Dalmia cement

cement! sugar! refractories! power!

DCBL/ENV/MoEF&CC/ NARANDA MINES/EC/COMPL/112024/01 Date: 12.11.2024

To,
The Additional Principal Chief Conservator of Forests
Ministry of Environment, Forest & Climate Change,
Regional Office (West Central Zone), Ground Floor,
East Wing, New Secretariat Building, Civil Lines,
Nagpur - 440001.

Sub: Half Yearly Compliance of Environmental Clearance issued for our Naranda Limestone Mine (ML area 71.01 Ha and production of 2.4 MTPA) at village Naranda, in Korpana Mandal, in Chandrapur Distt., in Maharashtra for the period of April to September 2024

Ref: Environmental Clearance F. No. - J-11015/380/2007 -IA II (M), Date: 12.12.2008

Dear Sir,

With respect to the subject referred above, we are submitting herewith the point wise half yearly compliance of above referred Environmental Clearance for our Naranda Limestone Mines (ML Area-71.01 Ha) for the period of **April 2024 to September 2024.**

Submitted for your kind information and record please.

Thanking you,

Yours Faithfully,
For **Dalmia Cement (Bharat) Ltd.**
Naranda Limestone Mine

(Subbaraidu Ayyagari)
Unit Head

CC: **1. The Regional Director, Central Pollution Control Board (CPCB), Regional Office, Survey No, 110, Dhankude Multipurpose Hall, Baner Road, Baner, Pune, Maharashtra - 411045.**

2. The Member Secretary, Maharashtra Pollution Control Board, Kalpataru Point, 3rd and 4th floor, Opp. CineMax Theatre, Sion (E), Mumbai - 400 022.

3. Regional Officer, Maharashtra Pollution Control Board (MPCB), 1st Floor, Udyog Bhawan, Railway Station Road, Chandrapur – 442401.

Your (Half Yearly Compliance Report) has been Submitted with following details	
Proposal No	F. No. - J-11015/380/2007 -IA II (M)
Compliance ID	113052947
Compliance Number(For Tracking)	EC/M/COMPLIANCE/113052947/2024
Reporting Year	2024
Reporting Period	01 Dec(01 Apr - 30 Sep)
Submission Date	29-11-2024
RO/SRO Name	Dr Senthil Kumar Sampath
RO/SRO Email	agmu156@ifs.nic.in
State	MAHARASHTRA
RO/SRO Office Address	Integrated Regional Offices, Nagpur
Note:- SMS and E-Mail has been sent to Dr Senthil Kumar Sampath, MAHARASHTRA with Notification to Project Proponent.	

ENVIRONMENTAL CLEARANCE COMPLIANCE REPORT

Ref: Environmental Clearance F. No. - J-11015/380/2007 -IA II (M), Date: 12th Dec 2008

Name of the Industry: Naranda Limestone Mines, Dalmia Cement (Bharat) Limited.

EC Details – Environmental Clearance for Naranda Limestone Mine (ML area 71.01 Ha and production of 2.4 MTPA) at village Naranda, in Korpana Mandal, in Chandrapur Distt., in Maharashtra.

Compliance Period – April 2024 to September 2024

Sr. No.	Condition	Compliance status
A	**Specific Conditions**	
(i)	No two pits shall be simultaneously worked i.e. before the first is exhausted and reclamation work completed, no more mineral bearing area shall be worked.	Complying with Mining is being done in accordance with approved Review of Mining plan. At present, mine working is being operational in one pit only for excavation of mineral. Photograph of mine pit is shown as **Annexure-I.**
(ii)	After exhausting the first mine pit and before starting mining operations in the next pit, reclamation and plantation works in the exhausted pit shall be completed so as to ensure that reclamation, forest cover and vegetation are visible during the first year of mining operations in the next pit.	Complying with The first mine pit is operational and still active. Plantation has been done all along the Safety zone and Mines Lease Boundary. After taking whole material from the active pit, the exhausted pit area will be reclaimed by plantation so as to ensure that reclamation, forest cover and vegetation are visible during the first year of mining operations in the next pit. The condition is being adhered.
(iii)	Adequate buffer zone shall be maintained between two consecutive mineral bearing deposits.	Mining is being done in accordance with approved Review of Mining plan. At present, mine working is being operational in one pit only for excavation of mineral. 7.5m green belt is developed across the working pit.
(iv)	Primary survey data of flora and fauna shall be submitted to the ministry within six months.	Erstwhile MIL had submitted primary flora & fauna details obtained from Deputy Conservator of Forests, Central Chanda Division, Chandrapur with letter no. MIL/Mines/2009-10/503, dated 16.02.2010. Copy of submitted letter is enclosed as **Annexure-II.**
(v)	Conservative plan for wildlife shall be prepared in consultation with the office of the concerned chief	Earstwhile MIL had submitted primary flora & fauna details obtained from Deputy Conservator of Forests, Central Chanda Division, Chandrapur with our letter no.

Sr. No.	Condition	Compliance status
	wildlife warden within six months. The plan shall consist of inbuilt monitoring and evaluation mechanism. Necessary fund for implementation of the same shall be separately allocated and shall not be diverted for any other activity.	MIL/Mines/2009-10/503, dated 16.02.2010 and also informed to the MoEFCC as Conservation Plan for wildlife is not required as there is no Schedule I species in the study area based on the documents available. However, upon approval of NCLT for implementation of the Resolution Plan, MIL has become a subsidiary of DCBL from September 10, 2020.
(vi)	Blast vibrations study shall be conducted and submitted to the Ministry within six months. The study shall also provide measures for prevention of blasting associated impact on nearby houses and agricultural fields.	Complying with Mining is being done by controlled blasting technology. Use of Delay Detonator, Non-Electric detonator & Controlled blasting to minimize Fly rock and Ground Vibration. Regular monitoring of ground vibration is being practiced. Maximum peak particle velocity result is below 5 MM/Sec. We are adopting the measures for prevention of blasting associated impact on nearby houses and agricultural fields. The condition may be treated as complied. Latest Blast Vibration study has been done during Nov-2023 to Mar-2024 by Faculty of Engineering & Technology, AKS University, Satna, M. P. and study report is enclosed as **Annexure-III.**
(vii)	Continuous air ambient quality monitoring system shall be installed before three months of start of mining activity at appropriate sites (including cement plant) in consultation with the State Pollution Control Board / Regional office of central pollution control board. Ambient air quality data shall be regularly submitted to the Regional Office of the Ministry and other concerned departments. The ambient air quality monitoring shall be including PM10, regular analysis of silica content for PM10, shall be carried out. Assessment of silica in silt shall be regularly carried out and record maintained.	Complying with Online continuous ambient air quality monitoring station has been installed at mines premises and data is being transferred to the server of CPCB and MPCB. Photograph of CAAQMs station enclosed as **Annexure-IV.** Monthly ambient air quality monitoring report is being submitted to the concern authority i.e. MPCB on Monthly. We are regularly conducting ambient air quality monitoring including PM10 and PM2.5 through NABL accredited laboratory. Assessment of the silica in silt in being carried out and records are being maintained.
(viii)	Need based assessment for the nearby villages shall be conducted to study economic measures which help in upliftment of poor section of society. Income generating projects/ tools such as development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development	Complying with Need based assessment has been done in nearby villages by consulting local gram panchayat and nearby villagers to help in upliftment of poor section of society. Accordingly, DCBL providing employment opportunities to the personal residing nearby villages.

Sr. No.	Condition	Compliance status
	activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self-employment and jobs.	Under CSR activities, Infrastructure development, educational, Health and Vocational training, Agriculture & Animal Husbandry, Rainwater Harvesting, Environmental Awareness activities etc. are being organized for the nearby villagers. In addition to the above, mining project is being generated revenue to the government in the form of Royalty, DMF and NMET. Better medical facilities, transportation and communication facilities are available and the, better admixture of the culture which results in preservation of cultural heritage and this project will uplift socio-economic level. The mining projects provides directly and indirect employment for the nearby villagers. The literacy rate and better living standards is enhanced due to increased earning capacity of the villager. CSR expenditures from 2020-21 to 2024-25 (as on September 2024) is enclosed as **Annexure-V.**
(ix)	Action plan for economic upliftment of poor sections of societies specially tribals, scheduled caste shall be formulated and implemented within six months. Status of implementation shall be reported to the Regional Office of the Ministry and the State Govt.	Pursuant to approval of NCLT for implementation of the Resolution Plan, MIL has become a subsidiary of DCBL from September 10, 2020. The Naranda Limestone mine was abandoned from 2015 to Nov'21 and was reopened on 05.12.2021 by DCBL and commenced extraction of Limestone. However, all the expenses incurred before 05.12.2021 were done by MIL. The details of the expenditures are not available. However, all the expenditures spend after acquiring MIL by DCBL. About, Rs. 112.4 lakhs have been spent on the social-economic development in nearby villages. Details of Implementation of Public hearing Action plan is enclosed herewith as **Annexure-VI.**
(x)	Land use pattern of the nearby villages shall be studied and action plan for abatement and compensation for damage to agricultural produce and land/ common property land (if any) in the nearby villages, due to mining activity shall be submitted to the Regional office of the Ministry within six months. Annual status of implementation of plan and expenditure thereon	No agricultural land/public property is being damaged due to mining activity. Land use pattern of the nearby villages is enclosed as **Annexure-VII.**

Sr. No.	Condition	Compliance status
	shall be reported to the Regional Office of the Ministry from time to time.	
(xi)	Rain water harvesting shall be undertaken to recharge the ground water source. Status of implementation shall be submitted to the Regional Office of the Ministry within six months and thereafter every year from the next consequent year.	Complying with Rain water is being collected during rainy season in the lower bench of the mine to recharge ground water resources and water harvested in mines pit is being utilized in the mining operations, dust suppression and Plantation & greenbelt development. Rainwater Harvesting injection wells are constructed to recharge the ground water, in addition to this nearby village ponds are deepened to store more rainwater and also recharge the ground water to enhance the water table. Photographs of rain Water Harvesting structures and village pond is enclosed as **Annexure-VIII.**
(xii)	Measures for prevention and control of soil erosion and management of silt shall be undertaken. Protection of dumps against erosion shall be carried out with geo textile matting or other suitable material, and thick plantation of native trees and shrubs shall be carried out at the dump slopes. Dumps shall be protected by retaining walls.	Following measure are being implemented followed to control the soil erosion and for silt management: 1. Formation of water garland to regulate and drain the rain waters from the quarry and direct its course away from the dumping area. 2. The dump is designed to have reserve slopes so that rain water does not flow through the dump slopes. 3. Provision of plantation around the foot of the dumps to control the soil erosion and silt management.
(xiii)	Cultivable waste land within 5 km radius of the lease shall be identified and developed into productive land and made available to villages. Status of implementation shall be submitted to the Regional office of the Ministry within six months.	Complying with The cultivable waste land within 5 km radius of the lease is identified and developed into productive land and made available to villages.
(xiv)	Trenches / garland drains shall be constructed at foot of dumps and coco filters (or other suitable filters) shall be installed at regular intervals to arrest silt from being carried to water bodies. Adequate no of check dams and gully plugs shall be constructed across seasonal / perennial nallahs (if any) flowing through the ML area and silts arrested. De-silting at regular intervals shall be carried out. Garland drain of appropriate size, gradient and length shall also be constructed for both mine pit and for	Complying with Garland drains constructed along the waste dumps to collect run off/storm water and routed to siltation pond of Capacity 1000 m3 then collected in mine pit. In addition to this, adequate number of check dams has been constructed at mines premises to arrest the silt. The collected water is being used for plantation & greenbelt development and water sprinkling on haul road. Photographs showing Garland drains & are shown below:

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance status</th></tr>
<tr><td></td><td>waste dump. Sump capacity shall be designated keeping 50% safety margin over and above peak sudden rainfall (based on 50-year data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and de-silted at regular intervals.</td><td>   </td></tr>
<tr><td>(xv)</td><td>Ground water in the core zone shall be regularly monitored for contamination and depletion due to mining activity and records maintained. The monitoring data shall be submitted to the regional office of the ministry regularly. Further, monitoring points shall be located between the mine and drainage in the direction of flow of ground water shall be set up and record maintained</td><td>Regular monitoring of ground water in the core zone is being carried out in and around the mining area through online Piezometer and records are being maintained. Third Party Environmental monitoring is being carried out by M/s Go Green Mechanism Pvt Ltd who is NABL accredited laboratory. Photographs of Piezometer is enclosed as Annexure-IX.</td></tr>
<tr><td>(xvi)</td><td>Fugitive dust generation shall be controlled. Fugitive dust emission shall be regularly monitored at locations of nearest human habitation (including schools and other public amenities located nearest to sources of dust generation as applicable) and records submitted to the Regional Office of the Ministry.</td><td>Water tankers provided for water sprinkling on haul roads for the dust suppression during mines operation. Fugitive Dust Emission Monitoring is being done in nearby area and reports are being submitted to Regional Office, MoEF&CC along with the half yearly compliance report & latest fugitive emission report is enclosed
Fugitive Dust Emission Monitoring reports during the compliance period is as follows:
<table>
<tr><th>Month</th><th>Near Batching Area</th><th>Near Pump House Area</th><th>Near Crusher Area</th></tr>
<tr><td>April-24</td><td>298</td><td>336</td><td>319</td></tr>
<tr><td>May-24</td><td>247</td><td>328</td><td>311</td></tr>
<tr><td>June-24</td><td>225</td><td>312</td><td>298</td></tr>
<tr><td>July-24</td><td>246</td><td>235</td><td>288</td></tr>
<tr><td>August-24</td><td>245</td><td>234</td><td>273</td></tr>
<tr><td>September-24</td><td>279</td><td>222</td><td>230</td></tr>
</table></td></tr>
<tr><td>(xvii)</td><td>Transportation of ore shall be done by covering the</td><td>The stipulation is being adhered. The limestone of the mines is being utilized in the</td></tr>
</table>

Sr. No.	Condition	Compliance status
	trucks with tarpaulin or other suitable mechanism so that no spillage of ore/dust takes place. Transportation shall be done only during day time.	captive cement plant located near the mines area. The material is being transported from crusher to plant through covered conveyer belt to avoid any spillage of ore/ dust. Transportation done usually during day time.
(xviii)	Occupational health and safety measures for the workers including identification of work related health hazardous, training of malaria eradication, HIV and health effects on exposure to mineral dust etc. shall be carried out. The company shall engage a full time a fulltime qualified doctor who is trained in occupational health. Periodic monitoring for exposure to respirable mineral dust on the workers shall be conducted and records maintained including health records of the workers. Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipment etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval of five years of less) shall be conducted followed blow up action wherever required.	As per the mining statutory laws regular periodic medical check-ups for the persons engaged in the mines is being done. Moreover, we are imparting free medical treatment at free of cost by the company and dispensary is established at the plant site with medical practitioner. Company ambulance is available to shift the casualty in case of serious condition. For occupational health and safety measures periodical health check up being carried out by medical practitioner. Personal protective Equipment's are being provided to works working in the mines.
(xix)	Maintenance of village roads through which transportation of ores are undertaken shall be carried out by the company regularly at its own expenses. The road shall be black topped.	The condition is treated as complied. Village Road is not being used for transportation of minerals. Haul road has been constructed in mines for mines operation and being repaired time to time as per requirement.
(xx)	Top soil/ soil waste shall be stacked properly and separately with proper slope and adequate safeguards and shall be utilized for backfilling (wherever applicable) for reclamation and rehabilitation of mined out area.	Top soil is being stacked with proper slope and adequate safeguards. The topsoil in the mining area striped and preserved along the mine lease boundary for plantation & greenbelt development and excess topsoil utilized for backfilling and reclamation of mined out area.
(xxi)	Monitoring of soil samples for assessment of contamination due to mining activity shall be regularly conducted and records maintained.	Soil Monitoring is being done regularly are records are maintained. Latest Soil Report is enclosed as **Annexure-X.**
(xxii)	Over burden (OB) shall be stacked at earmarked dump site(s) only and not be kept active for long period. The maximum height of the dump shall not exceed 30 m, each stage shall preferably be of 10m and overall slope	The NCLT, Mumbai approved the Resolution Plan of Dalmia Cement (Bharat) Limited (the Resolution Applicant) for the revival of MIL vide its Order(s) dated July 03, 2019, and July 22, 2019, and the same has been upheld by National Company Law Appellate

<table>
<tr><th>Sr. No.</th><th>Condition</th><th>Compliance status</th></tr>
<tr><td></td><td>of the dump shall not exceed 28°. The OB dump shall be backfilled. The OB dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. Monitoring and management of rehabilitation areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests of six-monthly basis.</td><td>Tribunal ("NCLAT) vide its judgement dated January 27, 2020.

The Naranda Limestone mine was abandoned from 2015 to Nov 21 and was reopened on 05.12.2021 and commenced extraction of Limestone by DCBL.

Overburden has been stacked at earmarked dump site (s) which are still active and not mature. Study of reclamation of overburden dump will be carried out in near future and will be submitted in due course of time.

The Over burden (OB) generated during mines operation is being and will be stacked at earmarked dump site(s) as per the IBM approved mining plan. The OB dumps will be vegetated scientifically with suitable native species to prevent erosion and surface run off.

Continuous monitoring and management of rehabilitation areas is being and will be done to maintain the vegetation to make itself – sustaining. Compliance status of the same is being submitted to the MoEF&CC on half yearly basis.

The limestone production, reject and over burden generation details during last 5-year period is given below

<table>
<tr><th>SN</th><th>FY Year</th><th>Production (MT)</th><th>Over Burden (MT)</th><th>Reject (MT)</th></tr>
<tr><td>1</td><td>2018-19</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>2</td><td>2019-20</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>3</td><td>2020-21</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>4</td><td>2021-22</td><td>314200</td><td>8083</td><td>137307</td></tr>
<tr><td>5</td><td>2022-23</td><td>1038212</td><td>8390</td><td>482082</td></tr>
<tr><td>6</td><td>2023-24</td><td>1273946</td><td>114281</td><td>755402</td></tr>
<tr><td>7</td><td>2024-25</td><td>641729</td><td>19600</td><td>244259</td></tr>
<tr><td></td><td>Total</td><td>3268087</td><td>150354</td><td>1619050</td></tr>
</table>
Photographs of OB dump and garland drains are enclosed as Annexure-XI.</td></tr>
</table>

Sr. No.	Condition	Compliance status
(xxiii)	Slope of the mining bench and ultimate pit limit shall be as per the mining scheme approved by Indian Bureau of Mines.	Complying with Slope of the mining bench and ultimate pit limit is being maintained as per IBM approved mining plan. Photograph showing slope of mining benches is given below: 
(xxiv)	Drilling (if any) shall be conducted by using dust extractors/ wet drilling. Controlled blasting shall be undertaken.	The drilling and blasting operation are being carried out during daytime only. We are using wet drilling by inbuilt water injection system for drills to suppress dust generation at source. Blasting operation is being done with controlled blasting technique by using NONEL, Muffle Blasting and Delay Detonators. Hence, the condition may be treated as complied.
(xxv)	Plantation shall be raised adequately in the ML area, haul roads, OB dump sites etc. Green belt development shall be carried out considering CPCB guidelines including selection of plant species and in consultation with the local DFO / Agricultural department. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. The density of the trees shall be around 2500 plants per ha. The company shall involve local people with the help of self-help group for plantation programme. Details of year wise afforestation programme including rehabilitation of mined out area shall be submitted to the Regional Office of the Ministry every year.	Plantation is being carried out in ML area as per the Mining Plan and CPCB guidelines. Out of 71.01 ha of ML area, 42.82 ha area will be covered under plantation & greenbelt development at the end of conceptual period. At present, greenbelt & plantation has been done in 9.30 ha with plant species of 11476 nos. We have done the plantation along the mining lease boundary, internal road and mining dump area etc. Further plantation is under progress. Plantation details along with the photographs of the Green belt at Mines are enclosed as **Annexure – XII.**

Sr. No.	Condition	Compliance status
(xxvi)	Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year – pre – monsoon (April-May), monsoon (August), Post – monsoon (November) and winter (January) and the data thus collected shall be regularly shall be regularly sent to MoEF, Central Ground Water Authority and Regional Director, Central Ground Water Board.	Complying with Regular monitoring of ground water level is being conducted in and around mining lease area. Installed one piezometer for continuous online ground water level monitoring in ML area. However, one piezometer installed at Plant which is adjacent to the ML boundary. Photographs of Piezometer & ground water level monitoring data is enclosed as **Annexure-IX.** Ground water quality monitoring is being carried out for pre and post monsoon, monsoon and winter seasons. Report enclosed as **Annexure-XIII.**
(xxvii)	The waste water from the mine shall be treated to conform to the prescribed standards before discharging in to the natural stream. The discharged water from the Tailing Dam (if any) shall be regularly monitored and report submitted to the Ministry of Environmental & Forests, Central Pollution Control Board and the State Pollution Control Board.	No waste water is being discharged into natural stream. All the equipment and HEMM are outsourced and maintenance, repairing is being done at designated workshop only. Domestic sewage generated is being disposed through septic tank followed by soak pit.
(xxviii)	Prior permission from the competent authority shall be obtained for extraction of ground water, if any.	Water requirement of 131 KLD is being met from Penganga River for which an agreement has been executed between Dalmia Cement (Bharat) Limited and Irrigation department. Copy of agreement is enclosed herewith. **Annexure- XIV.** Prior permission from the competent authority (CGWA) has been obtained for extraction (dewatering) of ground water (46 KLD) vide NOC No. CGWA/NOC/MIN/ORIG /2022/14242 Dated 05.01.2022. Application for renewal has been submitted on 04.01.2024.
(xxix)	Vehicular emission shall be kept under control and regularly monitored. Vehicles used for transportation of ores and others shall have valid permission as prescribed under Central Motor Vehicle Rules, 1989 and its amendments. Transportation of ore shall be done only during day time. The vehicles transporting ores shall be covered with a tarpaulin or other suitable enclosures so that no dust particles / fine matters escape during the course of transportation. No overloading of ores for transportation shall be	Complying with Vehicular emission being under control and regularly monitored and being allowed only PUC certified vehicles in ML area for mining excavation activities and transportation. Limestone is being transported from crusher to plant through covered conveyer belt. All Vehicles transporting ore is being covered with tarpaulin to control dust emission. No overloading of ores is done for mineral transportation. No wild life sanctuary is located near ML area of Naranda Limestone Mine.

Sr. No.	Condition	Compliance status
	committed. The trucks transporting ore shall not pass through wild life sanctuary.	
(xxx)	Action plan with respect to suggestions/ improvements and recommendation made during pubic consultation / hearing shall be submitted to the Ministry and the State Govt. within six months.	Pursuant to approval of NCLT for implementation of the Resolution Plan, MIL has become a subsidiary of DCBL from September 10, 2020. The Naranda Limestone mine was abandoned from 2015 to Nov'21 and was reopened on 05.12.2021 by DCBL and commenced extraction of Limestone. However, all the expenses incurred before 05.12.2021 were done by MIL. The details of the expenditures are not available. However, all the expenditures spend after acquiring MIL by DCBL About, Rs. 112.4 lakhs have been spent on the social-economic development in nearby villages. Details of Implementation of Public hearing Action plan is enclosed herewith as **Annexure-VI.**
(xxxi)	A final mine closure plan, along with details of Corpus Fund, shall be submitted to the Ministry of Environmental & Forest, 5 year in advance of final mine closure for approval.	Noted Final Mine Closure Plan (FMCP) will be submitted to IBM and MoEF&CC as per prevailing rules for necessary approval. As our Mining Lease is valid up to dated period up to 06-04-2036.
B.	**General Condition**	
(i)	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment & Forests.	The stipulation is being adhered and there is no change in mining technology and scope of working as the mining is being done in accordance with approved Review of Mining Plan and there is no change in mining technology and scope of working. For any change in mining technology and scope of working we shall obtain prior approval of the Ministry of Environment & Forests.
(ii)	No change in the calendar plan including excavation, quantum of mineral (iron ore) and waste shall be made.	Noted There is no change in the Calendar Plan for the production of Quantum of Mineral Limestone and Waste. However, less production of limestone as per Calendar plan due to less demand of cement in market.
(iii)	Four ambient air quality monitoring station shall be established in the core zone as well as in the buffer zone for RPM, SPM, SO2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographic features and environmentally and ecologically sensitive target and frequency of monitoring should be undertaken in	Complying with Ambient air quality monitoring stations are established in the core zone as well as in the buffer zone. Summary of ambient air quality monitoring results for core zone & buffer zone is enclosed as **Annexure-XV.**

Sr. No.	Condition	Compliance status
	consultation with the State Pollution Control Board.	
(iv)	Data on ambient air quality (RPM, SPM, SO2, NOx) should be regularly submitted to the ministry including its regional office located at Bhopal and the State Pollution Control Board / Central Pollution Control Board once in six months.	Ambient Air Quality Monitoring carried out through NABL accredited laboratory, data is being submitted to the IRO, MoEF&CC, Nagpur and MPCB along with the half yearly compliance report.
(v)	Fugitive dust emissions from all the sources shall be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained.	Complying With Fugitive dust emissions from all the sources are controlled i.e. Limestone Crusher attached with bag filters, Blast hole drilling is practiced by wet method, regular water spraying on haul roads, trucks covered with tarpaulin cover, on mineral heaps while loading, at crusher hopper and at conveyor transfer points etc. blasting is carried during non-windy times.
(vi)	Measures shall be taken for control of noise levels below 85 dB(A) in the work environment. Workers engaged in operations of HEMM, etc. shall be provided with ear plugs / muffs.	Complying with. Noise levels are monitored and maintained within the prescribed limit of 85 dB(A). Personnel protective equipment like ear plugs/muffs is provided to all workers engaged in mining operations.
(vii)	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	No industrial waste water is being generated due to mining activity. All the equipment and HEMM are outsourced and maintenance & repairing work is being done at designated workshop only.
(viii)	Personnel working in dusty areas shall be provided with protective respiratory devices and they shall also be imparted adequate training and information on safety and health aspects.	Complying with. PPEs have been provided and used by the persons engaged in drilling, dozing and loading and unloading operation to protect workers from respiratory illness and other hazards. Vocational Training (VT) is being provided as under required VT Rules 1966 to impart regular safety and awareness training. Regular check-up of workers is being carried out and till date no any abnormality is observed.

Sr. No.	Condition	Compliance status
		 
(ix)	Provision shall be made for the housing the labourers within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health, crèche etc. the housing may be in the form of temporary structures to be removed after the completion of the project.	Local labors (residing in nearby village) engaged for mining and allied operation are. All other outside workers are being accommodated in Temporary Labour colony with all necessary infrastructure and facilities.  Established OHS centre to facilitate medical health check-up of workers engaged in mining operation.
(x)	A separate Environmental Management Cell with suitable qualified personnel shall be set-up under the control of a Senior Executive, who will report directly to the head of the Organisation.	Complying with A separate environmental management cell comprising of qualified and experienced staff is established under the control of Environment Head who report to Unit head.
(xi)	The project authorities shall inform to the Regional Office of the Ministry located at Bhopal regarding data	Complying with

Sr. No.	Condition	Compliance status
	of financial closure and final approval of the project by the concerned authorities and the date of start of land development work.	This is an existing and ongoing limestone mining project.
(xii)	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry and its Regional Office located at Bhopal.	Expenditure towards environmental protection is being submitted in six monthly compliance report. Fund earmarked for environmental protection measures is being and will be kept in separate account. Year wise expenditure towards environmental protection is enclosed as **Annexure-XVI.**
(xiii)	The project authorities shall inform to the Regional Office located at Bhopal regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work	Complying with This is an existing and ongoing limestone mining project.
(xiv)	The regional office of the Ministry located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities shall extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data/ information / monitoring reports.	Complying with Already in the practice and will continue in future also to comply all the conditions as advised by the authority.
(xv)	A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any from whom suggestion / representation has been received while processing the proposal.	Complying with No suggestion / representation received against EC.
(xvi)	State pollution control board shall display a copy of the clearance letter at the Regional office. District industry Centre and Collector's office / Tehsildar's Office for 30 days.	Complying with
(xvii)	The project authorities shall advertise at least in two local newspapers widely circulated. One of which shall be in the vernacular language of the locality concerned within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a	Complying with Advertisement was published in Two newspapers and copies were submitted to MOEF&CC, New Delhi and their regional office at Bhopal.

Sr. No.	Condition	Compliance status
	copy of the same shall be forwarded to the Regional Office of the Ministry located in Bhopal.	
5.	The ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environmental protection.	Noted.
6.	Concealing factual data or submission of false / fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environmental (Protection) Act, 1986.	Noted.
7.	Any appeal against this environmental clearance shall lie with the National Environmental Appellate Authority, if preferred, within a period of 30 days as prescribed under section 11 of the National Environmental Appellate Authority Act, 1997.	Noted.
8.	The above conditions will be enforced inter – alia, under the provision of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environmental (Protection) Act, 1986 and the Public Liability Insurance Act. 1991 along with their amendments and rules.	Noted.

ANNEXURE-I
PHOTOGRAPH OF MINE PIT

Annexure-II

MURLI INDUSTRIES LTD.

MURLI

Ref: MIL/MINES/2009-2010/503
16TH February 2010

To,
Director
Ministry of Environment & Forest
Paryavaran Bhavan,
C.G.O. Complex, Lodhi Road,
New Delhi – 11 0003

Sub: Specific Conditions no. (iv) & (v) of MoEF letter for Environment Clearance in respect of Naranda Limestone Mine(71.01ha).

Dear Sir,

This has reference to your letter No. **J-11015/380/2007-IA,II(M) Dt. 12.12.2008** of Environment Clearance, accorded by your good self for **Naranda Limestone Mine(71.01ha)** of M/s Murli Industries (Cement Unit) for limestone production of 2.40MTPA in Taluka-Korpana, District-Chandrapur (Maharashtra).

It is revealed in part of specific conditions (condition no. A-iv&v) to submit primary survey data on flora & fauna & Conservation Plan for wildlife. In this context, we are submitting the primary data on flora & fauna given by the Dy.Conservator of Forests, Central Chanda Division, District- Chandrapur as **Annexure-I** for your kind perusal.

Conservation Plan for wildlife is not required as there is no wildlife involved as per Schedule I & II of Forest act.

Thanking You.

Yours faithfully,
For Murli Industries Ltd.
(Cement Unit)

(**Manoj Kumar Thakur**)
Agent / Dy. GM(Mines)

CC: The Regional Controller of Mines(CZ), Indian Bureau of Mines, Nagpur(Mah.)

Cement Unit : 'Radha House', Near Gajanan Temple, Bapat Nagar, Chandrapur - 442 401, India
Ph. : +91 7172 260122, 253921, Fax : +91 7172 250402, E-mail : cement@murliindustries.com

Corporate Office : 'Radha House', 239 East Wardhaman Nagar, Nagpur - 440 008, India. Ph.: +91 712 2683000, Fax : + 91 712 2684422
E-mail : info@murliindustries.com ▲ Website : www.murliindustries.com

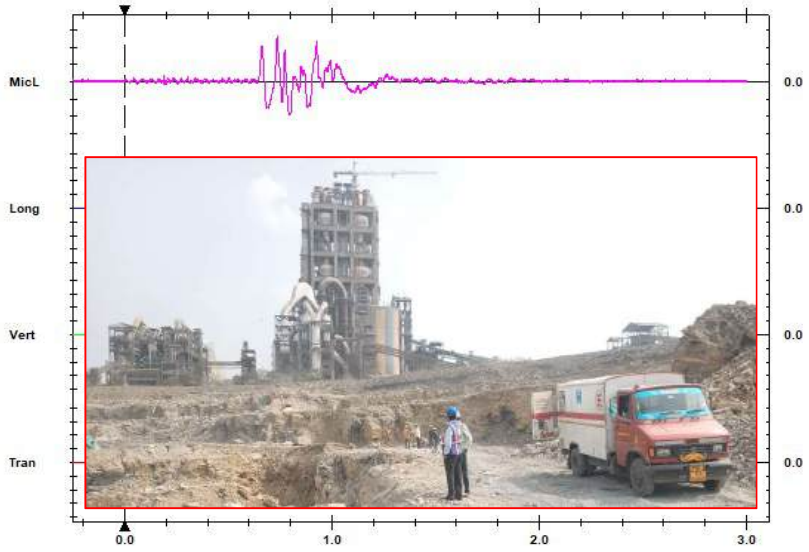
Confidential

Report on

Scientific Study for
Blast Vibration Analysis & Controlled blasting
of
NARANDA LIMESTONE MINE
M/s Dalmia Cement (Bharat) Limited

Village- Naranda, Tehsil & P.O. – Korpana, Dist- Chandrapur (M.H.)

(Work order No- 454001354/481 Dated- 08.11.2023)



Department of Mining Engineering

Faculty of Engineering & Technology

AKS University, Satna, M. P.

November- March, 2023-24

University established by M.P. legislature Act No. 44/2011 and duly recognized by UGC u/s 2(f).

AKS University, Satna

Sherganj, Panna Road, Satna (M.P.) Pin code 485001
Telephone No.: 0888-953-7776 Website: www.aksuniversity.ac.in

ACKNOWLEDGEMENT

Mine Management of Naranda Limestone Mine, of M/s Dalmia Bharat (Cement) Limited situated in Village- Naranda, Tehsil & P.O. – Korpana, Dist- Chandrapur (M.H.) had entrusted us to undertake Scientific Study for Blast Vibration Analysis & Controlled blasting. The Mine is situated near to village habitation area and the distance of nearest village house/structure is approx. 150m from lease boundary. due to proposed development towards village the impact of blasting to the structure situated near to lease boundary, Mine Management decided to undertake blasting more scientifically and site specific to reduce the impact of blasting and to ensure safety and minimum damage to the nearest structure. During the study, we made geological and geotechnical investigations. This entire deposit is a complex geological set up, with incidence of intercalations in the ore body, presence of folds and faults prominently. During our study we received full cooperation from all the field supervisors and from entire blasting crew in addition to valuable input from –

1. Shri Subba Raidu Ayyagari, Agent Mines
2. Shri Ashish Kulkarni, HOD- Mines
3. Shri Jai Sachdeva, Manager-Mines
4. Shri Shrikant Mandalwar, Asst. Manager- Mines
5. Shri Pankaj Gautam, Asst Manager- D&B
6. Shri Pradeep Singh, Foreman- D&B

This study was undertaken by our team comprising of -

1. Dr G.K. Pradhan, Prof. of Mining Engineering,
2. Shri Naman Soni, Project Associate (Mining)
3. Shri Atul Deep Soni, Asst. Professor

Prof G.K. Pradhan
Recipient of National Geosciences Award
PI/Professor of Mining Engineering &
Dean Faculty of Mining Engineering
Email: gkpradhan58@gmail.com

Table of Contents-

Particulars **Page No.**

List of Figures-

List of Tables-

INTRODUCTION-

Dalmia Bharat Group is a pioneer in the cement manufacturing for over eight decades since 1939. Dalmia Cement (Bharat) Limited (DCBL) is the 4th largest listed Indian Cement Company having strong presence in Southern, Eastern & North-East region of the country. The company operates a manufacturing capacity of 44.6 million tonnes per annum (MTPA), across 15 cement plants and grinding units, spread across nine states. With an expanding India footprint, the company is a category leader in all kinds of cement including super-specialty cements used for oil well, railway sleepers and air strips. Currently DCBL has Cement plants in Tamil Nadu (Dalmiapuram, Ariyalur & Sattur), Andhra Pradesh (Kadapa), Meghalaya (Thangskai) Karnataka (Belgaum), Jharkhand (Bokaro), Assam (Morigaon, Umrangso & Lanka), Odisha (Rajgangpur & Kapilas), Bihar (Kalyanpur), West Bengal (Medinipur) and Maharashtra (Chandrapur).

Chandrapur Cement Works:

Integrated cement plant of the M/s Chandrapur cement works (CCW) is located at village – Naranda, Tehsil – Korpana, Dist- Chandrapur- Maharashtra with the production capacity of Clinker 2 MTPA, Cement 2.86 MTPA (OPC & PPC), WHRB 16 MW and CPP 33 MW (2x16.5 MW) along with DG sets Capacity of 2x1500 KVA & 1x250 KVA. CCW incorporated under the Companies Act, 1956 was operating a Cement Plant at Naranda, District Chandrapur. The Company has now been taken over by M/s Dalmia Cement (Bharat) Limited (DCBL) in NCLT and it is now a Subsidiary of Dalmia Bharat Group Company.

In pursuant to the order dated April 05, 2017 of the National Company Law Tribunal, Mumbai Bench, Chandrapur cement works (CCW) was admitted for corporate insolvency resolution process in accordance with Insolvency and Bankruptcy Code, 2016. The resolution plan ("Resolution Plan") of Dalmia Cement (Bharat) Limited (DCBL) has been approved by the Committee of Creditors of CCW on December 20, 2017, the National Company Law Tribunal, Mumbai Bench vide its order(s) dated July 03, 2019, July 22, 2019 and July 25, 2019 and by the National Company Law Appellate Tribunal vide its order dated January 24, 2020. And pursuant to implementation of the Resolution Plan, CCW has become a subsidiary of DCBL from September 10, 2020. The plant of Chandrapur cement works was not being operational since October 2014. After the acquisition of CCW plant, Dalmia Cement (Bharat) limited has started the revival work from 10 Sept 2020 and the revival work of the plant is under progress. DCBL Plant will operate the plant by the Name of Chandrapur cement works.

Department is responsible for catering limestone requirement for manufacturing of cement through captive limestone mine. The captive limestone mine, Naranda Limestone Mine is fully mechanized opencast Limestone mine. The lease area lies in between latitude 19° 47'01.70" N to 19° 47'47.90" N and longitude 79°

02’51.10” E to 79° 03’50.60” E and falls in Survey of India topo sheet no. 56M/I. Total mining lease of the NLM is 71.01 hectares and lease deed was executed on 07th April ’1986. The Mine is situated 45 Km away from Chandrapur city and 2 KM away from the Naranda village towards North direction. Approach road to reach the mine site is via Town Gadchandur, which is 25 Km away from Naranda on Gadchandur - Korpana State highway no. 236.

