0.55		0.55	Direct	
7	Weekly Mobile health van visit to nearby villages Attended 1131 patients from Apr to Mar-20	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	9.80	10.20		10.20	Direct	
8	Free consultation & medicines distribution from PCL Medical centre Out door patient to nearby villagers (Attended 25773 patients from Apr to Mar-20)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh		0.00		0.00	Direct	
9	Organisation eye Camp for cataract patients from nearby villages (20 Nos.)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.70	1.66		1.66	Implementing Agency	Shri Sadguru Seva Sangh Trust Chitrakoot, Satna (M.P.)
10	24 hrs ambulance facility to nearby villagers free of cost. (Attended 1800 patients from Apr to Mar - 20)	Health & Hygiene Schedule VII (i)	Gram Panchayat Mankahari	Satna Madhya Pradesh	7.00	6.55		6.55	Direct	
11	Construction of ODF Toilets at Village Chulhi (10 nos)	Health & Hygiene Schedule VII (i)	Gram Panchayat Malgaon	Satna Madhya Pradesh	2.82	2.64		2.64	Direct	
12	Construction of ODF Toilets at Village Bairiha (10 nos)	Health & Hygiene Schedule VII (i)	Gram Panchayat Bairiha	Satna Madhya Pradesh	2.82	2.65		2.65	Direct	
13	Operation & Maintenance of Sulabh Complex at Mahurachh Turning (12 months)	Health & Hygiene Schedule VII (i) (Swatch Bharat Abhiyaan)	Gram Panchayat Mahurachh Kadaila	Satna Madhya Pradesh	0.36	0.30		0.30	Direct	
14	Construction of ODF Toilets at Baghai village (15 Nos.) (Continue work from 18-19)	Health & Hygiene Schedule VII (i) (Swatch Bharat Abhiyaan)	Gram Panchayat Baghai	Satna Madhya Pradesh	3.00	3.79		3.79	Direct	
15	Construction of Toilets block at Gadab Villages	Health & Hygiene Schedule VII (i) (Swatch Bharat Abhiyaan)	Gadab village, Pen Talika	Maharashtra	2.50	2.50		2.50	Direct	
16	Health Camp at Gadab Village	Health & Hygiene Schedule VII (i) (Swatch Bharat Abhiyaan)	Gadab village, Pen Talika	Maharashtra	0.50	0.50		0.50	Direct	
			SUB TOTAL		34.69	34.93		34.93		
WATER CONSERVATION & DRINKING WATER (Safe Drinking Water Schedule VII (i))										
1	Providing water Tankers for drinking purpose as required (157 tankers)	Safe Drinking Water Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	5.77	2.46		2.46	Direct	

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementing agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overheads:			
2	Operation of water Hut in summer Season at Mahurachh turning (From Apr to June)	Safe Drinking Water Schedule VII (i)	Gram Panchayat Mahurachh	Satna Madhya Pradesh	0.50	0.24		0.24	Direct	
3	Installation of RO at Governmetn Degree College Rampur Baghelan.	Safe Drinking Water Schedule VII (i)	Rampur Baghelan	Satna Madhya Pradesh	0.45	0.31		0.31	Direct	
4	Installation of new Hand pump with bore well at Hinauti	Safe Drinking Water Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	1.00	0.46		0.46	Direct	
5	Installation of new Hand pump with bore well at Badarkha	Safe Drinking Water Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	1.00	0.47		0.47	Direct	
6	Installation of new Hand pump with bore well at Bairiha	Safe Drinking Water Schedule VII (i)	Gram Panchayat Bairiha	Satna Madhya Pradesh	1.00	0.53		0.53	Direct	
7	Installation of new Hand pump with bore well Majhiyar	Safe Drinking Water Schedule VII (i)	Gram Panchayat Majhiyar	Satna Madhya Pradesh	1.00	0.48		0.48	Direct	
8	Installation of new Hand pump with bore well at Chulhi village (02 Nos)	Safe Drinking Water Schedule VII (i)	Gram Panchayat Malgaon	Satna Madhya Pradesh	2.00	0.93		0.93	Direct	
9	Installation of new Hand pump with bore well Baghai near Hanuman Ji temple and Kolan Basti (02 nos.)	Safe Drinking Water Schedule VII (i)	Gram Panchayat Baghai	Satna Madhya Pradesh	2.00	1.00		1.00	Direct	
				SUB TOTAL	14.72	6.88		6.88		
EDUCATION (Promoting Education Schedule VII (ii))										
1	Repairing, maintenance and white wash of Government Middle School building at Bairiha (1600 sqft)	Promoting Education Schedule VII (ii)	Gram Panchayat Bairiha	Satna Madhya Pradesh	2.00	1.58		1.58	Direct	
2	White wash of Government Primary School Majhiyar (1200 sqft)	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.50	1.31		1.31	Direct	
3	Construction of boundary wall at Govt. Middle School Chulhi (80 meter)	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	4.00	4.91		4.91	Direct	
4	White wash of Government Middle & Primary School Chormari (1200 sqft)	Promoting Education Schedule VII (ii)	Gram Panchayat Chormari	Satna Madhya Pradesh	2.00	2.34		2.34	Direct	
5	White wash of Government Middle & Primary School Badarkha	Promoting Education Schedule VII (ii)	Gram Panchayat Hinauti	Satna Madhya Pradesh	1.00	1.60		1.60	Direct	
6	White wash of Government Middle School Chulhi (1200 sqft)	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.00	1.34		1.34	Direct	
7	Roof Water Proofing at Govt Middle School Chulhi	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	0.50	0.92		0.92	Direct	
8	Electrical fitting at Government Middle School Bairiha	Promoting Education Schedule VII (ii)	Gram Panchayat Bairiha	Satna Madhya Pradesh	0.50	0.75		0.75	Direct	
9	Electrical fitting at Government Primary School Majhiyar	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	0.50	0.39		0.39	Direct	
10	Electrical fitting at of Government Middle School Chulhi	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	0.50	0.55		0.55	Direct	

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementin g agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overhea ds:			
11	Providing of 32 Desk table and 06 sets Teachers tables to Government Middle school Chulhi	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.50	1.56		1.56	Direct	
12	Providing of Desk table to Government Primary school Majhiyar (11 table)	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	0.50	0.41		0.41	Direct	
13	Uniform distribution to student of Government Middle school Chulhi (61 students)	Promoting Education Schedule VII (ii)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.50	0.47		0.47	Direct	
14	Providing Desk table to Government Higher Secondary school Bairiha (50 desk table)	Promoting Education Schedule VII (ii)	Gram Panchayat Bairiha	Satna Madhya Pradesh	2.25	1.88		1.88	Direct	
15	Wall paintings and slogans writing on walls at nearby villages pertaining to health & hygiene, education, self reliance, empowerment and other awareness themes (200 nos.)	Promoting Education Schedule VII (ii)	Nearby villages	Satna Madhya Pradesh	0.72	0.72		0.72	Direct	
16	Renovation of Anganwadi - 2 At Baghai village (500 sqft)	Promoting Education Schedule VII (ii)	Gram Panchayat Baghai	Satna Madhya Pradesh	3.05	2.41		2.41	Direct	
17	Repairing & Whitewash of Govt Primary School Barha Tola Sijahata (Continue Work from 18-19)	Promoting Education Schedule VII (ii)	Gram Panchayat Sijahata	Satna Madhya Pradesh	2.65	0.97		0.97	Direct	
18	Repairing and Whitewash of Sardar Patel School Badarkha (Continue Work from FY 18-19)	Promoting Education Schedule VII (ii)	Gram Panchayat Hinauti	Satna Madhya Pradesh		0.90		0.90	Direct	
19	Essay Competition on Single Use Plastic at Government Hr. Sec. School Bamhauri	Promoting Education Schedule VII (ii)	Govt. Hr. Sec. School Bamhauri	Satna Madhya Pradesh		0.14		0.14	Direct	
20	Grouting of Road side sign display board From Mahurachh Turning to Hinauti Turning for making awareness on road safety	Promoting Education Schedule VII (ii)	Gram Panchayat Bathiya	Satna Madhya Pradesh		0.67		0.67	Direct	
21	Installation of drum for road safety (70 Nos) From Mahurachh Turning to Hinauti Turning for making awareness on road safety	Promoting Education Schedule VII (ii)	Gram Panchayat Bathiya	Satna Madhya Pradesh		0.56		0.56	Direct	
22	Soil filling at Govt Primary School Majhiyar	Promoting Education Schedule VII (ii)	Govt Primary School Majhiyar	Satna Madhya Pradesh		1.61		1.61	Direct	
23	providing assistance to develop basic infrastructure at Gadab School	Promoting Education Schedule VII (ii)	Gadab village, Pen Taluka	Maharashtra	1.50	1.00		1.00	Direct	
				SUB TOTAL	27.17	28.99		28.99		
ENVIRONMENT CONSERVATION (Environment Conservation Schedule VII (iv))										
1	Installation of 100 tree guards with plants at Bamhauri villages (From July to Oct)	Environment Conservation Schedule VII (iv)	Gram Panchayat Bathiya	Satna Madhya Pradesh	1.50	1.23		1.23	Direct	
2	Survival & Maintenance of plantation at Sijahata & Baghai (73150 plants)	Environment Conservation Schedule VII (iv)	Gram Panchayat Sijahata & Baghai	Satna Madhya Pradesh	13.17	11.41		11.41	Direct	

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementing agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overheads:			
3	Survival & Maintenance and irrigation of Hinauti turning to Hinauti village plantation (11000 plants)	Environment Conservation Schedule VII (iv)	Gram Panchayat Hinauti	Satna Madhya Pradesh	4.98	0.84		0.84	Direct	
4	Distribution of fruit plant saplings and plantation at Nearby villages (3000 Plants Between July to Oct)	Environment Conservation Schedule VII (iv)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.26	0.42		0.42	Direct	
5	Construction of 02 water harvesting structures at Bairiha villages	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Bairiha	Satna Madhya Pradesh	0.76	0.73		0.73	Direct	
6	Construction of 02 water harvesting structures at Baghai	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	0.76	0.70		0.70	Direct	
7	Construction of 02 water harvesting structures at Chulhi	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Chulhi	Satna Madhya Pradesh	0.76	0.66		0.66	Direct	
8	Construction of 02 water harvesting structures at Majhiyar	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Malgaon	Satna Madhya Pradesh	0.76	0.62		0.62	Direct	
9	Construction of 02 water harvesting structures at Bamhauri Bathiya	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Bathiya	Satna Madhya Pradesh	0.76	0.62		0.62	Direct	
10	Deepening of Ponds at Baghai village (Total deepening Area =11400 M3 (100*76*1.5)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	17.16	12.34		12.34	Direct	
11	Single bore shaft construction at Baghai Pond	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh		1.38		1.38	Direct	
12	Double bore shaft construction at Baghai Pond	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh		2.41		2.41	Direct	
13	Deepening of Ponds at Narsinghpur village(Total deepening Area =172800 M3 (100*80*1.8)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh	15.48	13.62		13.62	Direct	
14	Single bore shaft construction at Narsinghpur Pond	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh		1.56		1.56	Direct	
15	Removing of Boulder Narsinghpur Pond (120*80M)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh		1.87		1.87	Direct	
16	Construction of stop dam at Baghai village at Bairiha Nala near Baghai Village	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	12.00	14.98		14.98	Direct	
17	Installation of 20 nos solar lights at Baghai village	Environment Conservation Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	2.00	2.78		2.78	Direct	
18	Repairing and maintenance of solar street lights at Bamhauri village (18 nos.)	Environment Conservation Schedule VII (iv)	Gram Panchayat Bathiya	Satna Madhya Pradesh		0.18		0.18	Direct	
19	Installation of 20 nos solar lights at Chulhi village	Environment Conservation Schedule VII (iv)	Gram Panchayat Malgaon	Satna Madhya Pradesh	2.00	2.78		2.78	Direct	
20	Plantation and development of new area at Satari village (30000 plants in 14 acre)	Environment Conservation Schedule VII (iv)	Gram Panchayat Satari	Satna Madhya Pradesh	10.00	12.27		12.27	Direct	
21	Providing & Laying of Hume pipe at newly constructed pond Baghai (Continue work from 18-19)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	0.50	0.24		0.24	Direct	
22	Construction of Check Dam at Baghai (Continue Work 18-19)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Baghai	Satna Madhya Pradesh	4.00	7.21		7.21	Direct	

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementing agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overheads:			
23	Construction of Drum based Water Harvesting Structure at Narsinghpur-75, Mankahari-50 and Mahurachh 75 Nos. (200 Nos.)	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Mankahari, Narsinghpur and Mahurachh	Satna Madhya Pradesh	4.00	8.70		8.70	Direct	
24	Installed of 02 Nos Reverse Vending Machine at Railway Station Satna on 17.12.2019	Conservation of Natural Resources Schedule VII (iv)	Railway Station Satna	Satna Madhya Pradesh	3.00	4.50		4.50	Direct	
				SUB TOTAL	94.85	104.05		104.05		
EMPOWERMENT & SKILL DEVELOPMENT Vocational Skill Development Schedule VII (ii)										
1	Training program for driver with license making for at least 200 incumbents (04 Batch of 50 nos.)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	6.00	3.83		3.83	Direct	Direct
2	Training program for Computer application for 60 students from nearby villages.	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	3.00	3.00		3.00	Implementing Agency	Bhavan's Prism School, Prism Johnson Limited, Mankahari, Satna
3	Training program for Stitching for 100 Person from nearby villages. (02 Batch of 50 nos.)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	8.60	8.50		8.50	Implementing Agency	Bhavani Ajivika Marauha
4	Training program for Beautician for 100Person from nearby villages. (02 Batch of 50 nos.)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	4.00	3.75		3.75	Implementing Agency	Slim Beauty & Shine Satna (M.P.)
5	Training program for carry bag making for 50 incumbents from nearby villages (01 batch of 50 nos.)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.50	1.75		1.75	Implementing Agency	Bhavani Ajivika Marauha
6	Training program for agarbatti making for 50 incumbents from nearby villages (01 batch of 50 incumbents)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.50	1.25		1.25	Implementing Agency	Bhavani Ajivika Marauha
7	Training program for candle making for 50 incumbents from nearby villages (01 batch of 50 incumbents)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.50	1.25		1.25	Implementing Agency	Bhavani Ajivika Marauha
8	Organising skill development training programs and providing sewing machines in Gadab village Pen Taluka	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Maharastra	1.00	1.00		1.00		
				SUB TOTAL	27.10	24.33		24.33		
PROMOTION OF SPORT ACTIVITIES (Promotion of Sports Schedule VII (vii))										
1	Construction of Boundary wall at Playground Mankahari village road side (130 meters)	Promotion of Sports Schedule VII (vii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	8.54	7.52		7.52	Direct	
2	Construction of Boundary wall at Playground Baghai village (130 meters meter one side)	Promotion of Sports Schedule VII (vii)	Gram Panchayat Baghai	Satna Madhya Pradesh		9.08		9.08	Direct	
3	Provides financial support to Mahatma Jyotiba Phule Khel Aum Samajik Sanstha Mankahari for Organising Cricket Tournament at Mankahari (For Purchasing of Cricket Kit 02 Sets) from 28.12.2019	Promotion of Sports Schedule VII (vii)	Mankahari	Satna Madhya Pradesh	10.50	0.44		0.44	Implementing Agency	Mahatma Jyotiba Phule Khel Aum Samajik Sanstha Mankahari, Satna (M.P.) Regd No.: 05/26/02/13639/17 Mob. 9425885820
4	Financial Assistance to for Kabaddi & Others to Dist Amateur Kabaddi Association Satna	Promotion of Sports Schedule VII (vii)	Satna	Satna Madhya Pradesh		1.50		1.50	Implementing Agency	District Amateur Kabaddi Association Satna (M.P.) Regd No. 4068/75 Mob.: 9752027978
				SUB TOTAL	19.04	18.54		18.54		
SOCIAL WELFARE Social Welfare Schedule VII (iii)										

Sl.No	CSR project or activity Identified.	Sector in which the project is covered	Projects or programs		Amount outlay (budget) project or programs wise (Rs. In Lacs)	Amount spent on the projects or programs (Rs. In Lacs)		Cumulative expenditure up to the reporting period	Amount sent: Direct or through implementing agency*	Details of implementing agency*
			(1) Local area or other	(2) Specify the state and district where projects or programs was under taken		(1) Direct expenditure on project or programs	(2) Overheads:			
1	Monthly contribution to Dr. Lalta Prasad Khare public Charitable Trust Nimi Babupur for Maintenance of Old Age home	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Gram Panchayat Nimi, Babupur	Satna Madhya Pradesh	6.50	6.00		6.00	Through Implementing Agency	Dr. Lalta Prasad Khare Public Charitable Trust, Nimi Babupur, Satna (M.P.)
2	Financial assistance for treatment to Cancer patients (Ramjeet Saket)	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Gram Panchayat Hinauti	Satna Madhya Pradesh		0.50		0.50	Direct	
3	Wheel Chairs to Handicapped peoples (35 nos.) (District Rehabilitation Centre Satna)	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Satna	Satna Madhya Pradesh	6.10	1.50		1.50	Direct	
4	Financial Assistance to Shri Gurudeo Samajik Sanstha Palghar, MH	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Palghar	Palghar, Maharastra		1.75		1.75	Implementing Agency	Shri Gurudeo Samajik Sanstha Palghar, MH
5	50 nos. dustbins provided at Municipal Corporation Chitrakoot on 26.10.2019	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Chitrakoot	Satna Madhya Pradesh		0.26		0.26	Direct	
6	Financial Assistance to Maa Bhagwati Jan Kalyan Samiti for renovation of hostel of Sanskrit College at Chitrakoot	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Chitrakoot	Chitrakoot Uttar Pradesh		1.51		1.51	Implementing Agency	Maa Bhagwati Jan Kalyan Samiti, Nidhiyawan, PO Bamrauli, Distt-Kaushambi, Uttar Pradesh-212201, Regd No. AL28577
7	Distributed 100 sets thermo cot inner wear to Senior Citizens at Satna on 17.12.2019	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Satna	Satna Madhya Pradesh		0.25		0.25	Direct	
8	Contribution for Amalgamated Special Fund (Armed Forces Flag Day)	SOCIAL WELFARE Social Welfare Schedule VII (iii)	Satna	Satna Madhya Pradesh		0.52		0.52	Implementing Agency	District Welfare Office Satna
				SUB TOTAL	12.60	12.29		12.29		
		GRAND TOTAL			280.42	279.92		279.92		

Prism Cement Limestone Mine 253.326 Hect: Modification of Mining Plan_2018-19 to 2020-21

exploration activities are completed. As on 1st January 2018 the total reserves of this mine are 28.73 million tonnes.

Annual requirement of Limestone is about 9.0 million tonnes. It is proposed to mine about 3.00 million tonnes of Limestone every year from this ML area. Remaining quantity will be met from other leases of the Company. Based on the proposed production capacity, the life of the mine is about 9.5 years which is likely to extend as reserves are enhanced post exploration activates.

Conceptual Exploration:

The exploration has been carried out by the GEM Division of M/s ACC Ltd. Overall three leases in village Hinauti & Sihhatta. The spacing of BH are at 200 x 200 mtrs. 23 boreholes has been completed in the current 2 years period. Now, it is proposed to carry out remaining drilling during this proposal periods from 2018-19 to 2020-21 and there will be no conceptual exploration in the mining lease area. The proposed locations where drilling will be carried out is shown in the Plate No. - IV.

Table No. 2.14

As on Date			During Proposal Period			During Conceptual Period		
Type	Quantum No. / Size	Area Covered (Ha.)	Type	Quantum No. / Size	Area Covered (Ha.)	Type	Quantum No. / Size	Area Covered (Ha.)
Pits	--	--	Pits			Pits		
Trench	--	--	Trench			Trench		
BH	59 + 16 + 23	253.236 (Large Grid)	BH	36	(200X200 Grid) 253.236 Ha (2 nd Band)	BH		
Other	--	--	Other			Other		

All exploration will be conducted in the proposal period there is no proposal to extended activities in to conceptual period.

Surface Geological Plan and Sections have been given in the Plate No. - IV and Plate No. - V respectively showing the locations of the boreholes drilled and ultimate pit limit.

Conceptual development:

Following Pits will be available at the end of Conceptual Period:

Table No. 2.15

S. No.	Pit Name/ No.	Broken Area (Ha)	Pit Bottom Area (Ha)	Surface RL (Range)	Pit Bottom RL (Lowest)	Maximum No. of Benches on any side of Pit			Overall Slope
						Type	Bench No.	Avg. Height	
1	Pit-1	121.17	104.85	288-295	273	Soil	1	1	45°
						Waste Rock	-	-	
						Limestone	2	6	
2	Pit-2	47.54	26.54	291-299	243	Soil	1	1	45°
						Waste Rock	3	8	
						Limestone	5	6	
Total		168.71	131.39						

Ore to be generated during conceptual period = 66,898,737 Tonnes
Waste Rock to be generated during conceptual period = 23,568,600 M³ (Cum)
Soil to be generated during conceptual period = 1,113,912 M³ (Cum)

Plan period 2021-26:

The opening balance reserve for this period is proposed to be at 6.52 million tons after generating 15.00 million tons for the plan period of 2016-21. The ore proposed to be exploited in this period is 6.5 Million tons. The working is proposed to be between pit located between N -1208 to 361 and E -20 to 638, occupying an area of 10.3 ha.. The second working from where mineral is proposed to be exploited will be located between N 2560 to 2885 and E 507 to 1134 in an area of 10.82 ha.. The working will be limited to two to three benches in mineral. The residual reserves at the end of this plan period area proposed to be at 0.00 million tons.



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Conceptual OB Dump Management:

The inter burden of saly limestone ranges from 16 to 26 mts thin soil cover of 1 to 6 mts covers the area left out of current mining activities .It is proposed to utilize the Waste rock in backfilling the mined out area. Plantation will be carried out over it after spreading 1 mtr. thick soil cover. No external dumping will be done during rest of life of the mine. Entire quantity of soil and waste rock to be generated will be utilized in backfilling purpose in mined out area.

(A) Present Position

a) Following Soil dumps will be available at at present:

TABLE NO. 2.16

Dump No.	Type Active/ Inactive	Quantity (M ³)	Quantity (Tonnes)	Base Area (M ²)	Base Area (Ha.)	Avg. Height (M)	Area stabilized	Location
S1	Inactive	97281	155649	28366	2.83	3	Terracing & Gentle slope	1241E to 1528E and -86N to -351N
S2	Inactive	144105	230568	13410	1.34	13	Temporary in pit Soil Storage	1315E to 1447E & -271N to -411N
Total		241386	386217	41776	4.17			

b) Following Waste dumps are available in the area at present:

Dump No.	Type Active/ Inactive	Quantity (M ³)	Quantity (Tonnes)	Base Area (M ²)	Base Area (Ha.)	Avg. Height (M)	Area stabilized	Location
D1	Active	821892	2054730	47907	4.79	17	Temporary in pit Dumping	621E to 850E and -1205N to -1517N
Total		821892	2054730	47907	4.79			



Signed/Approved

(B) Proposal Period Position

a) **Following Soil dumps will be available at the end of Proposal Period:**

Table No. 2.17

Dump No.	Type Active/ Inactive	Quantity (M ³)	Quantity (Tonnes)	Base Area (M ²)	Base Area (Ha.)	Avg. Height (M)	Area stabilized	Location
S1	Inactive	97281	155649	28366	2.83	3	Terracing & Gentle slope	1241E to 1528E and -86N to -351N
S2	Inactive	144105	230588	13410	1.34	13	Temporary in pit Soil Storage	1315E to 1447E & -271N to -411N
Total		241386	386217	41776	4.17			

b) **Following Waste dumps will be available at the end of Proposal Period:**

Table No. 2.18

Dump No.	Type Active/ Inactive	Quantity (M ³)	Quantity (Tonnes)	Base Area (M ²)	Base Area (Ha.)	Avg. Height (M)	Area stabilized	Location
D1	Active	821892	2054730	47907	5.79	27	Temporary in pit Dumping	571E to 860E and -1205N to -1517N
Total		821892	2054730	47907	5.79			

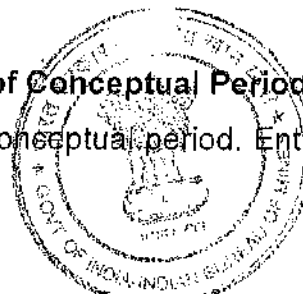
(C) Conceptual Period Position

a) **Following dumps will be available at the end of Conceptual Period:**

No dumps (soil & Waste Rock) will be available at the conceptual period. Entire soil and waste rock will be used for backfilling.

4.5 Conceptual Reclamation & Rehabilitation:

The mining lease area is about 248 Ha. Area will be disturbed by mining activity out of which 80 Ha mined out area will be reclaimed and rehabilitated by way of backfilling and plantation at the end of life of the mines and rest of the area i.e. 168 Ha. will be developed as water reservoir for recharging the water table of the area.



APPROVED

Table No. 2.19

Status	Mined Out Area (Ha)	Reclamation by Backfilling (Ha)	Rehabilitation (Ha)			Rehabilitation of Dump by Comp. & Afforestation	Protective measures for dumdum (GD/RW/ST)
			By Plantation on Backfilled area	By Water Reservoir	Total		
At Present	55.12	49.5	19.09	14.3	33.39	--	--
At the end of Scheme Period	22.91	16.71	7.68	0	7.68	--	--
At the end of Conceptual Period	248	80.0	80.0	168.0	248	--	--

The exploration in the lease is underway. The ultimate area (size) of the pit will be around 248 Ha. Whereas, ultimate depth of the pit will be about 60 m. and ultimate pit slope will be 45° .

Pit position as on date, proposed pit position at the end of scheme period and ultimate pit size at the end of life of the mine will be as shown in Conceptual Plan in Plate No. – XI and in section along with proposed Conceptual Plan is given in Plate No. – XII.

