

COMPLIANCE REPORT

For

Environmental Clearance over 1143.41 Ha area in Village -
Sijahata -Hinoti Limestone Mine of M/S Prism Johnson Ltd
(Period : Oct, 2018 - March, 2019)



OF



M/s Prism Johnson Limited.
(Formerly Prism Cement Limited)
Village—Mankahari, P.O.-Bhatila
Distt., - Satna (M.P.)

<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 Dtd 23.03.2018. 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	2014-15	3000050	2175000	2174343	
2	2015-16	3000000	2175000	2174591	
3	2016-17	3000000	2175000	2166122	
4	2017-18	3000000	2175000	2174813	
5	2018-19	300000	2175000	2173643	

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.	2014-15	371782	132066	360911	105959
2.	2015-16	293600	103500	210638	130334
3.	2016-17	76575	343506	38102	343373
4.	2017-18	1596848	624564	1854829	83094
5.	2018-19	162891	1904952	829504	16837

<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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	 <p style="text-align: center;">Soil Dump Located in Area 253.326 ha</p>  <p style="text-align: center;">Overburden Dump Located in Area 253.326 ha</p> <p>Top soil generated is stored and later spread over backfilled area which is used for plantation.</p> <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>
<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. Catch drains around the old OB dumps have been constructed. Picture of the same is displayed.</p>
 <p style="text-align: center;">Garland Drain</p>	 <p style="text-align: center;">Settling Pond</p>

<p><i>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 measures suggested in the EMP in this regard should be strictly implemented. The dust pollution in the limestone mine needs to be further controlled by</i></p>	<p>The SPM, SO_2, NO_x and RPM are well within the prescribed limits. Ambient air quality monitoring reports of different locations from Oct' 2018 to March'2019 are given in Annexure 5.</p>
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incorporating additional mitigative measures at the sources itself.

Pollution control measures are strictly implemented. Water spraying is done on the entire haul roads from water tanker.

Atomized water spraying arrangement exists at the crusher hopper.



Water spraying System in Crusher Hopper

Environment Protection Measures are mentioned in EMP, salient features are as mentioned below:-

POLLUTION CONTROL MEASURES

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:

)Measures to prevent Generation and Dispersal of Dust

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 :

- 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

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:

- 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..

Min,Max & Average date of Ambient Air Quality

Date	Location (1)					Location (2)					Location (3)					Location (4)					Wind Direction
	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	
08.10.2018	27.8	57.5	15.2	25.6	BDL	26.9	60.6	14.6	25.6	BDL	21.1	52.8	12.2	18.0	BDL	24.3	52.6	13.5	19.4	BDL	SW
22.10.2018	28.7	59.4	14.5	27.0	BDL	27.3	58.5	15.2	27.0	BDL	22.8	54.1	11.0	18.0	BDL	25.0	53.8	13.3	20.6	BDL	SW
13.11.18	28.6	56.3	14.6	27.7	BDL	27.6	57.1	14.6	29.1	BDL	20.2	54.7	13.3	18.2	BDL	23.9	53.8	13.9	20.6	BDL	SW
27.11.18	30.9	54.2	14.6	30.3	BDL	28.8	58.5	15.5	27.5	BDL	23.6	52.7	13.5	20.2	BDL	24.9	55.8	14.2	22.9	BDL	SE
14.12.18	30.4	65.7	15.2	29.1	BDL	29.4	70.0	16.2	30.1	BDL	21.9	60.8	14.2	19.8	BDL	24.9	64.8	14.6	22.1	BDL	SW
21.12.18	32.0	59.2	15.5	28.8	BDL	31.0	73.0	17.0	29.4	BDL	24.5	62.3	13.9	20.2	BDL	25.6	63.3	14.2	24.3	BDL	SW
09.01.9	28.2	63.7	16.2	30.1	BDL	30.2	67.5	17.0	29.1	BDL	23.0	59.7	13.9	22.2	BDL	24.9	64.8	15.2	25.2	BDL	SW
23.01.19	25.0	67.0	14.2	27.0	BDL	28.4	70.9	15.2	27.3	BDL	21.6	61.4	11.0	20.2	BDL	23.2	62.6	12.2	22.1	BDL	SE
07.02.19	27.0	66.3	14.6	26.3	BDL	30.1	70.4	15.5	28.8	BDL	24.9	61.6	12.2	20.6	BDL	24.5	65.2	13.5	22.9	BDL	SE
22.02.19	22.5	68.9	15.5	28.3	BDL	26.3	74.5	16.2	29.1	BDL	23.9	64.7	13.5	19.8	BDL	22.5	62.7	14.2	23.1	BDL	SW
06.03.19	31.95	68.84	16.20	29.12	BDL	28.80	73.41	17.01	30.05	BDL	24.87	64.05	13.88	22.06	BDL	26.31	69.22	14.17	24.27	BDL	SE
20.03.19	31.46	71.18	17.36	30.56	BDL	32.96	75.26	15.46	28.76	BDL	26.23	67.69	13.50	23.11	BDL	27.74	66.31	14.58	25.00	BDL	SW
Min	22.5	54.2	14.2	25.6	BDL	26.3	57.1	14.6	25.6	BDL	20.2	52.7	11.0	18.0	BDL	22.5	52.6	12.2	19.4	BDL	SW
Max	32.0	71.2	17.4	30.6	BDL	33.0	75.3	17.0	30.1	BDL	26.2	67.7	14.2	23.1	BDL	27.7	69.2	15.2	25.2	BDL	SW
Average	28.7	63.2	15.3	28.3	BDL	29.0	67.5	15.8	28.5	BDL	23.2	59.7	13.0	20.2	BDL	24.8	61.2	13.9	22.7	BDL	SW

GROUND WATER QUALITY REPORT

Sr No	Tests	Results Mines Site office HinautiSijahata	Results Sijahata Village Borewell	Detection Range
1	Colour	<5.0	<5	5-100
2	Odour	Agreeable	Agreeable	Qualitative
3	Taste	Agreeable	Agreeable	Qualitative
4	Turbidity as (NTU)	BDL	0.68	1.0-100
5	pH	7.20	7.29	2.0-13.9
6	Total Dissolved Solid as TDS(mg/l)	450.0	356.0	10-1000
7	Alkalinity (mg/l)	128.00	140.0	10-500
8	Total Hardness as CaCO₃ (mg/l)	228.00	252.00	10-1000
9	Calcium as Ca (mg/l)	65.6	67.2	10-1500
10	Magnesium as Mg (mg/l)	17.49	20.41	5-1500
11	Chloride as Cl(mg/l)	36.00	60.0	10-1000
12	Flouride as F(mg/l)	0.40	0.41	0.02-10
13	Sulphate as SO₄(mg/l)	45.0	116.0	1.0-200
14	Nitrate Nitrogen as NO₃(mg/l)	15.0	20.0	5.0-100
15	Manganese as Mn(mg/l)	BDL	BDL	0.05-5
16	Zinc as Zn (mg/l)	BDL	0.20	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)	0.25	0.25	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 H₂s (mg/l)	BDL	BDL	0.04-10
28	Iodide as I (mg/l)	BDL	BDL	0.1-10
29	Iron as Fe(mg/l)	0.16	0.15	0.05-100
30	Total Coliforms (MPN/100 ml)	BDL	BDL	1.8
31	E Coli (Nos/100 ml)	BDL	BDL	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 4, and 7 respectively**. The noise level is well within acceptable limits.

NOISE REPORT

Locations	Date of monitoring	Noise level in	Noise Level in dB(A)	Locations	Date of monitoring	Noise level	Noise Level
		(Day Time)	(Night Time)			(Day Time)	(Night)
SW (BP No. 18)	22.10.18	61	51.26	Mankahari Village	22.10.18	52.9	46.13
SW (BP No. 18)	15.11.18	61.83	50.63	Mankahari Village	15.11.18	51.7	46.4
SW (BP No. 18)	14.12.2018	62.2	54.2	Mankahari Village	14.12.2018	60.7	52.1
SW (BP No. 18)	17.01.2019	62.4	55.3	Mankahari Village	17.01.2019	61.2	52.8
SW (BP No. 18)	18.02.2019	61.5	56.4	Mankahari Village	18.02.2019	62.4	53.4
SW (BP No. 18)	10.03.2019	64.73	56.46	Mankahari Village	10.03.19	53.56	47.26
	Min	61	50.63		Min	51.7	46.13
	Max	64.73	56.46		Max	62.4	53.4
	Average	62.28	54.04		Average	57.08	49.68
Hinouti village	22.10.18	51.1	45.36	SW (BP No. 18)	22.10.18	61	51.26
Hinouti village	15.11.18	50.3	44.96	SW (BP No. 18)	15.11.18	61.83	50.63
Hinouti village	14.12.2018	58.5	48.5	SW (BP No. 18)	14.12.2018	62.2	54.2
Hinouti village	17.01.2019	59.7	47.56	SW (BP No. 18)	17.01.2019	62.4	55.3
Hinouti village	18.02.2019	59.8	48.3	SW (BP No. 18)	18.02.2019	61.5	56.4
Hinouti village	10.03.19	52	46.46	SW (BP No. 18)	10.03.2019	64.73	56.46
	Min	50.3	44.96		Min	61	50.63
	Max	59.8	48.5		Max	64.73	56.46
	Average	55.23	46.86		Average	62.28	54.04

Ear plugs, dust masks are provided to workmen working in noisy atmosphere.

Total PPE's Oct-18 to March-19

Material	Qty.	Amount in Rs.
Dust Mask	153	2372
Goggle Safety Glass PVC,	280	11334
Hand Gloves	105	1680
Helmet Industrial Safety	235	16948
Jacket fluorescent High Visibility Wear	100	12700
Plug Ear muff	350	1975
Safety Shoes	271	213778
TOTAL	1494	260787

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. xx



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 55 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.



A green belt around the dust generation points and 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.

Extensive plantation has been taken up covering the areas on either side 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 March 2019 is 85205 covering 25.00 Ha



Plantation 253.326 Ha for the last 7 years

Sl. No.	Year	Total No. of Plants
1	2012-13	2000
2	2013-14	2500
3	2014-15	2500
4	2015-16	9000
5	2016-17	10000

6	2017-18	6000
7	2018-19	6000

85205 since inception

<p>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.</p>	<p>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</p> <p>The CSR programme is common for PCL. Expenditure made during 2018-19(Apr to Mar) for socio – economic / community development has been given in Annexure No. 3.</p>
	
<p>Uniform distribution at School Village ,Hinauti</p>	<p>Renovation of Hr. Sec. School at Sijhata</p>
	
<p>Cataract Operation</p>	<p>Toilet - Swachha Bharat</p>
	
<p>Pickle & Papad Making Training</p>	
<p>Mining operations should be carried out in such a manner that inhabitants of the villages Sijhata and Hinouti should not be shifted and adequate measures for socio-economic development be carried out.</p>	<p>Mining operations are carried out taking utmost care as per Scheme of Mining approved by Indian Bureau of Mines.</p> <p>All blasting operations are carried out as per permissions by the DGMS and guidelines of CMFRI. Report attached as-Annexure no. 8</p>
	<p>The habitation of Hinauti and Sijhata villages are not affected.</p> <p>Adequate measures for socio-economic development are carried out as per details in sl no. 9</p>
<p>CSR ACTIVITIES ROADMAP FY 2019-20</p>	

S.N.	Particulars/Activity	Estimated Exp. In Lacs	Expected Target Date
A.	INFRASTRUCTURE DEVELOPMENT	49.89	31.03.2020
B.	HEALTH & HYGIENE	28.69	31.03.2020
C.	EDUCATION	20.02	31.03.2020
D.	ENVIRONMENT CONSERVATION	91.35	31.03.2020
E.	WATER CONSERVATION & DRINKING WATER	11.48	31.03.2020
F.	EMPOWERMENT & SKILL DEVELOPMENT	26.10	31.03.2020
G.	PROMOTION OF SPORT ACTIVITIES	25.04	31.03.2020
H.	SOCIAL WELFARE	11.50	31.03.2020
I.	Grand Total	264.08	31.03.2020

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.

Environmental Management Cell is functioning effectively, Structure of which is as follows:

<p>o</p>	<p>i</p> <p>t</p> <p>r</p>
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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.

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.

Year Wise Expenses for Environment Management (Common for the plant)						
Heads	Year					
	2013-14(Rs in Lacks)	2014-15(Rs in Lacks)	2015-16(Rs in Lacks)	2016-17(Rs in Lacks)	2017-18(Rs in Lacks)	2018-19(Rs in Lacs)
Maintenance of APCEs	15.49	48.94	65.48	38.64	75	14.71
Env Monitoring, STP Operation & Maintenance, Plantation Etc.	109.48	69.38	53.78	37.71	52	84.31
APCE Power Consumption	1403.67	1374.67	1157.06	996.72	631.00	701.93
Total (Rs in Lacks)	1528.64	1492.99	1276.32	1073.07	757.00	800.95

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
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>	Agreed
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 continuously being submitted to RO MoEF, Bhopal and respective authorities. The details are as given below:

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

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.
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मध्य प्रदेश शासन
खनिज तथा भू-विभाग
"संरक्षण"

253.326
3/9/96

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

कलेक्टर,

जिला- सतना [मण्डल]

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

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

मैसर्स प्रिज्म 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 प्रिज्म 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(2) 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 "क" 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 दिये गये शर्तों पर खनिजदाता
स्वीकृत किया जाता है :-

1. आवेदक का नाम

मैसर्स प्रिज्म लीमिटेड लिमिटेड

||2|| स्वीकृत क्षेत्र का विवरण - ग्राम हिनौली 240.746 हेक्टर
ग्राम तिजहटा 12.580 हेक्टर

कुल - 253.326 हेक्टर

- ||3|| खनिज का नाम लाईम स्टोन
- ||4|| स्वीकृति की अवधि 20वर्षी [बीत वर्षी] बिना नवकरण कण्डिका के ।
- ||5|| आवेदक कंपनी द्वारा स्थानीय क्षेत्रीय विकास कार्य हेतु स्वेच्छिक योगदान दिये जाने के संबंध में अपने पत्र दिनांक 22.7.96 से ही गई अडरटेकिंग के अनुसार जिस प्रकार अन्य बदयेधारियों से लिया जावेगा, आवेदक कंपनी को देय होगा ।
- ||6|| रायल्टी / डेडरेंट अधिनियम में प्रस्तावित दर से ।
- ||7|| थियोडोलाईट सर्वे आदि आवश्यक हो तो किया जावे ।
- ||8|| चुनावत्थर [मार्बल] डोलोमाईट की स्थिति में :-
खनि रियायत नियमावली 1960 के अन्तर्गत निर्धारित अनुबंध पत्र "के" खंड ताल में सर्वे क्रमांक 21 के बाद मध्य प्रदेश शासन, नैतर्गिक साधन विभाग के पत्र क्र. 8814-6384/12 दिनांक 24.11.1962 द्वारा तृपित सर्वे "ख" 21 "ख" जोड़ी जावे ।
- ||9|| आवेदक खनन किये गये चुनावत्थर का उपयोग स्थापित तीमेंट संयंत्र में करेगा।
5/- यदि आवेदक को उपरोक्त सर्वे मान्य हो तो निम्नानुसार 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 लेंकि आवेदक के ऊपर कितनी प्रकार का खनिज राजस्व की राशि बकाया तो नहीं है ।

मध्य प्रदेश के राज्यपाल के नाम से तथा
आदेशानुसार.

Self

|| ए.के. शिवेदी ||

अवर सचिव

मध्य प्रदेश शासन, खनिज साधन विभाग

11311

सूचक 3-29/95/12/1

मो.पाल. दि. 3/9/96

प्रतिलिपि:-

- 1] त.धि.भ. भारत सरकार, ज्ञान मंत्रालय, शास्त्री ज्ञान भवन नई दिल्ली ।
- 2] संचालक, मौखिकी तथा खनिज, रायपुर ।
- 3] डायरेक्टर जनरल आक माइन्स सेप्टी धनबाद (बिहार)
- 4] कन्ट्रोलर जनरल इण्डियन कोयला आक माइन्स नागपुर ।
- 5] क्षेत्रीय ज्ञान नियंत्रक भारतीय ज्ञान कोयला जवहरपुर ।
- 6] मेसर्स प्रिन्स सीमेंट लि. राजेन्द्र नगर सतना
की ओर सूचनाएं एवं आवश्यककार्यवाही हेतु उद्दिष्ट ।

र.के. त्रिवेदी
उपर त.धि.भ.

मध्यप्रदेश शासन, खनिज सार्वजनिक विभाग

श्रीवास्तव

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

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) 485001विषय:- 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 CEMENT LIMITED
CSR ACTIVITY EXPENSE SUMMARY FY 2018-19

As on 31.03.2019

(1)	(2)	(3)	(4)		(5)	(6)		(7)	(8)
SI.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*
			(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 from Pithaipur Main road to Jabla Baba Ashram Hinauti (Approx 500 mtrs)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	4.00	0.88		0.88	Direct
2	Repairing of Hinauti - Pithaipur WBM road (Approx 4 KM)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	6.50	0.00		0.00	Work is completed by PMRY
3	Repairing of Hinauti - Bandarkha WBM road (Approx. 1.3 KM)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	5.00	1.38		1.38	Direct
4	Development of river embankment steps and platform near Jabla Baba Ashram Hinauti	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh	6.00	4.61		4.61	Direct
5	Construction of bus shelter at village Baghai (Medhi)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Sijahata	Satna Madhya Pradesh	2.50	2.02		2.02	Direct
6	Construction of bus shelter at village Mankahari	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Mankahari	Satna Madhya Pradesh	2.50	1.90		1.90	Direct
7	Construction of balance part (162 M) of Mankahari Chhibaura road in front of state bank of India Branch Mankahari	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bathiya	Satna Madhya Pradesh	29.52	25.96		25.96	Direct
8	Construction of cremation shed at village Bamhauri	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bathiya	Satna Madhya Pradesh	4.50	3.99		3.99	Direct
9	Construction of cremation shed at village Tapa	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Tapa	Satna Madhya Pradesh	4.50	3.92		3.92	Direct
10	Construction of cremation shed at Chulhi village	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Chulhi	Satna Madhya Pradesh	4.50	1.76		1.76	Direct
11	Construction of Trench/Drainage System In front of New Bulker Yard Bamhauri	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bamhauri	Satna Madhya Pradesh	10.18	0.00		0.00	The work is temporarily held in abeyance due to villagers issues.)
12	WBM road repairing at Hinauti village	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Hinauti	Satna Madhya Pradesh		0.61		0.61	Direct

(1)	(2)	(3)	(4)		(5)	(6)		(7)	(8)
SI.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*
			(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:		
13	WBM road repairing at Mankahari village	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Mankahari	Satna Madhya Pradesh		0.61		0.61	Direct
14	Construction of 118 meter drain along with CC road infront of SBI (Sajjanpur Chhibaura road)	Rural Infrastructure Development Schedule VII (X)	Gram Panchayat Bathiya	Satna Madhya Pradesh		0.00		0.00	The work is carry forwarded to FY 19-20
				SUB TOTAL	79.70	47.63		47.63	
HEALTH & HYGIENE (Health & Hygiene Schedule VII (i))									
15	Organization of mega medical camp at village Hinauti tended 351 patients	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	1.00	0.68		0.68	Direct
16	Organization of mega medical camp at village Narsinghpur tended 309 pts	Health & Hygiene Schedule VII (i)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh	1.00	0.59		0.59	Direct
17	Organization of mega medical camp at village Bairiha tended 507 patients	Health & Hygiene Schedule VII (i)	Gram Panchayat Bairiha	Satna Madhya Pradesh	1.00	0.63		0.63	Direct
18	Organization of mega medical camp at village Malgaon tended 426 patients	Health & Hygiene Schedule VII (i)	Gram Panchayat Malgaon	Satna Madhya Pradesh	1.00	0.62		0.62	Direct
19	Organization of mega medical camp at village Mahurachh tended 304 patients	Health & Hygiene Schedule VII (i)	Gram Panchayat Mahurachh	Satna Madhya Pradesh	1.00	0.60		0.60	Direct
20	Visit by Mobile health van to nearby villages on weekly basis with providing free medical services tended 890 pts	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	3.00	8.45		8.45	Direct
21	Free consultation & medicines distribution from PCL Medical centre Out door patient to nearby villagers (Benefitted 22496 patients)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	20.00				Direct
22	Organization eye Camp for cataract patients from nearby villages (20 Nos.)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	2.00	1.66		1.66	Through Agency
23	24 hrs ambulance facility will be provided to nearby villagers free of cost. (tended 2283 patients)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	10.00	7.54		7.54	Direct
24	School student health check up at Government Middle School Mankahari covers 60 students	Health & Hygiene Schedule VII (i)	Gram Panchayat Mankahari	Satna Madhya Pradesh	0.50	0.02		0.02	Direct