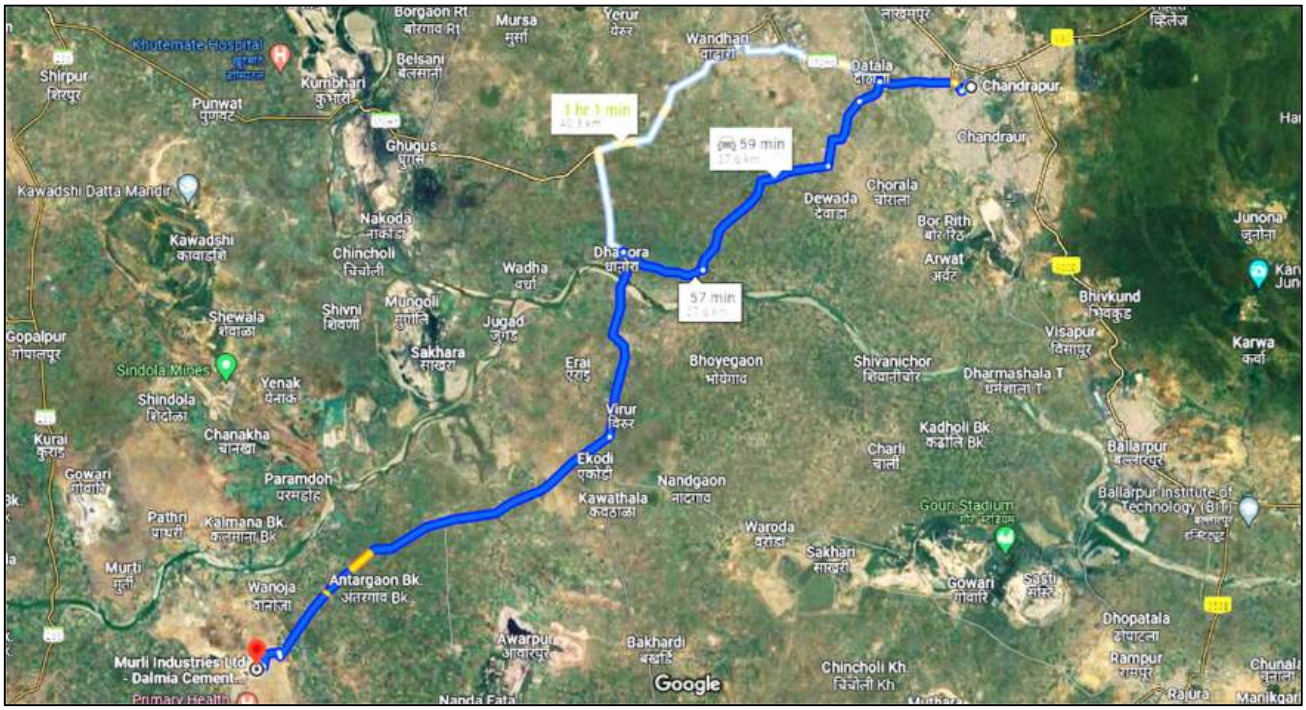


Figure-1: Topographical Location of Dalmia Cement Mine from Chandrapur

2.0 GEOLOGY-

2.1 Regional Geology-

Chandrapur district is situated in the eastern part of Maharashtra and covers an area of 8120 Sq km. Physio graphically, the area of district exhibits region of low-level plateaus in the south western part, plain of extrusive origin in the north western part, structural plateaus and plains in the western part, pediment/Pedi plain the western part structural hills and valleys in the north eastern part and floodplain along Wainganga and Wardha river courses. The maximum and minimum elevations of the area are 530 m and 195 m above msl in the south western and south eastern parts respectively. The district forms a part of Wardha and Wainganga sub-basin. The Wainganga River with its tributaries But, Bokardoh Gondni, Kalhar, Nag. Hattigota, Andhan, Pathn, Mul and Wardha River with its tributaries Penganga, Vagu, Erai Daiwal and Pathra drain the district. Rock formations ranging in age from Archaean to Quatemary are exposed in the district Bengpal Group of Archaean age (4000-2500 m.y) occupies the south eastern part and comprises granitic and migmatites with basic intrusive, amphibolite schist, homblende schist and banded ferruginous quartzite Amgaon Gneissic Complex

of Archaean to Palaeo Proterozoic age (2500-2100 my) comprising quartzite, banded-hematite quartzite with lenses of iron cres occurs as isolated outcrops in the north western part, Pakhal Group of Meso Proterozoic age (2000-1600 my) occurs in the south eastern part and comprises dolomitic limestone shale quartzite and sandstone. Penganga Group of Neo Proterozoic age (undifferentiated) (1600-570 my) occupies the south western part and north western parts and comprises limestone and shale.

2.2 Local Geology-

The area of Naranda-Pimpri-Wanoja comprises shales and carbonate rocks. The liho units i.e. limestone, dolomitic limestone, dolomite and shales occurring in the area belong to Penganga Beds of Precambrian Age. The stratigraphic sequence of rock units in the area are as under. Lithology Thickness Range Soil/Alluvium 0 m to 3.5 m Dolomite/Dolomitic limestone 0.5 m to 10 m Limestone 4.5 m to 22m Shales 4 m to >29m Description & Distribution of Rock Units: The main litho units occurring in the area are limestone, dolomitic limestone, dolomites and purple shales. These Rock Units are described below: Purple Shale: it is the oldest Rock Unit and it occurs in the major part of the area. It is well exposed and occupies low lying areas surrounding the limestone deposit. It is fine grained, soft and thinly laminated. It is brown to purple in colour. At some places purple shale with greenish tinge is also observed. These shales show NW-SE strike and low dips of 5 to 10 towards east. Limestone: It is the youngest member of Penganga Beds exposed in the area. It overlies the purple shales. The limestone in the area is interbanded with dolomitic limestone and at places dolomite. It is fined to medium grained, massive, compact, dark grey to black and pinkish in colour. It is generally thickly bedded with thickness of each bed varying from 2m to 10m Calcite Veins measuring up to 2 Cms in width are seen in the limestone Limestone at places is flaggy in nature soft and can be quarried as slabs The limestone beds vary in thickness from 5 Cms to 2m separated by thin films of yellowish argillaceous material. Dolomite / Dolomitic Limestone: These rocks are gray and grey white in colour. The site is connected by all-weather metal roads. The stratigraphic sequence of rock units in the area are as under:

Soil/Alluvium	-	Quaternary- Recent
Dolomite		
Dolomitic Limestone		Penganga Beds of Precambrian Age
Limestone		
Shale		

The limestone and dolomites of the Precambrian Beds occupy the elevated portion (triangular) of the area

between the villages Naranda, Pimpri and Wanoja while the purple shales occupy the low-lying area surrounding the main limestone area except towards north. The limestone / dolomite extends further north beyond the Penganga River in Yavatmal District.

2.3 Description & Distribution of Rock Units

The main litho units occurring in the area are limestone, dolomitic limestone, dolomites and purple shales. These Rock Units are described below:

2.3.1 Purple Shale

It is the oldest Rock Unit and it occurs in the major part of the area. It is well exposed and occupies low lying areas surrounding the limestone deposit. It is fine grained, soft and thinly laminated. It is brown to purple in colour. At some places purple shale with greenish tinge is also observed. These shales show NW-SE strike and low dips of 50 to 100 towards east.

2.3.2 Limestone

It is the youngest member of Penganga Beds exposed in the area. It overlies the purple shales. The limestone in the area is interbedded with dolomitic limestone and at places dolomite. It is fined to medium grained, massive, compact, dark grey to black and pinkish in colour. It is generally thickly bedded with thickness of each bed varying from 2m to 10m. Calcite Veins measuring up to 2 cms in width are seen in the limestone. Limestone at places is flaggy in nature, soft and can be quarried as slabs. The limestone beds vary in thickness from 5 cms to 2m separated by thin films of yellowish argillaceous material.

2.3.3 Dolomite / Dolomitic Limestone

These rocks are grey and grey white in colour and exhibit Elephant Skin Weathering. The rocks are hard, compact, and massive and breaks with concoidal fractures.

2.4 Structure

The limestone and associated dolomitic / argillaceous limestone occurring to the south of Penganga River in Naranda-Pimpri-Wanoja covers about 25 Sq. Km area. It is about 8.5 Kms in length and the width in the NW part is about 4 Kms and it diminishes and tappers out towards south-west. It forms a triangular shaped body tapering towards south-east. The eastern contact of this triangular body with underlying shales is gradual whereas the western contact of limestone with shales is faulted.

The limestone in general strikes NNW-NW-SE with dips varying from 50 to 300 on either side. It can be clearly

seen from the attitude of bed and their dips that the carbonate rocks are folded. These carbonate rocks exhibit a broad asymmetrical syncline plunging towards north-west. The limbs trends NW-SE with opposite dips varying from 50 to 300.The western limb which is faulted against the shales shows steep dips near the contact varying from 200 to 400 whereas the eastern limb the eastern limb shows gentle dips varying from 50 to 100. The limestone and associated dolomitic/argillaceous limestone occurring to the south of Penganga River in Naranda-Pimpri-Wanoja covers about 25 Sq Km area. It is about 8.5 Kms in length and the width in the NW part is about 4 Kms and it diminishes and tappers out towards south-west. It forms a triangular shaped body tapering towards south-east. The eastern contact of this triangular body with underlying shales is gradual whereas the western contact of limestone with shales is faulted. The limestone in general strikes NNW-NW-SE with dips varying from 5^0 to 30^0 on either side. It can be clearly seen from the attitude of bed and their dips that the carbonate rocks are folded. These carbonate rocks exhibit a broad: asymmetrical syncline plunging towards north-west. The limbs trends NW-SE with opposite dips varying from 5^0 to 30^0 The western limb which is faulted against the shales shows steep dips near the contact varying from 20^0 to 40^0 whereas the eastern limb the eastern limb shows gentle dips varying from 5^0 to 10^0.

The area indicates the following Structural Elements associated with Penganga Beds:

Bedding: It is distinct in both shales and carbonate rocks. The shales are thinly laminated whereas limestones are generally thickly bedded except where it is intercalated with argillaceous limestone.

Joints: The shales and limestone have developed a number of vertical to sub-vertical joints. The prominent among them are NNW-SSE to NW-SE, WNW-ESE, NNE-SSW to NE-SW and ENE to WSW.

Mine is being worked with conventional method of drilling & blasting and blasted limestone is loaded & transported by excavator tipper combination to Limestone Crusher. Multiple benches are being worked to achieve desired quality of limestone.

3.0 BASIC BLAST DESIGN PARAMETERS-

Many factors influence rock breakage by blasting. These factors can be classified broadly into two categories, such as uncontrollable and controllable factors. The uncontrollable factors are the geology and nature of the rock deposit. These are mainly rock and rock mass properties such as lithology, joint and bedding parameters, stress field, water content and different physico-mechanical properties of the rocks. The controllable factors are the basic blast design parameters including explosive properties. The basic blast design parameters and environmental impacts thereof resulted in a blasting operation are described in the following section.

3.1 Bench Height

The selection for an optimum bench height and width depends on inherent stability of the formation, thickness of the formation, drilling and loading equipment to be deployed etc. Higher bench height required more blast hole length and larger drill diameter. This could also result in ground vibration and fly rock problems when the dwelling areas and different structures are existed near by the blasting site.

3.2 Hole Diameter

The choice of blast hole diameter depends mainly on fragmentation size required, bench height and geology of the formation. It also depends on the overall economics in relation to the initial investment and the operating cost. Better and finer fragmentation could be achieved with smaller hole diameter. Control of ground vibration and flyrock are also much easier in smaller diameter than larger hole diameter. However, drilling cost generally increases as blasthole diameter decreases.

3.3 Hole Depth

The required hole depth depends on the bench height, inclination of hole and sub-grade drilling. Sub-grade drilling, on the other hand, depends on the strata condition at the toe portion. With a horizontal bedding plane and softer formation at the toe, use of sub-grade drilling may not be necessary. However, with higher dip of bedding plane or presence of harder strata at the toe portion, more sub-drilling length is required to avoid toe problem and irregular floor. Length of sub-grade drilling generally varies between zero and 0.3 times the burden.

3.4 Burden and Spacing

Burden is the minimum distance from the axis of a blast hole and the free face whereas spacing is the distance between consecutive blast holes in the same row. The values of burden and spacing depend upon blasthole diameter, properties of rock and explosive, bench height and the desired degree of fragmentation as well as muck displacement. Depending upon the properties of rock mass, burden value generally varies between 25

and 40 times the hole diameter. Different researchers to calculate burden value have suggested numerous formulas. Out of these formulae, the most commonly used equation for the calculation of burden value as given by Konya and Walter (1990) is:

$$\boldsymbol{B = \left[\frac{2\rho_e}{\rho_r} + 1.5\right] \times D_e}$$

Where,

B = Burden in inches
ρ_e = Specific gravity of explosive
ρ_r = Specific gravity of rock
D_e = Diameter of explosive in inches (for bulk explosive, it is the diameter of drill hole)

The value of spacing is calculated in function with the burden, delay timing between blastholes and the initiation sequence. In general, spacing value varies between 1.2 and 2.0 times the burden value.

3.5 Stemming Length

Stemming is the portion of blast hole which has been packed with inert material above the charge so as to confine and retain the gases produced by the explosion before the actual burden movement. Stemming length depends upon the nature of rock blasted, required throw, fragmentation as well as the type and size of stemming materials. Stemming length can be varied widely, ranging between 20 and 60 times the hole diameter. Whenever possible, stemming length of more than 25 times the blasthole diameter should be maintained in order to avoid flyrock, air blast, cutoffs and overbreak.

3.6 Explosive Type

The type of explosives to be used depends on properties of rock to be fragmented, ground water condition and availability in market. In hard and massive formations, explosive with higher density and higher strength is required for proper fragmentation. However, in softer formation and heavily jointed rock mass, low density explosive with lower strength may be used.

3.7 Specific Charge/Powder Factor

The quantity of explosive (kg) required to fragment one cubic metre of rock is called as specific charge or charge factor (kg/m3). The specific charge increases with an increase in diameter of blasthole, rock strength, degree of fragmentation, displacement and desired swelling. The wide range of specific charge for different types for rock in case of surface bench blasting is given in Table-1. In some places, specific charge is also

termed as charge factor (kg/m3)

Types of rock	Specific Charge (kg/m3)
Massive and high strength rock	0.60- 1.50
Medium strength rock	0.30- 0.60
High fissured rocks, weathered or soft	0.10- 0.30

Table-1: Ranges of specific charge for bench blasting in surface mines (after Jimeno et al., 1995)

4.0 IMPACT OF BLASTING TO SURROUNDING ENVIRONMENT

Only 15-30% of the total energy generated from the detonation of an explosive charge inside a blasthole is estimated to be used for the actual rock breakage. Rest of the energy is wasted in the form of ground vibration, noise and flyrock. These are the main environmental impacts resulted from surface blasting operations. Toxic fumes generated from blasting can also affect the working environment, especially in underground mines, tunnel, etc. However, this effect is less environmental concerned in case of surface blasting in comparison to ground vibration, flyrock and noise. Hence, fundamental concepts on these three environmental impacts created by surface blasting are discussed in this section.

4.1 Blast Induced Ground Vibration

When an explosive charge inside a blasthole is detonated, the explosive is converted into a hot gas at intense pressure. A steep wave front travels into the rock, crushing it for roughly twice the radius of the original blasthole, depending upon the resistance of the rock (Figure-2). In many rock types, the cavity that is formed has about four times the volume of the original hole around the charge. Many radial cracks start to form as the cavity expands. However, a few of the cracks become dominant and the other stop growing. The expanding gases continue to work on the rock, extending the cracks, and moving the rock upward and outward. This activity takes place in the zone of intended work on the rock, breaking it and moving it for excavation. Beyond the perimeter of damaged rock zone, the pulses are called elastic waves or seismic waves, meaning that there is no further damage to the rock or any permanent displacement of the rock properties. Seismic waves generated from blasting source travel in all directions. As they travel through the medium, they cause particle of the medium in motion which is called vibration.

1. Crushed Zone
2. Severely Fractured Zone
3. Moderately Fractured Zone
4. Least Fractured Zone
5. Seismic Zone/Elastic Zone

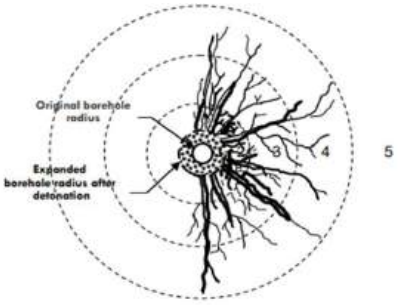


Figure-2: Different Zones of rock deformation around a blast

The velocity of a particle at any instant of time during the vibration disturbance is called as particle velocity. The maximum velocity from the position of rest is peak particle velocity or in short 'PPV'. PPV has traditionally been used as a mean to establish the degree of blast damage.

4.2 Factors Affecting Vibration Intensity and Characteristics

The intensity and characteristics of ground vibration generated from a blasting source depend upon different parameters such as:

- Local geology
- Charge weight per delay
- Distance from the point of blast
- Delay period
- Spatial distribution of explosive charge
- Confinement
- Type of explosive

The local surrounding geology has a great influence on the intensity and characteristics of ground vibration. The frequencies of seismic waves produced from blasting mainly depend on nature of the transmitting medium and the distance of measurement. If geological formation of the rock strata in a particular area is having massive formation with shallow soil cover, the blast vibration will be characterized by relatively lower frequencies. However, if the area around the blasting site has a deep covering of soil and jointed rock formations, the vibration will be characterized by relatively lower frequencies and larger displacement. Also with increasing the distance, high frequency waves attenuate and only lower frequency wave can travel to a larger distance. The magnitude of ground vibration also increases with decrease in distance of observation from the blasting source and vice-versa. In a blast where more than one period number of detonators is used, the largest charge per delay has the most direct influence on vibration intensity and not the total charge used for the blast, as long as the delay interval is sufficient to avoid constructive interferences between the waves generated by the different group of holes (Jimeno et al., 1995). A delay interval of 8 and 9 ms were suggested by Duval & Petkof (1959) and Duval & Fogelson (1962) to eliminate constructive interferences of different seismic waves generated from blasting. For the same charge weight per delay, vibrations produced from a single large hole diameter would be more than those generated from more number of holes with smaller diameter due to the spatial distribution of explosive charge (Oriard, 2002).

The confinement of explosive charge such as more burden and spacing values, deeply buried charge (excessive stemming length) and presence of blasted material at the face (choked face) generally increase the level of ground vibration. Explosives having lower borehole pressures also produce lower vibration than those

explosives having higher strength with more detonation pressure.

4.3 Ground Vibration Standards in India

Peak particle velocity (PPV) is mainly used to form the basis of blast damage criteria for different types of structures. The prescribed permissible limits of the Directorate General of Mines Safety (DGMS) on ground vibrations for different type of structures depending on the frequency of blast waves (Technical Circular No. 7, 1997) are given in Table 5.1. The ground vibration standards have also been given by the Indian Standard of Institution (IS: 6922) on the basis of the ground condition as given in Table-2. The IS:6922 (1973) is applicable to normal structures like building, elevated structures, bridges, retaining walls, concrete and masonry dams constructed in materials like brick walls, stone masonry and concrete.

Table-2: DGMS-prescribed permissible limit of ground vibrations (Technical Circular No. 7, 1997)

Type of structure		Dominant excitation frequency, Hz		
		< 8 Hz	**8 - 25 Hz**	**> 25 Hz**
(A) Buildings/structures not belonging to the owner				
i)	Domestic houses/structures (Kuchha brick and cement)	5	10	15
ii)	Industrial Buildings RCC and framed structures)	10	20	25
iii)	Objects of historical importance and sensitive structures	2	5	10
(B) Buildings belonging to owner with limited span of life				
iv)	Domestic houses/structures (Kuccha brick and cement)	10	15	25
v)	Industrial buildings (RCC & framed structures)	15	25	50

Table-3: Peak Particle velocity as damage criteria for different types of rocks (after Indian Standard Institution, IS:6922, Sec. 4.1.1.2, 1973)

Soil, weathered or soft rock condition	70mm/sec
Hard rock condition	100mm/sec

4.4 General Control Measures to Reduce Ground Vibration

The followings are some of the principal reasons that can be considered for reducing blast generated ground vibrations.

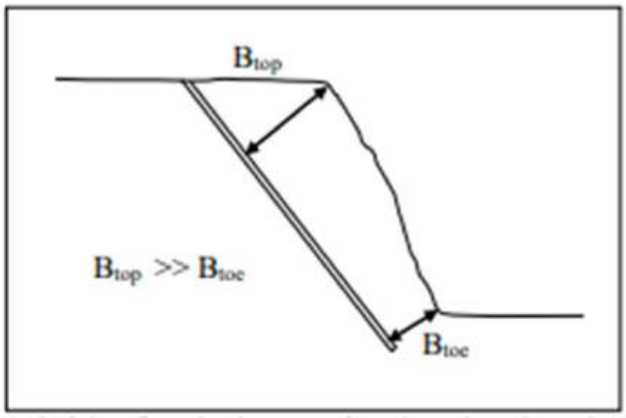
- Minimizing the explosive charge per delay by reducing drill hole diameter, blasthole depth, decking the explosive charges in a hole and initiating them at different times.
- Reduce the number of blast holes having instantaneous detonators by using a greater number of

delay detonators.

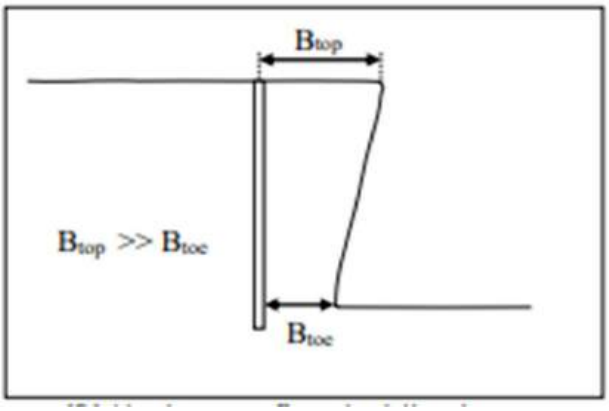
- Choose effective delay time between holes and rows which avoid wave interaction and give good rock displacement.
- Set the initiation sequence in a way that it progresses away from the structures to be protected.
- Maintain bench height to burden ratio more than two and use adequate powder factor to decrease over confinement of explosive charge.
- Use the largest possible free face blast area and avoid choked face blasting.

4.5 Fly-rock

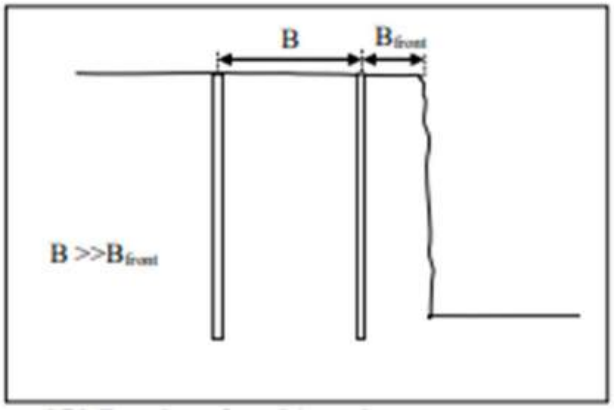
Fly-rock, also called rock throw, is the uncontrolled propelling of rock fragments produced in blasting. Flyrock constitutes one of the main sources of material damage and harm to people. The possible causes of flyrock, which are commonly encountered during any bench blasting in surface mine, are depicted in Figures-3 (A to G).



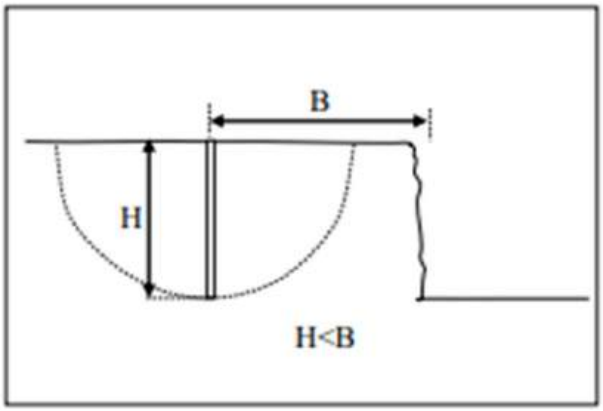
(a) Inclined hole causing less toe burden



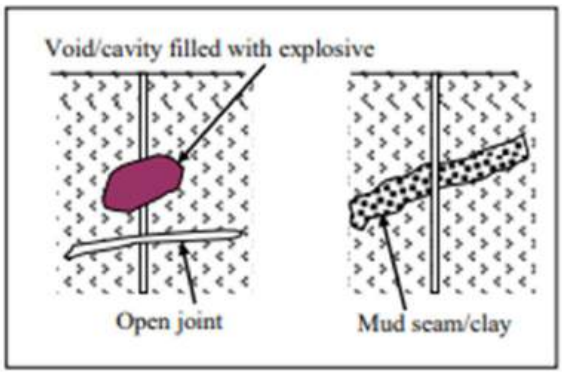
(b) Under confined at the toe



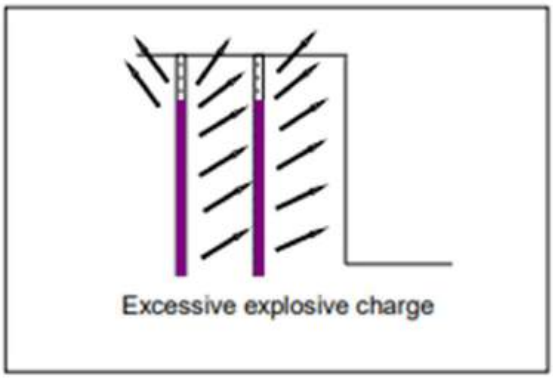
(c.) Too less front burden



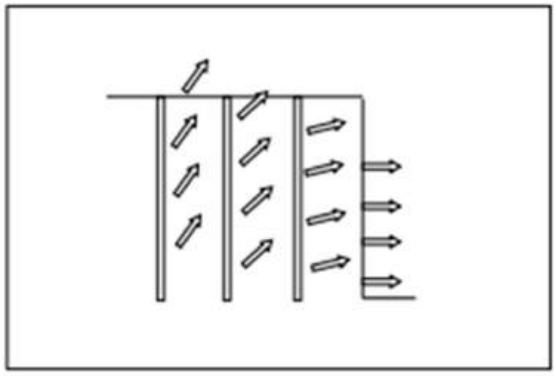
(d) Too large front burden



(e) Cavity, open joint and mud seam



(f) Excessive charge and very small top stemming



(g) Inadequate delay timing (back rows)

Figure-3: Common causes of fly rock in surface bench blasting

The control measures of fly rock in surface blasting operation are given below-

- The primary means of controlling fly rock is through proper blast design and delay timing. The consistency of the burden, specially the front burden (distance between first row to free face) must be maintained.
- Bench height to burden ratio less than 1.5 should be avoided. The spacing of about 1.2 - 2.0 times the burden is suggested to reduce the fly rock.
- While loading a shot, the blaster must be aware of his true powder factor (in m3/kg i.e. reverse of charge factor) in terms of the amount of explosive to be charged for the quantity of rock to be fragmented. Charging of excessive explosive quantity must be avoided.
- When firing more than one row of holes, sufficient delays should be used between the two sequence of rows of holes. Based on the observations, delays of at least 50 ms or more should be used between two consecutive rows.
- Length of stemming column should be greater than or at least equal to 25 times the hole diameter. For better protection, it may also be taken as greater than or equal to the burden.
- The blasting site should always be inspected before marking the holes. If any open joints and clay

fillings are present in the bench, an adjustment should be made in the drilling pattern.

- Before loading, blasting officials should always check the hole depths and ensure that the holes are drilled as per the blast design. Any change in the blast design should be carefully considered from the standpoint of its potential effect on fly-rock.
- All loose pieces of rock from the blasting site should be cleared before charging.
- Accidents due to lack of blast area security are commonly caused in the mines due to following reasons, which should be strictly taken care of in all the blasting operations.
- Failure to evacuate the blast area by employees and visitors,
- Failure to understand the instructions of the blaster or supervisor,
- Inadequate guarding of the access roads leading to the blast area,
- Taking shelter at an unsafe location or inside a weak structure.

4.6 Blast-induced Noise/air overpressure

Noise or air blast/air overpressure is considered to be one of the most hazardous environmental disturbances created by blasting operation. Blast induced air overpressure is the energy transmitted from the blast site within the atmosphere in the form of a series of pressure waves. Overpressure simply means the pressure over and above that of atmospheric pressure being present and the term air overpressure is used to describe the airwave generated by blasting. Air overpressure is formed either by the direct action of the explosion products from an unconfined explosive in the air or by the direction of a confining material subjected to blast loading. The pressure wave consists of both audible (noise) and sub-audible (concussion) energy. The maximum excess pressure in this wave is known as the peak air overpressure, generally measured in decibels (dB) using the linear frequency-weighting (L). The decibel is defined in term of air overpressure with the equation:

$$\boldsymbol{AOP} = \mathbf{20} \times \boldsymbol{log}\left[\frac{\boldsymbol{P}}{\boldsymbol{P_o}}\right]$$

Where,

AOP – Air over pressure in dB

P- Measured overpressure in N/m^2

P_o – Pressure of the lowest audible sound (2.0×10^{-6} N/m^2)

Factors Affecting Air overpressure

Oriard (2002) listed out the various factors contributing to air overpressure and arranged roughly in order of decreasing importance as follow:

- Maximum charge weight per delay
- Depth of burial of the explosive charges
- Exposed detonating materials on the ground surface
- Atmospheric condition
- Topography
- Volume of displaced rock
- Delay interval and orientation

4.7 Air overpressure Standards

Air overpressure generated due to blasting generally causes minor structural damage such as glass window breakage. No major structural damage is usually reported due to air overpressure unlike in the case of ground vibration. Presently, no standard / regulation or guidelines are available in India by the regulatory agencies regarding the permissible levels of air overpressure and noise from blasting operation. The typical air overpressure limits as given by Oriard (2002) and the limits recommended by United States Bureau of Mines (USBM) for surface mine blasting are given in Table-4 and Table-5 respectively. Table-6 shows Central Pollution Control Board (CPCB), India's permissible levels for noise exposure for work zone area as prescribed under Model Rules of Factories Act, 1948.

Table-4: Typical air overpressure criteria (after Oriard, 2002)

171 dB	General window breakage
151 dB	Occasional window breakage
140 dB	Long term history of application as a safe project specification
134 dB	Bureau of Mines recommendation following a study of large-scale surface mine blasting

Table-5: Air overpressure limits recommended by USBM for Surface mining (RI 8485)

134 dB	0.1 Hz high pass measuring system
133 dB	2.0 Hz high pass measuring system
129 dB	6.0 Hz high pass measuring system
105 dB	C-slow weighting scale on a sound level meter
(Event less than or equal to 2 sec duration)	

Table-6: Central Pollution Control Board (CPCB) permissible levels for noise exposure for work zone area

Peak sound pressure in dB	Permitted number of impulse or impact/day
140	100
135	315
130	1000
125	3160
120	10000

Note:

1. No exposure in excess of 140 dB peak sound pressure level is permitted.
2. For any peak sound pressure level falling in between any figure and the next higher or lower figure as indicated in column 1, the permitted number impulses or impacts per day is to be determined extrapolation on a proportionate basis.

General Control Measures to Reduce Noise/Air overpressure

- Increase confinement of explosive charge (i.e. burial depth of explosive) with longer stemming height (greater than 25 times the blast-hole diameter) and avoid shallow hole depth and plaster shooting.
- Minimize explosive charge weight per delay by using proper delay to reduce direct influence on air overpressure.
- Choose delay times so that the blast progresses along the face velocity lower than that of sound in the air (320 m/s).
- Avoid using detonating cord, and when it is completely unavoidable, cover it with sand/soil/drill cuttings of a minimum thickness of 10 to 15 cm.
- Never conduct blasting when the direction of the wind is critical.
- Avoid blasting in cloudy weather.

5.0 Field Investigation-

The field investigation was conducted in 23rd January, 2024 to identify and study different structure present nearby mining lease as well as distance from existing and proposed mining areas was measured. The distance of structure present in naranda village were tabulated in table-7.

Structure	Distance from lease boundary
Naranda School Building	173m
Naranda School Boundary	113m
Kuccha House	121m
Naranda Village Overhead water tank	146m

Table-7: List of Structure not belonging to owner and its distance

Whereas, Dalmia Cement Plant is partially situated in mining lease boundary, the distance of 1st active mine bench to plant boundary is 35m and distance from last bench to plant boundary is 160m belonging to owner. The study is conducted for the proposed development toward naranda village with drilling and blasting as different types of structure present nearby proposed working that requires protection from blasting impact viz. ground vibration, fly-rock and air overpressure/noise. As to determine the predictor for maximum charge per delay (MCPD), total charge per round and air overpressure. total 12 experimental blast in active mining area was conducted with technical support provided by AKS University Team. Physical inspection around the structure present in naranda village not belong to owner was examined, there was no cracks or instability sign were present in overhead water tank, in naranda school building and in kaccha house. To understand the vibration, AOP and frequency near to structure an instantel make minimate was also fixed and recording for each blast were recorded, where as a another instantel make micromate was fixed around 300m near to weigh bridge belonging to owner.

Figure-4: Google Map showing structure not belonging to owner near to lease boundary

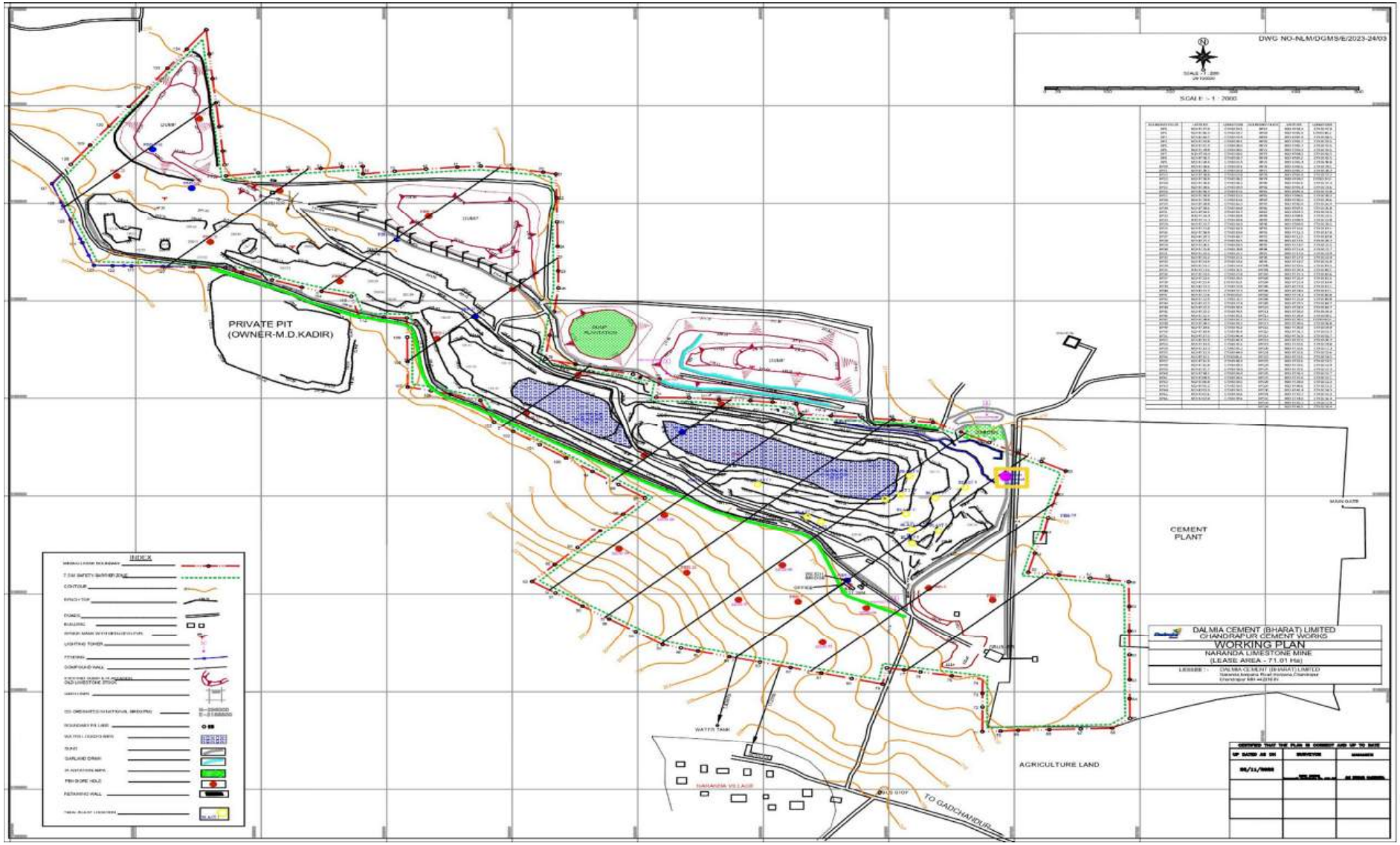


Figure-5: Surface plan showing experimental blast location and location of instruments

Figure-6: Meeting along team member of AKSU and Dalmia Cement Management

Figure-7: Charge of Explosive at third bench OB in presence of AKSU Technical Support Team.