B. UNDERGROUND MINING:

NOT APPLICABLE



SIGNATURE / APPROVED

Debarshi

Senapati

Adhikari

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An approved Laboratory from Ministry of Environment, Forest and Climate Change, Govt. of India, New Delhi

FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ1/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT AIR*

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

Sl. No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			24.09.2020	24.09.2020	24.09.2020	24.09.2020	
1	PM _{2.5} (µg/m ³)	NAAQM guide line volume - I by CPCB	32.80	34.50	40.60	37.90	60
2	PM ₁₀ (µg/m ³)	IS:5182 (Part-23)	62.10	64.80	72.20	69.20	100
3	SO ₂ (µg/m ³)	IS:5182 (Part-2)	10.85	9.65	12.40	12.60	80
4	NO _x (µg/m ³)	IS:5182 (Part-6)	14.65	17.85	17.10	19.80	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.45	0.55	0.50	0.55	02

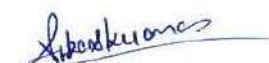
*The results are related only to item tested.

Note:

L1= Near PCL Colony L2=Near Guest House,
 L3= Near Crusher Unit-II L4= Near Admin. Building

Standards:

SI = Ambient Air Quality Standard for Residential, Industrial & Rural Other Area


 Analyst


 Authorized Signatory


 Quality Manager

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FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ2/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT AIR

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

Sl. No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			21.09.2020	21.09.2020	21.09.2020	21.09.2020	
1	PM _{2.5} (µg/m ³)	NAAQM guide line volume - I by CPCB	45.80	38.40	30.50	29.70	60
2	PM ₁₀ (µg/m ³)	IS:5182 (Part-23)	69.20	65.80	49.20	58.10	100
3	SO ₂ (µg/m ³)	IS:5182 (Part-2)	10.10	14.30	13.70	14.80	80
4	NO _x (µg/m ³)	IS:5182 (Part-6)	17.50	18.20	19.60	20.50	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.55	0.45	0.30	0.25	02

*The results are related only to item tested.

Note:

L1= Nr Mines Site Office

L2= Near Western Block Garden,

L3=Village Hinauti

L4= Village Sijahata

Standards:

SI = Ambient Air Quality Standard for Residential, Industrial & Rural Other Area

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FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ3/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT AIR

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

Sl. No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			25.09.2020	25.09.2020	25.09.2020	25.09.2020	
1	PM _{2.5} (µg/m ³)	NAAQM guide line volume - I by CPCB	29.80	36.50	40.10	37.10	60
2	PM ₁₀ (µg/m ³)	IS:5182 (Part-23)	54.40	50.30	55.60	68.80	100
3	SO ₂ (µg/m ³)	IS:5182 (Part-2)	10.10	11.80	11.60	10.10	80
4	NO _x (µg/m ³)	IS:5182 (Part-6)	12.85	16.20	16.80	15.80	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.45	0.35	0.40	0.45	02

*The results are related only to item tested.


Note:

L1= Adiwasia Tola (Nr Bagahai ML Area) L2= At Baisan Tola (Nr. Bagahai ML Area),
 L3=South Side of Working Pit (Bagahai Mines) L4= Near Boundary Pillar No.64 Bagahai

Standards:

S1 = Ambient Air Quality Standard for Residential, Industrial & Rural Other Area


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FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF WORK PLACE AIR MONITORING

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

Sl. No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			22.09.2020	22.09.2020	22.09.2020	22.09.2020	
1	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	NAAQM guide line volume - I by CPCB	50.80	45.60	49.80	45.40	60
2	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	IS:5182 (Part-23)	79.20	82.30	80.60	78.10	100
3	SO ₂ ($\mu\text{g}/\text{m}^3$)	IS:5182 (Part-2)	17.80	14.70	12.10	10.90	80
4	NO _x ($\mu\text{g}/\text{m}^3$)	IS:5182 (Part-6)	18.20	16.30	17.90	15.40	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.55	0.50	0.52	0.45	02

*The results are related only to item tested.

Note:

L1= Near Cement Mill Unit -II

L2= Near Railway Yard,

L3= Near Packing Plant

L4= Kiln Unit-II

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FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ5/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT AIR

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

SL No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			25.09.2020	25.09.2020	25.09.2020	25.09.2020	
1	PM _{2.5} (µg/m ³)	NAAQM guide line volume - I by CPCB	30.10	33.70	29.50	27.20	60
2	PM ₁₀ (µg/m ³)	IS:5182 (Part-23)	62.10	75.60	64.90	48.10	100
3	SO ₂ (µg/m ³)	IS:5182 (Part-2)	8.95	12.40	13.10	12.20	80
4	NO _x (µg/m ³)	IS:5182 (Part-6)	12.80	15.30	20.80	19.30	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.50	0.45	0.40	0.45	02

*The results are related only to item tested.

Note:

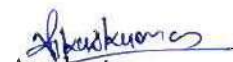
L1=Nr. Nar Nala Bridge,


L2= Nr. Medhi Mines Boundary Pillar No 28

L3=Nr. Medhi Mines Boundary Pillar No.23 L4= Village Malgaon

Standards:

S1 = Ambient Air Quality Standard for Residential, Industrial & Rural Other Area


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FORMAT NO. ECO/QS/FORMAT/10

TEST REPORT NO: ECO LAB/AAQ6/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT AIR

Name of the Company : M/s Prism Johnson Ltd.
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Sampling Method : IS: 5182
 Instrument Used : FDS & RDS

Sl. No.	Tests Conducted	Method	Result				Limit as per National Ambient Air Quality Standards
			L1	L2	L3	L4	
			22.09.2020	22.09.2020	22.09.2020	22.09.2020	
1	PM _{2.5} (µg/m ³)	NAAQM guide line volume - I by CPCB	27.90	25.20	29.80	30.10	60
2	PM ₁₀ (µg/m ³)	IS:5182 (Part-23)	42.50	57.20	47.50	58.30	100
3	SO ₂ (µg/m ³)	IS:5182 (Part-2)	10.05	12.80	12.65	11.70	80
4	NO _x (µg/m ³)	IS:5182 (Part-6)	13.85	18.20	16.20	18.60	80
5	CO (mg/m ³)	IS:5182 (Part-10)	0.25	0.40	0.35	0.30	02

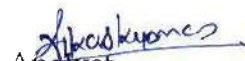
*The results are related only to item tested.


Note:

L1=Village Badarkha L2= Village Hinauta
 L3= Village Chulhi L4= Village Kulhari

Standards:

S1 = Ambient Air Quality Standard for Residential, Industrial & Rural Other Area


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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO: ECO LAB/DW/1243/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF DRINKING WATER*

Name of the Company : M/s. Prism Johnson Ltd.
 Address of the Company : Village Markahari, Tehsil Rampur Baghelan
 Distt. Satna (M.P.)
 Sampling Method : APHA/IS: 3025
 Sample Collected by : Mr. Maan Singh
 Sample Quantity : As per requirement.
 Date of Sampling : 22.09.2020
 Date of Receiving : 23.09.2020
 Date of Analysis : 24.09.2020 to 27.09.2020
 Source of Sample : Plant Site - Bore Well
 Sample ID Code : ELW-12586

Sl. No.	TESTS	PROTOCOL	RESULT	Detection Range	INDIAN STANDARDS as per IS 10500:1991(Reaff:2012)	
					Desirable	Permissible
1.	Colour (Hazen unit)	APHA, 23 rd Ed. 2017, 2120-B	<5.0	5-100	5.00	15.0
2.	Odour	APHA, 23 rd Ed. 2017, 2150-B	Agreeable	Qualitative	Agreeable	Agreeable
3.	Taste	APHA, 23 rd Ed. 2017, A+B	Agreeable	Qualitative	Agreeable	Agreeable
4.	Turbidity as (NTU)	APHA, 23 rd Ed. 2017, 2130-A+B	BDL	1 - 100	1.0	5.0
5.	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	7.29	2.0 - 12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	532.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+B	128.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	192.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	48.0	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	17.49	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	36.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.35	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	92.3	1.0 - 250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	10.23	5.0 - 100	45.0	No Relax.
15.	Manganese as Mn (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	BDL	0.1-5	0.10	0.30
16.	Zinc as Zn (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	0.11	0.02-50	5.0	15
17.	Lead as Pb (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	BDL	0.01-2	0.01	No Relax.
18.	Cadmium as Cd (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	BDL	0.002-2	0.003	No Relax.
19.	Nickel as Ni (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	BDL	0.02-5	0.02	No Relax.
20.	Arsenic as As (mg/l)	APHA, 23 rd Ed. 2017, 3114 C	BDL	0.01-2	0.01	0.05
21.	Total Chromium as Cr (mg/l)	APHA, 23 rd Ed. 2017, 3111 - A+B	BDL	0.04-10	0.05	No Relax.
22.	Mercury as Hg (mg/l)	APHA, 23 rd Ed. 2017, 3112 A+B	BDL	0.001-1	0.001	No Relax.
23.	Copper as Cu (mg/l)	APHA, 23 rd Ed. 2017, 3111 A+B	BDL	0.05-5	0.05	1.5
24.	Boron as B (mg/l)	APHA, 23 rd Ed. 2017, 4500 B A+C	0.25	0.2 - 10	0.5	1.0
25.	Aluminium as Al (mg/l)	APHA, 23 rd Ed. 2017 (3111-A+B)	BDL	1.0-100	0.03	0.2
26.	Free Residual Chlorine (mg/l)	APHA, 23 rd Ed. 2017, 4500-Cl B	BDL	0.5-10	0.20	1.0
27.	Sulphide as H ₂ S (mg/l)	APHA, 23 rd Ed. 2017, Reprint 2007	BDL	0.04-10	0.05	No Relax.
28.	Iodide as I (mg/l)	APHA, 23 rd Ed. 2017, 4500 - IB	BDL	0.1-10	-	-
29.	Iron as Fe (mg/l)	APHA, 23 rd Ed. 2017, 3500 Fe B	0.15	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, 9221 B+C	Absent	1-8	Absent	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, 9221B+E	Absent	1-8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit
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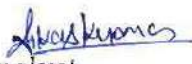

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FORMAT NO. ECO/QS/FORMAT/23 REPORT NO: ECO LAB/Piezo/GW/1243/09/20
TEST REPORT ISSUE DATE:**REPORT OF WATER LEVEL MEASUREMENT**

Name of the Customer : M/s. Prism Johnson Ltd.
Address of the Customer : Village - Mankahari,
Tehsil - Rampur Baghelan
Distt.Satna (M.P.)
Measurement by : Mr. Maan Singh
Date of Measurement : September 22th, 2020

Sl. No.	Piezometer Name.	Water Level (meter)
1.	Near Colony Gate	6.4
2.	In front of Den	2.5
3.	Behind B Block Colony	2
4.	Behind C block colony	1.5
5.	Near New Magzine Mines	10.7
6.	Mines near Ramprasan	9.3
7.	Mankahari Mines	15.8
8.	Western Block Mines	7.6
9.	Mendhi Mines	4.5
10.	Near Auto workshop	10.6
11.	Rose Garden near boundry	11
12.	Rose Garden near Road	8.9


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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN1/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT NOISE LEVEL

Name of the Company : **M/s Prism Johnson Ltd.**
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 21.09.2020 to 23.09.2020
 Instrument Description : Noise Meter (Make:HTC)
 Test Method : IS: 4412, Part-1 & 2, 1991

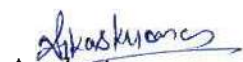
Sl. No.	Locations	Day Time Leq Value in dB(A)	Night Time Leq Value in dB(A)
1.	Near PCL Colony	44.80	40.20
2.	Near Guest House	47.50	42.60
3.	Near Crusher Unit-II	60.10	51.70
4.	Near Admin. Building	55.90	49.30


Noise (Ambient Standard)

Area Code	Category of area	Limit in dB (A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

- Day time is reckoned in between 6:00 AM and 10:00 PM.
- Night time is reckoned in between 10:00 PM and 6:00 AM
- Silence zone is defined as area up to 100m around such premises as hospitals, educational institutions & courts. The silence zones are to be declared by a competent authority.
- Mixed categories of areas should be declared as one of the four above-mentioned categories by the competent authority and the corresponding standard shall apply.


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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN2/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT NOISE LEVEL

Name of the Company : **M/s Prism Johnson Ltd.**
 Hinauti- Sijahata &
 Mankahari Limestone mines
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 21.09.2020 to 23.09.2020
 Instrument Description : Noise Meter (Make-HTC)
 Test Method : IS: 4412, Part-1 & 2, 1991

Sl. No.	Locations	Day Time Leq Value in dB(A)	Night Time Leq Value in dB(A)
1.	At Mines site Office	60.85	52.90
2.	Near Western Block Garden	56.10	51.40
3.	Village Hinauti	44.85	38.10
4.	Village Sijahata	46.60	36.80

Noise (Ambient Standard)

Area Code	Category of area	Limit in dB (A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

- Day time is reckoned in between 6:00 AM and 10:00 PM.
- Night time is reckoned in between 10:00 PM and 6:00 AM
- Silence zone is defined as area up to 100m around such premises as hospitals, educational institutions & courts. The silence zones are to be declared by a competent authority.
- Mixed categories of areas should be declared as one of the four above-mentioned categories by the competent authority and the corresponding standard shall apply.

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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN3/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT NOISE LEVEL

Name of the Company : **M/s Prism Johnson Ltd.**
 Address of the Company : Medhi Limestone mines
 Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna(M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 21.09.2020 to 23.09.2020
 Instrument Description : Noise Meter (Make-HTC)
 Test Method : IS: 4412, Part-1 & 2, 1991

Sl. No.	Locations	Day Time Leq Value in dB(A)	Night Time Leq Value in dB(A)
1.	Near Nar Nala Bridge	44.80	38.20
2.	Near Medhi Mines Boundary Pillar No28	50.60	41.60
3.	Near Medhi Mines Boundary Pillar No23	54.30	48.20
4.	Village Malgaon	45.90	42.40

Noise (Ambient Standard)

Area Code	Category of area	Limit in dB (A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

- Day time is reckoned in between 6:00 AM and 10:00 PM.
- Night time is reckoned in between 10:00 PM and 6:00 AM
- Silence zone is defined as area up to 100m around such premises as hospitals, educational institutions & courts. The silence zones are to be declared by a competent authority.
- Mixed categories of areas should be declared as one of the four above-mentioned categories by the competent authority and the corresponding standard shall apply.

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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN4/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT NOISE LEVEL

Name of the Company : **M/s Prism Johnson Ltd.**
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna(M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 21.09.2020 to 23.09.2020
 Instrument Description : Noise Meter (Make:HTC)
 Test Method : IS: 4412, Part-1 & 2, 1991

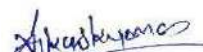
Sl. No.	Locations	Day Time Leq Value in dB(A)	Night Time Leq Value in dB(A)
1.	At AdiwasiTola	50.80	43.10
2.	At BaisanTola	47.50	37.80
3.	South Site of Working Pit	54.60	50.90
4.	Near Boundary Pillar No.64	55.30	49.50

Noise (Ambient Standard)

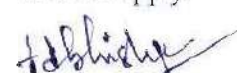
Area Code	Category of area	Limit in dB (A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

- Day time is reckoned in between 6:00 AM and 10:00 PM.
- Night time is reckoned in between 10:00 PM and 6:00 AM
- Silence zone is defined as area up to 100m around such premises as hospitals, educational institutions & courts. The silence zones are to be declared by a competent authority.
- Mixed categories of areas should be declared as one of the four above-mentioned categories by the competent authority and the corresponding standard shall apply.


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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN5/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF AMBIENT NOISE LEVEL

Name of the Company : **M/s Prism Johnson Ltd.**
 Address of the Company : Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna(M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 21.09.2020 to 23.09.2020
 Instrument Description : Noise Meter (Make:HTC)
 Test Method : IS: 4412, Part-1 & 2, 1991

Sl. No.	Locations	Day Time Leq Value in dB(A)	Night Time Leq Value in dB(A)
1.	Village Badarkha	45.10	40.90
2.	Village Hinauta	48.60	37.90
3.	Village Chulhi	44.90	40.40
4.	Village Kulhari	44.30	38.50

Noise (Ambient Standard)

Area Code	Category of area	Limit in dB (A) Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Day time is reckoned in between 6:00 AM and 10:00 PM.
2. Night time is reckoned in between 10:00 PM and 6:00 AM
3. Silence zone is defined as area up to 100m around such premises as hospitals, educational institutions & courts. The silence zones are to be declared by a competent authority.
4. Mixed categories of areas should be declared as one of the four above-mentioned categories by the competent authority and the corresponding standard shall apply.

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FORMAT NO. ECO/QS/FORMAT/13

TEST REPORT NO: ECO LAB/AN1/09/20

TEST REPORT ISSUE DATE: 30.09.2020

TEST REPORT OF NOISE LEVEL SURVEY

Name of the Customer : M/s Prism Johnson Ltd.
 Address of the Customer : Village Mankahari
 Tehsil Rampur Baghelan
 District- Satna (M.P.)
 Sample Collected by : Mr. Maan Singh
 Date of Monitoring : 24.09.2020 to 26.09.2020
 Instrument Description : Noise Meter (Maske:HTC)

Sl. No.	Locations	Leq Value in dB(A)	Protective Measures Adopted
Dozer-155 A			
1	Operator's cabin idle running	64.8	Ear muff provided
2	Operator's Cabin running on load	81.6	Ear muff provided
Poclain 300 CK			
3	Operator's cabin idle running	73.8	Ear muff provided
4	Operator's Cabin while loading	76.3	Ear muff provided
HAULPAK-PH 40			
5	Operator's Cabin while being loaded	72.4	Ear muff provided
6	Operator's Cabin while hauling	74.5	Ear muff provided
7	Operator's Cabin unloading in the hopper of crusher	88.6 (For 20 Second)	Ear muff provided
8	Alarm (while Reversing of dumper)	102.0	Short Duration
ATLASCOPCODRILL			
9	Operator's point while drilling	82.8	Ear muff provided
ROCKBREAKER			
10	Operator's Cabin	73.5	Ear muff provided
HEAVY BLASTING (INSTANTANEOUS)			
11	Blasting shelter	102.2	Momentary
12	At safe zone	84.9	
AMBIENT NOISE LEVEL DURING WORKING HOURS			
13	Office Campus, Mines workshop, Outfield (Haul Road)	72.8	-
14	Office Campus, Mines Workshop, Outfield (Haul Road) (at Night)	60.2	-

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Confidential

CSIR - CENTRAL INSTITUTE OF MINING & FUEL RESEARCH
(Council of Scientific & Industrial Research)
Barwa Road, Dhanbad – 826 015



Report on

Study and advice for optimization of blast design parameters at Prism Cement Limestone Mine of M/s Prism Cement Limited to control ground vibration, air overpressure/noise and flyrocks within safe limits for the safety of houses/structures in the periphery of the mine when blasting is to be performed at 50 m and beyond



PROJECT NO.: CNP/4491/2016-17

FEBRUARY 2017

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REPORT ON

Study and advice for optimization of blast design parameters at Prism Cement Limestone Mine of M/s Prism Cement Limited to control ground vibration, air overpressure/noise and flyrocks within safe limits for the safety of houses/structures in the periphery of the mine when blasting is to be performed at 50 m and beyond

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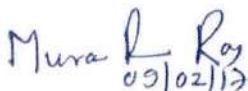
NOTE

This report is meant for internal use of the sponsor of the study and it should not be published in full or part by the sponsor. It should not be communicated or circulated to outside parties except concern departments. However, CSIR-CIMFR reserves the right to publish the results of investigation for the benefit of the mining industry.

The recommendations are based on the results of investigation carried out at Prism Cement Limestone Mine of M/s Prism cement Limited. It is hoped that the recommendations will be implemented to get optimum results without hampering production, productivity and safety of the mine. The recommendations are guidelines, which should be implemented in letter and spirit.

Since, the day-to-day blasting operations are not in the control of CSIR-CIMFR, the research team will not be held responsible for any untoward incident caused due to blasting.

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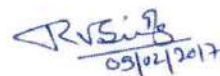

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EXECUTIVE SUMMARY

This report relates to the study conducted by CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad to study and advice for optimization of blast design parameters at Prism Cement Limestone Mine of M/s Prism Cement Limited, Satna to control ground vibration within safe limits for the safety of structures in the periphery of the mine with improved production and productivity. The study involved trials with varying blast designs and charging patterns, monitoring of ground vibration, air over-pressure/noise at various locations in the periphery of the mines. The ejections of flyrock from blasting operations were also monitored. The results of investigation, analyses of data and recommendations, made thereof, are summarised below:

- ❖ Fifteen blasts were conducted at different benches of the Prism Cement Limestone Mine of M/s Prism Cement Limited, Satna and 60 blast induced ground vibration data were recorded in the periphery of the mine.
- ❖ Maximum vibration recorded from production hole blast was 31.0 mm/s at 50 m. The blast was conducted at 15 no. Goyal face of Prism Cement Limestone Mine. The total explosive weight and explosive weight per delay were 710 kg and 50 kg respectively.
- ❖ The maximum air over-pressure was recorded from the blast conducted at 15 no. Goyal face on 26.12.16. The recorded air over-pressure was 137.8 dB(L) at 100 m distance from face. In this blast, explosives detonated in a blasting round and explosives weights per delay were 1125 and 75 kg respectively.
- ❖ There was no ejection of flyrock in any of the blast. The blasts were initiated with Nonel initiating system and electronic initiation system from the bottom of the hole and experimented blast designs ensured non-ejection of flyrocks.
- ❖ All the recorded vibration data were well within the safe limit at the houses/structures concerned. The dominant peak frequencies of ground vibrations were in the range of 11.4 to 129 Hz. FFT analysis of blast vibration frequencies confirmed that concentration of frequencies is in band of 13.3 - 40.3 Hz. So, the safe level of vibration has been taken as 10 mm/s for the safety of houses/structures of the surrounding villages as per DGMS standard.
- ❖ Propagation equation for the prediction of blast vibration has been established and is given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to maintain vibration within safe limit for distances of houses/structures concerned. For convenience, the recommended explosive weight per delay has been computed and is given in Table A3.

- ❖ Attempts were made to record the vibration from 50 to 250 m in most of the blasts and accordingly the explosives to be detonated in the delay and total amount of explosives to be fired has been computed and is given in the text in view of future blasting operations at 50 m and beyond.
- ❖ The delay interval between the holes in a row should be 17 ms whereas between the rows, it should be 65 ms or more depending upon the number of rows and effective burden. If the numbers of rows are more than two, the delay interval between rows should be increased by 15% in successive rows.
- ❖ It is recommended that the existing Nonel initiation system should be continued in the blasting operations. The sub-grade drilling should be 0.3 to 0.5 m for a blasthole depth of 6 to 7 m and should be initiated from the bottom of the hole.
- ❖ The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs Annexure as Figures A1-A2, will also ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mine.

1. Introduction

The Joint President- Commercial of M/s Prism Cement Limited entrusted CSIR-Central Institute of Mining & Fuel Research (CIMFR), Dhanbad, vide letter no. PCL/LOI/16-17/CIMFR/365 dated 06.12.2016 for a scientific study and advice for optimization of blast design parameters for deep hole blasting at Prism Cement Limestone Mine of M/s Prism Cement Limited, Satna to control ground vibration within safe limits for the safety of structures in the periphery of the mine with improved production and productivity.

The Rock Excavation Engineering (erstwhile Blasting Department) Research team of CSIR-Central Institute of Mining & Fuel Research, Dhanbad carried out field investigations during December 21-26, 2016. Altogether, fifteen blasts were conducted and blast induced ground vibration & air over-pressure/noise were monitored at various locations in the periphery of the Prism Cement Limestone Mine of M/s prism Cement Limited. The monitoring locations were back-side of the blast free face and in the left flank of the blast free face.

2. Location and geology

The Prism Cement Limestone Mine is situated at about 15 km North-East of Satna railway station. The mining lease area lies between longitude 80°57'31" to 80°58'28" East and Latitude 24°36'47" to 24°37'16" North. The limestone deposit of the mine falls in the Bhandar series of Upper Vindhyan System and is Upper Vindhyan in age. The general topography of the area is without any remarkable relief and forms a more or less flat terrain with a general dip of approximately 2°- 6° towards South between S10°W and S5°E. The area is completely devoid of any forest and the topographic elevation varies from 312 m (north direction) to 300 m (south direction) above MSL.

The limestone deposit in the mine occurs in two horizontal bands separated by a shaley limestone. The Vindhyan formations are broadly classified into lower calcareous and an upper arenaceous facies. The Bhandar limestone varying in thickness from about 5 to 15 m lies as a calcareous horizon in the upper arenaceous rocks. The Bhandar Limestone deposit of the area is the dominant rock type and overlain by Sirbu shale (0 – 2 m thick). It is widely jointed with two sets of joints along and across strike. The overview of the Prism Cement Limestone Mine is presented in Photograph 1.



Photograph 1. The overview of Prism Cement Limestone Mine of M/s Prism Cement Limited.

3. Instrumentations

Blast induced vibrations were monitored by seismographs namely MiniMate Plus, MiniMate Blaster and MiniMate DS-077 (Made in Canada by M/s Instantel Inc.). MiniMate plus are eight as well as four channel seismographs provided with two/one tri-axial transducer(s) for monitoring vibration (in mm/s) and two/one channel(s) for monitoring air over-pressure/noise in dB(L). MiniMate Blaster and MiniMate DS-077 are four channel seismographs provided with one tri-axial transducer for monitoring vibration (in mm/s) and one channel for monitoring of air over-pressure/noise in dB(L). All the seismographs record vibration in three directions i.e. Longitudinal (L), Vertical (V) and Transverse (T). They also record principal frequency of vibration and compute the peak vector sum of the vibration.

Explosives and delay detonators must provide the energy and timing for the blasts used under specific blasting conditions. The DataTrapII data/VOD recorder of M/s MREL, Canada is used to document the VOD performance of the explosives and delay time of delay detonators during blasts to compare the actual VOD and delay time results to the published specification.

4. Blasting details

Fifteen blasts including fourteen production blasts and one signature hole blast were conducted on different benches of Prism Cement Limestone Mine. The number of blast holes detonated in production blasting varied from 14 to 84. The diameters of deep blast holes were 115 mm. The depth of blast holes varied from 2.5 to 6 m and the explosives loaded in a hole varied from 2.8 to 35 kg. The explosives weight per delay ranged between 2.8 to 96 kg. Total

explosive weight detonated in a round of production blast varied between 58.4 and 2678 kg. Out of fifteen trial blasts five were conducted using Nonel initiation system and rest 10 were blasted with the help of electronic initiation system. The vibration measuring distances varied from 50 to 250 m. Details of blast design parameters experimented during the period of investigation are given in Annexure as Table A1.

