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Research Article

An Analysis of noise pollution in Tirupur city

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Abstract: Sound that is unwanted or disrupts one's quality of life is called as noise. When there is lot of noise in the environment, it is termed as noise pollution. Sound becomes undesirable when it disturbs the normal activities such as working, sleeping, and during conversations. It is an underrated environmental problem because of the fact that we can't see, smell, or taste it. Community noise, or environmental noise, is one of the most common pollutants. It is defined by the World Health Organization as noise emitted from all sources, except noise at the industrial workplace. 'Community noise includes the primary sources of road, rail and air traffic, industries, construction and public works and the neighbourhood' (WHO, 1999).Environmental noise is increasingly becoming a community concern internationally . Considerable efforts have been made over about the last four decades to reduce noise impacts from transportation sources such as road and rail traffic and aircraft. Nonetheless, many of the benefits of these efforts have been lost due to increased traffic volumes (by all modes) for longer periods of the day and evening. At the same time increases in urban population have resulted in greater exposure of a larger percentage of the population to the increased noise levels. World Health Organization stated that "Noise must be recognized as a major threat to human well-being. According to the USEPA, there are direct links between noise and health. Also, noise pollution adversely affects the lives of millions of people. Noise pollution can damage physiological and psychological health. High blood pressure, stress related illness, sleep disruption, hearing loss, and productivity loss are the problems related to noise pollution. It can also cause memory loss, severe depression, and panic attacks. In this paper a study of traffic noise in Tirupur city has been done in the busy areas of the city which have high traffic flow in peak hours, results obtained in the study shows that the whole city is affected heavily by noise pollution more during the evening hours when compared to morning hours and in almost 90% of the area prevailing noise level is more than the ambient noise level. It has been found that in many areas the noise level prevailing averages around 85 db at 90% of the busy points of the city. Most of the noise is generated only due to horns of vehicles like rickshaws, buses, wagons & trucks etc., Tirupur being a small and congested city, creates chronic issues related to noise pollution. The city is rapidly developing, more and more vehicles are being used regularly which adds thrust on noise level in the city which in turn will create many health issues. Since the traffic noise is increasing more in this city day by day so this has to be analysed and controlled so that no health hazards pose.
Keywords: Noise pollution, noise data, noise monitoring, noisemodelling

INTRODUCTION

Besides with the growing level of air and water pollution, road traffic noise pollution has been recognized rising as a new threat to the inhabitants of cities. The urban environmental quality of developing countries "cities" has been deteriorated by an unlimited increase of vehicles, infrastructure, and population. Consequently, the continuous increased intensity of traffic noise level due to the population has degraded urban quality of life. Road traffic noise is the big challenge for urban planners and environmental engineers to overcome road traffic noise in cities [1]. Continuous high level of noise can cause serious stress on the auditory and non-auditory, and nervous system of the city dwellers [2,3]. It is also leading cause of great annoyance for exposed population due to the poor conditions of engine, exhaust etc. [4]. In addition, there are various studies carried out on road traffic noise pollution, which effect severe health problems such as, physical and psychological, irritation, human performance and actions, hypertension, heart problems, tiredness, headache and sore throat respectively[5]. Noise is an unwanted sound; it causes social effects, feelings of disturbance, stress reactions, sleep disorders, some hormonal changes, increased blood pressure, increased risk of myocardial infarction, impairment of well-being and general quality of life. The effects of noise has been studied on humans [6-9], animals [10] and plants [11]. and buildings. Noise is a major factor that should be considered in the design and construction of new transport systems, as well as when improvements are made to existing systems [12] (Abo-Qudais et al., 2007). In addition, local authorities and environmentalists recognise the importance of monitoring trends in noise pollution when developing mitigating plans. As such, there is an obvious need to

measure and model noise pollution. Non-auditory physical health effects that are biologically plausible in relation to noise exposure and annoyance from noise exposure include changes in blood pressure, Heart rate, and levels of stress hormones [7]The biological mechanism linking noise to hypertension is thought to be mediated through sympathetic and endocrine stress response with subsequent acute changes in vascular tension. The hypothesis is that long-time exposure to noise could result in lasting cardiovascular changes such as atherosclerosis, and increase cardiovascular risk as well as hypertension.[8, 7].

The present work analysis the vehicular traffic noise during the morning peak hours and evening peak hours. A large number of set of data were recorded at different data in a random manner in order to account for statistical temporal variations in traffic flow condition. The noise measurement parameters recorded was using sound level meter (SL-4001)

The study reports community noise levels measured in fast developing semi- urban areas of Tirupur city, which is one of the rapidly developing industrial city in Tamilnadu supporting millions of people for their livelihood[13]

MATERIAL AND METHODS

Study area details

Since the 1990s, the formation of the new Tirupur district had been urged by the exporters of Tirupur. Tirupur city and surrounding region, where there is considerable industrial and business activities, was to be the core area. They believed that a new district would facilitate administration of the region and allow more aggressive development measures. Tirupur district was formed in 2009, carved out of the Coimbatore and Erode districts making it the 32nd district of Tamil Nadu and one of the tenth most industrialised and economically developed districts of TamilNadu. Before the formation of Tirupur district, Avinashi, Madathukulam, Palladam, Tirupur, and Udumalpet were taluks of Coimbatore district; and Dharapuram and Kangeyam were taluks of Erode district. The new taluk Madathukulam was formed after the district was created. Tirupur district lies on the western part of Tamil Nadu bordering the western ghats and hence the district enjoys a moderate climate.The district is surrounded by Coimbatore district in the west,Erode district to the North and northeast and Karur district in the east and Dindigul district in the south east.To the south the district is surrounded by Kerala state(idukki district).The district has an area of 516.12 square kilometers.the southern and south western parts of the district enjoys maximum rainfall,due to the surrounding of western ghats.The rest of the district lies in the rain shadow region of the Western Ghats and experiences salubrious climate most parts of the year,except the extreme east part of the district. The mean maximum and minimum temperatures for Tirupur city during summer and winter vary between 35°C to 18°C . The average annual rainfall in the plains is around 700 mm with the North East and the South West monsoons contributing to 47% and 28% respectively to the total rainfall. The major rivers flowing through the district are Noyyal and Amaravathi. The Amaravati river is the main source of irrigation in the district. Amaravathi Dam, which created Amaravathi Reservoir, is located at Amaravathinagar.Thirumurthy dam which is created by the PAP project is situated in this district.Both Amaravathi dam and Thirumurthy dam are the prime source of irrigation in the district,whereas Uppaar dam is another dam which receives water from seasonal rains.

Economic base

Tirupur town is one of the export business oriented cities of India and an internationally known town because of its numerous apparel (Banian) manufacturing industries spread over the entire town. The hot and cool weather condition in the city is in favour for Hosiery industry. In the 2001 census, Tirupur district had a population of 1,917,033, of which males constituted 976,802 and females constituted 940,231. In the 2001 census, the urban population was 825,006 and the rural population was 1,092,027. Tamil was the principal language spoken in the district, with sizable minorities of Telugu, Malayalam and Kannada speakers. Hindus formed the majority of the population at 90.08% followed by Muslims at 5.33%, Christians at 4.35% and others at 0.24%.

