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# STUDY ON NOISE POLLUTION OF INDUSTRIALIZED AND URBANIZED TOWNS LIKE RABAKAVI AND BANAHATTI OF BAGALKOT DISTRICT, KARNATAKA STATE, INDIA

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**ABSTRACT**
The modern civilization creates more and more noise, because of the development of Industries, machinery and Technology. It has been reported that noise inside the factories can become a health hazard causing deafness which includes temporary or permanent hearing loss. An assessment of noise pollution during different seasons in Industrialized and Urbanized towns were always highly polluted. The noise from different vehicles, festivals, transportations, blasting etc., and it is recorded that during festival (Diwali), marriage ceremony the noise levels as high as 110 dBA – 115 dBA and 106 dBA – 108 dBA respectively which were more than the permissible level have been recorded so far. The organizers of this festival are therefore advised to look out alternative ways of organizing the festival without excessive noise in the time of festivals. The public facing the risk of physiological ill effect of environmental pollution due to industrial development and other human activities. The sound levels generated by spinning mills of Banahatti and small scale Industries of Rabakavi. The average noise levels in the day time, after noon and night time were recorded and found to be the lowest noise levels during afternoon at the investigation periods. The traffic density and sound levels of individual vehicles and other human activities during afternoon time found in reduced levels.

**KEY WORDS:** Noise pollution, industrialization, Urbanization, sound levels, physiological ill effect.

## INTRODUCTION

Noise pollution is an environmental problem in many Urbanized and Industrialized towns. Industrialization has given direct impact on natural ecosystem, the most negative impact of industrialization are on air, water, soil and noise. The health hazards in humans due to noise pollution are of varied types. The noise pollution study will be carried out in Banahatti and Rabakavi both are Urbanizing towns of Bagalkot district of Karnataka state. These two twin towns situated in the north-west periphery of Bagalkot district of the state. Towns are placed 3000-3200 feet above sea level on state high way and are situated about 20 kms. from Jamkhandi and 100 kms from Kolhapur as well as Belagavi districts and are well connected by roads from Bijapur to Sangli, Poona and Mumbai. The noise levels were measured by using digital sound level meter in the selected areas. The noise causing in marriages, festivals, public meetings and individual vehicles like bus, lorry, car, autorikshaw, and scooter were measured and recorded. The individual vehicles, musical instruments, spinning mills, small scale industries, urbanization and human activities are the main sources of noise pollution[1]. Traffic noise levels increases with the increase in the density of traffic composition, traffic jams, defective roads and conditions of vehicles, unnecessary blowing of horns[2,3]. These attributes are well pronounced during festive periods. Study of noise pollution in twin cities during Diwali festival showed an average noise level of 110 dBA - 115 dBA. Spinning mill, power loom industries, automobiles, stone crushing mills, Chilligrinding mills, and Gadi industries were showed the noise pollution levels of 130 dBA, 85 dBA, 89 dBA, 108 dBA, 92 dBA, and 88 dBA respectively. All the sites under study showed higher sound level than the prescribed limits of the central pollution control Board (CPCB). The blowing of horns was up to 30-35 dBA above the tolerance limits in urbanized city, the most noticeable sources of noise pollution here are Lorries, autorikshaws, motor bikes[4]. The physiological ill effect caused by noise pollution is more aggravated during celebration of festival, marriage and other religious functions[5]. The noise from fire crackers is one of the most important environmental problems mainly during festive occasions. In the present investigation two sites each from Banahatti and Rabakavi cities were selected to measure the noise levels. The minimum 68.2 dBA noise levels recorded at Rabakavi new bus stand, while maximum 90.2 dBA sound level found at Banahatti Vaibhav talkies. The noise level in other two places namely Banahatti and Rabakavi old bus stand were recorded to be 81.2 dBA and 78.5 dBA respectively. The noise levels at Banahatti Vaibhav talkies, Banahatti bus stand during the day time and night times were higher than the permissible (legal) limit as prescribed by CPCB and according to Egyptian Environmental law.