Vibrations were monitored in terms of peak particle velocity (PPV) that varied from 0.73 mm/s to 31.0 mm/s in case of production blast depending upon the distance of measuring transducers of seismographs from the blasting face and the amount of explosives detonated in particular delay of the blast. The recorded levels of air over-pressure ranged from 110.2 – 137.8 dB(L). Recorded blast induced ground vibrations and air over-pressure are presented in Annexure as Table A2.

The blast movement and ejection of rock, if any, were monitored for each blast. There was no ejection of flying fragments. Precaution was taken by using blasting mate on the blastholes. Photograph 2 depicts the charging of the 15 no. RPL bench and use of blasting mate at 7050 RIL blast face to prevent flyrock.



Photograph 2. The charging of the 15 no. RPL bench and use of blasting mate at 7050 RIL blast face to prevent flyrock.

5. Analyses of recorded vibration data

Ground vibrations data recorded were grouped together for statistical analysis. An empirical relationship has been established correlating the maximum explosive weight per delay (Q_{\max} in kg), distance of vibration measuring transducers from the blasting face (R in m) and recorded peak particle velocity (v in mm/s). The established equation for the mine is:

$$v = 200.34 * \left(\frac{R}{\sqrt{Q_{\max}}} \right)^{-1.126} \quad (1)$$

Correlation co-efficient = 87.8 %

Where,

v = Peak particle velocity (mm/s)

R = Distance between vibration monitoring point and blasting face (m)

Q_{\max} = Maximum explosive weight per delay (kg)

The above equation is site specific and applicable only for Prism Cement Limestone Mine. It may be used to compute the maximum explosive weight to be detonated in a delay for distances of concern from the blasting site. The regression plot of vibration data recorded at their respective scaled distances is presented in Figure 1.

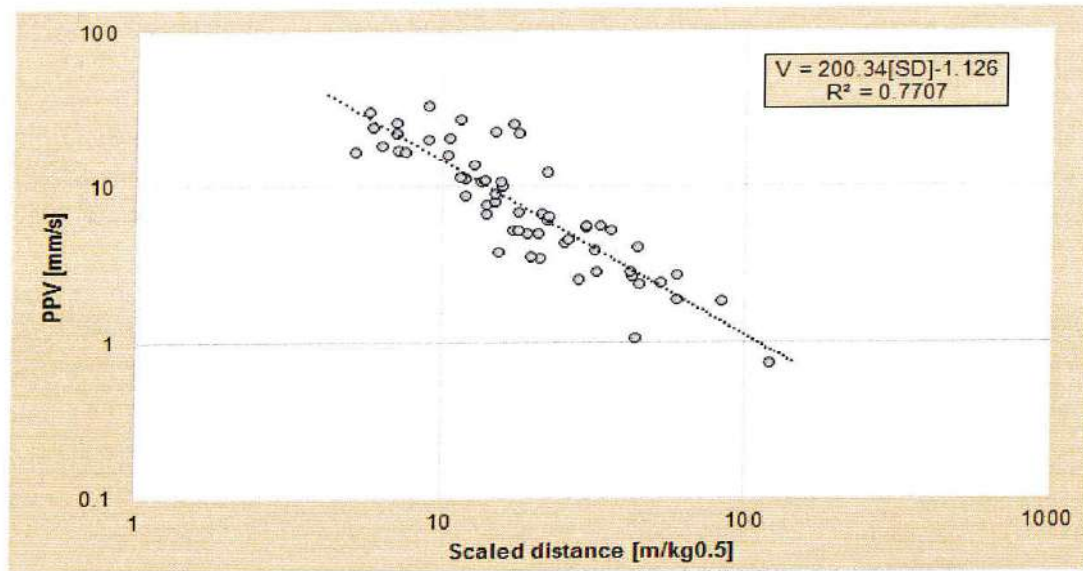


Figure 1. Regression plot of recorded PPV with their respective scaled distances.

5.1 Frequency of blast vibration

The dominant peak frequencies of ground vibrations recorded were in the range of 11.4 - 129 Hz whereas the most common range lies between 13.3 to 40.3 Hz. Most of the vibration measuring stations were on compact ground surfaces. The dominant peak frequency recorded at corresponding monitoring locations is presented in Figure 2. The blast wave signature recorded at Shankkar Ji temple of Hinauti village (Distance - 200 m; PPV - 5.29 mm/s) from the blast conducted at New Pit 01 bench of Prism Cement Limestone Mine is depicted in Figure 3 and its Fast Fourier Transform (FFT) analysis of frequency is shown in Figure 4. The blast wave signature recorded at the house of Shri Umesh Prasad from the blast conducted at 15 No. Goyal face bench is shown in Figure 4. Fast Fourier Transform (FFT) analysis of frequency of the vibration signature is presented in Figure 5. The Fast Fourier Transform (FFT) analysis of frequencies indicate high frequency vibrations recorded in blasting. The view of blast vibration monitoring in the periphery of the mine are shown in Photographs 3.

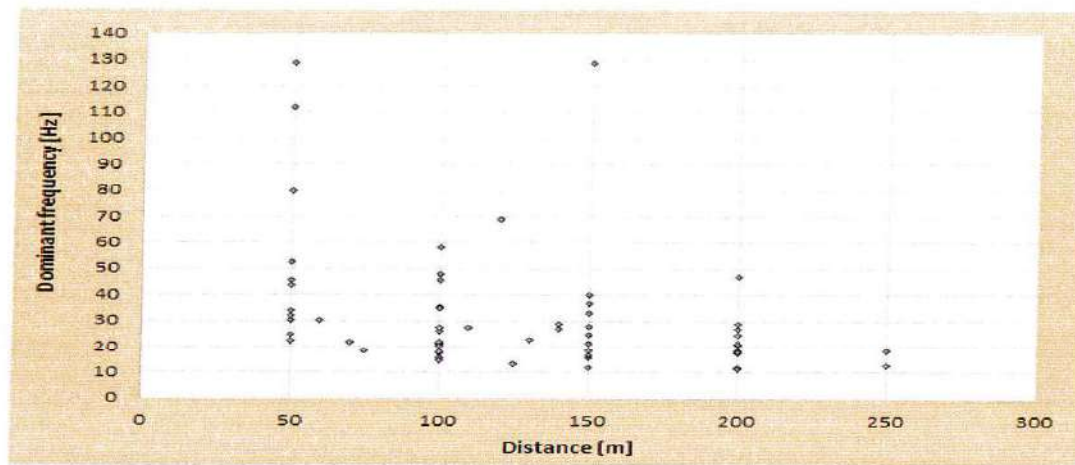


Figure 2. Plot of dominant frequency with respect to respective distances.

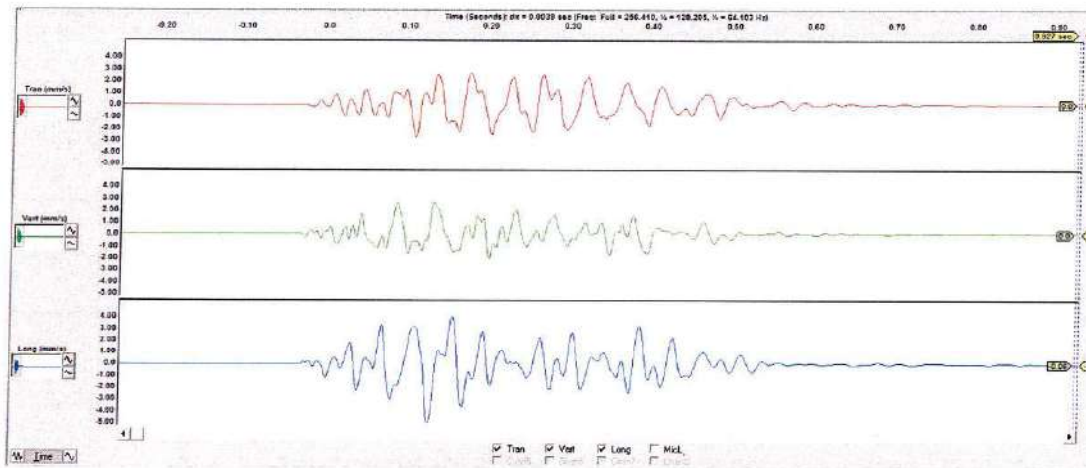


Figure 3. Blast wave signature recorded at Shankarji temple of Hinauti village from the blast conducted at New Pit 01 blastface of Prism Cement Limestone Mine.

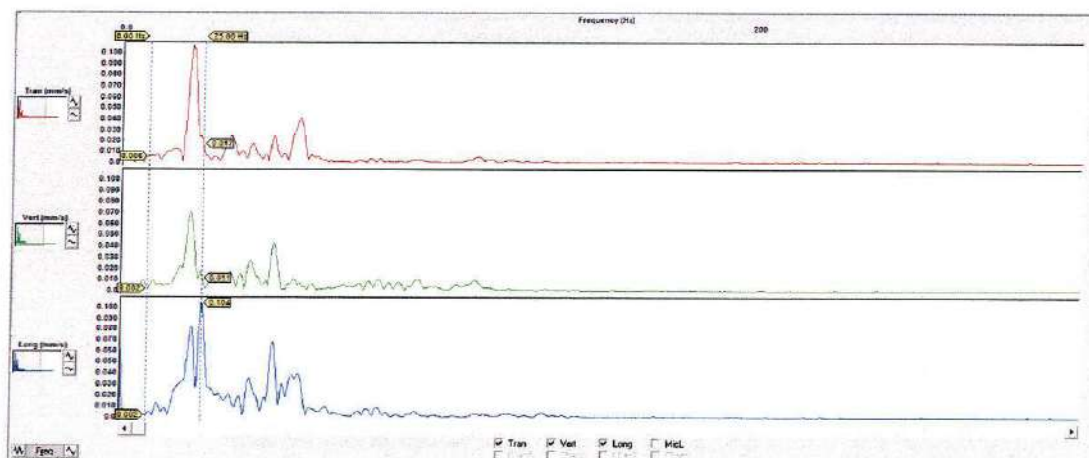


Figure 4. FFT analyses of frequencies of vibration presented in Figure 3.

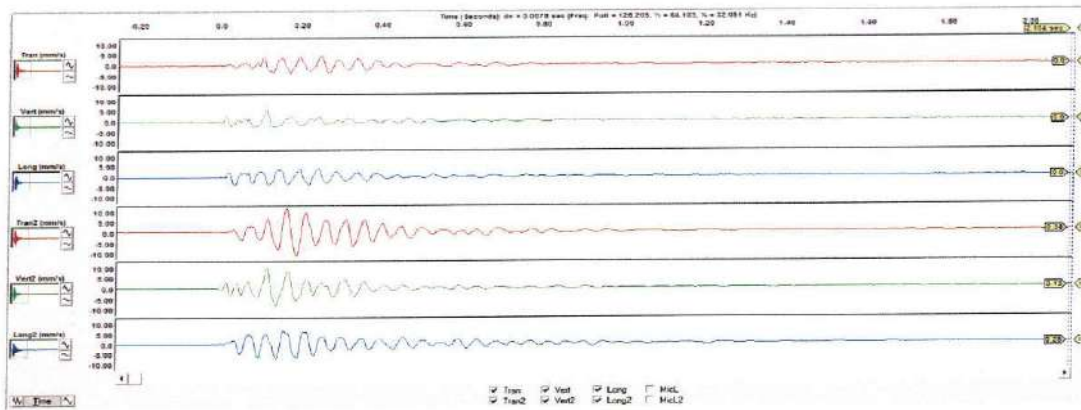


Figure 4. Blast wave signature recorded on the ground surface and roof of the house of Shri Umesh Prasad from the blast conducted at 15 No. Goyal face bench of Prism Cement Limestone Mine.

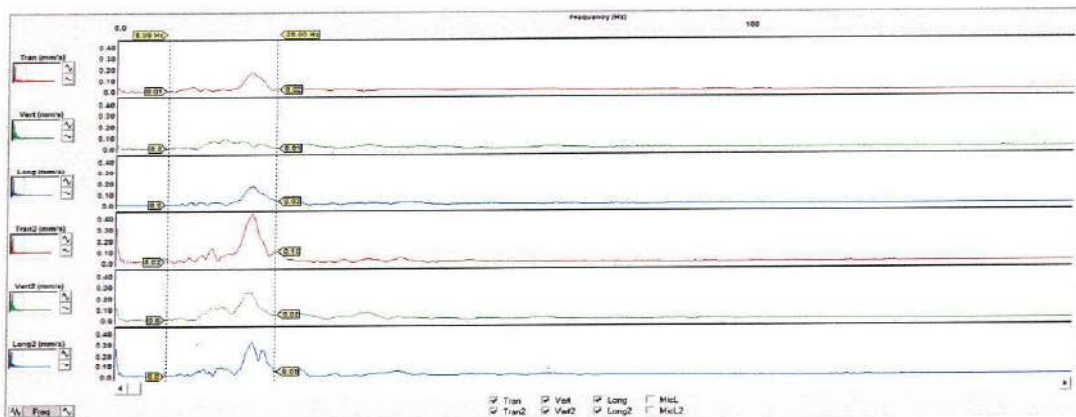
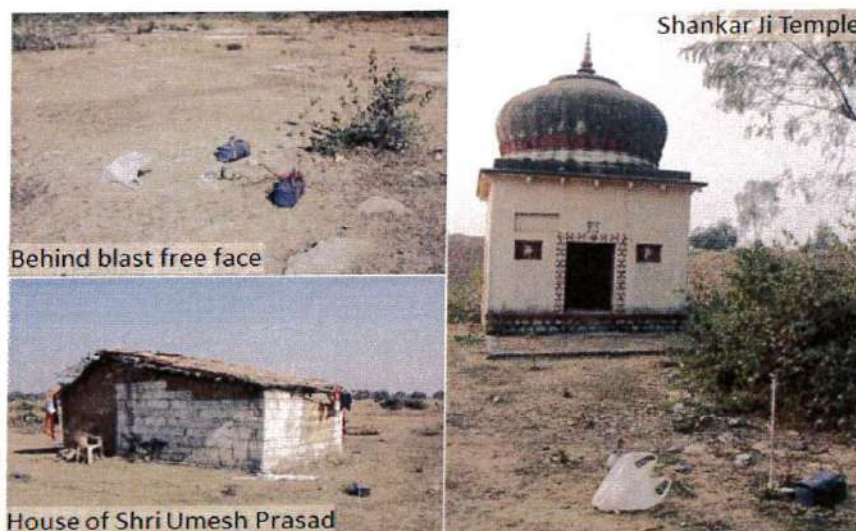


Figure 5. FFT analyses of frequencies of vibration presented in Figure 4.



Photograph 3. Monitoring of blast vibration at different locations in the periphery of the Prism Cement Limestone Mine.

5.2 Structural responses to ground vibration and their natural frequencies

The real cause of why people complain about blasting is structural response. All blast vibration complains is due to how much the house shakes, not how much the ground shakes. The ground motion resulting from blast induced waves is transmitted to the structure upside through the foundation, which causes the structure to vibrate. There are three factors of ground vibrations that determine how much structure vibrates. They are ground vibration amplitude, ground vibration duration and ground vibration frequency.

The responses of a few structures in the periphery of the mine was monitored. The recorded natural frequencies of the house of Shri Umesh Prasad was 21.3 Hz. The incoming blast vibration has frequency in the range of natural frequency of the houses and resonance occurred, the resultant amplitude of the vibration in the houses got amplified. The maximum amplification were recorded when incoming blast wave has dominant frequency very close to the natural frequency of the house. The process involved in determination of natural frequency is shown in Figure 6.

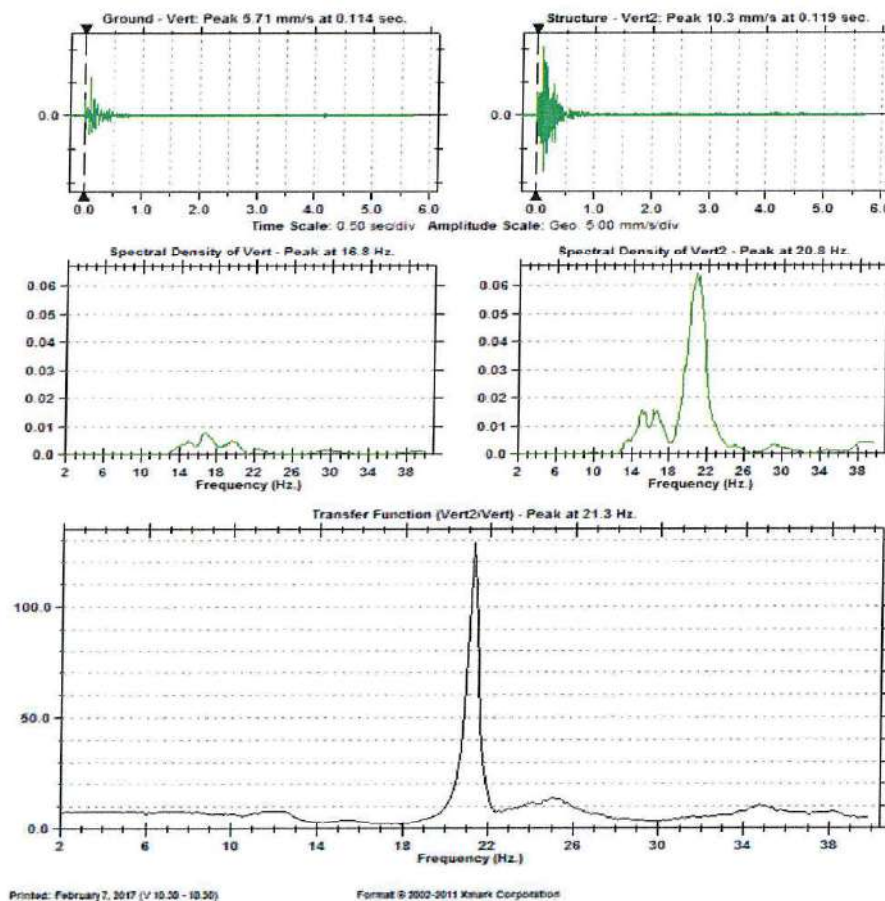


Figure 6. Processing of blast wave signature for determination of natural frequency of the house of Shri Umesh Yadav.

6. Existing vibration standard and criteria to prevent damage

Peak particle velocity (PPV) has been globally used in practice for assessment of blast induced damage to the structures. Different countries adopt different standards depending on their type of industrial/residential buildings. In India, presently DGMS technical circular 7 of 1997 is considered as vibration standard for the safety of surface structures in mining areas. The DGMS standard is given in Table 1.

Table 1. DGMS technical circular 7 of 1997 concerning to blast vibration standard in mm/s.

Type of structure	Dominant excitation frequency, Hz		
	< 8 Hz	8-25 Hz	> 25 Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, brick & cement)	5	10	15
2. Industrial buildings	10	20	25
3. Objects of historical importance and sensitive structures	2	5	10
(B) Buildings belonging to owner with limited span of life			
1. Domestic houses/structures	10	15	25
2. Industrial buildings	15	25	50

7. Air over-pressure/noise

Air overpressure in the mining or quarrying context is the superposition of a number of impulsive air pressures as a result of the detonation of explosive in the ground. Air over-pressure can be measured in pressure unit as well as sound pressure level (SPL).

$$\text{SPL (dB)} = 20 \log (p/p_0)$$

Where, p = measured over-pressure in Pascal (pa)

p_0 = reference pressure level of the lowest sound that can be heard, i.e.,
zero dB = 2×10^{-5} pa.

United State Bureau of Mines (USBM) has correlated the damage due to air over-pressure. The recommended values are given below:

Over-pressure (dB)	Over-pressure (KPa)	Air Blast Effects
177	14	All windows break
170	6	Most windows break
150	0.63	Some windows break
140	0.20	Some large plate glass windows may break, desk and windows rattle
136	0.13	USBM interim limit for allowable air blast
126	0.05	Complaints likely

The maximum level of air over-pressure recorded was 137.8 dB(L) at 100 m due to blasting at 15 no. Goyal Face bench of Prism Cement Limestone Mine. In this blast 45 blastholes were loaded with 1125 kg of explosives and were fired with the explosives weight per delay of 50 kg. The threshold level of air over pressure/noise is 136 dB(L) as per USBM standard.

8. Flyrocks

Flyrocks are the undesirable ejection of rock particles projected beyond the normal blast area. It is generated when there is insufficient stemming, too much explosive energy for a fixed amount of burden, or poor delay timing pattern, or explosives loaded in voids, mud seams.

The primary means of controlling flyrocks is through proper blast design and optimum delay timing between two detonations. Any pattern which over-confines the explosives or one with insufficient stemming tends to cause material to be thrown up in the air rather than allowing any horizontal movement. None of the blasts ejected flying fragments. The detonation of blast was very ideal and achieved blasting face was without back breaks in most of the time. It is recommended to use stemming to burden ratio of 0.7 or more did not cause ejection of flying fragments. Hence, to reduce the generation of boulders from the top portion of the face, stemming length should be 0.7 times of burden.

9. Recording of in-the-hole Velocity of Detonation (VOD) of explosives

The performance of explosives depends upon a number of parameters and VOD is one of the important parameters. The detonation pressure associated with the reaction zone of detonating explosives is directly proportional to the square of its VOD. It is measured in the C-J plane, behind the detonation front, during propagation through the explosives column. The detonation pressure (P_d) can be estimated by the following formula.

$$P_d = \frac{1}{2} \rho_e (VOD)^2 10^{-6}$$

Where, P_d = Detonation pressure (MPa)

ρ_e = Density of explosive (kg/m^3)

VOD = Velocity of detonation (m/s)

Uniform VOD is essentially required throughout the blast holes in the rock formations in order to produce sufficient detonation pressure to the borehole walls. Required booster is provided in the explosives column to maintain the VOD for the uniform breakage of rock. In-the-hole continuous velocity of detonation of explosives was recorded with the help of DataTrap II. The recorded in-the-hole VOD of site mixed emulsion (SME) explosives of M/s Indian Explosives Limited (Orica) was in the range of 5286.8 – 5399.7 m/s (Figure 7 & 8).

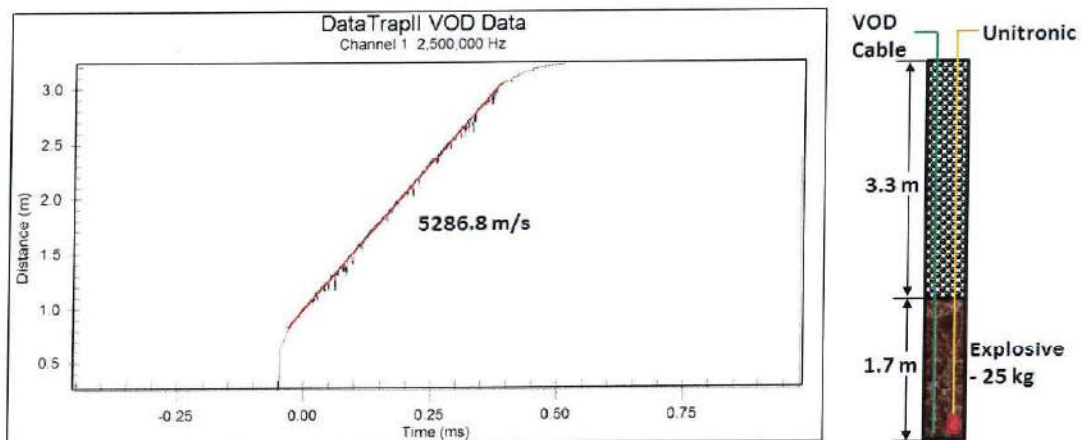


Figure 7. Trace of in-the-hole VOD of SME explosives of M/s Indian Explosives Limited.

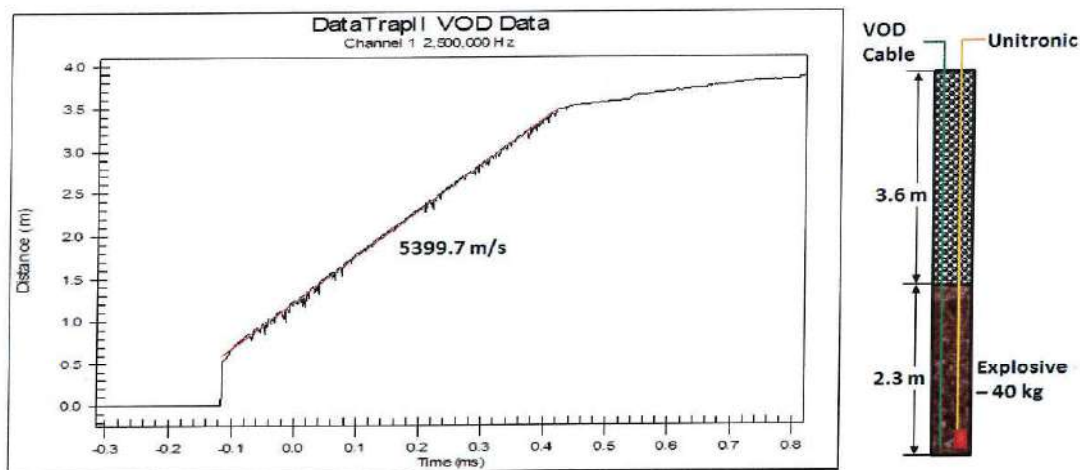


Figure 8. Trace of in-the-hole VOD of SME explosives of M/s Indian Explosives Limited.

10. Blast delay optimisation with the help of signature blast

The optimum blasts have the following objectives.