In the 2011 census Tirupur district reported a population of 2,471,222, roughly equal to the population of the nation of Kuwait or the US state of Nevada. This gave it a ranking of 176th among districts in India (out of a total of 640). The district had a population density of 476 inhabitants per square kilometer (1,230 /sq mi), up from the 2001 population density of 367 inhabitants per square kilometer (950 /sq mi). Its population growth rate over the decade 2001-2011 was 29.69%. The relatively large growth rate was due to an influx of workers from other parts of India due in turn to Tirupur's rapid industrialization during the period. Tirupur had a sex ratio of 988 females for every 1000 males, and a literacy rate of 79.1%.

In 2011 the populace was 38.52% rural and 61.48% urban; this represented an increase in the urban populace of 39.13% from 2001, and a relatively lower increase in rural of 15.37% from 2001.

Tirupur was constituted as Municipality during the year 1947. It was upgraded as Special Grade Municipality during 1983 and upgraded as Corporation from 1.1.2008. The total area of the Municipality is 27.19 Sq. Km with 52 wards. Total population as per 2001 census is 3,51,501 the floating population of the

town an average 1,50,000, 85% of the people commute in their own vehicle which creates more and more noise pollution in the main areas.

Noise pollution and its impact

The city of Amman, Jordan, has been subjected to persistent increase in road traffic due to overall increase in prosperity, fast development and expansion of economy, travel and tourism. The author had investigated traffic noise pollution in Amman. Road traffic noise index *l*10(1h) was measured at 28 locations that cover most of the city of Amman. Noise measurements were carried out at these 28 locations two times a day for a period of one hour during the early morning and early evening rush hours, in the presence and absence of a barrier. The calculation of road traffic noise (CRTN) prediction model was employed to predict noise levels at the locations chosen for the study. Data required for the model included traffic volume, speed, percentage of heavy vehicles, road surface, gradient, obstructions, distance, noise path, intervening ground, effect of shielding, and angle of view. The results of the investigation showed that the minimum and the maximum noise levels are 46 dB(a) and 81 dB(a) during day-time and 58 dB(a) and 71 dB(a) during night-time. The measured noise level exceeded the 62 dB(a) acceptable limit at most of the locations. The CTRN prediction model was successful in predicting noise levels at most of the locations chosen for this investigation, with more accurate predictions for night-time measurements. This study was carried out to evaluate the environmental noise pollution in the city Of Amman due to traffic noise, to investigate the diurnal variations of traffic noise levels in the city, to assess and rate noise exposure in the different urban zones of the city, to predict traffic noise levels in the city using the CTRN method starting from the knowledge of traffic flow and composition [10].

This paper reports the evaluation study subjective analysis of the traffic noise annoyance impact on the quality of life among resident's around the major arterials in intermediate city; Amravati, district place in Maharashtra state (India). A total of 500 individuals in the vicinity of arterials were questioned in writing for their perceptions and attitudes towards road traffic noise. The health effects of noise pollution were analyzed with the help of questionnaire survey. More than half of the total sample population around two major arterials in Amravati city expressed annoyance with traffic noise during daily activities. Of these, 16.8% were "extremely" and 21.1% "very much" annoyed, 18.3% to "some extent" and "little" and 25.5% "none" annoyed. The reported annoyance level reached its maximum during the noon hours for nearly 47% of the sample population [14].

The author focuses on the identification of traffic intensities and noise level measured at selected traffic sites in the Varanasi city. Noise levels recorded in the city, are much higher than the permissible level and are likely to cause associated health and psychological illnesses to nearby inhabitant. This paper describes the traffic impact on environment of Varanasi, UttarPradesh, India for the year 2008.The traffic congestion caused by various factors and situation pollutes the air and produces agents responsible for health hazards. This congestion is caused by insufficient capacity and bottlenecks. The lack of pedestrian, bicycle and informal public transport (auto rickshaws, taxi and private buses) contributes to more than 30% of the traffic congestion. Improvement in the management can lead to saving of time and effectively lessen the congestion and jams. Some tactics should be used to aware the people about traffic rules and consequences of the pollution caused by traffic. The traffic congestion contributes to air and noise pollution which effects more on the communities living around the main roads and places. Slum dwellers face the pollution from the motorized vehicles while pedestrians face the threat of being killed or injured by poor management of vehicles. Comprehensive inspection and maintenance policy to ensure minimum quality of life is inconceivable in the foreseeable future. Whatever has come as sporadic norms can probably not be forced upon. Observance of the policy cannot be assumed from the top. So there is need of the awareness form the root level i.e. Citizens [7].

Hamid Reza Ranjbar analyses and investigates the impact of traffic noise on high rise buildings and surrounding areas by the side of hem mat highway that links west of Tehran to the east. In this study, a 3D traffic noise simulation model is applied on a GIS system, visualized noise levels are formulated by the proposed model for noise mapping on all surfaces of the buildings and surrounding ground in a 3D platform. The assessment was done by combining the proposed model of traffic noise and 3D model of the study area in GIS environment. Initially the noise prediction model was presented with regards to their study area, it was then evaluated by measuring some control points in the field In the investigation results of noise impact from the motorway at this study area showed that the front facades of buildings receive the highest noises impact in comparison to all other building panels. By considering the natural condition of the study area and economical aspects, installing cantilever barriers could be an effective approach for noise attenuation in this area [15].

Author says noise pollution is not properly recognized despite of the fact that it is steadily growing in developing countries like India and in particular in the city Agartala. It is well established now that road

traffic noise is a potential hazard to health and is becoming an unjustifiable interference and imposition upon human comfort and quality of modern life. In swiftly urbanizing Agartala city, the transportation sector is growing rapidly. This has led to overcrowded roads and noise pollution in the city. In this study the results showed that there is a relationship between traffic noise and its annoyance on daily life of busy road side dwellers, employees in road side offices, banks etc.. A field survey was conducted for the calculation of percentage of highly annoyance among the individuals at eight heavy to medium congested corridors of the city. Collected data were compared with the regression models developed by different sets of independent variables. The hypothesis was also tested using t-test in order to examine the goodness of fit among the observed and predicted values. It can be concluded that the model based on noise indices gives significantly high correlation coefficient values as compared to other two models. The summarized detail showed that all the models can predict the annoyance level among busy road side dwellers, employees with certain degree of error in comparison to observed noise annoyance. The author says some of suggestions to prevent this type of problems due to road traffic noise are banning hydraulic horns, improvement and streamlining of roads and parking system, discouragement of high sound producing vehicles, and public awareness. By double-glazing the windows of homes facing the road will reduce the level by up to 20 db (a). Vegetation buffer zones must be created in different parts of the city. In addition design and fabrication of silencing devices and their use in all types of vehicles would also be an effective measure to abate noise pollution [16].

