



Environmental Impact Assessment of Noise level due to mining in Tilakhera, District Chittorgarh, Rajasthan

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ABSTRACT

Environmental impact assessment is a decision making tool to predict the effects of a proposed project, plan or program on the environment. Mining is the process of extracting the mineral and metals from the earth crust. Existing noise levels on and around the property should be identified as well as potential noise impact sites. If the potential impacts warrant it, pre-mining noise monitoring may be required. Similar exercise should be done for vibration. While for purpose of development and economic upliftment of people, there is need for establishment of industries and mining, but these have to be environmentally friendly. Therefore it is essential to assess the impacts of mining on different environmental parameters, so that abatement measures could be planned in advance for eco-friendly mining in the area. In this work, the noise sources and levels in and around mines, the effects of noise and finally suggestions to reduce these effects are given in details, together with a real case study from mining activities in District Chittorgarh.

Keyword: Assessment, proposed project, mineral, potential impact, economic, environmentally friendly, parameter, abatement, eco-friendly, mining activities.

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INTRODUCTION

Noise is generated by all opencast mining operations from different fixed, mobile and impulsive sources, thus becoming an integral part of the mining environment. It is defined as sound without agreeable musical quality or as unwanted sound. In opencast mines, noise is a common environmental factor as generated by the heavy earthmoving machineries [1]. Noise pollution poses a major health risk to the mine workers. When noise in the form of waves impinges the eardrum, it begins to vibrate, stimulating other delicate tissues and organs in the ear. If the magnitude of noise exceeds the tolerance limits, it is manifested in the form of discomfort leading to annoyance and in extreme cases to loss of hearing. Detrimental effects of noise pollution are not only related to sound pressure level and frequency, but also on the total duration of exposure and the age of the person. The noise occurring during extraction works (i.e. drilling-blasting, excavation, loading and transporting) that take place in both open and underground pits is important when considering labor health and job performance as the highest disease and illness rates in mining continue to be mine worker's permanent or temporary hearing loss [2].

Study area:

Limestone is an important factor of cement industry. This district can be identified as a limestone district of Rajasthan, since the districts is endowed with large deposits of cement grade limestone as well as splittable limestone. The Tilakhera limestone lease area is located at a distance of about 2 Kilometers from Gambhiri Road Railway Station in the eastern direction near Mangrol Village This mining area is situated in the Nimbahera Tehsil of Chittorgarh District of Rajasthan. The Latitudes 24° 41' 30" N - 24° 42' 43" N and longitudes 74° 41' 02" E - 74° 41' 50" E.

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MATERIALS AND METHODS

Noise sample is collected from and around the mining area for analyses of noise level. The noise levels in the study area are done by using a weighted sound pressure level meter. (Model No. SL-4012). The noise measurement was conducted in the working hours in and around the mining area at different location which were heavily occupied by the mining machinery. To explain about the noise and its significance on

health of mine-workers, a nearby villager were interviewed on a very extensive scale using a questionnaire. Duration of analysis of noise level in study area was Dec. to Feb. 2013-14.

Sources of Noise:

- Drilling;
- Blasting; ·
- Operation of HEMM; ·
- Crusher and Workshop ; ·
- Vehicular Movement; and ·
- Belt Conveyor.

Mining operations and the limestone crusher would be the main sources of noise pollution. Noise due to vehicular movement will be intermittent, but will also add to the background noise level.

Table No. 1 Noise level due to various sources:

S. No.	Equipment	Measurement Location	Noise Level dB (A)
1	Drill Operating	Operator's position	94-98
2	Dumper, operating	10 m away	88-102
3	Dozer & Dumper both, operating	05 m away	95-110
4	Diesel Excavator	Near location area	80-85
	Derrick cabin	Near location	75-80
	Vehicular Movement		86-90
	Road side	10 m away	56-60

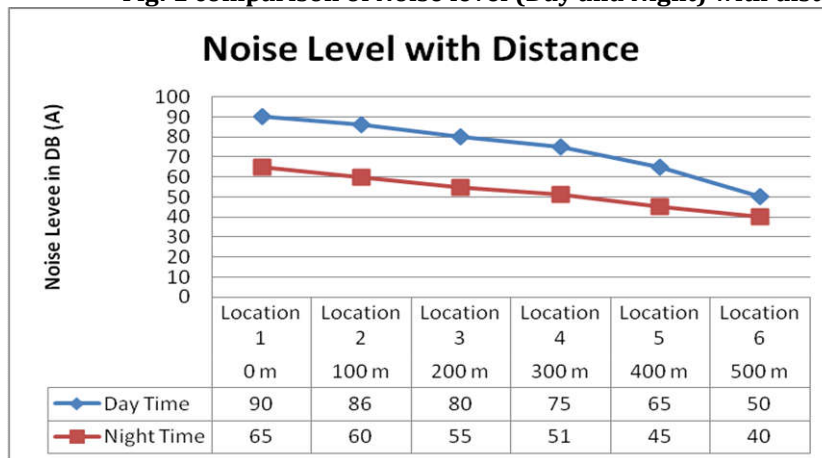
Table No: 2 Details of Noise Level Monitoring Sites:

S.No.	Sites	Distance from mine Site, (m)	Day Time DB (A)	Night Time DB (A)
1	Location 1	0	90	75
2	Location 2	100	86	60
3	Location 3	200	80	55
4	Location 4	300	75	51
5	Location 5	400	65	45
6	Location 6	500	50	40

Table: 3 Detail of Noise quality standards:

S.No.	Category of area	Limits in DB (A)	
		Day Time	Night Time
1	Industrial area	75	70
2	Commercial area	65	55
3	Residential area	55	45
4	Silence zone	50	40

Fig: 1 comparison of Noise level (Day and Night) with distance:

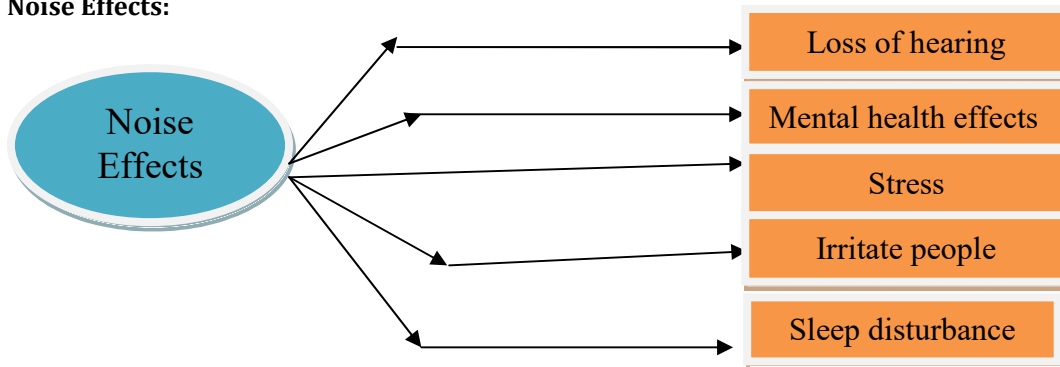


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RESULT AND DISCUSSION

Mining activities have been continuously going on from the last three decades and there are many mineral based industries also running in the area. The primary objective of noise survey in the study area is to monitor the noise sources and to assess the likely impact on the work exposure environment. Noise as pollutant produces contaminated environment which becomes a nuisance and affects the health of a person, his activities and mental abilities [3]. In comparison with the levels of noise exposure in various industries (airport, forest machinery, cement industry, foundry, textile industry, printing, metal plate workshop, ship engine room, riveting workshop), noise levels encountered in the open cast mining industry are second only to that encountered near jet engines at airports [4].

Noise Effects:



CONCLUSION

It is being observed that at the mine site where heavy earth moving machinery is in operation, noise level is more than the specific 80 dB. The sound pressure level generated by a noise source decreases with increasing distance from the source due to wave divergence. The government at both the local and state level should study the activity of operators, review/re-evaluate their EIA and evaluate their activity. The settlers should be relocated and compensated appropriately. It is recommended that a detailed Environmental Impact Assessment should be carried out before License can be obtained from government.

Proposed Environmental Mitigation Measures:

The nature of mining activities is such that noise & vibrations cannot be eliminated. Various measures to prevent noise pollution are:

- Provides of ear plugs and ear muffs to reduce noise level exposure.
- Use of noise abatement padding's in fixed plant installations
- Location of residential/resettlement colonies away from noise generating sources.
- Use of closed and advanced blasting technology.
- Providing silencers or enclosures for noise generating machines such as compressors etc., noise insulating enclosures.
- Creating a green belt around potential noise prone area.
- Reducing the exposure time of workers by practicing worker rotation.

Vibrations can be checked / prevented as under:

- Buildings likely to be affected due to vibrations should be identified and protected by trenching or other appropriate measures to minimize vibration effects.
- By the use of delays and superior blasting technology, avoiding over-charging we can be control on ground movement due to vibration. Due regard must be paid to vibration transmission properties of geological formations and terrain stability (tectonism, seismicity etc)
- Vibrations due to mobile plants and equipment can be minimized by modernization and proper maintenance.

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