- Adequate rock fragmentation, swelling and displacement
- Control over the flyrocks and over breaks
- Minimum level of vibration and air blasts

The delay timing between the holes in a row and between rows plays fundamental role in fulfilment of these objectives. To address this issue a blast hole was drilled at 15 No. RPL bench. The blasthole was loaded with 30 kg of explosives and fired instantaneously without in-hole delay. The blast wave signatures were recorded at interval of 50 m at 2 locations. The attenuation characteristics of blast wave were documented. The typical time history of blast wave signature recorded at 50 m from the blast hole is presented in Figure 9. The frequency spectra of the signature blast was analysed. Linear superposition of the waves were done to simulate the waveform characteristics for multi-hole blasting. The analyses revealed that very

short delay times between the holes and very long delay intervals between the rows should be avoided. The analyses further concluded that the mean time needed to start the movement of rock face is 6.4-7.5 ms/m of effective burden. The delay interval between the successive rows should be 13.5-28.5 ms/m of effective burden. The blast designs were optimised considering the out put of linear superimposition techniques. The signature hole analyses table of blast is depicted in Figure 10. The recommended blast designs on the basis of the analyses are given in Annexure.

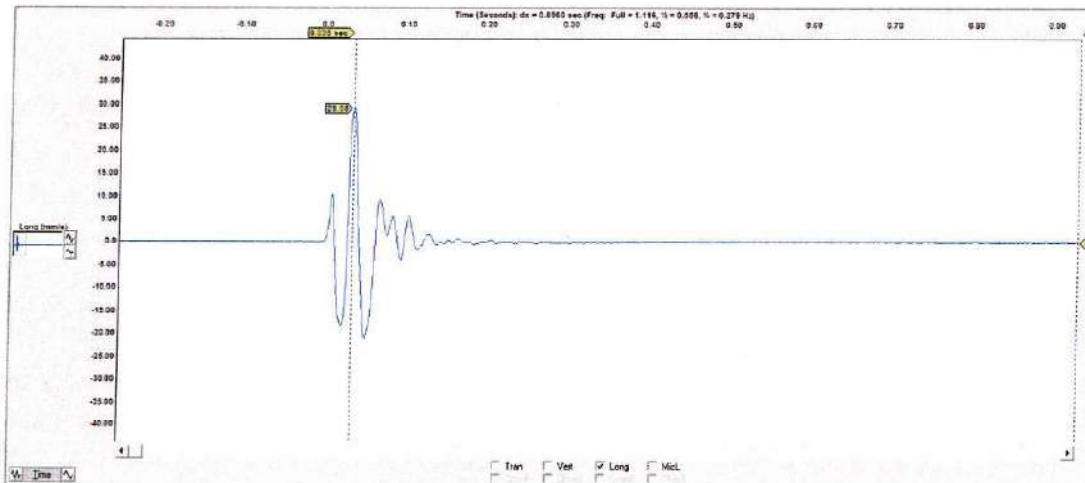


Figure 9. Time history of the signature blast in Longitudinal direction.

Signature Hole Analysis Table																			
File	Blast Timing			Peak Particle Velocity				PVS	Dominant FFT Frequency				Upper/Lower Frequency Ratio						
Filename (Double Click to view)	Deck	Hole	Row	Trans	Vert	Long	Peak	Vector Sun °	Trans	Vert	Long	Peak	Trans	Vert	Long	Peak			
	Delay (msec)	Delay (msec)	Delay (msec)	(mm/s)	(mm/s)	(mm/s)	(mm/s)		(Hz)	(Hz)	(Hz)	(Hz)							
2D1H16R100.BWP	1	16	100	19.70	18.40	22.70	22.70	26.50	61.4	61.5	59.3	61.5	0.202	12.000	0.194	12.000			
2D1H16R125.BWP	1	16	125	20.50	18.40	23.40	23.40	26.90	63.6	64.1	24.9	64.1	0.251	11.400	0.239	11.400			
2D1H16R130.BWP	1	16	130	21.00	19.10	23.30	23.30	27.50	61.4	62.3	61.3	62.3	0.065	3.660	0.068	3.660			
R2D1H16R95.BWP	1	16	95	19.90	20.60	24.30	24.30	28.00	63.0	63.3	62.6	63.3	0.061	3.020	0.053	3.020			
2D1H12R125.BWP	1	12	125	14.90	22.50	20.50	22.50	28.60	32.6	80.1	32.4	80.1	1.110	47.100	0.979	47.100			
R2D1H12R70.BWP	1	12	70	13.00	24.10	20.50	24.10	28.60	2.0	84.8	31.5	84.8	0.247	10.500	0.218	10.500			
2D1H12R120.BWP	1	12	120	13.30	23.10	25.00	25.00	28.80	33.8	83.1	33.3	83.1	0.823	30.600	0.703	30.600			
R2D1H12R75.BWP	1	12	75	12.90	25.70	20.50	25.70	28.80	2.0	80.4	24.1	80.4	1.060	44.900	0.960	44.900			
2D1H12R115.BWP	1	12	115	14.40	23.30	23.80	23.80	30.50	35.0	78.5	34.4	78.5	3.550	98.100	3.370	98.100			
R2D1H8R45.BWP	1	8	45	12.90	14.70	30.30	30.30	30.50	2.0	2.9	27.4	27.4	0.020	1.030	0.014	1.030			
R2D1H16R95.BWP	1	16	95	19.50	18.60	25.10	25.10	30.70	58.9	68.5	57.3	68.5	0.129	4.870	0.130	4.870			
R2D1H16R60.BWP	1	16	60	26.60	26.20	22.00	26.60	31.10	64.5	65.1	35.3	65.1	0.198	9.600	0.186	9.600			
2D1H12R105.BWP	1	12	105	13.00	23.40	25.70	25.70	31.50	37.0	85.4	20.1	85.4	0.261	11.500	0.239	11.500			
2D1H12R110.BWP	1	12	110	14.10	23.00	26.20	26.20	31.90	36.1	81.6	35.5	81.6	1.050	43.200	0.948	43.200			
2D1H12R130.BWP	1	12	130	13.30	23.40	26.10	26.10	32.80	37.6	84.3	22.8	84.3	0.247	11.100	0.224	11.100			
R2D1H12R65.BWP	1	12	65	20.70	22.50	26.40	26.40	32.90	32.9	78.5	32.3	78.5	0.614	26.900	0.551	26.900			
R2D1H16R70.BWP	1	16	70	20.20	18.40	23.10	23.10	33.10	59.4	80.0	27.1	80.0	0.063	4.020	0.056	4.020			
R2D1H8R100.BWP	1	8	100	13.90	14.50	31.80	31.80	33.10	30.3	129.0	30.0	129.0	0.024	1.390	0.023	1.390			
R2D1H8R105.BWP	1	8	105	15.00	13.90	31.80	31.80	33.10	29.1	124.0	29.1	124.0	0.008	0.602	0.010	0.602			
R2D1H8R110.BWP	1	8	110	14.60	14.30	31.80	31.80	33.10	28.0	128.0	28.0	128.0	0.035	2.090	0.031	2.090			
R2D1H8R115.BWP	1	8	115	15.30	13.40	31.90	31.90	33.10	34.4	130.0	26.9	130.0	0.133	13.700	0.136	13.700			
R2D1H8R120.BWP	1	8	120	14.40	13.50	31.80	31.80	33.10	32.9	125.0	32.5	125.0	0.029	1.140	0.021	1.140			
R2D1H8R130.BWP	1	8	130	14.20	13.90	31.80	31.80	33.10	30.8	130.0	30.6	130.0	0.007	0.507	0.009	0.507			
R2D1H8R80.BWP	1	8	80	13.90	16.10	31.70	31.70	33.10	35.8	126.0	26.9	126.0	0.022	2.020	0.027	2.020			
R2D1H8R65.BWP	1	8	65	13.90	16.30	31.80	31.80	33.10	34.4	129.0	33.5	129.0	0.140	5.050	0.122	5.050			

Figure 10. Signature hole analysis for the blasthole on 15 no. RPL Site of Prism Cement Limestone Mine.

11. Human response to blasting

The tolerance and reactions of human beings to vibrations are important when standards are based on annoyance, interference, work proficiency and health. Human beings notice and react to blast induced vibrations at levels that are lower than the damage thresholds.

It is impossible to establish a vibration level where nobody will complain. There are always some persons in a population who will complain no matter how small the disturbance is. Several researchers recognized that the duration of the vibration was critical. Most evident was that a higher level could be tolerated if the event was of short duration. Consequently, steady state vibration data could not be realistically applied to blasting except for events that exceed several seconds duration.

12. Results and discussions

The maximum vibration recorded from the production blasts in terms of peak particle velocity (PPV) was 31.0 mm/s at 50 m on the ground surface behind the blasting face. The associated dominant peak frequency was 32.0 Hz. This magnitude of vibration was due to detonation of 710 kg of explosives in 28 holes drilled in three rows and fired with maximum charge weight per delay of 50 kg. The PPV recorded at 100 m from the same blast was 6.66 mm/s with dominant peak frequency of 15.0 Hz. Fast attenuation of ground vibration is recorded.

The vibrations recorded in the periphery of the mine were of low amplitude and short duration. The persistence of vibration was in most of the cases less than 1 second. A few recorded blast waveforms at different locations are given in the Annexure which indicates low amplitude and short duration blast events. The existing practice of blasting will not cause any damage to the houses and structures in the periphery of the mine.

The signature hole blast was conducted and ground vibration was recorded at a distance of 50 and 100 m. The ground vibration recorded at 50 m was 33.9 mm/s with dominant peak frequency of 30.3 Hz. The signature hole was of 5 m and charged with the 30 kg of explosive. Ground vibration recorded at 100 m was 22.1 mm/s with dominant frequency of 45.5 Hz. The analyses revealed that very short delay times between the holes and very long delay intervals between the rows should be avoided. The analyses further concluded that the mean time needed to start the movement of rock face is 6.4-7.5 ms/m of effective burden. The delay interval between the successive rows should be 13.5-28.5 ms/m of effective burden.

The dominant peak frequencies of vibrations recorded were in the range of 11.4 to 129 Hz. The FFT analyses of frequency of vibration revealed that the concentration of vibration energy is in the range of 13.3-40.3 Hz. Based on DGMS circular; the safe limit of vibration (PPV) for the houses of surrounding villages is thus, 10 mm/s. The maximum explosives to be fired in a delay for safety of residential houses at various distances from the blasting site

may be computed from the Equation 1. For ready references, the maximum permissible explosive weight per delay to be detonated in blast round has been computed and is Annexured as Table A3. The predicated PPV levels at various distances by detonation of explosives weight per delay of 10, 20, 30 and 50 kg are presented in Table A4.

The maximum air over-pressure recorded was 137.8 dB(L) at 100 m due to the blast conducted at 15 No. Goyal Face on 26.12.2016 by detonation of 1125 kg of explosives in 45 holes. The blasts initiated with Nonel initiation system and Unitronic electronic initiation system generate significantly lower level of air over-pressure compared to detonating fuse initiation system. There was no ejection of flyrock in any of the blasts.

The recorded vibration and air over-pressure data and subsequent analyses revealed that blasting might be performed at 50 m from the nearest house of the village with explosives weight per delay of 12.2 kg. The blast designs have been recommended for blasting operations to be conducted at 50 m and beyond from the nearest house of the concern villages or other structures. The recommended blast designs are given as Figures A1-A2. The recommended explosive weights per delay for various distances of the concern up to 300 m are computed and are presented in Table A3. The predicted peak particle velocities levels for detonation of various charge weight per delay are given in Table A4.

There were no ejections of flyrocks in any of the blast. The experimented blast designs ensured that there were no any ejections of flyrocks, although for more safety, blasting mates with sand bags were used for controlling the flyrocks.

13. Conclusions and recommendations

- ❖ Maximum vibration recorded from the production blast was 31.0 mm/s with associated dominant peak frequency of 32.0 Hz at 50 m from blasting site. The explosives weight per delay was 50.8 kg. The PPV recorded at 100 m from the same blast was 6.66 mm/s with dominant peak frequency of 15.0 Hz. Fast attenuation of vibration were encountered.
- ❖ The maximum air over-pressure recorded was 137.8 dB(L) at 100 m due to the blast conducted at 15 No. Goyal Face on 26.12.2016. In this blast, explosives detonated in a blasting round and explosives weight per delay were 1125 kg and 75 kg respectively. The Electronic initiation system and Nonel initiation system reduces the air over-pressure to a greater extent and improves the blasting performance too. There was no ejection of flyrocks in any of the blast.
- ❖ All the recorded data (blast vibrations, air overpressures and flyrocks) were well within the safe limit at the houses/structures concerned. The dominant peak frequencies of ground vibrations were in the range of 11.4 to 129 Hz. FFT analysis of blast vibration frequencies confirmed that concentration of frequencies is in band of 13.3-40.3 Hz. So, the safe level of vibration has been taken as 10 mm/s for the safety of houses/structures of the surrounding villages as per DGMS standard.

- ❖ Propagation equation for the prediction of blast vibration has been established and is given as Equation 1. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. For convenience, the recommended explosives weight per delay has been computed and is given in Table A3.
- ❖ The delay interval between the holes in a row should be 17 ms whereas between the rows, it should be 65 ms or more depending upon the number of rows and effective burden. If the numbers of rows are more than two, the delay interval between rows should be increased by 15% in successive rows.
- ❖ It is recommended that the existing Nonel initiation system should be continued in the blasting operations and Electronic initiation systems should be practiced on the benches near to the structures for more precise and accurate delay design. The sub-grade drilling should be 0.3 to 0.5 m for a blasthole depth of 6 to 7 m and should be initiated from the bottom of the hole.
- ❖ It is advisable to use blasting mate with sand bags in sensitive area to ensure any non-ejection of flyrocks. For this Nonel as well as electronic system may be used as an initiation system.
- ❖ The recommended blast designs should be followed for day-to-day blasting operations for safe and efficient blasting operations. The blast designs given in Annexure as Figures A1-A2, will ensure the safety of the houses/structures, life of human beings and other property in the periphery of the mine.

Acknowledgements

The research team is thankful to M/s Prism Cement Limited for sponsoring the study. The sincere co-operation and help extended to the team by the following officials in completing the study successfully are thankfully acknowledged.

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Shri Sanjay Singh Baghel,	Manager (Mines)
Shri Chandrakand pandey,	Asst. Manager
Shri Binod Giri,	Asst. Manager
Shri A. K. Baghel,	Blasting Foreman
Shri S. Singh,	Field Surveyor

The research team also expresses their gratitude to the inhabitants of Hinauti and Sijhata villages for their co-operation in blast vibration and air overpressure monitoring.

Table A1. Summary of blast performed during the period of study at Prism Cement Limestone mine, Prism Cement Limited, Satna (M.P.).

S. No.	Date of Blast	Location of Blast	No. of holes	Hole dia. [mm]	Hole depth [m]	Burden × Spacing [m]	Top Stemming [m]	Avg. explosive Per hole [kg]	Total explosive Weight [kg]	Remarks
1.	21.12.16	15 No. Goyal Face	30	115	3	3×3.5	2	5.6	165 (Solargel Cartridge & Solar Prime Booster)	❖ Precaution was taken with blasting mate placement to prevent fly rock ejection. ❖ Boulder formation was there. ❖ No ejection of flyrock.
2.	21.12.16	7050 RIL Face	34	115	6	3×3.5	1.6	30.5	1037 (Solargel Cartridge & Solar Prime Booster)	❖ No ejection of flyrock ❖ Nonel (TLD – 17 ms, 42 ms, DTH – 450 ms) ❖ Good fragmentation
3.	22.12.16	15 No. Goyal Face	20	115	4.5	3×3.5	3	22	440 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock ❖ Good fragmentation ❖ Unitronic (Orica)
4.	23.12.16	15 No. RPL Site	01	115	5	Burden - 3 m	2.7	30	30 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ Very good movement towards free face. ❖ No fly rock ejection. ❖ Unitronic (Orica).
5.	23.12.16	15 No. RPL Site	31	115	4-5	3×3.5	2.8 - 3	20-25	830 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ VOD was measured. ❖ Very good movement towards free face. ❖ Excellent Fragmentation.
6.	23.12.16	20 No. Pit	66	115	5-6	3×4	3 - 3.5	25	1670 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock. ❖ Unitronic (Orica)
7.	23.12.16	New Pit 01 Hinauti	14	115	5.5-6	3×3.5	3.3 - 3.5	25-30	420 (Booster Primex and SME)	❖ Chocked face. ❖ No ejection of flyrock. ❖ Unitronic ❖ Chocked face. ❖ Free face was not available.

Table A2. Blast induced vibration monitored at different location in and around Prism Cement Limestone mine, Prism Cement Limited, (M.P.)

Blast No.	Location of Blast	Total Explosives detonated in round [Kg]	Maximum Explosives weight per delay [Kg]	Location of measuring instruments	Distance of measuring point from blasting face [m]	Peck particle velocity (PPV) [mm/s]	Dominant peck frequency [Hz]	Air over-pressure/noise [dB (L)]
1.	15 No. Goyal Face	165	11 (2×5.5)	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 150 200	22.7 5.54 2.35 1.88	79.6 26.1 32.9 26.9	130 122.5 122.3 121.5
2.	7050 RIL Face	1037	61 (2×30.5)	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 125 150 200	18.7 13.9 10.0 4.95 4.33	33.8 21.3 13.3 12.1 12.3	129.8 123.3 121.2 122.9 121.3
3.	15 No. Goyal Face	440	22	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 150 200 250	21.0 6.75 3.88 2.63 2.40	44 47.9 40.3 47.3 12.8	136.1 119.8 118.8 112.6 116.9
4.	15 No. RPL Site	30	30	➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100	33.9 22.1	30.3 45.5	127.8 125.8
5.	15 No. RPL Site	830	50 (2×25)	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 150 200	22.1 7.78 3.49 2.55	45.5 21.5 28 21	125.8 122.9 115.7 115.9
6.	20 No. Pit	1670	75 (3×25)	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 150 200	30.4 27.1 25.6 5.24	112 21.6 18.5 24.9	131.5 122.2 122.6 119.1

7.	New Pit 01. Hinauti	420	30	➤ Left Side From Blast Face ➤ Back Side From Blast Face ➤ Left Side From Blast Face ➤ Left Side From Blast Face (village Shankarji temple)	50 75 100	20.4 10.7 5.24	22.5 18.5 22	135.1 132.5 134.8
8.	15 No. RPL Site	1405	70 (2×35)	➤ Left Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Left Side From Blast Face ➤ Back Side From Blast Face	200 50 60 100 100	5.29 24.4 17.5 11.3 8.77	18.5 52.9 30.4 15.9 17.8	122.6 127.8 128.8 127.8 123.9
9.	15 No. Goyal Face	440	20	➤ Back Side From Blast Face ➤ Right Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	150 100 100 200	6.89 12.5 6.14 5.62	15.9 27.4 35.6 36.8	128 122.3 133.4 120
10.	15 No. Goyal Face	113	21	➤ Back Side From Blast Face ➤ Right Side From Blast Face ➤ Back Side From Blast Face	200 150 200	4.07 2.83 1.08	11.4 24.6 28.8	116.3 125 110.2
11.	15 No. Goyal Face	603	44 (2×22)	➤ Left Side From Blast Face ➤ Back Side From Blast Face ➤ House of Sri Umesh Prasad ➤ Structure height (roof-3m) ➤ Back Side From Blast Face	50 100 150 150 200	17.1 8.10 6.35 15.1 5.65	24.5 18 16.8 21.3 17.5	131.4 130.6 128.9 - 126.5
12.	15 No. RPL	2678	95 (3×31.6)	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face	50 100 150 200 250	17.0 16.3 10.7 5.03 4.56	129 58.5 129 18.0 18.6	131 121.9 121.8 123.1 123.5
13.	15 No. Goyal Face	710	50 (2×25)	➤ Left Side From Blast Face ➤ Left Side From Blast Face ➤ Right Side From Blast Face ➤ Right Side From Blast Face	50 100 110 140	31.0 6.66 3.84 3.59	32 15 27.5 27.1	130.1 123.9 126.8 123.6

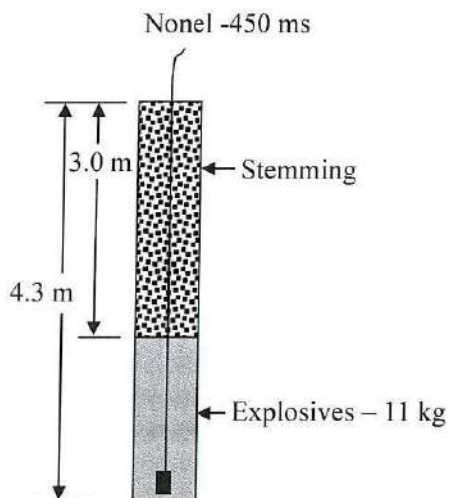
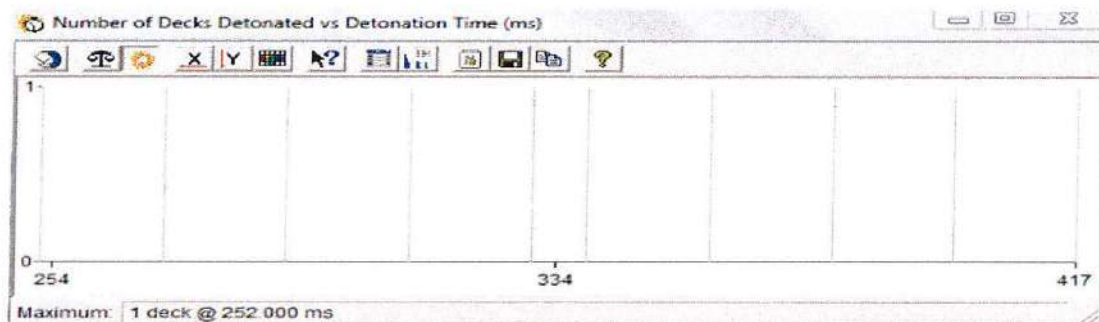
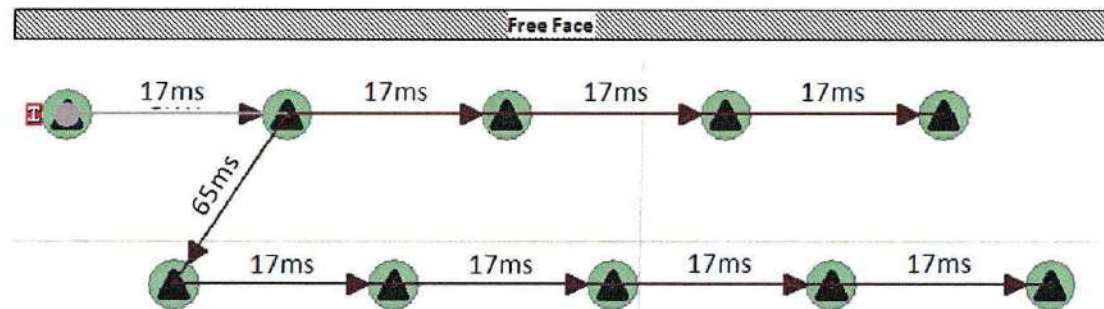
14.	15 No. Goyal Face	58.38	2.78	➤ Back Side From Blast Face ➤ Back Side From Blast Face ➤ Front Side From Blast Face ➤ Front Side From Blast Face	70 100 140 200	2.83 2.71 1.84 0.73	21.8 20.6 28.8 21.3	121.6 116.1 119.3 116.4
15.	15 No. Goyal Face	1125	75 (3×25)	➤ Right Side From Blast Face ➤ Right Side From Blast Face ➤ Right Side From Blast Face	100 120 130	11.6 11.0 9.0	34.8 69.1 22.8	137.8 132.7 132.2

Table A3. Recommended explosives weight per delay to be detonated in a blasting round for the safety of houses/structures taking 10 mm/s (for the houses/structures not belonging to the Owner) and 15 mm/s (for the houses/structures belonging to the Owner) as safe limit of peak particle velocity for Prism Cement Limestone mine, Prism Cement Limited, Satna, (M. P).

Distance of structures from the blast face [m]	Maximum explosive weight to be detonated in a delay [kg]	
	10 mm/s	15 mm/s
50	12	19
75	27	42
100	49	75
125	76	118
150	110	170
175	149	231
200	195	302
225	247	382
250	305	471
275	369	570
300	439	678

Table A4. Predicted peak particle velocity level at various distance due to detonation of explosive weight per delay of 10, 20, 30 & 50 kg at Prism Cement Limestone mine, Prism Cement Limited, Satna, (M.P).

Distance of structures from the blast face [m]	Predicted peak particle velocity levels [mm/s]			
	10 kg	20 kg	30 kg	50 kg
50	9.9	13.2	16.6	22.1
75	6.3	8.4	10.5	14.0
100	4.6	6.1	7.6	10.1
125	3.5	4.7	5.9	7.9
150	2.9	3.8	4.8	6.4
175	2.4	3.2	4.1	5.4
200	2.1	2.8	3.5	4.6
225	1.8	2.4	3.1	4.1
250	1.6	2.2	2.7	3.6
275	1.5	1.9	2.4	3.2
300	1.3	1.8	2.2	2.9



BLAST GEOMETRY	
Hole diameter	: 115 mm
Hole depth	: 4.3 m
No. of holes	: 10
Bench height	: 4 m
Burden	: 2 m
Spacing	: 2.5 m
Explosive per hole	: 11 kg (4×2.78kg)
Initiation system	: DTH-450 ms
	: TLD - 17 ms & 65 ms
Explosives	: Cartridge/SME Bulk
Charge factor	: 0.55 kg/m ³

Figure A1. Recommended blast design and charging pattern of holes for 4 m benches of Prism Cement Limestone mine when blasting is to be conducted at or beyond 50m.