The author examines the problem of noise pollution in the wake of its ill effect on the life of the people. A cross-section survey of the population in Delhi state points out that main sources of noise pollution are loudspeakers and automobiles. However, female population is affected by religious noise a little more than male population. Major effects of noise pollution include interference with communication, sleeplessness, and reduced efficiency. The extreme effects e.g. Deafness and mental breakdown neither is ruled out. Generally, a request to reduce or stop the noise is made out by the aggrieved party. However, complaints to the administration and police have also been accepted as a way of solving this menace. Public education appears to be the best method as suggested by the respondents. However, government and NGOs can play a significant role in this process. The author explored the sources, effects, reactions and suggestions for controlling the excessive noise. Automobiles and public address system (loudspeakers) turns out to be major sources of noise pollution. It is noted that loudspeakers are frequently used for religious functions (and temple prayers). Disturbance by loudspeakers and automobiles is felt by age groups of 20-40 years somewhat lesser than other groups. Across various age groups, there is almost an equal proportions of respondent reporting neighbourhood, music and religions functions as sources of noise. The survey indicated that noise affects individuals in several ways. It results in improper communication, sleeplessness and reduced efficiency. Though the psycho-somatic effects (annoyance and depression) are also common yet the extreme effects e.g. Deafness and mental breakdown are not ruled out. In a majority of cases, the affected party tenders a request to stop [17].

Authors had presented a novel approach to monitor noise pollution involving the general public. They had presented noise tube, a project aimed at developing a participative noise pollution monitoring platform to enable citizens as well as governmental bodies and non-governmental organisations to gain awareness and insight into the problem of urban noise pollution. Finally they symphonized the difficulties to evaluate and deploy this approach in real world situations, due to technological, social and open research challenges that need to be resolved before the democratization of environmental sensing through citizen science can succeed [18].

Methodology

In this study an effort is made to compare the noise level in some main areas of Tirupur city during the morning hour and evening hour traffic using sound level meter. Since noise level varies with atmospheric conditions, in each area respective temperature and its humidity has also been recorded. The noise level also varies according to the no of vehicles passing so the total vehicles were also recorded during the study. The readings were taken during early hours of the day (6.30 AM to 9.30 AM) and during evening rush hours (6.30 AM to 9.30 AM) and with those readings comparison of noise level are done. The comparison of noise data is plotted in the form of chart so that it makes convenient to differentiate the traffic noise. In each area for each a minute readings were taken almost for 15 minutes. The following parameters like

1. Total vehicle volume per hour
2. Atmospheric temperature in degree Celsius
3. Relative humidity in percentage.
4. Type of vehicles crossing the area during the study.
5. Noise level in that area

were all recorded in order to have a brief study of vehicular noise in Tirupur city. Noise measurements were done at a distance of 3m from road side at an elevation of 130cm above the road surface. A and C sound level meter type SL-4001 with the capacity of measuring noise from 30 dB to 130 dB was used for measurements. Humidity in % and temperature in degree Celsius was measured by Thermo- hygrometer

ATC-288 in each area. For averaging purpose the study is conducted repeatedly and the average value is taken for the results analysis. This study is done to identify the amount of noise generated at same time and same place during morning and evening hours so that we can know how much the city is affected by noise pollution.

RESULTS AND DISCUSSION

It is noticeable that the major part of the populations exposed to noise levels greater than 65 dB(A) everyday. There are about 3,000,000 different types of vehicles in the city of Tirupur which one third of them are more than 20-yearold. Planning along with lack of strong police monitoring are the major reasons of noise pollution in the city. Although heavy vehicles are not permitted to enter the city in the daytime 06:00 – 22:00 but still the main fraction of transport activities are relied to personal gasoline cars and diesel buses which generate the high level of noise pollution due to poor maintenance and old technology. The effects of noise pollution on cognitive task performance have been well-studied. Noise pollution impairs task performance at school and at work, increases errors, and decreases motivation. Reading attention, problem solving, and memory are most strongly affected by noise. Two types of memory deficits have been identified under experimental conditions: recall of subject content and recall of incidental details. Both are adversely influenced by noise. Deficits in performance can lead to errors and accidents, both of which have health and economic consequences. From the results it is noticed that not only the main areas are affected by noise pollution but also the school zone and hospital zones are affected highly. In school and hospitals if the same noise level is patented then it may affect in future to the inhabitants. Environmental noise pollution is to be controlled otherwise it may pose severe health hazards to the inhabitants of the city.

Table1: Sound level information of main areas in Tirupur

S.no	Location	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total Vehicles
1	New bus stand	6.30-6.45 am	82	25.8	78	118
2	Kumaran hospital	6.45-7.00 am	74	26	76	34
3	60 feet road	7.00-7.15 am	90	26.5	77	100
4	Pushpa theater	7.15-7.30 am	92.5	26.4	75	185
5	Railway station outside	7.30-7.45am	78	27.6	69	36
6	Railway station inside	8.00-8.15 am	82	27.4	72	_
7	Town hall	8.15-8.30 am	95	28.5	65	560
8	Old bus stand outside	8.30-8.45 am	89	29.1	62	516
9	Old bus stand inside	8.45-9.00 am	90.65	30.5	58	_
10	Nanjappa school zone	9.15-9.30 am	95.76	31.4	54	409

Table 2: Sound level information for new bus stand area

New bus stand area					
S.no	Time	Noiselevel (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	6.31am	81	25.8	78	11
2	6.32am	75	25.8	78	12
3	6.33am	91	25.8	78	13
4	6.34am	75	25.8	78	13
5	6.35am	92	25.8	78	13
6	6.36am	75.4	25.8	78	10
7	6.37am	77.3	25.8	78	15
8	6.38am	92.4	25.8	78	14
9	6.39am	71.3	25.8	78	14
10	6.40am	75.9	25.8	78	2
11	6.41am	92.2	25.8	78	2
12	6.42am	77.6	25.8	78	12
13	6.43am	82	25.8	78	8
14	6.44am	86.3	25.8	78	7
15	6.45am	91.7	25.8	78	11

Table 3: Sound level measurement for Kumaran hospital area

Kumaran hospital area					
S.no	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	6.46am	92.6	26	76	4
2	6.47am	81.2	26	76	4
3	6.48am	75.4	26	76	2
4	6.49am	92.1	26	76	5
5	6.50am	75.3	26	76	4
6	6.51am	55	26	76	-
7	6.52am	75.2	26	76	5
8	6.53am	75.7	26	76	3
9	6.54am	59.9	26	76	2
10	6.55am	73.4	26	76	2
11	6.56am	92.3	26	76	2
12	6.57am	75.1	26	76	1

Table 4: Sound level measurement for 60 feet road area

60 feet road area					
S.no	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	7.01am	83.7	26.5	77	8
2	7.02 am	92.4	26.5	77	9
3	7.03 am	82.3	26.5	77	2
4	7.04 am	93	26.5	77	4
5	7.05 am	95.4	26.5	77	6
6	7.06 am	95.7	26.5	77	6
7	7.07 am	80.8	26.5	77	1
8	7.08 am	79.5	26.5	77	1
9	7.09 am	59.8	26.5	77	-
10	7.10 am	81.5	26.5	77	6
11	7.11 am	91.8	26.5	77	13
12	7.12 am	91.3	26.5	77	5

Table 5: Sound level measurement for pushpa theater area

Pushpa theater area					
S.no	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	7.16 am	100.1	26.4	75	27
2	7.17 am	93.1	26.4	75	22
3	7.18 am	91.5	26.4	75	8
4	7.19 am	77.1	26.4	75	16
5	7.20 am	96.6	26.4	75	25
6	7.21 am	92.6	26.4	75	15
7	7.22 am	93.4	26.4	75	22
8	7.23 am	94	26.4	75	9
9	7.24 am	93.3	26.4	75	18
10	7.25 am	92.8	26.4	75	23
11	7.26 am	91.7	26.4	75	21
12	7.27 am	93.6	26.4	75	24