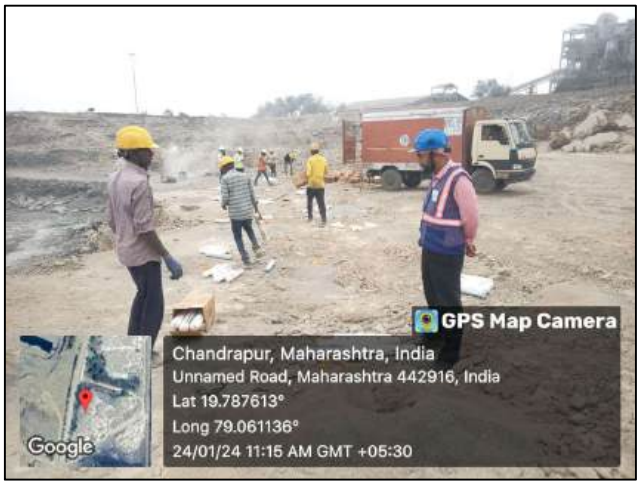


Figure-8: Charging in progress with Technical Support from AKS University Team

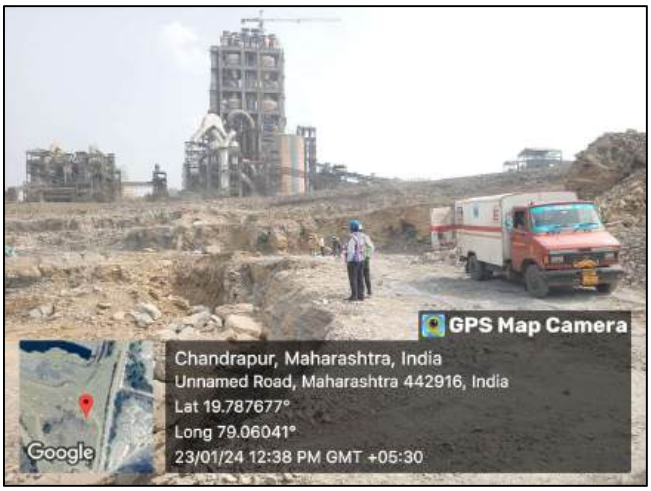


Figure-9: View of Mine Benches and Plant of Dalmia Cement, Chandrapur

Figure-10: Stemming & Connection of TLD's in presence of technical Support team

Figure-11: View of Charging in 4th bench

Figure-12: Measurement of drill hole parameters

Table-8: Summary of experimental blasts -

Date	Blast ID	Blast Time	No. of Holes	Burden x Spacing	Hole Depth	Charge Length (m)	Stemming Height (m)	Maximum Charge per Delay(kg)	Total Charge per blast (kg)	Instrument-1 (Location- Near to mine Weigh Bridge)				Instrument-2 (Location- Near to Plant Boundary)			
										PPV (mm/sec.)	Frequency (Hz)	AOP (dB)	Distance of Instrument from Blast site (m)	PPV (mm/sec.)	Frequency (Hz)	AOP (dB)	Distance of Instrument from Blast site (m)
23-01-2024	B-1	14:15	21	2.5x3	5	3.5	1.5	25	525	4.597	21	114.7	286	5.75	5.00	120.00	390
23-01-2024	B-2	14:17	20	2.5x3	5	3.5	1.5	25	488.89	2.689	17.1	108.8	314	7.66	6.40	121.70	165
23-01-2024	B-3	14:21	20	2.5x3	5	3.5	1.5	25	500	4.307	22	112.6	273	5.52	7.60	129.90	173
23-01-2024	B-4	14:31	20	2x3	5	2.7	2.3	19.46	389.2	1.119	18.3	104	270	-	-	-	-
23-01-2024	B-5	14:37	19	2x3	5	2.7	2.3	19.46	369.74	5.256	14.4	109.4	312	3.10	5.20	123.10	177
23-01-2024	B-6	14:45	20	2x3	5	2.7	2.3	19.46	352.18	2.357	47	109.8	244	-	-	-	-
24-01-2024	B-7	13:51	20	2.5x3	5	3.5	1.5	25	500	2.349	17.7	117.3	260	3.86	7.5	124.50	142
24-01-2024	B-8	13:55	20	2.5x3	5	3.5	1.5	25	475	1.164	19.7	110.8	306	7.45	6.5	124.50	110
24-01-2024	B-9	14:03	20	2x3	5	2.5	2.5	16.68	325	1.931	18	106.6	250	-	-	-	-
24-01-2024	B-10	14:11	20	2.5x3	5	3.5	1.5	25	475	1.217	19	115.7	342	-	-	-	-
24-01-2024	B-11	14:16	20	3x4	5	2.4	2.6	16.68	325	2.175	25	115.6	280	3.21	7.1	120.30	303
24-01-2024	B-12	14:22	20	3x2	5	1.9	3.1	13.90	275	3.174	21	114.3	250	2.14	5.5	123.1	326

6.0 Empirical relationship between ground vibration, distance and explosive charge:

Peak particle velocity (PPV) is generally a direct function of the maximum charge per delay called "Scaled Distance" and is negatively related to the distance between the blasting point and the recording point. To find a mathematical expression of the determination of the laws of transmission of vibrations, the "scaled distance," which is defined as the relation between the distance and the energy of the explosive charge, was used. The scaled distance was calculated as-

$$\mathbf{SD} = \left(\frac{\boldsymbol{D}}{\sqrt{\boldsymbol{Q}}}\right)$$

Where,

SD- is the scaled distance,
D- is the distance between the emitted point and received point in m, and
Q- is the amount of maximum charge per delay in kg

The empirical relation between the PPV and the scaled distance is then obtained, which takes the following form:

$$\mathbf{PPV} = \mathbf{k}^{*}(\boldsymbol{SD})^{\alpha}$$

The values obtained for PPV and SD are plotted to determine the value of the constants K and α, which will depend on geological conditions. Then, the equation of the regression curve that best fits the plot is obtained. The law of transmission of ground vibration was obtained using the data from Table no-8.

Table-9: Summary of blast Recorded data (12 observation)-

Parameter	Class Interval	No. of events	Range	Remark
Maximum Charge Per Delay (kg)	0-50	12	13.90 to 25	Within stipulated limits
	>50	-	-	
PPV (mm/sec.)	<10	12	1.119 to 7.660	Within stipulated limits
	10-20	-	-	
Distance (m)	100-500	12	110- 390	-
Frequency (Hz)	<8Hz	8	5.2 to 7.60	Instrument-2 Readings near to plant boundary
	8-25Hz	12	17.1 to 25	Instrument-1 readings near to Mine weigh bridge
A.O.P. (dB)	<88 to 130	20	104 to 129.90	All the events are safe limit below then 130 dB (Including Inst-1 & 2).
	131 to 140	-	-	

7.0 Development of Ground Vibration and AOP Predictor Equations-

In order to develop ground vibration predictor equations, the ground vibration data obtained from those blasts conducted with 110 mm blast hole diameter have been selected from the above-mentioned different mines. The values of maximum charge per delay varied between 13.90 and 25 kg and total explosive charge varied between 275 and 525 kg. The distances of ground vibration monitoring points ranged between 110 and 390 m. Regression analyses have been carried out by correlating maximum charge per delay, total explosive charge and distance from the vast data to develop the best-fit ground vibration predictor equations and air overpressure as given in Figures-13 to 16. The predictor equations obtained for ground vibration and air overpressure are given in Equations 13 to 16.

7.1 Ground Vibration Predictor equation using Q_{max} –

Ground vibration predictor equation for max charge per delay (Q), D is the Scaled Distance:

$$\mathbf{PPV = 182.6 * \left(\frac{D}{\sqrt{Q}}\right)^{-0.783}}$$

Coefficient of determination – 0.258
Standard Deviation- 0.212

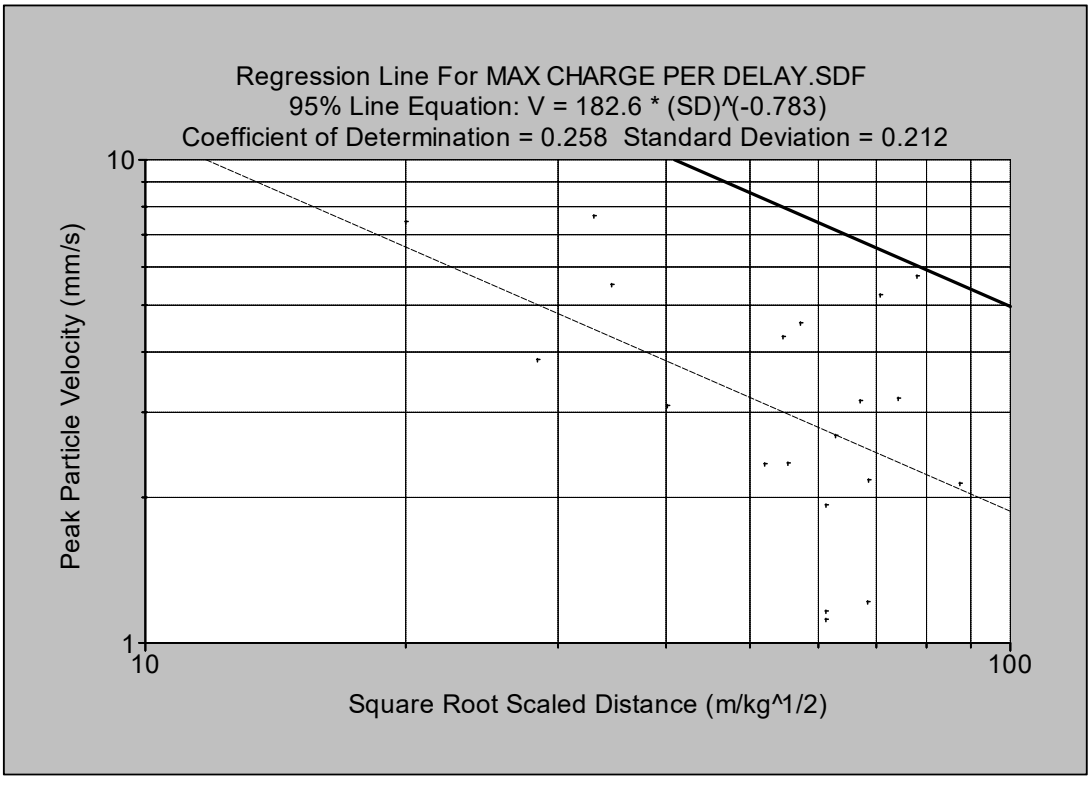


Figure-13: Regression analysis result for ground vibration prediction using maximum charge per delay (Q_{max})

7.2 Ground Vibration Predictor equation using Q_{total} –

Ground vibration predictor equation for Total charge per round (TQ), D is the Scaled Distance:

$$\mathbf{PPV = 60.31 * \left(\frac{D}{\sqrt{Q}}\right)^{-0.810}}$$

Coefficient of determination – 0.273
Standard Deviation- 0.210

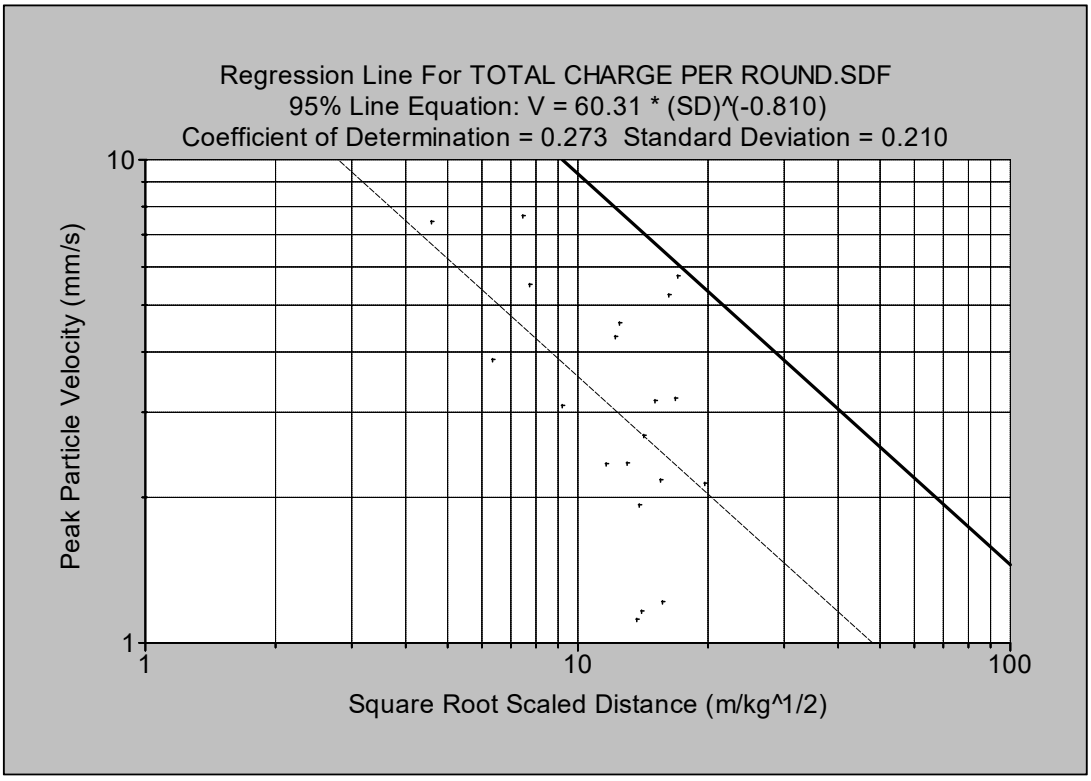


Figure-14: Regression analysis result for ground vibration prediction using total charge per round (TQ)

7.3 Air Overpressure (AOP) Predictor equation using Q_{max} –

AOP predictor equation for Maximum charge per delay (Q_{max}), D is the Scaled Distance:

$$\mathbf{V = 187.9 * \left(\frac{D}{\sqrt[3]{Q}}\right)^{-0.085}}$$

Coefficient of determination – 0.264
Standard Deviation- 0.022

Where,

V = Peak particle velocity in mm/s,
AOP = Air overpressure/air blast/noise in dB(L),
D = Distance of vibration monitoring point from the blast face in m,
Q_{max} = Maximum explosive weight per delay (kg),
Q_{total} = Total explosive charge in the blasting round (kg).

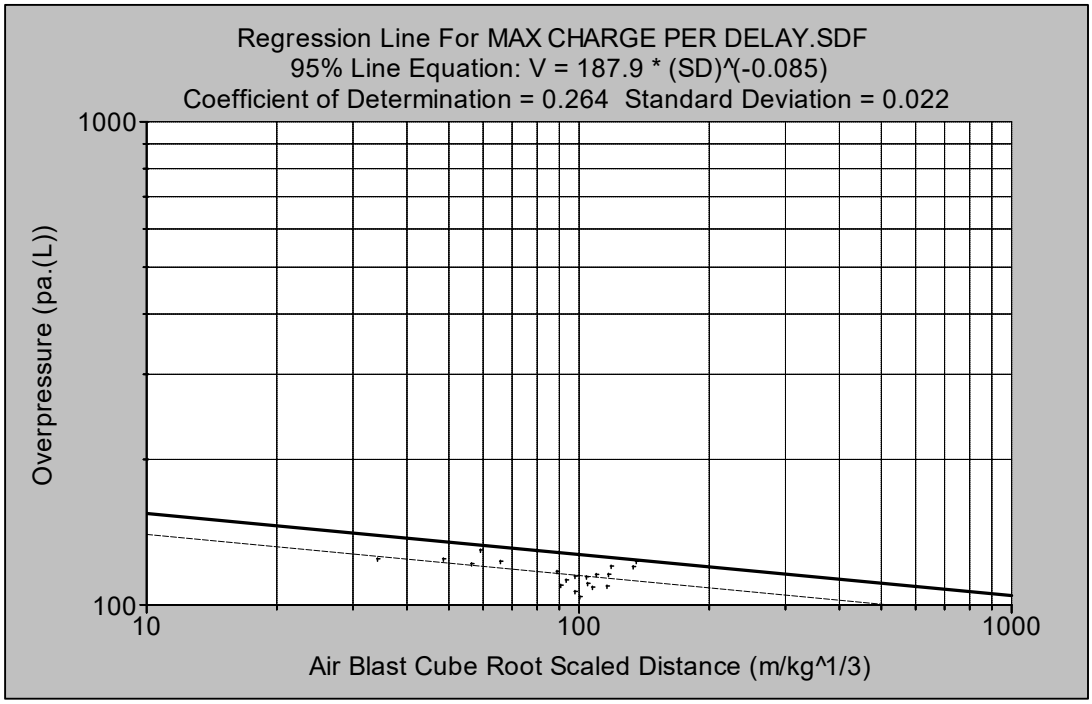


Figure-15: Regression analysis result for AOP prediction using maximum charge per delay (Q_{max})

7.4 Air Overpressure (AOP) Predictor equation using Q_{total} –

AOP predictor equation for Maximum charge per round (Q_{total}), D is the Scaled Distance:

$$\mathbf{V = 173.7 * \left(\frac{D}{\sqrt[3]{Q}}\right)^{-0.087}}$$

Coefficient of determination – 0.273

Standard Deviation- 0.022

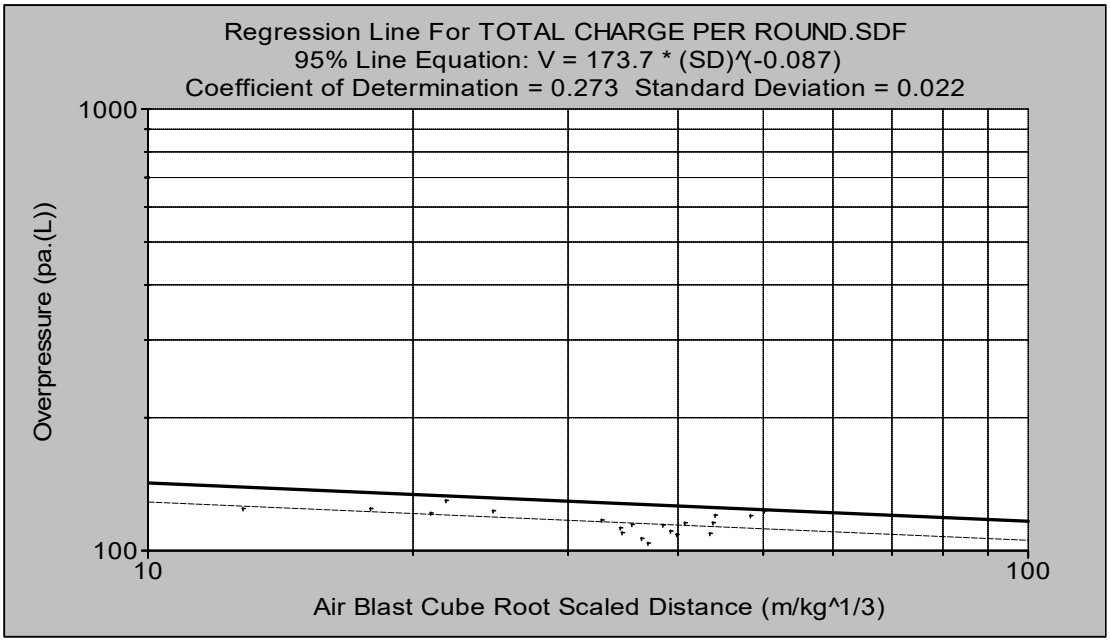


Figure-16: Regression analysis result for AOP prediction using Total charge per round (Q_{total})

8.0 Assessment of ground vibration impact-

Based on mining plan, the bench height is being maintained is 5m and drilling diameter is 110mm. due to medium hard rock formation in OB/limestone benches. The maximum charge per delay may vary between 15kg to 25kg. hence, prediction for ground vibration with consideration of Maximum charge per delay variation between 15kg to 25kg are calculated using determined predictor. Resulted PPV with variation in distance are tabulated below-

Distance	Ground vibration (PPV) in mm/s generated by different values of Max. charge per delay at different distances		
	Max charge- 15kg	Max charge- 20kg	Max charge- 25kg
50	24.64	27.58	30.10
100	14.32	16.03	17.49
150	10.42	11.67	12.73
200	8.32	9.31	10.16
250	6.99	7.82	8.54
300	6.06	6.78	7.40
350	5.37	6.01	6.56
400	4.84	5.41	5.91
450	4.41	4.94	5.39
500	4.06	4.55	4.96
550	3.77	4.22	4.60
600	3.52	3.94	4.30
650	3.31	3.70	4.04

Table-10: Predicted values of ground vibrations produced by different maximum charge per delay

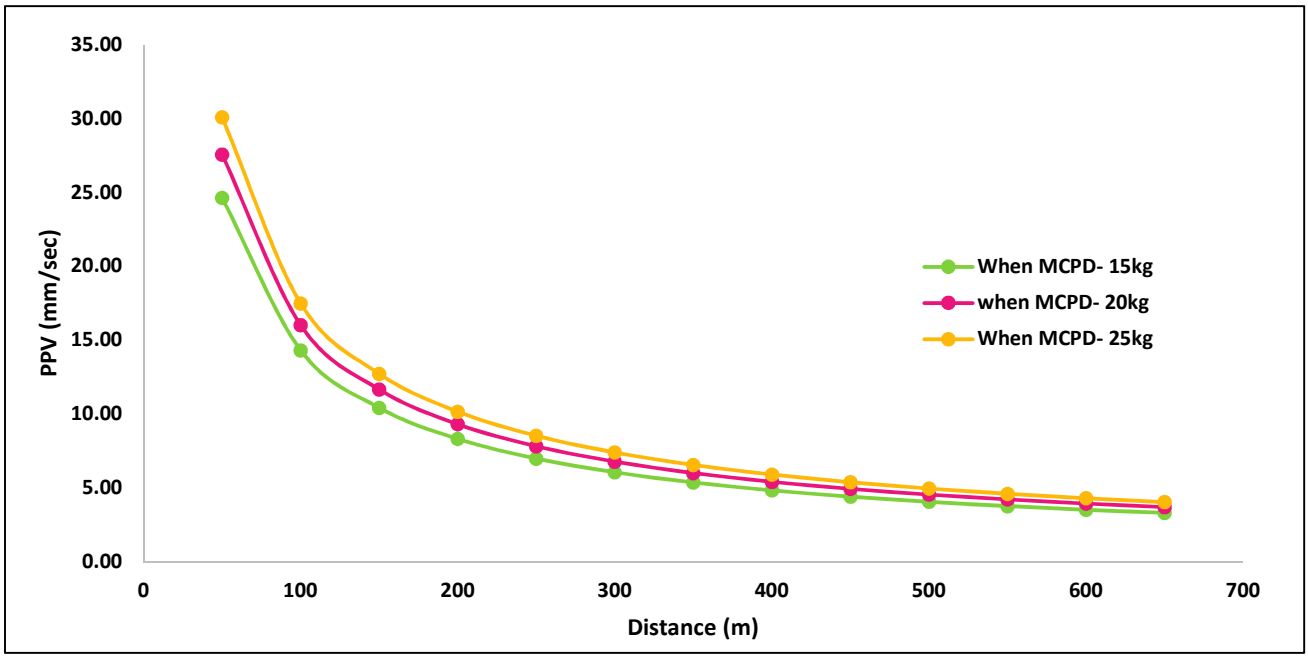


Figure-17: Predicted value of ground vibrations at different distances for different values of maximum charge per delay

8.1 Calculation of MCPD & MCPR -

Based on experimental blast recording, low frequency (<8Hz) is recorded towards plant boundary, whereas frequency 8-25 Hz are recorded by instrument fixed in naranda village site near to weigh bridge. Hence plant structure is belonging to owner and it is industrial building of RCC & framed structures as per DGMS circular no-7 of 1997 permissible peak particle velocity at the foundation level shall be 15mm/sec. whereas naranda school structure and houses are not belong to owner shall have permissible PPV at the foundation level 10mm/sec when dominant excitation frequency ranges between 8-25Hz as recorded. Therefore, the safe values of PPV for different structures have been assigned based on DGMS standards and are given in table no-11.

Sl. No.	Structure	Safe level of PPV
1.	Buildings/structures not belonging to the owner (Domestic houses/structures (Kuchha brick and cement)	10mm/sec
2.	Buildings belonging to owner with limited span of life Industrial buildings (RCC & framed structures)	15mm/sec

Table-11: Threshold level of PPV for different structures near the ML Area.

Table-12: Predicted Safe MCPD (Maximum charge per delay)-

Distance of the structure from the blasting face	For village house/structure permanent in nature and not belonging to owner (safe Level of PPV- 10mm/sec)	For building /structure with limited span of life and belonging to owner (safe level of PPV- 15mm/sec)
[m]	[kg]	[kg]
100	6.00	16.90
150	13.50	38.04
200	24.00	67.63
250	37.51	105.69
300	54.01	152.20
350	73.53	207.18
400	96.04	270.63
450	121.56	342.53
500	150.08	422.91

Table-13: Predicted Safe MCPR (Maximum charge per round)-

Distance of the structure from the blasting face	For village house/structure permanent in nature and not belonging to owner (safe Level of PPV- 10mm/sec)	For building /structure with limited span of life and belonging to owner (safe level of PPV- 15mm/sec)
[m]	[kg]	[kg]
100	118.35	322.09
150	266.29	724.71
200	473.42	1288.39
250	739.72	2013.13
300	1065.21	2898.94
350	1449.88	3945.80
400	1893.73	5153.74
450	2396.77	6522.74
500	2958.99	8052.81

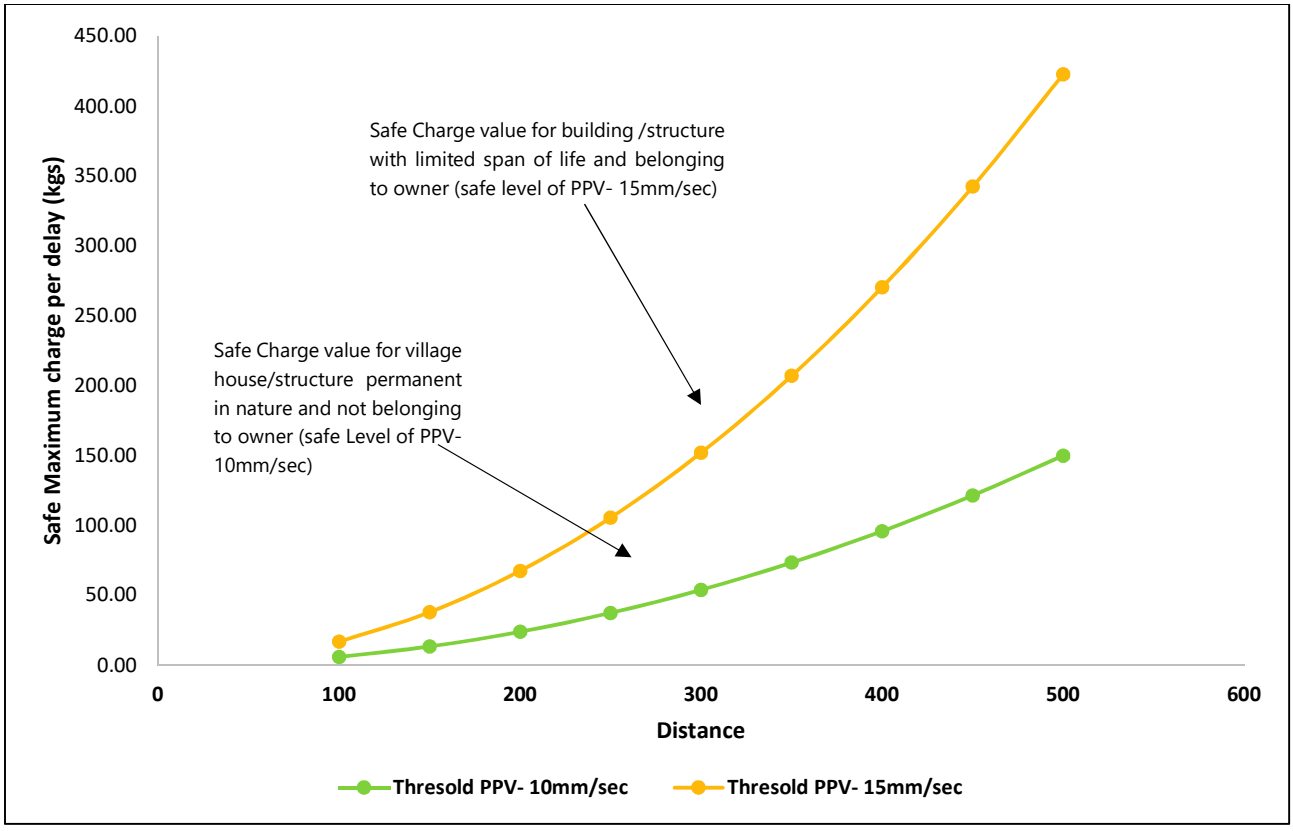


Figure-18: Safe values of maximum charge per delay for various distances determined from the ground vibration predictor equation

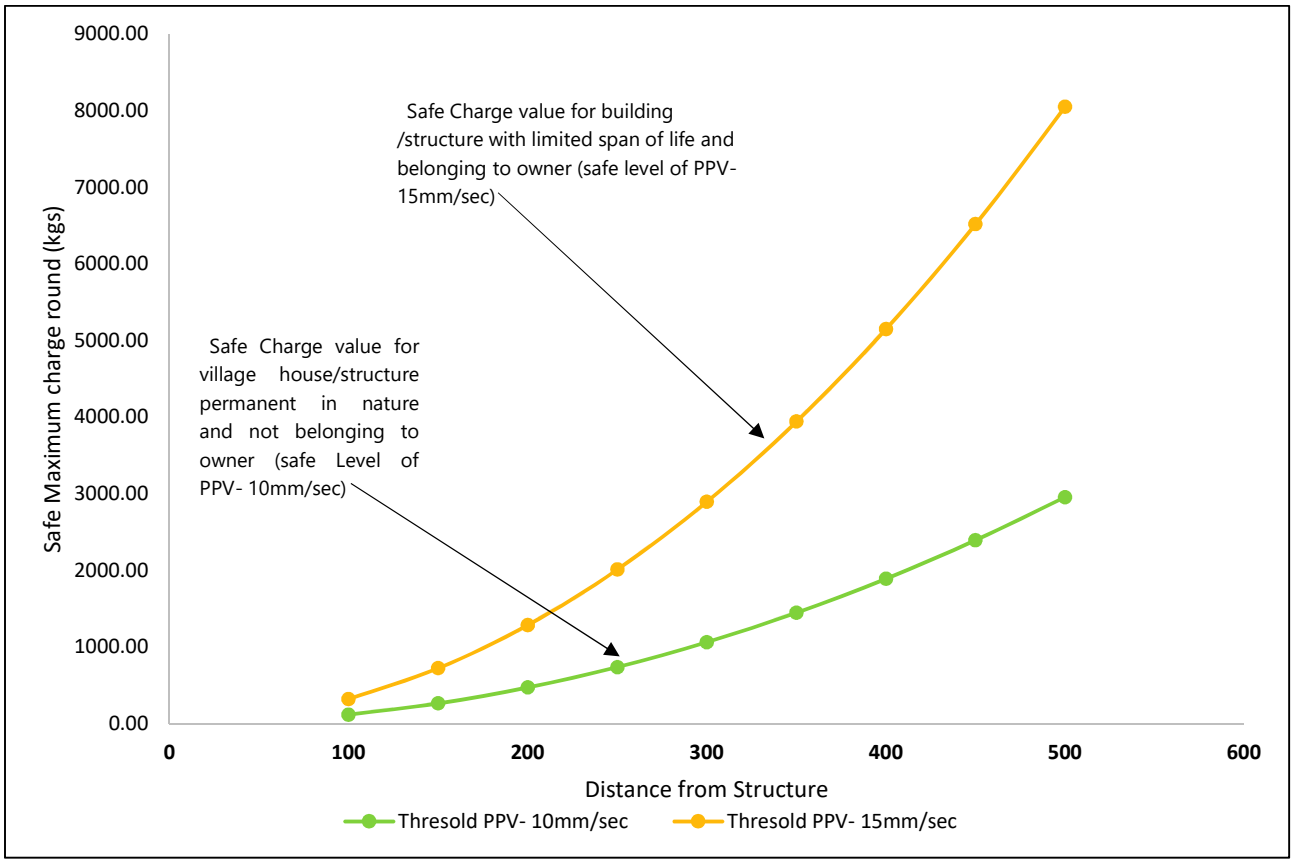


Figure-19: Safe values of maximum charge per round for various distances determined from the ground vibration predictor equation

8.2 Assessment of impact of Noise/Air-overpressure-

The predicted levels of air overpressure generated by different maximum charge per delay varying from 15.00 to 25.00 kg for Naranda Limestone mine is given in Table-14 and Figure-20. The levels of air overpressure at the distance of 100 m is more than 140dB(L), whereas, at the distance of 150m from blast site. It has been predicted that AOP is resulted less than 140dB(L) with reference to CPCB guideline (table-6), when maximum charge per delay ranges between 15kg to 25kg. There are no sensitive structures made of glass frames in the Naranda village which are vulnerable to air overpressure. Hence, in view of air overpressure/noise, blasting operations can be carried out safely without causing any structural damages at proposed development of Naranda limestone Mine.

Table-14: Predicted values of air overpressure/noise produced by different maximum charge per delay-

Distance	Air overpressure/noise in dB(L) generated by different values of Max. charge per delay at different distances		
	Max charge- 15kg	Max charge- 20kg	Max charge- 25kg
100	142.53	144.28	145.66
150	137.70	139.40	140.73
200	134.38	136.03	137.33
250	131.85	133.47	134.75
300	129.82	131.42	132.67
350	128.13	129.71	130.95
400	126.69	128.25	129.47
450	125.43	126.97	128.18
500	124.31	125.84	127.04
550	123.30	124.82	126.01
600	122.40	123.90	125.08
650	121.57	123.06	124.23

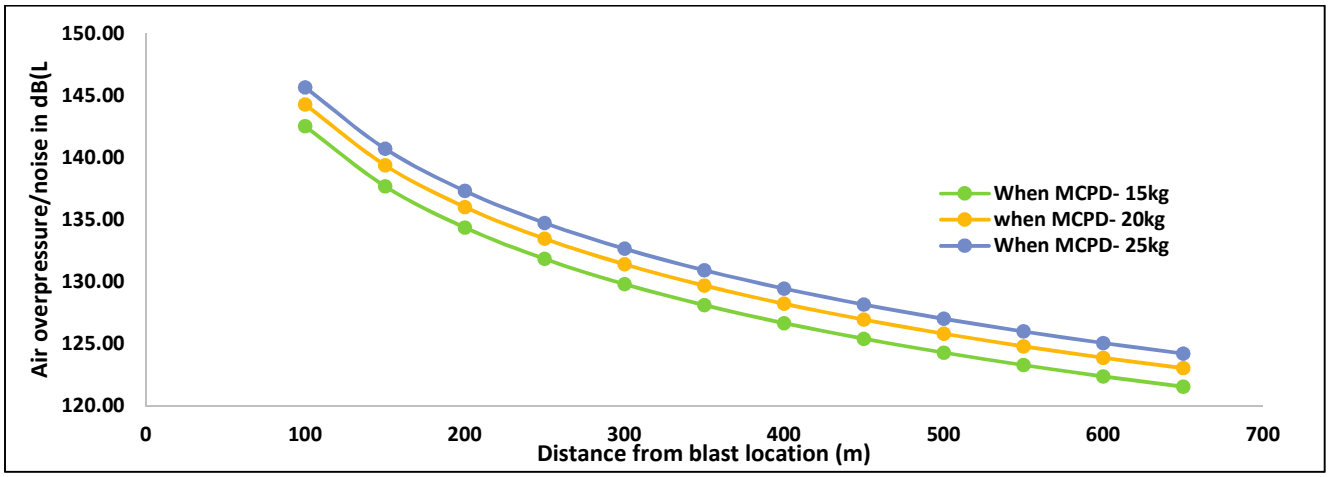


Figure- 20: Predicted value of air overpressure (AOP) at different distances for different values of maximum charge per delay.

9.0 Recommendations-

1. Drill Hole Diameter-

Drilling hole diameter of 110 mm is best suited for 5m height benches. For 110 mm diameter blast hole the true burden may be 2.0 to 2.5 M & spacing of 3 to 3.2 m.

2. No. of Rows –

During the experimental blast the length of the blast was more than the width of the blast. In most blasts length of the blasting block has been more than the width of the blasted block. In these cases, number of rows can result PPV within laid down norms and a maximum of 2 to 3 rows are recommended.

3.0 Initiation arrangements/tie-lines -

NONEL which has been used is best suitable to contain blast induced ground vibration and air blast. Besides, it also gives very good fragmentation, less back break, and controlled throw on free face. The delay between the hole may be kept as 17ms and between rows may be 42ms (Refer attached figure).

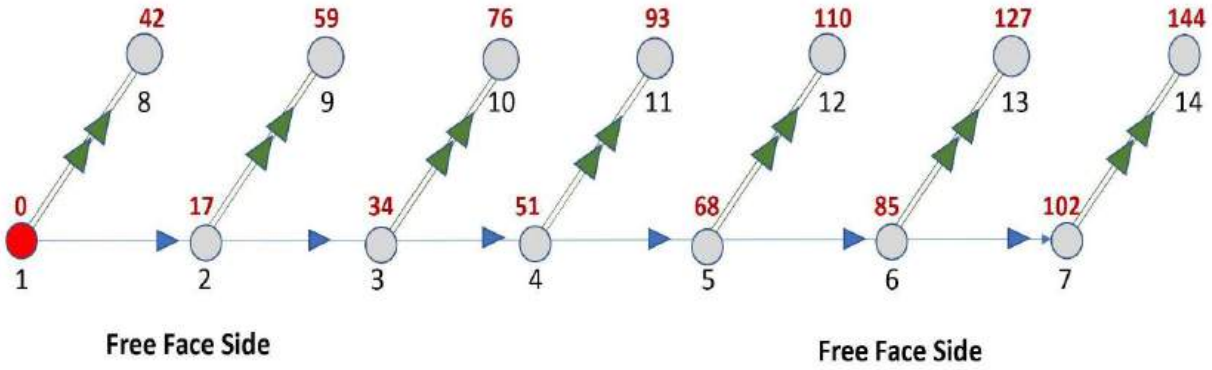


Figure-21: Two Row Blast Pattern with delay

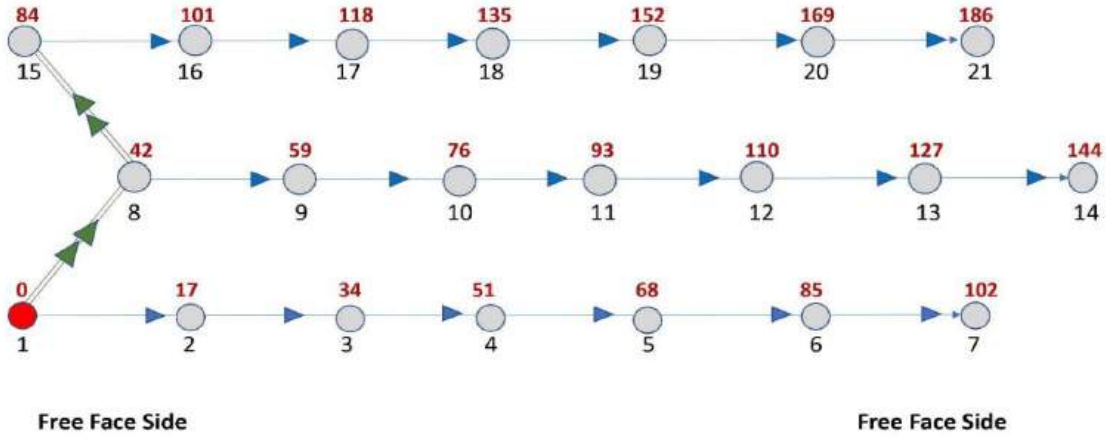


Figure-22: Three Row Blast Pattern with delay

- Misfires can be eliminated with the use of NONEL or shock tubes.
- Using a high delay interval of 450 MS down-the-hole delay with 17MS surface delay

ensures that the detonation of the surface tie line would be several rows or blast holes ahead before the first blast hole gets initiated (after 450ms) and ground movement starts subsequently. This makes the blast free from any misfires due to initiation resulted by cut-off of in hole or downline initiator due to ground movement.

- **Initiation pattern –** While drilling holes staggered pattern may be adopted. It has been observed that staggered pattern with equilateral triangular give better fragmentation as compared to square pattern.
- **Period of blast –** The total period of blast from the initiation of the first hole to the last hole should preferably be not more than 1000 Ms.

Before commencing Drilling:

(a). Face preparation before commencement of drilling –

The bench must be properly dozed to ensure no flying fragments of the previous blast or boulders are present. On the free face side, the face needs to be dressed properly so that no loose overhangs are present. The shotfirer must mark the location of holes after measuring the burden and spacing. The driller must report any deviations observed in burden and spacing and hole collapse during withdrawal of the drill rod.

(b). Free Face –

The key to success of any safe blast is the free face. It must be noted that the direction of throw must be towards free face. Whenever two free faces are available, the direction of throw can be diagonal for better muck pile and uniform throw.

