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ORIGINAL ARTICLE **OPEN ACCESS**

Monitoring of Noise Pollution Level During Working and Non-Working Day at Transport Stations, Udaipur

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ABSTRACT

Noise is a critical toxin present in climate which causes heaps of wellbeing dangers. In present study, Railway Station and Bus Stop are selected in Udaipur city of India. The selected site offers a wide difference in human activities. In the framework of the baseline noise assessment, screening of all the selected sites was through an appropriate sound meter application. The data were collected on one working and one non-working day. The assessment of a single day was divided into five phases, for half an hour. It was seen that the level of noise was higher at the Bus station than that of Railroad station. The value of disturbance index was likewise noticed higher at the Bus station than Railroad station. At the Bus station frequency of noise was recorded high at early afternoon as well as additionally at the night time and is least at morning. While at the Railroad Station, level of noise was most extreme at morning and is least during night. Hence the current study shows how transport station causes the clamor contamination. In the current analysis, noise levels at all sites sampled at various times of the day were typically found to be in a wide range, with bus station showing more noise pollution than railway station and that is also in the noon and night time and is least at morning time. This happens as a result of a number of factors, including congested and overcrowded roads, poorly managed traffic, and road development operations

Keywords: *Noise pollution, Transport, Environment, Health, Disturbance.*

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INTRODUCTION

After air and water contamination, noise pollution is considered as the third most perilous pollution as indicated by the WHO 2005. Noise is undesirable, unsavory and irritating sound goes about as natural contamination in the environment, which makes obstruction in communication and makes health problems [1-3]. The clearest impact of noise is loss of hearing capacity, which might be transitory or super durable relying upon the exposure time [4-6]. It was seen that limited scale ventures as a significant wellspring of noise pollution [7]. Unreasonable commotion might cause serious rest aggravation, exhaustion and disturbance because of local area noise [8]. The quick advancement of street foundation and ascend in number of vehicles out and about will be a rising danger to local natural surroundings of numerous wildlife populaces all over the planet [9-10]. Pollution of noise is an issue from one side of the planet to the other. The fast advancement of the travel industry is straightforwardly causes ecological issues, for example, expanding noise level, decline air quality, water contamination and loss of biodiversity [11-12]. Day tourists affect climate through their transportation to the location as well as their exercises as location destinations [13]. Crooks profit this open door and engaged with wrong doings during unreasonable noise [14]. Numerous studies related to pollution have recommended that people persistently presented to nonstop commotion at level of something like 85 decibel have worse hypertension than those not presented to noise [15-16]. The noise level was checked during kali puja celebration in Asansol, west Bengal and furthermore detailed 19.2% ascent in noise level on festive day when contrasted with non - festive day [17]. In present research, a thorough scientific analysis was carried at extremely busy, road stretches that have medium to very dense traffic flow which covers the foremost intersection points of the city. All study areas had heterogeneous traffic stream. It incorporated all classifications of vehicles, for example, bikes, three-wheelers, vehicles, small scale transports, standard transports and so on. Adjacent to this, the streets were stuffed with walkers. The work was deliberate to study the road traffic noise levels at different areas and to evaluate the noise environment in its spatial and worldly aspects.