(1)	(2)	(3)	(4)		(5)	(6)		(7)	(8)
SI.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*
			(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:		
25	School student health check up at Government Middle School Hinauti covers 65 students	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh		0.02		0.02	Direct
26	School student health check up at Government Primary School Malgaon covers 15 students	Health & Hygiene Schedule VII (i)	Gram Panchayat Malgaon	Satna Madhya Pradesh		0.02		0.02	Direct
27	School student health check up at Government Middle School Sijahata covers 60 students	Health & Hygiene Schedule VII (i)	Gram Panchayat Sijahata	Satna Madhya Pradesh		0.02		0.02	Direct
28	School student health check up at Government Middle School Baghai covers 45 students	Health & Hygiene Schedule VII (i)	Gram Panchayat Baghai	Satna Madhya Pradesh		0.02		0.02	Direct
29	Distribution of nutritional supplement to malnourished child as per Government Norms to Anganvadies to eradicate malnutrition of nearby villages (10 child each from 03 Nos. Anganvadies)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	3.00	0.00		0.00	Not approved by plant CSR Committee
30	Construction, Repairing & Maintenance of ODF Toilets at Village Sijahata & Hinauti (20 nos.)	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti and Sijahata	Satna Madhya Pradesh	10.00	5.09		5.09	Direct
31	Operation & Maintenance of Sulabh Complex at Mahurachh Turning (12 months)	Health & Hygiene Schedule VII (i)	Gram Panchayat Mahurachh	Satna Madhya Pradesh	0.50	0.30		0.30	Direct
32	Construction of 138 ODF Toilet at Baghai (15 nos constructed in FY 2018-19)	Health & Hygiene Schedule VII (i) (Swachh Bharat Abhiyaan)	Gram Panchayat Baghai	Satna Madhya Pradesh	40.00	3.66		3.66	Direct
33	Repairing of toilet at Govt Middle School Baghai	Health & Hygiene Schedule VII (i) (Swachh Bharat Abhiyaan)	Gram Panchayat Baghai	Satna Madhya Pradesh		0.49		0.49	Direct
			SUB TOTAL		94.00	30.42		30.42	
EDUCATION (Promoting Education Schedule VII (ii))									
34	To create awareness and motivation amongst the local villagers pertaining to health (AIDS & TB) & hygiene, education, self reliance, empowerment and other themes through wall paintings and slogans writing. (300 nos.)	Promoting Education Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	2.50	1.08		1.08	Praveen Arts Satna
35	Repairing, maintenance and white wash of Government Primary & Middle School building at Mankahari	Promoting Education Schedule VII (ii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	4.00	2.52		2.52	Direct

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SI.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*
			(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:		
36	White wash of Government Middle School Baghai	Promoting Education Schedule VII (ii)	Gram Panchayat Baghai	Satna Madhya Pradesh	1.00	2.25		2.25	Direct
37	Renovation of Government High School Bairiha	Promoting Education Schedule VII (ii)	Gram Panchayat Bairiha	Satna Madhya Pradesh	3.00	1.25		1.25	Direct
38	Roof repairing and whitewash of Government Primary School Barha Tola Sijahata	Promoting Education Schedule VII (ii)	Gram Panchayat Sijahata	Satna Madhya Pradesh	1.50	0.00		0.00	The work is carry forwarded to FY 19-20
39	Repairing and white wash of Government Middle School Hinauti (Extra Room)	Promoting Education Schedule VII (ii)	Gram Panchayat Hinauti	Satna Madhya Pradesh	2.00	0.96		0.96	Direct
40	Electrical fitting at Government Middle School Mankahari	Promoting Education Schedule VII (ii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	0.75	0.48		0.48	Direct
41	Electrical fitting at Government Middle School Hinauti	Promoting Education Schedule VII (ii)	Gram Panchayat Hinauti	Satna Madhya Pradesh	0.75	0.17		0.17	Direct
42	Electrical fitting at of Government Higher Secondary School Sijahata	Promoting Education Schedule VII (ii)	Gram Panchayat Sijahata	Satna Madhya Pradesh	1.50	0.63		0.63	Direct
43	Provides 05 nos Dari & 31 Desk table to Government Middle school Mankahari	Promoting Education Schedule VII (ii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	2.00	1.71		1.71	Direct
44	Distributed Uniform to 103 student of Government Middle school Mankahari	Promoting Education Schedule VII (ii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	1.50	0.74		0.74	Direct
45	Provides 140 Desk table to Government Higher Secondary school Sijahata	Promoting Education Schedule VII (ii)	Gram Panchayat Sijahata	Satna Madhya Pradesh	6.50	5.57		5.57	Direct
46	Create a public library at Rampur Baghelan college (06 almira and 179 books)	Promoting Education Schedule VII (ii)	Rampur Baghelan	Satna Madhya Pradesh	1.00	0.87		0.87	Direct
47	Sitting Arrangement at Bal Niketan Junior Girls school Kanpur (200 chairs)	Promoting Education Schedule VII (ii)	Kanpur	Uttar Pradesh		3.80		3.80	Direct
48	Leveling of ground in front of Govt. Middle School Hinauti	Promoting Education Schedule VII (ii)	Hinauti	Satna Madhya Pradesh		0.35		0.35	Direct
				SUB TOTAL	28.00	22.37		22.37	
ENVIRONMENT CONSERVATION (Environment Conservation Schedule VII (iv))									
49	Installation of 100 tree guards with plants in nearby villages (From July to Oct)	Environment Conservation Schedule VII (iv)	Nearby Gram Panchayat	Satna Madhya Pradesh	3.00	1.14		1.14	Direct
50	Survival & Maintenance of plantation at Sijahata & Baghai (73150 plants)	Environment Conservation Schedule VII (iv)	Gram Panchayat Sijahata and Baghai	Satna Madhya Pradesh	17.00	16.51		16.51	Direct
51	Distribution of fruit plant saplings and plantation at Nearby villages (2000 Plants Between July to Oct)	Environment Conservation Schedule VII (iv)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.00	0.21		0.21	Direct

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			(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:		
52	Construction of 10 water harvesting structures at Mahurachh, Bathiya, Narsinghpur & Bamhauri villages	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Sijahata, Mahurachh, Narsinghpur	Satna Madhya Pradesh	6.41	3.53		3.53	Direct
54	Deepening of Ponds at Mankahari (15783.3 cumm) and Bamhauri (9551 cumm) village with hume pipe and ground water recharge system	Health & Hygiene Schedule VII (i)	Gram Panchayat Mankahari & Bathiya	Satna Madhya Pradesh	43.47	41.06		41.06	Direct
53	Construction of ground water recharge system at Narsinghpur pond	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Narsinghpur	Satna Madhya Pradesh		0.59		0.59	Direct
55	Repairing of existing check dam at Karmau village	Conservation of Natural Resources Schedule VII (iv)	Gram Panchayat Karmau	Satna Madhya Pradesh	3.08	2.53		2.53	Direct
56	Plantation in Mankahari pond, Bamhuari Pond and Hinauti road side (11000 plants)	Environment Conservation Schedule VII (iv)	Gram Panchayat Mankahari, Bathiya and Hinauti	Satna Madhya Pradesh	7.50	3.96		3.96	Direct
57	Construction of Check Dam with Reservoir at village Baghai (Continue Work From FY 17-18)	Health & Hygiene Schedule VII (i)	Gram Panchayat Baghai	Satna Madhya Pradesh	33.11	33.50		33.50	Direct
58	Installation of 100 tree guards with plants in nearby villages (Work left by old Vendor. Only 50 nos. Tree guards are supplied and installed)	Environment Conservation Schedule VII (iv)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.08	0.61		0.61	Direct
				SUB TOTAL	115.66	103.64		103.64	
WATER CONSERVATION & DRINKING WATER (Health & Hygiene Schedule VII (i))									
59	Providing water Tankers for drinking purpose as required (230 tankers)	Health & Hygiene Schedule VII (i)	Nearby Gram Panchayat	Satna Madhya Pradesh	3.00	3.06		3.06	Direct
60	Operation of water Hut in summer Season at Mahurachh turning (From Apr to June)	Health & Hygiene Schedule VII (i)	Gram Panchayat Mahurachh	Satna Madhya Pradesh	0.20	0.24		0.24	Direct
61	Operation of water Hut in summer Season at Hinauti Turning (Apr to June)	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	0.20	0.20		0.20	Direct
62	Installation of new Hand pump with bore well at Bamhauri	Health & Hygiene Schedule VII (i)	Gram Panchayat Bathiya	Satna Madhya Pradesh	0.75	0.48		0.48	Direct
63	Installation of new Hand pump with bore well at Mahurachh	Health & Hygiene Schedule VII (i)	Gram Panchayat Mahurachh	Satna Madhya Pradesh	0.75	0.54		0.54	Direct

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			(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:		
64	Installation of new Hand pump with bore well Medhi	Health & Hygiene Schedule VII (i)	Gram Panchayat Sijahata	Satna Madhya Pradesh	0.75	0.49		0.49	Direct
65	Installation of new Hand pump with bore well Pithaipur	Health & Hygiene Schedule VII (i)	Gram Panchayat Hinauti	Satna Madhya Pradesh	0.75	0.42		0.42	Direct
66	Installation of submersible pump with bore well drilling and construction of pump house (01 Nos.)	Safe Drinking Water Schedule VII (i)	Gram Panchayat Baghai	Satna Madhya Pradesh	1.30	1.07		1.07	Direct
				SUB TOTAL	7.70	6.51		6.51	
EMPOWERMENT & SKILL DEVELOPMENT Vocational Skill Development Schedule VII (ii)									
67	Training program for driver for at least 25 male persons (01 Batch)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	2.00	0.58		0.58	Through Implementing Agency
68	Training program for driving trainees extra batch in place of mobile repairing training for 30 persons (01 Batch)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	2.00	0.68		0.68	Through Implementing Agency
69	Training program for Beautician for 25 females from nearby villages. (01 Batch)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.00	1.00		1.00	Through Implementing Agency
70	Training program for Stitching for 25 females from nearby villages. (01 Batch)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.00	2.18		2.18	Through Implementing Agency
71	Training program for farmers from nearby villages (60 farmers from nearby villages)	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.00	0.81		0.81	Through Implementing Agency
72	120 hrs computer training to 30 students and youth from nearby villages	Vocational Skill Development Schedule VII (ii)	Nearby Gram Panchayat	Satna Madhya Pradesh	1.50	1.50		1.50	Through Implementing Agency
				SUB TOTAL	8.50	6.73		6.73	
PROMOTION OF SPORT ACTIVITIES (Promotion of Sports Schedule VII (vii))									
73	Construction of Boundary wall at Playground Mankahari village road side (110 meter)	Promotion of Sports Schedule VII (vii)	Gram Panchayat Mankahari	Satna Madhya Pradesh	9.00	5.82		5.82	Direct
74	Organise Solar Car Race (Indo Asian Solar Challenge 18 from 06.04.2018 to 09.04.2018)	Promotion of Sports Schedule VII (vii)	Hinauti	Satna Madhya Pradesh	3.00	1.50		1.50	Through Implementing Agency
75	Assistance to Independence football tournament Nagod	Promotion of Sports Schedule VII (vii)	Nagod	Satna Madhya Pradesh		0.75		0.75	Through Implementing Agency

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			(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:		
76	Assistance to District Amateur Kabaddi Association Satna	Promotion of Sports Schedule VII (vii)	Babupur	Satna Madhya Pradesh		1.50		1.50	Through Implementing Agency
77	Sponsor Late Brijendra Singh Memorial Cricket Tournament Mankahari	Promotion of Sports Schedule VII (vii)	Mankahari	Satna Madhya Pradesh		0.44		0.44	Through Implementing Agency
78	Sponsor Sijahata Cricket League Tournament	Promotion of Sports Schedule VII (vii)	Sijahata	Satna Madhya Pradesh		0.30		0.30	Through Implementing Agency
79	Cleaning of Sijahata ckt playground	Promotion of Sports Schedule VII (vii)	Sijahata	Satna Madhya Pradesh		0.25		0.25	Direct
80	Cleaning of Mankahari ckt playground	Promotion of Sports Schedule VII (vii)	Mankahari	Satna Madhya Pradesh		0.13		0.13	Direct
				SUB TOTAL	12.00	10.69		10.69	
SOCIAL WELFARE Social Welfare Schedule VII (iii)									
81	Contribution for samuh Bhoj at Khambha Baba	Social Welfare Schedule VII (viii)	Khambha Baba	Satna Madhya Pradesh	5.00	0.21		0.21	Through Implementing Agency
82	Contribution for samuh Bhoj at Jabla Baba	Social Welfare Schedule VII (viii)	Jabla Baba	Satna Madhya Pradesh		0.40		0.40	Through Implementing Agency
83	Contribution to Yadav Mahasabha	Social Welfare Schedule VII (viii)	Ramvan	Satna Madhya Pradesh		0.11		0.11	Through Implementing Agency
84	Contribution for samuh Bhoj at Ramvan	Social Welfare Schedule VII (viii)	Ramvan	Satna Madhya Pradesh		0.50		0.50	Through Implementing Agency
85	Financial assistance for organiging Kavi Sammelan "Kirtiman" Maihar	Social Welfare Schedule VII (viii)	Maihar	Satna Madhya Pradesh		0.08		0.08	Through Implementing Agency
86	Flex Hoarding on World Environment Day	Social Welfare Schedule VII (viii)	Satna	Satna Madhya Pradesh		0.10		0.10	Direct
87	Provided submersible motor to Mankahari Gram Panchayat	Social Welfare Schedule VII (viii)	Mankahari	Satna Madhya Pradesh		0.31		0.31	Direct
88	Installation of Inverter at Tehsildar Office Rampur Baghelan for public welfare	Social Welfare Schedule VII (viii)	Rampur Baghelan	Satna Madhya Pradesh		0.28		0.28	Direct
89	Contribution for Armed forces flag day	Social Welfare Schedule VII (viii)	Satna	Satna Madhya Pradesh		0.51		0.51	Through Implementing Agency
89	Distribution of Innerwear to central Jail Prisoners	Social Welfare Schedule VII (viii)	Satna	Satna Madhya Pradesh		0.24		0.24	Direct

(1)	(2)	(3)	(4)		(5)	(6)		(7)	(8)
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			(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:		
90	Contribution to Deen Dayal Research Institute	Social Welfare Schedule VII (viii)	Chitrakoot	Satna Madhya Pradesh		3.00		3.00	Through Implementing Agency
91	Contribution to Goshala Basaman Mama for animal welfare.	Social Welfare Schedule VII (viii)	Basaman Mama	Rewa Madhya Pradesh	5.00	5.00		5.00	Through Implementing Agency
92	Contribution to Dr. Lalta Prasad Khare Public Charitable Trust	Social Welfare Schedule VII (viii)	Satna	Satna Madhya Pradesh	5.00	4.50		4.50	Direct
				SUB TOTAL	15.00	15.24		15.24	
				GRAND TOTAL	360.55	243.24		243.24	

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 & Sijhatta. 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			



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(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	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 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.

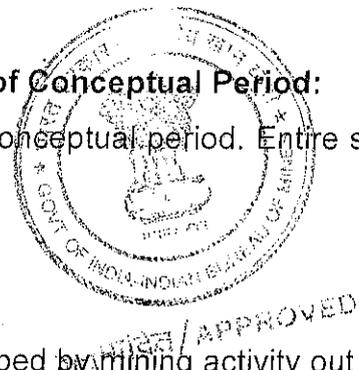


Table No. 2.19

Status	Mined Out Area (Ha)	Reclamation by Backfilling (Ha)	Rehabilitation (Ha)			Rehabilitation of Dump by Comp. & Afforestation	Protective measures for dum dum (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



APPROVED

Debarshi

Sudhanshu

Aditya

**AIR QUALITY MONITORING REPORT FOR MINES
MONTH - OCTOBER YEAR-2018**

1 NAME & ADDRESS OF FACTORY

PRISM JOHNSON LTD
PRISM CEMENT LIMESTONE MINES
VILLAGE: MANKAHARI, HINAUTI & SLAHATA
POST: BATHIA
DISTT : SATNA (M.P.) - 485111

2 NAME OF PERSON PREPARED THE REPORT

Sumitabh Dwivedi

3 AMBIENT AIR QUALITY MONITORING

1. DURATION

8X3=24Hrs.

2. DISTANCE FROM FACTORY

LOCATION (1) - SW (BP No. 18)
LOCATION (2) - Near Western side ML boundary (Pillar No. 14) of ML area
LOCATION (3) - Near Mankahari Village
LOCATION (4) - Near Himouti Village

3. WIND DIRECTION

MENTIONED IN THE TABLE

Sl No.	Date	Location (1)				Location (2)				Location (3)				Location (4)				Wind Direction							
		PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³		PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³			
1	08.10.2018	27.8	57.5	15.2	25.6	BDL	60.6	14.6	25.6	BDL	21.1	52.8	12.2	18.0	BDL	24.3	52.6	13.5	19.4	BDL	53.8	13.3	20.6	BDL	SW
2	22.10.2018	28.7	59.4	14.5	27.0	BDL	58.5	15.2	27.0	BDL	22.8	54.1	11.0	18.0	BDL	25.0	53.8	13.3	20.6	BDL	53.8	13.3	20.6	BDL	SW

BDL - Below Detectable Limit



Sumitabh Dwivedi
Manager- Environment
Prism Johnson Ltd. Satna (M.P.)



Manoj Kumar Kishor
Sr. General Manager
Prism Johnson Ltd. Satna (M.P.)

**AIR QUALITY MONITORING REPORT FOR MINES
MONTH - DECEMBER YEAR-2018**

1 NAME & ADDRESS OF FACTORY

PRISM JOHNSON LTD
PRISM CEMENT LIMESTONE MINES
VILLAGE: MANKAHARI, HINAUTI & SUAHATA
POST : BATHIA
DIST: SATNA (M.P.)-485111

2 NAME OF PERSON PREPARED THE REPORT

Sumitabh Dwivedi

3 AMBIENT AIR QUALITY MONITORING

1. DURATION

2. DISTANCE FROM FACTORY

EX3=24Hrs.

LOCATION (1) - SW (BP No. 18)

LOCATION (2) - Near Western side ML boundary (Pillar No. 14) of ML area

LOCATION (3) - Near Mankahari Village

LOCATION (4) - Near Hinouti Village

3. WIND DIRECTION

MENTIONED IN THE TABLE

Sl No.	Date	Location (1)							Location (2)							Location (3)							Location (4)							Wind Direction
		PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³				
1	14.12.18	30.4	65.7	15.2	29.1	BDL	29.4	70.0	16.2	30.1	BDL	21.9	60.8	14.2	19.8	BDL	24.9	64.8	14.6	22.1	BDL	25.6	63.3	14.2	24.3	BDL	BDL	SW		
2	21.12.18	32.0	59.2	15.5	28.8	BDL	31.0	73.0	17.0	29.4	BDL	24.5	62.3	13.9	20.2	BDL	25.6	63.3	14.2	24.3	BDL	25.6	63.3	14.2	24.3	BDL	BDL	SW		

BDL - Below Detectable Limit


Sumitabh Dwivedi
Manager- Environment
Prism Johnson Ltd. Satna (M.P.)


Manoj Kumar Kashiwapa
Sr. General Manager
Prism Johnson Ltd. Satna (M.P.)

AIR QUALITY MONITORING REPORT FOR MINES
MONTH - JANUARY YEAR-2019

- 1 NAME & ADDRESS OF FACTORY : PRISM JOHNSON LTD
 PRISM CEMENT LIMESTONE MINES
 VILLAGE: MANKAHARI, HINAUTI & SHAHATA
 POST : BATHIA
 DISTT : SATNA (M.P.) - 485111
- 2 NAME OF PERSON PREPARED THE REPORT : Sumitabh Dwivedi
- 3 AMBIENT AIR QUALITY MONITORING
 1. DURATION : 8X3=24Hrs.
 2. DISTANCE FROM FACTORY : LOCATION (1) - SW (BP No. 18)
 LOCATION (2) - Near Western side ML boundary (Pillar No. 14) of ML area
 LOCATION (3) - Near Mankahari Village
 LOCATION (4) - Near Hinrauti Village
3. WIND DIRECTION : MENTIONED IN THE TABLE

Sl No.	Date	Location (1)							Location (2)							Location (3)							Location (4)							Wind Direction
		PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³				
1	09.01.19	28.2	63.7	16.2	30.1	BDL	30.2	67.5	17.0	29.1	BDL	23.0	59.7	13.9	22.2	BDL	24.9	64.8	15.2	25.2	BDL	23.2	62.6	12.2	22.1	BDL	BDL	From SW		
2	23.01.19	25.0	67.0	14.2	27.0	BDL	28.4	70.9	15.2	27.3	BDL	21.6	61.4	11.0	20.2	BDL	23.2	62.6	12.2	22.1	BDL	23.2	62.6	12.2	22.1	BDL	BDL	SE		

BDL - Below Detectable Limit


Sumitabh Dwivedi
 Manager- Environment
 Prism Johnson Ltd, Satna (M.P.)