(c). Stemming and stemming material-

To hold the post detonation fumes inside the blast hole is essential to ensure movement and breakage of the in-situ rock. The blasting crew should have specially trained workmen who can ensure tight stemming. If watery holes are encountered, it must be dealt with lot of care so as to ensure settlement of explosive and stemming material. In all the blasts dry drill cuttings were used and care was taken to see no damages to the shock tube down-line.

(d). Muffling of holes –

In case of critical areas only sandbags shall be placed over the conveyor belts so as to provide additional

precaution to restrict flying fragments.

(e). Charging of explosives on the last row of holes –

In case of more than 3 rows of blasting on the last row of holes, the quantity of explosive can be reduced by 10 to 15% so as to ensure better stability, reduction in back break, less dressing required before finishing excavation due to less loose overhangs and less overhang areas.

ADDITIONAL PRECAUTIONS:

- Maximum charge per delay and per blast for various distance of structures from blasting site may be estimated using equation stated above.
- Blasting Report showing hole number, location on the rows, depth, meterage of water inside the hole (if any), burden and spacing need to be prepared before commencement of lowering the booster and cartridge explosive. For any holes having less depth quantity to be adjusted accordingly keeping stemming height unchanged.
- Blast Area Security – The mine management shall strictly abide by blasting time and adequate number of guards shall be posted around the blast site to prevent inadvertent entry of persons. All the machineries shall be parked at safe distances following parking norms of each machinery. Sirens shall be blown to warn persons of nearby areas about blasting operations.
- The engineer concerned must move to the shelter after setting the instrument with proper time lags etc.
- Secondary Blasting should not be conducted and is not practiced. oversize boulders are broken and toes are removed by hydraulic rock breakers.
- Safety awareness and training needs of the blasting crew – The mine management shall hold training programs for engineers and statutory persons to deliberate on various aspects of blast design, charging, field management, blast area security, provisions of MMR 1961, and other guidelines. Blasting crew shall have adequate knowledge of safe handling, charging, stemming, priming, tie-line hook up of explosive, following the siren etc.
- PPE – all persons engaged in blasting shall be provided with PPE and other essential gadgets like whistle, red flags and hand gloves etc.

10.0 Conclusion:

The report presents the details of the experimental blasts carried out using cartridge explosives, for validating the blasting pattern and allowable maximum charge per delay and per round based on the ground vibration, air overpressure and other post blast details (like fly rock, muck pile, misfires if any, back break, throw etc).

In view of the successful and safe conduct of the blasts as a part of this Scientific Study, with explosives in cartridge form by following the norms as stipulated in the permission letter granted, it is recommended that the charge/delay and maximum charge of explosive per round as indicated above, and followed by the mine is in line with the provisions of MMR 1961 and also blasting practices can be termed as "Controlled Blasting".

Table-15: Safe Predicted value of MCPD & MCPR-

Distance of the structure from the blasting face	For village house/structure permanent in nature and not belonging to owner (safe Level of PPV- 10mm/sec)	For building /structure with limited span of life and belonging to owner (safe level of PPV- 15mm/sec)
[m]	[kg]	[kg]
100	6.00	16.90
150	13.50	38.04
200	24.00	67.63
250	37.51	105.69
300	54.01	152.20
350	73.53	207.18
400	96.04	270.63
450	121.56	342.53
500	150.08	422.91

Table-16: Blast design parameters as recommended shall be as follows-

Bench Type	Max. No. of Holes per Blast	Blast Hole Diameter	Hole Depth (m)	Burden x Spacing	Length of Explosive
Overburden	20	110mm	5m (Max.)	3.0m x 3.5m	1.9m- 2.0m
Ore/LST	20	110mm	5m (Max.)	2.50m x 3.0m	2.5m- 2.8m

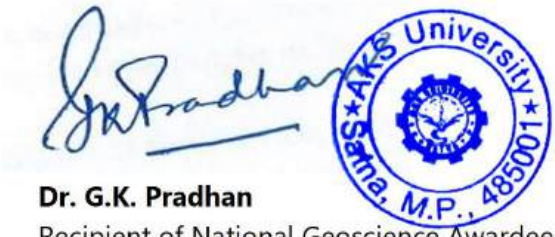
For executing a blast to protect the structure within 150m from the blast location, the maximum charge per delay shall not be exceed 13.50 kg and total quantity of charge per round shall not be exceed 266 kgs. Whereas, considering bench parameters with 5m bench height with 110mm blast hole diameter and structure distance from blast site shall be 150-200m from lease boundary. Following maximum charge

delay and total charge per round shall not exceed as tabulated below-

Table-17: MCPD & MCPR for the various structures near to lease boundary-

Distance of the structure from the blasting face	**Maximum charge per delay** for village house/structure permanent in nature and not belonging to owner (safe Level of PPV- 10mm/sec)	**Total charge per round** for village house/structure permanent in nature and not belonging to owner (safe Level of PPV- 10mm/sec)
[m]	**[kg]**	**[kg]**
150	13.50	266.29
160	15.36	302.98
170	17.34	342.04
180	19.44	383.46
190	21.66	427.26
200	24.00	473.42

Regular monitoring of blast induced ground vibration and air over pressure shall be carried out for analysis of impact towards Naranda Village structure (Overhead tank & Naranda Govt. School Building) for further optimization in blast parameters to reduce the impact of blasting (if any).



Dr. G.K. Pradhan
Recipient of National Geoscience Awardee
Principal Investigator (PI)
Professor of Mining Engineering & Dean
Faculty of Engineering &Technology (FE&T)
AKS University, Satna (M.P.)

Instantel

Event Report

Instantel

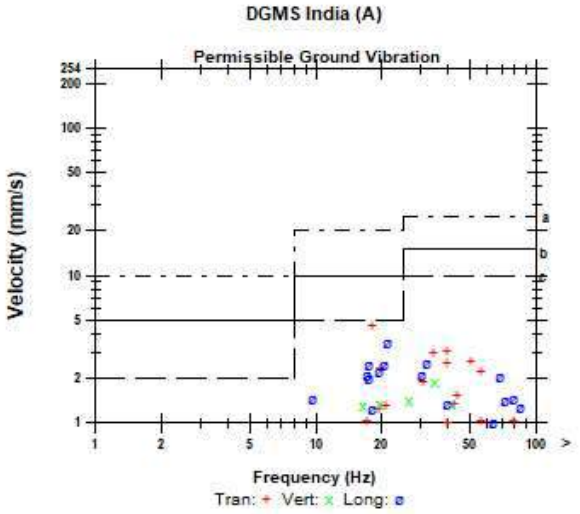
Date/Time	Vert at 14:15:29 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123141529.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

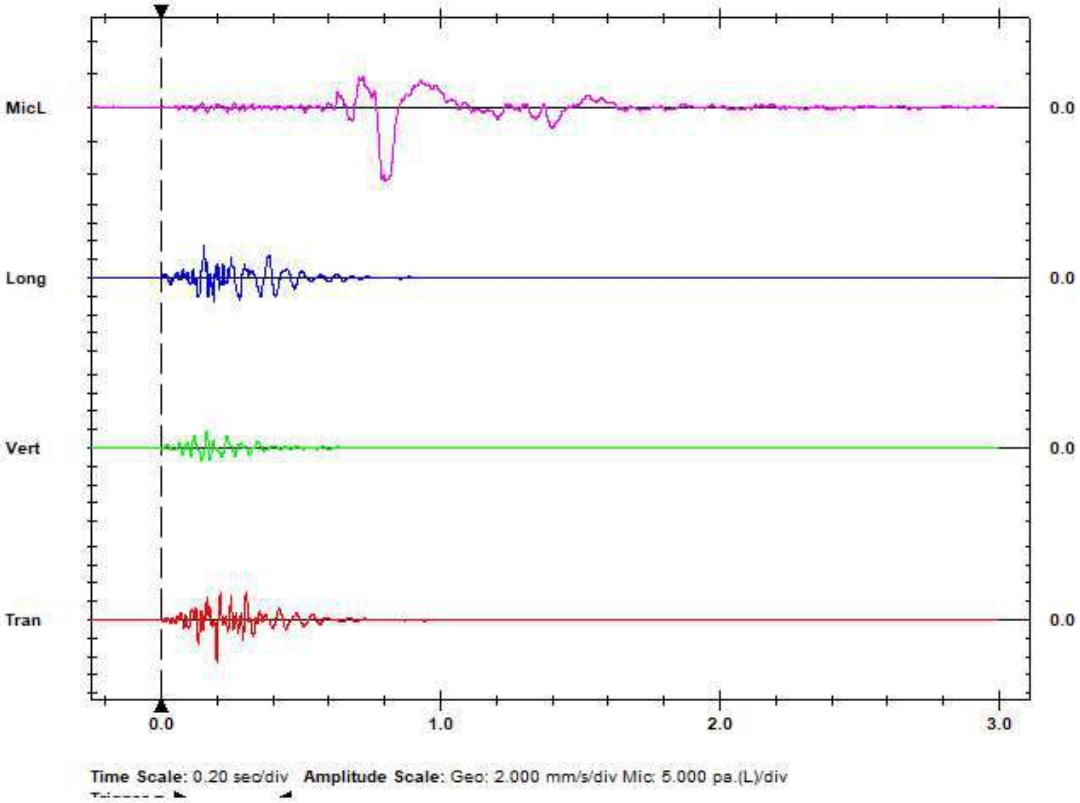
Microphone	Linear Weighting
PSPL	114.7 dB(L) at 0.806 sec
ZC Freq	6.1 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	4.595	1.892	3.460	mm/s
ZC Freq	18.3	34	21	Hz
Time (Rel. to Trig)	0.199	0.163	0.152	sec
Peak Acceleration	0.160	0.067	0.127	g
Peak Displacement	0.019	0.008	0.021	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 4.597 mm/s at 0.199 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1) Format © 1995-2015 Xmark Corporation

Instantel

Event Report

Instantel

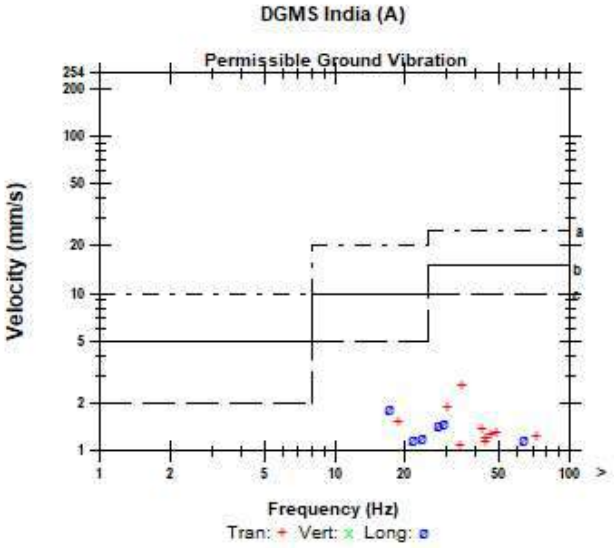
Date/Time	Vert at 14:17:36 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123141736.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

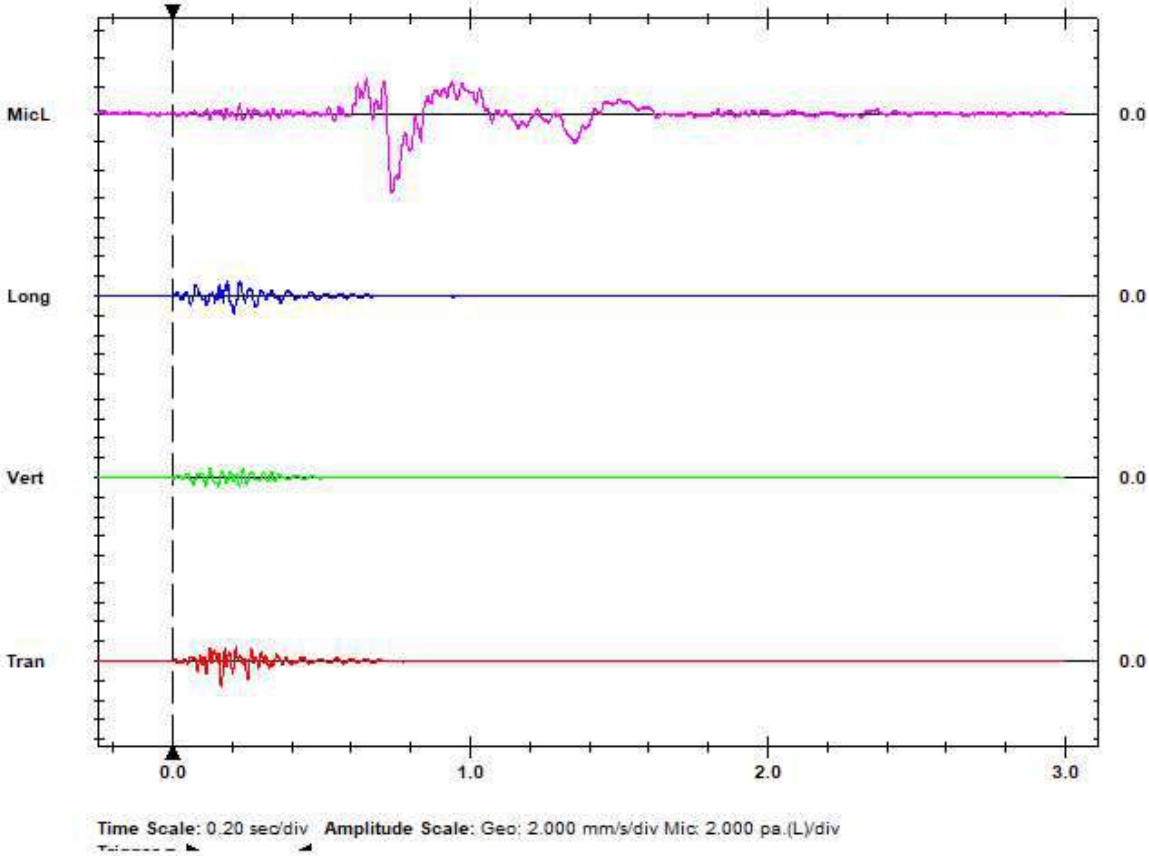
Microphone	Linear Weighting
PSPL	108.8 dB(L) at 0.734 sec
ZC Freq	4.1 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	2.640	0.946	1.836	mm/s
ZC Freq	35	30	17.1	Hz
Time (Rel. to Trig)	0.163	0.125	0.206	sec
Peak Acceleration	0.089	0.043	0.059	g
Peak Displacement	0.011	0.007	0.013	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.689 mm/s at 0.163 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1) Format © 1995-2015 Xmark Corporation

Instantel

Event Report

Instantel

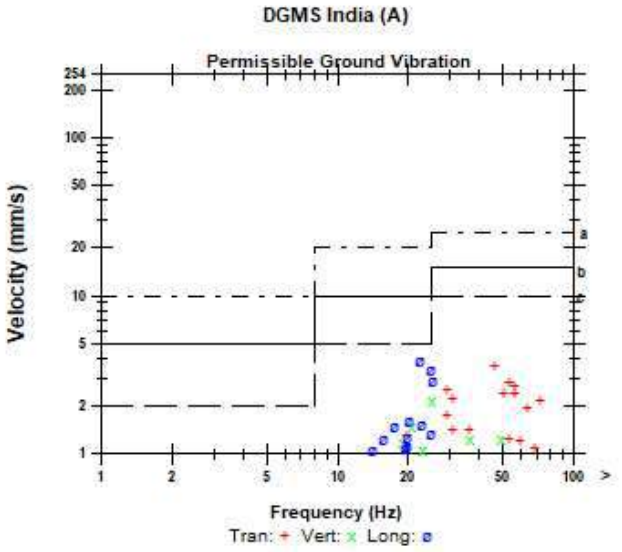
Date/Time	Vert at 14:21:25 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123142125.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

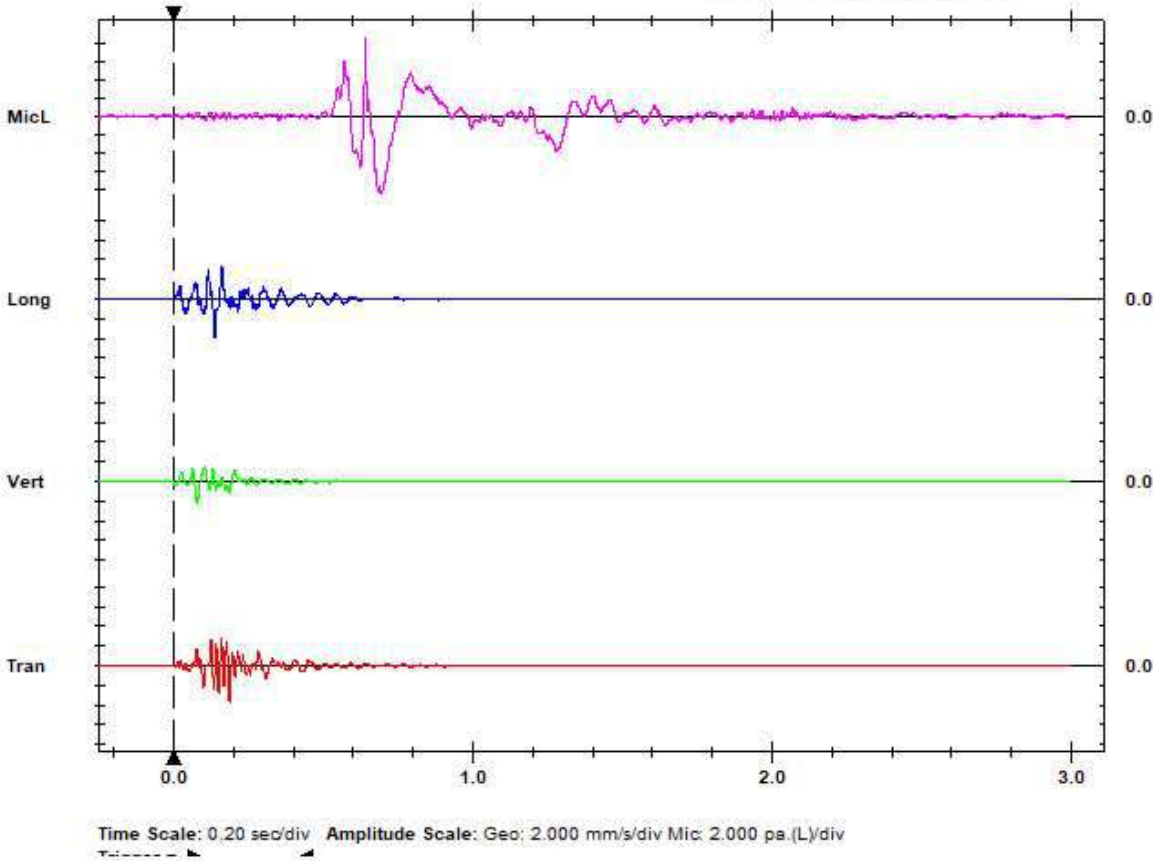
Microphone	Linear Weighting
PSPL	112.6 dB(L) at 0.640 sec
ZC Freq	22 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	3.618	2.168	3.933	mm/s
ZC Freq	47	25	22	Hz
Time (Rel. to Trig)	0.187	0.078	0.137	sec
Peak Acceleration	0.130	0.058	0.148	g
Peak Displacement	0.012	0.013	0.020	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 4.307 mm/s at 0.160 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1) Format © 1995-2015 Xmark Corporation

Instantel

Event Report

Instantel

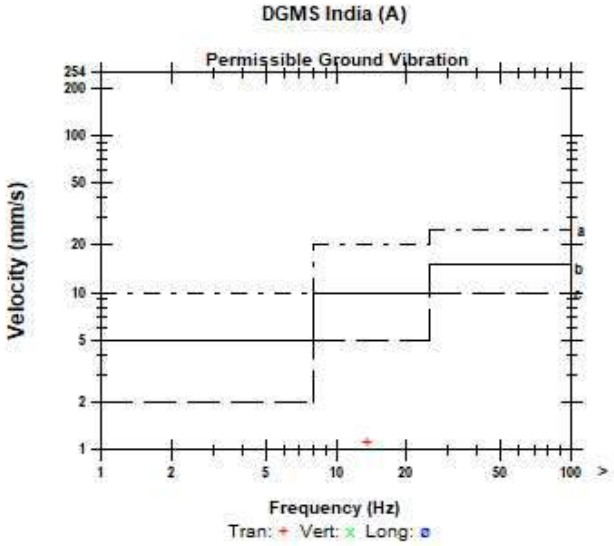
Date/Time	Long at 14:31:48 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123143148.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

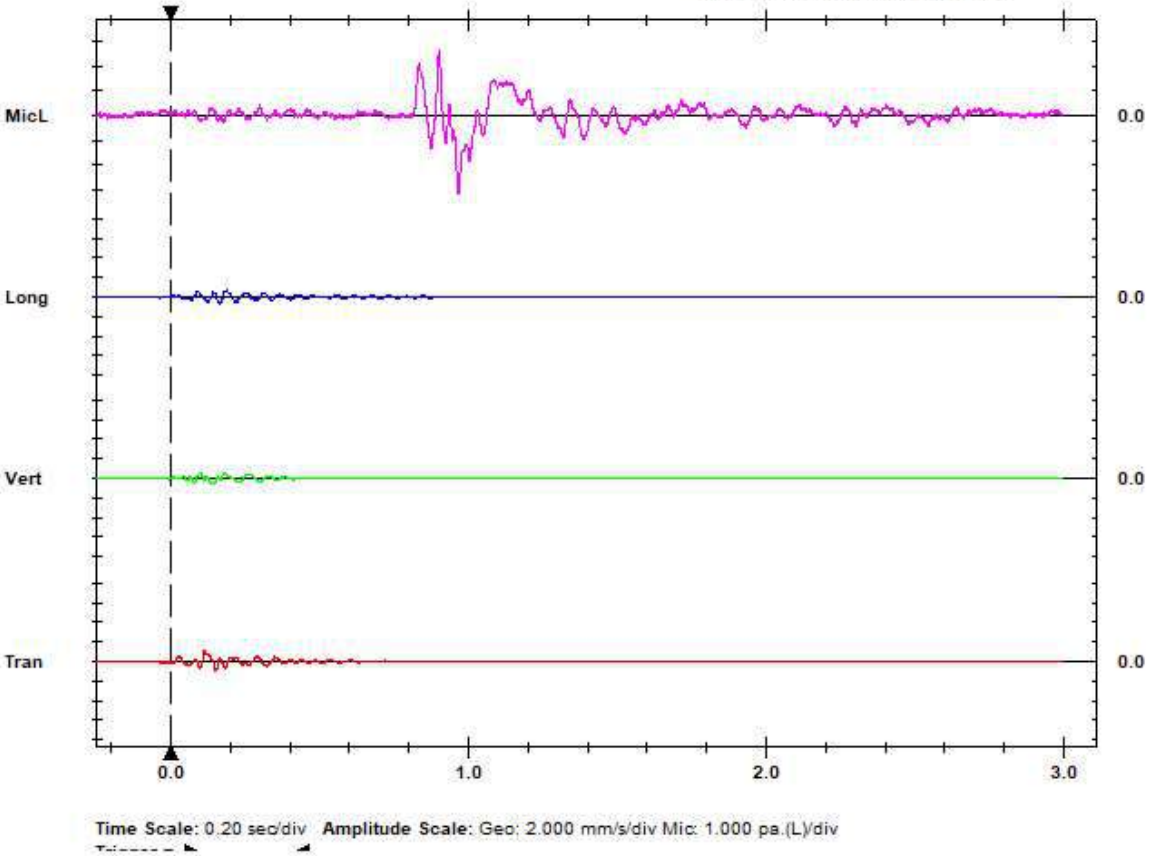
Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

Microphone	Linear Weighting
PSPL	104.0 dB(L) at 0.968 sec
ZC Freq	5.8 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	1.111	0.654	0.788	mm/s
ZC Freq	13.7	14.4	18.3	Hz
Time (Rel. to Trig)	0.114	0.180	0.188	sec
Peak Acceleration	0.026	0.016	0.030	g
Peak Displacement	0.011	0.006	0.006	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.119 mm/s at 0.114 sec





Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

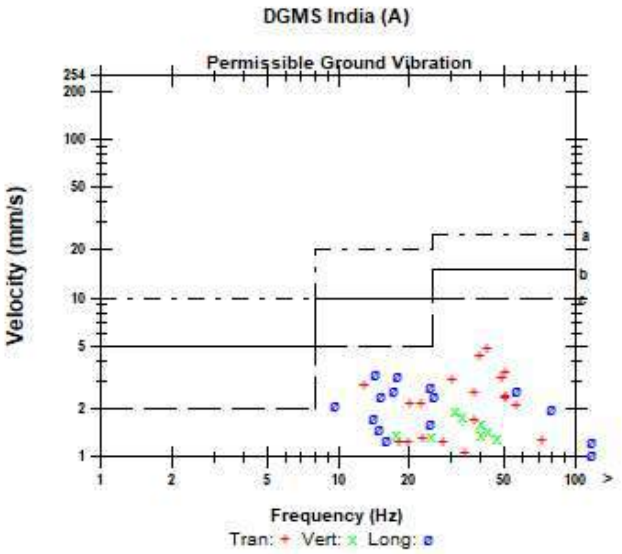
Date/Time	Vert at 14:37:56 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123143756.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

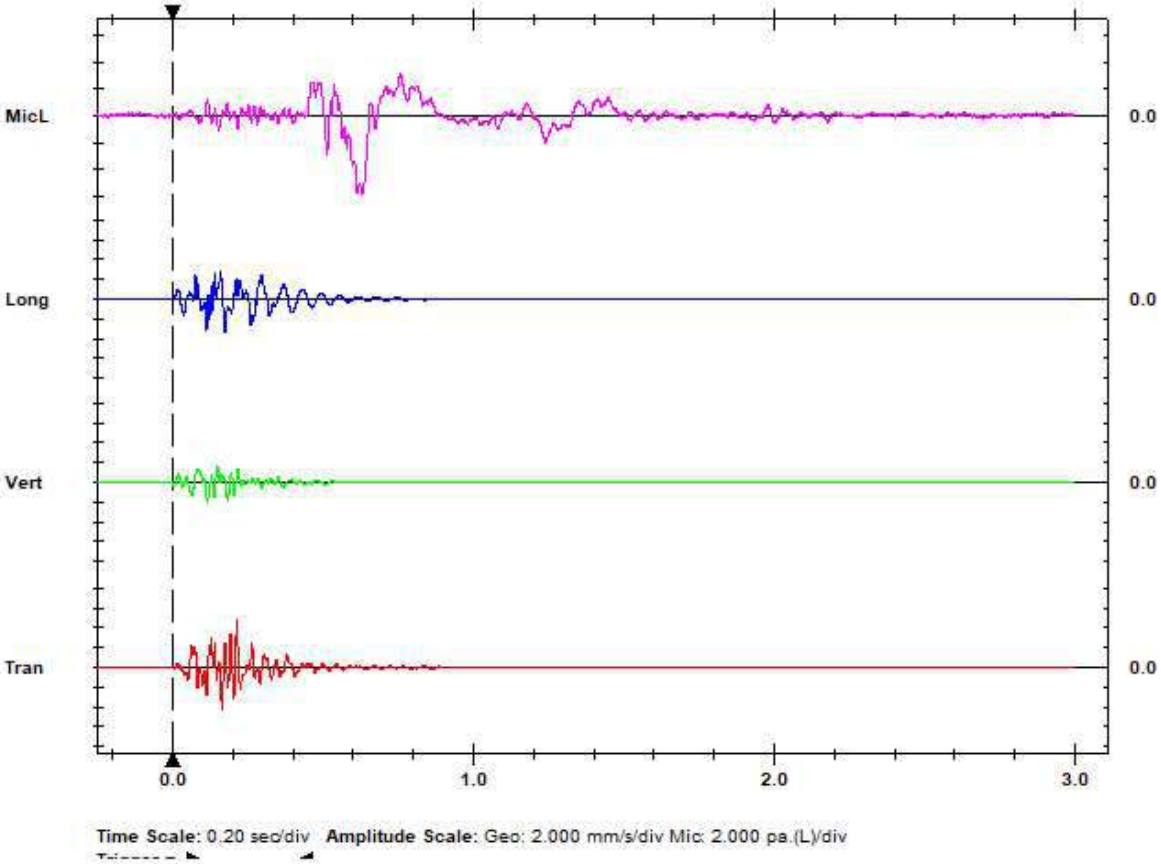
Microphone	Linear Weighting
PSPL	109.4 dB(L) at 0.629 sec
ZC Freq	5.3 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	4.847	1.970	3.326	mm/s
ZC Freq	43	31	14.4	Hz
Time (Rel. to Trig)	0.213	0.115	0.173	sec
Peak Acceleration	0.191	0.082	0.168	g
Peak Displacement	0.023	0.013	0.025	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 5.256 mm/s at 0.212 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

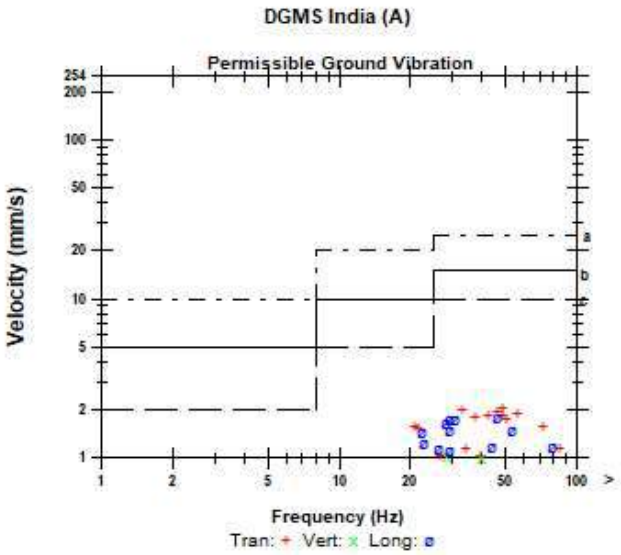
Date/Time	Vert at 14:45:18 January 23, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240123144518.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

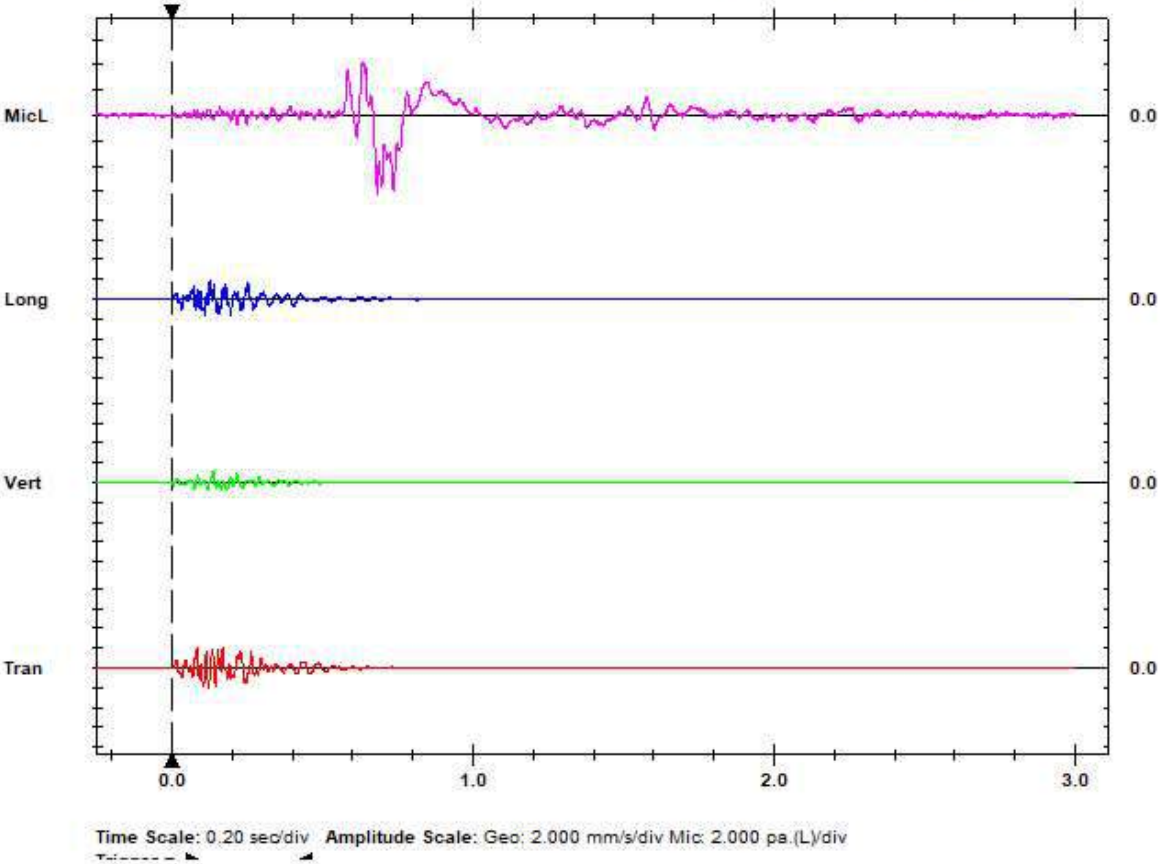
Microphone	Linear Weighting
PSPL	109.8 dB(L) at 0.682 sec
ZC Freq	5.0 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1191 mv)

	Tran	Vert	Long	
PPV	2.065	1.033	1.789	mm/s
ZC Freq	49	28	47	Hz
Time (Rel. to Trig)	0.169	0.137	0.125	sec
Peak Acceleration	0.087	0.043	0.097	g
Peak Displacement	0.012	0.005	0.010	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.357 mm/s at 0.169 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

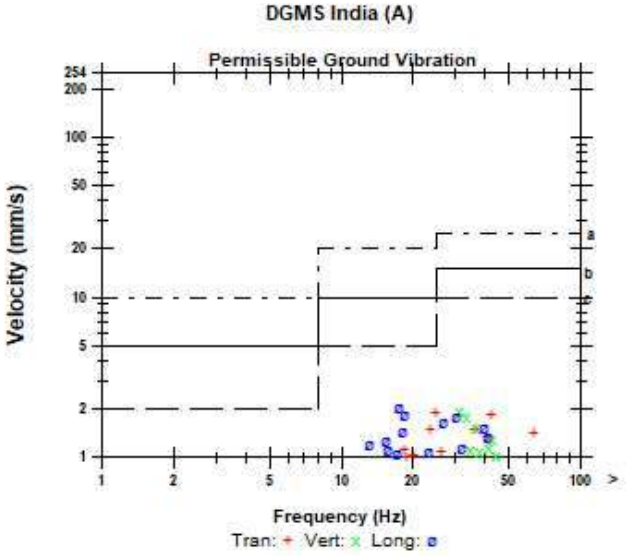
Date/Time	Vert at 13:51:55 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124135155.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

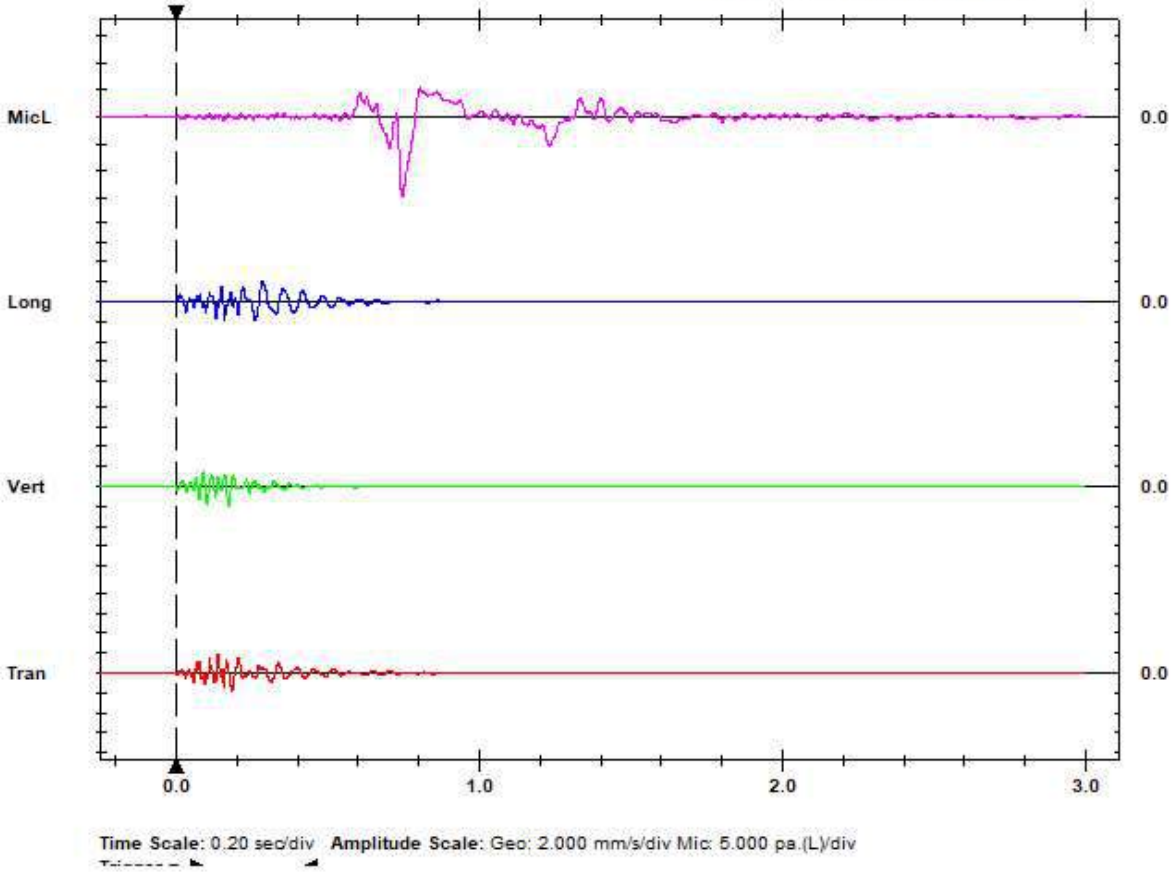
Microphone	Linear Weighting
PSPL	117.3 dB(L) at 0.747 sec
ZC Freq	8.5 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	1.892	1.955	2.057	mm/s
ZC Freq	25	31	17.7	Hz
Time (Rel. to Trig)	0.185	0.172	0.284	sec
Peak Acceleration	0.081	0.067	0.066	g
Peak Displacement	0.010	0.009	0.018	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.349 mm/s at 0.159 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

