

The Characteristics Of Noise From Mining industries



INTRODUCTION

NOISE IS A SIGNIFICANT ENVIRONMENTAL AND OCCUPATIONAL HAZARD IN MINING OPERATIONS. IT IS GENERATED BY A RANGE OF ACTIVITIES AND EQUIPMENTS, AFFECTING WORKER'S HEALTH AND NEARBY COMMUNITIES.

ABOUT MINES...

- **A mine** is an excavation made directly or through shafts and galleries on mineralized zones in the earth's crust to extract or mine the ore minerals.
- **Mines are essential** for providing raw materials necessary for various industries, including **construction, manufacturing, and energy production.**

ABOUT MINING...

- ❑ **Mining** is the process of extracting minerals of economic value from the earth's crust for the mankind that is exploitation of natural resources.
- ❑ **Mining include processes** such as **exploration, extraction. processing, transportation, Rehabilitation, reclamation.**

TYPES OF MINING...

- ❑ **Surface mining (open cast mining)** is a process of extracting minerals from earth by removing overburden to access deposits near the surface.
- ❑ **Underground mining (Subsurface Mining)** is a process of extracting minerals located deep below the surface.

Noise Sources in Surface Mining



MINING MACHINERY

- Excavators, haul trucks, and loaders (85-110 dB)



BLASTING OPERATIONS

- Impulse Noise from explosions mainly done by Blast Hole Drills (up to 140 dB)



CRUSHING AND PROCESSING

- Crushers and conveyor systems (90-100 dB)



DRILLING OPERATIONS

- High Pitched Noise From Percussive and Rotatory tools such as Rotatory drills



VENTILATION AND CONVEYORS

- Continuous noise from moving materials and ventilation fans

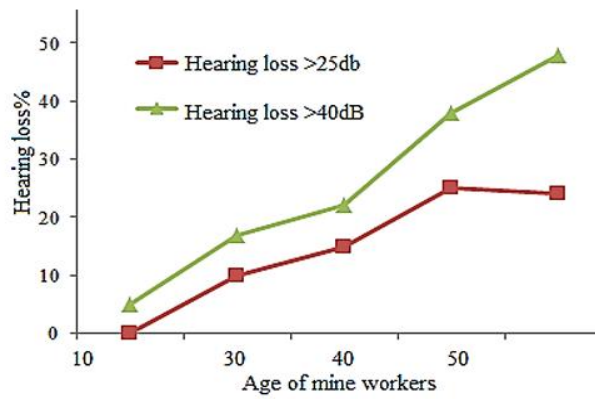


Figure 1. Hearing loss % of underground workers

NOISE SOURCES IN UNDERGROUND MINING



CONTINUOUS MINERS

Equipment used to cut through rock (85-110 dB)



DRILLS AND ROOF BOLTERS

- High noise from rock drilling (up to 120 dB)



CONVEYORS AND SHUTTLE CARS

- Moving ore through the mine (90-100 dB)



BLASTING

- Controlled but still loud blasts, less frequent than surface mining



VENTILLATION SYSTEM

- Fans create background noise within tunnels

IMPACTS OF NOISE IN SURFACE AND UNDERGROUND MINING

❑ VIBRATIONS AND WORKER'S HEALTH

- Whole-Body Vibrations(WBV)→Source : Heavy equipment , trucks , and machinery in surface and underground mining.
 - Impacts : Prolonged exposure leads to musculoskeletal disorders , lower back pain , fatigue, spine–related issues.
- Hand-Arm Vibrations(HAV/HIV)→Source : Handheld drills , jackhammers, and power tools.
 - Impacts :Vibration-Induced white finger(VWF),nerve damage , carpel tunnel syndrome , and reduced hand strength.

❑ COMMUNITY DISTURBANCES

- Noise pollution : Machinery and blasting operations disrupt nearby communities , causing sleep disturbances and anxiety.
- Vibrations from Blasting : Can cause structural damage to buildings and create a sense of unease among residents.
- Air Quality Impact : Dust from surface mining settles in nearby areas , affecting respiratory health.
- Increased Noise Levels and Safety risks : Machinery noise makes communication difficult among workers and miscommunication lead accidents.