Manoj Kumar Kashyap
 Sr. General Manager
 Prism Johnson Ltd, Satna (M.P.)

**AIR QUALITY MONITORING REPORT FOR MINES
MONTH - FEBRUARY YEAR-2019**

1 NAME & ADDRESS OF FACTORY :

PRISM JOHNSON LTD
PRISM CEMENT LIMESTONE MINES
VILLAGE: MANKAHARI, HINAUTI & SEHAHATA
POST : BATHIA
DISTT : SATNA (M.P.)-485111

2 NAME OF PERSON PREPARED THE REPORT :

Sumitabh Dwivedi

3 AMBIENT AIR QUALITY MONITORING

1. DURATION :

8X3-24Hrs.

2. DISTANCE FROM FACTORY :

LOCATION (1) - SW (BP No. 18)
LOCATION (2) - Near Western side ML boundary (Pillar No. 14) of ML area
LOCATION (3) - Near Mankahari Village
LOCATION (4) - Near Hinout Village

3. WIND DIRECTION :

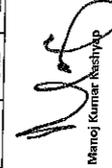
MENTIONED IN THE TABLE

Sl. No.	Date	Location (1)						Location (2)						Location (3)						Location (4)						Wind Direction		
		PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³	PM2.5 ug/M ³	PM10 ug/M ³	SO ₂ ug/M ³	NOX ug/M ³	CO ug/M ³							
1	07.02.19	27.0	66.3	14.6	26.3	BDL	30.1	70.4	15.5	28.8	BDL	24.9	61.6	12.2	20.6	BDL	24.5	65.2	13.5	22.9	BDL	22.5	62.7	14.2	23.1	BDL	BDL	SE
2	22.02.19	22.5	68.9	15.5	28.3	BDL	26.3	74.5	16.2	29.1	BDL	23.9	64.7	13.5	19.8	BDL	22.5	62.7	14.2	23.1	BDL	22.5	62.7	14.2	23.1	BDL	BDL	SW

BDL - Below Detectable Limit



Sumitabh Dwivedi
Manager- Environment
Prism Johnson Ltd, Satna (M.P.)



Manoj Kumar Keshyap
Sr. General Manager
Prism Johnson Ltd, Satna (M.P.)

ECOMEN LABORATORIES PVT. LTD.

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

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LABORATORIES PVT. LTD.

FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW2/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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.Maam Singh
Sample Quantity : As per requirement.
Date of Sampling : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 14.03.2019 to 22.03.2019
Source of Sample : Plant Site - Bore Well

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	7.21	2.0 -12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	510.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	116.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	228.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	56.0	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	21.38	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	46.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.27	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	136.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	11.28	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	0.18	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	0.21	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	0.18	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	Absent	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	Absent	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

Authorized signatory

Quality Manager

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

ECOMEN LABORATORIES PVT. LTD.

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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

FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW4/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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 : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 14.03.2019 to 22.03.2019
Source of Sample : Rajaha Village – Hand Pump

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	7.28	2.0-12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	356.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	140.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	156.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	36.8	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	14.58	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	24.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.23	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	105.75	1.0-250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	9.0	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	BDL	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	0.20	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	0.23	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

Ecomen Laboratories Pvt. Ltd.
Authorized signatory

Quality Manager

ECOMEN LABORATORIES PVT. LTD.**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

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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW7/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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 : 12.03.2019

Date of Receiving : 14.03.2019

Date of Analysis : 14.03.2019 to 22.03.2019

Source of Sample : Mankahari Village – Hand Pump

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	656.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	180.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	312.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	83.2	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	25.27	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	70.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.62	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	152.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	17.0	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	0.18	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	BDL	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	0.21	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	Absent	1.8	0.05	Absent
31.	<i>E.coli</i> (Nog/100)	APHA, 23 rd Ed. 2017, B+E	Absent	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW9/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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.Maam Singh

Sample Quantity : As per requirement.

Date of Sampling : 12.03.2019

Date of Receiving : 14.03.2019

Date of Analysis : 14.03.2019 to 22.03.2019

Source of Sample : PCL Colony Supply Water – Bore Well

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	7.25	2.0 -12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	642.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	164.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	328.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	87.2	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	26.73	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	64.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.33	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	135.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	13.80	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	0.23	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	BDL	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	0.18	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst
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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW10/03/19

TEST REPORT ISSUE DATE:25.03.2019

TEST REPORT OF DRINKING 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.Maam Singh

Sample Quantity : As per requirement.

Date of Sampling : 12.03.2019

Date of Receiving : 14.03.2019

Date of Analysis : 14.03.2019 to 22.03.2019

Source of Sample : Mines Site Office Hinauti Sijatah

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	7.26	2.0 -12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	462.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	120.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	224.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	62.4	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	16.52	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	32.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.38	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	42.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	14.98	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	BDL	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	0.18	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	0.20	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/DW13/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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.Maam Singh
Sample Quantity : As per requirement.
Date of Sampling : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 14.03.2019 to 22.03.2019
Source of Sample : Hinauta Village – Bore Well

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	7.32	2.0 -12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	328.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	140.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	256.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	62.4	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	24.3	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	58.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.33	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	98.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	17.90	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	0.17	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	0.24	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	0.23	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

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FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/GW2/09/18

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING WATER*

Name of the Company: M/s. Prism Johnson Ltd.

Address of the Company : Village Mankabari,
Tehsil Rampur Baghelan
Distt.Satna (M.P.)

Sampling Method : APHA/ IS: 3025
Sample Collected by : Mr.Maam Singh
Sample Quantity : As per requirement.
Date of Sampling : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 14.03.2019 to 22.03.2019
Source of Sample : Plant Pump House

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	<1.0	1 - 100	1.0	5.0
5.	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	7.28	2.0 - 12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	356.0	5 - 5000	500	2000
7.	Alkalinity (mg/l)	APHA, 23 rd Ed. 2017, 2320 A+ B	132.0	5-1500	200	600
8.	Total Hardness as CaCO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 2340 A+C	240.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	64.0	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	19.44	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	42.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.28	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	36.50	1.0 - 250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	13.50	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	0.23	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	0.21	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	0.17	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Arif Khan
Analyst

[Signature]
Ecomen Laboratories Pvt. Ltd.
Authorized signatory
Sector-H, Aliganj, Lucknow-226024
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Quality Manager

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

ecoMen
LABORATORIES PVT. LTD.

FORMAT NO. ECO/QS/FORMAT/09

TEST REPORT NO:ECO LAB/GW3/03/19

TEST REPORT ISSUE DATE: 25.03.2019

TEST REPORT OF DRINKING 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.Maam Singh
Sample Quantity : As per requirement.
Date of Sampling : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 4.03.2019 to 22.03.2019
Source of Sample : Packing Plant Unit-I

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	<1.0	1 - 100	1.0	5.0
5.	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	7.26	2.0 -12	6.5-8.5	No Relax.
6.	Total Dissolved Solids as TDS (mg/l)	APHA, 23 rd Ed. 2017, 2540-C	320.0	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	232.0	5-1500	200.0	600.0
9.	Calcium as Ca (mg/l)	APHA, 23 rd Ed. 2017, 3500 Ca A+B	54.4	5 - 1000	75.0	200.0
10.	Magnesium as Mg (mg/l)	APHA, 23 rd Ed. 2017, 3500 Mg A+B	23.32	5-1000	30.0	100.0
11.	Chloride as Cl (mg/l)	APHA, 23 rd Ed. 2017, 4500 Cl A+B	40.0	5-1000	250.0	1000.0
12.	Fluorides as F (mg/l)	APHA, 23 rd Ed. 2017, 4500-C	0.37	0.05-10	1.0	1.5
13.	Sulfate as SO ₄ (mg/l)	APHA, 23 rd Ed. 2017, 4500-SO ₄ ²⁻ E	38.0	1.0 -250	200.0	400.0
14.	Nitrate Nitrogen as NO ₃ (mg/l)	APHA, 23 rd Ed. 2017, 4500-NO ₃ ⁻ B	14.6	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	0.22	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	0.21	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	0.24	0.02-50	0.3	No Relax.
30.	Total coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, B+C	BDL	1.8	0.05	Absent
31.	E.coli (Nos/100)	APHA, 23 rd Ed. 2017, B+E	BDL	1.8	Absent	Absent

*The result are related only to item tested.

BDL = Below Detection Limit

Analyst

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

Quality Manager

**PRISM JOHNSON LIMITED
SATNA (M.P.)**

NOISE MONITORING REPORT

MONTH – OCTOBER 2018

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1	SW (BP No. 18)	22.10.18	61.0	51.26
2	Near Western side ML boundary (Pillar No. 14) of ML area	22.10.18	62.2	51.76
3	Mankahari Village	22.10.18	52.9	46.13
4	Hinouti village	22.10.18	51.1	45.36


Sumitabh Dwivedi
Manager – Environment


Manoj Kumar Kashyap
Sr. General Manager

**PRISM JOHNSON LIMITED
SATNA (M.P.)**

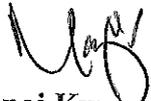
NOISE MONITORING REPORT

MONTH – NOVEMBER 2018

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1	SW (BP No. 18)	15.11.18	61.83	50.63
2	Near Western side ML boundary (Pillar No. 14) of ML area	15.11.18	60.26	47.3
3	Mankahari Village	15.11.18	51.7	46.4
4	Hinouti village	15.11.18	50.3	44.96


Sumitabh Dwivedi
Manager – Environment


Manoj Kumar Kashyap
Sr. General Manager

**PRISM JOHNSON LIMITED
SATNA (M.P.)**

AMBIENT NOISE MONITORING REPORT

MONTH – DECEMBER 2018

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1	SW (BP No. 18)	14.12.2018	62.2	54.2
2	Near Western side ML boundary (Pillar No. 14) of ML area	14.12.2018	61.5	53.5
3	Mankahari Village	14.12.2018	60.7	52.1
4	Hinouti village	14.12.2018	58.5	48.5


Sumitabh Dwivedi
Manager – Environment


Manoj Kumar Kashyap
Sr. General Manager

**PRISM JOHNSON LIMITED
SATNA (M.P.)**

AMBIENT NOISE MONITORING REPORT

MONTH -- JANUARY 2019

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1.	SW (BP No. 18)	17.01.2019	62.4	55.3
2	Near Western side ML boundary (Pillar No. 14) of ML area	17.01.2019	61.8	53.8
3	Mankahari Village	17.01.2019	61.2	52.8
4	Hinouti village	17.01.2019	59.7	47.56


Sumitabh Dwivedi
Manager - Environment


Manoj Kumar Kashyap
Sr. General Manager

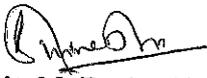
**PRISM JOHNSON LIMITED
SATNA (M.P.)**

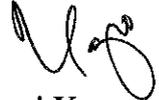
AMBIENT NOISE MONITORING REPORT

MONTH – FEBRUARY 2019

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1	SW (BP No. 18)	18.02.2019	61.5	56.4
2	Near Western side ML boundary (Pillar No. 14) of ML area	18.02.2019	60.3	54.1
3	Mankahari Village	18.02.2019	62.4	53.4
4	Hinouti village	18.02.2019	59.8	48.3


Sumitabh Dwivedi
Manager – Environment


Manoj Kumar Kashyap
Sr. General Manager

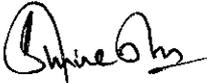
**PRISM JOHNSON LIMITED
SATNA (M.P.)**

AMBIENT NOISE MONITORING REPORT

MONTH – MARCH 2019

1. Name and address of Factory : **PRISM JOHNSON LTD.**
Prism Cement Limestone Mines
Village- Mankahari, Hinauti & Sijahata
Post - Bathia
Distt - Satna (M.P)- 485111
2. Name of person prepared the report : Sumitabh Dwivedi
3. Details of noise monitoring :-

Sl.No	Locations	Date of monitoring	Noise level in dB(A) (Day Time)	Noise Level in dB(A) (Night Time)
1	SW (BP No. 18)	08.03.2019	64.73	56.46
2	Near Western side ML boundary (Pillar No. 14) of ML area	08.03.2019	60.23	47.9
3	Mankahari Village	09.03.2019	53.56	47.26
4	Hinouti village	09.03.2019	52.0	46.46


Sumitabh Dwivedi
Manager – Environment


Manoj Kumar Kashyap
Sr. General Manager

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

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

BY

Dr. M. P. Roy,	Principal Scientist & Project Leader
Dr. C. Sawmliana,	Principal Scientist
Shri Vivek K Himanshu,	Scientist
Shri R. S. Yadav,	Sr. Technical Officer
Shri P. Hembram,	Technical Assistant
Dr. P. Pal Roy,	Outstanding Scientist & HORG
Dr. P. K. Singh,	Director

PROJECT NO.: CNP/4491/2016-17

FEBRUARY 2017

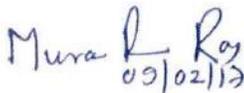
NOTE

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.

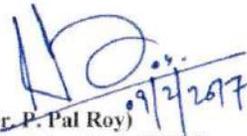
The recommendations are based on the results of investigation carried out at Prism Cement Limestone Mine of M/s Prism cement Limited. It is hoped that the recommendations will be implemented to get optimum results without hampering production, productivity and safety of the mine. The recommendations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

SIGNATURE OF THE PROJECT PROPONENTS

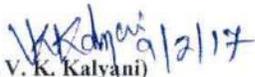

09/02/17

(Dr. M. P. Roy)
Principal Scientist
Project Leader

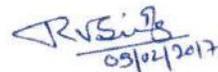

09/2/2017

(Dr. P. Pal Roy)
Outstanding Scientist & HORG
Project Co-ordinator

CSIR-CIMFR AUTHORISED SIGNATORIES


9/2/17

(Dr. V. K. Kalyani)
Sr. Principal Scientist & HOS
Project Monitoring & Evaluation Cell


09/02/2017

(Dr. R. V. K. Singh)
Chief Scientist & HORG
Business Development & industrial Liaison

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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.

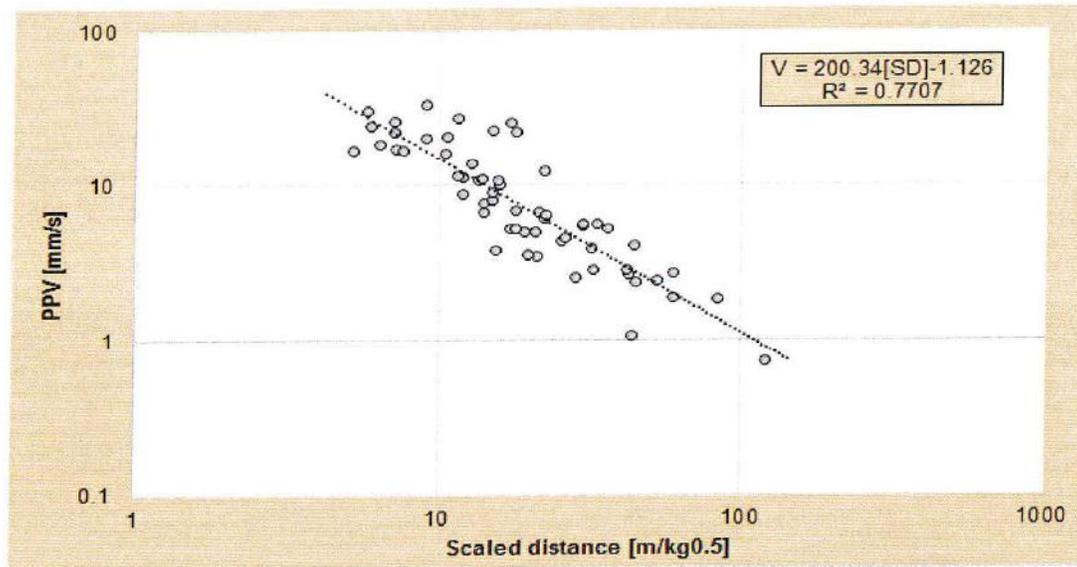


Figure 1. Regression plot of recorded PPV with their respective scaled distances.

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.

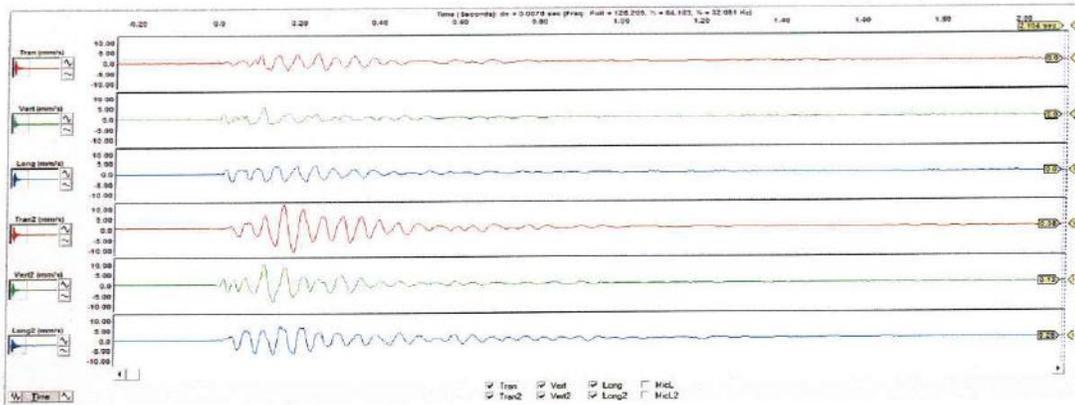


Figure 4. Blast wave signature recorded on the ground surface and roof of the house of Shri Umesh Prasad from the blast conducted at 15 No. Goyal face bench of Prism Cement Limestone Mine.

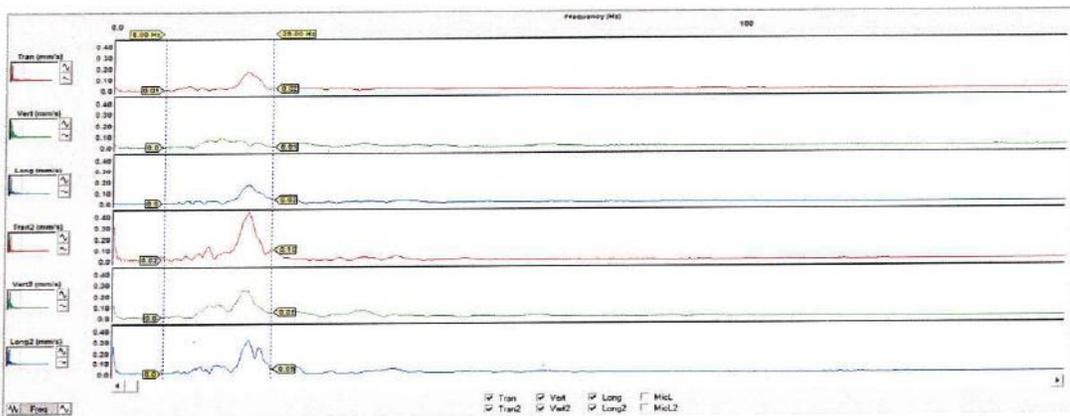
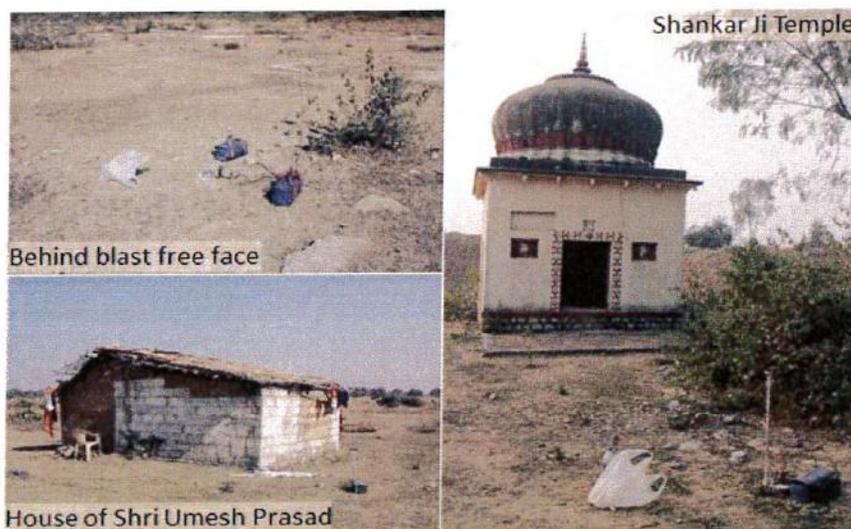


Figure 5. FFT analyses of frequencies of vibration presented in Figure 4.