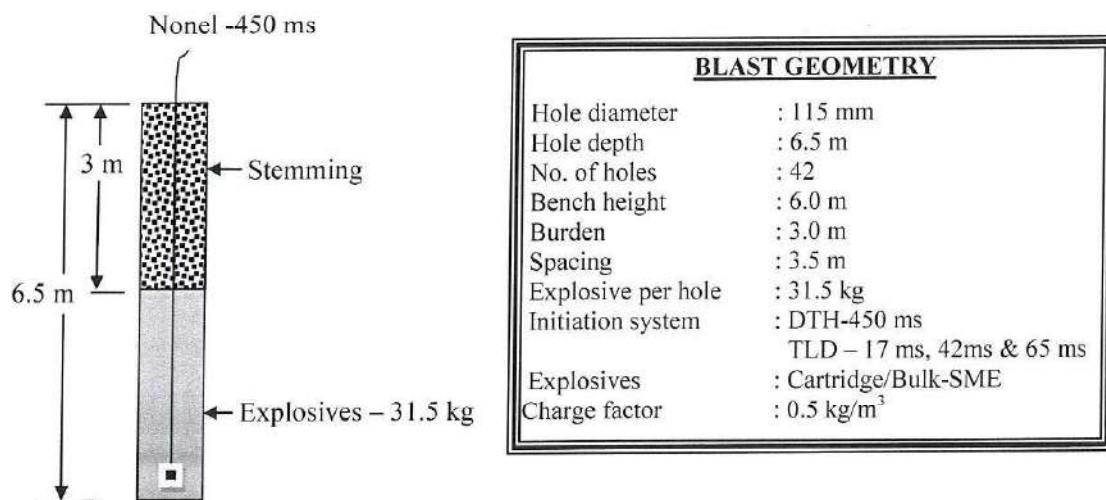
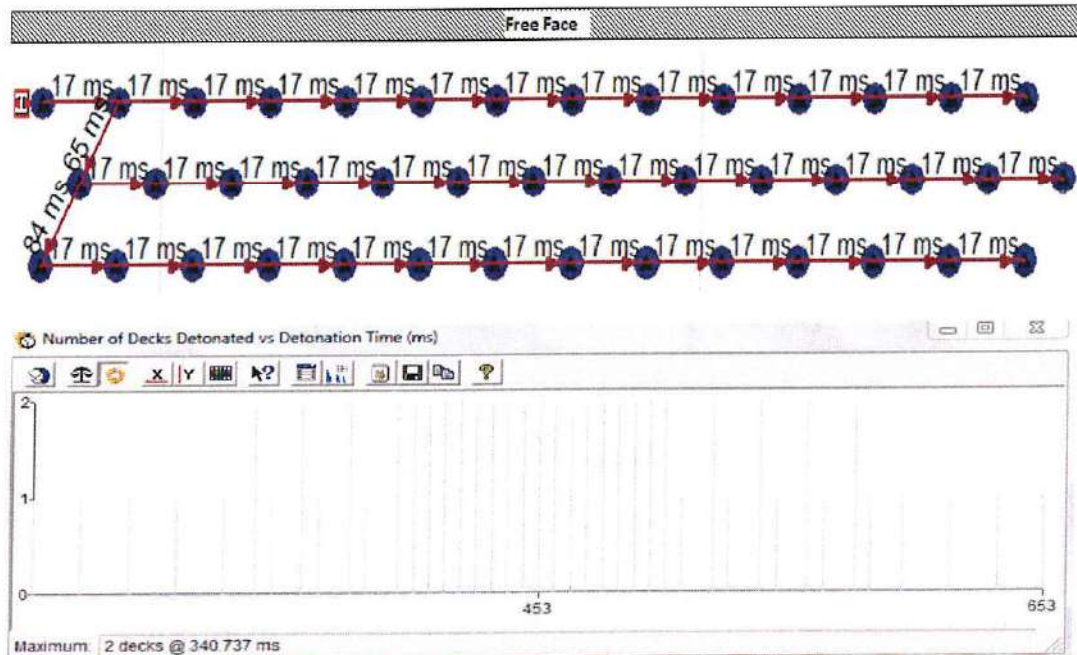


Figure A2. Recommended blast design and charging pattern of holes for 6.0 m benches of Prism Cement Limestone mine when blasting is to be conducted at or beyond 100 m.



Event Report



Date/Time Tran at 11:28:03 December 21, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 264 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number BE20375 V 10 60-8.17 MiniMate Plus
Battery Level 8.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375G00Y IRO

Notes

Location: On Ground Surface
Client: PRISM CEMENT LTD. STANA
User Name: REE Division, CSIR- CIMFR, Dhanbad
General:

Extended Notes

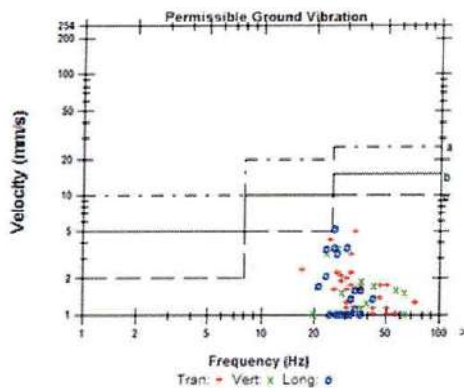
Blast vibration study at Mendhi and Hinauli Limestone Mines of Prism Cement Ltd.

Microphone Linear Weighting
PSPL 122.5 dB(L) at 0.859 sec
ZC Freq 7.5 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 504 mv)

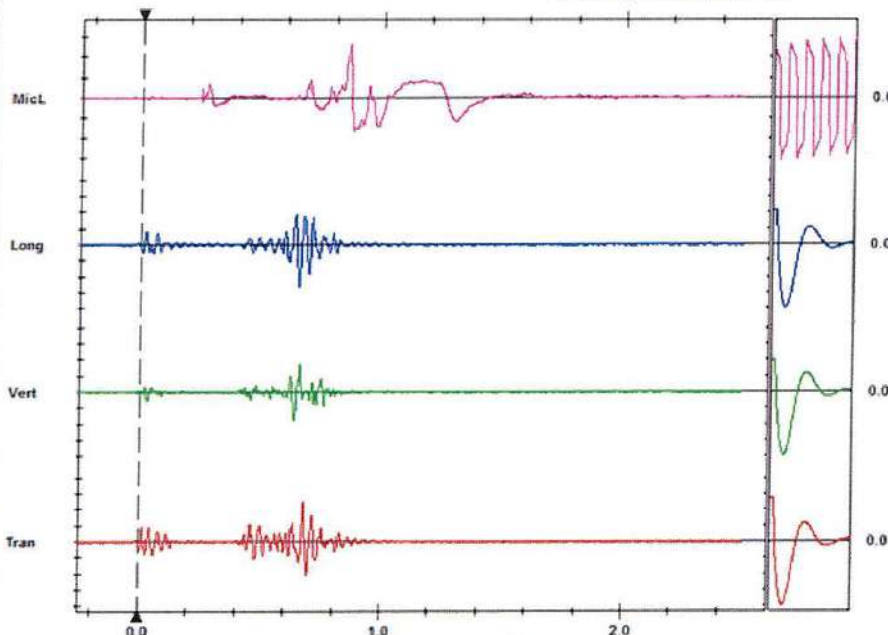
	Tran	Vert	Long	
PPV	4.95	3.56	5.21	mm/s
ZC Freq	34	27	26	Hz
Time (Rel. to Trig)	0.882	0.637	0.663	sec
Peak Acceleration	0.106	0.0795	0.119	g
Peak Displacement	0.0223	0.0187	0.0307	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.2	Hz
Overswing Ratio	3.6	3.6	3.6	

Peak Vector Sum: 5.54 mm/s at 0.653 sec

DGMS India (A)



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa (L)/div

Sensor Check



FFT Report



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Range Geo: 254 mm/s
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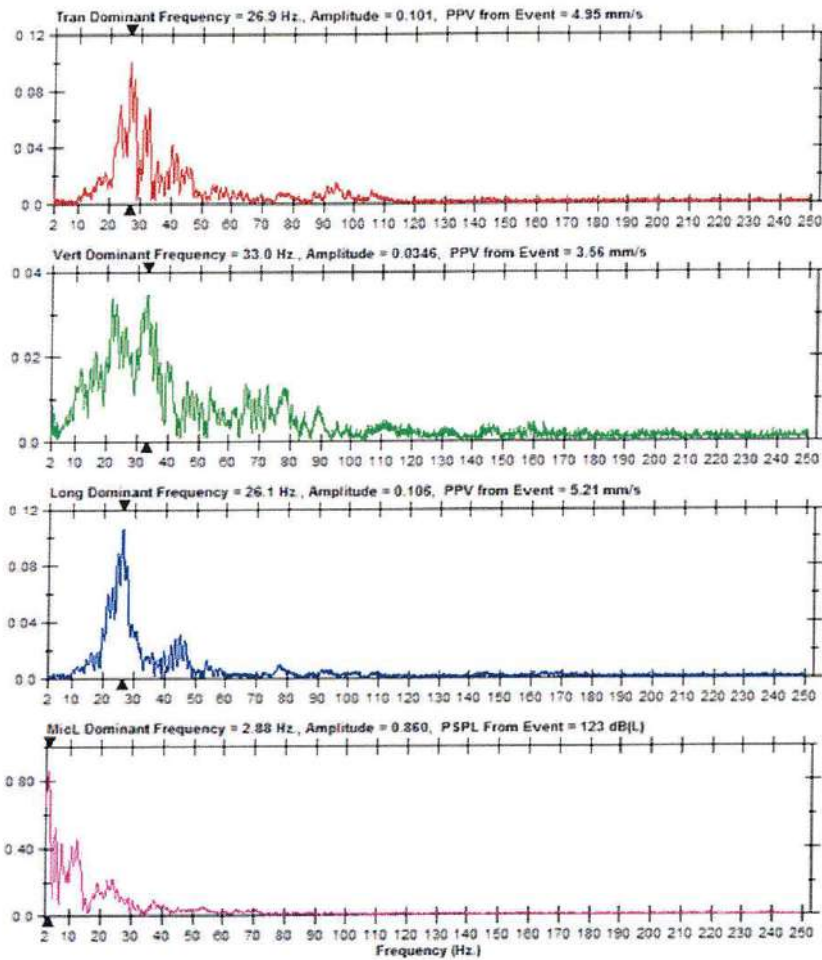
Serial Number BE20375 V 10 60-8 17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375GOOY IR0

Notes

Location On Ground Surface
Client PRISM CEMENT LTD. STANA
User Name REE Division, CSIR- CIMFR, Dhanbad
General

Extended Notes

Blast vibration study at Mendhi and Hinabti Limestone Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 16:31:38 December 21, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 2048 sps
Job Number: 1

Serial Number BA13814 V 8 12-8-0 BlastMate III
Battery Level 6.1 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name Q814GQPC.KQ0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

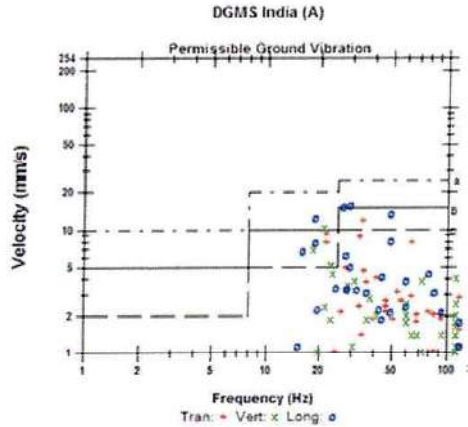
Extended Notes

Blast vibration study at Mandhi and Hinauli Limestone Mines of Prism Cement Ltd.

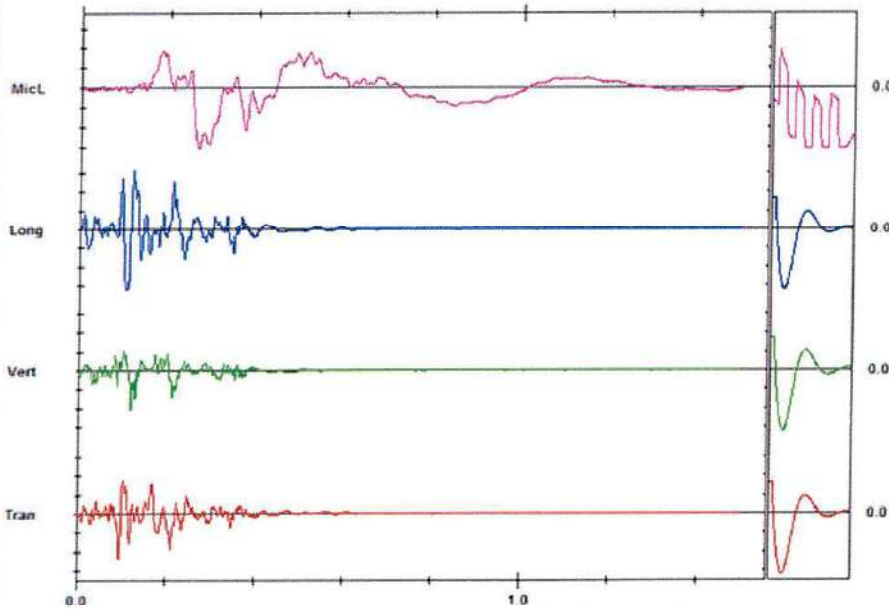
Microphone Linear Weighting
PSPL 129.8 dB(L) at 0.266 sec
ZC Freq 7.3 Hz
Channel Test Passed (Freq = 19.3 Hz Amp = 692 mv)

	Tran	Vert	Long	
PPV	11.8	10.3	16.0	mm/s
ZC Freq	34	21	29	Hz
Time (Rel. to Trig)	0.097	0.119	0.105	sec
Peak Acceleration	0.451	0.398	0.530	g
Peak Displacement	0.0497	0.0464	0.101	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.6	7.5	Hz
Overswing Ratio	3.7	3.3	3.7	

Peak Vector Sum 18.7 mm/s at 0.120 sec



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 5.00 mm/s/div Mic: 20.0 pa (L)/div

Sensor Check



FFT Report



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Range: Geo: 254 mm/s
Record Time: 4.0 sec at 2048 sps
Job Number: 1

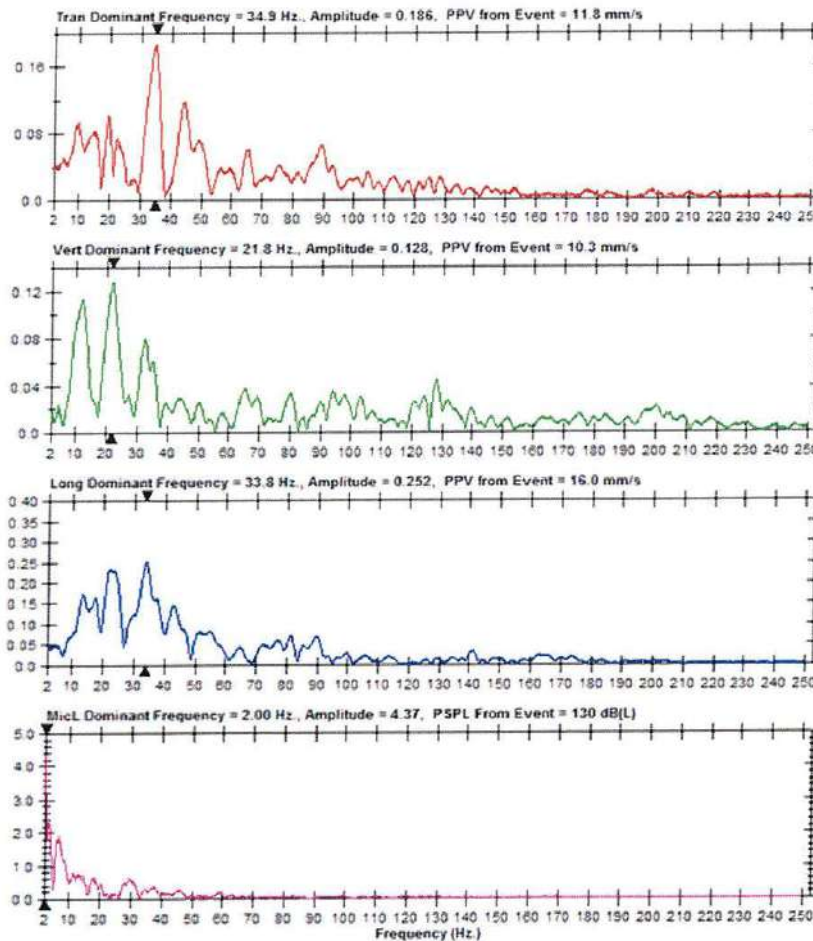
Serial Number: BA13814 V 8 12-8 0 BlastMate III
Battery Level: 6.1 Volts
Unit Calibration: July 14, 2016 by CIMFR, Dhanbad
File Name: 0814G0PC.KQ8

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

Blast vibration study at Menchi and Hinauti Limestone
Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 16:31:40 December 21, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number BE20375 V 10 60-S 17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Chanbad
File Name V375G0PC KS0

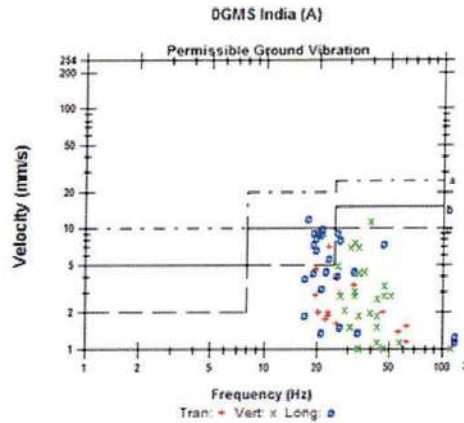
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Location On Ground Surface
Client PRISM CEMENT LTD- STANA
User Name REE Division, CSIR- CIMFR, Chanbad
General:

Extended Notes
Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

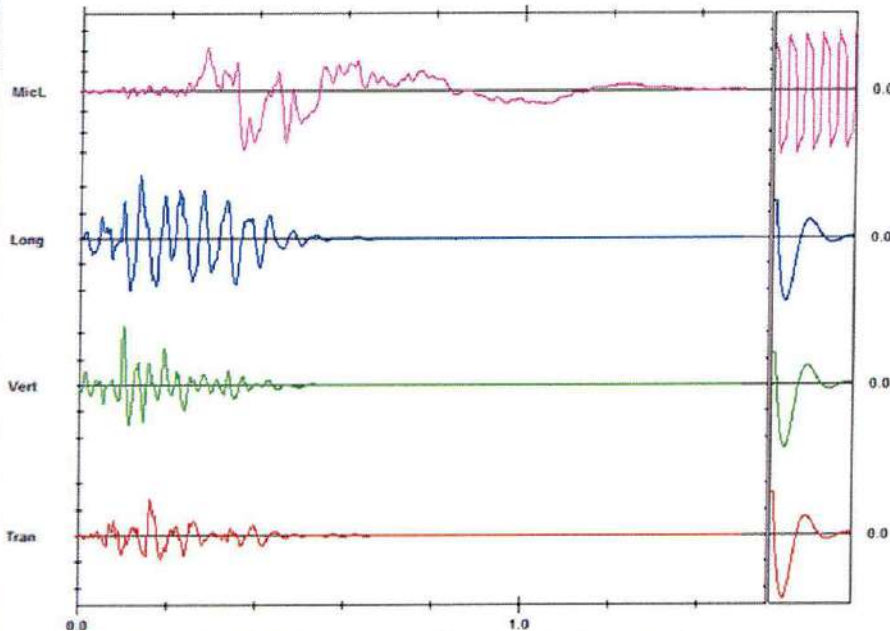
Microphone Linear Weighting
PSPL 123.3 dB(L) at 0.365 sec
ZC Freq 6.7 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 526 mv)

	Tran	Vert	Long	
PPV	7.11	11.4	12.2	mm/s
ZC Freq	23	39	18	Hz
Time (Rel. to Trig)	0.162	0.100	0.133	sec
Peak Acceleration	0.159	0.265	0.265	g
Peak Displacement	0.0432	0.0409	0.0841	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.3	Hz
Overswing Ratio	3.5	3.6	3.7	

Peak Vector Sum 13.9 mm/s at 0.099 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 5.00 mm/s/div Mic: 10.00 pa (L)/div

Sensor Check



FFT Report



Date/Time Vert at 16:31:40 December 21, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 8.0 sec at 1024 sps

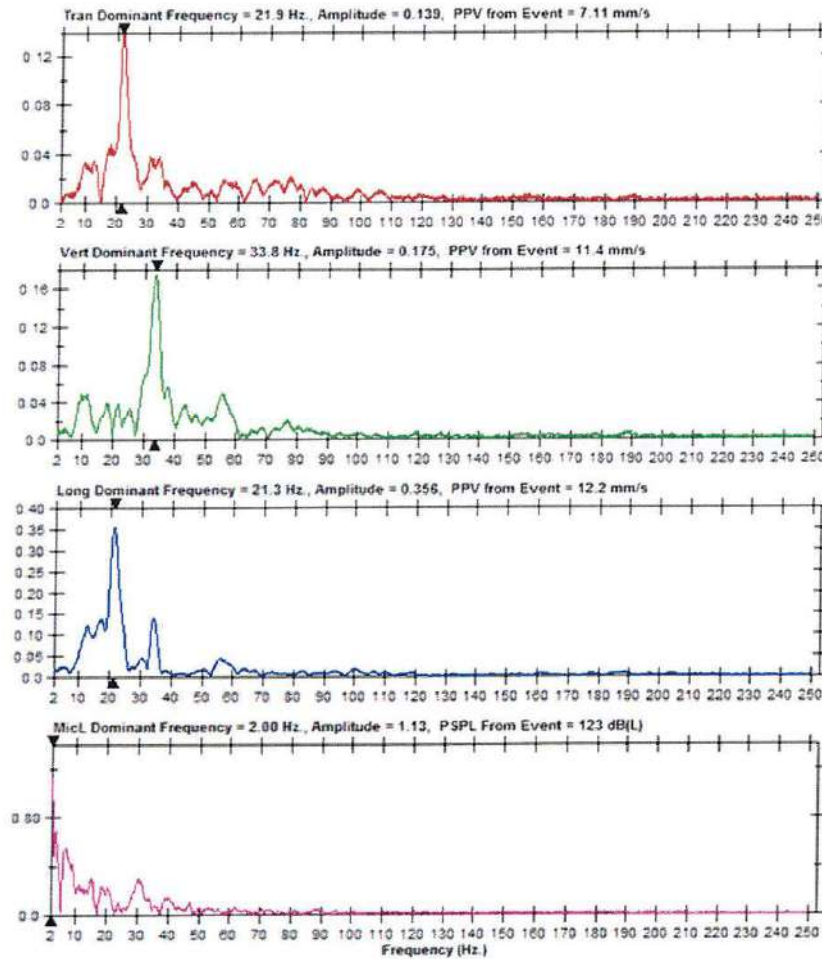
Serial Number BE20375 V 10 60-8:17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375GQPC KS0

Notes

Location On Ground Surface
Client PRISM CEMENT LTD. STANA
User Name REE Division, CSIR- CIMFR, Dhanbad
General

Extended Notes

Blast vibration study at Mendhi and Hinabti Limestone Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 12:30:58 December 22, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 2048 sps
Job Number: 1

Serial Number BA13814 V & 12-8.0 BlastMate III
Battery Level 6.1 Volts
Unit Calibration July 14, 2016 by CIMFR, Chanbad
File Name Q814GQW 3.M0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

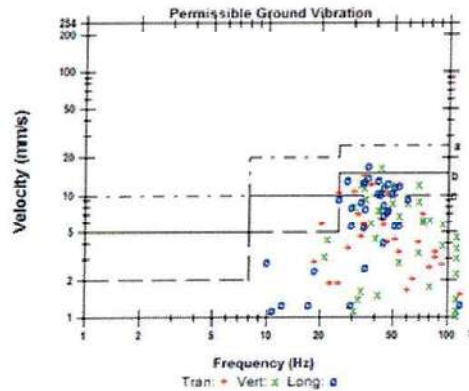
Blast vibration study at Mandhi and Hinauti Limestone
Mines of Prism Cement Ltd.

Microphone Linear Weighting
PSPL 138.1 dB(L) at 0.290 sec
ZC Freq 3.7 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 700 mv)

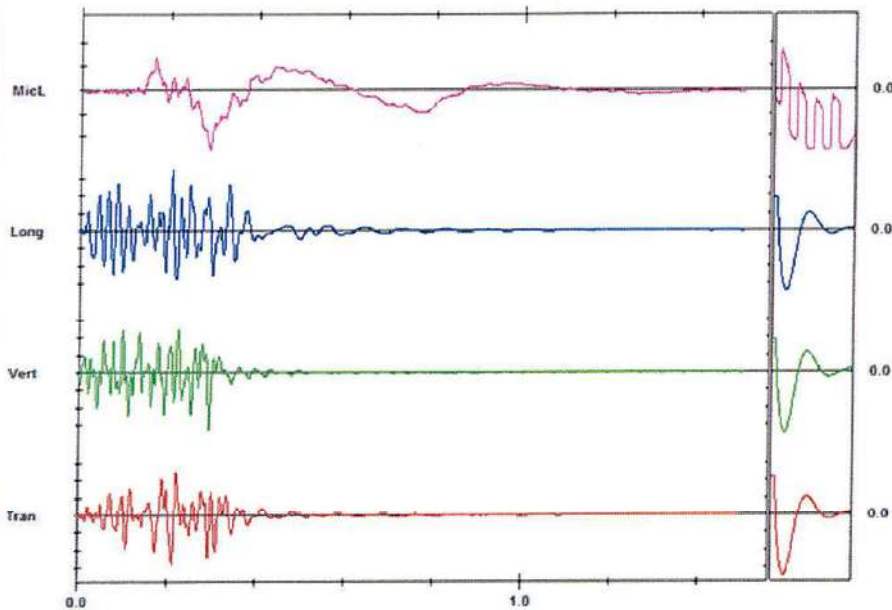
	Tran	Vert	Long	
PPV	14.2	16.6	17.4	mm/s
ZC Freq	3.4	4.3	3.7	Hz
Time (Rel. to Trig)	0.212	0.293	0.206	sec
Peak Acceleration	0.530	0.583	0.583	g
Peak Displacement	0.0616	0.0554	0.0677	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.4	Hz
Overswing Ratio	3.6	3.3	3.7	

Peak Vector Sum 21.0 mm/s at 0.293 sec

DGMS India (A)



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 5.00 mm/s/div Mic: 50.0 pa (L)/div

Sensor Check



FFT Report



Date/Time Vert at 12:30:58 December 22, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 2048 sps
Job Number: 1

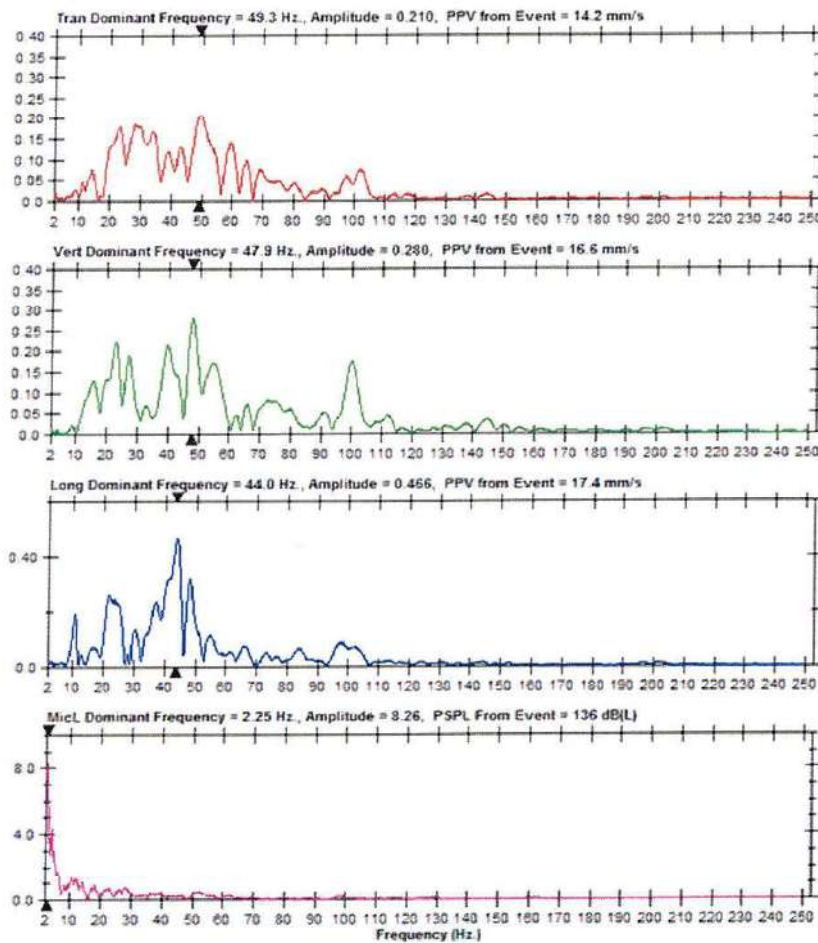
Serial Number BA13814 V 8 12-8 0 BlastMate III
Battery Level 8.1 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name C814GQW 3M0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone
Mines of Prism Cement Ltd.