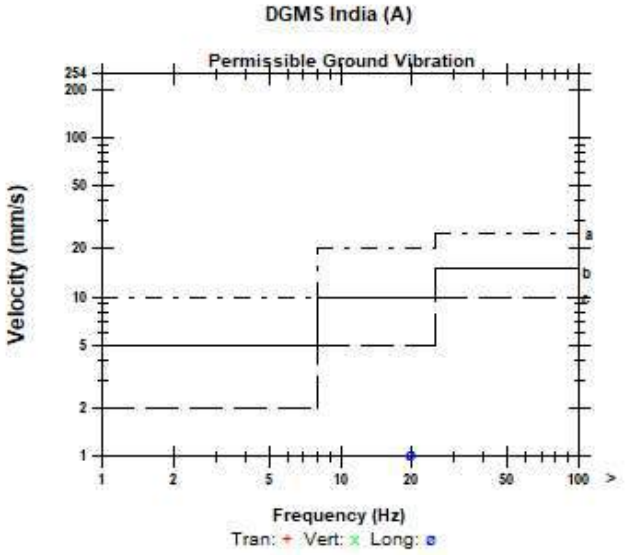
Date/Time	Vert at 13:55:45 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124135545.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

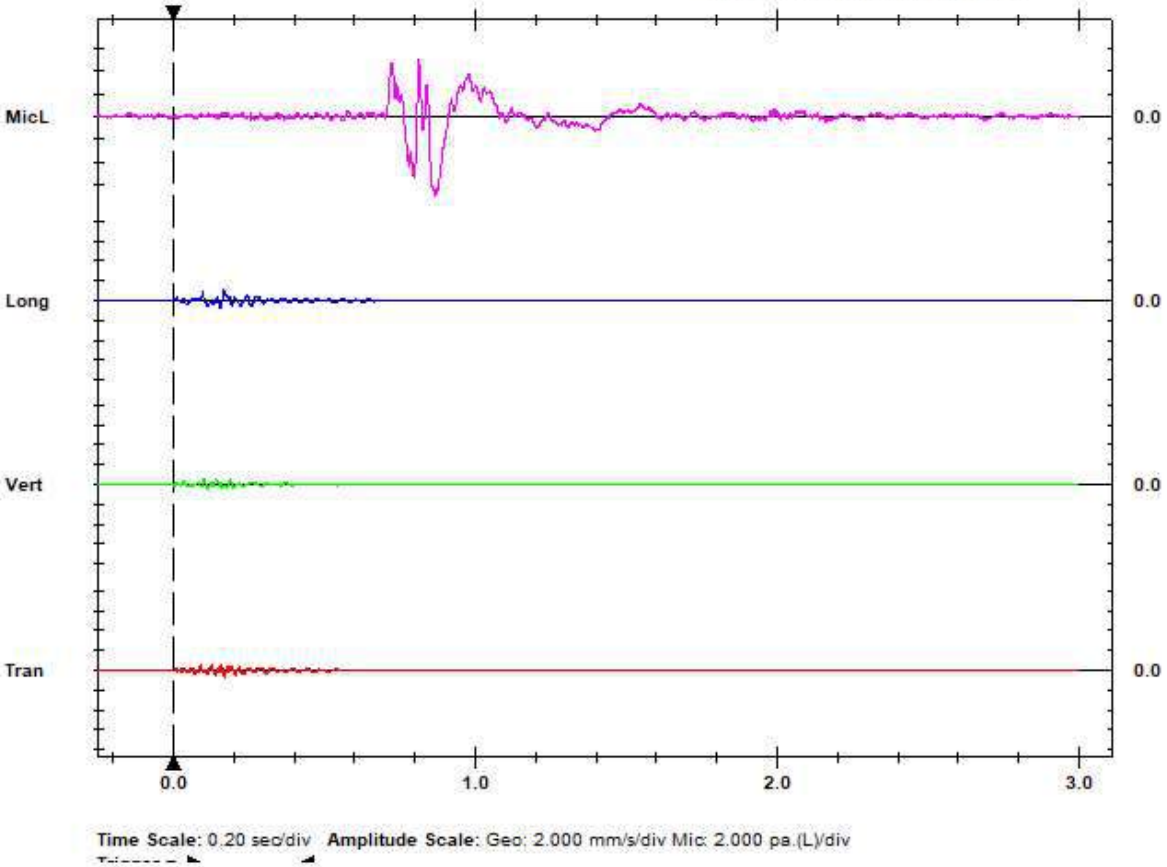
Microphone	Linear Weighting
PSPL	110.8 dB(L) at 0.868 sec
ZC Freq	7.9 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	0.662	0.575	1.040	mm/s
ZC Freq	47	27	19.7	Hz
Time (Rel. to Trig)	0.169	0.140	0.167	sec
Peak Acceleration	0.043	0.026	0.044	g
Peak Displacement	0.002	0.003	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.164 mm/s at 0.168 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 2.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

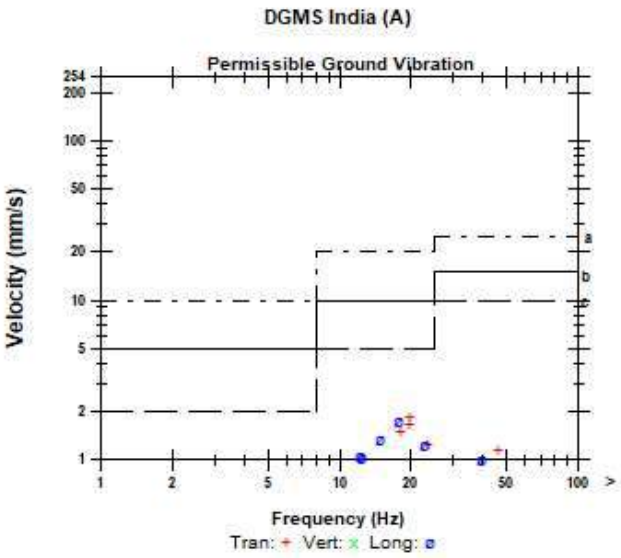
Date/Time	Vert at 14:03:26 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124140326.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

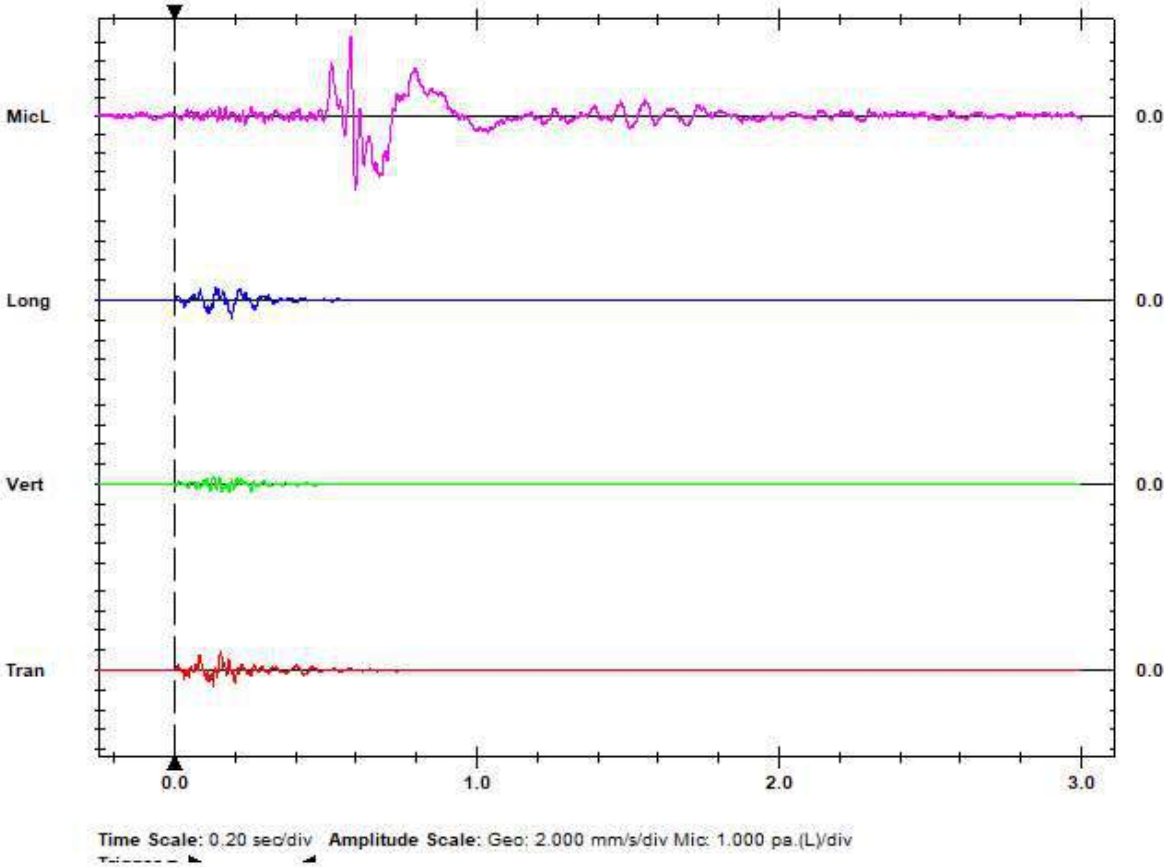
Microphone	Linear Weighting
PSPL	106.6 dB(L) at 0.582 sec
ZC Freq	24 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	1.852	0.804	1.766	mm/s
ZC Freq	19.7	24	18.0	Hz
Time (Rel. to Trig)	0.152	0.155	0.189	sec
Peak Acceleration	0.064	0.044	0.064	g
Peak Displacement	0.011	0.005	0.012	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.931 mm/s at 0.127 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

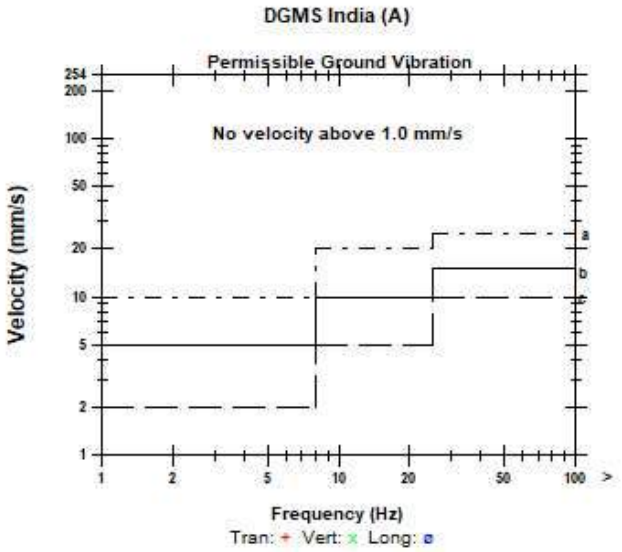
Date/Time	Vert at 14:11:25 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124141125.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

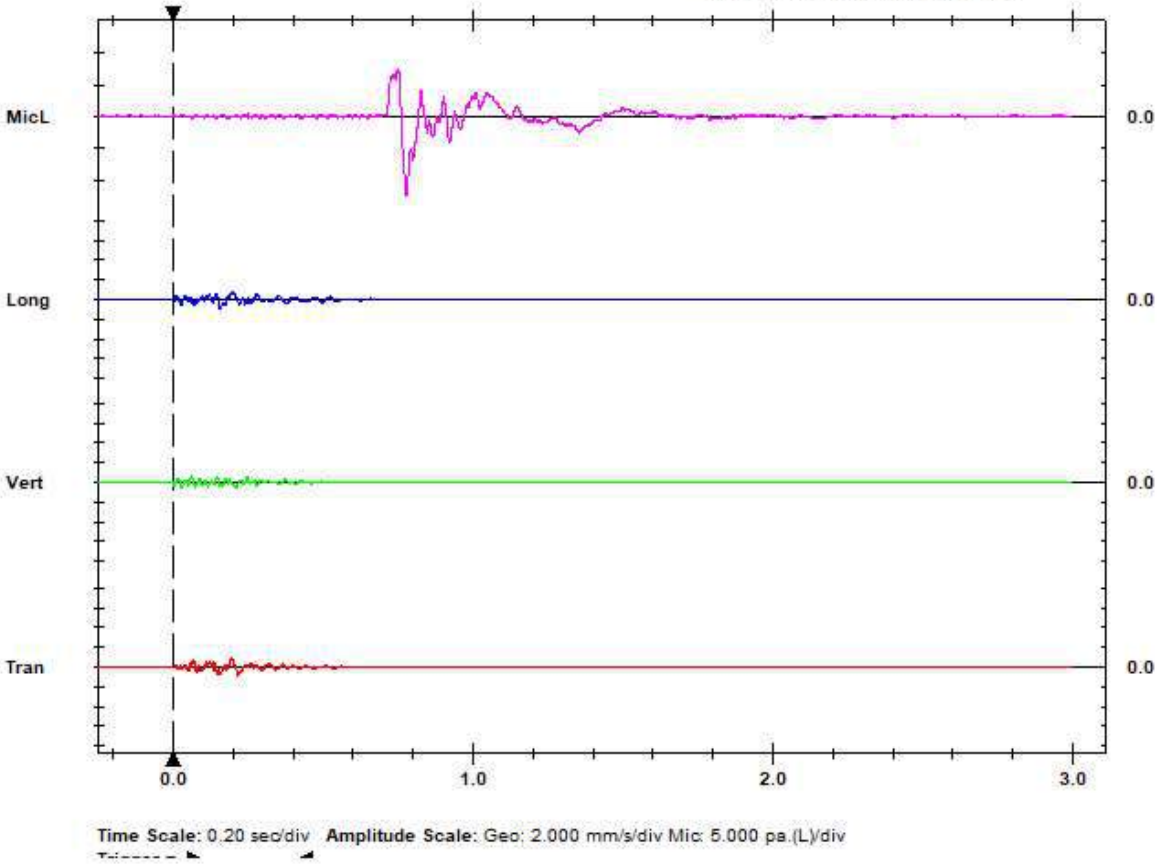
Microphone	Linear Weighting
PSPL	115.7 dB(L) at 0.778 sec
ZC Freq	8.7 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	0.969	0.772	0.930	mm/s
ZC Freq	20	37	19.0	Hz
Time (Rel. to Trig)	0.196	0.062	0.155	sec
Peak Acceleration	0.058	0.033	0.041	g
Peak Displacement	0.006	0.004	0.007	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 1.217 mm/s at 0.197 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1)

Instantel

Event Report

Instantel

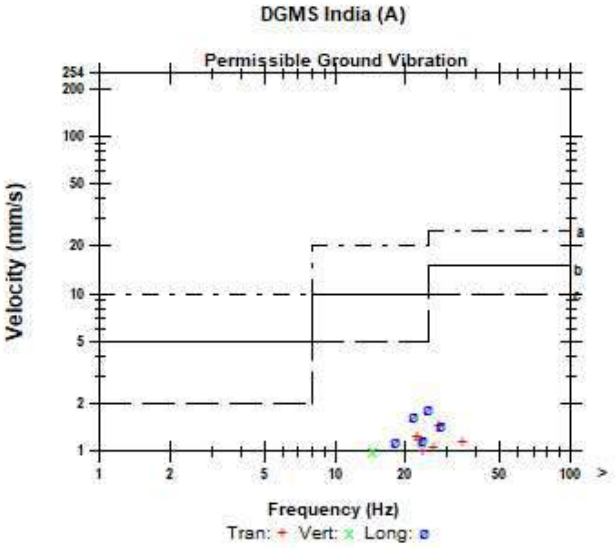
Date/Time	Vert at 14:16:36 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124141636.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

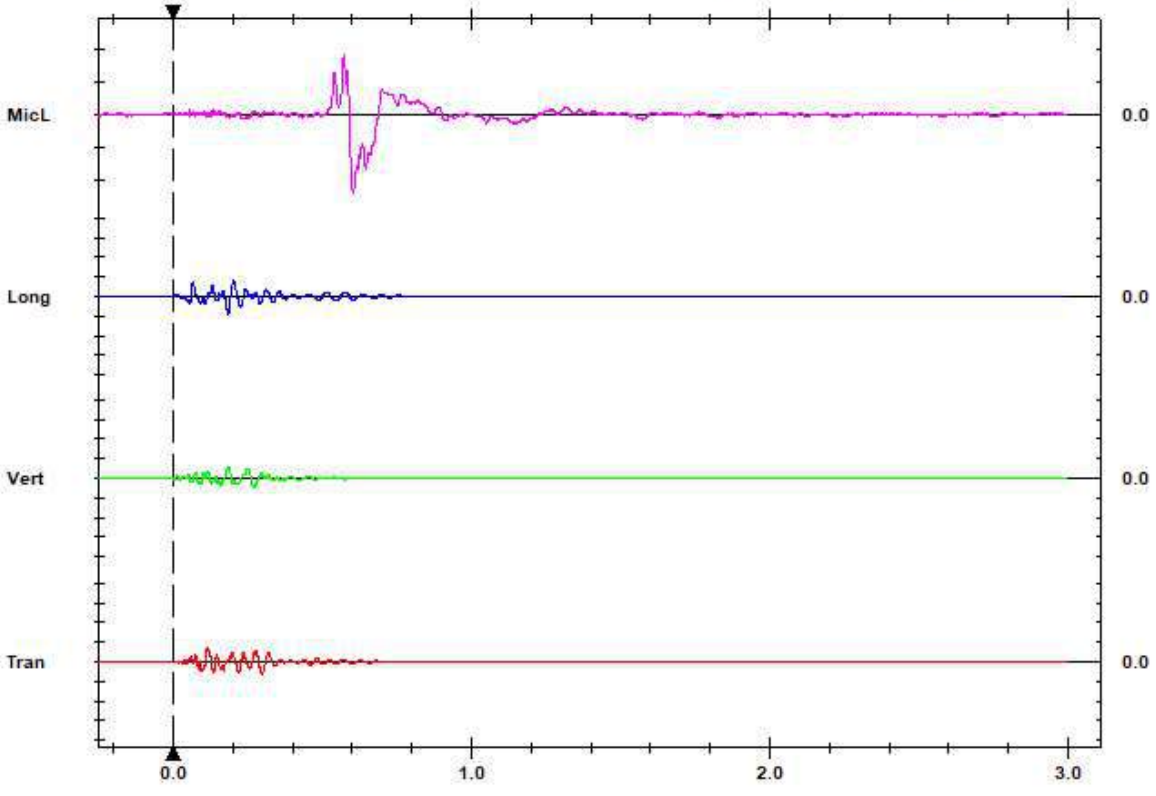
Microphone	Linear Weighting
PSPL	115.6 dB(L) at 0.603 sec
ZC Freq	5.1 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	1.466	1.143	1.860	mm/s
ZC Freq	28	23	25	Hz
Time (Rel. to Trig)	0.115	0.186	0.184	sec
Peak Acceleration	0.041	0.044	0.049	g
Peak Displacement	0.008	0.009	0.011	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 2.175 mm/s at 0.184 sec



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



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1) Format © 1995-2015 Xmark Corporation

Event Report

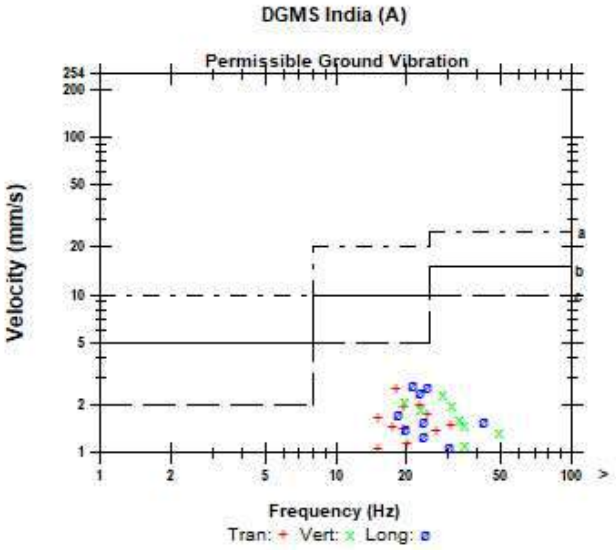
Date/Time	Vert at 14:22:14 January 24, 2024	**Serial Number**	UM20687 V 10-90FB Micromate ISEE
Trigger Source	Geo: 0.127 mm/s, Mic: 100.00 dB(L)	**Battery Level**	3.7 Volts
Range	Geo: 254.0 mm/s	**Unit Calibration**	October 5, 2023 by UES New Delhi
Record Time	3.0 sec at 2048 sps	**File Name**	UM20687_20240124142214.IDFW
Operator/Setup:	AKS UNIVERSITY_SATNA/DALMIA CEMENT.M	**Scaled Distance**	N/A

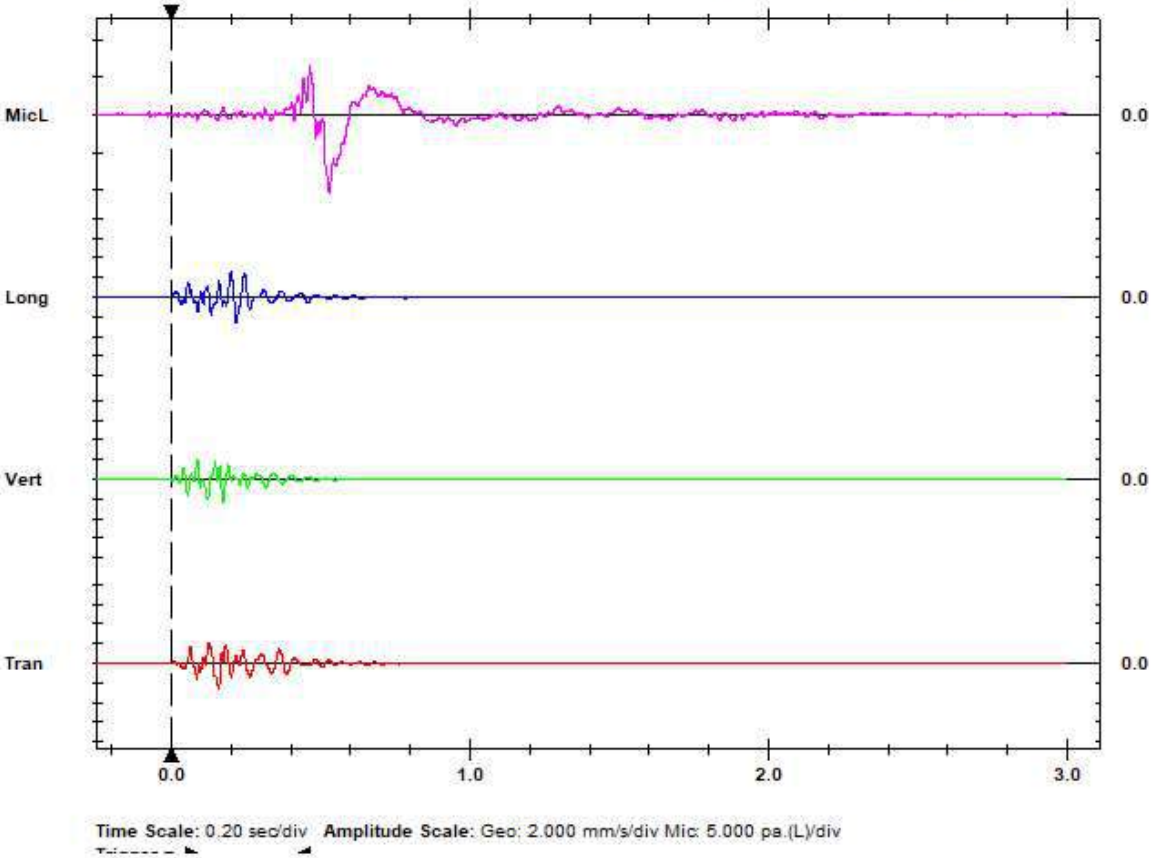
Notes
Location: NARANDA LIMESTONE DALMIA CEMENT
Client: DALMIA CEMENT
User Name:
General:

Microphone	Linear Weighting
PSPL	114.3 dB(L) at 0.529 sec
ZC Freq	4.3 Hz
Channel Test	Passed (Freq = 19.7 Hz Amp = 1229 mv)

	Tran	Vert	Long	
PPV	2.554	2.317	2.680	mm/s
ZC Freq	18.3	28	21	Hz
Time (Rel. to Trig)	0.160	0.172	0.217	sec
Peak Acceleration	0.072	0.100	0.067	g
Peak Displacement	0.021	0.014	0.017	mm
Sensor Check	Passed	Passed	Passed	

Peak Vector Sum 3.174 mm/s at 0.160 sec



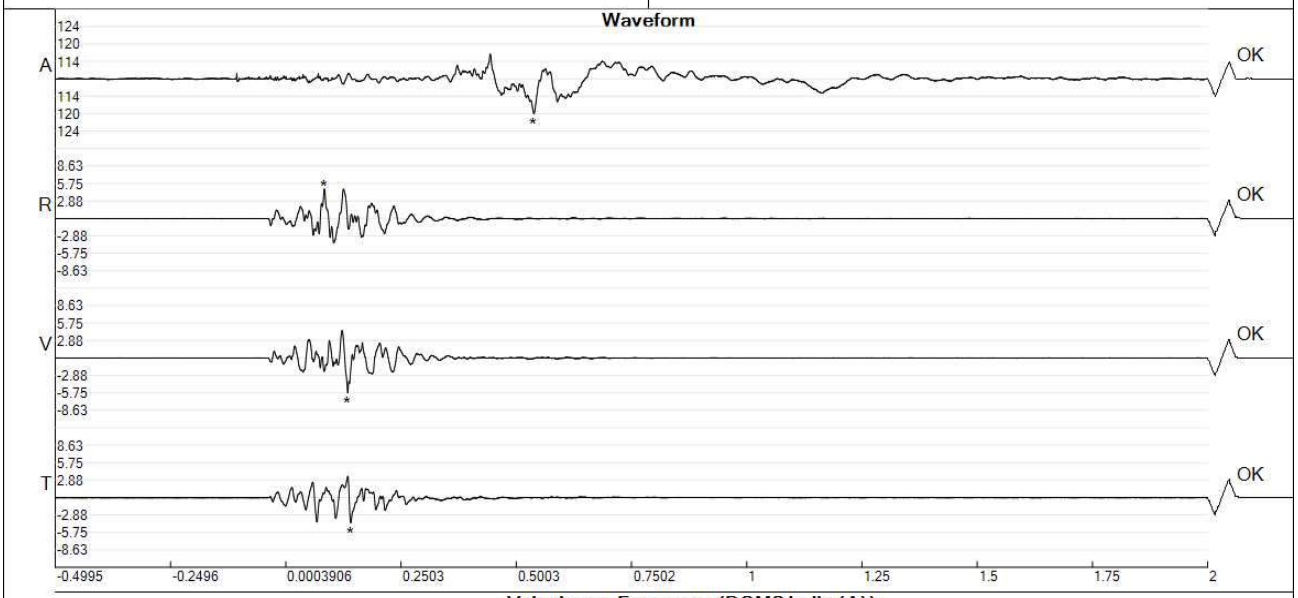


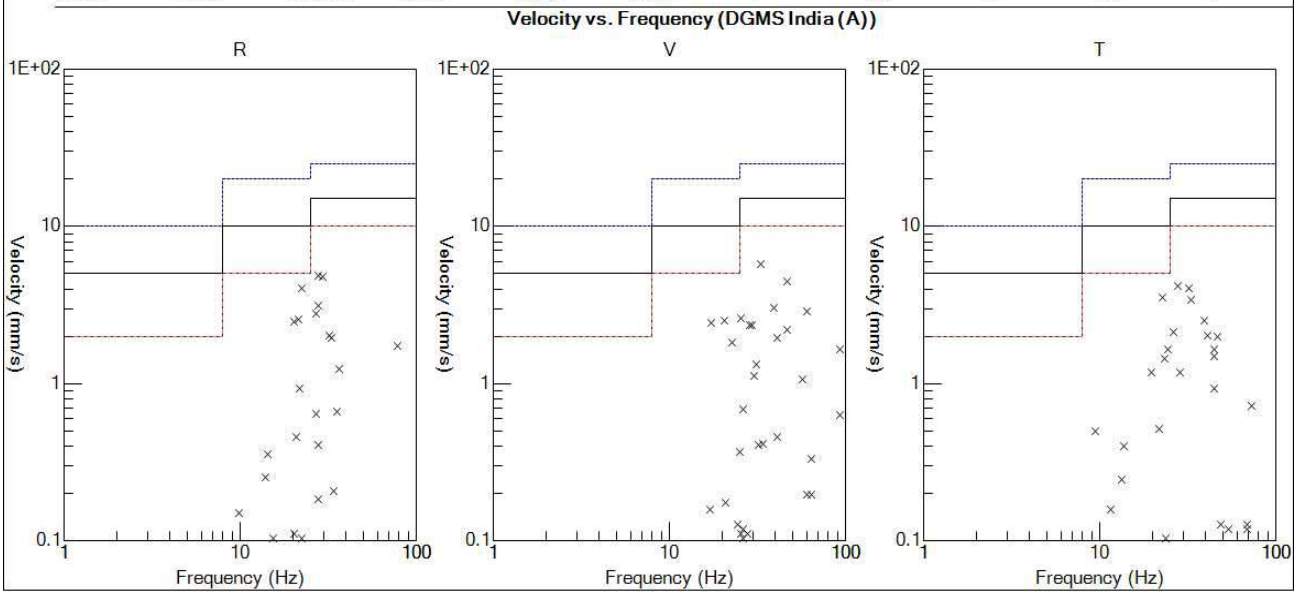
Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div

Printed: March 2, 2024 (V 10.72 - 10.72.1) Format © 1995-2015 Instantel Corporation

Record: 10151202401231418220904.proevt
Number: 904
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 23-01-2024 14:18:22
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.20

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 5.75 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 120.0 dB @ 5.0 Hz (0.5390625 s)	
Radial #1: 4.83 mm/s @ 27.7 Hz (0.08447266 s)	
Vertical #1: 5.75 mm/s @ 33.0 Hz (0.1352539 s)	
Transverse #1: 4.15 mm/s @ 27.7 Hz (0.1420898 s)	
Last Calibration Date: 28-02-2023	

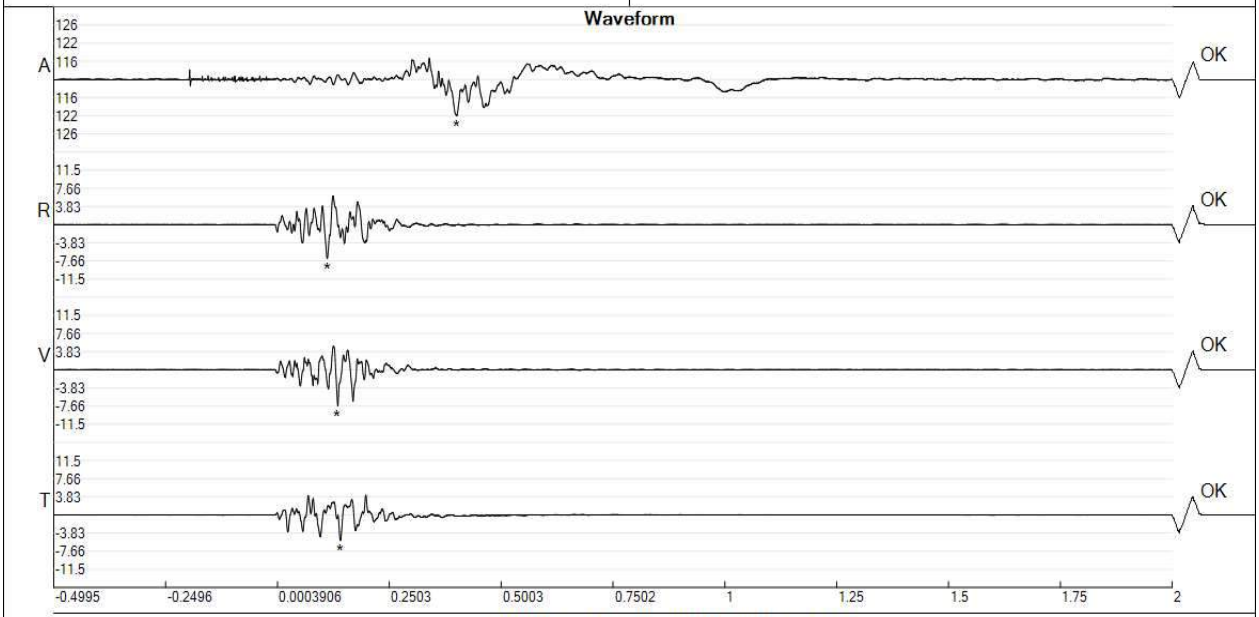


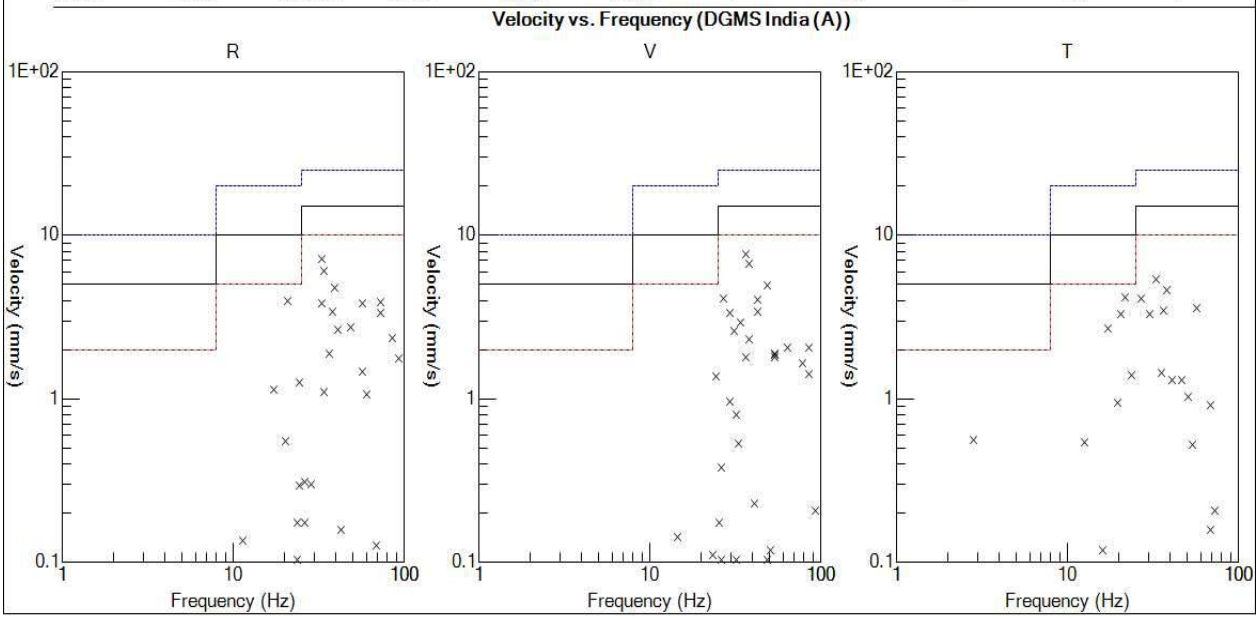


White Seismograph Data Analysis V13

Record: 10151202401231420290905.proevt
Number: 905
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 23-01-2024 14:20:29
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.28

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 7.66 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 121.7 dB @ 6.4 Hz (0.4018555 s)	
Radial #1: 7.14 mm/s @ 33.0 Hz (0.1123047 s)	
Vertical #1: 7.66 mm/s @ 36.6 Hz (0.1357422 s)	
Transverse #1: 5.42 mm/s @ 33.0 Hz (0.1416016 s)	
Last Calibration Date: 28-02-2023	

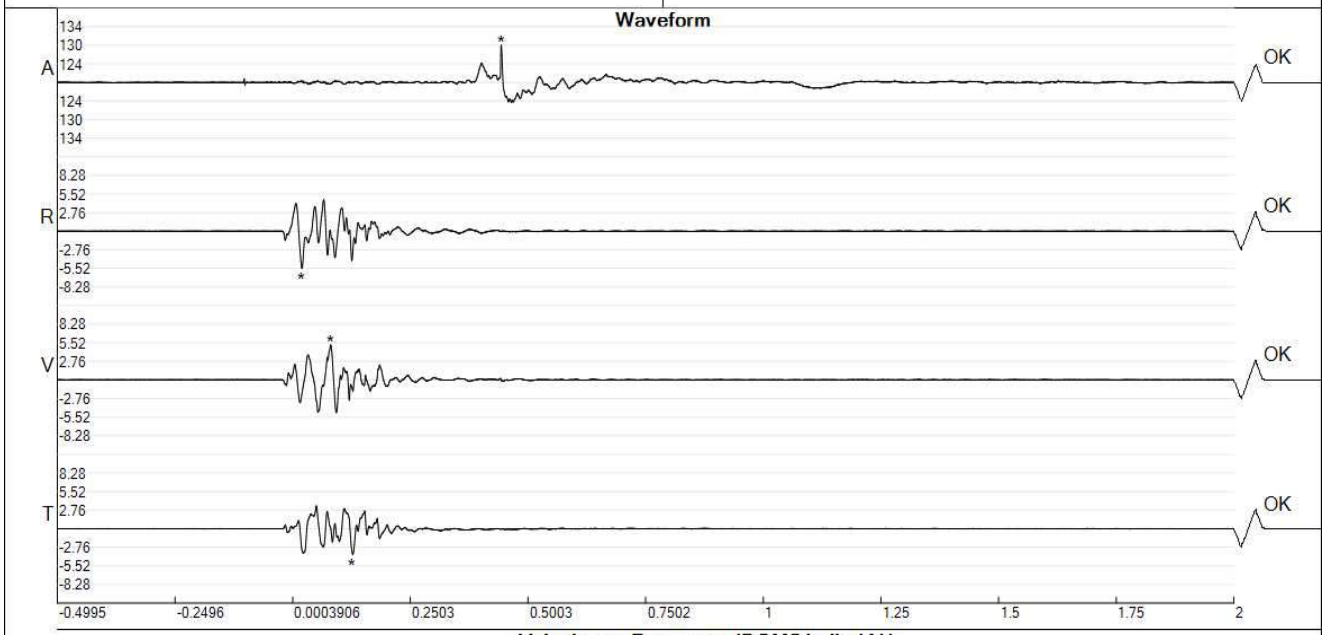


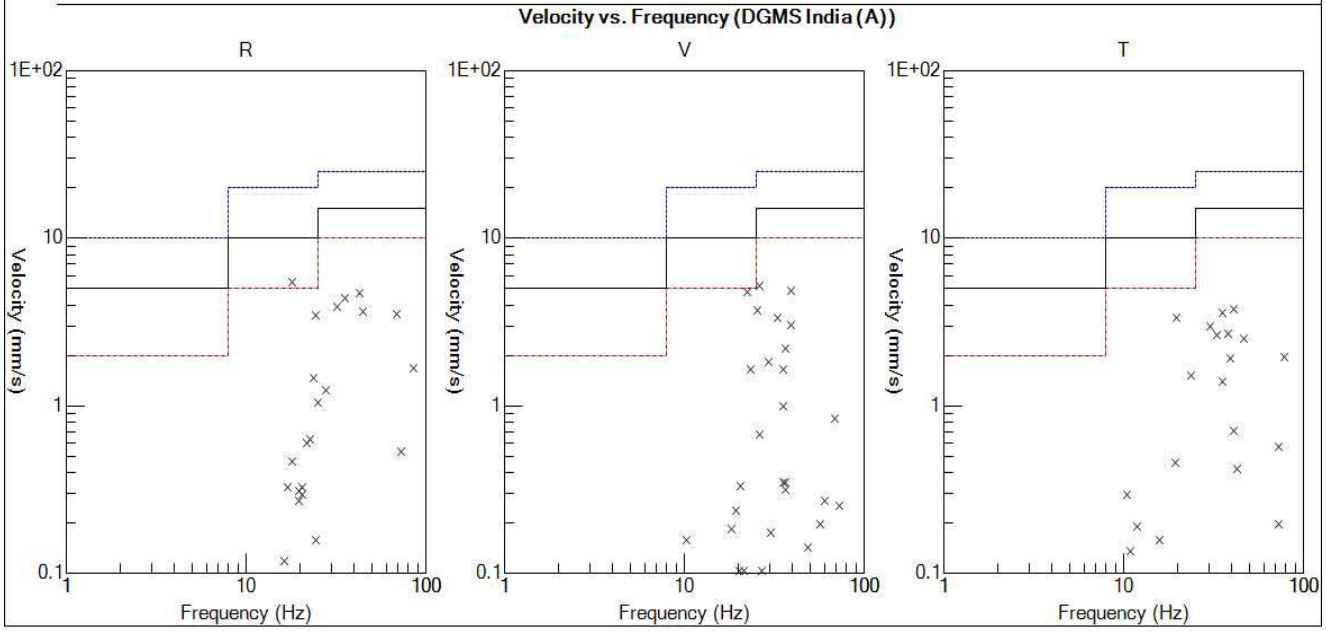


White Seismograph Data Analysis V13

Record: 10151202401231424180906.proevt
Number: 906
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 23-01-2024 14:24:18
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.18