MATERIAL AND METHODS

In present study, Railway Station and Bus Stop are selected in Udaipur city of India. The selected site offers a wide difference in human activities. In the framework of the baseline noise assessment, screening of all the selected sites was through an appropriate sound meter application. The data were collected on one working and one non-working day. The assessment of a single day was divided into five phases, for half an hour. The basic noise data were recorded from morning 7-7:30A.M, 10-10:30 A.M, at noon 1-1:30P.M, 4-4:30 P.M to evening 7-7:30 P.M for the two respective sites. Noise from the noise generating point sources was identified from the destination area and comparison of the noise level through minimum, average and maximum data recorded by the sound meter application. The sound was measured in decibel unit. We also measured the prevailing level of disturbance at the sites by recording the number of pedestrians passed, passing and parked vehicles, horn blow within 30m of the center of reading for the same time half an hour during the same working day and non- working day. For each component of disturbance, a source was allocated for five different levels of disturbance as follows, number of pedestrians:1=1-30, 2=31-60, 3=61-90, 4=91-120, 5= >120 ; number of passing vehicles : 1= 1-90, 2= 91-180, 3= 180-270, 4= 271-360, 5= >360 and number of parking vehicles 1= 0-3, 2= 4-6, 3= 7-9, 4= 10-12, 5= >12as shown in table 1. A disturbance index was then calculated by multiplying the scores obtained for all three components [18]. For comparisons between disturbances level in working day and non- working day and non- working day for the both sites were examined for the same time mentioned. During our result analysis, we observed that the disturbance index proposed by Soh is not appropriate for the range of data we observed. Therefore, we hereby proposed a new revised disturbance index (Table 1) and also compared the result of our newly proposed index with the index given by Soh *et al* [18].

Table1. Proposed Revised Disturbance Index (RDI)

Number of Pedestrians	Number of Passing Vehicle	Number of Parked Vehicles
1 = 1-30	1 = 1-300	1 = 1-10
2 = 31-60	2 = 301-600	2 = 11-20
3 = 61-90	3 = 601-900	3 = 21-30
4 = 91-120	4 = 901-1200	4 = 31-40
5 = 121-150	5 = 1201-1500	5 = 41-50
6 = 151-180	6 = 1501-1800	6 = 51-60
7 = 181-210	7 = 1801-2100	7 = 61-70
8 = 210-240	8 = 2100-2400	8 = 71-80
9 = 240-270	9 = 2400-2700	9 = 81-90
10 >270	10 >2700	10 >91

RESULT

Noise from motor vehicle is a very significant part of urban environment, are also the main source of urban noise emission, contributing as a major part to the total noise. We recorded noise level at Bus Station (table 3 & 4) and Railway Station (table 4 & 5), a very busy place of the Udaipur city. In case of Bus Station as shown in fig. 1, on non-working day, the noise level gradually increased during the time period of 7:00 AM – 10:30 AM then decreased at16:00 PM - 16:30 PM (64dB) and again increased a little bit at 19:00 PM - 19:30 PM (65dB). On working day the noise level was same for 7:00 AM – 10: 30 AM as of non- working day nut increased at noon 13:00 PM – 13:30 PM hours of time (66dB) and then again decreased at 16:00 PM – 16:30 PM (64dB) which is also same as of non– working day and maximum frequency was recorded at evening 19:30 PM (66dB). In case of Railway Station as shown in fig. 2, on non-working day, the noise level was highest during 7:00 AM – 7:30AM (77dB), decreased drastically at 10:00 AM – 16:30 PM (72dB), a little bit increasement was seen at 19:00 PM - 19:30 PM (73dB). On working day, the level of noise pollution was totally different from non – working day. It was maximum at 7:00 AM – 13:30 PM (76dB) and gets decreased at 16:00 PM - 19:30 PM (74dB). In case of Bus Stop, disturbance index was observed same on both the working and non- working days. In case of Railway Station, disturbance index was slightly more during non- working days as compare to the working days. The disturbance index was calculated from the recorded data was found quite different from the original table of disturbance index [18]. Therefore a new range of disturbance index was proposed and data were plotted according to revised disturbance index table (RDI) along with the original one and is shown in fig. 3 and 4 for Bus station and Railway station respectively.