## MATERIALS & METHODS

Sound level measurements were carried out at various site locations by using digital sound level meters (SL-4010 Lurton Q 604567 made in Taiwan) set at fast time evaluation and frequency evaluation filter (weighting) set at A. The sound meter was set at fast time evaluation because the measured sound levels of spinning mills, blowing horns, voices, vehicles were changes rapidly. The measurements were done with sound meter at Hi-range

which for this meter is 60 dBA to 130 dBA. The meter was hand held at 1.4 m above the ground level and at a distance of 10-15 feet away from the road side. The sound level measurements were carried out for 6 days at intervals of two days each in September 2013. October 2013 and November 2013 months, at different locations and of different periods. The measurements were made during morning when people were busy going to industrial work, afternoon while people going on break and during evening at 7.30 pm to 9.30 pm these were all busy hours. The Traffic Noise levels generated by Individual vehicles, community noise levels, Noise level generated by spinning mills of Banahatti and small scale industries of Rabakavi, density of traffic were measured and recorded in tables 1 to 4 respectively during the monitoring period. It is noticed that the noise level was higher in the morning and in evening but lower at noon, the contributions of traffic noise pollution generated by individual vehicles were recorded in between 88 dBA to 102 dBA. The sound levels varied from vehicle to vehicle seasonally[4]. Figure 1 and figure 2 indicate the Sound levels of the individual vehicles whereas Lorry produced high noise level than other vehicles, and the community noise level recorded high during the Deepawali festivals.

**TABLE 1:** Traffic Noise levels Generated by Individual Vehicles: (Noise levels measured in Decibel scale).

| Sl. No. | Vehicle | Noise level |
|---|---|---|
| 1 | Autorikshaws | 97 dBA |
| 2 | Bus | 99 dBA |
| 3 | Car | 87 dBA |
| 4 | Lorry | 102 dBA |
| 5 | Motor Bike | 92 dBA |
| 6 | Scooter | 88 dBA |
| 7 | Tractor | 100 dBA |
| 8 | Tam-Tam | 98 dBA |

**TABLE 2**: Community Noise in dBA levels

| Sl.No. | Type | Noise level |
|---|---|---|
| 1 | Marriage Ceremony | 106-108 dBA |
| 2 | Public Meeting | 997-99 dBA |
| 3 | Festival (Diwali) | 110-115 dBA |
| 4 | Home Environments | |
| | TV | 78-80 dBA |
| | VCR | 80-110 dBA |
| | Washing Machine | 80-90 dBA |
| 5 | Automobiles | 89-92 dBA |
| 6 | Building Construction (Equipment) | 84-86 dBA |
| 7 | Crackers (Atom bomb) | 90-92 dBA |
| 8 | Funeral | 88-90 dBA |

**TABLE 3:** Noise level Generated by Spinning Mills of Banahatti and Small Scale Industries of Rabakavi

| Sl. No. | Industries | Day time (6.0 am to 9.0 am) Noise level in dBA. | Night time (8.0 pm to mid night) Noise level in dBA. |
|---|---|---|---|
| 1 | Banahatti Spinning Mills | 130-135 dBA | 131-135 dBA |
| 2 | Power loom industries | 85-88 dBA | 82-86 dBA |
| 3 | Crushing mills (stone crushing) | 108-110 dBA | 105-109 dBA |
| 4 | Chilly (Marche) grinding mills | 92-94 dBA | 96-98 dBA |
| 5 | Gadi industries | 88-90 dBA | 95-97 dBA |
| 6 | Generators (2W capacity) | 92-95 dBA | 96-98 dBA |

**TABLE 4**: Density of Traffic:A-Towards Bijapur. B-Towards Sangli and Miraj
Date of Observation: 12.11.2013 Location Banahatti Bus Stand.

| Sl.No. | Types of Vehicle | 8 to 9 am | | 11 to 12pm | | 4 to 5 pm | | 7 to 8 pm | | 10.0 pm | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | A | B | A | B | A | B | A | B |
| 1 | Bus | 32 | 22 | 68 | 71 | 65 | 45 | 18 | 12 | 8 | 6 |
| 2 | Lorries and other 6 wheelers | 38 | 35 | 38 | 28 | 21 | 18 | 19 | 11 | 6 | 8 |
| 3 | Four- wheelers | 82 | 92 | 105 | 92 | 35 | 21 | 32 | 21 | 18 | 11 |
| 4 | Three-wheelers | 41 | 47 | 38 | 28 | 15 | 18 | 19 | 16 | 25 | 19 |
| 5 | Two-wheelers (Hero Honda and Scooters) | 310 | 285 | 415 | 295 | 112 | 92 | 98 | 84 | 45 | 22 |