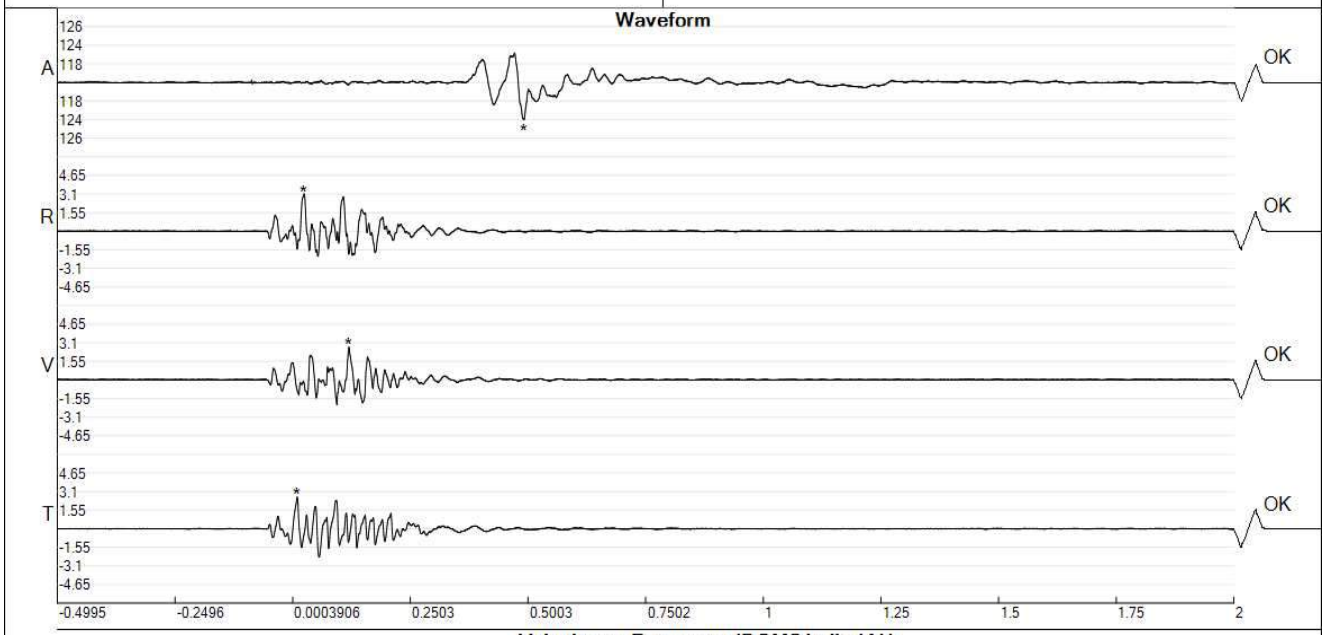
Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 5.52 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 129.9 dB @ 7.6 Hz (0.4438477 s)	
Radial #1: 5.52 mm/s @ 18.0 Hz (0.02050781 s)	
Vertical #1: 5.22 mm/s @ 26.3 Hz (0.08154297 s)	
Transverse #1: 3.8 mm/s @ 41.0 Hz (0.128418 s)	
Last Calibration Date: 28-02-2023	

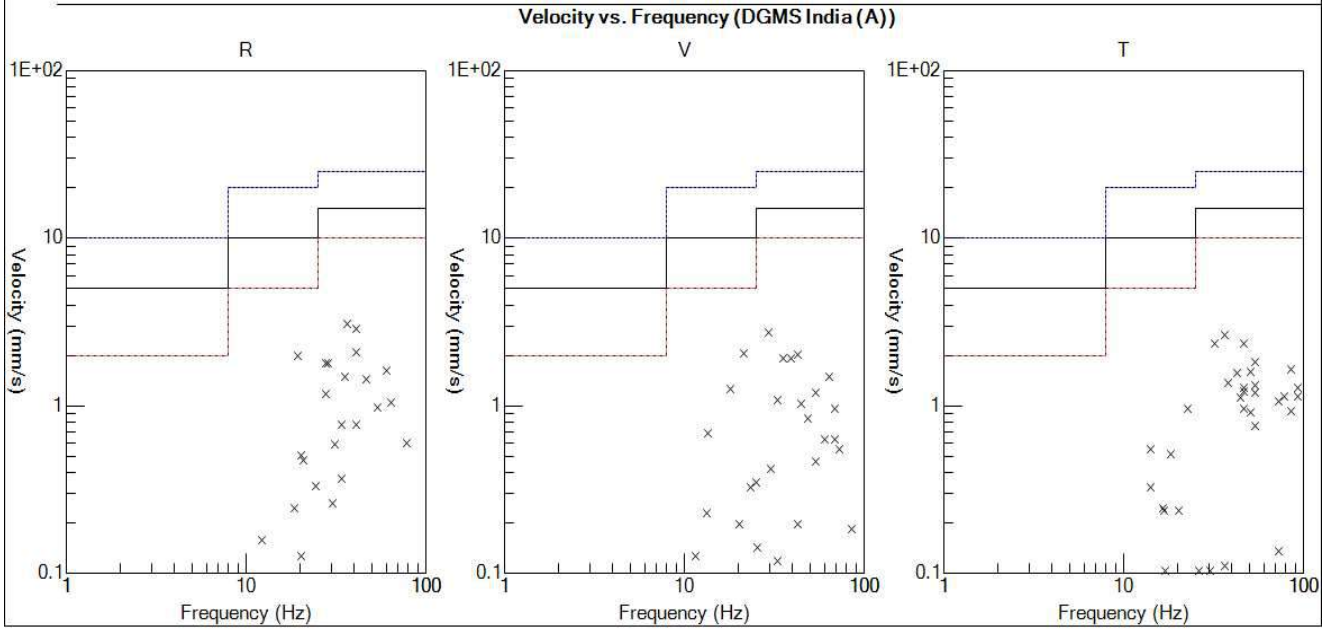




Record: 10151202401231440500918.proevt
Number: 918
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 23-01-2024 14:40:50
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.19

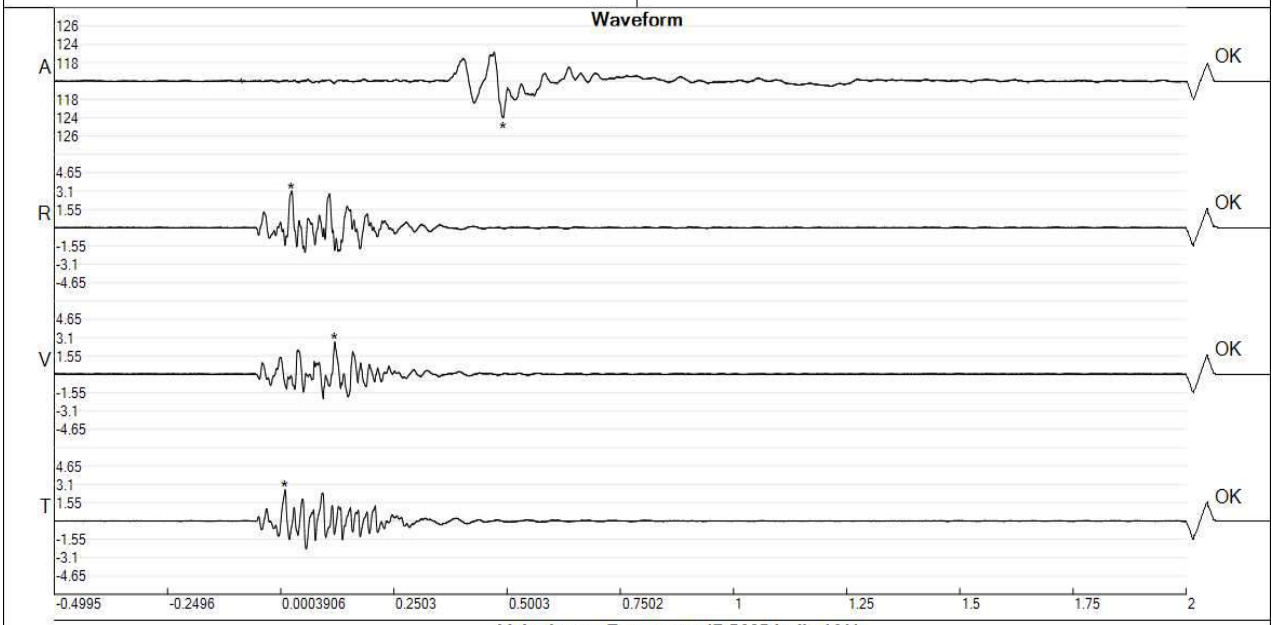
Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 3.1 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 123.1 dB @ 5.2 Hz (0.4921875 s)	
Radial #1: 3.1 mm/s @ 36.6 Hz (0.02490234 s)	
Vertical #1: 2.73 mm/s @ 29.3 Hz (0.1201172 s)	
Transverse #1: 2.63 mm/s @ 36.6 Hz (0.01074219 s)	
Last Calibration Date: 28-02-2023	

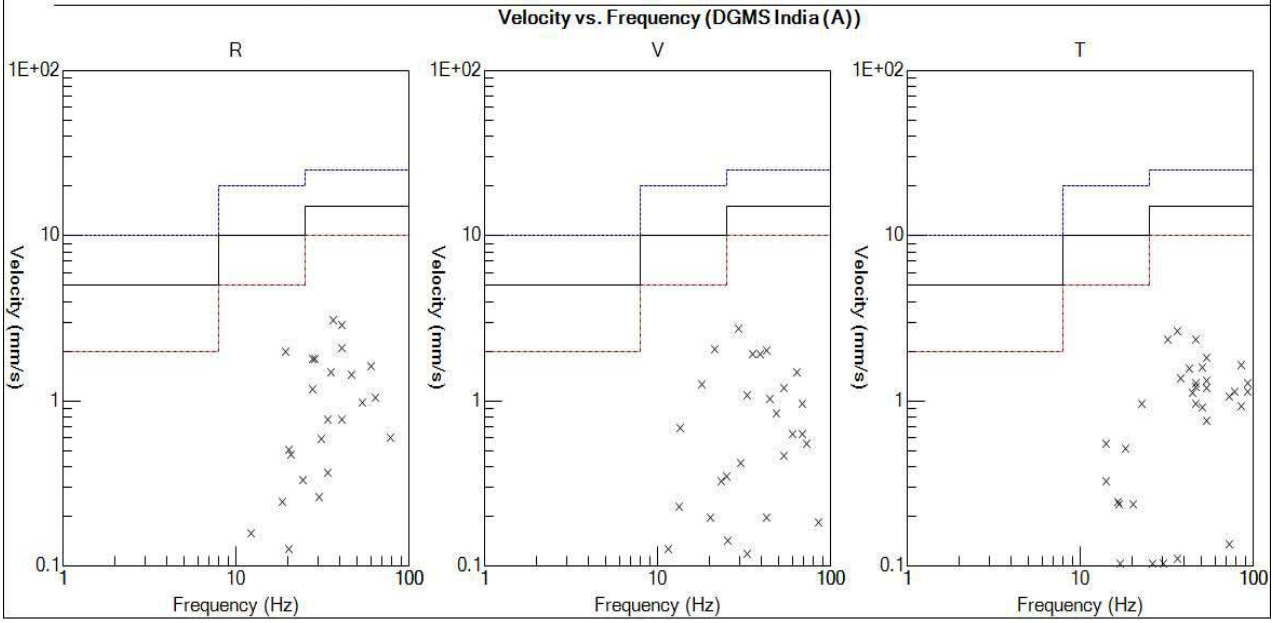




Record: 10151202401231440500918.proevt
Number: 918
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 23-01-2024 14:40:50
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.19

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 3.1 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 123.1 dB @ 5.2 Hz (0.4921875 s)	
Radial #1: 3.1 mm/s @ 36.6 Hz (0.02490234 s)	
Vertical #1: 2.73 mm/s @ 29.3 Hz (0.1201172 s)	
Transverse #1: 2.63 mm/s @ 36.6 Hz (0.01074219 s)	
Last Calibration Date: 28-02-2023	

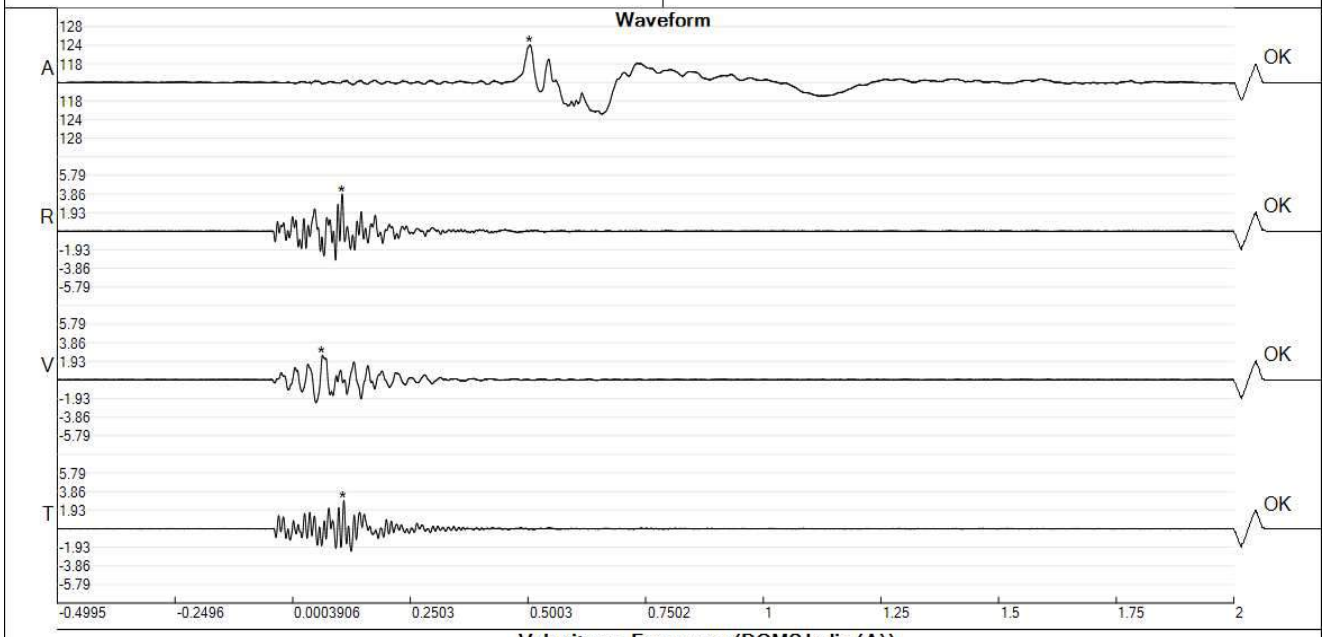


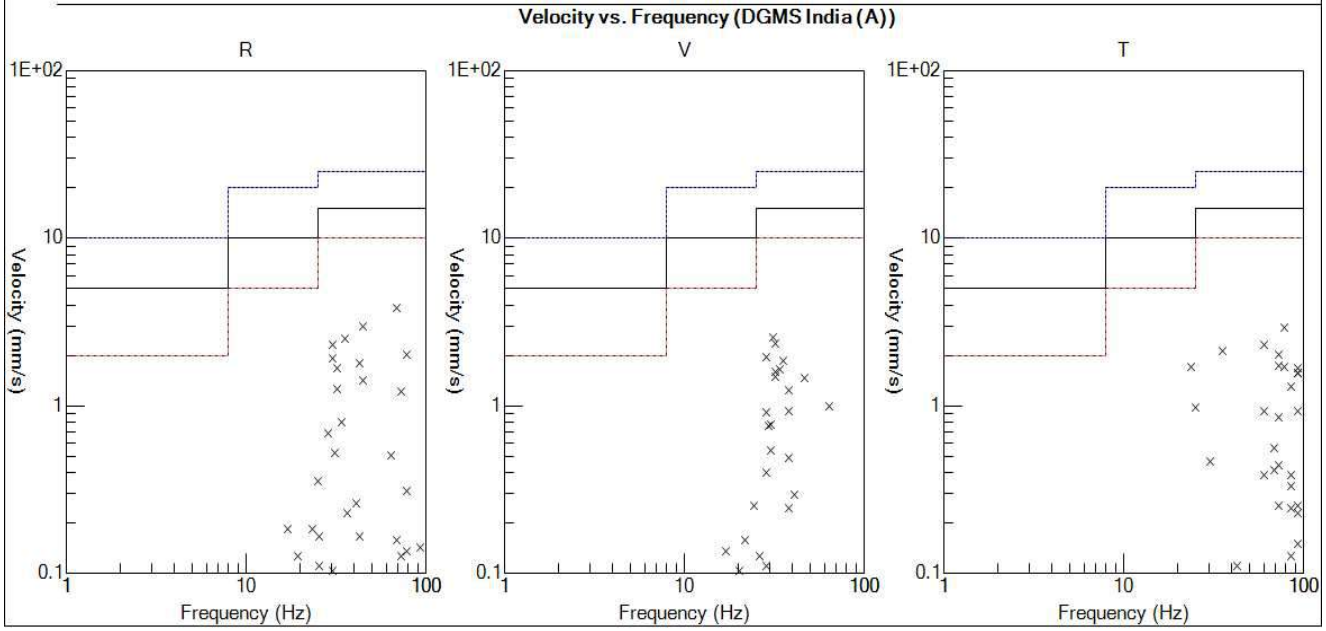


White Seismograph Data Analysis V13

Record: 10151202401241354480922.proevt
Number: 922
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 24-01-2024 13:54:48
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.29

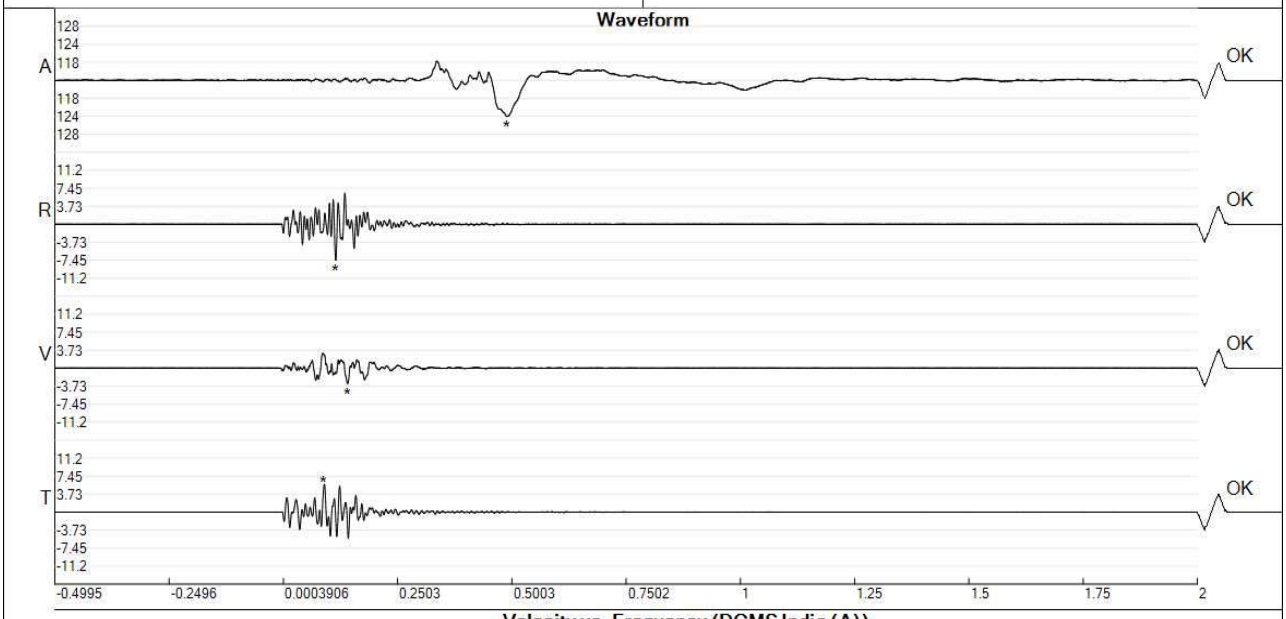
Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 3.86 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 124.5 dB @ 7.5 Hz (0.5053711 s)	
Radial #1: 3.86 mm/s @ 68.3 Hz (0.105957 s)	
Vertical #1: 2.58 mm/s @ 31.0 Hz (0.06396484 s)	
Transverse #1: 2.91 mm/s @ 78.8 Hz (0.109375 s)	
Last Calibration Date: 28-02-2023	

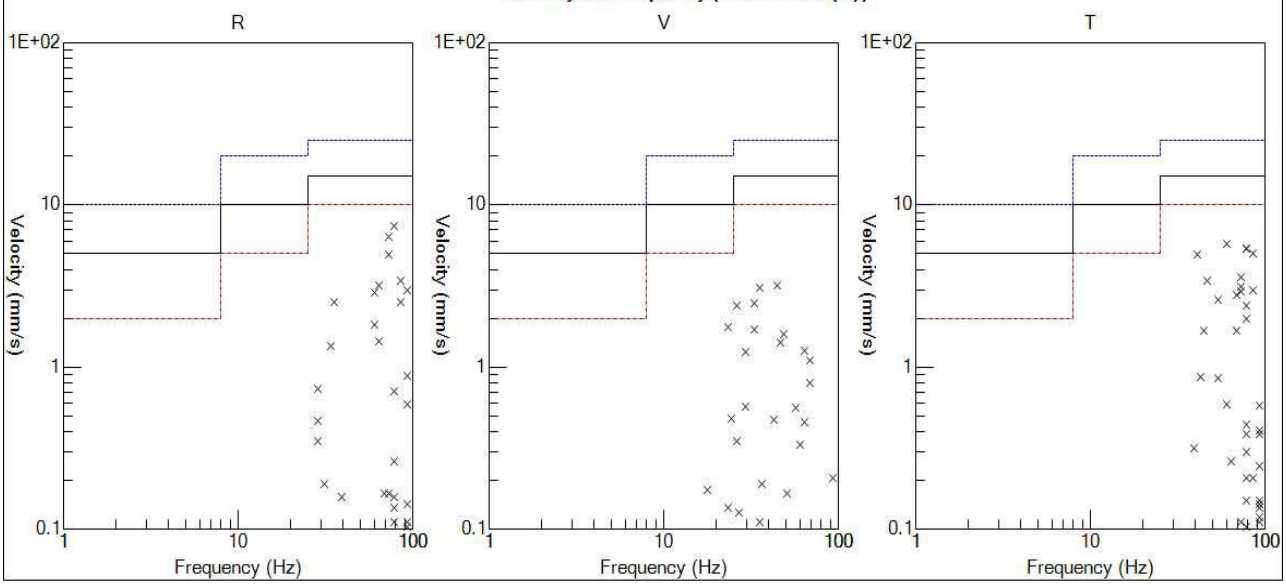




Record: 10151202401241358390923.proevt
Number: 923
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 24-01-2024 13:58:39
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.27

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 7.45 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 124.5 dB @ 6.5 Hz (0.4892578 s)	
Radial #1: 7.45 mm/s @ 78.8 Hz (0.1152344 s)	
Vertical #1: 3.2 mm/s @ 44.5 Hz (0.1411133 s)	
Transverse #1: 5.75 mm/s @ 60.2 Hz (0.09033203 s)	
Last Calibration Date: 28-02-2023	

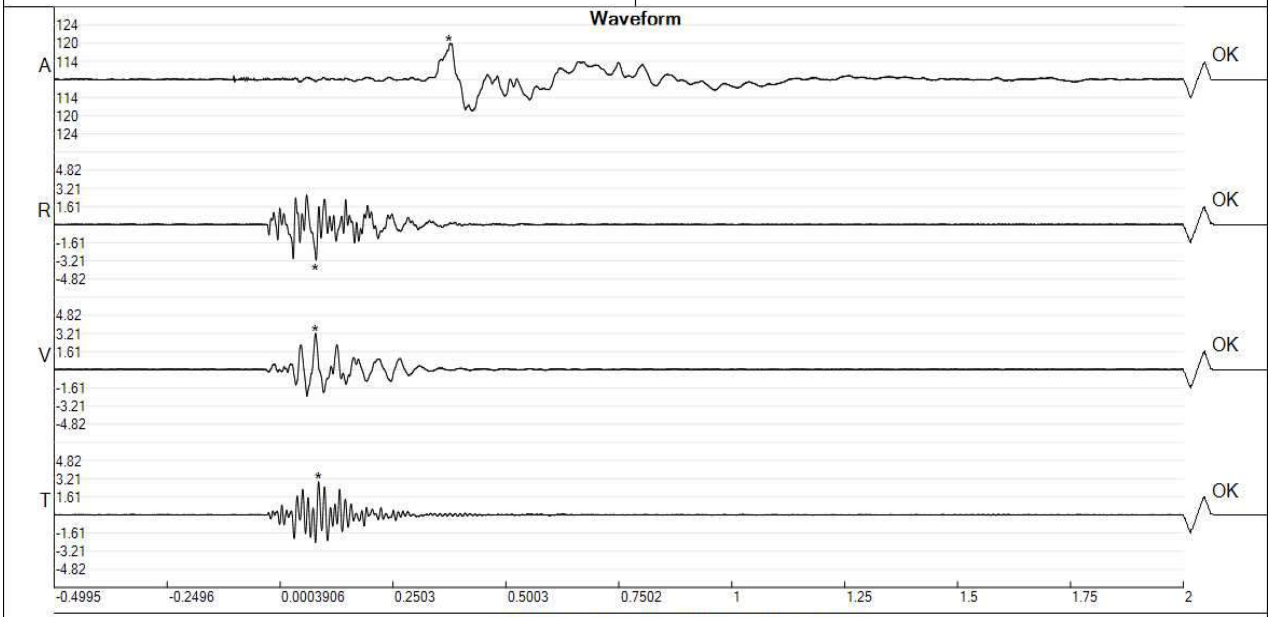


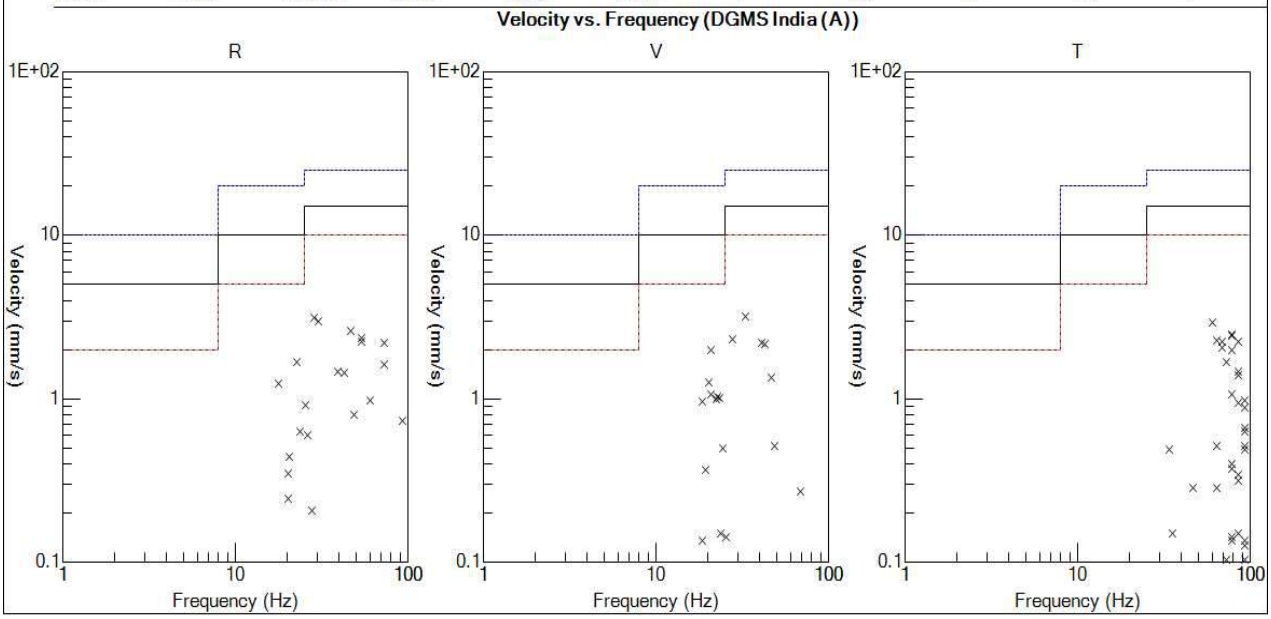


White Seismograph Data Analysis V13

Record: 10151202401241419300925.proevt
Number: 925
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 24-01-2024 14:19:30
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.25

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 3.21 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 120.3 dB @ 7.1 Hz (0.3764648 s)	
Radial #1: 3.15 mm/s @ 28.4 Hz (0.08056641 s)	
Vertical #1: 3.21 mm/s @ 33.0 Hz (0.07958984 s)	
Transverse #1: 2.93 mm/s @ 60.2 Hz (0.0859375 s)	
Last Calibration Date: 28-02-2023	

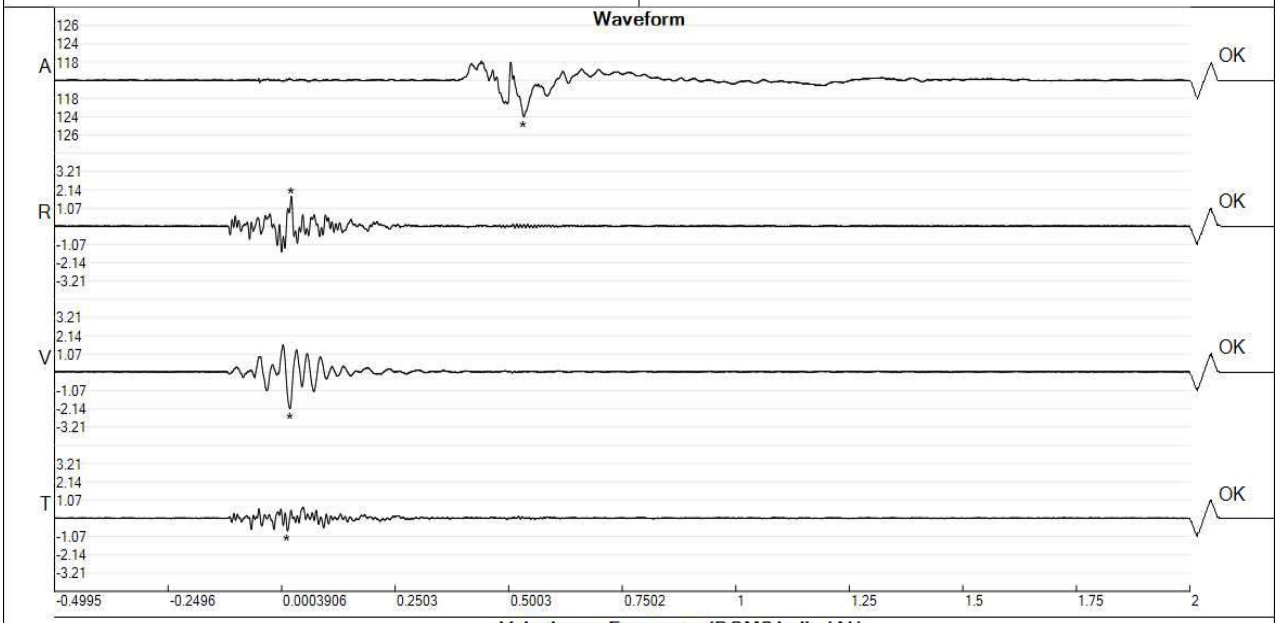


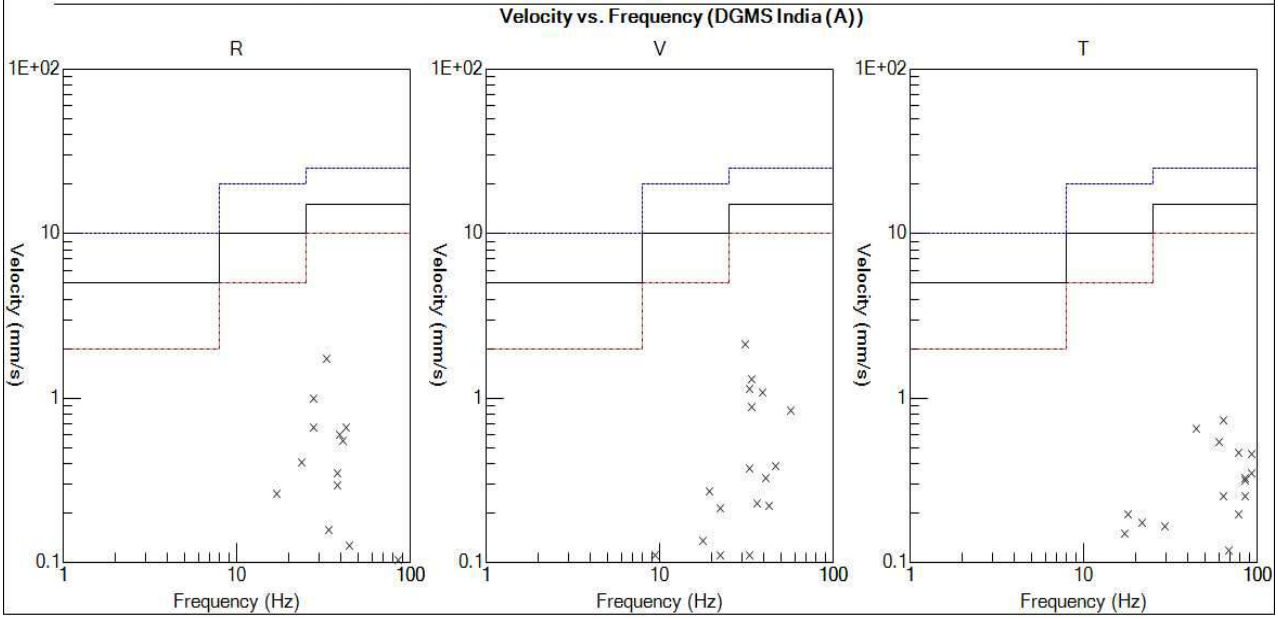


White Seismograph Data Analysis V13

Record: 10151202401241425080926.proevt
Number: 926
Seismograph: Mini-Seis III Pro 10151
Type of Record: Waveform
Date: 24-01-2024 14:25:08
Duration: 2.50 Seconds
Sample Rate: 2048
Pre-Trigger: 0.5 Seconds
Seismic Trigger: 1.4 mm/s
Acoustic Trigger: 148.2 dB
Seismic Gain: 260.096
Acoustic Gain: 148.2 dB
Voltage: 6.24

Peaks and Frequencies	Graph Information
PPV Maximum (Geo #1): 2.14 mm/s	Time Range: -0.4995 s to 2 s, Intervals: 0.2500 Seconds
Acoustic #1: 123.1 dB @ 5.5 Hz (0.5341797 s)	
Radial #1: 1.75 mm/s @ 33.0 Hz (0.02197266 s)	
Vertical #1: 2.14 mm/s @ 31.0 Hz (0.01953125 s)	
Transverse #1: 0.738 mm/s @ 64.0 Hz (0.01367188 s)	
Last Calibration Date: 28-02-2023	





White Seismograph Data Analysis V13

References-

1. CSIR-CIMFR Report on, "Study into Blast Design Parameters at Tirap Colliery, NEC to Control Ground Vibration, Air Overpressure and Flyrock Within Safe Limits GC/MT/102/2005-06"

2. CSIR-CIMFR Report on, "Scientific Study for Optimization of Blasting Parameters for the Captive Limestone Mine of M/s Adhunik Cement Limited, Jaintia Hills, Meghalaya CNP-2478/2009-10".

3. CSIR-CIMFR Report on, "Investigations into Blast-induced Ground Vibrations at Manal Limestone Mine, Rajban Cement Works, CCIL, H.P GC/MT/124/2005-06".

4. CSIR-CIMFR Report on, "Scientific study and advice for design and development of controlled blasting nearby villages at Kashlog/Mangu Limestone mine of Ambuja Cements Limited, Darlaghat, HP, 2022".

5. CSIR-CIMFR Report on, "Scientific study and advice for designing of controlled blasting patterns for carrying out safe blasting operations at South Khliehjari Limestone Mine of M/s Meghalaya Cements Limited, East Jaintia Hills, Meghalaya, 2022.

6. Blasters' Handbook, 18th Edition, 2011. International Society of Explosive Engineers, USA, (Eds. Jeffrey L. Dean et al.), p. 1030. 7. DGMS (Tech) S&T Circular No. 7 of 1997. Damage to the structures due to blast induced ground vibration in the mining areas, Directorate General of Mines Safety, Dhanbad, India, pp. 9-12.

8. Dowding, C. H., 1985. 'Blast vibration monitoring and control'. PrenticeHall, Englewood Cliffs, NJ, p. 287.

9. Duval, W. I. and Petkof, B., 1959. 'Spherical propagation of explosion generated strain pulses in rock'. US Bureau of Mines, R.I. 5483, p. 20.