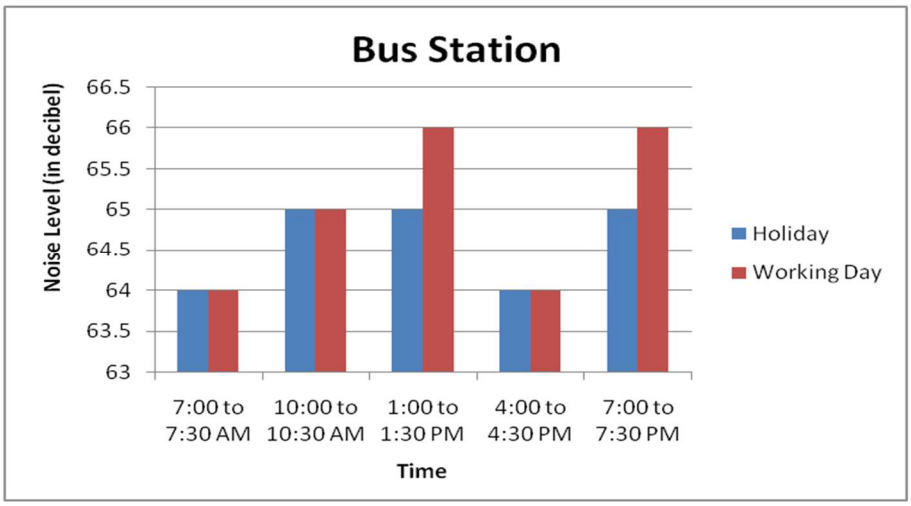

Fig.1. Noise level dynamics during working day and non-working day at Bus Station

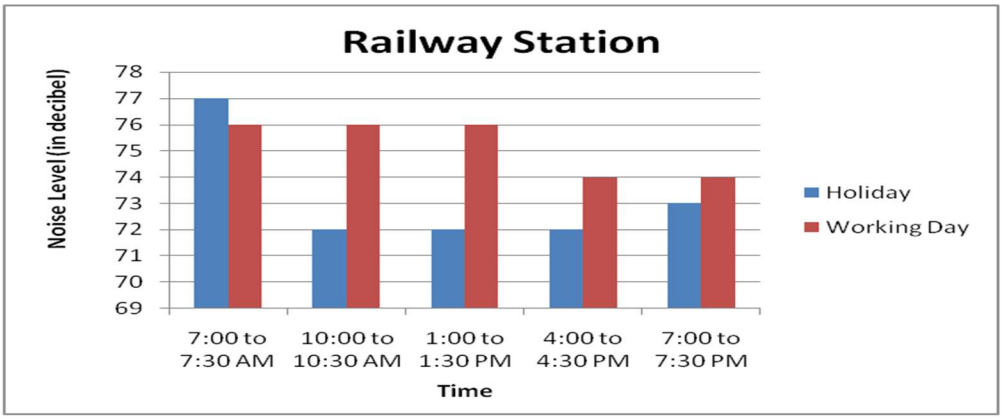

Fig.2. Noise level dynamics during working day and non-working day at Railway Station

Table 2: Noise level dynamics and disturbance level at Bus Station on Non-working day

Time Period	Noise Level (in decibel)			No. of passing Pedestrians	No. of Passing Vehicles	No. of Parked vehicles (30 meter periphery)	No. of blowing horn	Disturbance Index
	Min.	Max.	Avg.					
7:00 to 7:30 am	40	83	64	200	1200	91	274	125
10:00 to 10:30 am	44	84	65	749	2357	86	430	125
1:00 to 1:30 pm	42	85	65	226	2617	118	513	125
4:00 to 4:30 pm	41	85	64	346	2003	85	373	125
7:00 to 7:30 pm	40	81	65	459	2418	71	648	125

Table 3: Noise level dynamics and disturbance level at Bus Station on working day

Time Period	Noise Level (in decibel)			No. of passing Pedestrians	No. of Passing Vehicles	No. of Parked vehicles (30 meter periphery)	No. of blowing horn	Disturbance Index
	Min.	Max.	Avg.					
7:00 to 7:30 am	45	85	64	327	1082	89	479	125
10:00 to 10:30 am	45	86	65	938	3080	101	568	125
1:00 to 1:30 pm	46	85	66	502	3170	90	486	125
4:00 to 4:30 pm	44	87	64	348	2602	118	425	125
7:00 to 7:30 pm	44	86	66	287	3320	89	607	125

Table 4: Noise level dynamics and disturbance level at Railway Station on Non-working day