Event Report



Date/Time Vert at 12:30:59 December 22, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number BE20375 V 10 60-8 17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375G0QW 3N0

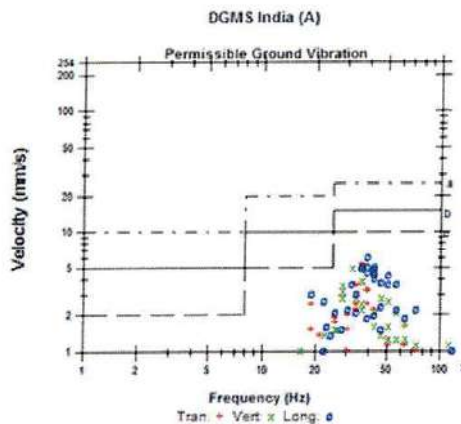
Notes
Location: On Ground Surface
Client: PRISM CEMENT LTD. STANA
User Name: REE Division, CSIR- CIMFR, Dhanbad
General:

Extended Notes
Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

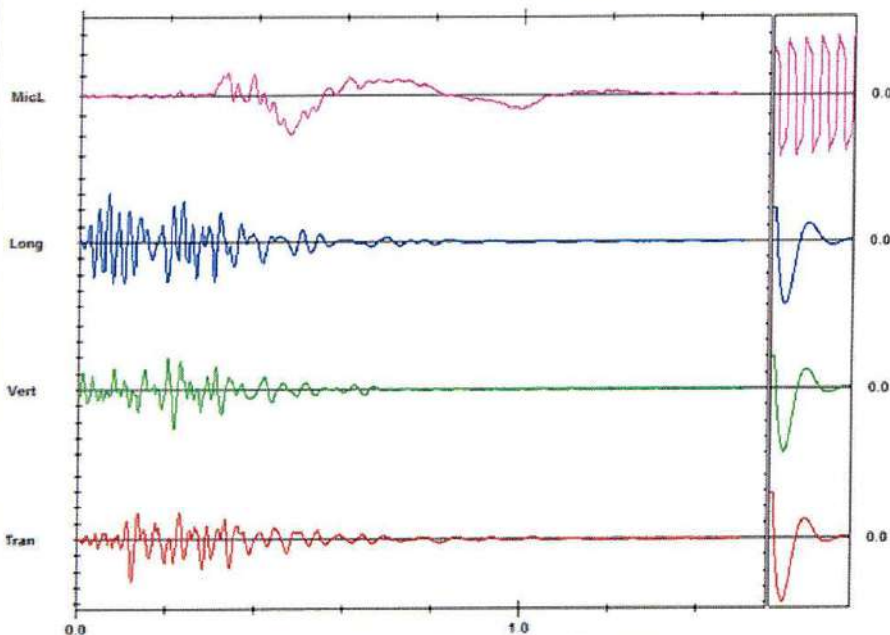
Microphone Linear Weighting
PSPL 119.8 dB(L) at 0.473 sec
ZC Freq 3.8 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 477 mv)

	Tran	Vert	Long	
PPV	5.33	4.95	6.10	mm/s
ZC Freq	37	32	39	Hz
Time (Rel. to Trig)	0.124	0.217	0.065	sec
Peak Acceleration	0.119	0.106	0.199	g
Peak Displacement	0.0224	0.0205	0.0236	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.2	Hz
Overswing Ratio	3.6	3.6	3.8	

Peak Vector Sum 6.75 mm/s at 0.232 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 ps (L)/div

Sensor Check



FFT Report



Date/Time: Vert at 12:30:59 December 22, 2016
Trigger Source: Geo: 0.510 mm/s
Range: Geo: 254 mm/s
Record Time: 6.0 sec at 1024 sps

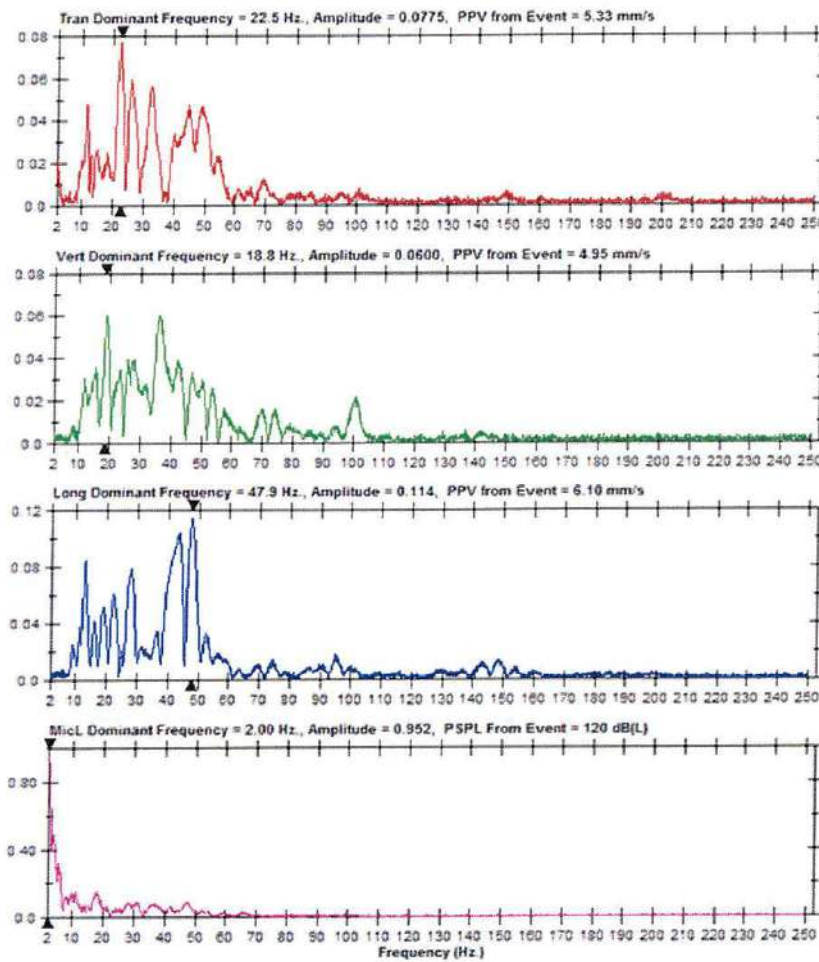
Serial Number: BE20375 V 10 60-8.17 MiniMate Plus
Battery Level: 6.3 Volts
Unit Calibration: April 29, 2015 by CIMFR, Dhanbad
File Name: V375GQW 3N0

Notes

Location: On Ground Surface
Client: PRISM CEMENT LTD. STANA
User Name: REE Division, CSIR- CIMFR, Dhanbad
General:

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 10:14:09 December 23, 2016
Trigger Source Geo: 0.508 mm/s
Range Geo: 127 mm/s
Record Time 8.0 sec at 1024 sps
Notes
Location: On ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE, CSIR-CIMFR, Dhanbad
Converted: December 23, 2016 20:27:06 (V10.30)

Serial Number 4710 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GOUF 3L0

Extended Notes

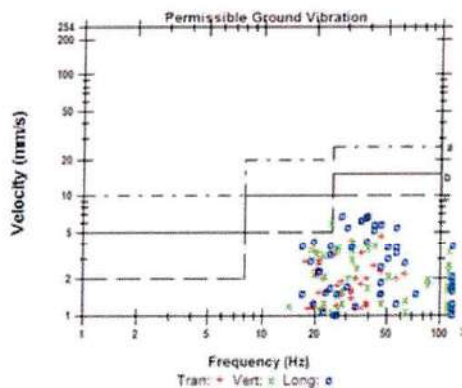
Blast vibration study at Mandhi and Hinault Limestone Mines of Prism Cement Ltd

Microphone Linear Weighting
PSPL 122.9 dB(L) at 4.534 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 477 mv)

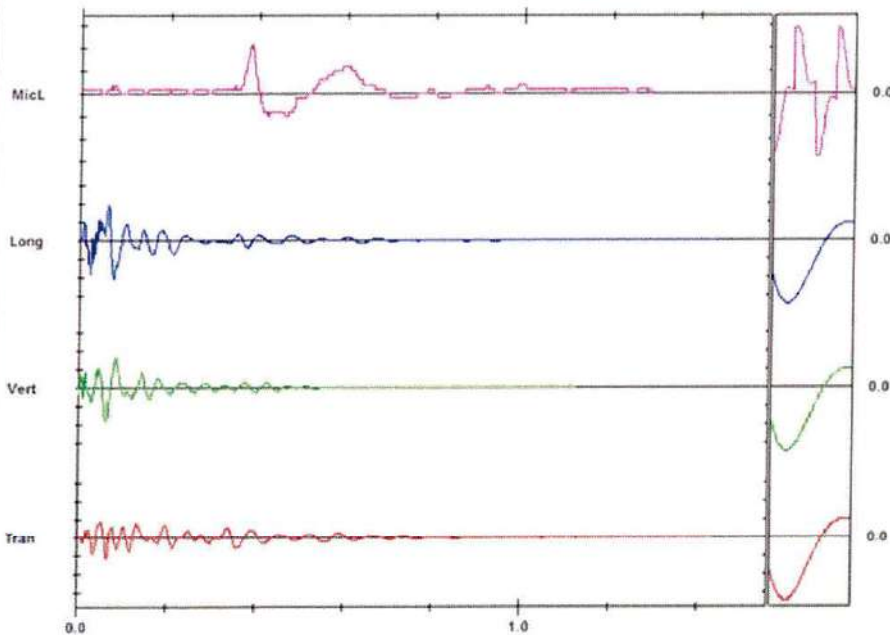
	Tran	Vert	Long	
PPV	4.57	6.97	6.92	mm/s
ZC Freq	47	24	39	Hz
Time (Rel. to Trig)	4.178	4.189	4.130	sec
Peak Acceleration	0.225	0.239	0.278	g
Peak Displacement	0.0266	0.0335	0.0322	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.8	7.7	Hz
Overswing Ratio	3.5	3.4	3.6	

Peak Vector Sum 7.78 mm/s at 4.130 sec

DGMS India (A)



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa.(L)/div

Sensor Check



FFT Report

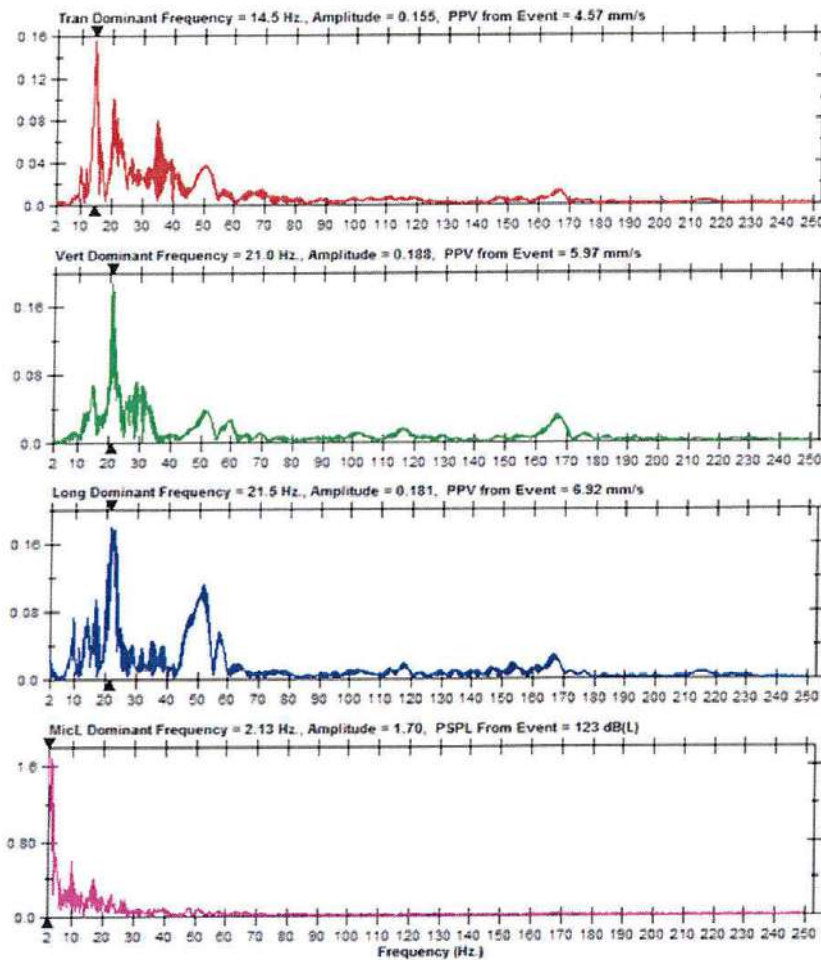


Date/Time Vert at 10:14:09 December 23, 2016
Trigger Source Geo 0.508 mm/s
Range Geo 127 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number 4710 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GOUF 3L0

Notes
Location: On ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE CSIR-CIMFR, Dhanbad
Converted: December 23, 2016 20:27:06 (V10.30)

Extended Notes
Blast vibration study at Meedhi and Hinauti Limestone Mines of
Prism Cement Ltd.





Event Report



Date/Time Vert at 16:41:31 December 23, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 4.0 sec at 1024 sps
Job Number: 1

Serial Number BE8183 V 10 30-8 17 MiniMate Plus-8
Battery Level 6.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name J183GOT2.D70

Notes

Location On ground surface
Client PRISM CEMENT LTD. SATNA
User Name REE-Division, CSIR-CIMFR, Dhanbad
General

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

Microphone Linear Weighting

PSPL 122.6 dB(L) at 0.577 sec

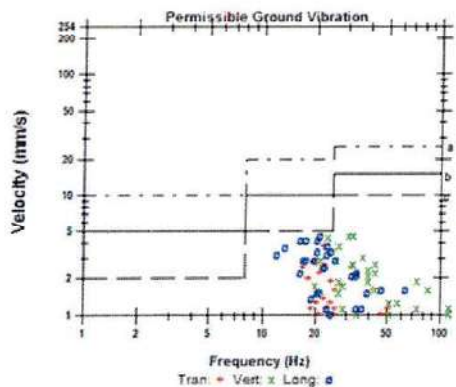
ZC Freq 9.7 Hz

Channel Test Passed (Freq = 19.7 Hz Amp = 507 mv)

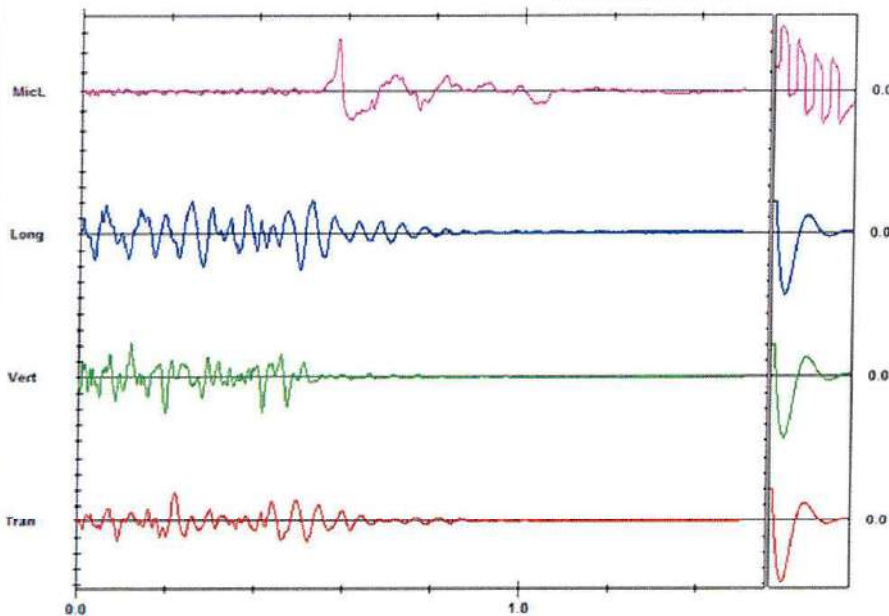
	Tran	Vert	Long	
PPV	3.81	4.57	4.57	mm/s
ZC Freq	22	32	21	Hz
Time (Rel. to Trig)	0.218	0.195	0.497	sec
Peak Acceleration	0.0563	0.133	0.106	g
Peak Displacement	0.0282	0.0233	0.0393	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.7	3.5	3.8	

Peak Vector Sum 5.24 mm/s at 0.497 sec

DGMS India (A)



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa (L)/div

Sensor Check



FFT Report

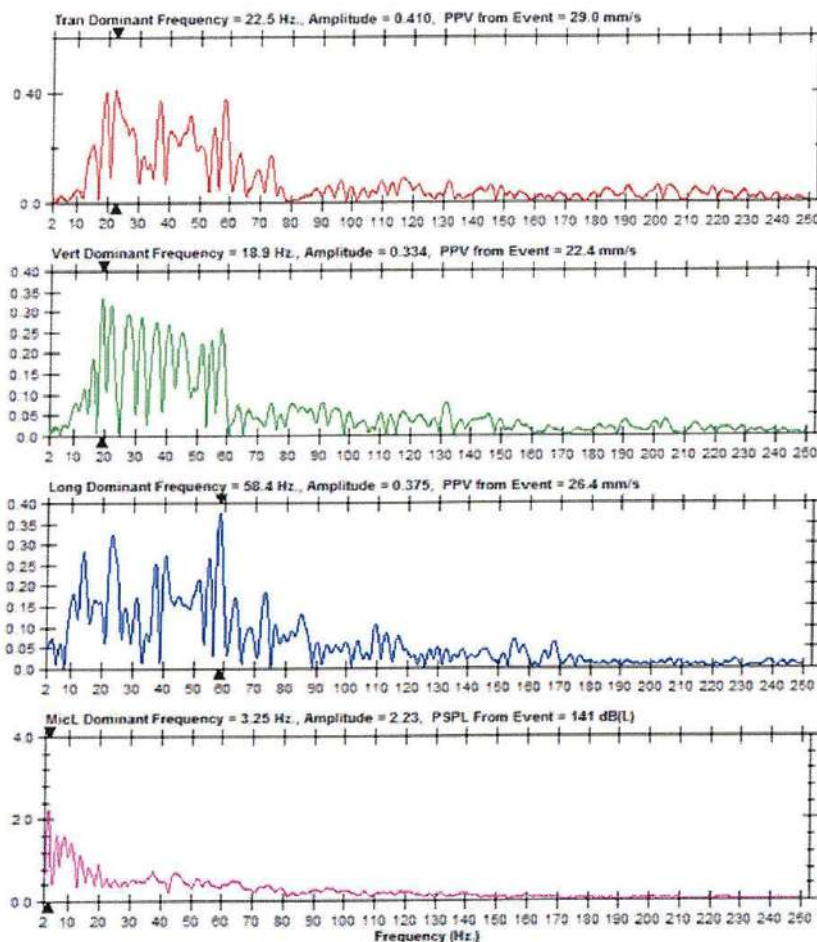


Date/Time: Vert at 16:41:33 December 23, 2016
Trigger Source: Geo: 0.510 mm/s
Range: Geo: 254 mm/s
Record Time: 4.0 sec at 4096 sps
Job Number: 1

Serial Number: BA13814 V 8 12-8.0 BlastMate III
Battery Level: 6.2 Volts
Unit Calibration: July 14, 2016 by CIMFR, Dhanbad
File Name: 0814GOT2.D90

Notes
Location: On the ground surface
Client: PRISM CEMENT LTD, SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes
Blast vibration study at Mendhi and Hinault Limestone
Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 16:41:31 December 23, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 1024 sps
Job Number: 1

Serial Number BE8183 V 10 30-8 17 MiniMate Plus/8
Battery Level 6.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name J183GOT2.D70

Notes

Location On ground surface
Client PRISM CEMENT LTD. SATNA
User Name REE-Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

Microphone Linear Weighting

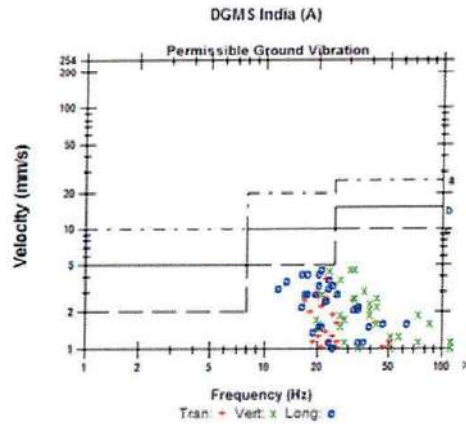
PSPL 122.6 dB(L) at 0.577 sec

ZC Freq 9.7 Hz

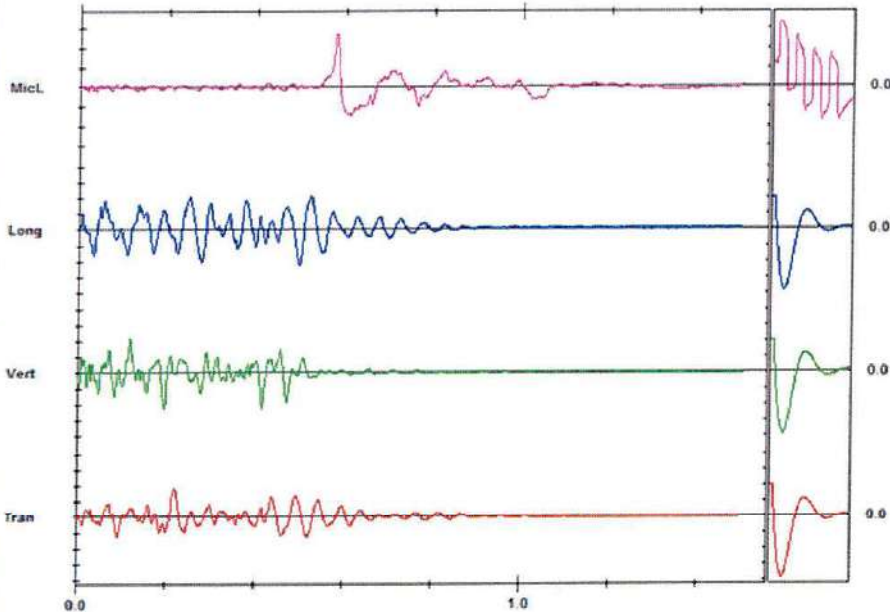
Channel Test Passed (Freq = 19.7 Hz Amp = 507 mv)

	Tran	Vert	Long	
PPV	3.81	4.57	4.57	mm/s
ZC Freq	22	32	21	Hz
Time (Rel. to Trig)	0.218	0.195	0.497	sec
Peak Acceleration	0.0663	0.133	0.106	g
Peak Displacement	0.0282	0.0293	0.0393	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.7	3.5	3.8	

Peak Vector Sum 5.24 mm/s at 0.497 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa (L)/div

Sensor Check:



FFT Report



Date/Time: Vert at 16:41:31 December 23, 2016
Trigger Source: Geo: 0.510 mm/s
Range: Geo: 254 mm/s
Record Time: 4.0 sec at 1024 sps
Job Number: 1

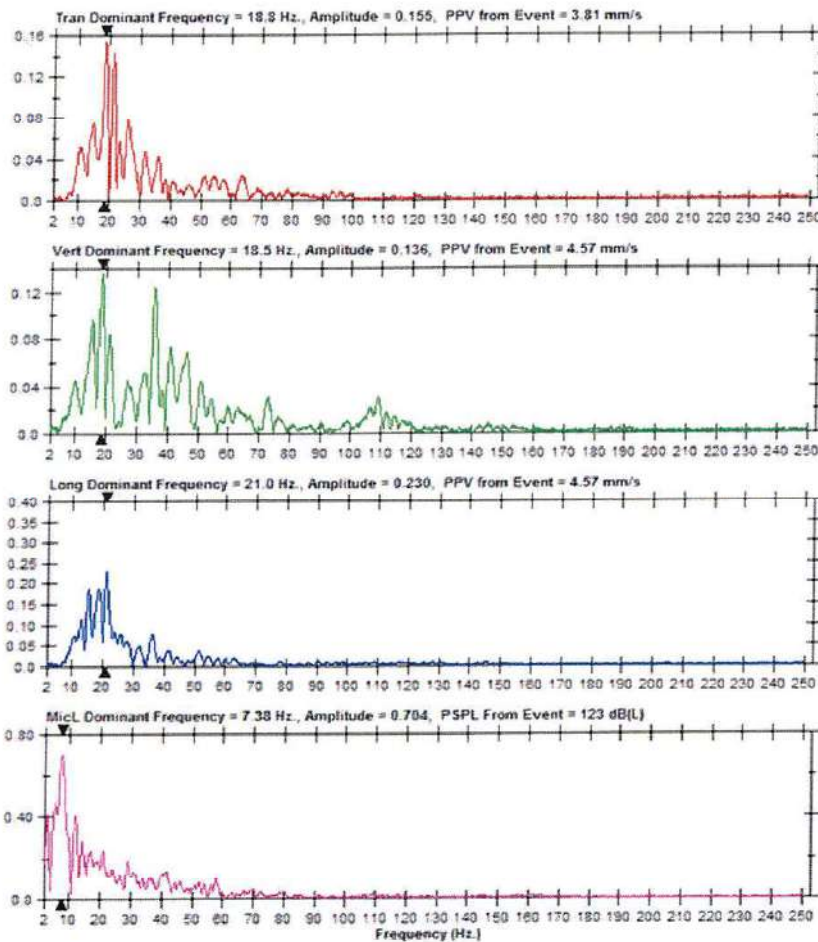
Serial Number: BE8183 V 10 30-9 17 MiniMate Plus-8
Battery Level: 6.2 Volts
Unit Calibration: January 14, 2016 by CIMFR, Chanbad
File Name: J183GOT2.D70

Notes

Location: On ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE-Division, CSIR-CIMFR, Chanbad
General:

Extended Notes

Blast vibration study at Mendhi and Himsuti Limestone Mines of Prism Cement Ltd.





