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Research question: What effect does vegetation have on sound pollution in Delhi?

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Abstract

Noise pollution is a major issue, particularly in urban areas, and traffic noise is the most significant source of noise in cities. Because of the large number of cars and other road vehicles with internal combustion engines, traffic noise is a substantial source of noise pollution. When commuters honk even when the traffic light is red, the unwanted sound decibels rise in the periphery of the junction. This noise may affect a person, such as hearing impairment, high blood pressure, stress, etc. At traffic signals, people blow their horns restlessly, adding environmental noise. This paper looks at how the presence of a green belt helps prevent sound from traffic from affecting buildings near traffic signals.

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Background

To reduce traffic noise pollution, barriers such as walls, fences, or earth mounds are frequently used. A vegetation belt is an alternative that is likely to be more environmentally and aesthetically pleasing. (HUDDART,1990). It is well known that urban traffic noise varies significantly over time. These variations can be short-term (due to individual vehicle pass-bys or traffic cycle fluctuations) or long-term (due to rush hour or night and day alternation). This noise has a significant effect on the buildings present at the edges of heavy traffic points. Noise pollution (after air and water pollution) is considered to be the third most serious kind of pollution in metropolises, by the World Health Organization (WHO). The WHO recently estimated that traffic noise could conservatively account for over one million health years of life lost annually in the European Union and Western European countries (Mishra et al., 2010)

Natural vegetation, if hign enough, wide enough, and dense enough, has been found to decrease road traffic noise [Acoust (2008)]. Reports have shown that the noise screening effect of vegetation is usually considered to be low unless

the planting is dense and the belt of vegetation is deep, but where effective, noise barriers have been reported to reduce noise levels by 10—15 dB [Sound Vib (1983)]. Natural vegetation as a noise barrier, like buffer zones, may be impractical in many established towns and city centers due to the space required. The main disadvantage is the high cost of land and the length of time required for vegetation to establish and thus become effective.

The increase in road traffic and the construction of new roads has resulted in an increase in traffic noise pollution and the need for mitigation measures. Traffic noise has always been a problem in urban areas, and some abatement measures considered for existing roads or roads being redeveloped include creating buffer zones, constructing barriers, planting vegetation, and installing noise insulation on buildings.

The physical description of traffic noise is required so that measurements or predictions of noise exposure in these units are practical measurements or predictions of a nuisance. Social surveys are used to develop such teams, and typical survey techniques are briefly described (Scholes, 1970).

Following are the principles for the plant belt.

- The minimum planting area should be 5m width. This amount could be as much as far up to 30m.
- The plants which are subjected to use should be selected from natural flora or the appropriate varieties which are compatible with the natural flora.
- The “evergreen” plants should be used primarily.
- The plants should be planted uprightly to the noise direction.
- The plants should be planted as closely as possible as to each other and the distance between two plants should be appropriate with growing conditions.
- The plants which are longer, bigger, hard textured, intensive leaf-branch and apical tissue which is reaching to the ground should be preferred.
- The plant groups which consist from different heights of trees, shrubs and bushes should be used.
- The longer plants should be planted to the back side of shorter plants, and the distance between them should be increased as much as possible. The plants consist from bushes and coniferous trees which are more than 5m are able to block the noise.

Aims and Objectives

- To record and analyze the sound frequency at the ITO traffic signal.
- To check the difference in the sound level with and without vegetation.

Methodology

- A heavy traffic nod is picked within the proximity to an institutional building.