10. Duval, W. I. and Fogelson, D. E., 1962. 'Review of criteria for estimating damage to residences from blasting vibration'. US Bureau of Mines, R.I. 5968, p. 19. CSIR-Central Institute of Mining & Fuel Research (CSIR-CIMFR), Dhanbad-826015 56 *CSIR- INDIA*

11. Jimeno, C. L., Jimeno, E. L. and Carcedo, F. J. A., 1995. 'Drilling and Blasting of Rock'. Geomining Technological Institute of Spain, ISBN 90 5410 1997, A. A. Balkema/Rotterdam, p. 391.

12. Konya, C. J. and Walter, E. J., 1990. 'Surface blast design'. Prentice Hall Int. Inc., USA, p. 303.

13. Oriard, L. L., 2002. 'Explosive engineering, construction vibrations and geotechnology'. International Society of Explosive Engineering (ISEE), Cleveland, OH, USA, p. 680.

14. McKenzie, C.K. (2009): "Flyrock Range & Fragmentation Size Prediction", in Proceedings of the 35th Conference on Explosives and Blasting Technique, Vol. 2, ISEE.

15. Pal Roy, Pijush, 2005. 'Rock blasting effects and operations', Oxford and IBH Publishing Company Pvt. Ltd., New Delhi (Also published by A. A. Balkema, Rotterdam, The Netherlands), p. 345

ANNEXURE-IV
PHOTOGRAPH OF CAAQMS STATION AT NARANDA LIMESTONE MINE

CAAQMS Installed at Crusher Area (Mines)

ANNEXURE-V
CSR EXPENDITURES

SN	CSR Activities	CSR expenditures (in Rs Lakhs)				
		2020-21	2021-22	2022-23	2023-24	2024-25 (As on Sep-24)
1	Education	0	0.85	2.58	2.4	1.79
2	Health	0.29	9.61	0.53	0	0.093
3	Agriculture & Animal husbandry	0	2.5	9.3	18.35	3.47
4	Women empowerment & Vocational Trainings	0.01	0.04	1.57	0	4.72
5	Infrastructure Development	0	9.76	16.66	6.27	2.45
6	Event & day celebration	0.01	0.1	0.3	0.2	0
7	Plantation & Rain Water Harvesting	0	0	8.5	9.1	0.96
		0.3	**22.86**	**39.44**	**36.32**	**13.48**
Grand Total		**112.40**				

Activities undertaken as per Public Commitments

Programs	Activities
Environmental Monitoring and Management	One Continuous ambient air quality monitoring station installed near limestone crusher and 2 stations installed in adjacent Cement plant. The real time data is uploading to CPCB as well as MPCB. Ambient air quality data is displayed in public domain outside the plant gate. **Total amount of Rs. 135 lakhs** have been incurred for Environmental monitoring and management in FY 2023-24. Environment protection measures are being implementing to control the dust emissions during mining activities, crushing limestone and vehicle movement inside the ML area. Bag filters provided at Limestone crusher, Limestone transportation being done through covered conveyor belt. Regular water sprinkling on internal roads and haul roads of mine. Agriculture crops and agriculture land in nearby villages including surrounding environment are not being damaged due to the mining activities.
	Water quality has been monitored for all the parameters as per IS-10500. There is no adverse impact on water quality due to mining activities
Socio-Economic development activities	Pursuant to approval of NCLT for implementation of the Resolution Plan, Murli Industries Limited (MIL) has become a subsidiary of Dalmia Cement (Bharat) Limited (DCBL) from September 10, 2020. After that we have initiated Socio-Economic development activities in nearby villages as per need base assessment. Under CSR activities, Infrastructure development, educational, Health and Vocational training, Agriculture & Animal Husbandry, Rainwater Harvesting, Environmental Awareness activities etc. are being organized for the nearby villagers. **At about Rs. 112.4 Lakh** has been spent towards various Socio-economic developmental activities in phased manner from FY' 2020-21 till FY 2024-25 (As on September-2024).

PARIVARTAN

Chandrapur

Quarterly Issue (April to June 2024)

Village: 12 | Population: 11,253

Dear All,

Greetings from Dalmia Bharat Foundation.

We trust this note finds you well. It's with great pleasure that Dalmia Bharat Foundation (DBF) Team reflects on the incredible journey undertaken in the first Quarter of FY 25 and we are thrilled to share our collective achievements through the pages of our Quarterly CSR Magazine.

-Team DBF, Chandrapur

Livelihood Initiatives

Seed Treatment in Cotton & Soyabean

- Protects crops from seedborne diseases, encouraging higher germination rates and healthy plant growth.
- Reduces reliance on chemical fertilizers and spraying, lowering overall costs.
- Increases yield by **7-10% per hectare.**
- Benefited over **800 farmers.**

Convergence: Goat Rearing training by R-SETI

- Conducted Goat Rearing Training in Naranda village for 35 participants.
- Following the training, an exam was held where all participants successfully passed the exam.
- Organized an exposure visit for trainees to a nearby goat unit in Chandrapur.
- Awarded training completion and exam certificates to the participants.
- R-SETI secured assurances to support participants in obtaining bank loans for their goat rearing businesses.

Convergence: Seed drill machine.

- 5 farmers were benefited from the seed drill program.

  Suitable for sowing all types of seeds.
- Reduces sowing costs and minimizes labor requirements.
- Optimizes efficiency by completing tasks quickly and thoroughly.
- Ensures consistent plant spacing within and between rows
- It saves farmers Rs.3500 per annum

EDP-Microenterprise Training

- Empowered SHG members by providing training on diverse business opportunities.
- Utilized audio-visual aids to showcase successful microenterprises in various fields, including agarbatti making, cloth and vegetable sales, vermicelli production and packaging, goat rearing, and poultry farming.
- Motivated 100 SHG members to pursue goat rearing and poultry businesses.
- Program has benefitted a total of **460 individuals.**

Training on SHG Bank linkage

- Equipped SHG members with loan application skills for their business ventures.
- Training covered essential practices for loan eligibility, including consistent SHG meetings, on-time internal loan repayments, recordkeeping, understanding loan purposes and proper utilization, and efficient documentation processes.
- Empowered a total of **488 individuals** through the program.

Dashparni Ark production & sale

- SHG launched Dashparni Ark production in April.
- SHG members have successfully produced 200 liters of Dashparni Ark.

  Effective for organic pest control in cotton, soybean, chili, and vegetables.
- This product reduces spraying costs for farmers and has the potential to increase yields by 1-1.5 quintals per acre
- Each household is expected to earn an annual income of **Rs. 15,000/-**

GRAM PARIVARTAN PROJECT

(An action towards bringing change)

Introduction

The Gram Parivartan Program was launched with the aim of providing livelihoods that are economically sustainable, ecologically responsible, and socially equitable. The objective is to foster sustainable economic progress within selected communities, where household chosen for participation is expected to achieve an additional annual income of **Rs. 1,00,000**. This can be achieved through individual or group interventions and can function independently or converged with government programs.

2721
Households Mapped

4361
Interventions Planned

1742
Households with Additional Income

11.28 Crore
Additional Income

HH distributed in different Income slabs				
<25K	25K-50K	50K-75K	75K-1L	>1L
152	596	330	110	554

Location Demographic Profile:

- Villages: 12
- Households: 2738
- Population: 11253

SOCIAL INFRASTRUCTURE

Road Repairing

- Responded to villagers' requests by repairing the road from Wanoja bus stand to the pump house.
- The project, completed with the assistance of the Mines Department, improves accessibility for farmers and their agricultural activities.
- 74 farmers were benefitted.

Pipeline for drainage at village Sangoda (60m)

- Collaborated with the Mines Department to address drainage issues in Sangoda village.
- The joint efforts of DBF and the Mines team successfully resolved the drainage problem, eliminating the spread of dirty water and unpleasant odors around homes.
- Improved living conditions for **215 households**.

Voter Awareness campaign & Booth decoration

- As instructed by the Honorable District Collector, we supported the Lok Sabha 1st phase election in Gadchandur by:
  - Conducting a voter awareness campaign.
  - Decorating two polling booths, which included displaying posters, banners with slogans, setting up selfie points, balloon decorations, and providing drinking water and breakfast for government staff.
- We are grateful for the appreciation received from the Honorable District Collector.

CONVERGENCE WITH GOVERNMENT SCHEMES IN FY 24

Location: Chandrapur		Category	No. of Beneficiaries		
S.No	Scheme Name	Livelihoods/ Water/ Soil/ Social Infrastructure	Male	Female	Total
1	Goat Rearing Training by R-SETI, Chandrapur	Livelihood	2	33	35
2	Farmers workshop on Seed Treatment for cotton and soybean crop - Agricultural department	Livelihood	40	100	140
3	Mini Dal mill purchased under Pradhan Mantri Formalisation of Micro Food Processing Enterprises scheme	Livelihood	10	0	10
4	Vermicelli machine purchased under Pradhan Mantri Formalisation of Micro Food Processing Enterprises scheme	livelihood	0	10	10
			52	143	195

Photo Gallery

One day farmers workshop organized with help of MAHABEEJ.

Microenterprises and bank linkage training

Vermi compost production by beneficiaries

Voter awareness in plant

Dalmia
Bharat Foundation

NEWS LETTER
Of Chandrapur

Dear All,

Greetings from Dalmia Bharat Foundation.

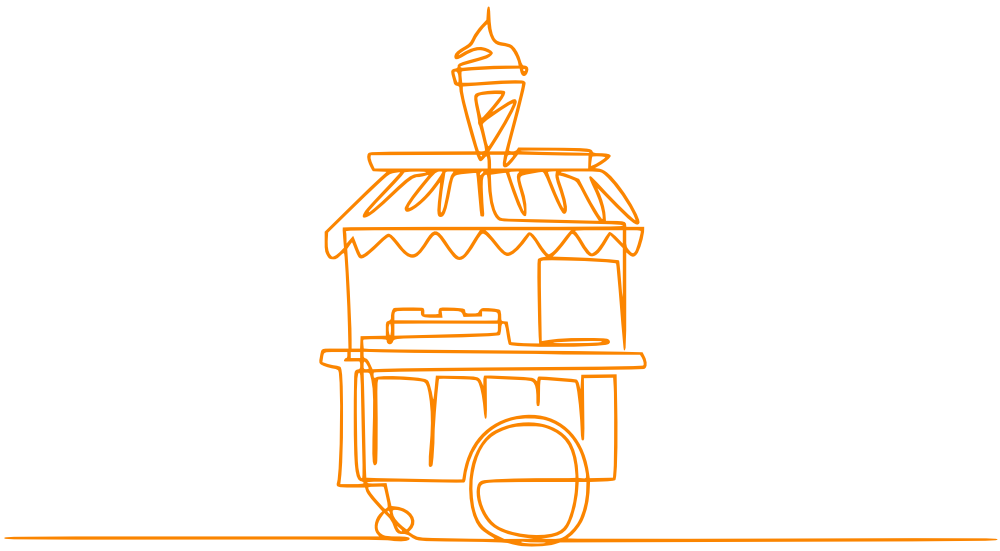
We trust this note finds you well. It's with great pleasure that Dalmia Bharat Foundation (DBF) Team reflects on the incredible journey undertaken in the Second Quarter of FY 2025, and we are thrilled to share our collective achievements through the pages of our Quarterly CSR Magazine

Team DBF,
Chandrapur

Quarterly Issue (Jul 24 to Sep 24)

PARIVARTAN

12 Villages | **11,253** Population



LIVELIHOOD & WATER INITIATIVES

POWER SPRAY PUMP DISTRIBUTION

Power Spray Pump Distribution

- Power spray pumps with a 40-liter capacity were distributed to women farmers to support large-scale agricultural farming.
- A group of **10 women benefited** from this initiative, with each expected to earn an **annual income of ₹18,000.**

HANDCART SUPPORT FOR VEGETABLE BUSINESS

- **A vegetable handcart was provided to Mrs. Kiran Gurnule from Naranda village**, with the inauguration ceremony attended by members of the Sakhiya Ladies Club and local leaders.
- The beneficiary is expected to **earn an annual income of ₹1,00,000 from this initiative.**

Handcart Support For Vegetable Business

DRUMSTICK SEED DISTRIBUTION

Drumstick Seed Distribution

- Drumstick seeds were distributed to SHG members for kitchen gardens and bund plantation, offering high nutritional value and strong market demand.
- A total of **190 beneficiaries** received these seeds, with each expected to earn an additional **annual income of Rs.5900.**

GRAM PARIVARTAN

An action towards bringing change

INTRODUCTION

12 Villages

2738 Households

11253 Population

The Gram Parivartan Program was launched with the aim of providing livelihoods that are economically sustainable, ecologically responsible, and socially equitable. The objective is to foster sustainable economic progress within selected communities, where household chosen for participation is expected to achieve an additional annual income of Rs. 1,00,000. This can be achieved through individual or group interventions and can function independently or converged with government programs.

2713 Households Mapped

5231 Interventions Planned

1652 Households with Additional Income

HH DISTRIBUTED IN DIFFERENT INCOME SLABS				
<25K	25K-50K	50K-75K	75K-1L	>1L
78	489	347	204	534

CASE STUDY

Empowering Livelihoods through Entrepreneurship

Dalmia Bharat Foundation supported Mrs. Vandana Vangane from Naranda village by providing her with a handcart and a free space to start her pani-puri business. As a landless individual, Mrs. Vangane previously relied on wages from agricultural labor for her income.

Following our intervention, she now earns between ₹300 and ₹400 daily. This has resulted in an additional annual income of ₹106,000, significantly improving her financial situation and livelihood.

SOCIAL INFRASTURCTURE

SCHOOL UNIFORM DISTRIBUTION

School Uniform Distribution

On Independence Day, school uniforms were distributed to **45 students from 1st to 4th grade at Z.P. School Vanoja**, supporting their educational needs.

GREEN BOARD DISTRIBUTION TO SCHOOL

In response to renovation efforts, **six green boards** were provided to **Adarsh Kisan Vidyalaya & Jr. College in Naranda, benefiting 540 students** by enhancing their classroom environment.

Green Board Distribution To School

CONVERGENCE TABLE (Apr – Sept 2024)

S.NO	SCHEME NAME	CATEGORY	NO. OF BENEFICIARIES		
		LIVELIHOODS/ WATER/ SOIL/ SOCIAL INFRASTRUCTURE	MALE	FEMALE	TOTAL
1	Goat Rearing Training by R-SETI,Chandrapur	Livelihood	2	33	35
2	Farmers workshop on Seed Treatment for cotton and soybean crop - Agricultural department	Livelihood	40	100	140
4	Vermicelli machine purchased under Pradhan Mantri Formalisation of Micro Food Processing Enterprises scheme	Livelihood	0	10	10
5	Seed drill Machine (Hand operated) distribution on 50% subsidy from govt. agency:	Livelihood	5	0	5
6	Pheromone & sticky trap distribution: No. of beneficiary:90 farmers	Livelihood	31	59	60
7	Integrated Pest Management training by block Agril. dept	Livelihood	181	64	245
8	Mukyamantri Ladki bahin	Livelihood	0	700	700
9	PM Kisan Samman Nidhi	Livelihood	1877	0	1877
10	Sanitory pad distribution an health initiative by PHC Naranda	Social Infra	167	60	60
11	Ayushyman Bharat	Social Infra	195	179	374
12	SHG bank linkage	Livelihood	0	767	767
Total			**2498**	**1972**	**4273**

HEALTH

1. Total 6250 Mask distributed directly to frontline health workers, in 13 Gram Panchayat, 2 Nagar Panchayat, 2 Police station, 2 Rural Hospital

2. Covid Vaccination Drive: DBF supports in mobilization and registration of villagers to PHC Naranda & PHC Kawthala for Covid Vaccination Drive: Till date we have covered 6806 people to get vaccinated – Covered 10 villages: 1. Naranda, 2. Vanoja, 3. Sangoda, 4. Kadholi, 5. Asan B. K, 6. Antargaon, 7. Zutting, 8. Pimpalgaon, 9. Gadchandur, 10. Loni

3. Support in Covid Vaccination drive to District administration: 100000 Auto Disable (A.D) Syringe (0.5 ml) hand over to District Health Officer

4. Felicitation of frontline Health worker of PHC Naranda and PHC Kawthala by Unit Head-MIL-DCBL, HR-Head.

5. Vehicle Support for one month to SDO office, Primary Health Center Naranda to mobilize staff, vaccine distribution and for door to door vaccination in our project villages. Covered 2 PHC and 1 PHC subcenter

6. **Free health Check-up Camp**
   Organized Two free health Checkup camp (B.P, Sugar, oral cancer, gynec related diseases etc.) at Sangoda and Antargaon village in association with PHC Kawthala and Tata Trust Chandrapur.
   Total beneficiary:
   1. Sangoda: 107
   2. Antargaon: 114

   Blood Donation Camp at Vanoja Village, Naranda Village and kadholi kh

7. Organized the TB Orientation program to women SHG members at Naranda in association with The Union Organization, Taluka Health Department and PHC Naranda. Total 78 members present in the program. No. of villages covered: 2

8. Health Check-up Camp: Organized health checkup for pregnant women, counselling and treatment camp of B.P, Sugar, cancer at PHC Sub-Center Antargaon. Total beneficiaries 70.

9. PHC Naranda & Dalmia Bharat Foundation Naranda organized free health check-up camp at PHC Naranda under govt. health campaign of "Safe Mother-Safe home". Taluka health officer Korpana Total beneficiary of the health camp 175. Protein powder distribution to 68 pregnant women done in this program

10. PHC Sub center Antargaon & Dalmia Bharat Foundation Naranda organized "Arogya Melava" at Sangoda for counselling, personal hygiene, disease, symptoms, treatment, nutrition and awareness about schemes for pregnant women.

11. Dalmia Bharat Foundation as Ni-kshay Mitra distributed the Nutrition Kit to two identified T.B patients under the " Pradhan Mantri T.B Mukt Bharat Abhiyan " at PHC Naranda. DBF will support the patient upto six month.


Dalmia
Dalmia


PROJECT
BAALA

SOCIAL INFRASTRUCTURE

1. **Installation of 20 solar street lights in 5 villages:**
   1.Sangoda
   2.Vanoja
   3.Antargaon
   4.Kadholi kh
   5.Pipari

2. **Two High mast Light at Naranda**

3. **Village Pond Development**
   Size of the Pond: Length-400 ft. Breadth-170 ft. Depth- 5ft.
   Excavated 5 ft. more. Now Total depth 10ft

4. **Sitting cement benches for community at Vanoja village**

5. **Safe Drinking Water Facility:** Installation of RO Unit & Construction of RO Shade at Vanoja village and 60 LPH RO installed at PHC Naranda
   No. of beneficiaries impacted: 180 House Holds
   No. of villages covered: 2

6. **E-Learning kit setup & Installation done at 4 School and 2 Anganwadi**

7. **2 LPG Gas cylinder and Shegdi provided to Anganwadi at Sangoda village: Support to mid-day meal cooking at Anganwadi.**

8. **Beautification of village Entry Gate Sangoda**

9. **Beautification of Sites: 1. Paver block fixing at Z.P School vanoja 2. Community hall Naranda 3. Z.P school Pipari**

10. **Construction of 20 Nos Rain water recharge structures in nearby villages**


Dalmia
Dalmia


Dalmia


म.गांधी तंटामुक्ती समिती
ग्रा.पं. सांगोडा/कारवाई


Naranda, Maharashtra, India
Q3P7+MPJ, Naranda, Maharashtra 442916, India
Lat 19.78546°
Long 79.065368°
22/03/24 02:04 PM GMT +05:30


Naranda, Maharashtra, India
Q3P7+MPJ, Naranda, Maharashtra 442916, India
Lat 19.78546°
Long 79.065368°
22/03/24 01:48 PM GMT +05:30




AGRICULTURE & ANIMAL HUSBANDRY

1. Dalmia Bharat Foundation and Taluka Agriculture department Korpana jointly organized Soyabean seed treatment demonstration program prior seed sowing (kharip season) at Antargaon & Vanoja project villages.
   No. of beneficiaries impacted: 75, No. of villages covered: 2 (Antargaon & vanoja)

2. Demonstration on Dashparni ark making for organic pest control method to SHG women farmer at Naranda. useful for spraying on cotton, soyabean, vegetables. It will help farmers to reduce the input cost. SHG farmers also planned to marketing of the products at minimum cost. Total 10 SHG women farmer participated in the program.

3. Veterinary animal health checkup camp: 1. Naranda, 2. Vanoja, 3. Sangoda, 4.Antargaon, 5. Kadholi kh

4. Dalmia Bharat Foundation and Veterinary department jointly conducted veterinary camp at Antargaon, Sangoda, Vanoja, Kadholi kh, Pipari, Naranda village in Korpana block.
   Total cattles 450 in which 320 cattles (Cow, Bullock, buffalo) & 130 Goats treated through this camp.
   Knapsack Power Spray Distribution to farmers:
   No. of villages covered: 4, No. of beneficiary farmer:200, Beneficiary contribution: 40%


Dalmia

EDUCATION

1. Today DBF & NIIT foundation started CCFL (Certificate Course in Financial Literacy) batch at Adarsh Kisan Vidyalaya & Jr. college Naranda.
   24 students enrolled for the course.

2. E-Learning kit setup & installation in 15 Anganwadi under Digital Anganwadi Initiative
   No. of Villages covered:13, No. of students covered: 260

3. Library Development Support:
   Village: 1. Sangoda 2. Kadholi kh 3.Antargaon

4. Organized Self Defence Training Program at Adarsh Kisan Vidyalay & Jr. college Naranda.
   Total 150 students participated in the program

5. Celebration of Azadi Ka Amrit Mahotsav (theme-Mehandi)

6. Safety Week Celebration at School Naranda/sangoda


Dalmia
Dalmia
Bharat Foundation


289 मेगा
पोलीस भरती
वनरक्षक

ENVIRONMENTAL AWARENESS

Plantation: Sites:1. Vanoja Road, 2. Kadholi kh Road, 3. Naranda Bus stand to PHC road 4. PHC Naranda

SKILLS & LIVELIHOOD

1. "Entrepreneurship Development training program" in nearby villages for women SHG members & for girls. like Bakery products making training, Fast food, Pickle & Papad, poultry etc.
   Total 120 women members participated in the program.
   Total villages covered:5

2. Micro-entrprises: Vermicelli making group activity
   No. of Beneficiary: 10
   Name of SHG- Vedanti SHG, Name of Village: Naranda

3. Micro-enterprises: Nursery Development at Naranda

4. Micro-enterprises: Paper Plate (disposable) making group activity: Antargaon
   DBF supported to purchase raw material
   No. of Beneficiary: 10
   Name of Village: Antargaon

5. Strive-Skill Strengthening for Industrial Value Enhancement
6. Azolla bed distribution to farmers
7. Vermicompost bed distribution to farmers
8. Linseed crop cultivation
9. Nutrition kit support to TB patient
10. 5 KW solar unit installation at chunala orphanage
11. Oranic pest control-Dashparni ark sale by Shg


Dalmia


HEIF


Dalmia

ANNEXURE-VII
LANDUSE/LAND COVER OF NARANDA LIMESTONE MINE

1 LANDUSE/LAND COVER OF THE SURROUNDING AREA

Current vintage data of Indian Remote Sensing Satellite Sentinel-2 Land Cover been used for the preparation of the Land use/ Land cover thematic map of the study area.

These models were applied to the entire Sentinel-2 scene collection for each year from 2017 to 2022 that's over 2,000,000 Earth observations from 6 spectral bands to produce the maps.

The output provides a 9-class map of the surface, including vegetation types, bare surface, water, cropland and built areas. These maps are available from ArcGIS Living Atlas of the World.

Table 1: Technical Description

S. No.	Particulars	Détails
1.	Satellite Image	Sentinel-2
2.	Satellite Data Source	ArcGIS Living Atlas

Table 2: LULC Classification

S.NO.	Class	Area Sqm	Area Sqkm	Percentage Distribution %
1.	Water	5707800	5.71	1.82
2.	Tree	2371400	2.37	0.76
3.	Cropland	247878600	247.88	78.98
4.	Built Area	9873600	9.87	3.15
5.	Range Land	864200	0.86	0.28
6.	Bare Ground	47136600	47.14	15.02
Total			**314.15**	**100**

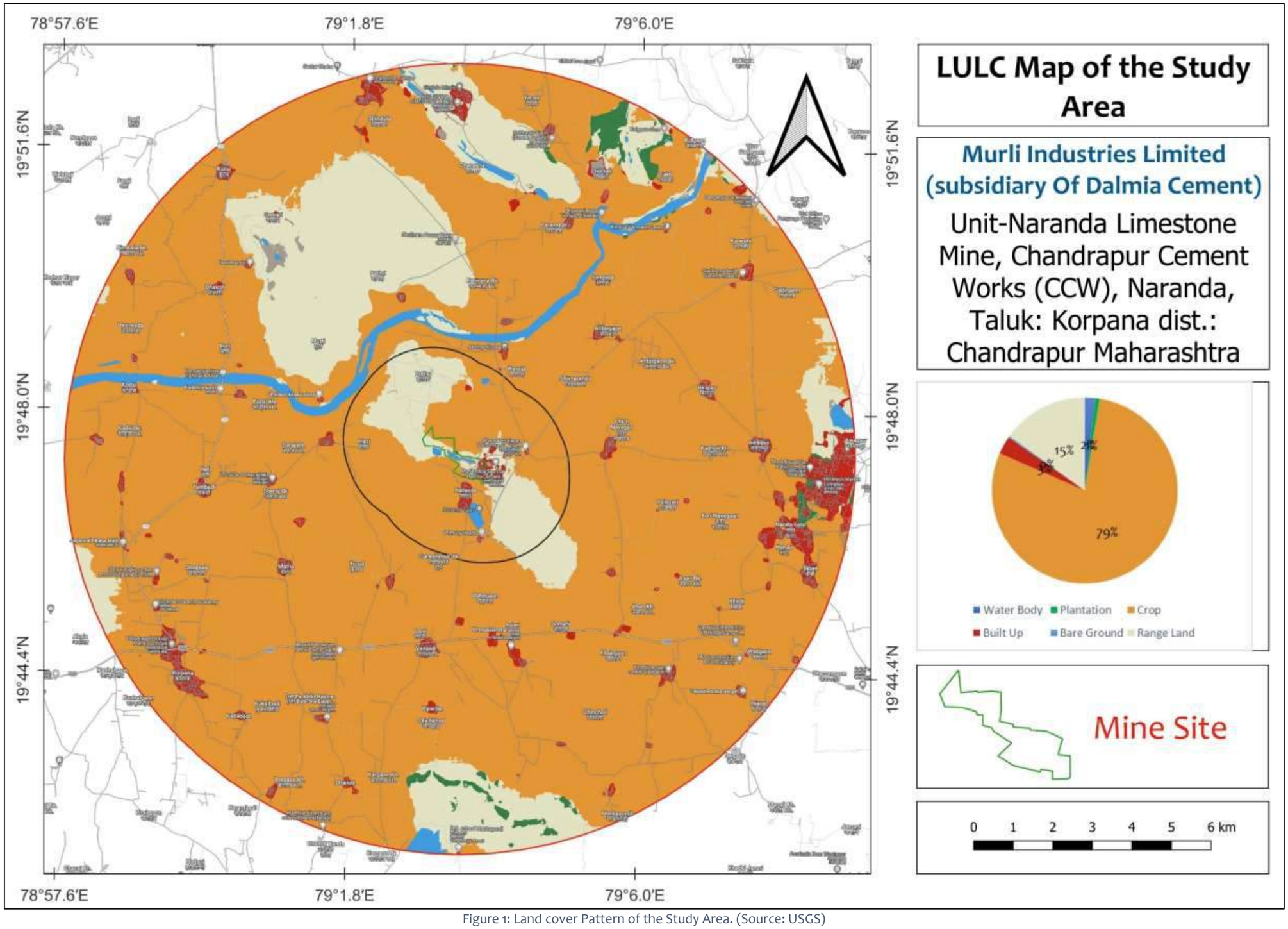


Figure 1: Land cover Pattern of the Study Area. (Source: USGS)

Annexure-VIII

RAINWATER HARVESTING MEASURES

Naranda Village (RWH-1)

Naranda Village (RWH-2)

Naranda Village (RWH-3)

Naranda Village (RWH-4)

Naranda Village (RWH-5)

Plant Site (RWH-6)

Pimpri Village (RWH-7)

Pimpri Village (RWH-8)

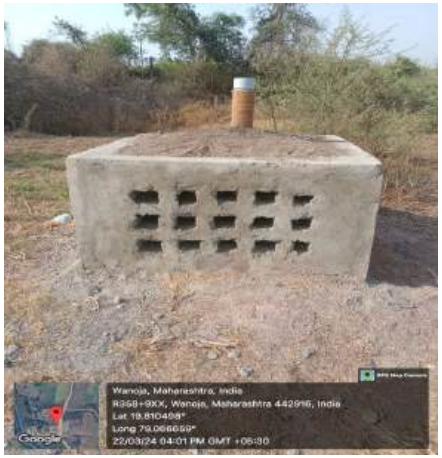
Pimpri Village (RWH-9)

Loni Village (RWH-10)

Bori Navegaon Vill. (RWH-11)

Kadholi Kh Vill.(RWH-12)

Wanoja Village (RWH-13)



Wanoja Village (RWH-14)

Zutting Village (RWH-15)

Zutting Village (RWH-16)

Zutting Village (RWH-17)

Zutting Village (RWH-18)

Zutting Village (RWH-19)

Zutting Village (RWH-20)

DEEPENING OF POND NEAR NARANDA VILLAGE

GROUND WATER LEVEL MONITORING DATA

Sr. No.	Month	Ground Water Level Monitoring Data BGL in meter	
		Core Zone	Buffer Zone
1	Feb-22	23.91	21.96
2	Mar-22	23.83	21.65
3	Apr-22	23.85	21.66
4	May-22	20.72	16.92
5	Jun-22	12.93	6.27
6	Jul-22	13.39	7.11
7	Aug-22	15.8	8.14
8	Sep-22	16.98	10.24
9	Oct-22	16.35	10.36
10	Nov-22	22.19	18.24
11	Dec-22	20.2	15.86
12	Jan-23	20.75	19.25
13	Feb-23	18.57	20.95
14	Mar-23	20.83	22.13
15	Apr-23	20.58	21.54
16	May-23	21.16	20.98
17	Jun-23	13.33	20.92
18	Jul-23	14.56	10.13
19	Aug-23	15.98	11.52
20	Sep-23	17.77	11.98
21	Oct-23	16.83	12.96
22	Nov-23	23.43	19.87
23	Dec-23	21.6	17.5
24	Jan-24	20.8	18.6
25	Feb-24	19.2	20.1
26	Mar-24	20.8	21.3
27	Apr-24	23.5	7.69
28	May-24	26.17	7.54
29	June-24	23.6	5.7
30	July-24	22.4	4.07
31	Aug-24	24.09	3.42
32	Sep-24	28.62	4.22
Avg.		**20.14**	**14.39**

PHOTOGRAPHS OF PIEZOMETER AT PLANT AND MINE

Piezometer - Mines

Piezometer - Plant

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/20

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/20	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Soil	Analysis Start Date:	13/05/2024
Sample Description:	Naranda Mine Pit	Analysis End Date:	22/05/2024
Sample Quantity:	2 Kg	Sampling Method:	GGMPL/WI/27F
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Available Phosphorus	BQL (QL=2)	mg/kg	GGMPL/SOP/SOIL/44	-
2	pH	7.98	-	IS 2720 (Part 26)	-
3	Conductivity	850.6	uS/cm	IS 14767	-
4	Iron	69896.55	mg/Kg	USEPA Method 3051A	-
5	Chloride	2717.79	mg/kg	GGMPL/SOP/SOIL/45	-
6	Organic Matter	0.67	%	IS 2720 (Part XXII)	-
7	Sodium	1184.23	mg/kg	USEPA Method 3051A	-
8	Total Kjeldahl Nitrogen	156.72	mg/kg	IS 14684	-
9	Water Holding Capacity	41.23	%	IS 14765	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/20A

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/20	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Soil	Analysis Start Date:	13/05/2024
Sample Description:	Naranda Mine Pit	Analysis End Date:	22/05/2024
Sample Quantity:	2 Kg	Sampling Method:	GGMPL/WI/27F
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters*	Results	Unit	Test Method	Norm
1	Sulphate	30.83	mg/kg	IS 2720(Part 27)-1977 (RA 2015)	-
2	Phosphorus As P	BQL (QL=2)	mg/kg	GGMPL/SOP/SOIL/44	-
3	Nitrate	9.85	mg/kg	GGMPL/SOIL/SOP-57	-
4	Available Nitrogen	243.43	Kg/ha	IS 14684: 2005	-
5	Phosphate As PO4	5.16	mg/kg	GGMPL/SOP/SOIL/44	-
6	Exchangeable Calcium	86.08	meq/100gm	IS 5949: 2003	-
7	Available Potassium	129.77	kg/ha	USEPA Method 3051A	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/20

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/20	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Soil	Analysis Start Date:	10/08/2024
Sample Description:	Naranda Mine Pit	Analysis End Date:	17/08/2024
Sample Quantity:	2 Kg	Sampling Method:	GGMPL/WI/27F
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Available Phosphorus	BQL (QL=2)	mg/kg	GGMPL/SOP/SOIL/44	-
2	pH	7.25	-	IS 2720 (Part 26)	-
3	Conductivity	825.5	uS/cm	IS 14767	-
4	Iron	67187.50	mg/Kg	USEPA Method 3051A	-
5	Chloride	2694.58	mg/kg	GGMPL/SOP/SOIL/45	-
6	Organic Matter	0.70	%	IS 2720 (Part XXII)	-
7	Sodium	1172.1191	mg/kg	USEPA Method 3051A	-
8	Total Kjeldahl Nitrogen	139.76	mg/kg	IS 14684	-
9	Water Holding Capacity	39.39	%	IS 14765	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/20A

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/20	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Soil	Analysis Start Date:	10/08/2024
Sample Description:	Naranda Mine Pit	Analysis End Date:	17/08/2024
mple Quantity:	2 Kg	Sampling Method:	GGMPL/WI/27F
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters*	Results	Unit	Test Method	Norm
1	Sulphate	23.33	mg/kg	IS 2720(Part 27)-1977 (RA 2015)	-
2	Phosphorus As P	BQL (QL=2)	mg/kg	GGMPL/SOP/SOIL/44	-
3	Nitrate	8.85	mg/kg	GGMPL/SOIL/SOP-57	-
4	Available Nitrogen	211.68	Kg/ha	IS 14684: 2005	-
5	Phosphate As PO4	4.27	mg/kg	GGMPL/SOP/SOIL/44	-
6	Exchangeable Calcium	81.73	meq/100gm	IS 5949: 2003	-
7	Available Potassium	109.62	kg/ha	USEPA Method 3051A	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

Annexure IV – Showing Pictorial view of Protective Measures around dump area

Garland Drain and Plantation developed around the periphery of Dump area

Retaining wall and Plantation developed around the periphery of Overburden Dump and Soil dump as protective measure

GREEN BELT & PLANTATION IN NARANDA LIMESTONE MINE

Plantation at Mines Lease Boundary

Plantation along the Mines Road

Plantation at Mines Area

GREEN BELT & PLANTATION IN NARANDA LIMESTONE MINE

Plantation at Mines Dump Area

Plantation at waste dump Area

GREEN BELT & PLANTATION IN NARANDA LIMESTONE MINE

New Plantation along the road

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/02

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/02	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Naranda Mine Borewell (core zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Alkalinity as CaCO3	308.00	mg/L	APHA 23rd Edn 2320 B	-
2	BOD at 27 oC for 3 days	BQL (QL=2)	mg/L	IS 3025-Part 44	-
3	Chemical Oxygen Demand (COD)	10.00	mg/L	APHA 23rd Edn 5220 B	-
4	Chloride	108.96	mg/L	IS 3025- Part 32	-
5	Conductivity	650.6	uS/cm	IS 3025- Part 14	-
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	-
7	pH at 25 °C	7.92	-	IS 3025- Part 11	-
8	Sulphate	88.92	mg/L	APHA 23rd Edn 4500 SO4 E	-
9	Total Dissolved Solids (TDS)	560.00	mg/L	APHA 23rd Edn 2540 C	-
10	Total Suspended Solids (TSS)	8.00	mg/L	APHA 23rd Edn 2540 D	-
11	Total Hardness as CaCO3	250.00	mg/L	APHA 23rd Edn 2340 C	-
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/02

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/02	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Naranda Mine Borewell (core zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
13	Bi Carbonate as CaHco3	308.0	mg/L	APHA 23rd Edn 2320 B	-
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	-
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	-
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
23	Nitrate	2.06	mg/L	APHA 23rd Edn 4500 NO3 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/03

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/03	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Borewell Near Grampanchayat - Naranda (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Alkalinity as CaCO3	300.00	mg/L	APHA 23rd Edn 2320 B	-
2	BOD at 27 oC for 3 days	6.4	mg/L	IS 3025-Part 44	-
3	Chemical Oxygen Demand (COD)	20.00	mg/L	APHA 23rd Edn 5220 B	-
4	Chloride	164.94	mg/L	IS 3025- Part 32	-
5	Conductivity	821.1	uS/cm	IS 3025- Part 14	-
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	-
7	pH at 25 °C	7.56	-	IS 3025- Part 11	-
8	Sulphate	100.03	mg/L	APHA 23rd Edn 4500 SO4 E	-
9	Total Dissolved Solids (TDS)	740.00	mg/L	APHA 23rd Edn 2540 C	-
10	Total Suspended Solids (TSS)	6.00	mg/L	APHA 23rd Edn 2540 D	-
11	Total Hardness as CaCO3	450.00	mg/L	APHA 23rd Edn 2340 C	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/03

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/03	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Borewell Near Grampanchayat - Naranda (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	-
13	Bi Carbonate as CaHco3	300.00	mg/L	APHA 23rd Edn 2320 B	-
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	-
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	-
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/03

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/03	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Borewell Near Grampanchayat - Naranda (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
23	Nitrate	1.29	mg/L	APHA 23rd Edn 4500 NO3 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/04

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/04	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Z.P School Vanoja (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Alkalinity as CaCO3	302.00	mg/L	APHA 23rd Edn 2320 B	-
2	BOD at 27 oC for 3 days	BQL (QL=2)	mg/L	IS 3025-Part 44	-
3	Chemical Oxygen Demand (COD)	10.00	mg/L	APHA 23rd Edn 5220 B	-
4	Chloride	154.95	mg/L	IS 3025- Part 32	-
5	Conductivity	820.3	uS/cm	IS 3025- Part 14	-
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	-
7	pH at 25 °C	7.52	-	IS 3025- Part 11	-
8	Sulphate	135.13	mg/L	APHA 23rd Edn 4500 SO4 E	-
9	Total Dissolved Solids (TDS)	770.00	mg/L	APHA 23rd Edn 2540 C	-
10	Total Suspended Solids (TSS)	8.00	mg/L	APHA 23rd Edn 2540 D	-
11	Total Hardness as CaCO3	450.00	mg/L	APHA 23rd Edn 2340 C	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/04

