

ASSESSMENT OF NOISE LEVEL IN THE WORK PLACE OF AN OPEN CAST MINES

¹ T. Naidu, ² N.Ramanjaneyulu, ³ CH.venkatesh

¹Assistant professor, ²⁻³U G Students

Department of Mining Engineering,

Godavari Institute of Engineering and Technology, Rajahmundry, AP, India.

Abstract : The increases mechanization in the opencast mines operations supports the production of large level of the noise. Exposure of miners to high concentrations of noise may cause occupational health hazards like pneumoconiosis and noise induced hearing loss and other allied health risk. Health risk to miners from dust depends on concentration and duration of exposure whereas noise induced hearing loss depends on sound pressure level, frequency and exposure level of workers. Therefore, the knowledge of the accurate noise level is key concern in today's mining industry. In this regard, an attempt has been made to investigate the noise level survey at the different places of the mines. The measured locations for noise survey are, drilling place, blasting place, quarry below the ground and quarry above the ground. Among them, the blasting zone area was recorded as the highly noisy area which was measured at 128.2 dBA.

Key words- Noise level, open cast mines, drilling, blasting area, Miners health.

I. INTRODUCTION

Noise is defined as the unwanted sound produced by the source of sound [1]. The generation of noise is a extreme environmental parameters which affect the working of efficiency of the workers. There are various sources of noise in the open cast mines such as, continuous operation of heavy machinery, blasting, drilling, transportation, beneficiations plant etc., These noise production affects the entire working environment of the mines [2]. The problem has been further aggravated by the rapid industrialization consequent upon technological advancement to meet the ever-increasing demand of industrial products. So far as mining industry is concerned, the noise pollution is not new [3]. The introduction of mechanization in the mining industry is main origin of the generation of noise problem [4]. The opencast mining methods has become most favorable due to high productivity, economic viability, better safety, higher conservation, etc., but due to high mechanization the noise in open cast operation gets increases.

The permissible noise level of 90dBA was defined by the DGMS in any mining industry [5]. Above this range it stars giving the problem to the mine workers. All that generates high level of noise within the mine premises as well as surrounding localities/residential areas. The availability of large diameter drills and various types of explosives facilitate use of hundreds of tonnes of explosives to break the over burden rocks as well as coal. In pit crushing system with mobile crusher and capacity coal handling plants are being installed. All these activities major sources of noise pollution. In this paper, we tried to made the survey of noise in the open cast road metal mines. The rest part of the paper discussed about the perusal of the selected site in the Section II which is followed by the noise survey in mines. The Section IV of the paper deals with the conclusion of the paper.

II. EFFECTS NOISE IN OPENCAST MINES

Noise is an invisible physical force in wave form that disrupts the electromagnetic system of our cognition and its proper and harmonious functioning that will cause all the affects you have listed and chaotic features in on our body system. In any dynamical system, an introduction of a new object will definitely change the proper behavior of the system either for good or bad and noise (particularly powerful and unpalatable by our brain) is one such object to our body system. Noise pollution has several ill effects on human beings. The most direct harmful effect of excessive noise in physical damage to the ear and the temporary or permanent hearing loss often called as 'temporary threshold shift' (TTS). Person suffering from the condition is unable to detect weak sounds. However, hearing ability is usually recovered within a month of exposure. Permanent loss usually called 'noise-induced permanent threshold shift' (NIPT's) represents a loss of hearing ability from which there is no recovery. The sound of 100 dB leads to permanent loss of hearing. Noise of about 90 dB causes auditory fatigue. Noise pollution leads to various disorders in human beings. It causes mental disorders such as insomnia, anxiety, depression and behavioral and emotional stress. Lack of concentration and mental fatigue are significant health effects of noise. It has been observed that the performance of school children is poor in comprehension tasks when schools are situated in busy areas of a city or suffer from noise pollution. There has been report of low weight children born to mothers living near airports.

