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Analysis of Railway Traffic Noise in Mysuru City

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Abstract- This paper presents assessment of noise pollution levels produced by railway traffic at various locations along a railway track in Mysuru city, using noise dosimeter. Railway traffic noise creates problems for surrounding area especially where there is high speeds and high railway traffic volume. Due to the recent urban sprawl and also Indian Railways being fourth largest network in the world it is a necessity to understand the railway noise pollution and its implications on human habitation.

Key words: Noise pollution; Railway traffic; CPCB standards; Mysuru city; Noise measurement; Urban sprawl.

I.Introduction

Mysore, officially renamed as Mysuru, is the third most populous city in the state of Karnataka, India. Tourism is the major industry, while information technology has emerged as a major employer alongside the traditional industries. Mysore depends majorly on railway and road transport for inter-city connections, which contributes to the traffic noise in the city. The Indian Railways is one of the major contributor to the city noise pollution, with the increase in number of trains per day and new railway lines. Additionally due to the recent urban sprawl, a very dense population of dwelling is found around railway tracks in many places of Mysuru.

India being a developing country like many other countries around the world suffers from large amounts of environmental pollution, in which Noise pollution is also a major constituent. The word noise is derivative from nausea which is a Latin word, meaning wrong sound in wrong place at wrong time.

Noise is a very convoluted experience in its physical aspect, as well as in its psychological and medical scopes. In consequence, it is very important to measure, forecast or define noise in a simplified way.

The rising unrestrained noise pollution raises health related concerns, which can cause short term as well as long term psychological, behavioural, subjective and physiological syndromes.

Indian railways established in 1853, is the fourth largest railway network in the world comprising of 119,630 kilometres of total track. Railway transport, both passenger and freight transport, is increasing exponentially. Traffic noise from railways creates problems for surrounding area especially when there is high railway traffic volume and railway train speeds.

Table 1.1. CPCB standards

Sl No	Type of Vehicle	Noise Limit (dB)
1	*Two wheeler* Displacement up to 80 cm^3 Displacement more than 80 cm^3 but up to 175 cm^3 Displacement more than 175 cm^3	 75 77 80
2	*Three wheeler* Displacement up to 175 cm^3 Displacement more than 175 cm^3	 70 80
3	*Passenger car*	75
4	*Passenger or commercial vehicle* Gross vehicle weight upto 4 tonnes Gross vehicle weight more than 4 tonnes but up to 12 tonnes Gross vehicle weight more than 12 tonnes	 80 83 85

II. Methadology

For the assessment of railway traffic noise in Mysuru city, noise intensity was measured at different locations on railway track connecting Chamarajnagar - Mysuru-Bengaluru within city limits which are categorised as 'At grade', 'Above grade' and 'Below grade' and Mysuru railway Junction platform. Additionally noise levels were measured near industrial and residential area though which the selected railway track passes

At grade- Is a location where the railway track is at the same level as that of the instrument measuring the sound intensity. The readings are taken at a distance of 10, 20 and 30m from the track.

Above grade- Is a location where the railway track is on an elevated level such as a bridge, and the readings are taken under the track.

Below grade- Is a location where the railway track is passing underneath the point from where noise intensity is measured.

Mysuru Junction railway platform readings were taken at a distance of 5m from the railway track, where the passenger seating arrangement is made.

Industrial and Residential area readings are taken at the same level at a distance of 10, 20 and 30m from the track.

The readings were recorded using a Type-2 Noise Dosimeter (Model name Cesva SC310). The instrument was held in the

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hand at still position at around 1m from the ground level pointed perpendicularly towards the railway train at all the selected locations.

All the above readings are taken for a same train at the same time on different days. However, before starting to measure the noise, the instrument was calibrated initially and few preliminary settings were made to get the desired outputs. For the proper evaluation and analysis of the results, the following noise manifestations were calculated:

- L_{AT}& L_{CT}: Equivalent continuous sound pressure level with integration time T for A and C frequency weightages respectively.
- L_{CPeak}: Peak Sound Pressure Level.

Locations of Study of Noise Levels:

- 'At grade' readings are taken near Kukralli Lake railway crossing, where the Chamaraja Nagar passenger train passes at 12:25pm.
- 'Above grade' readings are taken near Kalamandhir, where Chamaraja Nagar train passes at 12:45pm.
- 'Below grade' readings are taken near bamboo bazzar, where Basava Express train passes at 13:30 hours.
- 'Mysuru Junction railway platform readings are taken from a distance of 5m from the railway track at the distance where the passenger seating arrangement is made.
- 'Industrial area' readings are taken near Yaadavagiri, where Tippu Express train passes at 15:00 hours.
- 'Residential area' readings are taken near BM Shree Nagar, where GolGumbuz train passes at 8:15 hours.

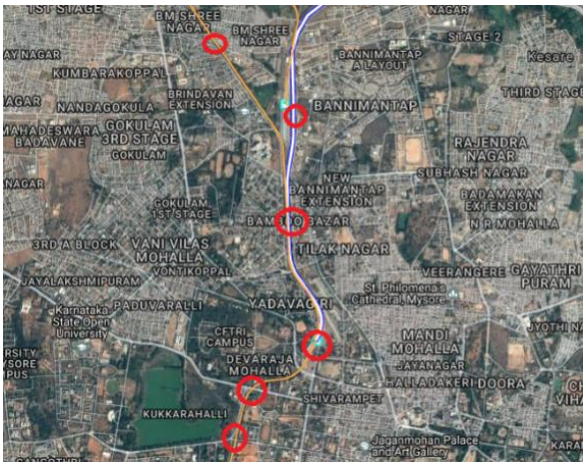

Fig. 2.1. Measurement points along the railway line

III. Results and Discussions

The measurements of sound intensity at the mentioned locations are been compare to CPCB standards. As of now there are no standards set by the board specifically for railway noise but the standards do mention a maximum allowable sound level is 85dB for vehicles exceeding 12 tonnes of weight.