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.

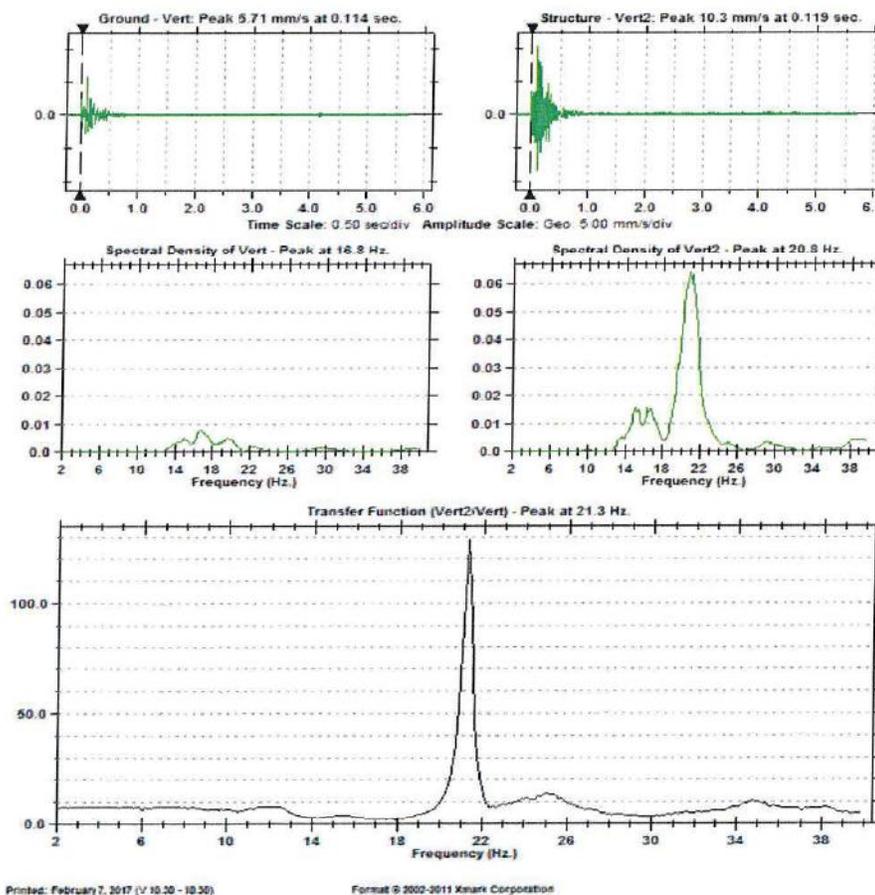


Figure 6. Processing of blast wave signature for determination of natural frequency of the house of Shri Umesh Yadav.

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 overpressure 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).

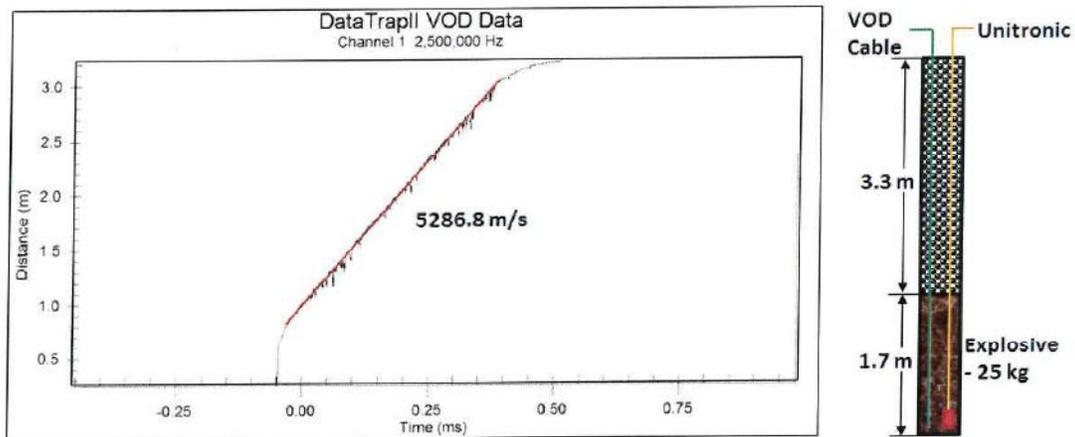


Figure 7. Trace of in-the-hole VOD of SME explosives of M/s Indian Explosives Limited.

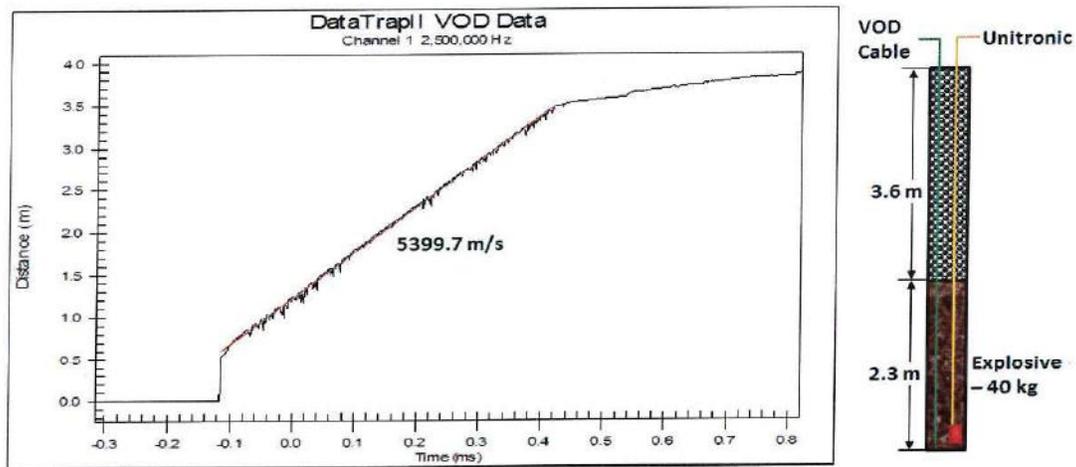


Figure 8. Trace of in-the-hole VOD of SME explosives of M/s Indian Explosives Limited.

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.

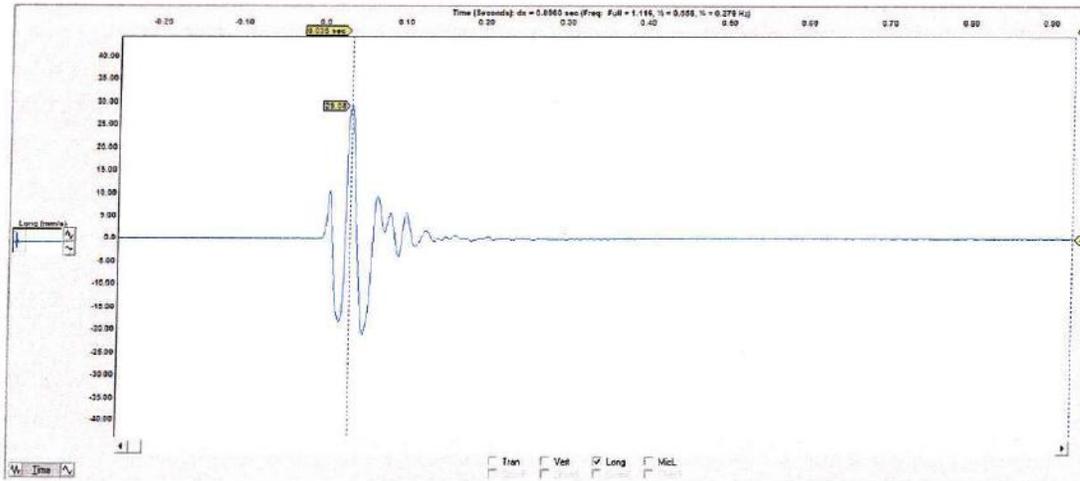


Figure 9. Time history of the signature blast in Longitudinal direction.

Signature Hole Analysis Table																
File																
Filename (Double Click to view)	Blast Timing			Peak Particle Velocity				PVS Peak Vector Sun ∇	Dominant FFT Frequency				Upper/Lower Frequency Ratio			
	Deck Delay msec	Hole Delay msec	Row Delay msec	Trans (mm/s)	Vert (mm/s)	Long (mm/s)	Peak (mm/s)		Trans [Hz]	Vert [Hz]	Long [Hz]	Peak [Hz]	Trans	Vert	Long	Peak
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	90.1	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
R2D1H16R55.BWP	1	16	55	19.50	18.60	25.10	25.10	30.70	58.9	58.5	57.3	58.5	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	60.0	27.1	60.0	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	31.90	31.90	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.

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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)	<ul style="list-style-type: none"> ❖ 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)	<ul style="list-style-type: none"> ❖ 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)	<ul style="list-style-type: none"> ❖ No ejection of Flyrock ❖ Good fragmentation ❖ Unitronic (Orica) ❖ Very good movement towards free face.
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)	<ul style="list-style-type: none"> ❖ Very good movement towards free face. ❖ No fly rock ejection. ❖ Unitronic (Orica). ❖ VOD was measured.
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)	<ul style="list-style-type: none"> ❖ Very good movement towards free face. ❖ Excellent Fragmentation. ❖ No ejection of Flyrock. ❖ Unitronic (Orica)
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)	<ul style="list-style-type: none"> ❖ Chocked face. ❖ No ejection of Flyrock. ❖ Unitronic
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)	<ul style="list-style-type: none"> ❖ Chocked face. ❖ Free face was not available.

8.	24.12.16	15 No. RPL Site	40	115	6	3×3.5	3.5	35	explosives of M/s IEPL Orica) 1405 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock. ❖ VOD Measurement. ❖ No ejection of flyrock. ❖ Unitronic
9.	24.12.16	15 No. Goyal Face	20	115	5.5	3×3.5	3.6	22	440 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock. ❖ Good fragmentation ❖ Unitronic
10.	24.12.16	15 No. Goyal Face	21	115	2.5	3×3.5	1.7	5.4	113 (Solarigel Cartridge & Solar Prime Booster)	❖ No ejection of flyrock ❖ Good fragmentation ❖ Unitronic
11.	24.12.16	15 No. Goyal Face	30	115	3.5-4.5	3×3.5	2.5 - 3	14.7 - 20	603 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ Chocked face ❖ No ejection of flyrock ❖ Good fragmentation ❖ Nonel (TLD – 17 ms, 42 ms, DTH – 450 ms)
12.	25.12.16	15 No. RPL	84	115	6	3×3.5	3.5	32	2678 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock ❖ Good fragmentation ❖ Unitronic
13.	26.12.16	15 No. Goyal Face	28	115	5	3×4	3	25	710 (Booster Primex and SME explosives of M/s IEPL Orica)	❖ No ejection of flyrock ❖ Good fragmentation ❖ Unitronic
14.	26.12.16	15 No. Goyal Face	21	115	3	3×4	2.6	2.78	58.4 (Solar Prime Booster)	❖ No ejection of flyrock ❖ Nonel (TLD – 17 ms, 42 ms, DTH – 450 ms)
15.	26.12.16	15 No. Goyal Face	45	115	6	2.5×3	2.4	25	1125 (Solarigel Cartridge & Solar Prime Booster)	❖ No ejection of flyrock ❖ Excellent fragmentation ❖ Nonel (TLD – 17 ms, 42 ms, DTH – 450 ms)

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

7.	New Pit 01. Hinauti	420	30	<ul style="list-style-type: none"> ➤ Left Side From Blast Face ➤ Back Side From Blast Face ➤ Left Side From Blast Face ➤ Left Side From Blast Face (village Shankarji temple) 	50 75 100 200	20.4 10.7 5.24 5.29	22.5 18.5 22 18.5	135.1 132.5 134.8 122.6
8.	15 No. RPL Site	1405	70 (2×35)	<ul style="list-style-type: none"> ➤ 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 	50 60 100 100 150	24.4 17.5 11.3 8.77 6.89	52.9 30.4 15.9 17.8 15.9	127.8 128.8 127.8 123.9 128
9.	15 No. Goyal Face	440	20	<ul style="list-style-type: none"> ➤ Back Side From Blast Face ➤ Right Side From Blast Face ➤ Back Side From Blast Face ➤ Back Side From Blast Face 	100 100 150 200	12.5 6.14 5.62 4.07	27.4 35.6 36.8 11.4	122.3 133.4 120 116.3
10.	15 No. Goyal Face	113	21	<ul style="list-style-type: none"> ➤ Right Side From Blast Face ➤ Back Side From Blast Face 	150 200	2.83 1.08	24.6 28.8	125 110.2
11.	15 No. Goyal Face	603	44 (2×22)	<ul style="list-style-type: none"> ➤ 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)	<ul style="list-style-type: none"> ➤ 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)	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ 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)	<ul style="list-style-type: none"> ➤ 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

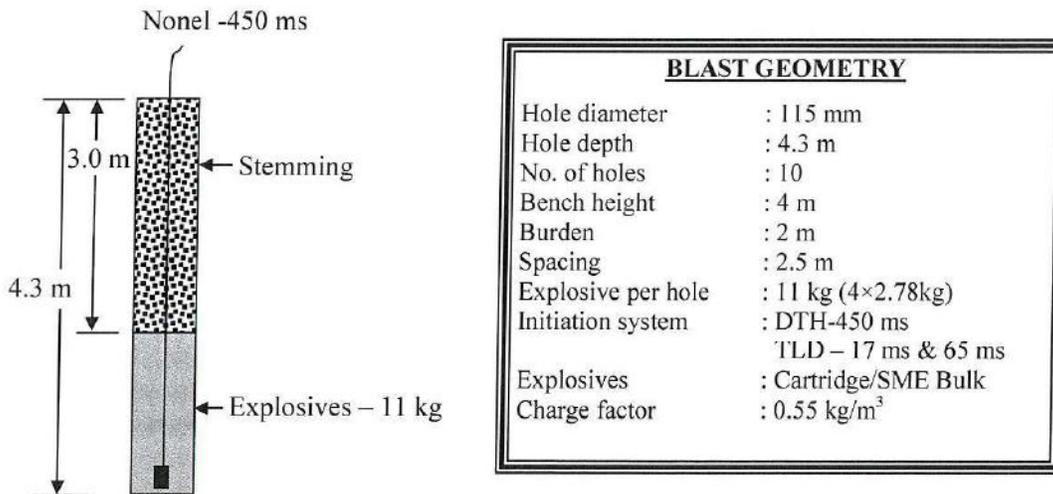
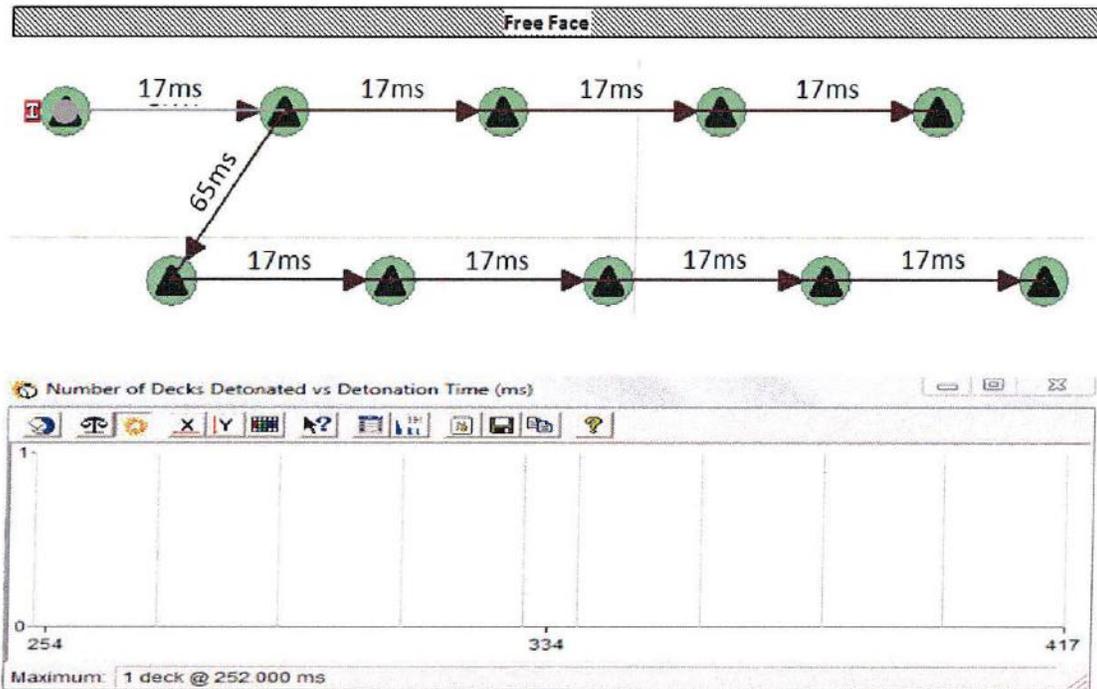


Figure A1. Recommended blast design and charging pattern of holes for 4 m benches of Prism Cement Limestone mine when blasting is to be conducted at or beyond 50m.

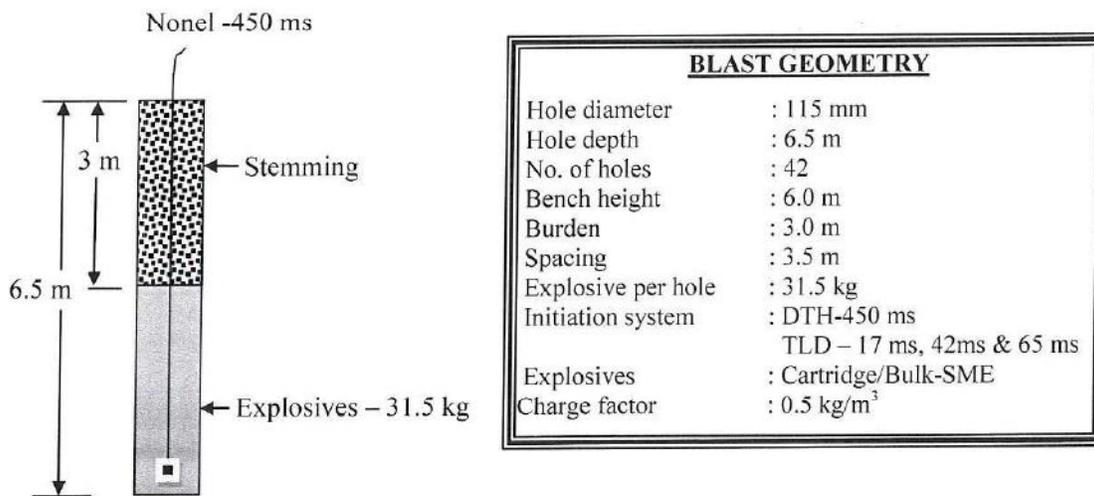
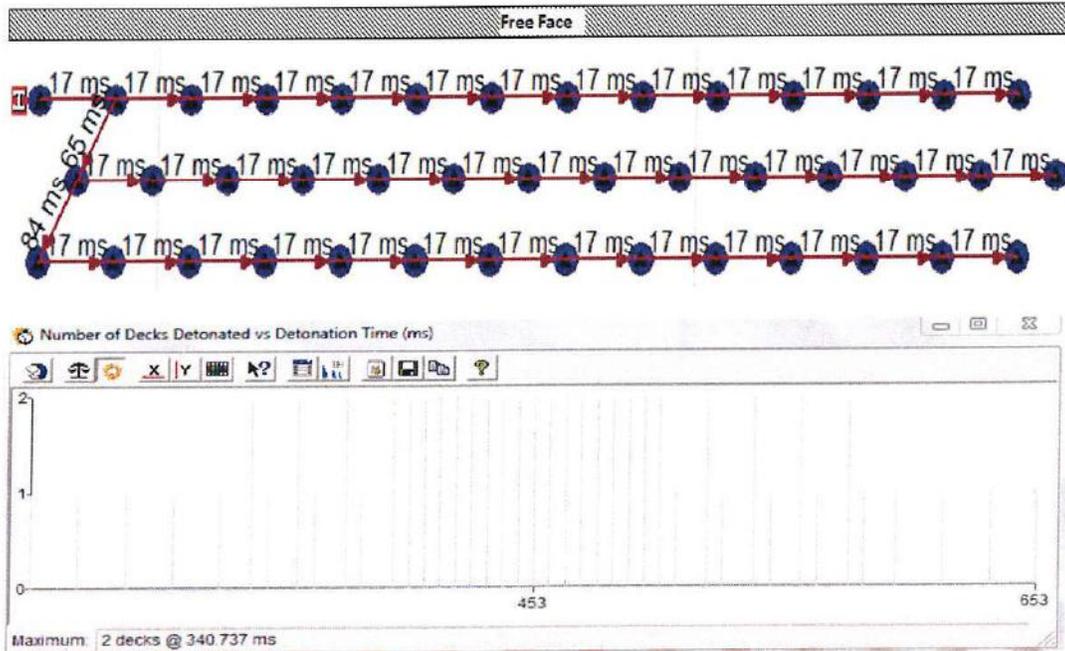


Figure A2. Recommended blast design and charging pattern of holes for 6.0 m benches of Prism Cement Limestone mine when blasting is to be conducted at or beyond 100 m.