III. PERSUAL OF THE SELECTED SITE

Noise survey is basically conducted in areas where noise exposure is likely to be occur such as mines area. Therefore, to conduct he noise survey an opencast mine which is situated at Anantapur district of the state of Andhra Pradesh. This is a road metal mines which is quipped with heavy machinery. A constant amount of the noise was observed in the mines. This constant production of the noise not only affect he mines production but also the surrounding locality. The survey was conducted during the month of March 2019.

Noise level refers to the level of sound. A noise survey involves measuring noise level at selected locations throughout an entire mines or sections to identify noisy areas. This is usually done with a sound level meter (SLM). A reasonably accurate sketch showing the locations of workers and noisy machines is drawn. Noise level measurements are taken at a suitable number of positions around the area and are marked on the sketch.

IV. NOISE SURVEY IN OPEN CAST MINES

In this project, the noise measurements have been carried out in the road metal mine, building stone. It is a opencast mine which is semi mechanized. It is a quarrying over an extent of 5.40Ha in the area of Ananthapur district in Andhra Pradesh. The noise measurement was carried out with the help of the sound level meter. The photograph of the noise meter which was used in the project is shown in Figure 1. The detail technical specification of the used sound level meter is presented in Table 1



Fig. 1 Photograph of the noise level meter

Table 1: Technical Specification of the Noise level meter

Measurement range	20 to 140 dB (single range), 143 dB Peak
Display	320 x 240 pixel color TFT
Output to PC	USB Mini B
Batteries	3 x AA Alkaline, (20 hours with backlight off)
External Power	9 to 14V DC at 250mA
Measurements stored	100
Dimensions	72 x 229 x 31mm, 295g
	2.8" x 9.0" x 1.2". 10.4oz

The detailed noise survey was made at five different places in the selected mines such as loading area, drilling place, blasting place, quarry below the ground and quarry above the ground. The sound level of these areas were measured individually and thereafter, their analysis part was done. The measured values of the noise (in terms of the average noise level) in these areas is presented in Table 2. As indicated in Table 2 the blasting area produces higher amount of noise than the other selected areas. This is mainly because of the high ground vibration produces at the time of the blasting operation. The drilling area also carry the high noise level which is next to blasting area. These areas show a high level of noise because of the high mechanized drilling operation at that mines.

Table 2: Measured values of noise at various places in the mines

Place	Maximum noise dB(A)	Minimum noise dB(A)
Drilling area	118.8	101.9
Blasting area	126.3	98.9
Quarry below the ground	90.6	64.2
Quarry above the ground	57.2	39.6
Loading	88.3	69.2

V. Conclusion

The noise is a measure of unwanted noise, which is being measured by the noise level or sound level meter. Noise is generated from almost all opencast mining operations from different fixed, mobile and impulsive sources; thereby becoming an integral part of the mining environment. The noise measurement survey was conducted in the various places of the open cast mines. Among all the measured noise levels the noise level of the blasting area was found to be higher than the other areas. The of noise level at the blasting and drilling was observed as the maximum of 128.2 dBA and 118.2 dbA respectively. The noise level at dumper, drill machines, drums scrubber double deck screen an de-watering screen was more than 90 dBA which is maximum permissible limit for 8hrs working period.

References :

- [1]. Tripathy, D.P., Noise Pollution , APH Publishing Corporation, New Delhi, 1999.
- [2]. 2. Vardhan ,Harsha., Karmakar ,N.C., and Rao,Y.V. "Impact of Noise on Miners-A Critical Review", Enviromedia, 2003, 22(3) , 311-325.
- [3].3. Tonin, R., "Estimating Noise Level from Petrochemical Plants, Mines and Industrial Complexes", Acoustics Australia, 1985, 13 (2), 59-67.
- [4].4. Pal, A.K., Mishra, Y., Mitra, S. and Saxena, N.C., "Noise Model for Mining Complex- A Case Discussion", Second World Mining Environment Congress, Katwice, Poland, 1997, 1-10.
- [5].5. Mohalik, N. K. and Pal, A.K., "Development of A Noise Model With Respect to Sound Propagation and Its Application to A Mining Complex", Noise and Vibration Worldwide, 2003, 33, 8-16.