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/04	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Z.P School Vanoja (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	-
13	Bi Carbonate as CaHco3	302.0	mg/L	APHA 23rd Edn 2320 B	-
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	-
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	-
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/04

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/04	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Z.P School Vanoja (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
23	Nitrate	1.21	mg/L	APHA 23rd Edn 4500 NO3 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/05

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/05	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Hanuman Mandir Vansadi (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Alkalinity as CaCO3	390.00	mg/L	APHA 23rd Edn 2320 B	-
2	BOD at 27 oC for 3 days	BQL (QL=2)	mg/L	IS 3025-Part 44	-
3	Chemical Oxygen Demand (COD)	10.00	mg/L	APHA 23rd Edn 5220 B	-
4	Chloride	249.92	mg/L	IS 3025- Part 32	-
5	Conductivity	1260	uS/cm	IS 3025- Part 14	-
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	-
7	pH at 25 °C	7.92	-	IS 3025- Part 11	-
8	Sulphate	230.10	mg/L	APHA 23rd Edn 4500 SO4 E	-
9	Total Dissolved Solids (TDS)	1180.00	mg/L	APHA 23rd Edn 2540 C	-
10	Total Suspended Solids (TSS)	8.00	mg/L	APHA 23rd Edn 2540 D	-
11	Total Hardness as CaCO3	580.00	mg/L	APHA 23rd Edn 2340 C	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/05

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/05	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Hanuman Mandir Vansadi (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	-
13	Bi Carbonate as CaHco3	390.0	mg/L	APHA 23rd Edn 2320 B	
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	-
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	-
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/05

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/05	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Hanuman Mandir Vansadi (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
23	Nitrate	4.27	mg/L	APHA 23rd Edn 4500 NO3 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/06

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/06	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
1	Alkalinity as CaCO3	380.00	mg/L	APHA 23rd Edn 2320 B	-
2	BOD at 27 oC for 3 days	BQL (QL=2)	mg/L	IS 3025-Part 44	-
3	Chemical Oxygen Demand (COD)	10.00	mg/L	APHA 23rd Edn 5220 B	-
4	Chloride	384.88	mg/L	IS 3025- Part 32	-
5	Conductivity	1503	uS/cm	IS 3025- Part 14	-
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	-
7	pH at 25 °C	7.68	-	IS 3025- Part 11	-
8	Sulphate	349.05	mg/L	APHA 23rd Edn 4500 SO4 E	-
9	Total Dissolved Solids (TDS)	1380.00	mg/L	APHA 23rd Edn 2540 C	-
10	Total Suspended Solids (TSS)	6.00	mg/L	APHA 23rd Edn 2540 D	-
11	Total Hardness as CaCO3	550.00	mg/L	APHA 23rd Edn 2340 C	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/06

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/06	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon (Buffer zone)	Analysis End Date:	22/05/2024
mple Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	-
13	Bi Carbonate as CaHco3	380.0	mg/L	APHA 23rd Edn 2320 B	-
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	-
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	-
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	-
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	-
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/401D/69/06

Reporting Date : 23/05/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/401D/69/06	Sampling Date:	09/05/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	11/05/2024
Sample Type:	Ground Water	Analysis Start Date:	13/05/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon (Buffer zone)	Analysis End Date:	22/05/2024
Sample Quantity:	3.5 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Norm
23	Nitrate	6.31	mg/L	APHA 23rd Edn 4500 NO3 B	-

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Analyzed By
Priyanka Shrimali

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/02

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/02	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Naranda Mine Borewell	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
1	Alkalinity as CaCO3	250.00	mg/L	APHA 23rd Edn 2320 B	200	600
2	BOD at 27 oC for 3 days	3.0	mg/L	IS 3025-Part 44	NS	NS
3	Chemical Oxygen Demand (COD)	8.00	mg/L	APHA 23rd Edn 5220 B	NS	NS
4	Chloride	90.47	mg/L	IS 3025- Part 32	250	1000
5	Conductivity	850.85	uS/cm	IS 3025- Part 14	NS	NS
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	NS	NS
7	pH at 25 °C	7.82	-	IS 3025- Part 11	6.5-8.5	No relaxation
8	Sulphate	83.63	mg/L	APHA 23rd Edn 4500 SO4 E	200	400
9	Total Dissolved Solids (TDS)	590.00	mg/L	APHA 23rd Edn 2540 C	500	2000
10	Total Suspended Solids (TSS)	6.00	mg/L	APHA 23rd Edn 2540 D	NS	NS
11	Total Hardness as CaCO3	385.00	mg/L	APHA 23rd Edn 2340 C	200	600
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	NS	NS

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/02

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/02	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Naranda Mine Borewell	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
13	Bi Carbonate as CaHco3	250	mg/L	APHA 23rd Edn 2320 B	NS	NS
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	0.05
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.5	1.0
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	0.003	No relaxation
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	NS	NS
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	0.05	1.5
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.3	No relaxation
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	No relaxation
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	0.02	No relaxation
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	5	15
23	Nitrate	1.93	mg/L	APHA 23rd Edn 4500 NO3 B	45	No relaxation

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/03

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/03	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Borewell Near Grampanchayat Naranda	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Specification: AL	PL
1	Alkalinity as CaCO3	310.00	mg/L	APHA 23rd Edn 2320 B	200	600
2	BOD at 27 oC for 3 days	6.0	mg/L	IS 3025-Part 44	NS	NS
3	Chemical Oxygen Demand (COD)	20.00	mg/L	APHA 23rd Edn 5220 B	NS	NS
4	Chloride	98.96	mg/L	IS 3025- Part 32	250	1000
5	Conductivity	1000.50	uS/cm	IS 3025- Part 14	NS	NS
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	NS	NS
7	pH at 25 °C	7.42	-	IS 3025- Part 11	6.5-8.5	No relaxation
8	Sulphate	82.83	mg/L	APHA 23rd Edn 4500 SO4 E	200	400
9	Total Dissolved Solids (TDS)	650.00	mg/L	APHA 23rd Edn 2540 C	500	2000
10	Total Suspended Solids (TSS)	8.00	mg/L	APHA 23rd Edn 2540 D	NS	NS
11	Total Hardness as CaCO3	480.00	mg/L	APHA 23rd Edn 2340 C	200	600

AL & PL As Per IS 10500.

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/03

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/03	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Borewell Near Grampanchayat Naranda	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	NS	NS
13	Bi Carbonate as CaHco3	310	mg/L	APHA 23rd Edn 2320 B	NS	NS
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	0.05
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.5	1.0
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	0.003	No relaxation
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	NS	NS
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	0.05	1.5
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.3	No relaxation
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	No relaxation
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	0.02	No relaxation
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	5	15

AL & PL As Per IS 10500.

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/03

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/03	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Borewell Near Grampanchayat Naranda	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
23	Nitrate	1.81	mg/L	APHA 23rd Edn 4500 NO3 B	45	No relaxation

AL & PL As Per IS 10500.

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426 Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/04

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/04	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Z.P School Vanoja	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
1	Alkalinity as CaCO3	245.00	mg/L	APHA 23rd Edn 2320 B	200	600
2	BOD at 27 oC for 3 days	3.00	mg/L	IS 3025-Part 44	NS	NS
3	Chemical Oxygen Demand (COD)	8.00	mg/L	APHA 23rd Edn 5220 B	NS	NS
4	Chloride	105.96	mg/L	IS 3025- Part 32	250	1000
5	Conductivity	908.50	uS/cm	IS 3025- Part 14	NS	NS
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	NS	NS
7	pH at 25 °C	7.44	-	IS 3025- Part 11	6.5-8.5	No relaxation
8	Sulphate	84.63	mg/L	APHA 23rd Edn 4500 SO4 E	200	400
9	Total Dissolved Solids (TDS)	980.00	mg/L	APHA 23rd Edn 2540 C	500	2000
10	Total Suspended Solids (TSS)	6.00	mg/L	APHA 23rd Edn 2540 D	NS	NS
11	Total Hardness as CaCO3	450.00	mg/L	APHA 23rd Edn 2340 C	200	600
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	NS	NS

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/05

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/05	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Hanuman Mandir Vansadi	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	NS	NS
13	Bi Carbonate as CaHco3	250	mg/L	APHA 23rd Edn 2320 B	NS	NS
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	0.05
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.5	1.0
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	0.003	No relaxation
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	NS	NS
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	0.05	1.5
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.3	No relaxation
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	No relaxation
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	0.02	No relaxation
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	5	15

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/05

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/05	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Hanuman Mandir Vansadi	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
23	Nitrate	3.61	mg/L	APHA 23rd Edn 4500 NO3 B	45	No relaxation

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426 Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/06

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/06	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Sr.No	Parameters	Results	Unit	Test Method	Specification: AL	PL
1	Alkalinity as CaCO3	80.00	mg/L	APHA 23rd Edn 2320 B	200	600
2	BOD at 27 oC for 3 days	4.0	mg/L	IS 3025-Part 44	NS	NS
3	Chemical Oxygen Demand (COD)	12.00	mg/L	APHA 23rd Edn 5220 B	NS	NS
4	Chloride	93.97	mg/L	IS 3025- Part 32	250	1000
5	Conductivity	538.50	uS/cm	IS 3025- Part 14	NS	NS
6	Oil and Grease	BQL (QL=1)	mg/L	IS 3025- Part 39	NS	NS
7	pH at 25 °C	7.63	-	IS 3025- Part 11	6.5-8.5	No relaxation
8	Sulphate	30.33	mg/L	APHA 23rd Edn 4500 SO4 E	200	400
9	Total Dissolved Solids (TDS)	300.00	mg/L	APHA 23rd Edn 2540 C	500	2000
10	Total Suspended Solids (TSS)	6.00	mg/L	APHA 23rd Edn 2540 D	NS	NS
11	Total Hardness as CaCO3	250.00	mg/L	APHA 23rd Edn 2340 C	200	600

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/06

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/06	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
12	Carbonate as CaCO3	BQL (QL=2)	mg/L	APHA 23rd Edn 2320 B	NS	NS
13	Bi Carbonate as CaHco3	80	mg/L	APHA 23rd Edn 2320 B	NS	NS
14	Arsenic	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	0.05
15	Boron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.5	1.0
16	Cadmium	BQL (QL=0.002)	mg/L	GGMPL/SOP/W & WW/46	0.003	No relaxation
17	Cobalt	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	NS	NS
18	Copper	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	0.05	1.5
19	Iron	BQL (QL=0.05)	mg/L	GGMPL/SOP/W & WW/46	0.3	No relaxation
20	Lead	BQL (QL=0.005)	mg/L	GGMPL/SOP/W & WW/46	0.01	No relaxation
21	Nickel	BQL (QL=0.01)	mg/L	GGMPL/SOP/W & WW/46	0.02	No relaxation
22	Zinc	BQL (QL=0.02)	mg/L	GGMPL/SOP/W & WW/46	5	15

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

GO GREEN MECHANISMS PVT. LTD.

Head Office & Lab
Dayal Estate, National Highway No.8, Opp APMC Market Gate-1, Jetalpur, District-Ahmedabad-382426
Gujarat. INDIA

Mobile No : +91-7069072001 Email Id : lab@gogreenmechanisms.com

CERTIFICATE OF ANALYSIS

Report Number: GGMPL/PN/1605D/69/06

Reporting Date : 19/08/2024

Dalmia Cement (Bharat) Ltd.
Naranda Limestone Mine Village Naranda, Tahsil Korpana,Dist-Chandrapur

TC-7073

SAMPLE DETAILS

Lab ID:	Lab/PN/1605D/69/06	Sampling Date:	07/08/2024
Sample Drawn By:	Laboratory Representative	Sample Receipt Date:	09/08/2024
Sample Type:	Water	Analysis Start Date:	10/08/2024
Sample Description:	G.W of Handpump Near Shivaji Vidhyalaya Antargaon	Analysis End Date:	17/08/2024
Sample Quantity:	4 L	Sampling Method:	GGMPL/WI/27A
Sample Condition:	Satisfactory	Packing:	Sealed

Specification:

Sr.No	Parameters	Results	Unit	Test Method	AL	PL
23	Nitrate	1.22	mg/L	APHA 23rd Edn 4500 NO3 B	45	No relaxation

AL & PL As Per IS 10500

NS=Not Specified, BQL=Below Quantification Limit,QL= Quantification Limit

Analyzed By
Priyanka Shrimali

GO GREEN MECHANISMS PVT. LTD. AHMEDABAD

Authorized Signatory
Manish Kumawat

--- End of Report ---

Annexure-XIV

Dalmia cement

cement! sugar! refractories! power!

DCBL/CA/Irr.Pen.River Agree/06-23/0010

Date: 28/06/2023

To,
The Executive Engineer
Chandrapur Irrigation Division,
Civil Lines,Chandrapur (M.S)

Sub:-Submission of Agreement for Approval.

Dear Sir,

Kindly refer your letter जा क्र 1661/राजस्व/मुरली बिगर सिंचन /2023., dtd.15.06.2023, according to the same and subsequent discussion with you,we are submitting the Agreement for your approval to draw the water from Penganga River for our Industrial and domestic purpose.

Please grant your approval for the Agreement and oblige.
Thanking you.

Yours truly
For Dalmia Cement (Bharat) Limited

Subbaraidu Ayyagari
(Plant Head)

Encl:- 1) Agreement -5 sets (1 Original,4 Photo Copy)
2) MPCB Consent to Operate Plant (Photo Copy)
3) Company 7/12 (Photo Copy)
4) Company Layout Map (Photo Copy)
5) Memorandum of Articles Association (Photo Copy)
6) Certificate of Incorporation (Photo Copy)
7) Resolution Board of Directors (Photo Copy)
8) Cheque Rs.1,23,442/- (Original Cheque No.160849, dtd. 17.06.2023)
9) Letter for Chief Engineer, Nagpur (Photo Copy)

कार्यकारी अभियंता
टपर पाटबंधारे विभाग
चंद पूर

DALMIA CEMENT (BHARAT) LIMITED

CHANDRAPUR CEMENT WORKS

VILLAGE NARANDA

BETWEEN

WATER RESOURCE DEPARTMENT

CHANDRAPUR

VALID FROM 1ST JULY 2023 TO 30TH JUNE 2028

महाराष्ट्र MAHARASHTRA ◑ 2022 ◑ BS 757958

Dalmia Cement (Bharat) Ltd. CCW Naranda

29 MAY 2023

AGREEMENT
Stamp Rs.1000/-
(For non-Irrigation water supply)

An agreement made on the 30th date of June **Two Thousand Twenty Three between Dalmia Cement (Bharat) Limited, Chandrapur Cement Works** (formerly known as Murli Industries Ltd.)**Village Naranda., Tehsil Koroana., Distt: Chandrapur- 442916** and **EXECUTIVE ENGINEER, IRRIGATION DIVISION CHANDRAPUR, NAGPUR ROAD, CIVIL LINES, CHANDRAPUR** Local self Government body such as Gram panchayat, Municipal authorities, Zilla Parishad, Jeewan Pradhikaran or company and Industrial corporation (which expression hereinafter referred to as ' **the company**' shall, unless excluded by or it be repugnant to the context or meaning thereof be deemed to include its successors and assigns) registered under the Indian Companies Act, 1913 (VII of 1913), the companies Act, 1956(I of 1956) and having its registered Office at Dalmiapuram, District Tiruchirappalli - 621 651, (T.N), Indiahereinafter referred to as **'the company' of the one part** and the Governor of Maharashtra hereinafter referred to as **'the Government'** (which expression shall unless excluded by or it be repugnant to the context or meaning thereof be deemed to include his successors and assigns) **of the other part**.

Executive Engineer,
Chandrapur Irrigation Division,
CHANDRAPUR.

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

जोडपत्र – २

दस्ताचा प्रकार / अनुच्छेद क्रमांक : करारनामा
दस्त नोंदणी करणार आहेत का ?
नोंदणी होणार असल्यास [illegible]
दुय्यम निबंधक कार्यालयाचे नाव
मिळकतीचे वर्णन
मोबदला रक्कम
मुद्रांक विकत घेणाऱ्याचे नाव : डालमिया सिमेंट (भारत) लि. नारंडा
दुसऱ्या पक्षकाराचे नाव : प्रो. सुभाषचंद्र [illegible]
हस्ते असल्यास त्याचे नांव व पत्ता
मुद्रांक शुल्क रक्कम : 400/-
मुद्रांक विक्री नोंद वही अनु.क्र. : 8989 दि. 9/9/2023
मुद्रांक विकत घेणाऱ्याची सही

श्रीमती मंदाकिनी अ देशमुख, स्टॅम्प विक्रेता, चंद्रपूर

Whereas the company is desirous of constructing a pumping station on the company's land atSurvey No. 131 Naranda , Village Dalmia Cement (Bharat) Limited(formerly known as Murli Industries Ltd.) for drawing water from the source(Penganga River)
(hereinafter referred to as **"the said source")** for the use by the company's------- Plant. (hereinafter referred to as "the said Plant") and laying underground and surface pipes and drains for discharge of the factory effluent.

AND whereas the company has applied to the Government for permission to

Draw **2.50** Million Cum. of water per year from the said source.

AND whereas the company has paid **Rs**. Nill (**Rupees**------------)to Government towards the proportional cost of capital out lay of the project.

AND whereas the Government has agreed to grant the aforesaid permission to the

Company on the terms and conditions hereinafter appearing.

AND WHEREAS UNDER the said terms and conditions the company has to deposit with the **Executive Engineer, Chandrapur Irrigation Division, Chandrapur** to the Government a sum of **Rs.27,50,002/-as security equivalent to 2 Months company's probable annual water charges** *based on yearly sanctioned and as communicated,* **In cash or in the form of a bank Guarantee issued by a scheduled / nationalized bank having it's main/branch office situated locally** for the due observance and performance by the company of the terms and conditions of this Agreement; AND WHEREAS the company has accordingly prior to the execution of these presents deposited with the Government **Rs. 27,50,002/-** as security for the due observance and performance by the company of the terms and conditions herein contained; AND WHEREAS it has been agreed that the saidamount will not carry any interest if deposited in cash.

NOW THIS AGREEMENT WITNESSTH AS FOLLOWS :

1) (a) In consideration of the company making payment to the Government as hereinafter specified and observing and performing the convenience and conditions herein contained Government do hereby grants to the company permission to draw following quota of water for the specified purpose.

CCW Naranda — Dalmia Cement (Bharat) Ltd.

For, Dalmia Cement (Bharat) Ltd.
Authorised Signatory

Executive Engineer, Chandrapur Irrigation Division, CHANDRAPUR.

C:\Documents and Settings\Mule\Desktop\NI agreement Draft Reservoir sudharit- 2022.doc

महाराष्ट्र MAHARASHTRA ◑ 2022 ◑ BS 757959

Dalmia Cement (Bharat) Ltd CCW Naranda

29 MAY 2023

STAMP CLERK

Sr. No.	Description/use	Quantity (Mcum per year)
1	Total sanctioned quota.	2.50 mm3
1.1	For Industries which use water as a raw material for preparation of cold drinks, mineral water etc.	-----
1.2	For industries other than Sr. No. 1.1	2.50 mm3
1.3	For domestic use	----
1.4	For agriculture use (nursery/ gardening) within the Company's premises	------

and use the same for the purpose of the Company's said plant or project and for supply to residential colonies for a term of **Five** years commencing from the---------- On the following terms and conditions.

Executive Engineer.
Chandrapur Irigation Division
CHANDRAPUR.

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

जोडपत्र – २

दस्ताचा प्रकार/अनुच्छेद क्रमांक : करारनामा
दस्त नोंदणी करणार आहेत का ?
नोंदणी होणार असल्यास
दुय्यम निबंधक कार्यालयाचे नांव
मिळकतीचे वर्णन : डालमिया सिमेंट (भारत) लिमिटेड नारंडा
मोबदला रक्कम
मुद्रांक विकत घेणाऱ्याचे नाव
दुसऱ्या पक्षकाराचे नाव
हस्ते असल्यास
मुद्रांक शुल्क रक्कम : ५००/-
मुद्रांक विक्री नोंद अनु.क्र. : ४९५० दि. २७/६/२०२३

(b) The Industrial water requirement as raw material and the Domestic water requirement of the company as demanded deemed to be **separate and independent for the sole purpose** and water charges assessment shall **be accordingly separate and Independent** for other clauses of this agreement.

(c) Within the limits of permitted quota the company is permitted to give its phase wise water utilization schedule as an annexure to this Agreement. This phased water utilization scheduled will be on yearly basis. For this purpose year will start from 1st day of July.

2) The permission hereby granted shall be subject to the provision of the Maharashtra IrrigationAct. 1976, the Bombay Canal Rules 1934,MWRRA Act,2005 read with MWRRA (Amendments and Continuance) Act,2011 of 22/04/2011 and subsequent revisions, if any, in force and any executive orders issued in this behalf by Government and any statutory amendment thereof from time to time and for the time being in force.

3) Nothing herein contained shall be deemed to imply and guarantee on the part of the Government as to the availability or otherwise of any specific quantity of water and Government shall not be responsible for the non-supply or in adequate supply of water on any account whatsoever.

However in case of inadequate or non-supply **due to shortage of water or reason beyond the control of the Department,** bill shall be charged as per actual quantity of water supplied during such period.

4) The company shall use thewater drawn from the said Reservoir for purposes of the company's said Plant and for supply to the residential colonies constructed by the company within the area of the said Plant for providing housing to its employees and workers (hereinafter referred to as " the said residentialColonies"). The company shall not sale the water from the said reservoir to any other person,firm or company, corporation or other body. In the event of the company selling water

For, Dalmia Cement (Bharat) Ltd.
Authorised Signatory

Executive Engineer,
Chandrapur Irrigation Division,
CHANDRAPUR.

drawn from the said river, then Government without prejudice to its right will forthwith revoke the license. Government shall be entitled to recover from the company the proceeds of any such sale made by the company.

As regards water supply to Penganga River Dalmia Cement (Bharat) Limited.Chandrapur Cement Works (formerly known as Murli Industries Ltd.)this clause of resale of water will not be applicable to the extent the water is supplied by them to the industrial units and residential colonels in their jurisdiction. But, for any purposes other than the above if ----------Dalmia Cement (Bharat) Limited.Chandrapur Cement Works(formerly known as Murli Industries Ltd.)desires to supply the water then the prior permission of the Government in Irrigation Department is obligatory. Water supply made by ----------Dalmia Cement (Bharat) Limited., Chandrapur Cement Works(formerly known as Murli Industries Ltd.)without prior permission will be charged at the maximum rates applicable for industrial water supply.

5) Government shall be entitled to utilize water of the said reservoir available after meeting the reasonable requirements of the company ; as to which matter the decision of the Government shall be final and binding on the company, for such purpose as Government deem fit.

6) The permission hereby granted shall not in any manner prejudicially affect the existing water rights vested in the upstream riparian owners; nor shall it in any way, prejudice Government'sright to here after launch or implement in public interest any new schemes of its own at, on or in connection with present source of channel of water supply available to the company, subject however to thesafe-guarding of its reasonable demand referred to in clause (5) above.

7) (a) For ascertaining the quantity of water drawn by the companyDalmia Cement (Bharat) Limited., Chandrapur Cement Works(formerly known as Murli Industries Ltd.)shall forthwith at **its own cost** and after obtaining prior approval in writing thereto of the Executive Engineer, install independent pipelinesfitted with separate electronic water measuring devices for use of water for the said Independent intention (hereinafter referred to as "the said electronic measuring devices") at such places as is indicated by the Executive Engineer. All the pipeline layout from the said source shall be got approved from the Executive Engineer. No changes in the approved layout shall be made without the prior written approval from the Executive Engineer. In the event of the company failing to install and keep in proper working order the said electronic measuring devices for use of water for the said Plant and supply to the said residential colonies as aforesaid the company shall be liable to pay for the full sanctioned water quota. During such period 150% water charges will be charged at the prevailing rates for the said plant. The said electronic measuring devices shall always be kept under the lock and seal of the Executive Engineer and the key of such lock shall at all times remain with the Executive Engineer. The company shall at all times, during the substance of this agreement at its own cost maintain the said electronic measuring devices in proper working order and condition.

Dalmia Cement (Bharat) Ltd. CCW Naranda

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

Executive Engineer, Chandrapur Irrigation Division, CHANDRAPUR.

(b) Reading for the water so drawn by the company will be taken on the sold electronic measuring devices, on the**Last**day of each month/at agreed times, Jointly by the authorized representatives of the Executive Engineer and of theDalmia Cement (Bharat) Limited.Chandrapur Cement Works(formerly known as Murli Industries Ltd.).

(c) If at any time in the opinion of the Executive Engineer the said electronic measuring devices are found defective, the same shall be tested for its accuracy and the cost of such testing shall be borne and paid by the company. If on such testing the said electronic measuringdevices are found to be defective the company shall forthwith get the same repaired and set right at its own cost and in the event of company failing to do so within 30 (thirty) days thereafter the Executive Engineer may proceed to do so on account and at the cost of the company.

(d) In the event of the said electronic measuring devices going out of order and becoming defective the quantity of water drawn by the company during the period when the meter was defective and not working shall be ascertained in the following manner.

(I) If the said electronic measuring devices remain out of order for a period of less 30 days, then the quantity of water deemed to be drawn by the company during the said period, shall be calculated on proportionatebasis on 90% *of the yearly sanctioned quantity as communicated in clause 1or average for the last six months whichever***is higher**.

(II) If the said electronic measuring devices remain out of order for a period exceeding 30 days then the quantity of water deemed to be drawn by the company during the said period shall be deemed to be 150% of the sanctioned quota based on the phased requirement for that period or the monthly maximum during the previous six months whichever is higher. This will be made applicable for the period during which the measuring devices remained out of order.

The aforesaid provisions will also apply when the quantity of water drawn by the company cannot be measured on account of removal of the said electronic measuring devices for repair or the same in the option of the Executive Engineer not working properly.

8) The Bill for the water drawn by the company during the previous calendar months shall be sent in duplicate/ triplicate by the Executive Engineer to the office of the company within 15 days after the end of the water consumption month. The company shall thereafter duly pay the same by a demand draft drawn in the same of the **Executive Engineer,Chandrapur Irrigation Division Chandrapur**for and on behalf of the government within a fortnight from the date of receipt of the bill and shall not allow the same to fall in arrears. If the company fails to pay amount within this stipulated time (15 days from the date of receipt of the bill i.e. before the end of the current month) extra charge not exceeding 12% per annum of the amount due will be charged. If the delay in payment of water charges exceeds six months, the Government reserves the right to terminate the water supply with a notice of 15 days in advance.

9) The cost of all works in connection with the arrangements for water supply including the cost of measuring devices and its installation and maintenance, shall be borne by the company.

Dalmia Cement (Bharat) Ltd. CCW Naraindara

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

Executive Engineer, Chandrapur Irrigation Divi

10) Subject to the provisions of clause (7) hereof, the company shall pay to the Government at the time and in the manner specified in clause (11) hereof water charges for the quantity of water drawn by the company form the said reservoir as measured by the said electronic measuring devices at the rates notified by Government time to time.

I.In case, actual water use happens to be less than90%of the phase-wise planned quantity of water, the billing shall be done on the 90 % of the quantity of water specified in the Agreement, If the actual water use is between 90 % to 100% of the corresponding phase-wise water use: billing shall be made as per the standard rate

II. For water use more than 100% & less than 150% of sanctioned quota, water charges will be 1.50 times of AR and beyond 150% of sanctioned quota, water charges will be 3.0 times of AR

III.In addition to above, commitmentcharges at 5% of applicable charges, shall be payable on sanctioned quota less agreed phased quota of water.

IV. In addition to the payment of water charges referred to above the company shall also pay to the Government local funds cess at the rate of 20 paisa per every rupee of water charges.

11)(a) The company shall pay to the Executive Engineer, water rates and local fund cess either in advance every month on the basis of anticipated quantum of water to be drawn by it from the said source during the month or on monthly basis within fifteen (15) days from the date of receipt of the month demands by the company from the Executive Engineer.**On default of the company to pay the water rate or localcess as aforesaid vide clause 8 and 10, Government shall without prejudice to its any other rights and remedies be entitled to terminate this agreement forthwith as per clause no. 8.**

(b) In the case of disputes regarding quantity of water billed or rate at which the bill is prepared the Company/ firm/ individual water user shall first pay the complete amount of the bill and then claim for refund of any excess bill charged giving the reasons justification of wrong billing. However the decision of Superintending Engineer,Chandrapur Irrigation Circle Chandrapur,in this regard shall be final and binding on the Company.

12) Government hereby reserves to itself the right to revise from time to time the water rates and local fund cess and company shall pay the revised water rates and local fund cess as may be fixed by Government from time to time.

13) The company shall discharge the effluent only after treatment to desired standards of Maharashtra Pollution Control Board (MPCB). Company shall get its effluent examined from MPCB and submit the certificate of MPCB to Executive Engineer quarterly. The company will be charged at

Dalmia Cement (Bharat) Ltd. CCW Naranda

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

Executive Engineer,
Chandrapur Irrigation Division,
CHANDRAPUR.

applicable rates only if it regularly submit the certificate of MPCB stating that effluent meets the MPCB standards.

If the company fails to submit MPCB certificate or effluent does not meet MPCB standards than 5% penal charges will be applicable for next 3 months. And at the end of three months water supply will be closed.

Government also reserves the right to call for list of water polluting companies. If Governmentfounds that effluent of the company is not meeting MPCB standards, then Government will give three months notice to company to cure the default. During this cure period company will be charged at rates twice the applicable rates. And if company fails to cure the default the water supply will be stopped at the end of 3 months.

If an industry adopts Zero Liquid Discharge (ZLD) technology and draws only up to 25% of its allocation to cover pipeline loss, evaporation and process consumption, it will be charged only at 25%. Of the applicable rate for the water drawn. However, this concession will be applicable to those industries who reduce its annual sanctioned water demand up to minimum 75% or less. It will be mandatory to ascertain and certify this by the officer not below rank of Executive Engineer

14) The effluent disposal arrangement made by the company shall be got approved by the Company from the Maharashtra Pollution Control Board/Environmental Department of the Government prior to commencing the operation of pumping/drawing water from the source.

15) The company shall at all the times allow an officer of Water Resources Department of the Government or authorised in that behalf to inspect the said works as well as accounts and copies taken of entries from the records maintained by the company.

16) Any notice or other documents to be given to or served upon the company may be given or served on behalf of the Government by the **Executive Engineer, Chandrapur Irrigation Division Chandrapur** and any such notice or document shall be deemed to have been duly given to or served upon the company or sent by registered post to the registered company if it is delivered at the registered office of the company or sent by registered post to the registered address for the time being of the company.

17) The said sum of **Rs. 27,50,002/- (-) Rs. 26,26,560= Rs.1,23,442/-**deposited in the **Chequeno.160849 dtd.17/06/2023 issued by State bank of India** by the company with the **Executive Engineer, Chandrapur Irrigation Division Chandrapur** -to the government as aforesaid shall be held by the Government as security for the due observance and performance by the company of the covenants, terms and conditions herein contained. In case of default on the part of the company to perform and observe any of the said covenants and conditions it shall be lawful for the Government in his absolute discretion to forfeit the whole of the security deposit or any part thereof without prejudice nevertheless to any rights and remedies which the Government

Dalmia Cement (Bharat) Ltd. CCW Naranda

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

may have against the company under these presents for such breach and the company shall forthwith pay up the amount so forfeited and shall always maintain the original amount of deposit throughout the period of this agreement. On the expiry of the terms of this agreement, the said security deposit of **Rs.27,50,002/-**,or such part thereof as shall not have been appropriated as aforesaid shall be refund to the company.

18) All amounts due to the Government by the company under this agreement shall be deemed to be arrears of land revenue and may without prejudice to any other rights and remedies of the Government be recovered from the company as arrears of land revenue.

19) On the expiry of the term of this agreement, Government may renew this agreement within 90 days for such further period and on such terms and conditions, as Government may at its absolute discretion deem fit.

20) The costs incurred in the execution of the Incidental charges for this agreement including stamp duty shall be borne and paid by company.

21) The agreement supersedes all the previous agreements entered into by the company with the Government in connection with the supply of water from Penganga River.

22) **IF THE COMPANY COMMITS A BREACH OF ANY OF THE TERMS AND CONDITION THEREOF GOVERNMENT SHALL BE ENTITLED TO CANCEL THIS PERMISSION AND DISCONTINUE THE SUPPLY OF WATER WITHOUT PAYMENT OF ANY COMPENSATION WHATSOEVER TO THE COMPANY.**

23) The Government hereby reserves to itself its right to change/ amend/ modify/ cancel/revise any of the terms and conditions, rules and regulations of water management and Maharashtra Irrigation Act. And rules laid under them which shall be applicable for this agreement.

Dalmia Cement (Bharat) Ltd. CCW Naranda

For, Dalmia Cement (Bharat) Ltd.

Authorised Signatory

Executive Engineer.
Chandrapur Irrigation Division
CHANDRAPUR.

IN WITNESS WHEREOF THE Common Seal of the **Dalmia Cement (Bharat) Limited., Chandrapur Cement Works**(formerly known as Murli Industries Ltd.).,**Village Naranda., Tehsil Korpana., Distt. Chandrapur -442916** has been hereof affixed **Subbaraidu Ayyagari (Plant Head)** AND the **Executive Engineer, Chandrapur Irrigation Division Chandrapur**, has for and on behalf of the Governor of Maharashtra hereto set his hand and affixed the seal of his Office the day and year first herein above written. **THE COMMON SEAL OF DALMIA CEMENT (BHARAT) LIMITED**(formerly known as Murli Industries Ltd.)
Was pursuant to a resolution
Of the Board of Directors of
The company dated the.....
Hereto affixed in the presence of.....**for Dalmia Cement (Bharat) Limited**

1. ----------

2. ---------- **(Unit Head)**

Two Direction of the company who in taken thereof have set their respective hands in the presence of.....

1. ---------- (Arvind Thakur)

2. ----------

SIGNED, SEALED AND DELIVERED by the Executive Engineer, Chandrapur Irrigation Division for and on behalf of the Governor of Maharashtra in the presence of...

1. ----------

2, ----------

Executive Engineer
(Chandrapur Irrigation Division)
Chandrapur

For, Dalmia Cement (Bharat) Ltd

Authorised Signatory

ANNEXURE-XV

AMBIENT AIR QUALITY IN CORE AND BUFFER ZONE

AMBIENT AIR QUALITY IN CORE ZONE

Month	PM 2.5 (µg/m3)	PM 10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	CO (mg/m3)
Standard	**60.0**	**100.0**	**80.0**	**80.0**	**4.0**
AAQMS-1 : Near Explosive Magazine					
April-24	36.7	72.5	19.18	23.09	1.09
May-24	31.2	70.0	16.28	24.99	1.13
June-24	33.7	72.1	18.61	27.63	1.15
July-24	27.1	64.3	17	24.53	1.09
August-24	32.9	56.7	17.26	21.81	1.14
September-24	23.7	54.5	15.91	22.72	1.03
AAQMS-2 : Near Mines Office					
April-24	40.8	71.0	23.3	25.4	1.1
May-24	37.9	74.0	20.9	24.6	1.1
June-24	40.0	77.5	17.54	22.14	1.11
July-24	24.2	61.9	15.6	21.8	1.1
August-24	33.3	58.1	16.9	19.5	1.12
September-24	26.2	59.5	14.0	19.5	1.06
AAQMS-3 : Near Old Working Area					
April-24	38.3	70.6	17.3	27.7	1.11
May-24	33.3	65.2	15.93	22.35	1.13
June-24	36.2	67.1	19.9	27.2	1.1
July-24	23.7	56.2	16.4	23.6	1.1
August-24	35.4	53.7	18.8	21.3	1.14
September-24	24.6	51.1	14.7	22.4	1.0
AAQMS-4 : Old Waste Dump Area					
April-24	38.3	71.2	17.3	27.2	1.1
May-24	30.4	68.7	15.96	24.87	1.13
June-24	32.1	70.3	16.1	25.6	1.14
July-24	25.8	59.6	12.1	19.6	1.08
August-24	30.8	55.2	15.0	20.8	1.13
September-24	25.8	55.8	9.6	17.1	1.07

ANNEXURE-XV

AMBIENT AIR QUALITY IN CORE AND BUFFER ZONE

AMBIENT AIR QUALITY IN BUFFER ZONE

Month	PM 2.5 (µg/m3)	PM 10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)
Standard	**60.0**	**100.0**	**80.0**	**80.0**
Location :- Near Naranda Village				
April-24	32.07	57.75	14.03	24.82
May-24	35.4	59.24	17.96	22.21
June-24	30.82	55.59	15.3	20.56
July-24	24.99	60.4	11.19	19.63
August-24	33.74	60.98	19.7	22.34
September-24	27.49	58.85	10.37	20.69
Location:- Antargao Village				
April-24	35.0	63.7	24.7	24.0
May-24	36.7	66.2	27.8	27.1
June-24	38.3	69.3	22.6	30.6
July-24	21.7	62.7	16.2	22.8
August-24	32.1	64.7	18.4	24.5
September-24	25.0	57.5	17.8	21.6
Location:- Near Vanoja Village				
April-24	32.1	58.6	15.7	24.4
May-24	35.0	61.5	17.4	26.2
June-24	38.7	66.6	21.0	28.8
July-24	30.0	63.8	18.9	26.2
August-24	31.2	61.8	20.5	24.4
September-24	28.7	59.6	15.5	24.7
Location:- Near Vansadi Village				
April-24	32.4	55.3	16.7	25.7
May-24	38.7	58.5	18.0	28.6
June-24	33.3	64.9	19.3	26.8
July-24	22.5	57.0	14.7	22.1
August-24	34.2	63.5	23.2	25.8
September-24	25.4	53.7	11.2	20.4

ANNEXURE-XVI

YEAR WISE EXPENDITURE TOWARDS ENVIRONMENTAL PROTECTION

SN	Activity	Expenditures (In Lakhs)			
		2021-22	**2022-23**	**2023-24**	**2024-25 (As on Sep-24)**
1	Operation and Maintenance of Air Pollution Control Equipment	11.29	10.6	4.8	2.4
2	Fugitive Dust Emission Control Measures	10.6	6.5	6.54	2.66
3	Installation of Environment Monitoring Equipment - CAAQMS	55	-	-	-
4	Environment Monitoring & Studies	4.422	5.11	12.45	1.26
5	Environmental Awareness Programmes	1.5	1.5	1.5	
6	Greenbelt Development & Plantation	2.504	6.57	9.31	0.65
	Sub Total	**85.316**	**30.28**	**34.6**	**6.97**
	Grand Total	**157.166**			

Sr. No.	Activity	Expenditure (In Lakhs)
		(April-24 to Sep-24)
1	Operation and Maintenance of Air Pollution Control Equipment	2.4
2	Fugitive Dust Emission Control Measures	2.66
3	Environment Monitoring & Studies	1.26
4	Plantation & Greenbelt Development	0.65
	Total	**6.97**