Event Report



Date/Time Tran at 11:28:03 December 21, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 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 IR0

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

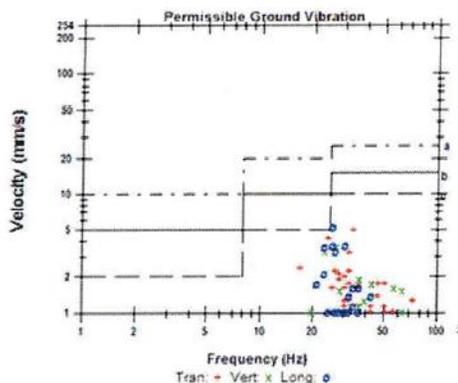
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

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 = 50.4 mv)

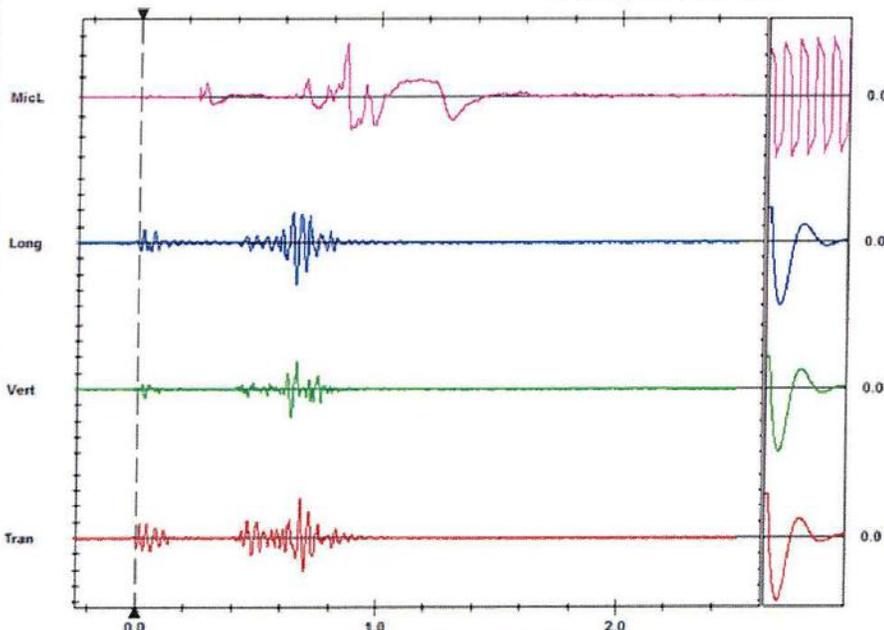
	Tran	Vert	Long	
PPV	4.95	3.56	5.21	mm/s
ZC Freq	34	27	26	Hz
Time (Rel. to Trig)	0.682	0.637	0.653	sec
Peak Acceleration	0.106	0.0795	0.119	g
Peak Displacement	0.0223	0.0187	0.0307	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.2	Hz
Overswing Ratio	3.6	3.6	3.8	

Peak Vector Sum: 5.54 mm/s at 0.653 sec

DGMS India (A)



Tran: + Vert x Long: e
 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

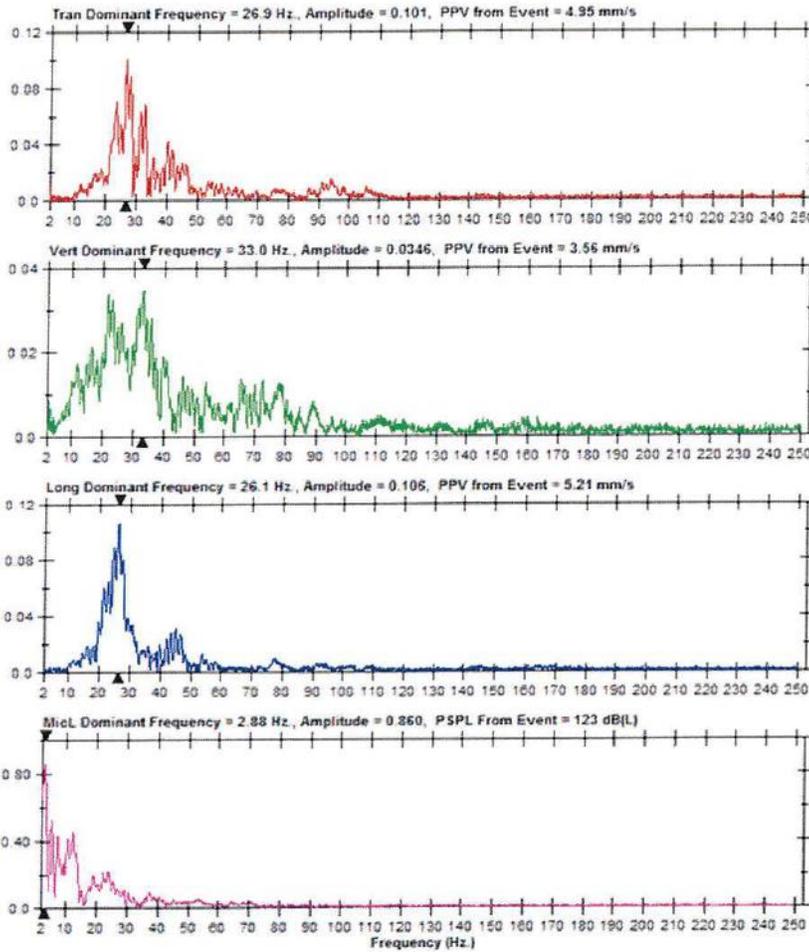


Date/Time Tran at 11:28:03 December 21, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number BE20375 V 10 60-8 17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375GOOY 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 Hinauti 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 0814GOPC K00

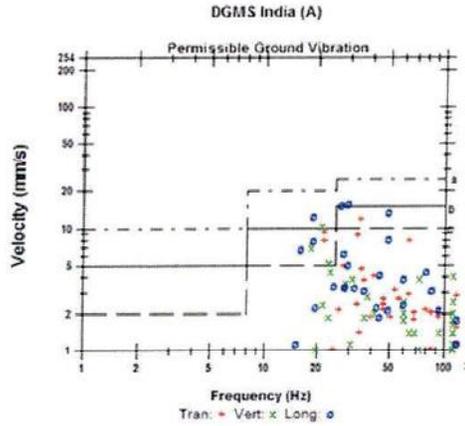
Notes
 Location: On the ground surface
 Client: PRISM CEMENT LTD. SATNA
 User Name: REE Division, CSIR-CIMFR, Dhanbad
 General:

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

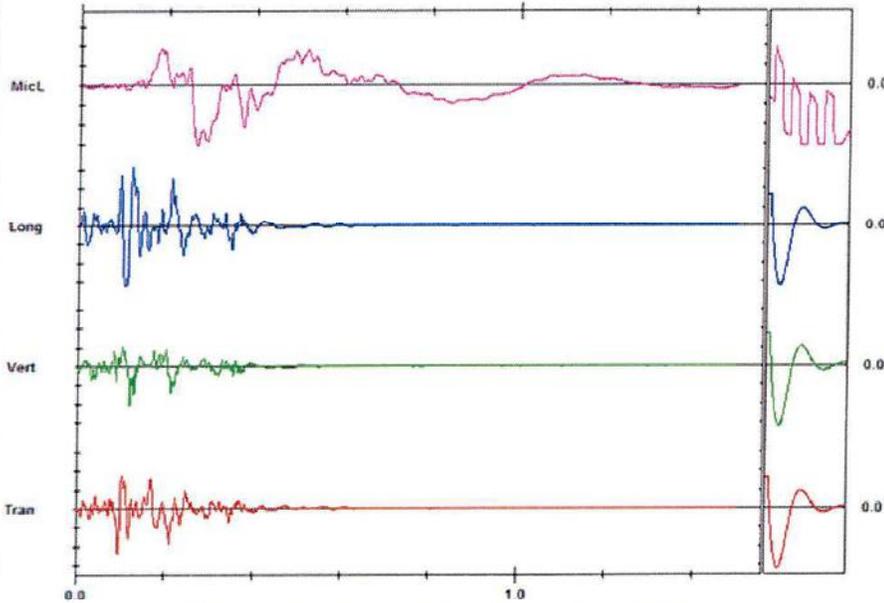
Microphone Linear Weighting
PSPL 129.8 dB(L) at 0.266 sec
ZC Freq 7.3 Hz
Channel Test Passed (Freq = 19.3 Hz Amp = 692 mv)

	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

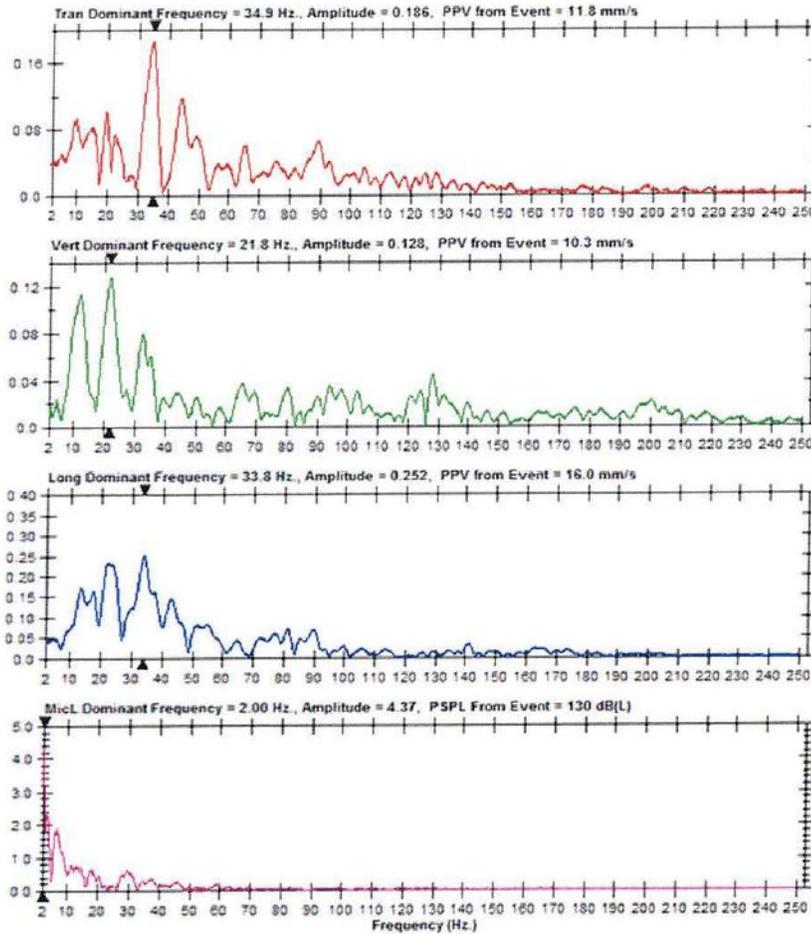


Date/Time Vert at 16:31:38 December 21, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 4.0 sec at 2048 sps
Job Number 1

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 0814G0PC K08

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 60-8 17 MiniMate Plus
Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Chanbad
File Name V375G0PC.KS0

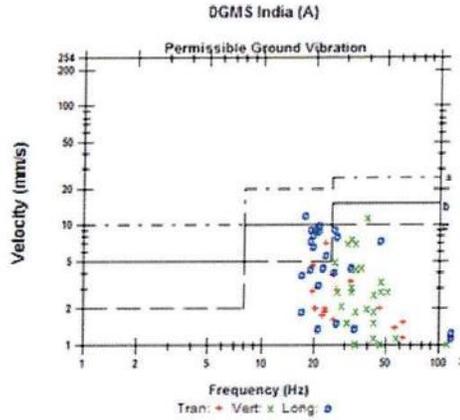
Notes
 Location: On Ground Surface
 Client: PRISM CEMENT LTD. STANA
 User Name: REE Division, CSIR- CIMFR, Dhanbad
 General:

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

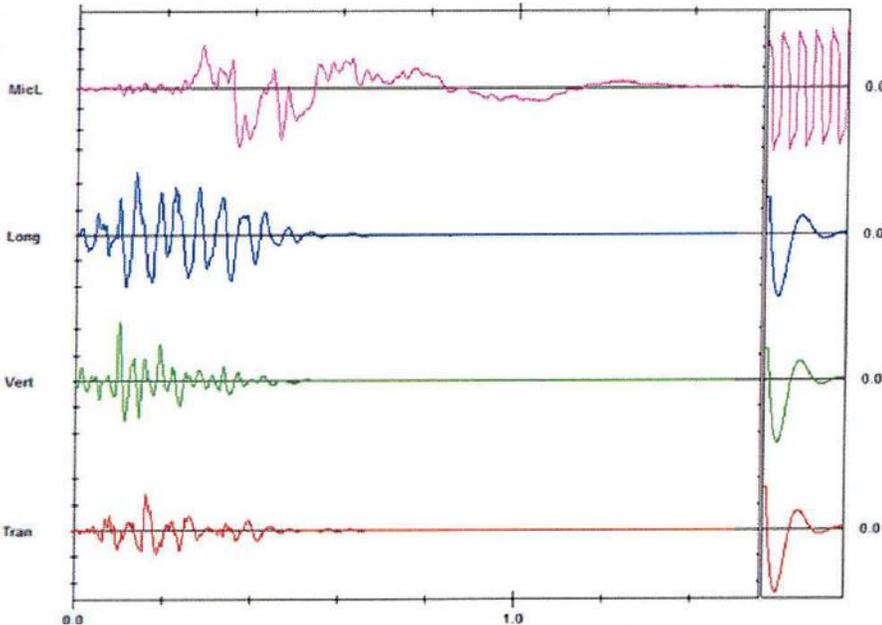
Microphone Linear Weighting
PSPL 123.3 dB(L) at 0.365 sec
ZC Freq 6.7 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 520 mv)

	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

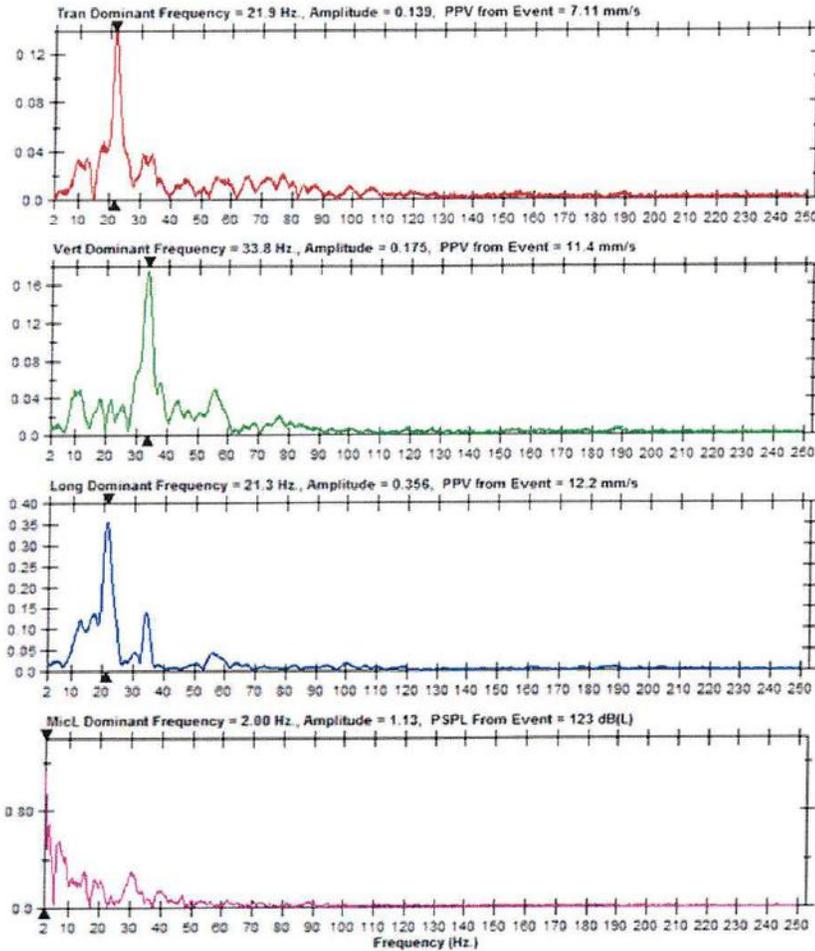
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Battery Level 6.3 Volts
Unit Calibration April 29, 2015 by CIMFR, Dhanbad
File Name V375G0PC.KS0

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 8 12-8 0 BlastMate III
Battery Level 6.1 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name 0814GQQW 3M0

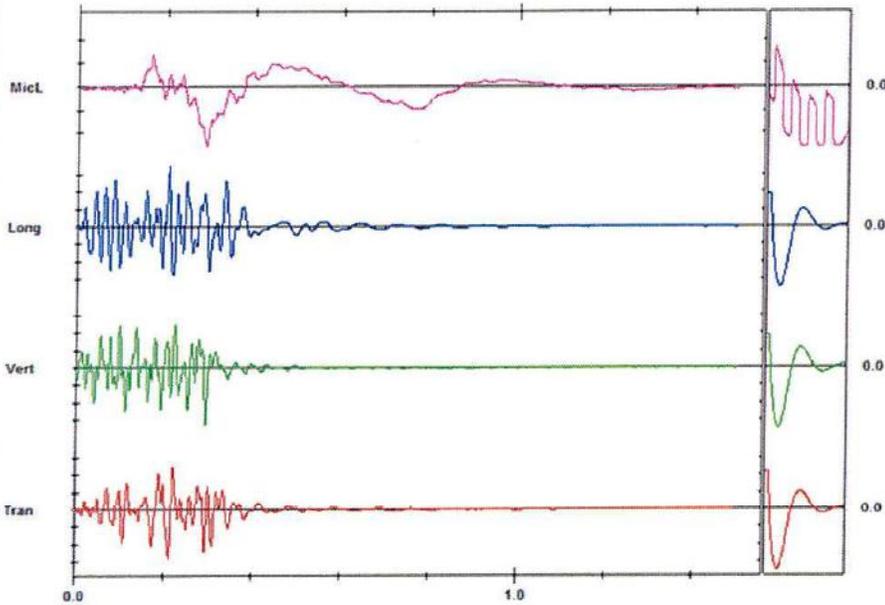
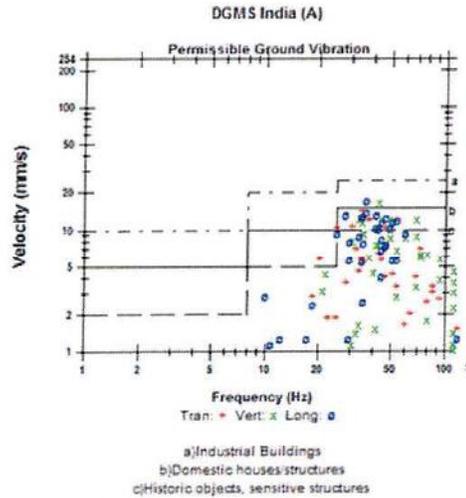
Notes
 Location: On the ground surface
 Client: PRISM CEMENT LTD. SATNA
 User Name: REE Division, CSIR-CIMFR, Dhanbad
 General:

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

Microphone Linear Weighting
PSPL 136.1 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	0.0654	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