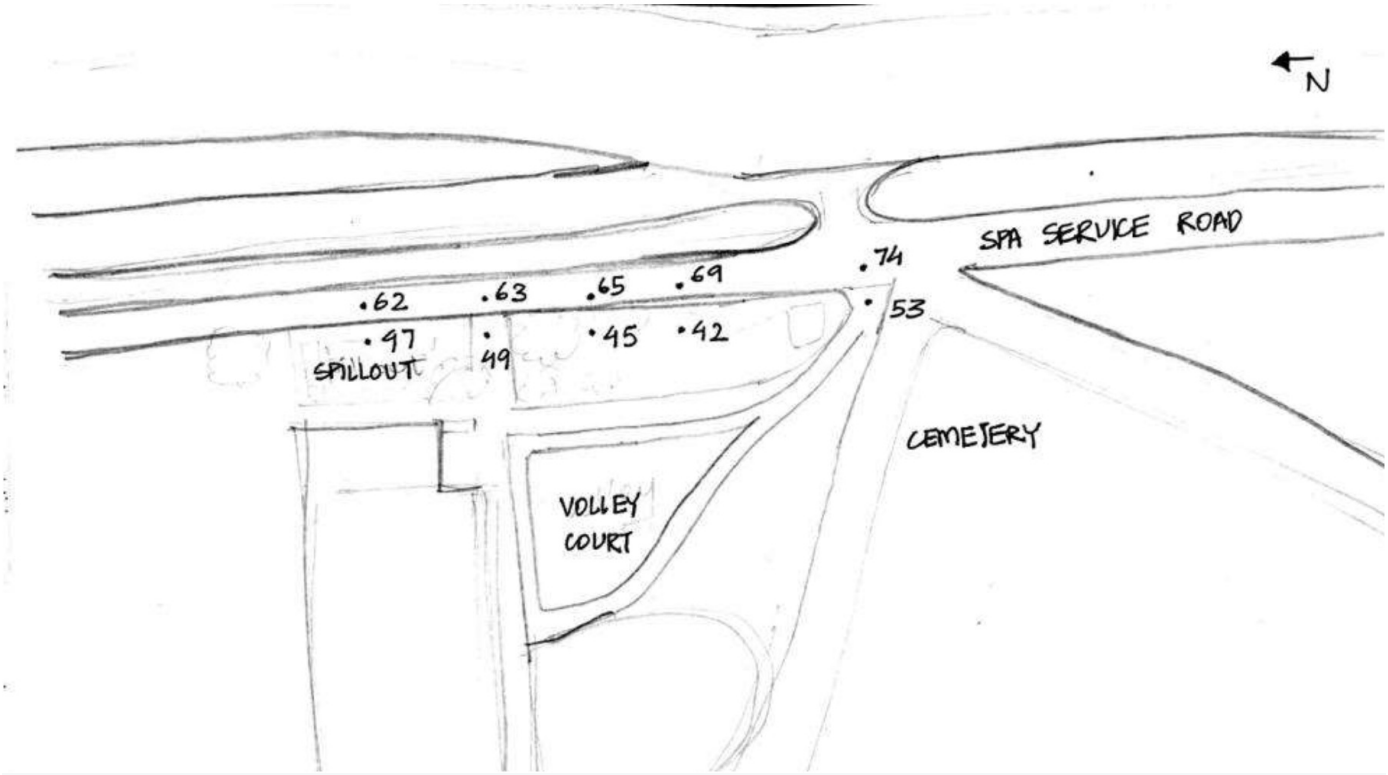
- The plan for the traffic nod is drawn up with a marking of the already existing greens in the belt.
- Using a sound frequency recording app (Arduino science journal), the readings at two point, one next to the road and one after the vegetation, was taken. e The results are compiled and reported.

Results and analysis

Looking at the survey, we notice that the sound frequency at both points differed. The reading taken right next to the road was high. We also see that the assignment are high as we move closer to the signal. The lesson taken from behind the green belt is comparatively lower. Another critical point to be noted is that at the crossing, the frequency is relatively high when a heavy vehicle passes by, even with the presence of green.

However, the effectiveness of the vegetation was the most incredible close to the road. Based on the findings, it is clear that the foliage acts as a plant noise barrier, reducing the intensity of the noise.

- In streets with high traffic volumes, vegetation can significantly reduce the intensity of traffic noise.



Reading taken at Architecture block SPA, Delhi (Source: Author)

Reading taken at Planning block SPA, Delhi (Source: Author)

Conclusions

Both the literature and the field study discovered that foliage is important in reducing high frequencies (above 2000 Hz), whereas low frequencies (250 to 500 Hz) are attenuated by the ground's absorbing qualities, which may be enhanced by the plant root system and leaf litter.

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