Table 6: Sound level measurement for railway station (outside) area

Railway station area					
S.no	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	7.31 am	75	27.6	69	2
2	7.32 am	79.9	27.6	69	3
3	7.33 am	76.4	27.6	69	1
4	7.34 am	81.3	27.6	69	4
5	7.35 am	80.3	27.6	69	2
6	7.36 am	75.9	27.6	69	-
7	7.37 am	79.2	27.6	69	-
8	7.38 am	76.4	27.6	69	2
9	7.39 am	77.2	27.6	69	1
10	7.40 am	82.3	27.6	69	4
11	7.41 am	85.6	27.6	69	3
12	7.42 am	84.4	27.6	69	2

Table 7: Sound level measurement for town hall area

Town hall area					
S.no	Time	Noise level (db)	Temperature (^{0}C)	Humidity (%)	Total vehicle
1	8.16 am	93.9	28.5	65	35
2	8.17 am	86.6	28.5	65	47
3	8.18 am	93	28.5	65	33
4	8.19 am	93.5	28.5	65	26
5	8.20 am	94.2	28.5	65	38
6	8.21 am	94	28.5	65	50
7	8.22 am	110.7	28.5	65	34
8	8.23 am	91.9	28.5	65	40
9	8.24 am	98.7	28.5	65	41
10	8.25 am	97.2	28.5	65	41
11	8.26	99.4	28.5	65	36
12	8.27 am	93.7	28.5	65	41

Table 8: Sound level measurement for old bus stand (outside) area

Old bus stand (outside)					
S.no	Time	Noise level (db)	Temperature (^{0}C)	Humidity (%)	Total vehicle
1	8.31 am	92.5	29.1	62	30
2	8.32 am	91.7	29.1	62	38
3	8.33 am	82.2	29.1	62	31
4	8.34 am	98.9	29.1	62	36
5	8.35 am	100.1	29.1	62	33
6	8.36 am	96.8	29.1	62	35
7	8.37 am	96.6	29.1	62	39
8	8.38 am	92.2	29.1	62	36
9	8.39 am	92.4	29.1	62	35
10	8.40 am	103.4	29.1	62	42
11	8.41 am	97.4	29.1	62	34
12	8.42 am	93.4	29.1	62	36

Table 9: Sound level measurement for old bus stand (inside) area

Old bus stand (inside)				
S.no	Time	Noise level (db)	Temperature (^{0}C)	Humidity (%)
1	8.46 am	92.9	32.4	54
2	8.47 am	77.1	33.2	51
3	8.48 am	92.5	34.5	49
4	8.49 am	99.9	35.7	46
5	8.50 am	93.8	36.5	45
6	8.51 am	92.4	38.2	41
7	8.52 am	91.9	38.4	39
8	8.53 am	93.7	38.8	41
9	8.54 am	80.3	38.8	40
10	8.55 am	92.1	39.2	39
11	8.56 am	93.6	39.2	39
12	8.57 am	91.5	39.6	41

Table 10: Sound level measurement for nanjappa school area

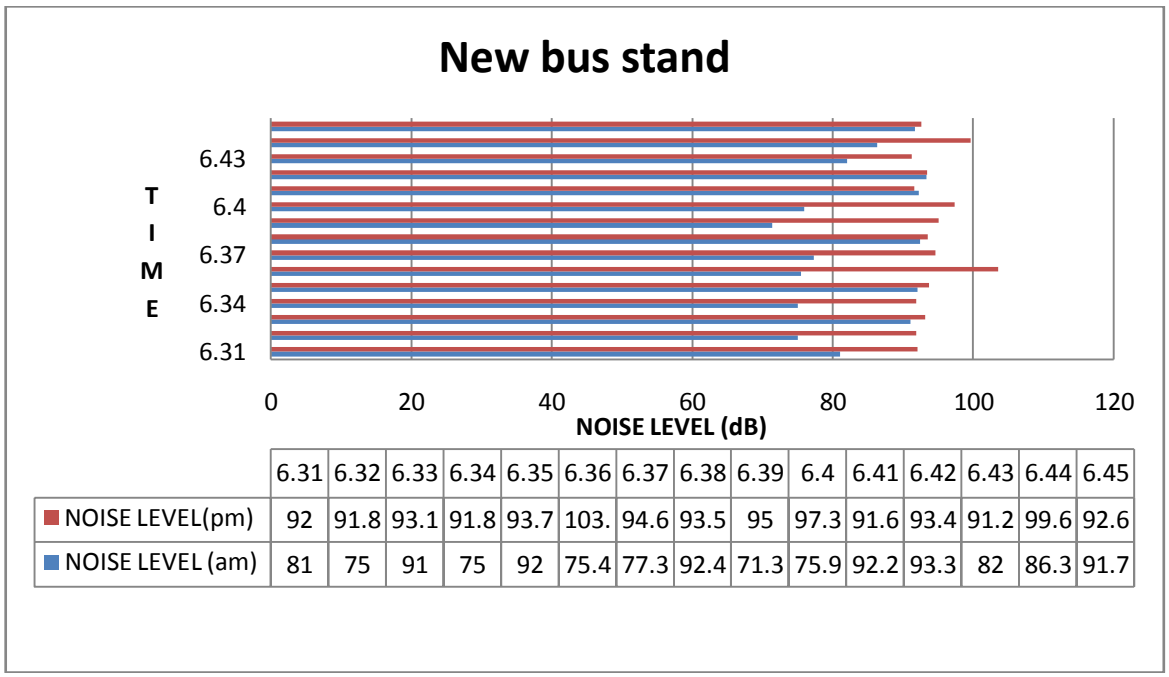
Nanjappa school and Kadar pettai area					
S.no	Time	Noise level (db)	Temperature (^{0}C)	Humidity (%)	Total vehicle
1	9.16 am	92.2	32.3	56	25
2	9.17 am	92.4	31.8	55	36
3	9.18 am	92	31.7	54	22
4	9.19 am	131.7	31.5	54	28
5	9.20 am	92.7	31.4	54	36
6	9.21 am	93.7	31.4	55	42
7	9.22 am	92.4	31.4	55	53
8	9.23 am	92.7	31.2	55	30
9	9.24 am	92.2	31.1	56	36
10	9.25 am	93.6	30.9	56	35
11	9.26 am	92.7	30.9	56	35
12	9.27 am	90.9	30.9	56	31

Table 11: Sound level information of main areas in Tirupur (Morning peak hours)