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

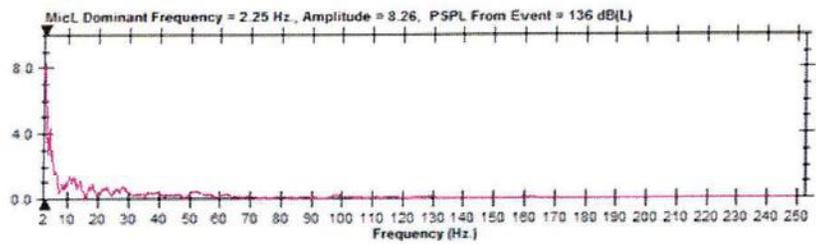
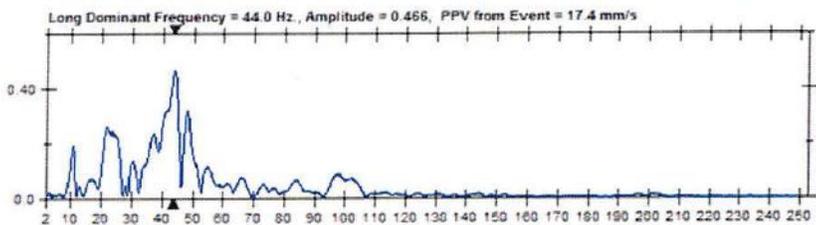
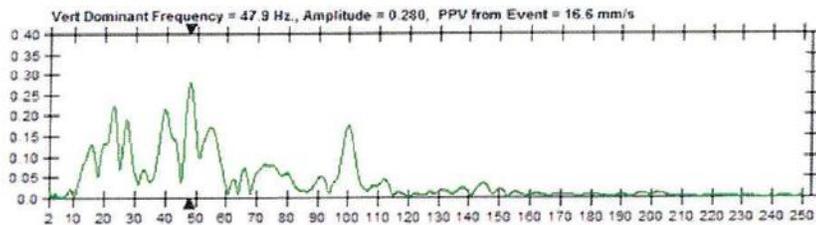
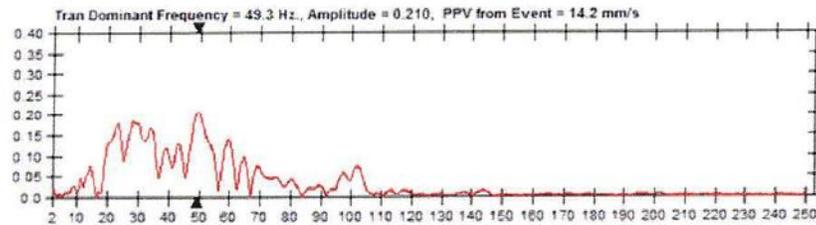


Date/Time Vert at 12:30:58 December 22, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 4.0 sec at 2048 sps
Job Number: 1

Serial Number BA13814 V 8 12-8 0 BlastMate III
Battery Level 6.1 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name 0814GQQW 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 5.3 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:

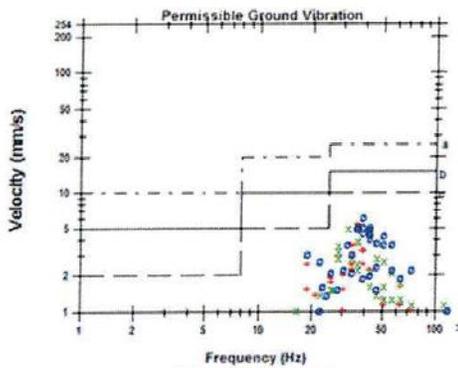
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

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	3.7	3.2	3.9	Hz
Time (Rel. to Trig)	0.124	0.217	0.065	sec
Peak Acceleration	0.119	0.106	0.159	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	

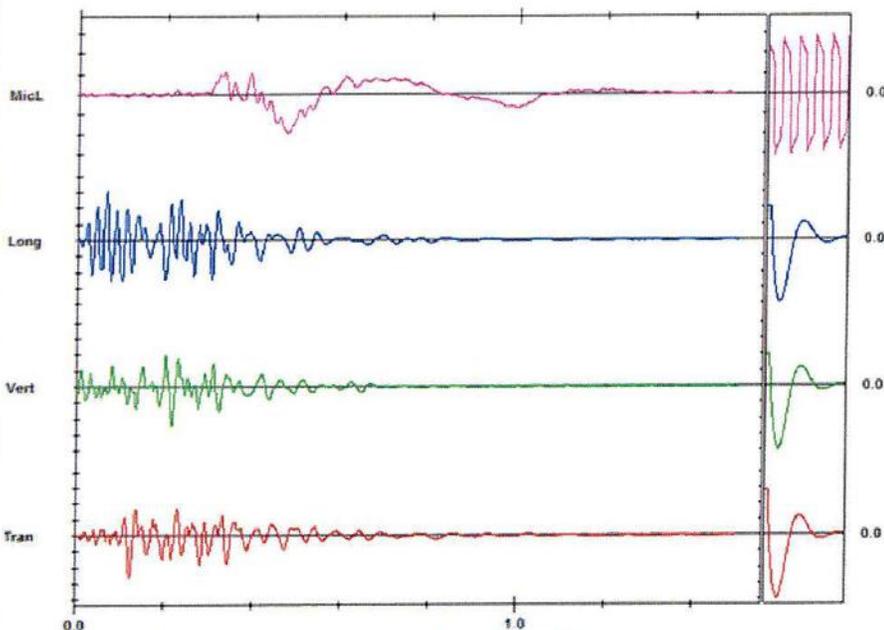
Peak Vector Sum 6.75 mm/s at 0.232 sec

DGMS India (A)



Tran: + Vert: x Long: o

- 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

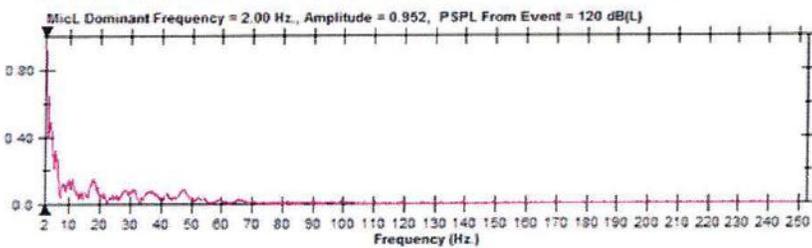
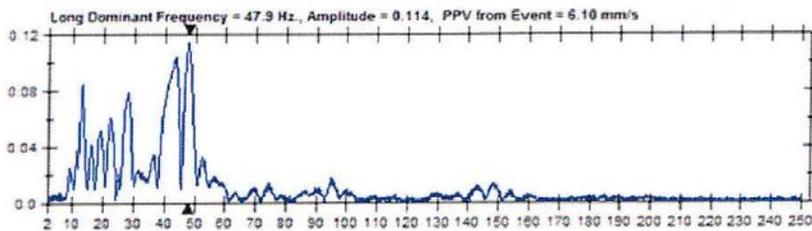
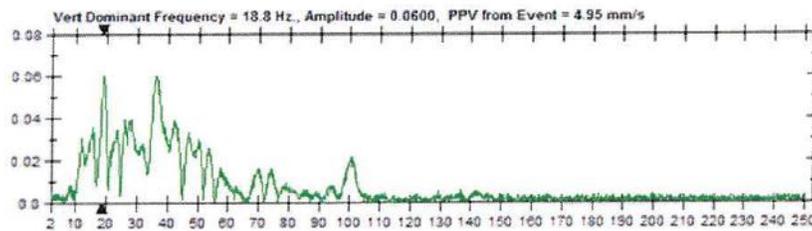
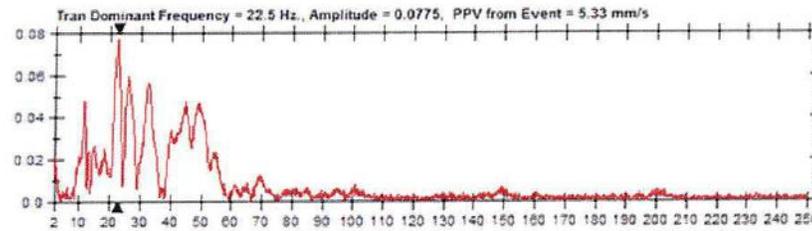


Date/Time Vert at 12:30:59 December 22, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 6.0 sec at 1024 sps

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 20:27:05 (V10.30)

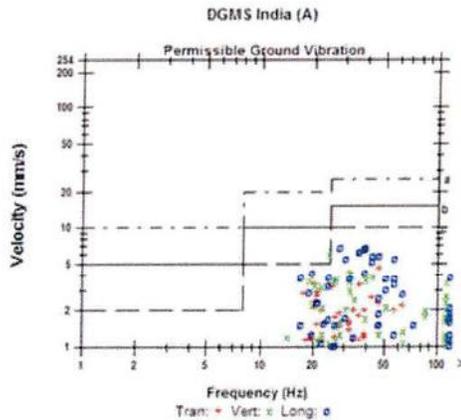
Serial Number 4710 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GOUF.3L0

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

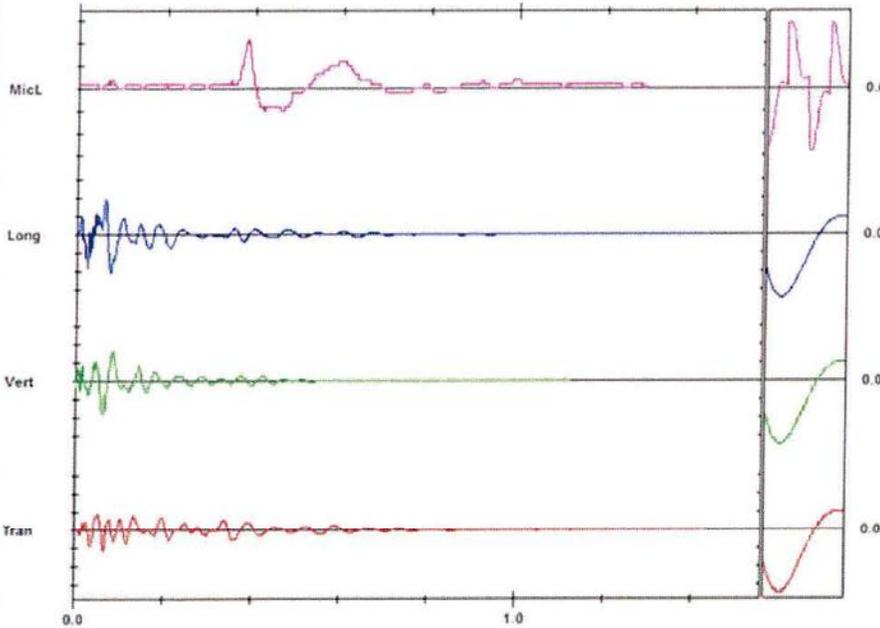
Microphone Linear Weighting
PSPL 122.9 dB(L) at 4.534 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 477 mv)

	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	0.0296	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



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

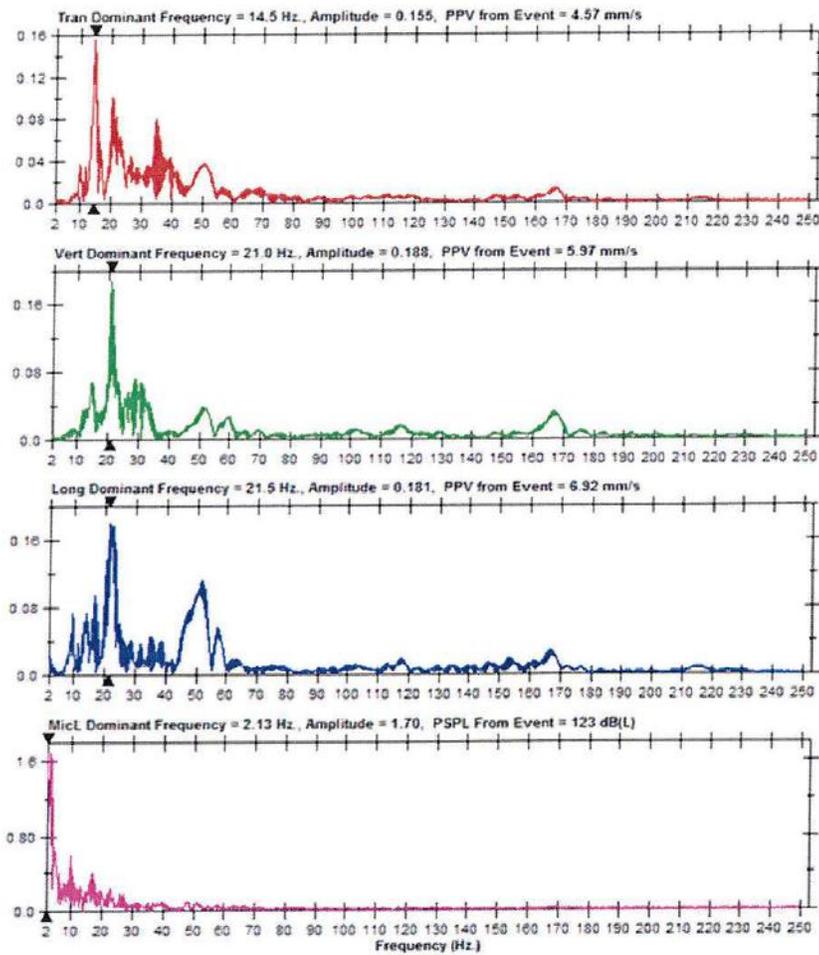


Date/Time Vert at 10:14:09 December 23, 2016
Trigger Source Geo 0.508 mm/s
Range Geo 127 mm/s
Record Time 6.0 sec at 1024 sps

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 20:27:05 (V10.30)

Extended Notes
Blast vibration study at Meedhu 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:

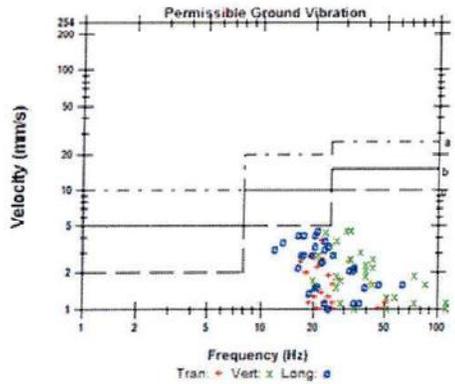
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

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)

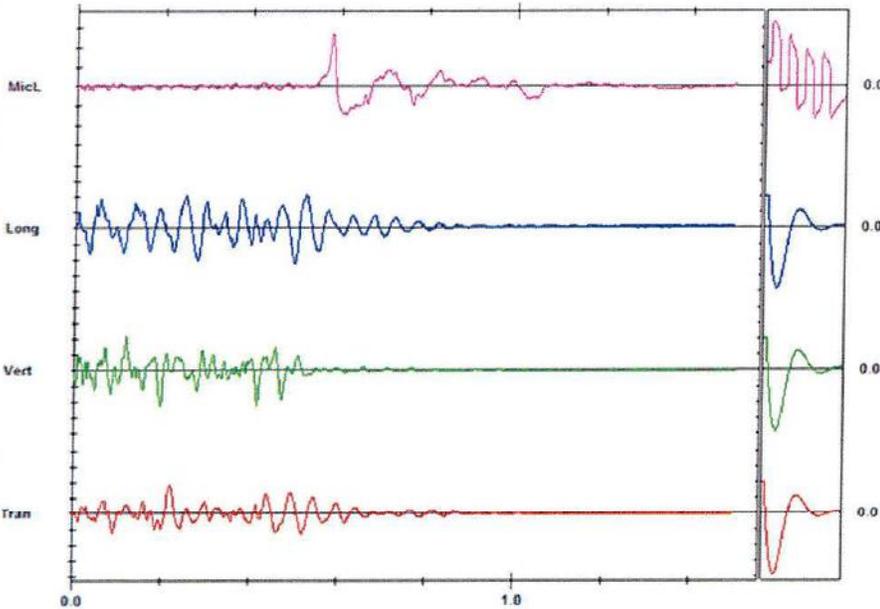
	Tran	Vert	Long	
PPV	3.81	4.57	4.57	mm/s
ZC Freq	22	32	21	Hz
Time (Rel. to Trig)	0.218	0.195	0.457	sec
Peak Acceleration	0.0563	0.133	0.106	g
Peak Displacement	0.0282	0.0233	0.0393	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.7	3.5	3.8	

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

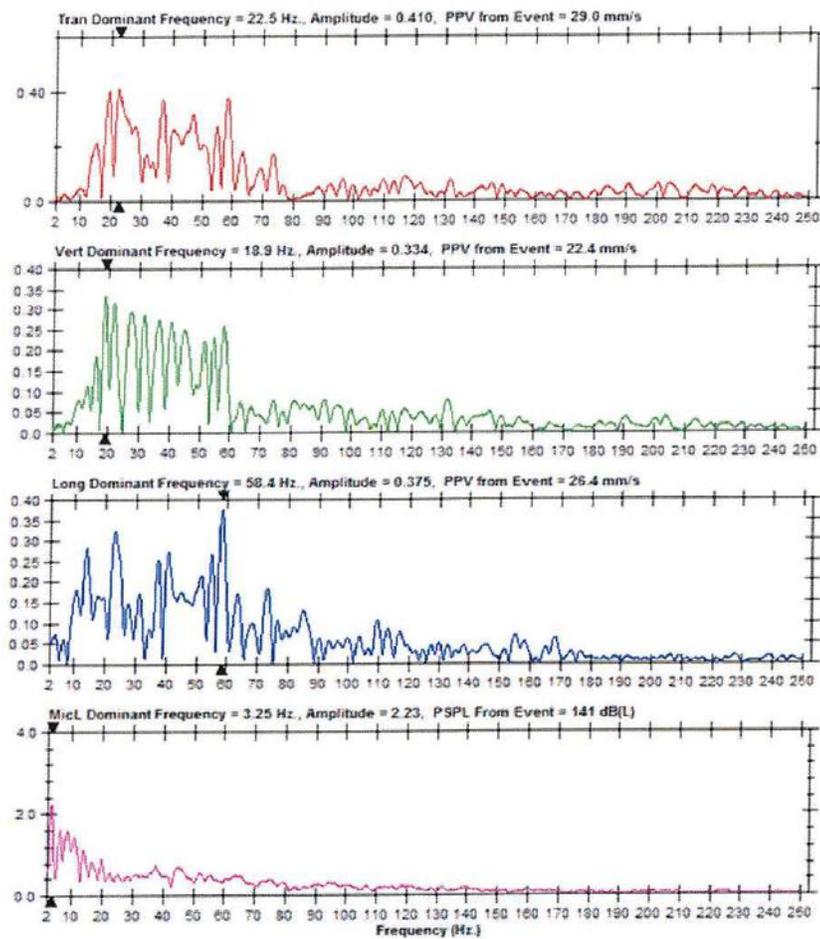


Date/Time Vert at 16:41:33 December 23, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 4096 sps
Job Number: 1

Serial Number BA13814 V 8 12-8 0 BlastMate III
Battery Level 8.2 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 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:

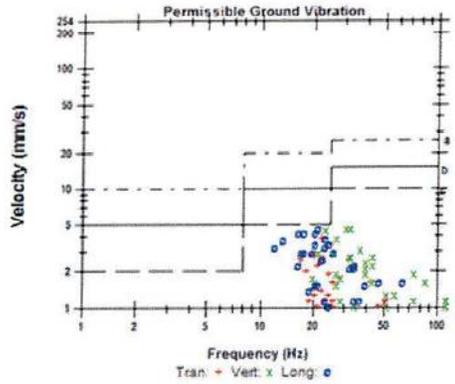
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd

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)