❑ ENVIORNMENTAL IMPACTS

Wildlife Disruption , Habitat Destruction, Soil Erosion: Noise and vibrations interfere with animal communication and migration patterns , especially in forested terrains .Also due to surface mining leads to deforestation affecting ecosystem and leads to soil erosion.

NOISE MITIGATION IN MINING INDUSTRY: PROCESS AND GUIDELINES

ENGINEERING CONTROLS:

Engineering design,
Tool maintenance,
Protective equipment

ENVIRONMENTAL MITIGATION:

Blasting timings,
Noise-dampening materials,
Community Buffer Zones

REGULATORY GUIDELINES:

WHO, OSHA, BIS, ISO etc.

ADMINISTRATIVE CONTROLS:

Job Rotation and breaks,
Training and Awareness,
Monitoring Noise levels

Personal Protecting Equipment(PPE)

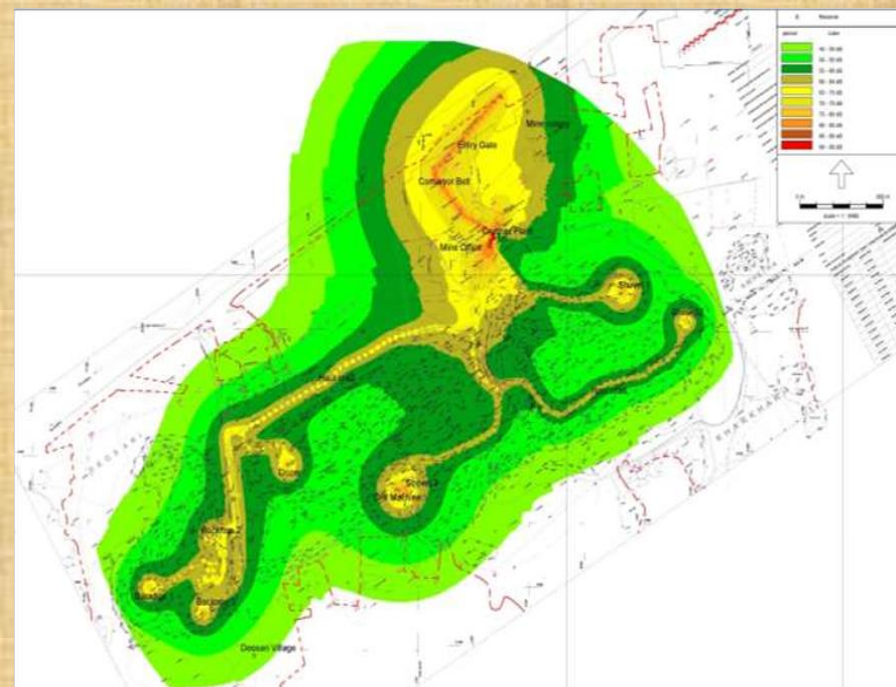
Road surface Improvements,
Tool selection,
Improved Seating

NOISE MANAGEMENT BY NOISE MAPPING → A CASE STUDY AREA OF CENTRAL INDIA MINE

- ❑ The research conducted by National Institute of Miners' Health, Department of Occupational Hygiene, Nagpur, India and Department of Environmental Science and Engineering(IIT-ISM),Dhanbad in a mechanized opencast limestone mine in Central India.

SUMMARY:

- ❑ Mine is operating in three blocks i.e new pit,old pit and deosari mine.
- ❑ All the mining operations are done by deployment of heavy earth moving machineries like dumpers , shovels, excavators, drill machine , dozers etc. There exists a running conveyor belt carrying limestone ore through 50-100 m of residential colony.
- ❑ There exists a number of villages surrounding the mine which are affected by noise generated by different sources directly or indirectly.
- ❑ It was observed :
 - Noise level inside crushers(90-95 dB(A));Noise level around drill machine(85-90 dB(A));Noise levels on both sides of conveyor belt(80-85 dB(A))
 - This facilitates in pinpointing action plans for noise management by identifying dominant sources that are responsible for adverse impact on mine environment and surrounding localities.



THANKYOU

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