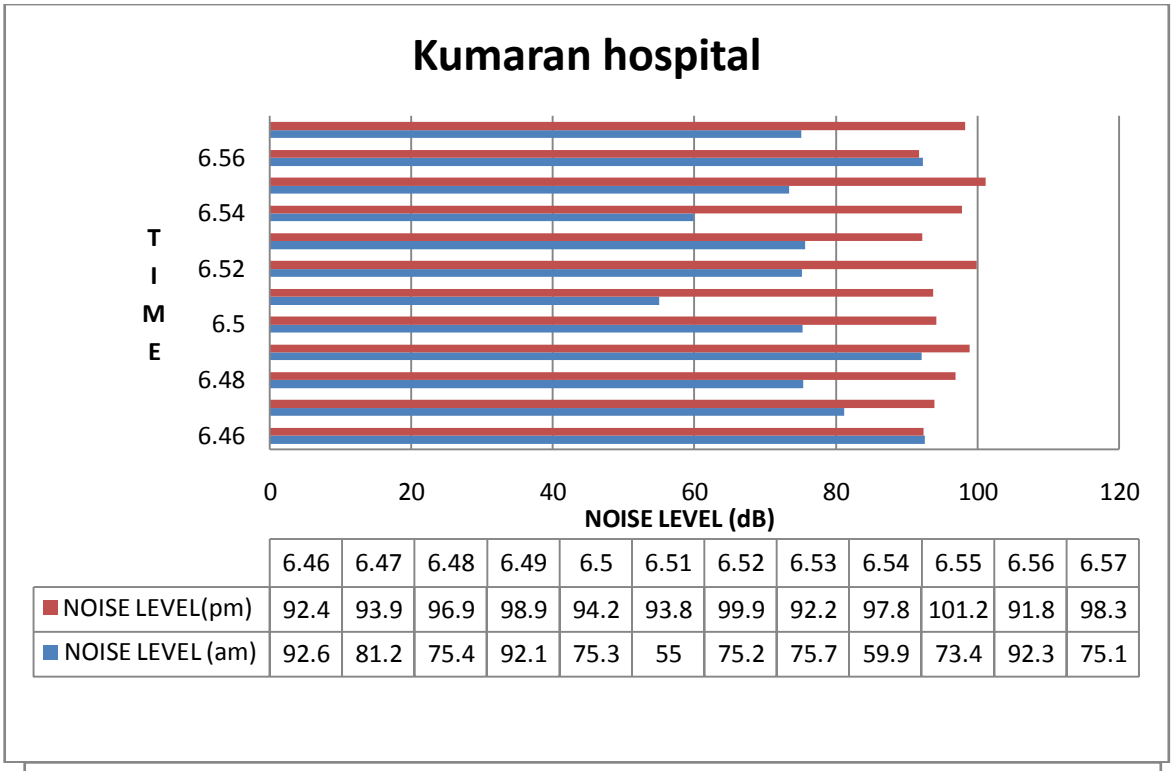
S.no	Location	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total Vehicles
1	New bus stand	6.30-6.45 pm	94.31	27.73	60.93	921
2	Kumaran hospital	6.45-7.00 pm	95.94	30.23	61.25	260
3	60 feet road	7.00-7.15 pm	101.12	30.59	58.12	523
4	Pushpa theater	7.15-7.30 pm	94.58	29.56	59.67	697
5	Railway station outside	7.30-7.45 pm	73.98	29.6	60.25	31
6	Railway station inside	8.00-8.15 pm	78.78	29.46	62.12	_
7	Town hall	8.15-8.30 pm	95.52	28.71	63.92	880
8	Old bus stand outside	8.30-8.45 pm	95.37	28.67	64.42	1059
9	Old bus stand inside	8.45-9.00 pm	91.01	28.62	66.92	_
10	Nanjappa school zone	9.15-9.30 pm	93.23	29.78	63.17	392

Table 12: Sound level information of main areas in Tirupur (Evening peak hours)

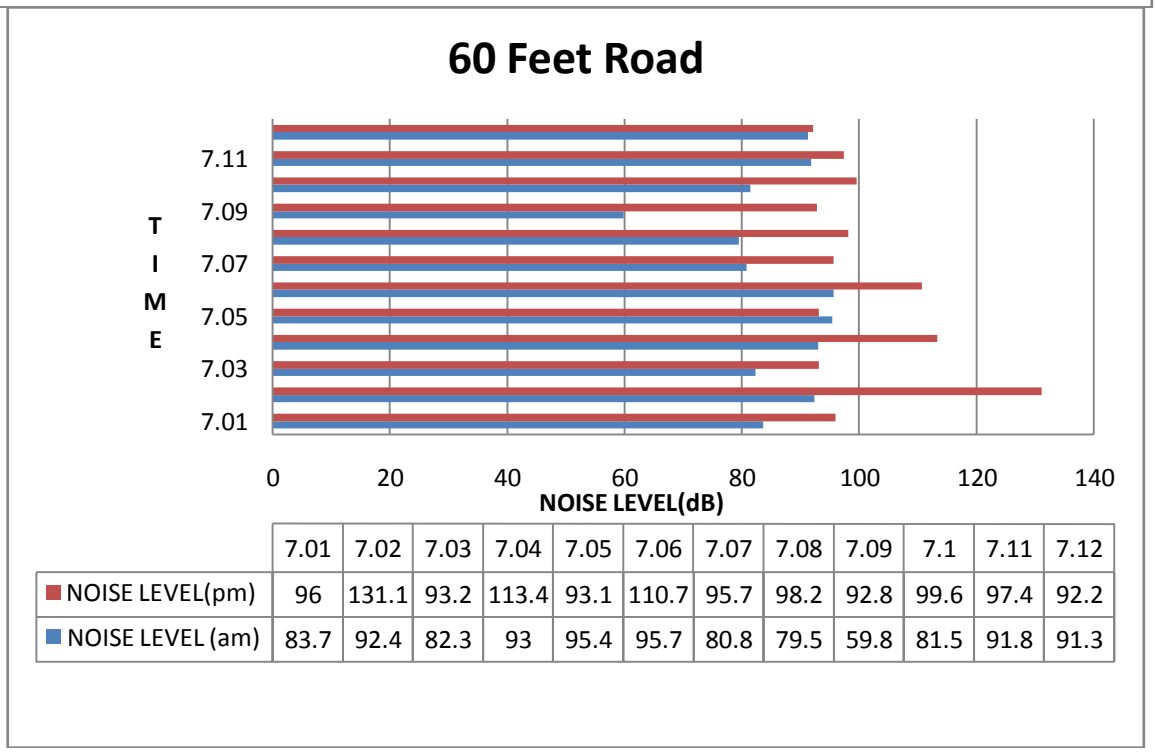
S.no	Location	Time	Noise level (dB)	Temperature (^{0}C)	Humidity (%)	Total vehicles
1	New Bus stand	6.30-6.45 am	82	25.8	78	118
2	Kumaran Hospital	6.45-7.00 am	74	26	76	34
3	60 Feet Road	7.00-7.15 am	90	26.5	77	100
4	Pushpa Theater	7.15-7.30 am	92.5	26.4	75	185
5	Railway Station (Outside)	7.30-7.45 am	78	27.6	69	36
6	Railway Station (Inside)	8.00-8.15 am	82	27.4	72	_
7	Town Hall	8.15-8.30 am	95	28.5	65	560
8	Old Bus stand (Outside)	8.30-8.45 am	89	29.1	62	516
9	Old Bus stand (Inside)	8.45-9.00 am	90.65	30.5	58	_
10	Nanjappa School Zone	9.15-9.30 am	95.76	31.4	54	409



