

# **STUDY ON IMPACT OF NOISE LEVEL DUE TO QUARRYING ACTIVITY IN AND AROUND RATHINAMANGALAM AREA OF KANCHEEPURAM DISTRICT, TAMILNADU, INDIA.**

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## **ABSTRACT**

Mining is the extraction of minerals and metals from earth. Depending on the type of location and nature of the resource, there are different types of mining. Mining can generally be divided into surface and subsurface (underground) mining. It plays a very significant role in the economic growth and development of the country. Quarrying plays an important role in infrastructure development and also the development of particular area. As the mining activity has more negative impact than the positive impact caused due to improper process of mining and without proper preventive measures indirectly affecting the air, water, noise and other resources of the particular locality. The negative effect normally leads to poor quality of the environment and also it causes long term impact on human health. It can be controlled by proper periodic monitoring and their effective control of the pollution. The negative impact of the stone quarrying activity in and around Rathinamangalam area of Kancheepuram District of Tamil Nadu India was studied to assess the noise level. The sampling station was selected near the mining area and it is located at the close vicinity of residential locality of the study area. The study was carried out using sound level meter to determine the various noise level. The values obtained were compared with the Central Pollution Control Board (CPCB) standards. Increased noise level was mainly attributed due to improper quarrying, crushing and blasting. It was also due to heavy vehicle movements around the site location. The study also highlights that there is an urgent need for certain protective measures to be taken to protect the environment in and around the study area to protect the people from severe health impacts. This kind of study also highlights that there is an urgent need for proper monitoring of mining industry to protect the environment and also to protect the people from health risk assessment.

**KEYWORDS:** Noise level, Central Pollution Control Board (CPCB), Health risk assessment.

## **INTRODUCTION**

Every environmental pollution problem has roots in the past be it water, air or noise pollution and all these problems are becoming critical in the recent years due to increasing use of modern technologies. The aim of this project is to assess noise level in the Rathinamangalam area.<sup>1,13</sup> The various noise level and exposure time has been assessed in the vicinity. Noise produced are due to quarrying, aggregate crushing, abrasive blasting, unsealed surfaces and material stock piles.<sup>1,2</sup>

Infrastructure development such as roads, airports and many other facilities is vital to the growth of any populated area. Due to rapid population growth, the infrastructure has become inadequate and new roads, streets and sewage systems must be built to meet the increased needs.<sup>3,4</sup>

Mining is the technique by which we extract resources from the earth. Depending on the type of location and nature of the resources, there are different types of mining. Mining can generally be divided into surface and subsurface (underground) mining.<sup>2</sup> The choice of surface or subsurface mining method depends on different factors like economic, geologic, engineering and other factors. One of the most widely used mineral resources is construction materials from surface mining operations which are extracted by quarrying method.

A quarry is a type of open-pit surface mining from which rocks are extracted.<sup>5,12</sup> Quarries are generally used for extracting construction materials, such as dimension stone, ornamental stones, road building and industrial raw materials. Since all the activities in the urban centers depend on materials from earth, especially quarrying and their related activities are located near population centers, industries, temples and educational institutions.<sup>6</sup>

Quarry is a place from where dimension stone, rock, construction aggregate, riprap, sand gravel or slate has been excavated from ground. A quarry is the same thing as an open-pit mines from which minerals are extracted. The only trivial difference between the two is that open-pit mines that produce building materials and dimension stone are commonly referred as quarries.<sup>7,11</sup> Advantages of quarrying using extracted materials, thus enhancing trade creating jobs for people around creating new habits sometimes new roads are built, first to transport the machineries and then the extracted material, which are then left to be used locally after the removal of extracted material, the site used for leisure and sports activities. Disadvantages of quarrying are noise pollution, air pollution, destruction of natural beauty, destruction of habitats, creating a menace if not disposed of wisely, contamination of water. The emissions of particulate matter are emitted high in the quarrying site.<sup>8,9</sup>

The various noise level exposure of daytime and nighttime was studied in the mining areas of Rathinamangalam and its surroundings.