Time Period	Noise Level (in decibel)			No. of passing Pedestrians	No. of Passing Vehicles	No. of Parked vehicles (30 meter periphery)	No. of blowing horn	Disturbance Index
	Min.	Max.	Avg.					
7:00 to 7:30 am	41	88	77	895	919	139	349	125
10:00 to 10:30 am	41	84	72	154	1337	50	408	125
1:00 to 1:30 pm	40	83	72	174	1427	62	290	125
4:00 to 4:30 pm	63	86	72	265	1303	90	374	125
7:00 to 7:30 pm	66	85	73	315	1395	85	376	125

Table 5: Noise level dynamics and disturbance level at Railway Station on Working day

Time Period	Noise Level (in decibel)			No. of passing Pedestrians	No. of Passing Vehicles	No. of Parked vehicles (30 meter periphery)	No. of blowing horn	Disturbance Index
	Min.	Max.	Avg.					
7:00 to 7:30 am	42	88	76	498	885	134	538	125
10:00 to 10:30 am	41	86	76	122	2268	54	483	125
1:00 to 1:30 pm	42	87	76	117	1773	77	444	125
4:00 to 4:30 pm	41	85	74	303	1517	52	330	125
7:00 to 7:30 pm	42	84	74	323	2127	43	578	125

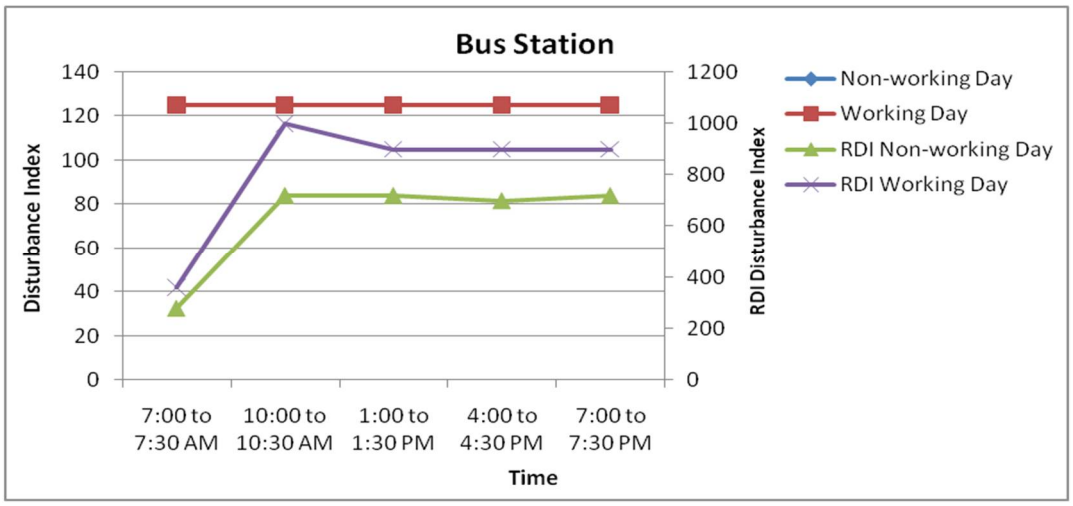

Fig. 3. Dynamics of Disturbance Index and Revised Disturbance Index (RDI) on working and non-working day at Bus Station