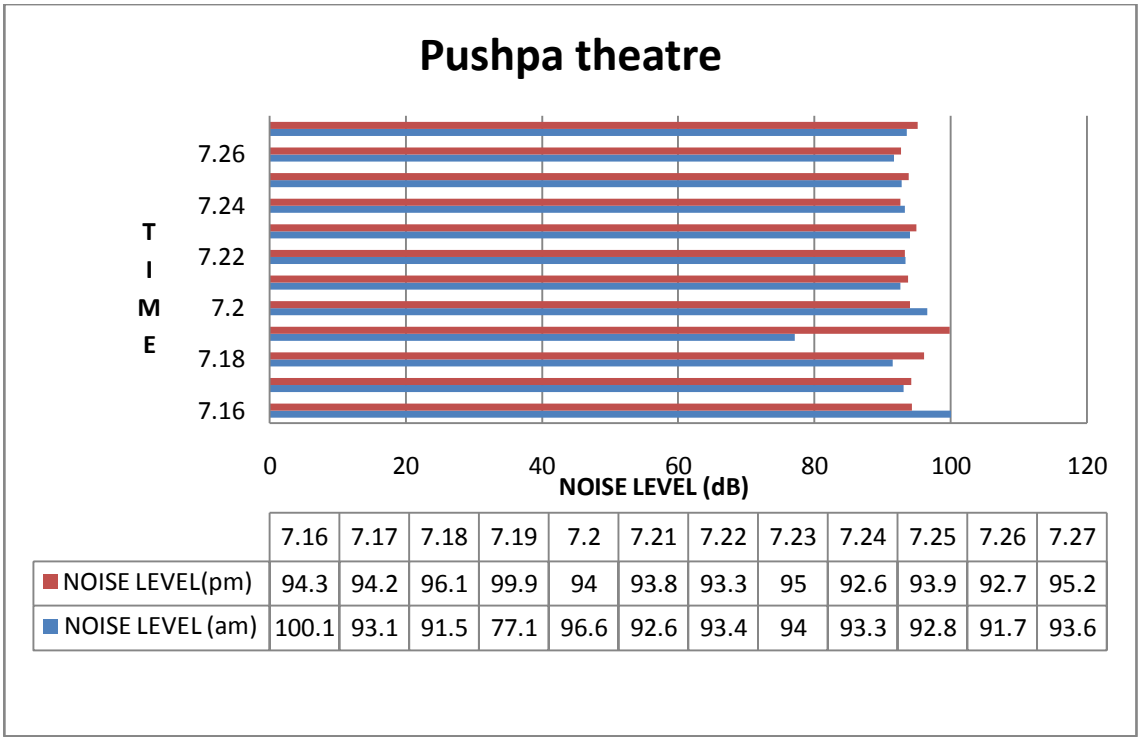
	6.31	6.32	6.33	6.34	6.35	6.36	6.37	6.38	6.39	6.4	6.41	6.42	6.43	6.44	6.45
NOISE LEVEL(pm)	92	91.8	93.1	91.8	93.7	103.	94.6	93.5	95	97.3	91.6	93.4	91.2	99.6	92.6
NOISE LEVEL (am)	81	75	91	75	92	75.4	77.3	92.4	71.3	75.9	92.2	93.3	82	86.3	91.7



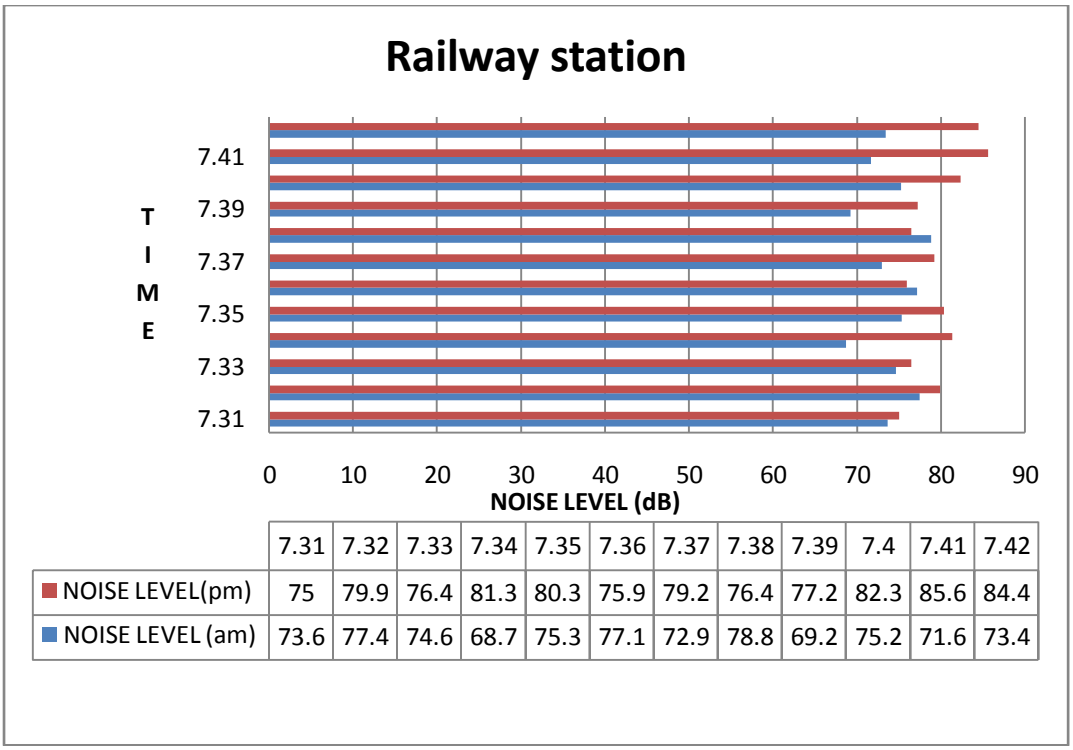
	6.46	6.47	6.48	6.49	6.5	6.51	6.52	6.53	6.54	6.55	6.56	6.57
NOISE LEVEL(pm)	92.4	93.9	96.9	98.9	94.2	93.8	99.9	92.2	97.8	101.2	91.8	98.3
NOISE LEVEL (am)	92.6	81.2	75.4	92.1	75.3	55	75.2	75.7	59.9	73.4	92.3	75.1