## **MATERIALS AND METHODS**

### **SITE SELECTION**

The noise level and exposure time assessments were carried out in Rathinamangalam area. Quarrying site located in Rathinamangalam near Vandalur, northeast of Kanchipuram district has been selected for collecting sample. Since vandalur being a zone of reserved forest, particulate matter emission measurement from the quarrying is vital for considering any environmental mitigation measures. The noise level readings are collected around Rathinamangalam, Kandigai, Kollapakkam and Police Academy.

### **SAMPLING FRAME WORK**

Data collection: Data collected initially at the sampling site for noise level using sound level meter. Primary data collected is compared with Central Pollution Control Board Standards for effective comparison. The noise level readings are been measured in the project area and also collected surrounding of the Rathinamangalam, Kandigai, Kollapakkam and police academy. The sampling points was noted from 1 to 11 and the co-ordinates was plotted in the map. The readings were collected in the peak hours from 8-10 am and 4-6 pm.<sup>9,10</sup>

The noise level and the exposure time in the selected sampling site date of sample collection and the co-ordinates were shown in table 1. The present of noise level and equivalent noise level and the equivalent noise level was calculated.

Noise exposures in sampling area from the urban and silent zones are been distinguished and listed in the table 1. The average noise level in the peak hours has been calculated and listed in it.

## **INSTRUMENTAL ANALYSIS**

### **Sound Level Meter**

A sound level meter or sound meter is an instrument that measures sound pressure level, commonly used in noise pollution studies for the quantification of different kinds of noise, especially for industrial,

environmental and aircraft noise<sup>5</sup>. However, the reading from a sound level meter does not correlate well to human-perceived loudness, which is better measure by a loudness meter.

Sound-level meter, device for measuring the intensity of noise, music, and other sounds. A typical meter consists of a microphone for picking up the sound and converting it into an electrical signal, followed by electronic circuitry for operating on this signal so that the desired characteristics can be measured<sup>4</sup>. The indicating device is usually a meter calibrated to read the sound level in decibels (dB; a logarithmic unit used to measure the sound intensity). Threshold of hearing is about zero decibels for the average young listener, and threshold of pain (extremely loud sounds) is around 120 decibels, representing a power 1,000,000,000,000 (or  $10^{12}$ ) times greater than zero decibels.

A sound level meter is an instrument designed to respond to sound in approximately by the same way as the human ear and to give objective, reproducible measurements of sound pressure level. There are many different sound measuring systems available. Although different in detail, each system consists of a microphone, a processing section and a read-out unit.<sup>13-15</sup>

## RESULTS

The sound level meter was taken and measured the intensity of noise in and around the Rathinamangalam area. About 11 sampling locations are selected in that colleges, temple, hospital and rural area are included in it. Sampling was taken in the time intervals of peak hours morning 8-10am and evening 4-6pm. The readings are noted and calculated using Equivalent noise level.