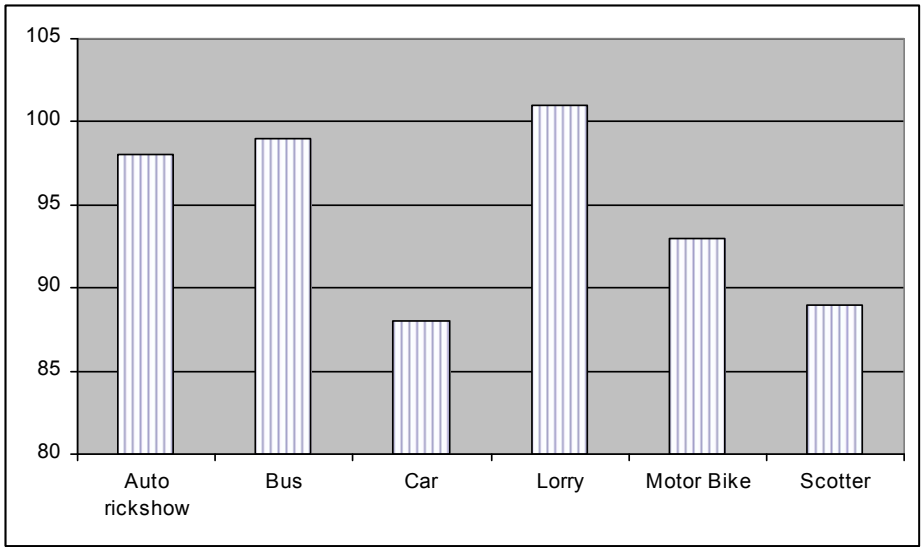


**FIGURE-1.** Traffic Noise levels generated by individual vehicles

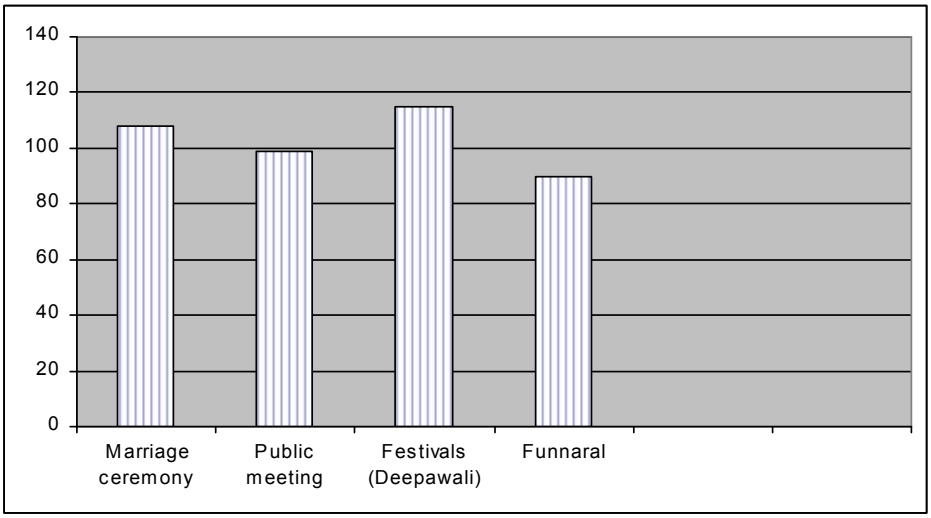


**FIGURE-2.** Community Noise

**RESULTS & DISCUSSION**

The study of noise levels in Urbanized and Industrialized towns by different modes, period's to find out whether the sound levels are within the recommended standards to know the sound pressure and its physiological ill effect on human health. It is observed that the noise level generated by spinning mills of Banahatti and small scale industries of Rabakavi were in the range of 131 dBA- 135 dBA and 85 dBA – 88 dBA during day and night times respectively. The sound levels of stone crushing mills of the towns generated the sound level in between 105 dBA to 109 dBA, the grinding mills and gadi industries in the towns produced sound levels in between 88 dBA to 98 dBA. The 2 KW capacity generators of film talkies measure the sound levels in between 96 dBA to 98 dBA during night time. The sound pressures during traffic density generated by individual vehicles – maximum sound levels observed for Lorries in between 102 dBA to 110 dBA. Hence the minimum sound levels observed in between 87 dBA to 89 dBA for cars, Autorikshaws showed noise at 100 dBA level. Scooters and motor bike produced the sound levels in between 88 dBA to 92 dBA. Now days the urbanized cities were crowded with Tam - Tam three wheelers vehicles producing the sound pollution with the levels of 98 dBA.