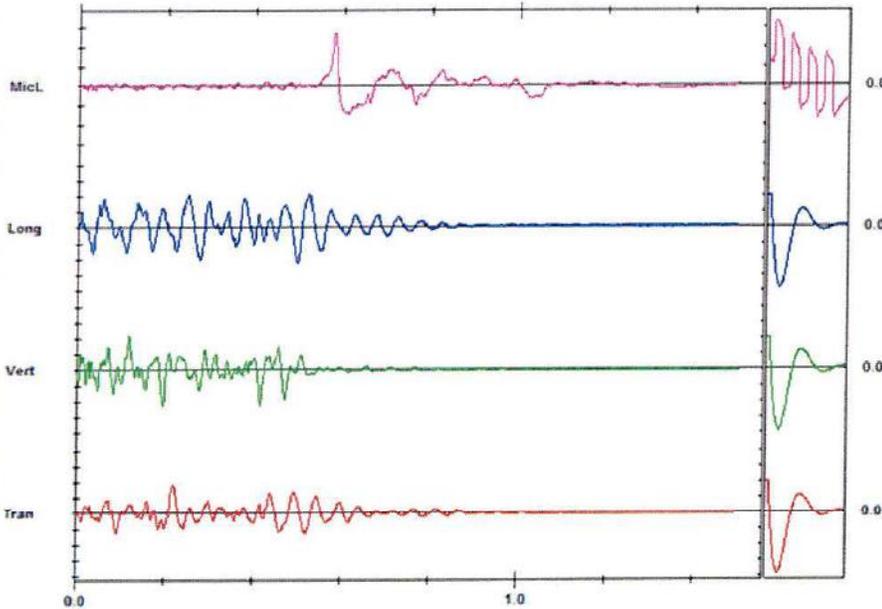
	Tran	Vert	Long	
PPV	3.81	4.57	4.57	mm/s
ZC Freq	22	32	21	Hz
Time (Rel. to Trig)	0.218	0.195	0.497	sec
Peak Acceleration	0.0663	0.133	0.106	g
Peak Displacement	0.0282	0.0293	0.0393	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.5	Hz
Overswing Ratio	3.7	3.5	3.8	

Peak Vector Sum 5.24 mm/s at 0.497 sec

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

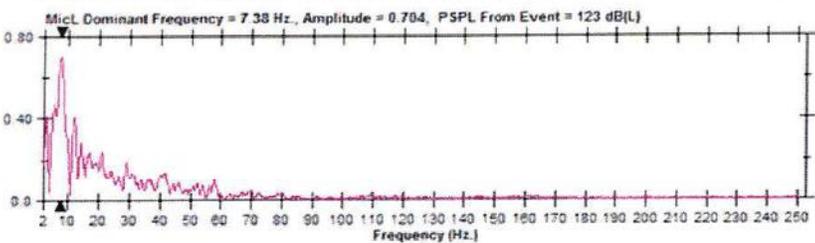
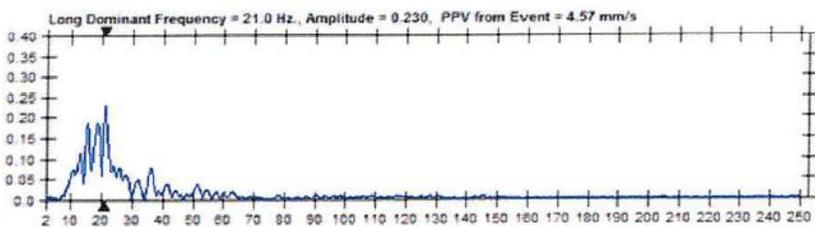
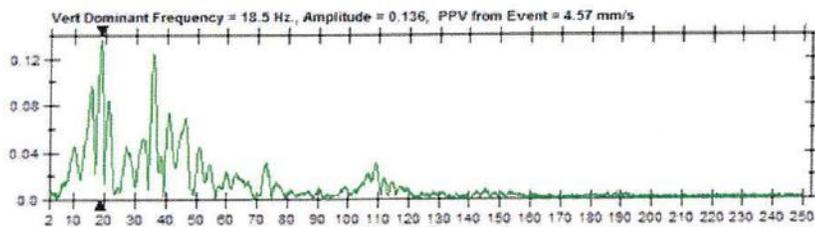
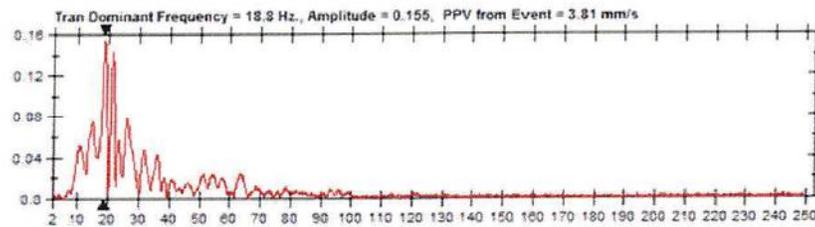


Date/Time: Vert at 16:41:31 December 23, 2016
Trigger Source: Geo: 0.510 mm/s
Range: Geo: 254 mm/s
Record Time: 4.0 sec at 1024 sps
Job Number: 1

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.





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 8.2 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name O814GOSW.FK0

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

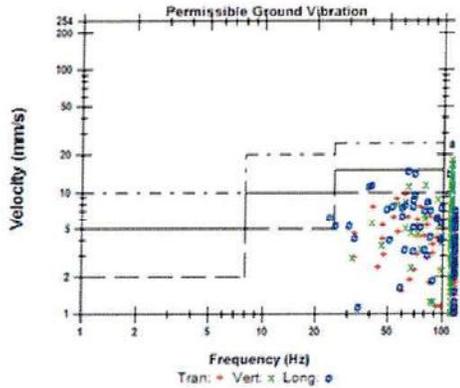
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

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)

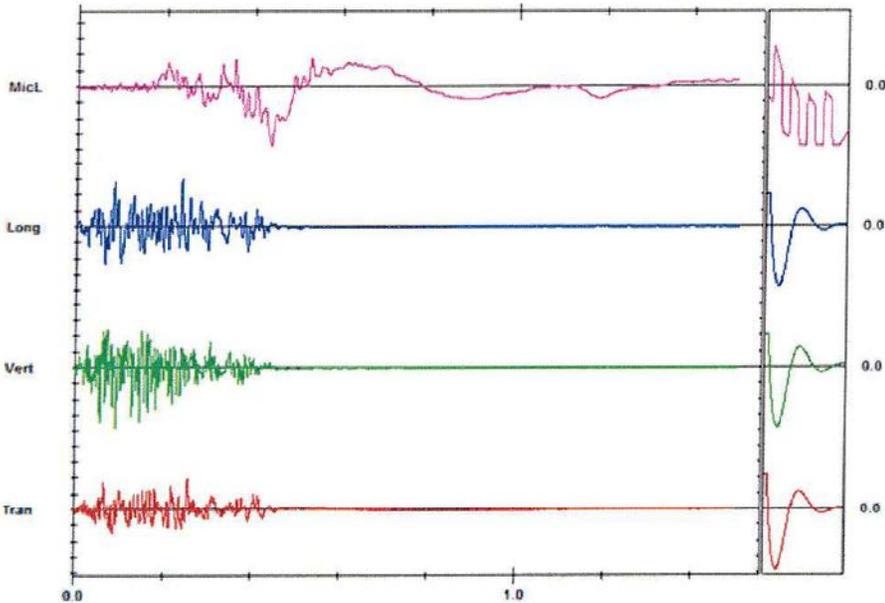
	Tran	Vert	Long	
PPV	9.52	18.9	15.0	mm/s
ZC Freq	6.2	11.4	6.4	Hz
Time (Rel. to Trig)	0.265	0.092	0.237	sec
Peak Acceleration	0.689	1.43	0.795	g
Peak Displacement	0.0213	0.0244	0.0422	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.5	Hz
Overswing Ratio	3.6	3.3	3.7	

Peak Vector Sum 20.4 mm/s at 0.093 sec

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: 20.0 pa (L)/div

Sensor Check



FFT Report

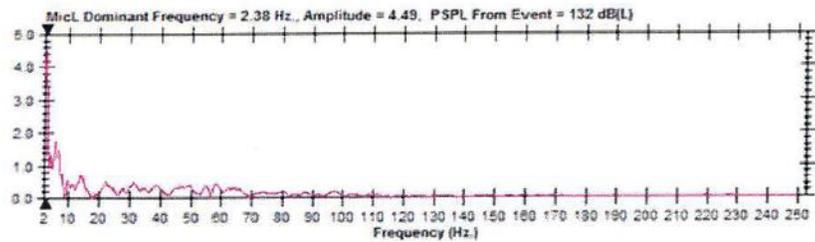
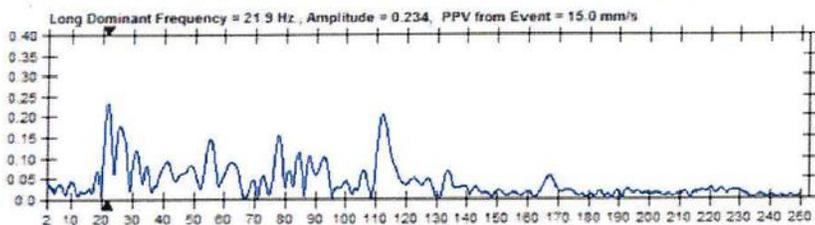
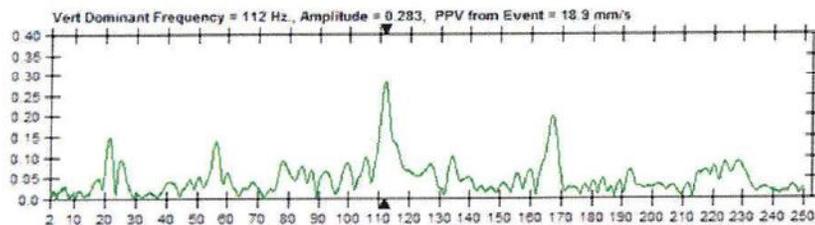
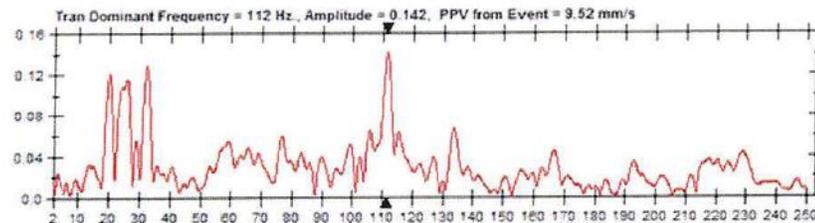


Date/Time Vert at 14:33:20 December 23, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 4.0 sec at 4096 sps
Job Number: 1

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

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 Long at 14:33:26 December 23, 2016
 Trigger Source Geo: 0.508 mm/s
 Range Geo: 127 mm/s
 Record Time 8.0 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 F710GOUR.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)

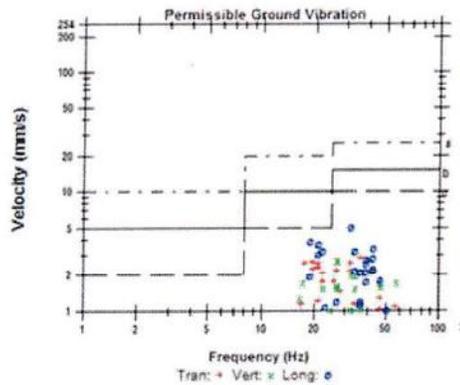
Extended Notes
 Blast vibration study at Mandhi and Hinauti Limestone Mines of Prism Cement Ltd.

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)

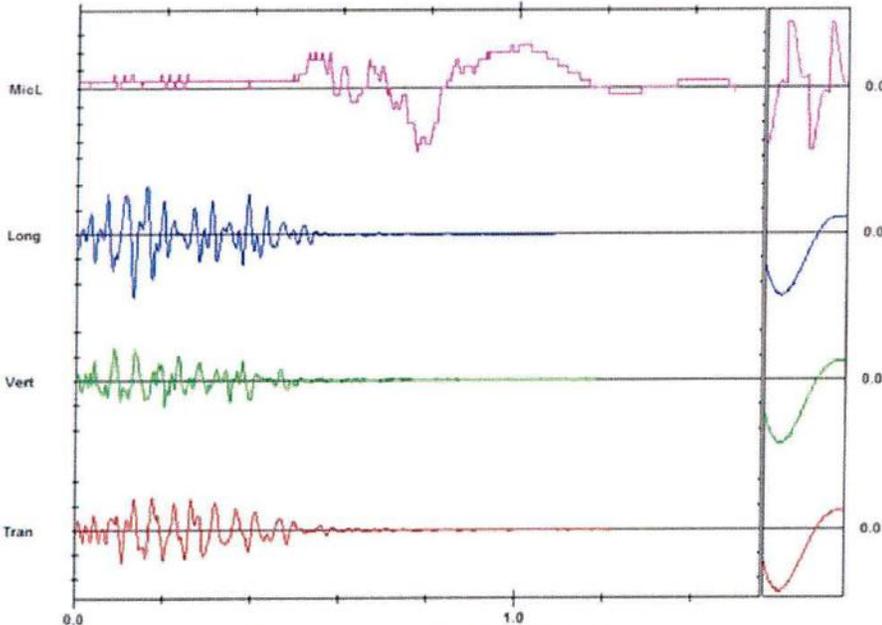
	Tran	Vert	Long	
PPV	2.79	2.67	5.14	mm/s
ZC Freq	27	27	32	Hz
Time (Rel to Trig)	0.110	0.089	0.130	sec
Peak Acceleration	0.0083	0.0795	0.108	g
Peak Displacement	0.0182	0.0157	0.0245	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.8	7.8	Hz
Overswing Ratio	3.4	3.4	3.7	

Peak Vector Sum 5.29 mm/s at 0.132 sec

DGMS India (A)



Tran: + Vert: x Long: e
 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

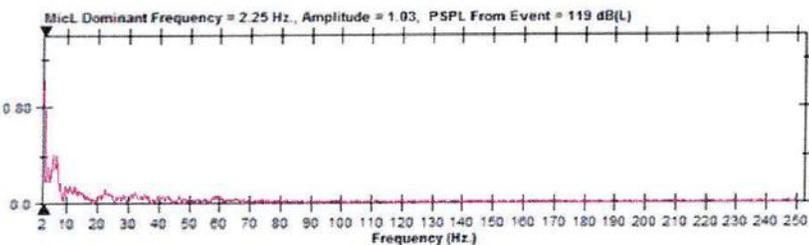
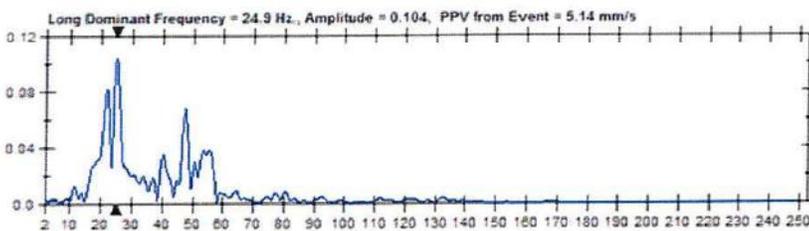
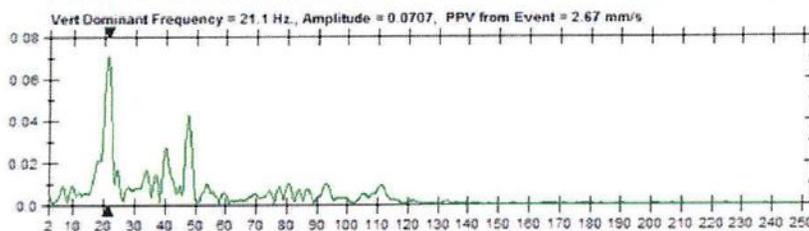
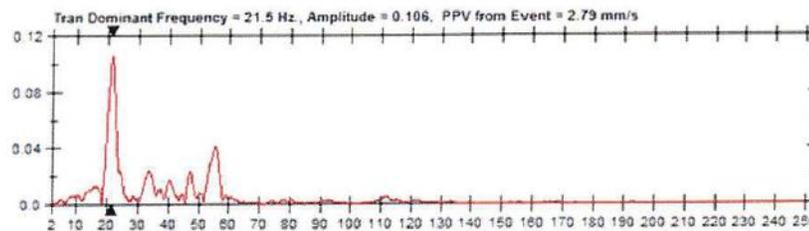


Date/Time Long at 14:33:26 December 23, 2016
Trigger Source Geo: 0.508 mm/s
Range Geo: 127 mm/s
Record Time 6.0 sec at 1024 sps

Serial Number 4710 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name F710GOUR 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.NKO

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

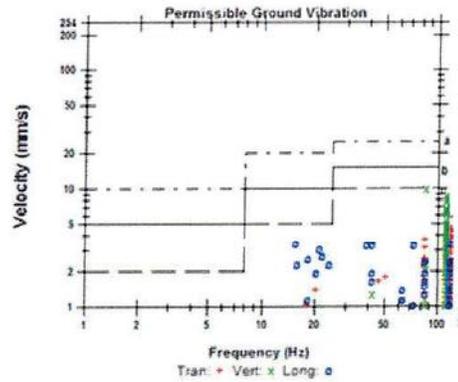
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd.

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)

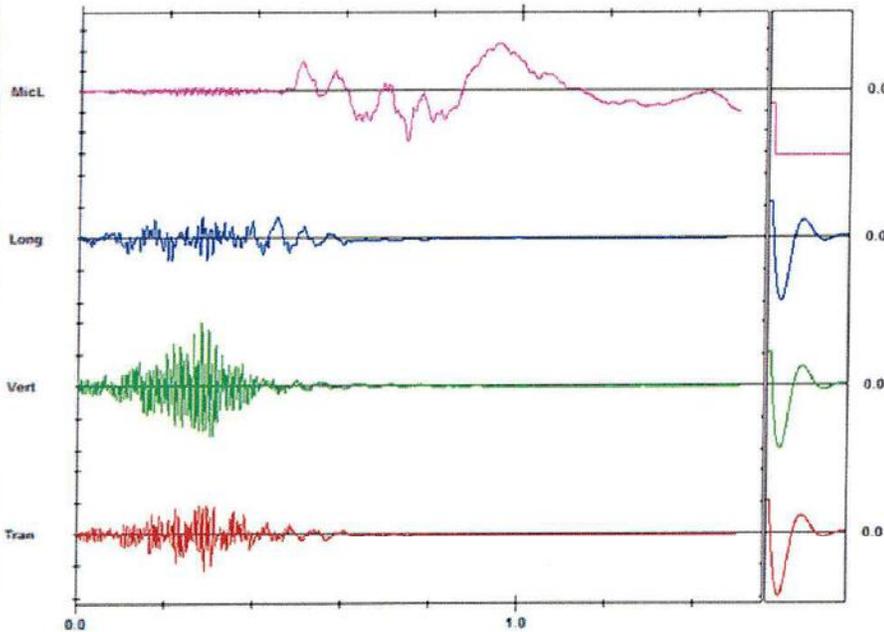
	Tran	Vert	Long	
PPV	5.71	9.91	3.43	mm/s
ZC Freq	>100	85	>100	Hz
Time (Rel. to Trig)	0.292	0.280	0.290	sec
Peak Acceleration	0.371	0.703	0.172	g
Peak Displacement	0.00893	0.0162	0.0326	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.6	Hz
Overswing Ratio	3.8	3.6	4.0	

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

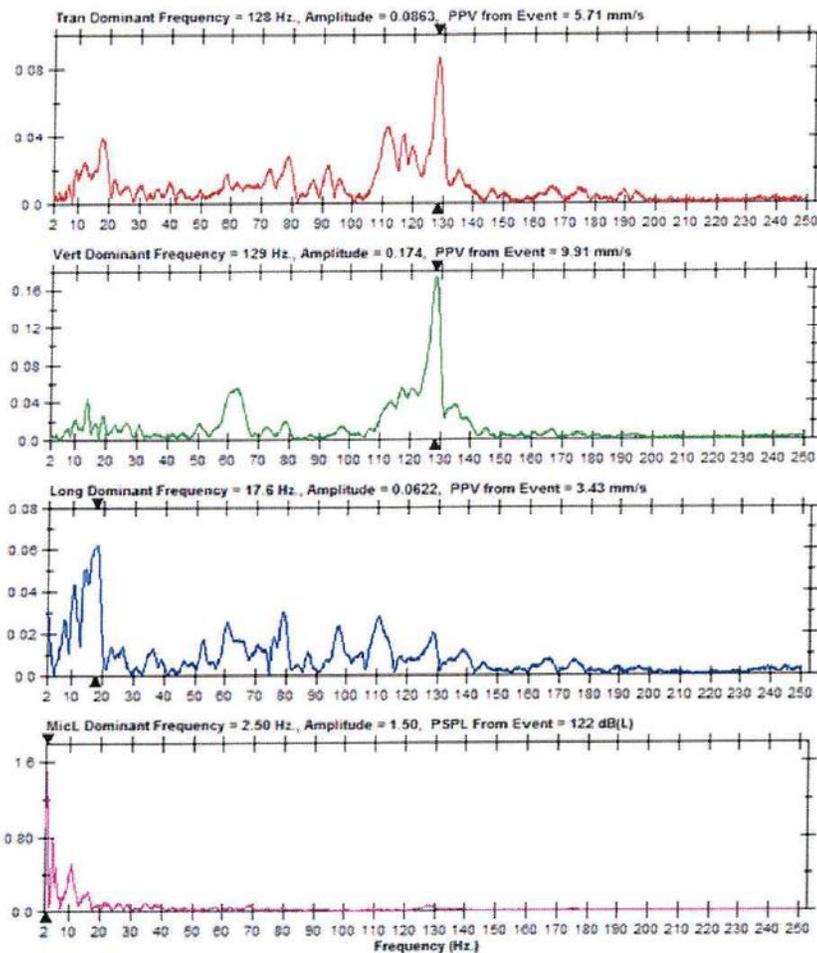


Date/Time Vert at 12:42:56 December 25, 2016
Trigger Source Geo 0.510 mm/s
Range Geo 254 mm/s
Record Time 6.0 sec at 1024 sps