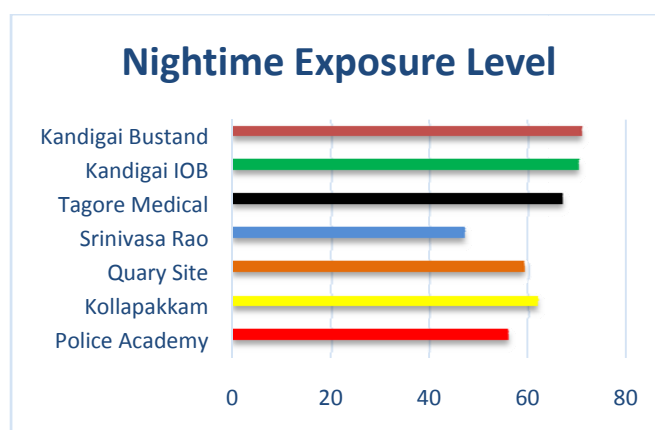
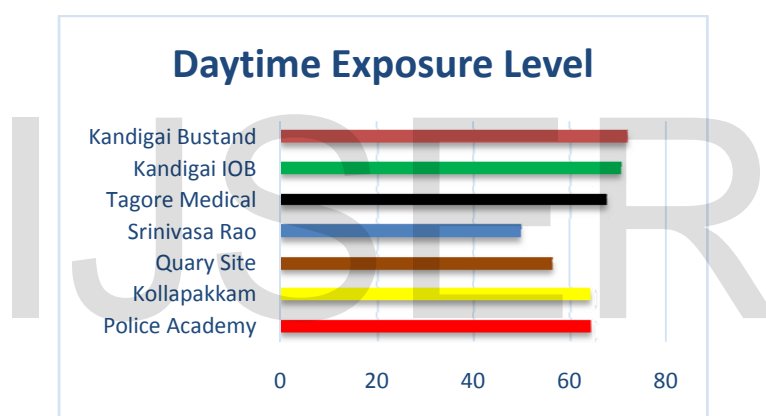
Table 1

S.No	Sampling Locations	Date	Equivalent Noise Exposure Level(dB)		Average Noise Level(dB)	
			8 – 10AM	4 – 6PM		
1	Police Academy	12/3/2015	66.5	59	64.2	56.0
		13/3/2015	57.7	46.2		
		14/3/2015	62.8	52.3		
		15/3/2015	70.0	66.4		
2	Kollapakkam	12/3/2015	60.0	64.5	64.1	61.9
		13/3/2015	66.0	66.2		
		14/3/2015	57.6	55.0		
		15/3/2015	72.6	62.0		
3	Quarry Site Entrance	12/3/2015	60.0	61.0	56.3	59.1
		13/3/2015	52.7	56.8		
		14/3/2015	51.0	57.0		
		15/3/2015	61.4	61.7		
4	SrinivasaRao	19/3/2015	50.8	49.3	49.9	47.1
		20/3/2015	45.7	50.0		
		21/3/2015	49.2	45.0		
		22/3/2015	54.0	44.0		
5	Tagore Medical Entrance	25/3/2015	70.7	68.0	67.5	67.0
		27/3/2015	67.6	69.5		
		28/3/2015	64.8	69.4		
		30/3/2015	67.0	61.2		
6	Kandigai IOB	25/3/2015	73.8	68.7	70.6	70.2
		27/3/2015	68.5	72.4		

		28/3/2015	68.6	71.0		
		30/3/2015	71.6	68.8		
7	KandigaiBustand	25/3/2015	72.0	68.8	71.8	70.9
		27/3/2015	70.5	73.0		
		28/3/2015	75.8	70.7		
		30/3/2015	69.0	71.2		

## Graphs

The various values of nighttime and daytime exposure level obtained are plotted in the graph given below. From the daytime and nighttime exposure level graph it is clear that places such as Kandigai IOB and KandigaiBustand have high noise level around 70 decibels when compared to other places



## CONCLUSION

According to central pollution control board noise standards, average noise level in the sampling site is moderate including moderate noise level in residential zone and silent zone. Among the residential zone, noise samples collected near road is comparatively higher a prescribed by CPCB. Noise level in the sampling site 6 is higher according to CPCB. Social survey reveals that around the sampling site there is

widespread respiratory illness which may be due to the presence of particulate matter. Periodic air and noise quality monitoring has to be carried to minimize the quarrying impacts.

The health risk assessment, hazard risk assessment, analysis of heavy metals, PAHs, can be done using the study. From the study, it is recommended that for sustainable quarry activities, quarry site should be located in the interior surrounded by adequate vegetation which would act as sinks and blocks for various emissions emanating from the quarry. Inhabitants of the area where a quarry is to be sited should be relocated to prevent the impact of the emissions generated by the quarry industries on them.

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