The sound level limits prescribed by WHO and KSPCB legal limits during day and night time were at industrial area in between 70 dBA to 76 dBA and at residential zone 36 dBA to 52 dBA. It is observed that noise has adverse effects on citizens, and considered noise as a major threat to human beings. It has been scientifically proved that noise more than 85 dBA can cause hearing impairment and other physiological ill effect shown the table 5 and also the acceptable noise levels in residential areas shown in table 6. The comparative study of noise levels limits Prescribed by WHO & KSPCB legal limits during day and night time is represented in the table 7.

**TABLE 5**: Sound Pressure and Physiological Effect

| Sound Pressure (dBA) | Physiological ill effect |
|---|---|
| 0 dBA | Threshold of normal hearing audibility. |
| 20 dBA | Rusting of levels due to gentle wind. |
| 50 dBA | Normal conversation, telephone. |
| 52 dBA | Quiet speech. |
| 55-60 dBA | Average office, small shop. |
| 75 dBA | Speech interference. |
| 80 dBA | Printing Press, Alarm clock irritation starts. |
| 90 dBA | Large factory, Tympanic membrane to contract (Aural reflux action), traffic, track, theatre sound and loud spear. |
| 100 dBA | Significant changes in pulse. |
| 110 dBA | Boiler factory, stimulation of skin receptors. |
| 115-120 dBA | Pain threshold (Physiological disturbance in man). |
| 130 dBA | Aero plane noise (at a distance of 3 meters). |
| 130-135 dBA | Nausea, dizziness, vomiting, interference with touch and muscle sense. |
| 140 dBA | Pain in ear, extreme limit of tolerance. |
| 150 dBA | Prolonged exposure cause, burning of the skin. |
| 160 dBA | Minor permanent damage if prolonged exposure. |
| 190 dBA | Major Permanent damage in short time, mice died at 175 dBA noise. |

**TABLE 6**: Acceptable Noise levels in Residential areas.

| Noise level dBA | Location |
|---|---|
| 25-30 dBA | Rural area |
| 30-35 dBA | Music theatre |
| 25-35 dBA | Radio, TV, VCR Studios |
| 30-45 dBA | Sub-Urban areas, Auditorium |
| 35-40 dBA | Residential (Urban), Conference room, court room, Libraries, Exam halls. |
| 40-45 dBA | Urban business, Private offices, schools. |
| 45-55 dBA | City market area. |
| 50-55 dBA | Banks, Restaurants. |
| 50-60 dBA | Industrial areas, factories. |

**TABLE 7:** Noise level limits prescribed by WHO & KSPCB legal limits during day and night time:

| Sl.No. | Site | 6 am – 9 am | 9 pm – 6 am |
|---|---|---|---|
| 1 | Industrial area | 76 dBA | 70 dBA |
| 2 | Residential zone | 52 dBA | 36 dBA |

The quality of life which include aspects of emotional, functional , physical, mental and social well being as perceived by individuals offer wide possibility to look at health related outcome of noise. Also health includes physical, psychological and social well being of an individual[7]. The people living near noise producing units have higher incidence of psychiatric and mental problems. Women living in the noise producing units suffer from a number of menstrual disorders. Constant high level causes the blood vessels to contract, skin to become pale, muscles to constrict and adrenaline be shoot into the blood stream.

## CONCLUSIONS

The significance of this work is to provide an insight into various facts of Urbanization and consequential industrial pollution to evaluate the level of the major environmental factor such as noise. The study has shown the noise level in the residential area, noise level generated by individual vehicles, community noise, noise level generated by spinning mills of Banahatti and small scale industries of Rabakavi and finally the noise pressures caused by high traffic density of these urbanized and industrialized cities. The noise level recorded from various measures were found higher and far exceed noise the public stand the risk of endangering their health physically, psychologically and socially.

## RECOMMENDATIONS

The organizers and the concerned authorities are therefore advised not to look at the income generation aspect but should also consider the damaging effect, physiological ill effect of noise generated during the festival periods on the human beings which includes hearing loss. Alternative ways of organizing the festival without noise should be sought for.

**Recommendation on Community noise**

Use of loudspeakers, fireworks should be minimized and prohibited in populated and residential areas, use of banjos during Jatra of area should be stopped, and the cooperation of the public of the community stands the best way to reduce the noise in the community.

**Recommendation on Traffic noise control**

Research should be carried out to develop quieter type of diesel engines, routing away of highways from populated areas. Noise can be baffled with barriers. Planting avenue trees along pavements. Lowering speed limits and designing for non-operations.

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