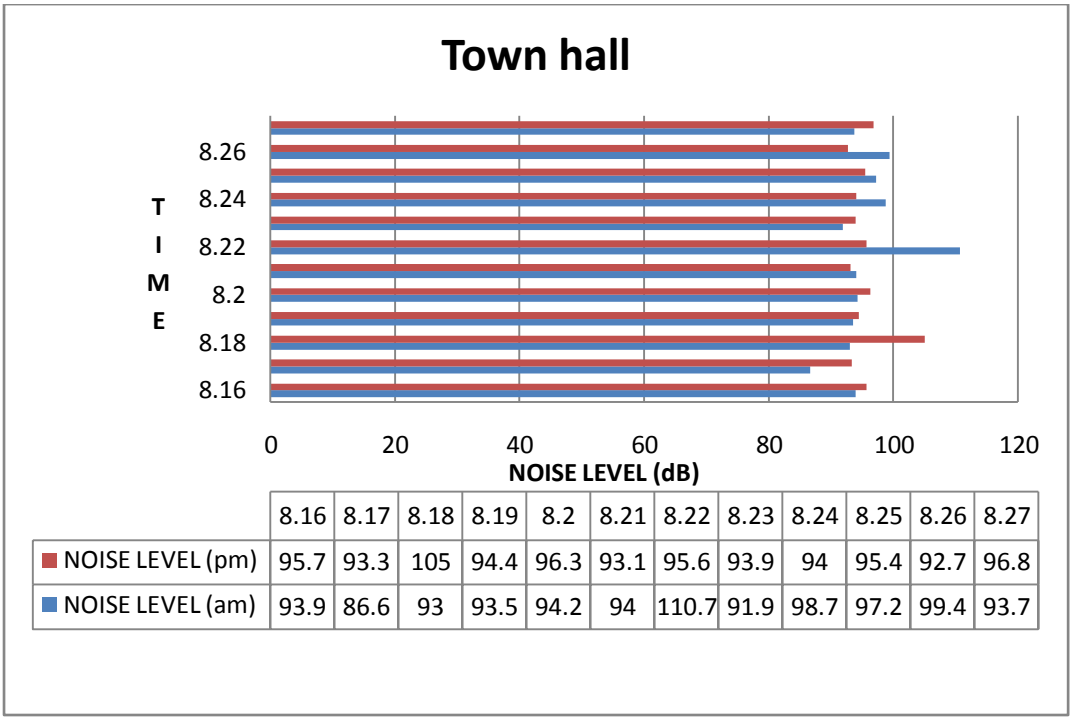
	7.01	7.02	7.03	7.04	7.05	7.06	7.07	7.08	7.09	7.1	7.11	7.12
NOISE LEVEL(pm)	96	131.1	93.2	113.4	93.1	110.7	95.7	98.2	92.8	99.6	97.4	92.2
NOISE LEVEL (am)	83.7	92.4	82.3	93	95.4	95.7	80.8	79.5	59.8	81.5	91.8	91.3



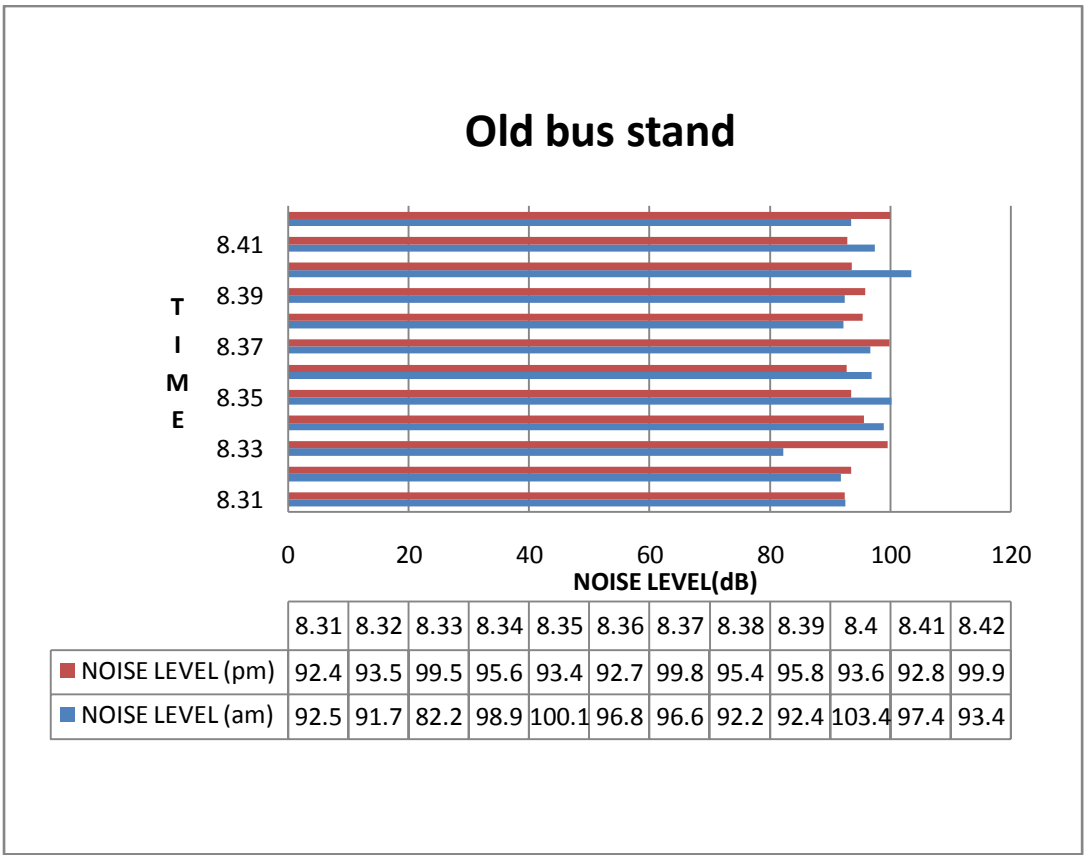
	7.16	7.17	7.18	7.19	7.2	7.21	7.22	7.23	7.24	7.25	7.26	7.27
NOISE LEVEL(pm)	94.3	94.2	96.1	99.9	94	93.8	93.3	95	92.6	93.9	92.7	95.2
NOISE LEVEL (am)	100.1	93.1	91.5	77.1	96.6	92.6	93.4	94	93.3	92.8	91.7	93.6



	7.31	7.32	7.33	7.34	7.35	7.36	7.37	7.38	7.39	7.4	7.41	7.42
NOISE LEVEL(pm)	75	79.9	76.4	81.3	80.3	75.9	79.2	76.4	77.2	82.3	85.6	84.4
NOISE LEVEL (am)	73.6	77.4	74.6	68.7	75.3	77.1	72.9	78.8	69.2	75.2	71.6	73.4



	8.16	8.17	8.18	8.19	8.2	8.21	8.22	8.23	8.24	8.25	8.26	8.27
NOISE LEVEL (pm)	95.7	93.3	105	94.4	96.3	93.1	95.6	93.9	94	95.4	92.7	96.8
NOISE LEVEL (am)	93.9	86.6	93	93.5	94.2	94	110.7	91.9	98.7	97.2	99.4	93.7



	8.31	8.32	8.33	8.34	8.35	8.36	8.37	8.38	8.39	8.4	8.41	8.42
NOISE LEVEL (pm)	92.4	93.5	99.5	95.6	93.4	92.7	99.8	95.4	95.8	93.6	92.8	99.9
NOISE LEVEL (am)	92.5	91.7	82.2	98.9	100.1	96.8	96.6	92.2	92.4	103.4	97.4	93.4

Table 13: Sound level information of main areas in Tirupur (Morning& Evening peak hours)

S.no	Location	Time	Morning		Evening	
			Noise level (dB)	Total Vehicles	Noise level (dB)	Total Vehicles
1	New bus stand	6.30-6.45	82	118	94.31	921
2	Kumaran hospital	6.45-7.00	74	34	95.94	260
3	60 feet road	7.00-7.15	90	100	101.12	523
4	Pushpa theater	7.15-7.30	92.5	185	94.58	697
5	Railway station (outside)	7.30-7.45	78	36	73.98	31
6	Railway station inside	8.00-8.15	82	-	78.78	-
7	Town hall	8.15-8.30	95	560	95.52	880
8	Old bus stand (outside)	8.30-8.45	89	516	95.37	1059
9	Old bus stand (inside)	8.45-9.00	90.65	-	91.01	-
10	Nanjappa school zone	9.15-9.30	95.76	409	93.23	392