Event Report



Date/Time Vert at 14:33:20 December 23, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 4096 sps
Job Number: 1

Serial Number BA13514 V 3.12-5.0 BlastMate III
Battery Level 6.2 Volts
Unit Calibration July 14, 2016 by CIMFR, Chanbad
File Name 0814GOSW FK0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Chanbad
General:

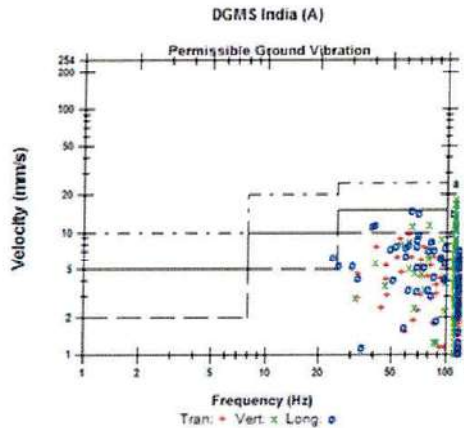
Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone
Mines of Prism Cement Ltd.

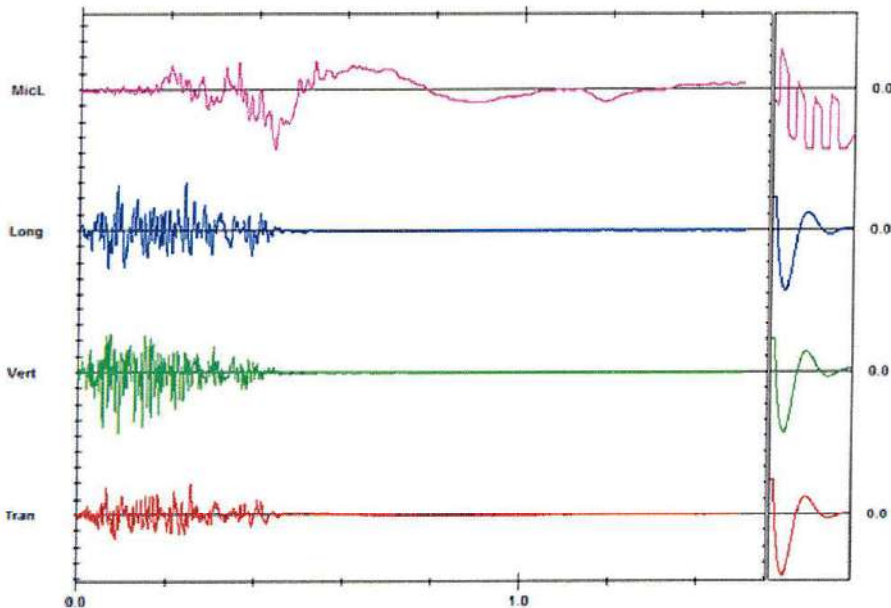
Microphone Linear Weighting
PSPL 131.5 dB(L) at 0.438 sec
ZC Freq 5.9 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 720 mv)

	Tran	Vert	Long	
PPV	9.52	18.9	15.0	mm/s
ZC Freq	62	114	64	Hz
Time (Rel. to Trig)	0.266	0.092	0.237	sec
Peak Acceleration	0.689	1.43	0.795	g
Peak Displacement	0.0213	0.0244	0.0422	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.5	Hz
Overswing Ratio	3.6	3.3	3.7	

Peak Vector Sum: 20.4 mm/s at 0.093 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 5.00 mm/s/div Mic: 20.0 pa (L)/div

Sensor Check



FFT Report



Date/Time: Vert at 14:33:20 December 23, 2016
Trigger Source: Geo: 0.510 mm/s
Range: Geo: 254 mm/s
Record Time: 4.0 sec at 4096 sps
Job Number: 1

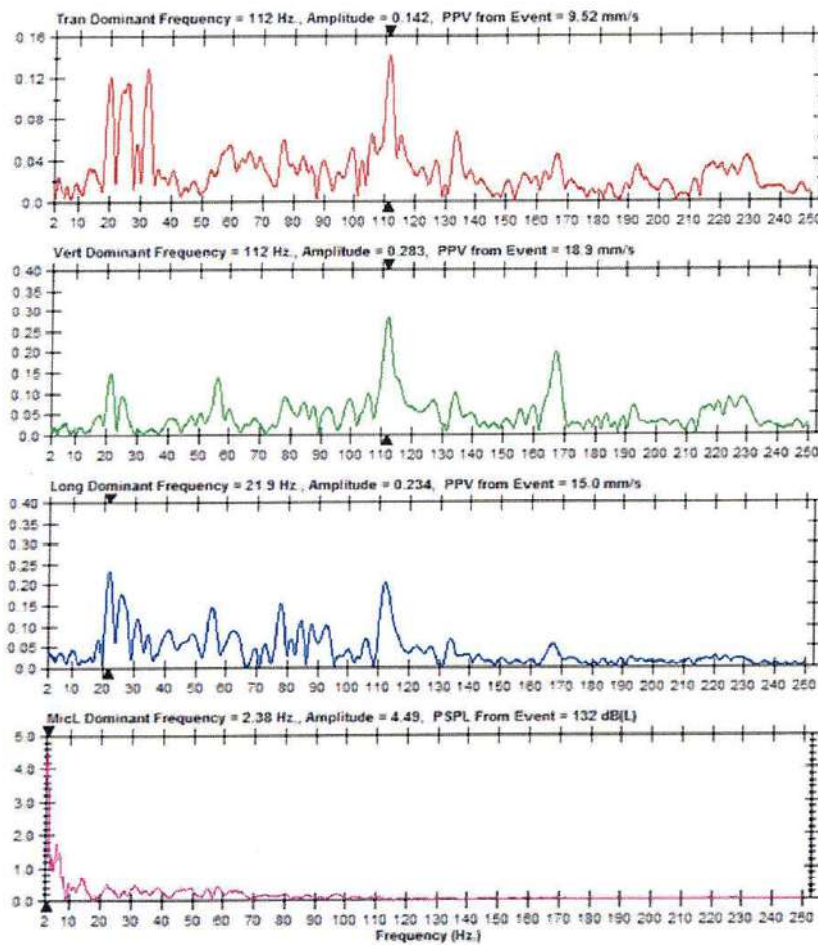
Serial Number: BA13814 V 8.12-8.0 BlastMate III
Battery Level: 6.2 Volts
Unit Calibration: July 14, 2016 by CIMFR, Chanbad
File Name: C814GOSW.FK0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Chanbad
General:

Extended Notes

Blast vibration study at Mendhi and Hirauti Limestone
Mines of Prism Cement Ltd.





Event Report



Date/Time Long at 14:33:26 December 23, 2016
Trigger Source Geo: 0.508 mm/s
Range Geo: 127 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number 4719 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name FT10GOUR.3Q0

Notes

Location: On ground surface
Client: PRISM CEMENT LTD. SATNA.
User Name: REE, CSIR-CIMFR, Dhanbad
Converted: December 23, 2016 20:27:06 (v10.30)

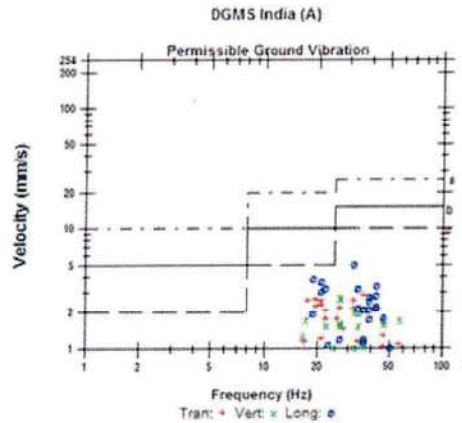
Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

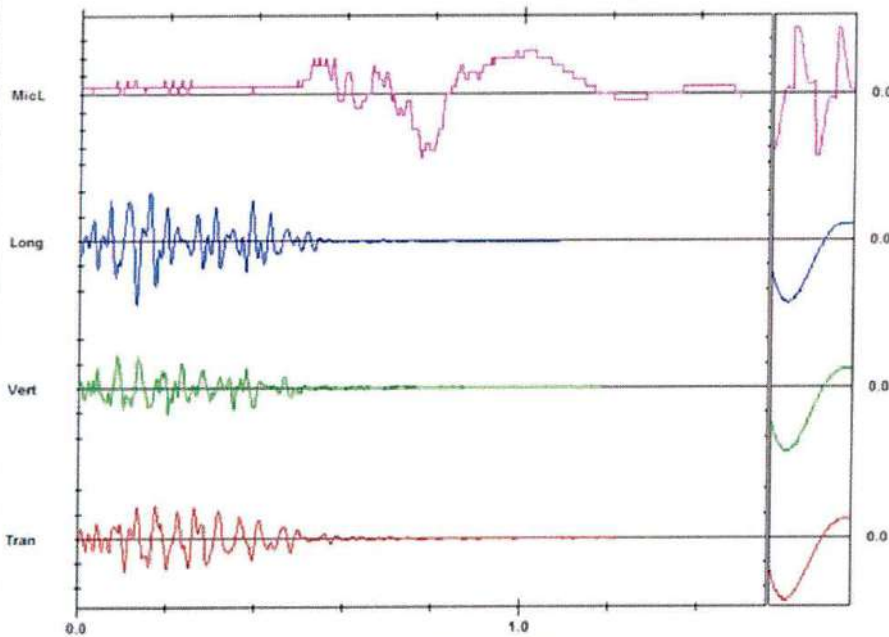
Microphone Linear Weighting
PSPL 119.1 dB(L) at 0.768 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 476 mv)

	Tran	Vert	Long	
PPV	2.79	2.67	5.14	mm/s
ZC Freq	37	27	32	Hz
Time (Rel to Trig)	0.110	0.069	0.130	sec
Peak Acceleration	0.0063	0.0795	0.106	g
Peak Displacement	0.0182	0.0157	0.0245	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.8	7.8	Hz
Overswing Ratio	2.4	3.4	3.7	

Peak Vector Sum 5.29 mm/s at 0.132 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 5.00 pa(L)/div

Sensor Check



FFT Report



Date/Time Long at 14:33:26 December 23, 2016
Trigger Source Geo: 0.508 mm/s
Range Geo: 127 mm/s
Record Time 6.0 sec at 1024 sps

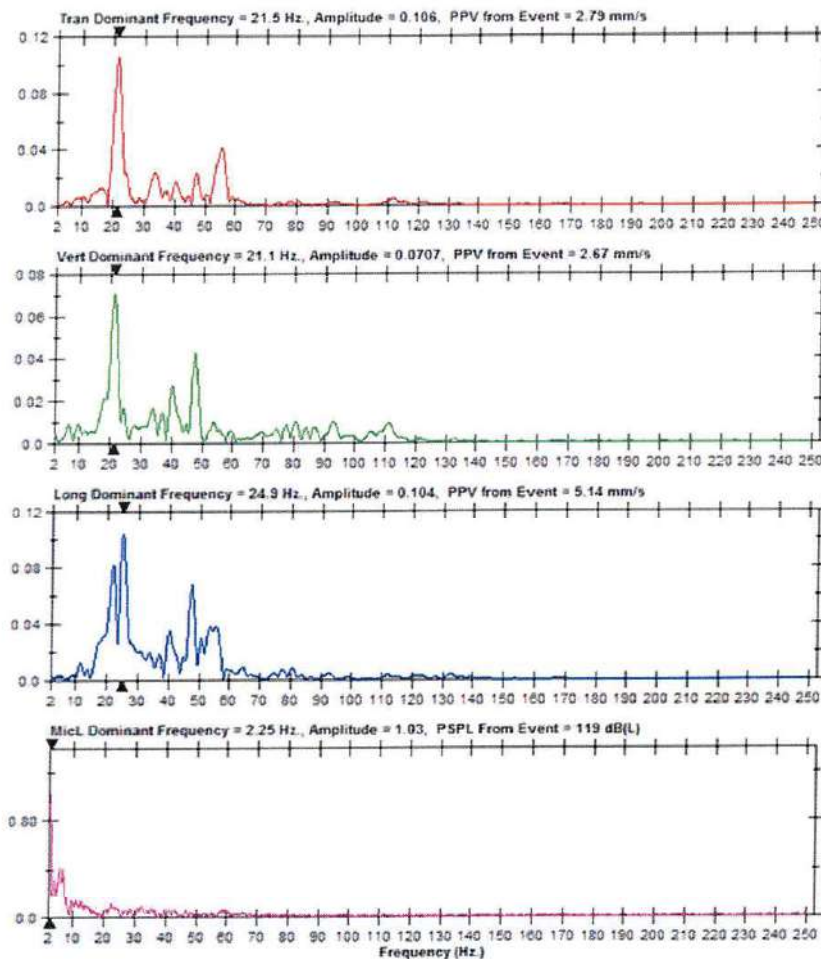
Serial Number 4710 V 2.81 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name FT16GOUR 3Q0

Notes

Location On ground surface
Client PRISM CEMENT LTD. SATNA
User Name REE CSIR-CIMFR, Dhanbad
Converted December 23, 2016 20:27:06 (V10.30)

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.





Event Report



Date/Time Vert at 12:42:56 December 25, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number BE10010 V 10 30-1 1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name L010GOWG-NK0

Notes

Location: On Ground Surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

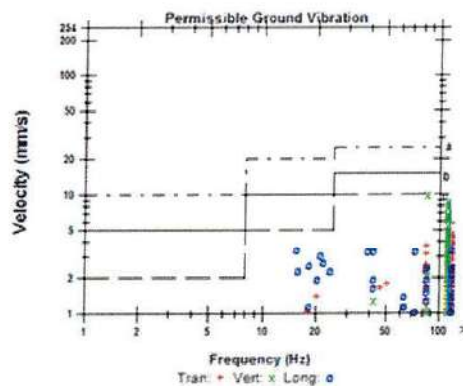
Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

Microphone Linear Weighting
PSPL 121.8 dB(L) at 0.742 sec
ZC Freq 3.2 Hz
Channel Test Check (Freq = 0.0 Hz Amp = 0 mv)

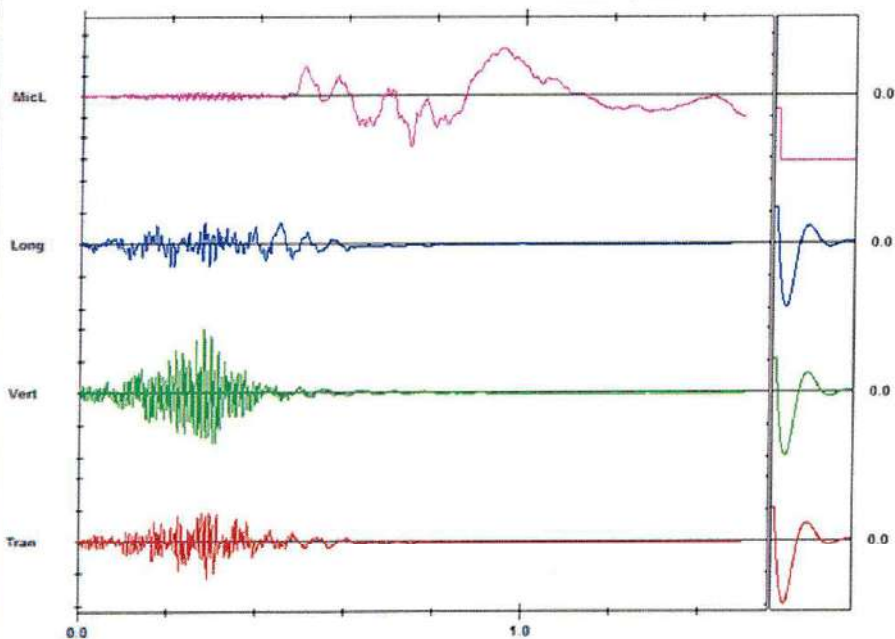
	Tran	Vert	Long	
PPV	5.71	9.91	3.43	mm/s
ZC Freq	>100	85	>100	Hz
Time (Rel. to Trig)	0.292	0.280	0.290	sec
Peak Acceleration	0.371	0.703	0.172	g
Peak Displacement	0.00893	0.0162	0.0326	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.6	Hz
Overswing Ratio	3.8	3.6	4.0	

Peak Vector Sum 10.7 mm/s at 0.279 sec

DGMS India (A)



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 5.00 mm/s/div Mic: 10.00 pa(L)/div

Sensor Check



FFT Report



Date/Time Vert at 12:42:56 December 25, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 6.0 sec at 1024 sps

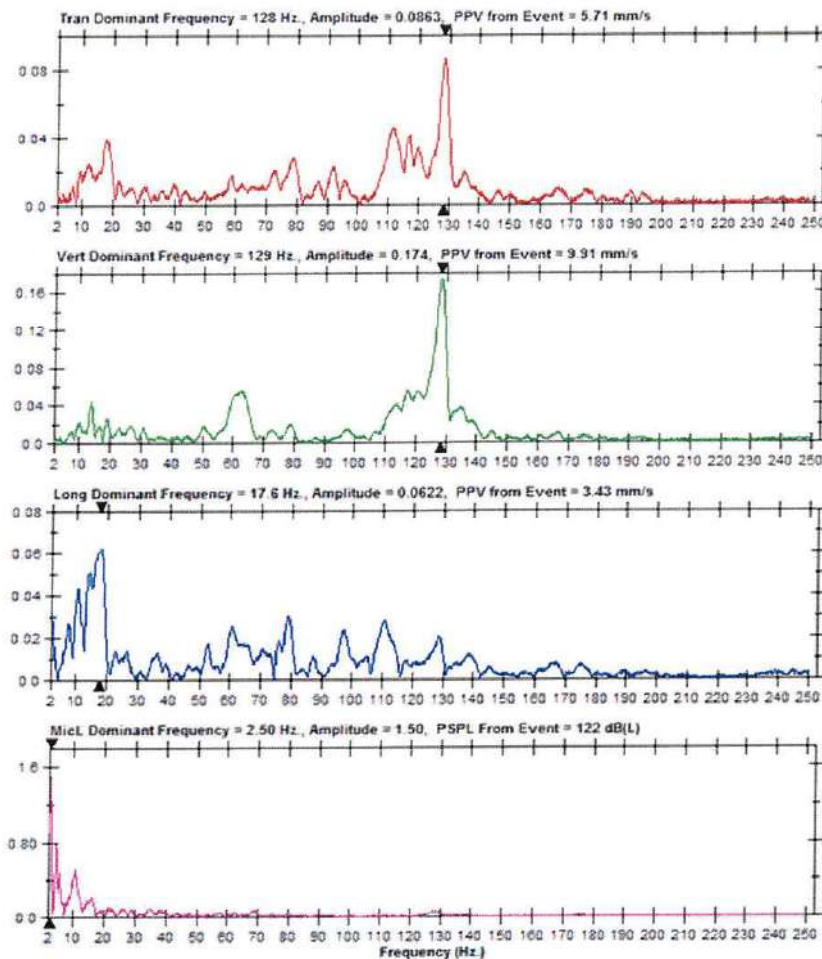
Serial Number BE10010 V 10 30-1 1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name L010GOWG.NK0

Notes

Location On Ground Surface
Client PRISM CEMENT LTD SATNA
User Name REE Division, CSIR-CIMFR, Dhanbad.
General

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.





Event Report



Date/Time Vert at 16:22:41 December 26, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 3.0 sec at 1024 sps

Serial Number BE10010 V 10-30-1.1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name L010GOYL HT0

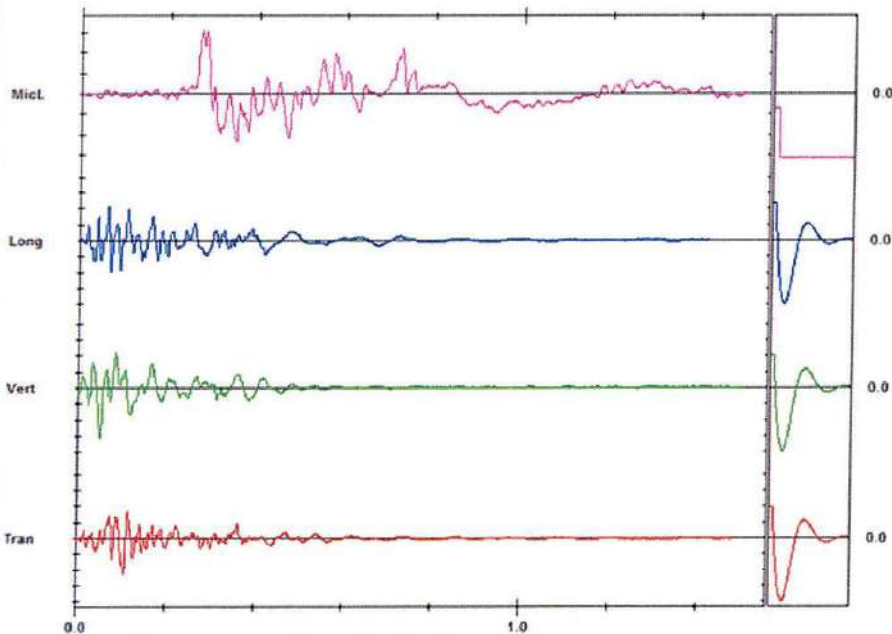
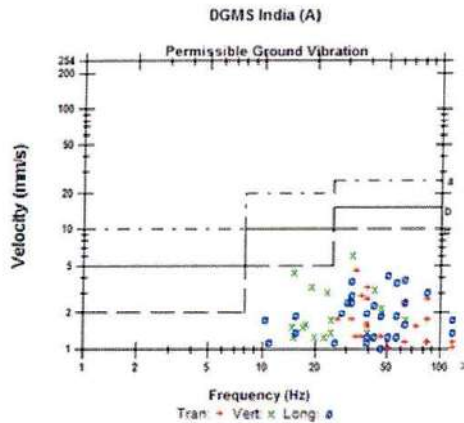
Notes
Location: On Ground Surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes
Blast vibration study at Mandhi and Himauti Limestone Mines of Prism Cement Ltd

Microphone Linear Weighting
PSPL 123.9 dB(L) at 0.271 sec
ZC Freq 9.0 Hz
Channel Test Check (Freq = 0.0 Hz Amp = 0 mv)

	Tran	Vert	Long	
PPV	4.57	6.10	4.19	mm/s
ZC Freq	34	32	51	Hz
Time (Rel. to Trig)	0.108	0.051	0.084	sec
Peak Acceleration	0.172	0.159	0.199	g
Peak Displacement	0.0203	0.0316	0.0198	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.6	Hz
Overswing Ratio	3.8	3.8	4.0	

Peak Vector Sum 6.86 mm/s at 0.051 sec



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa (L)/div

Sensor Check



FFT Report



Date/Time Vert at 16:22:41 December 26, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 3.0 sec at 1024 sps

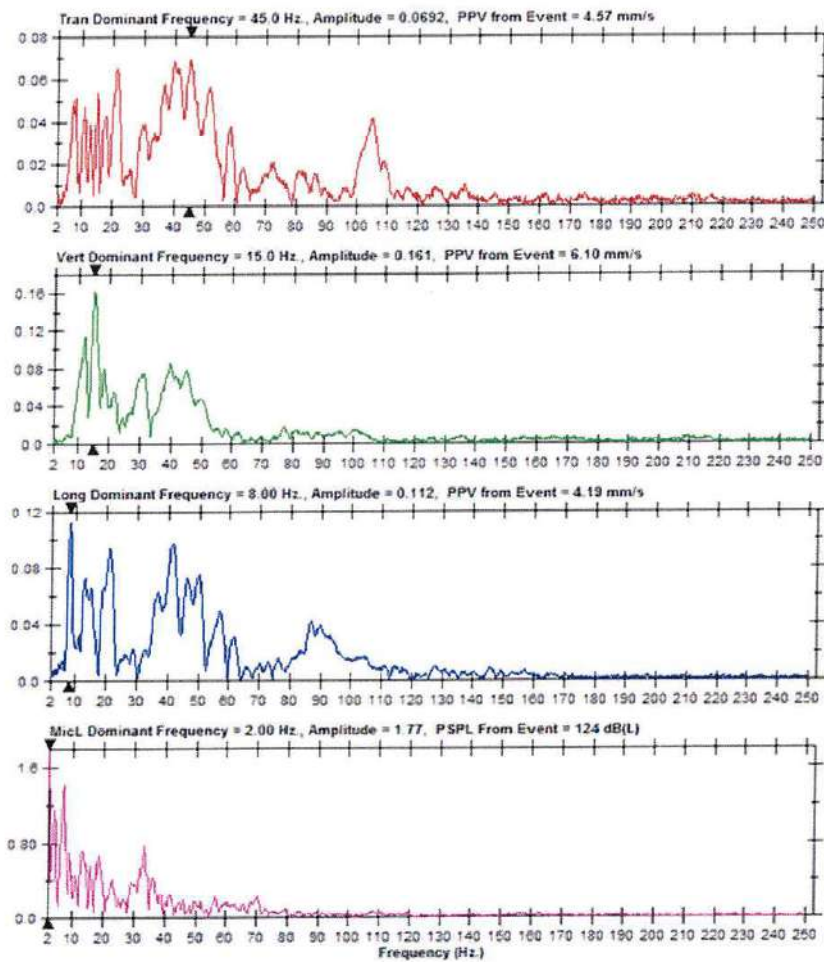
Serial Number BE10010 V 10 30-1 1 Minimate Blaster
Battery Level 8.2 Volts
Unit Calibration January 14, 2016 by CIMFR, Dhanbad
File Name LD10GOYL HT0