Table 3.1.The values tabulated are the average of three trials at the respected locations.

Sl. No.	Location	Distance (m)	L_{AT} (dB)	L_{CT} (dB)	L_{CPeak} (dB)
1.	At grade	10	131.10	129.67	144.87
		20	129.10	127.90	141.33
		30	126.90	126.63	137.13
		Avg.	129.03	128.07	141.11
2.	Above grade	-	94.83	90.43	109.63
3.	Below grade	-	100.63	99.80	115.37
4.	Railway platform	5	113.36	113.73	126.96
5.	Industrial area	10	94.77	91.40	113.23
		20	94.30	89.70	110.90
		30	92.87	89.23	107.97
		Avg.	93.98	90.11	110.70
6.	Residential area	10	97.76	86.97	108.50
		20	96.30	83.57	107.43
		30	94.00	81.10	105.73
		Avg.	96.02	83.88	107.22

L_{CPeak} being the peak sound pressure is the value with the maximum sound intensity, hence it is been compared with the CPCB standards in a graphical format as shown in Fig. 3.1.

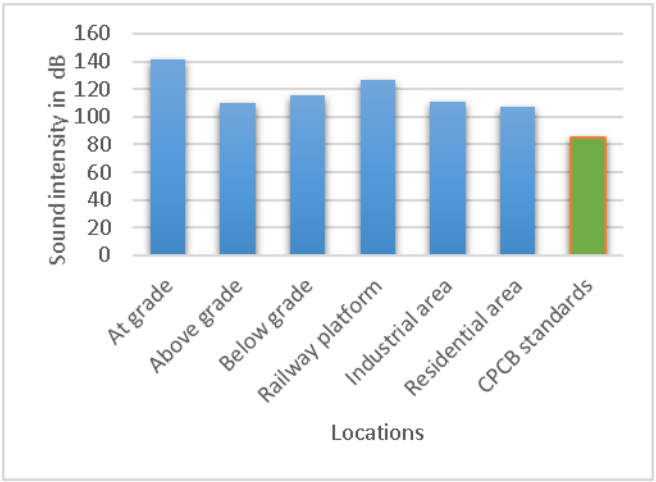

Fig. 3.1. Average noise level at different locations.

Noise level reading taken AT GRADE exceed by 52dB even at the maximum distance of 30m from the railway track. This junction is a very busy traffic route rendering the commute of two, three, four wheelers, etc. throughout the day.

ABOVE GRADE noise level reading demonstrated a peak in noise level at 109.63dB, which clearly exceeds the CPCB standards. The affected group is not been stopped by the passage of the train but on repetitive and similar exposure there can be attributed number of health related hazards on a longer run.

Readings taken BELOW GRADE proved a very high sound level averaging to maximum peak of 115.37dB although it can be mostly attributed to the road traffic at this zone. This is a

potential hazard and needs to be addressed at the earliest possible stage.

Readings taken at the Mysore Junction railways station revealed that sound intensity level exceed the standards up to fifty percent. Thousands of people who travel on a regular basis, employees and people having their business installation on the platform, have a very adverse effect on their heath directly and indirectly. The railway noise is also additionally exemplified by the honking sound of each and every train approaching and departing from the station.

Industrial area near Railway goods yard show a peak of 107.97dB which when combined to the sound pollution by the industries and road traffic can account for a very high value. These sound levels will definitely have adverse effect on the workers, as they are continuously exposed to the exceeding noise levels with very less to no safety on them.

Finally the results of sound intensity residential area is the area hosting the livelihood, it is always expected to be an area of calmness and peace. The sound measurements taken in selected residential area near which railway track passes show a peak reading of 105.73dB at a maximum distance of 30m from track.

Additionally a survey of questioners was filled by locals at all the mentioned locations. It revealed that more than 80% of people exposed to railway traffic noise found it to be 'too high' and is a reason of constant discomfort and more than 50% feel that the vibrations from the movement of railways created are 'too high'.

III. CONCLUSION

This research work clearly elucidates railway noise pollution levels exceeding the set standards by CPCB at all selected locations near railway track in Mysuru city.

IV. NOISE DAMPERING MEASURES

Vegetation, if it is high enough, wide enough, and dense enough that it cannot be seen over or through, will provide sufficient sound dampening. Construction of noise barriers using earth, concrete, masonry, wood, metal, and other materials. To effectively reduce sound transmission through the barrier, the material chosen must be rigid and sufficiently dense. Additionally sound dampening ear plugs when provided to workers at the industrial area as well as at the Railway platform can provide a very high level of relief form intense sound intensity pollution. Measures can be taken by the Municipality to not allow construction of buildings in the affinity of the railway track. India Railways can also take steps in improving the railway technology to advance electrical trains, which will result in reduction of sound and air pollution substantially.

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