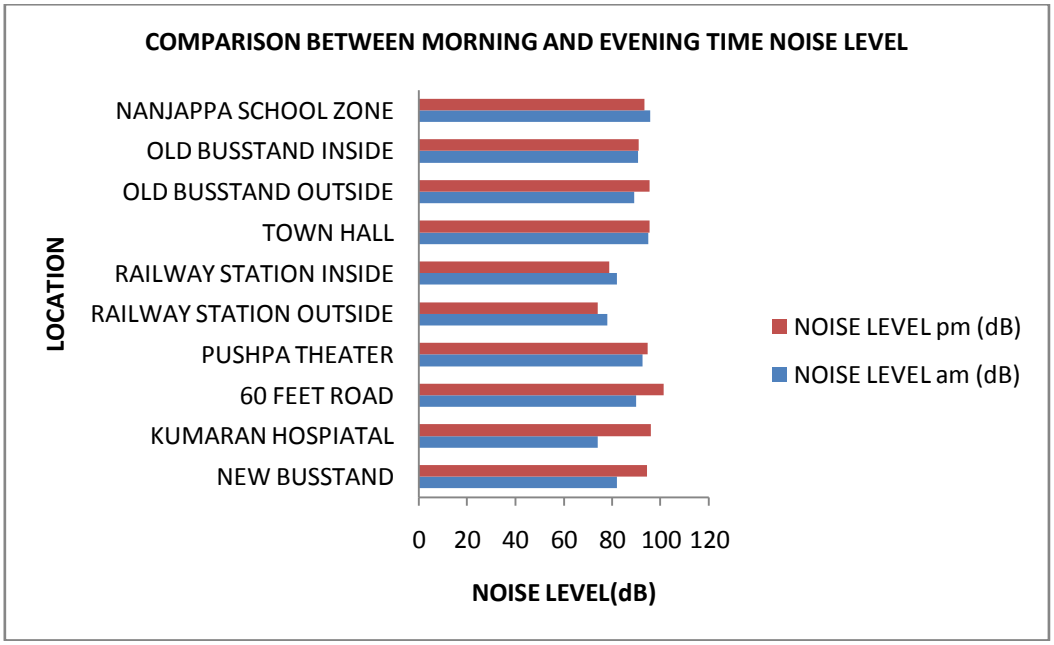


Figure 1(a) :Noise Level Meter(SL-4001) (b): Thermohygrometer(288-ATH)

CONCLUSION

Through the results obtained in the study it's very evident that the city is suffering from severe noise pollution due to the vehicular traffic, industries contribute less concerned with increase in noise pollution. This is mainly attributed towards congested traffic area, unplanned road network, reduced one way traffic, construction of silence zone in the main area of the city, unplanned urban sprawl etc. In most the areas the noise level is exorbitant with more than 85 db average is prevailing across the city during the peak hour traffic, many schools, hospitals are situated in the heart of the city are also affected severely by the noise pollution.

Noise has been found to interfere with our activities at three levels; (a) audio logical level in referring with the satisfactory performance of the hearing mechanism; (b) biological level interfering with the biological functioning of the body; and (c) behavioral level affecting the sociological behavior of the subjects. Because of this the noise affects categorically, performance, physiology and psychology. Noxious has been known to cause of nervous disorder, headache, high blood pressure and short memory. The various effects of noise may be as follows. Various psychological effect of noise pollution is summarized below:

(a) Depression and fatigue, which considerably reduces the efficiency of a person.

(b) Insomnia as a result of lack of undisturbed and refreshing sleep.

(c) Straining of senses and annoyance as a result of slow but persistent noise from motorcycles, alarm clocks, call bells, telephone rings etc.

(d) Affecting of psychomotor performance of a person by a sudden loud noise (sound)

(e) It is a cause of frustration and is associated with difficulty in concentration, disturbance of rest, physical and mental fatigue. Low frequency noise of 50 to 60 dB affects the higher centre of brain and causes an alternation in the normal sleep pattern and prevents sound sleep.

(f) Noise, which is an annoyance also causes irritation dis-satisfaction, dis-interest and affects work "performance. Noise has been reported both to improve and to decrease work efficiency, depending on its intensity, duration and frequency distribution etc.

Various physiological as well as pathologic effects of noise pollution are as under:

(a) Noise pollution affects human health, comfort and efficiency. It cause contraction of blood vessels, makes, the skin pale, leads to excessive secretion of adrenalin hormone into blood stream with is responsible for high blood pressure.

(b) It causes muscles to contract leading to nervous breakdown, tension and even insanity.

(c) Noise effects are anxiety, stress reaction and fright. These adverse reactions are coupled with a change in hormone content of blood, which in turn produces increased rate of heart beat, constriction of blood vessels, digestive sperms and dilation of pupil of eye.

(d) The most immediate and acute effect of noise is the impairment of hearing, which diminishes by the damage of some part of auditory system. When exposed to very loud and sudden noise acute damage occurs to the eardrum. Prolonged exposure to noise of certain frequency pattern will lead to chronic damage to the hair cells in the inner ear.

(e) Auditory fatigue appears in the 90 dB associated with whistling and buzzing in ears. Temporary deafness occurs at 4000-6000 Hz, and this effect is known as Temporary Threshold Shift (TTS), Permanent loss of hearing occurs at 100 dB due to continuous noise exposure. Under such conditions, the auditory threshold shift is called Permanent Threshold Shift (PTS). Besides chronic hearing loss, there may be instantaneous damage or acoustic trauma, which may be caused by very high intensity impulsive noise resulting

from an explosion or sudden excessive noise of more than 150 dB.

(f) Physiological effects of noise pollution include neurosis, hypertension, increase in sweating, hepatic diseases, giddiness, peptic ulcers, undesirable change in gastro intestinal activities behavioral and emotional stress.

(g) Noise mainly interferes with man's communication. It is easily visualized that a conversation can be carried on in whisper in a still place, while one his to shout to make sense in a noisy factory.

(h) Blood gets thickened by excessive noise. Changes in breathing amplitude have also been reported due to impulsive noise.

(i) Noise causes cosinophilia, hyperglycemia, hypocalcaemia and hypoglycemia by a change in blood and other body fluids.

(j) Noise causes chronic headache and irritability; work, which needs a high degree of skill, is considerably affected. The overall working efficiency goes down when noise level goes up.

(k) Loud and sudden noise such as sonic boom produces a startle effect, which may damage the brain. Sonic booms can also cause physical damage to property i.e. windows may break due to it. Sudden noise can be much more harmful than a continuous noise.

Noise pollution can be minimized by the following ways:

- use of noise barriers,
- limitation of vehicle speeds,
- alteration of roadway surface texture,
- limitation of heavy duty vehicles,
- use of traffic controls that smooth vehicle flow
- to reduce braking and acceleration,
- innovative tire design and other methods.

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