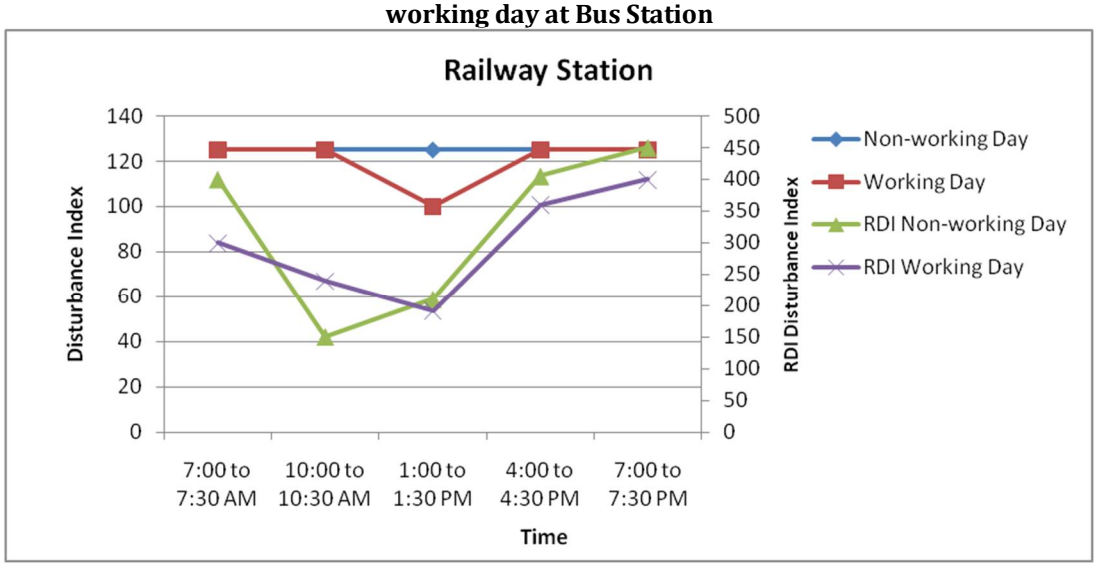

Fig. 4. Dynamics of Disturbance Index and Revised Disturbance Index (RDI) on working and non-working day at Railway Station

DISCUSSION

Most of our regular activities contribute to noise pollution. A healthy human ear can tolerate a very wide range of SPL, from painless at zero dB to unpleasant at 100-120 dB to painful at 130-140 Db. Noise needs to be managed since it has so many negative effects on both people and the environment. The approach or combination of techniques to be utilised for noise control depends on how much noise reduction is necessary, the type of equipment being used, and the cost-effectiveness of the solutions that are now available [19]. In the current analysis, noise levels at all sites sampled at various times of the day were typically found to be in a wide range, with bus station showing more noise pollution than railway station and that is also in the noon and night time and is least at morning time. This happens as a result of a number of factors, including congested and overcrowded roads, poorly managed traffic, and road development operations [1]. Assessment of the vehicle traffic noise in Aurangabad city at different time interval the vehicular traffic is a significant source of noise pollution in metropolitan areas [20]. The total number of vehicles using the road in a certain amount of time and the fourth dimension of the day (morning, afternoon, and evening) were used to calculate the intensity of the noise level for each session. In Kolhapur city, Maharashtra state, India, noise pollution levels were researched by Manglekar *et al*. in 2012 [21]. He stated that the chosen location of every noise pollution study exhibit elevated noise levels compared to the recommended standards. He too concluded that the increase in vehicle usage causes congestion on the roads, which inevitably results in noise pollution. Traffic noises as well as certain anthropogenic activities

lead to noise pollution. According to the results it has been noticed the majority of the sample stations exhibit high noise levels compared to standards of Noise Pollution Rule and CPCB Schedule [22-23].

CONCLUSION

It was seen that the level of noise was higher at the Bus station than that of Railroad station. Thus the disturbance index value was likewise noticed higher at the Bus station than Railroad station. At the Bus station noise pollution recurrence was recorded high at early afternoon as well as additionally at the night time and is least at morning. Though at the Railroad Station, level of the noise pollution was most extreme at morning and is least during night. As per Standard aggravation list table, the value 5 is given for >120 walkers , >360 passing vehicle and >12 left vehicle and the joined worth of each of the three is most extreme 125, yet in occupied region of the city, I have recorded up to ~900 people on foot , ~3000 passing vehicle and ~150 left vehicle which is considerably more than esteem in standard table. Thus, taking 5 qualities for this perusing doesn't appear to be important, consequently we have proposed an updated aggravation record in this study.

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