Notes

Location On Ground Surface
Client PRISM CEMENT LTD. SATNA
User Name REE Division, CSIR-CIMFR, Dhanbad
General

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd





Event Report



Date/Time Long at 16:38:31 December 26, 2016
Trigger Source Geo: 0.508 mm/s
Range Geo: 127 mm/s
Record Time 4.0 sec at 1024 sps

Serial Number 4710 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GP0G.W70

Notes

Location: On ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE, CSIR-CIMFR, Dhanbad
Converted: December 26, 2016 22:51:18 (V10.30)

Extended Notes

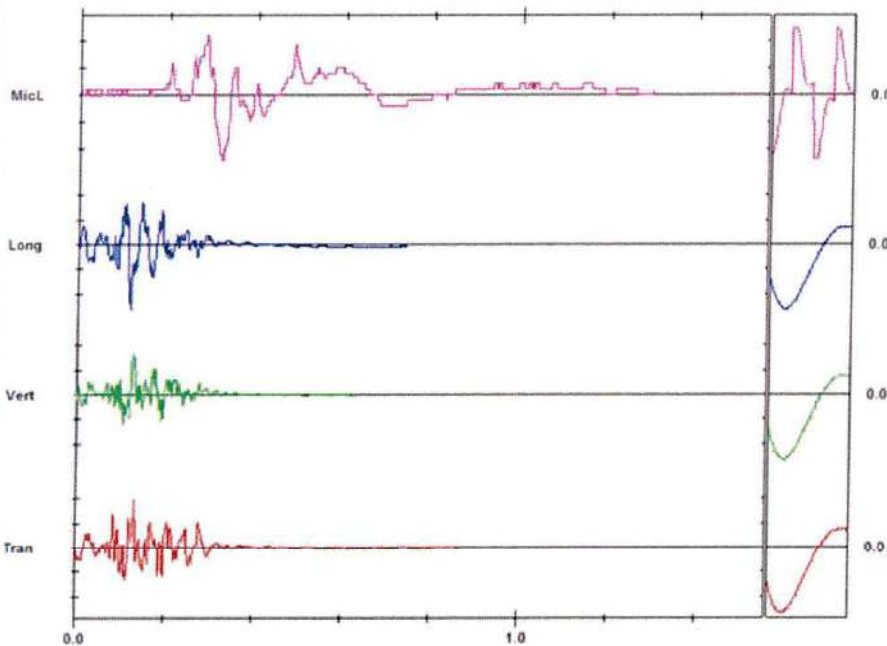
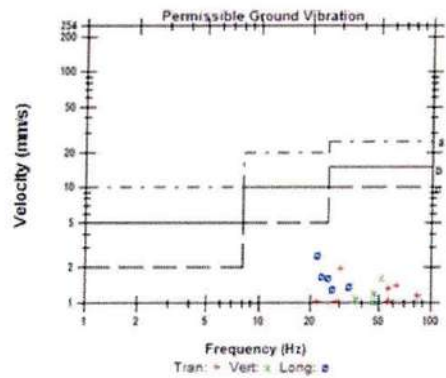
Blast vibration study at Mandhi and Hinauti Limestone Mines of Prism Cement Ltd.

Microphone Linear Weighting
PSPL 121.6 dB(L) at 0.321 sec
ZC Freq 14 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 476 mv)

	Tran	Vert	Long	
PPV	1.97	1.65	2.60	mm/s
ZC Freq	30	51	22	Hz
Time (Rel. to Trig)	0.125	0.128	0.121	sec
Peak Acceleration	0.0862	0.0862	0.113	g
Peak Displacement	0.00738	0.00592	0.0132	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.8	7.7	Hz
Overswing Ratio	3.5	3.4	3.6	

Peak Vector Sum 2.83 mm/s at 0.121 sec

DGMS India (A)



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 1.000 mm/s/div Mic: 10.00 pa.(L)/div

Sensor Check



FFT Report



Date/Time Long at 16:39:31 December 26, 2016
Trigger Source Geo 0.508 mm/s
Range Geo 127 mm/s
Record Time 4.0 sec at 1024 sps

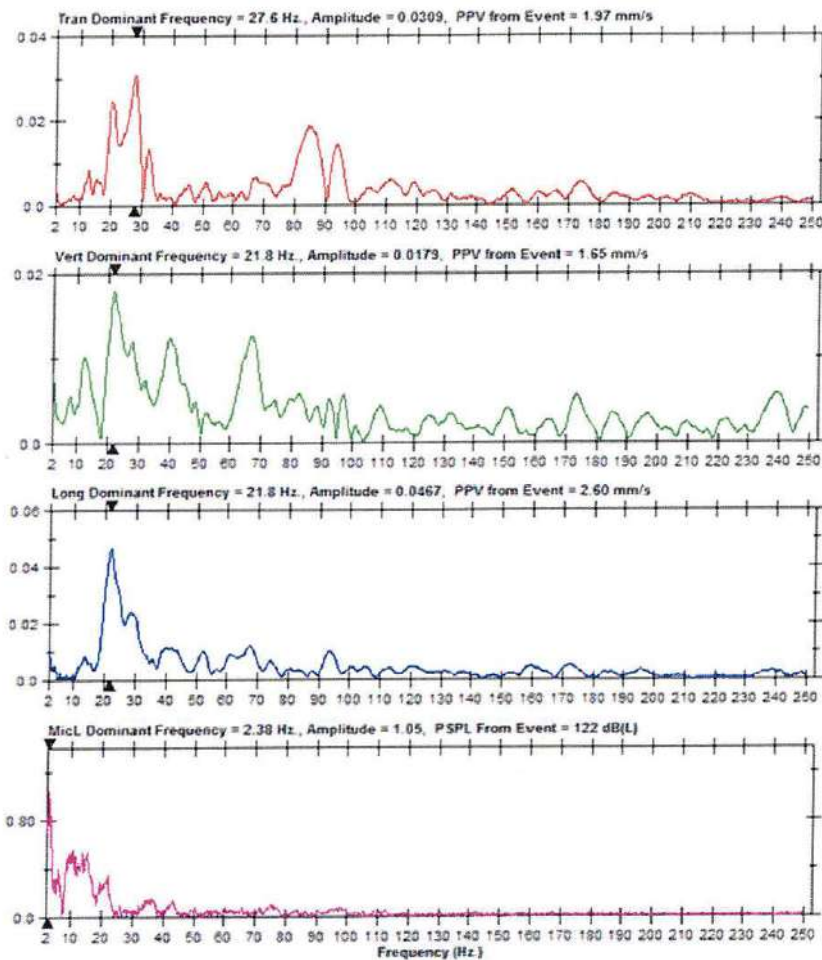
Serial Number 4710 V.2.81 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GP0G.W70

Notes

Location: On ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: RSE, CSIR-CIMFR, Dhanbad
Converted: December 26, 2016 22:51:18 (V10.30)

Extended Notes

Blast vibration study at Mendhi and Hirakuti Limestone Mines of Prism Cement Ltd





Event Report



Date/Time Vert at 16:53:08 December 26, 2016
Trigger Source Geo: 0.610 mm/s
Range Geo: 254 mm/s
Record Time 3.0 sec at 4096 sps
Job Number: 1

Serial Number BA13814 V.8.12-8.0 BlastMate III
Battery Level 6.2 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name 0814GOVM.WK0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General

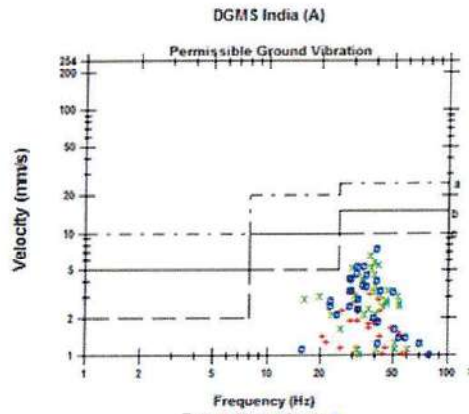
Extended Notes

Blast vibration study at Mandli and Hinauti Limestone Mines of Prism Cement Ltd.

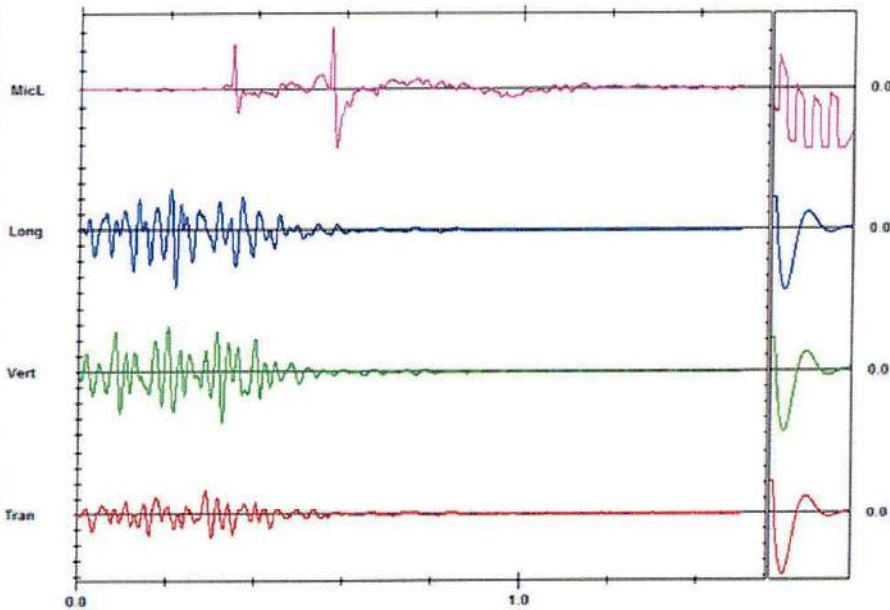
Microphone Linear Weighting
PSPL 138.0 dB(L) at 0.566 sec
ZC Freq 41 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 751 mv)

	Tran	Vert	Long	
PPV	3.17	6.60	7.62	mm/s
ZC Freq	31.0	37.2	40	Hz
Time (Rel. to Trig)	0.291	0.325	0.216	sec
Peak Acceleration	0.106	0.212	0.212	g
Peak Displacement	0.0156	0.0296	0.0292	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.3	Hz
Overswing Ratio	3.7	3.4	3.8	

Peak Vector Sum 9.00 mm/s at 0.216 sec



a) Industrial Buildings
b) Domestic houses/structures
c) Historic objects, sensitive structures



Time scale has been modified and may not represent the actual length of the event record
Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 50.0 pa (Ly/div)

Sensor Check



FFT Report



Date/Time Vert at 16:53:08 December 26, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 3.0 sec at 4096 sps
Job Number: 1

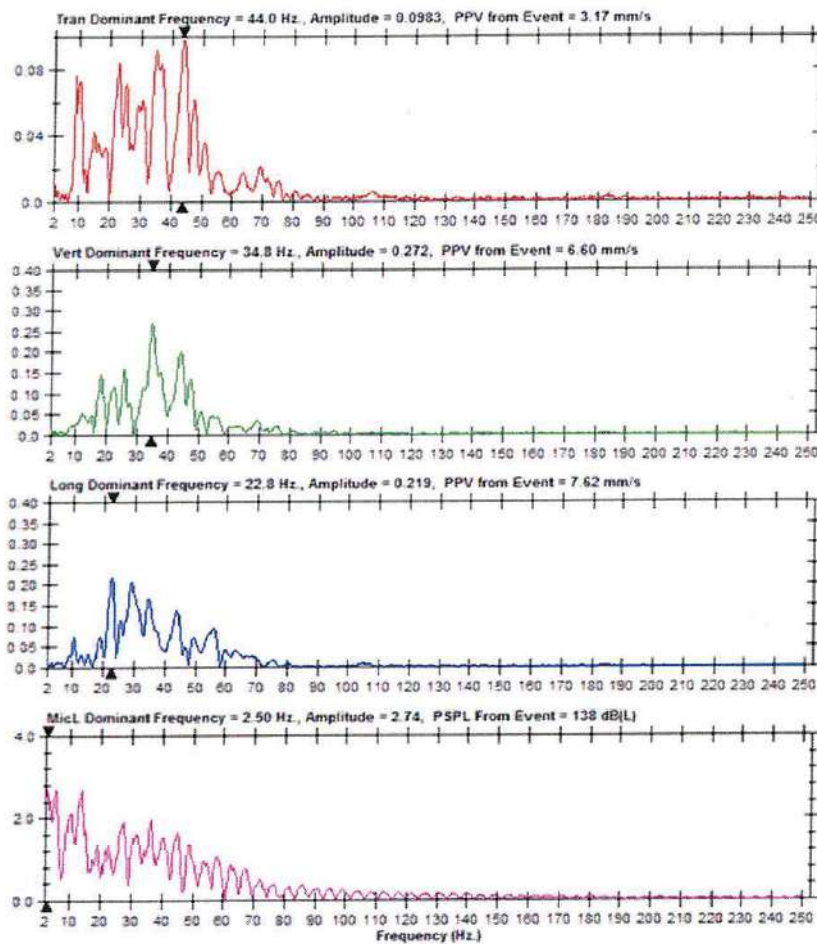
Serial Number BA13814 V 8 12-8 0 BlastMate III
Battery Level 6.2 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name C914GYM.WK0

Notes

Location: On the ground surface
Client: PRISM CEMENT LTD. SATNA
User Name: REE Division, CSIR-CIMFR, Dhanbad
General:

Extended Notes

Blast vibration study at Mendhi and Hinauti Limestone
Mines of Prism Cement Ltd.



MIN/0701/990628 03.02.2000

The Joint Director(S)
Ministry Of Environment & Forests
(MOEF), Regional Office, Western Region
E-3/240 Arera Colony,
Bhopal-462016(M.P)

Dear Sir,

Sub: Compliance Report – Sijhata-Hinouti-Limestone Mine of M/s. Prism Cement Ltd.

Ref: Letter – No. 11015/37/96/1A II(M) dated 20/12/99 of MOEF, New Delhi
Your office letter no. 3-1/97(Env)/1359 dated 5/7/99.

We kindly acknowledge the above mentioned letters. We regret very much for not sending the compliance reports in time. We assure you, sir, we will be sending the same in time in future.

We hereby mention our clarifications pointiwise as raised by you:

The garland drains have been done all around the dumping sites, which restrict erosion the settling of silt around the faces.

a) Monitoring of Quality of Effluent:

In mines there is no generation of any effluent water. However the Sewage Water generated from the residential colony (combined for plant & mines) is being treated in colony premises and is being monitored regularly as per guidelines of MPPCB.

The rainwater accumulated in the lower benches of the working areas, is being pumped out and carried through pipeline to the reservoirs (settling tanks). The reservoir is in two blocks having cumulative water holding capacities of about 1.5 lakhs cub. mtrs. We find water in the reservoir till end of January or max 2nd week of February.

This water is being used sometimes for plantation and dust suppression on the hauling roads.

(b) Monitoring of RPM:

The monitoring of RPM is presently is not being monitored, as there is no norms mentioned in the MPPCB consent letter. At present we are regularly monitoring SPM, SO₂, NO_x in Mines. RPM is not being monitored as on date. If you feel it is required we will arrange to carry out the same. We request for your guidelines for RPM monitoring.

...2/-

c) Submission of Analysis Report in respect of Noise pollution:

We have submitted a copy of the comprehensive, EIA and EMP (Post commissioning) for the area, vide our letter no. MIN0703/990369 dated 15/9/99, in person, which is duly acknowledged by your Regional Office, Bhopal on 16/9/99.

However, we are furnishing copies of the same for your ready reference and records.

d) Submission of analysis -- report on the monitoring data:

We are furnishing here with the monthly Ambient Air Quality Monitoring reports till date.

e) Construction of settling tanks and toe-drains leading to it for arresting siltation of surface water.

We do not have an open drainage system. The pumped out water is being carried through pipelines and released in the reservoir. The reservoirs consist of two blocks of a cumulative water holding capacity of 1.5 lakhs cub. Mtrs. The water is not discharged from reservoir. Hence all the silt will be deposited within the reservoir.

f) Submission of annual action plan for socio economic development:

We are herewith furnishing a note on the various social (welfare) economic measures carried out by Prism cement. We have enclosed herewith the Socio Economic Action Plan for your kind perusal.

g) Establishment of Environment Management Cell:

We have already established Environmental Management Cell, members of which are as below :

Mr. M.P. Rai	-	Vice President (Works)
Mr. U.K. Das	-	Sr. Jt. General Manager (Mines)
Mr. A.K. Shrivastava	-	Asst. Gen. Manager
Mr. V.V. Kulkarni	-	Manager (Geology).
Mr. D.K. Singh	-	Asst. Manager (Pollution Control)
Mr. S.P. Singh	-	Horticulturist.

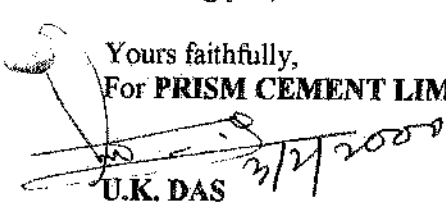
- h) Regular submission of reports for every 6 months about environmental compliance to Regional office:**

We regret for not sending regularly the reports as mentioned above. The same will be complied in future.

Hope all these points are in order and we assure you that to the best of our efforts, we shall continue to comply with various provisions of the Act.

Thanking you,

Yours faithfully,
For **PRISM CEMENT LIMITED**


U.K. DAS
Sr. Jt. General Manager (Mines)

Encl: as above.

CC: Additional Director, MOEF – For necessary information and records.
CGO Complex, Lodhi Road
New Delhi – 110 003

PS: We have complied all the points referred in your letter dated 20.12.99 and sent all the relevant details to Regional office, Bhopal

03.02.2000

**SOCIO- ECONOMIC DEVELOPMENT ACTION PLAN
(WORKSHEET)**

S.No	Particular	Details	Amount
1.	Village road repair – leading Eastern Block		Rs. 2000
2.	Soil filling and levelling at Sijhata school (29.1.99)	150 soil trips x 3 = 450 cu. Mtr x Rs.45	Rs. 20250
3.	Soil filling at Hinouti Mandir 24.3.99	50 trips = 50 x 3 = 150 cu.mtr. x Rs.45	Rs. 6750
4.	Soil filling at Sijhata village – Road side (3/3/999)	50 trips = 50 x 3 =150 cu.mtr. x Rs. 45	Rs. 6750
5.	Soil filling at Ramvan for Basanth Panchami (Jan- 2000)	50 trips =50x3 = 150 cu. Mtr x Rs. 45	Rs. 6750
6.	Hinouti village road bridge,near village for water management (culvert built)		Rs. 25000
7.	Village road leading to Pithepur (Magazine) (99-2000)		Rs. 150000
8.	Soil supplied to Rampur – (Police Station)		
9.	Jailor – Rampur		
10.	Hinouti Road – From Baghicha to Hinouti village	Rs. 80000 labour wages + Rs. 100000 material cost.	Rs. 180000
11.	Drains in village for proper water management in the Patel Tola of Hinouti village habitation.		Rs. 50000
12.	Other roads leading to Hinouti village	250 labour x Rs. 70 = 17500 + 2000 trips material x 3 = 6000 cu.mtr = Rs. 270000	Rs. 287500
13.	1300- 1400 trips of soil will be given to the villagers during 2000-2001	1350 x 3 = 4050 cu.mtr. x Rs. 45	Rs. 200000
	<u>Medical facilities</u>		
	250 patients x Rs. 7 x Rs. 12		Rs. 21000
	Mobile clinic treatment in villages @ Rs. 60/- per patient (inclusive of van charges)	15000 x 12	Rs. 180000

SOCIO- ECONOMIC DEVELOPMENT ACTION PLAN

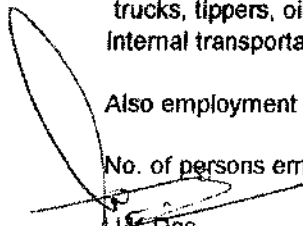
Sl.No	Particulars	Incurred
		2000-2001
1	General Development of Villages – for 4 villages namely Hinouti, Sijhata, Mankahari & Bamhori @ Rs. 50000/- each per annum to vill. Panchayats	200000
2	Welfare to needy villagers – exgratia	300000
3	Repairs incurred on village roads within 5 km range villages viz. Hinouti, Sijhata, mankahari, Bamhori, Rampur etc.	320000
4	Soil filling & levelling the school and panchayat buildings areas & playground. Sijhata School area and approach road In Hinouti village, Mankahari village, Ramvan, etc.	241989
5	Medical facilities: (i) Patients being treated at medical centre on an average about 250/ month or 1500/ annum.	696000
	(ii) Patients being treated at villages through mobile clinic on an average about 21 per day	21000
6	Contribution to sports activities	15000
		1793989
	Total Rs.In Lakhs	17.93

Prism cement is giving preference to the local villagers and land sellers suitable employment based on their qualification and capabilities.

In addition to the employment, indirect employment is also generated/ provided, like deploying trucks, tippers, oil tankers, compressors etc. purchased by local villagers have been hired for internal transportation of materials.

Also employment is provided for the development of horticulture and green belt.

No. of persons employed (workers category) during 1998-99 - 592. (Including plant)


U.K. Das
Gen. Manager (Mines)

ECOMEN LABORATORIES PVT. LTD.

Flat No. 8, 2nd Floor, Arif Chamber-V, Sector H, Aliganj, Lucknow - 226 024

Phone No. : (91-522) 2746282, 2745726 Telefax No.: (91 - 522) 2745726

E-mail: ravi.bhargava@gmail.com, Website: www.ecomen.in, CIN - U74210UP1989PTC010601, GSTIN : 09AAACE6076H1Z1

ecoMen
LABORATORIES PVT. LTD.

An approved Laboratory from Ministry of Environment, Forest and Climate Change, Govt. of India, New Delhi

FORMAT NO. ECO/QS/FORMAT/07 TEST REPORT NO: ECO LAB/WW/1243/09/20
TEST REPORT ISSUE DATE: 30.09.2020**TEST REPORT OF WASTE WATER***

Name of the Company : M/s. Prism Johnson Ltd.
Address of the Company : Village Mankahari,
Tehsil Rampur Baghelan
Distt. Satna (M.P.)
Sampling Method : APHA/ IS: 3025
Sample Collected by : Mr. Maan Singh
Sample Quantity : As per requirement.
Date of Sampling : 22.09.2020
Date of Receiving : 23.09.2020
Date of Analysis : 24.09.2020 to 27.09.2020
Source of Sample : STP Inlet
Sample ID Code : ELW-12577

Sl. No.	TESTS	PROTOCOL	RESULT	Limits of Detection
1	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	6.82	2-12
2	Total Suspended Solids(mg/l)	APHA, 23 rd Ed. 2017, 2540-D	153.2	5.0-1000
3	Oil & Grease as O & G (mg/l)	APHA, 23 rd Ed. 2017, 5520 A+B+D	BDL	5.0-600
4	Biochemical Oxygen Demand as BOD (mg/l) 3days at 27°C	APHA, 23 rd Ed. 2017, 5210 A+B	40.0	5-10000
5	Chemical Oxygen Demand as COD (mg/l)	APHA, 23 rd Ed. 2017, 5220 A+C	152.0	5-50000

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

Authorized signatory
Ecomen Laboratories Pvt. Ltd.
Flat No.-8, 2nd Floor, Arif Chamber-V
Sector-H, Aliganj, Lucknow-226024
Ph.-2746282, Fax:2745726

Quality Manager

ECOMEN LABORATORIES PVT. LTD.

Flat No. 8, 2nd Floor, Arif Chamber-V, Sector H, Aliganj, Lucknow - 226 024

Phone No. : (91-522) 2746282, 2745726 Telefax No.: (91 - 522) 2745726

E-mail: ravi.bhargava@gmail.com, Website: www.ecomen.in, CIN - U74210UP1989PTC010601, GSTIN : 09AAACE6076H1Z1

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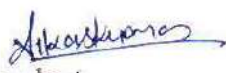
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Address of the Company : Village Mankahari,
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Distt. Satna (M.P.)
Sampling Method : APHA/ IS: 3025
Sample Collected by : Mr. Maan Singh
Sample Quantity : As per requirement.
Date of Sampling : 22.09.2020
Date of Receiving : 23.09.2020
Date of Analysis : 24.09.2020 to 27.09.2020
Source of Sample : STP Outlet
Sample ID Code : ELW-12578

Sl. No.	TESTS	PROTOCOL	RESULT	Limits of Detection	G.S.R 1265 (E)
1	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	6.92	2-12	6.5-9.0
2	Total Suspended Solids (mg/l)	APHA, 23 rd Ed. 2017, 2540-D	18.0	5.0-1000	<100.0
3	Oil & Grease as O & G (mg/l)	APHA, 23 rd Ed. 2017, 5520 A+B+D	BDL	5.0-600	-
4	Biochemical Oxygen Demand as BOD (mg/l) 3days at 27°C	APHA, 23 rd Ed. 2017, 5210 A+B	6.5	5-10000	30.0
5	Chemical Oxygen Demand as COD (mg/l)	APHA, 23 rd Ed. 2017, 5220 A+C	34.0	5-50000	-
6	Fecal Coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, 9221 A + E	166.0	-	<1000

*The result are related only to item tested.

BDL = Below Detection Limit


Analyst
Authorized signatory
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Quality Manager