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.HTO

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

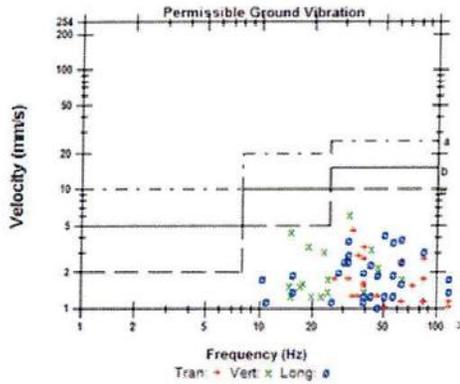
Extended Notes
 Blast vibration study at Mendhi and Hinauti Limestone Mines of Prism Cement Ltd

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

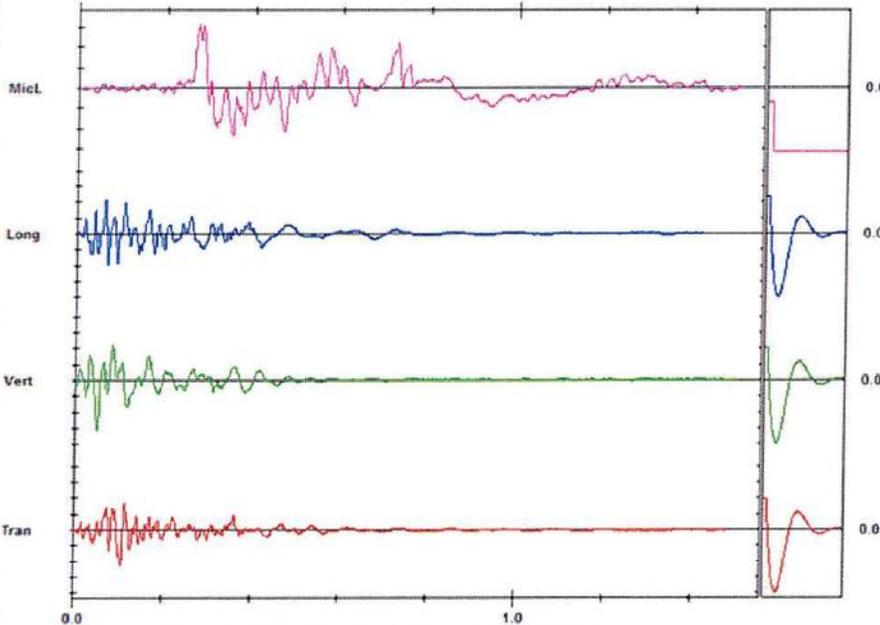
	Tran	Vert	Long	
PPV	4.57	6.10	4.19	mm/s
ZC Freq	34	32	51	Hz
Time (Rel. to Trig)	0.108	0.051	0.084	sec
Peak Acceleration	0.172	0.159	0.199	g
Peak Displacement	0.0203	0.0318	0.0198	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.6	Hz
Overswing Ratio	3.8	3.8	4.3	

Peak Vector Sum 6.86 mm/s at 0.051 sec

DGMS India (A)



Tran = Vert x Long
 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

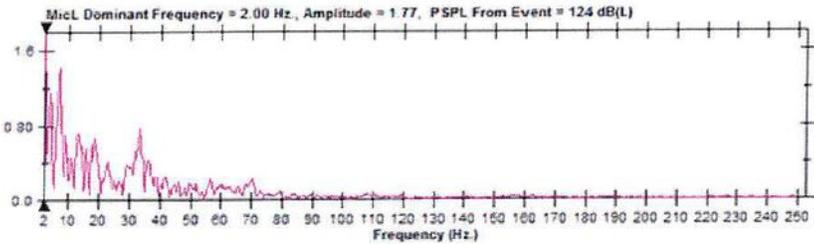
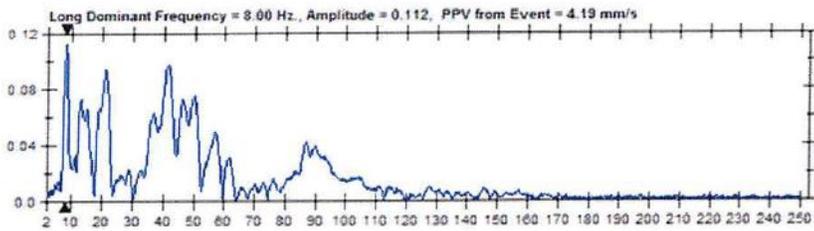
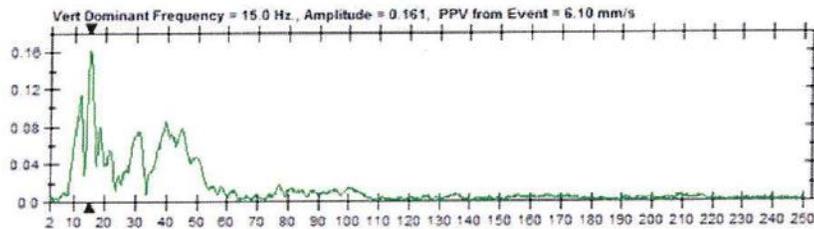
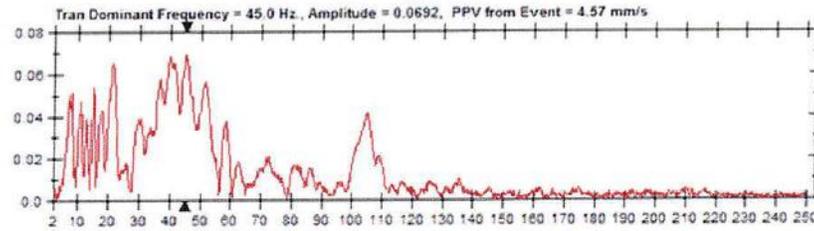


Date/Time Vert at 16:22:41 December 26, 2016
Trigger Source Geo: 0.510 mm/s
Range Geo: 254 mm/s
Record Time 3.0 sec at 1024 ips

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 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

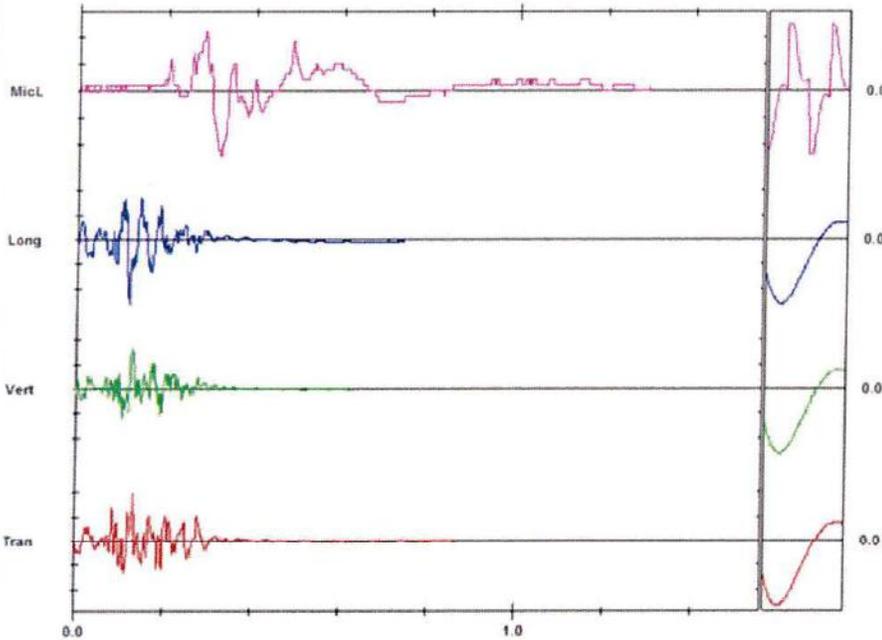
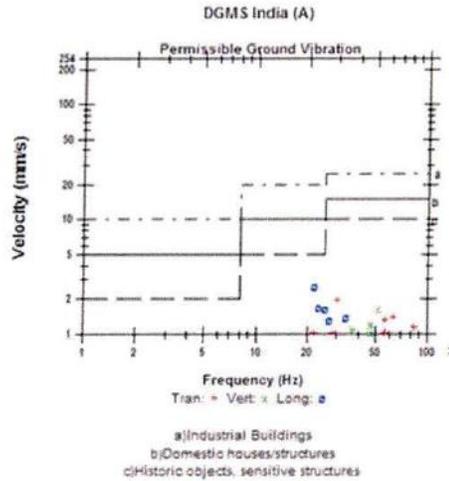
Notes
 Location: On ground surface
 Client: PRISM CEMENT LTD. SATNA.
 User Name: REE, CSIR-CIMFR, Dhanbad
 Converted: December 26, 2016 22:51:18 (V10.30)

Extended Notes
 Blast vibration study at Mendhi 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	1.66	2.60	mm/s
ZC Freq	30	51	22	Hz
Time (Rel. to Trig)	0.135	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



Sensor Check



FFT Report

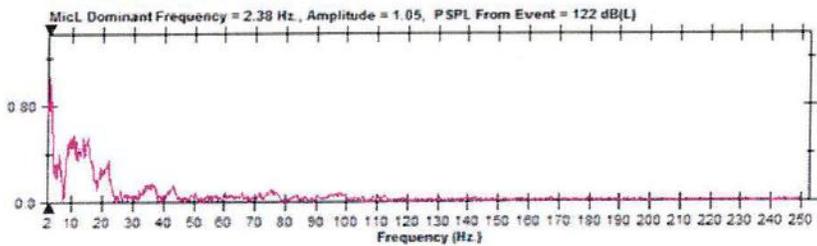
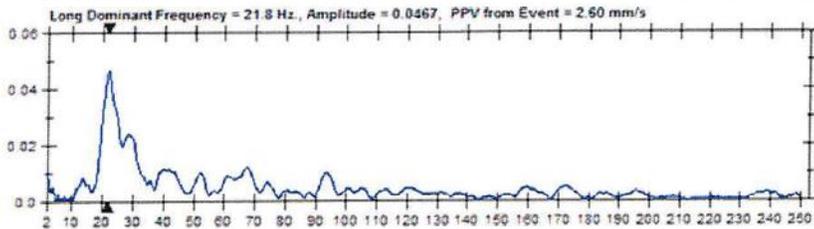
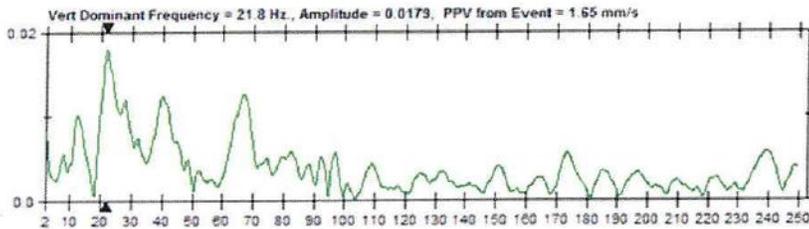
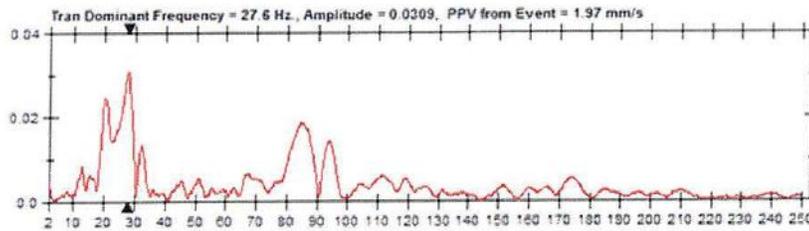


Date/Time Long at 16:39:31 December 26, 2016
Trigger Source Geo 0.508 mm/s
Range Geo 127 mm/s
Record Time 4.0 sec at 1024 sps

Serial Number 4710 V.2.B1 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 22:51:16 (V10.30)

Extended Notes
Blast vibration study at Mendhi and Hinauti 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 0814GOYM WK0

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

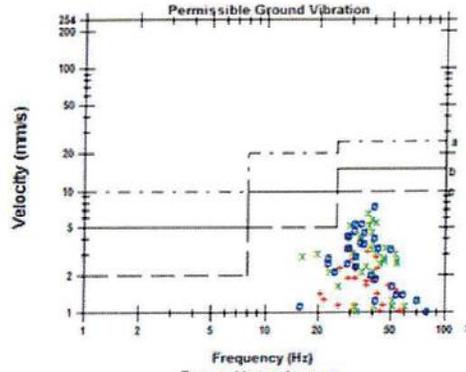
Extended Notes
 Blast vibration study at Mandhi and Hinadi Limestone Mines of Prism Cement Ltd.

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)

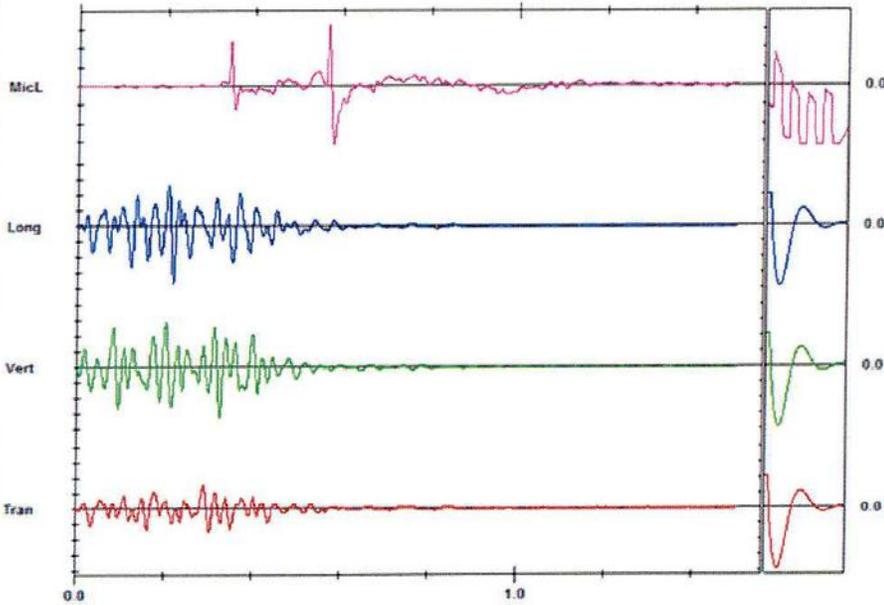
	Tran	Vert	Long	
PPV	3.17	6.60	7.62	mm/s
ZC Freq	31.0	37.2	40	Hz
Time (Rel. to Trig)	0.291	0.325	0.216	sec
Peak Acceleration	0.106	0.212	0.212	g
Peak Displacement	0.0156	0.0296	0.0292	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.3	Hz
Overswing Ratio	3.7	3.4	3.8	

Peak Vector Sum: 9.00 mm/s at 0.216 sec

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: 50.0 pa (L/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

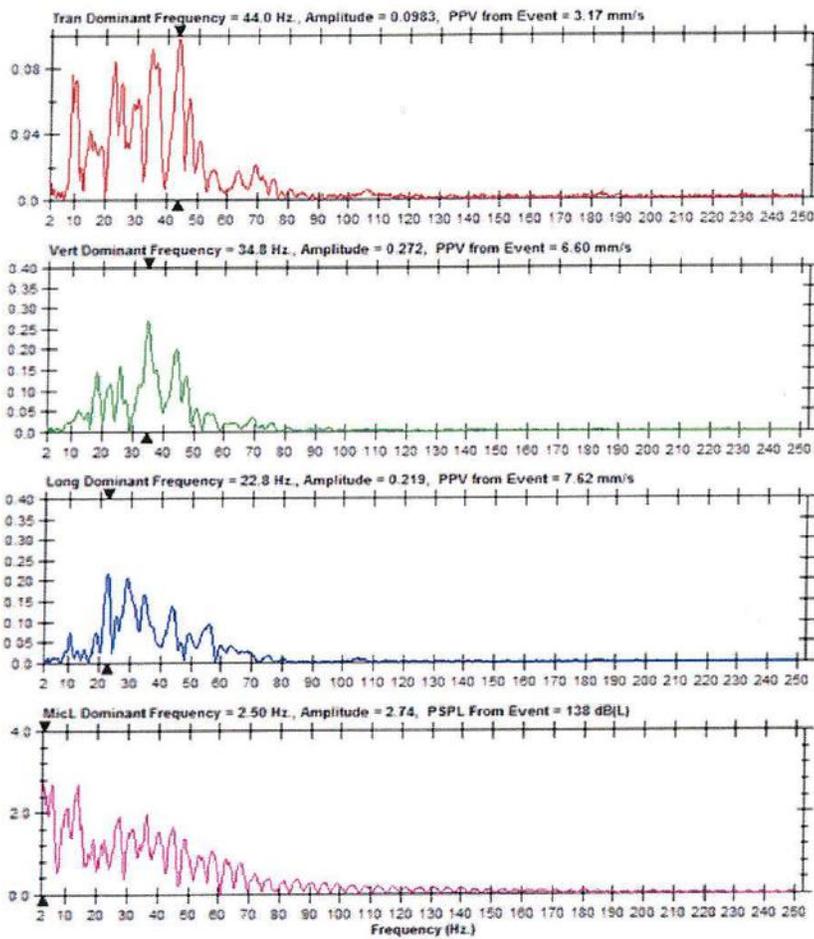
Serial Number BA13814 V 8 12-8 0 BlastMate III
Battery Level 6.2 Volts
Unit Calibration July 14, 2016 by CIMFR, Dhanbad
File Name C814GOYM.WK0

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 pointwise 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.

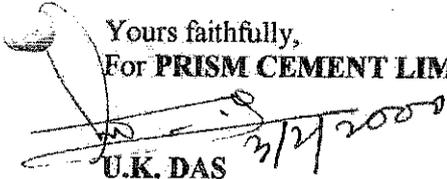
- h) Regular submission of reports for every 6 months about environmental compliance to Regional office:**

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
	Medical facilities		
	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

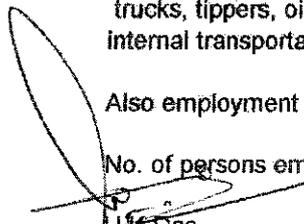
Sl.No	Particulars	Incurring
		2000-2001
1	General Development of Villages - for 4 villages namely Hinouti, Sijhata, Mankahari & Bamhori @ Rs. 50000/- each per annum to vill. Panchayats	200000
2	Welfare to needy villagers - exgratia	300000
3	Repairs incurred on village roads within 5 km range villages 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
	Total Rs.In Lakhs	1793989
		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

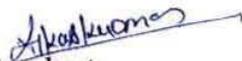
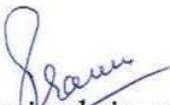
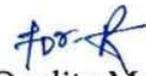
ecoMen
LABORATORIES PVT. LTD.FORMAT NO. ECO/QS/FORMAT/07 TEST REPORT NO:ECO LAB/WW3/03/19
TEST REPORT ISSUE DATE: 25.03.2019**TEST REPORT OF WASTE WATER***

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 : 12.03.2019
Date of Receiving : 14.03.2019
Date of Analysis : 14.03.2019 to 22.03.2019
Source of Sample : Mine Workshop after separate Treated Water

Sl. No.	TESTS	PROTOCOL	RESULT	Range of Testing / Limits of Detection	G.S.R 1265(E)
1	pH	APHA, 23 rd Ed. 2017, 4500H+ A+B	7.12	2-12	6.5-9.0
2	Total Suspended Solid as TSS (mg/l)	APHA, 23 rd Ed. 2017, 2540-D	18.5	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	6.1	5-10000	30.0
5	Chemical Oxygen Demand as COD (mg/l)	APHA, 23 rd Ed. 2017, 5220 A+C	36.0	5-50000	-
6.	Fecal Coliform (MPN/100 ml)	APHA, 23 rd Ed. 2017, A + E	Absent	-	<1000

*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