

TOWARDS REDUCING NOISE POLLUTION ON THE HIGHWAYS

In recent years, the unpleasant, unwanted sounds generated on the roads and highways has been of increasing concern both to the travellers and inhabitants in the adjoining localities. In fact, traffic noise impacts the people, more than any other environmental noise source. The effects of noise pollution are varied and mostly depend on the noise intensity, frequency and the period of time it manifests. Poor hearing, dizziness, stress, loss of concentration, difficulty to work, learn, rest, relax, sleep, etc. are the most common symptoms of noise pollution on human beings.

The noise pollution is a characteristic problem of contemporary urban settlements, which comprise a large number of noise-generating sources such as road, rail or air traffic, industries, marketplaces etc. The level of traffic noise on roads mainly depends on the volume of traffic, speed of the traffic, type of surfacing and type of vehicles plying on roads. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tyres. The loudness of traffic noise is also increased by defective or old vehicles. Any condition such as a steep gradient which causes heavy labouring of vehicles' engine increases traffic noise levels.

The cacophony of noise in the modern world may be annoying to many and literally enough to make some people sick. Fortunately, new technologies are emerging worldwide to combat noise pollution. Some noise reduction measures include creating buffer zones, constructing

barriers, planting trees and vegetation, managing traffic, etc. Attenuation requirements may vary with the time of occurrence of the noise and the characteristics and level of the noise.

Buffer zones are undeveloped open spaces which border a highway. Buffer zones should be created when a highway agency acquires land, in addition to the normal right of way so that future dwellings are not constructed close to the highway. This precludes the possibility of constructing dwellings that would otherwise experience an excessive noise level from nearby highway traffic. Noise generated at night would normally require a larger separation distance. An additional benefit of buffer zones may be that they can improve the roadside appearance. However, because of the tremendous amount of land which must be acquired and because in many cases dwellings may already border existing roads, creating buffer zones may not be possible always.

Noise barriers can be formed by earth berms along the roads. But creating earth berms may require quite a lot of land, if they are very high, as also earth from borrow areas. Alternatively, noise barriers can also be made of wood, concrete, masonry, metal and other materials. Noise barriers should be such that they are visually pleasing and blend well with their surroundings. Noise barriers, however, do have limitations. Studies by Federal Highway Administration have revealed that a noise barrier can achieve a

5 dB noise level reduction when it is tall enough to break the line-of-sight from the highway to the receiver and it can achieve an approximate 1.5 dB additional noise level reduction for each metre of height after it breaks the line-of-sight. It may not always be possible to construct noise barriers if they conflict with the safety, aesthetics or local community's requirements.

Roadside trees and vegetation can be planted for lessening the traffic noise levels. The planting of trees and shrubs may, however, provide only psychological benefits or aesthetic treatment and may not necessarily help in noise abatement. Vegetation, if it is high and dense enough not to be seen through, may help in decreasing traffic noise levels. However, it may usually not be possible to plant enough vegetation along the highway to achieve such reductions.

Studies in Europe have shown that one of the promising approaches to reduce road noise involves the use of rubberized asphalt pavement. Surfacing with Asphalt Rubber Friction Course (ARFC) can achieve considerable noise level reductions of 3–5 dB when compared to traditional asphalt dense-graded surfaces and 6–12 dB compared to concrete surfaces. As the tyre passes over the pavement, it causes a change in air pressure between the tyre and the pavement, which generates sound. ARFC has many air pockets which dampen the air pressure gradient and thus reduce sound. In addition, the ARFC surface provides a smoother riding surface than concrete surface because it is laid in a continuous manner with minimal joints and contains smaller aggregates.

Sometimes, noise reductions may also be obtained by shifting the horizontal alignment, depressing the carriageway, enforcing operation controls on vehicle types, hours of operation, etc.

There are constraints, however, on using these solutions. Usually horizontal alignment cannot be shifted, particularly on roads that are to be improved. In other cases, important natural or man-made features govern the vertical alignment and prevent depression of the carriageway. Controlling traffic could sometimes reduce noise problems, if trucks could be prohibited from certain streets and roads or if they could be restricted to use certain streets and roads only during some fixed hours of the day.

Highway traffic noise could be reduced through a program of shared responsibility. Central and State governments should plan to include noise abatement measures in planning and design of roads. State governments should use their power to regulate land development in such a way that projects of new roads, widening or improvements to existing roads should go through the Environmental Impact Assessment (EIA) process to assess and evaluate their impact on both the existing and planned sensitive uses and to propose and implement practicable mitigation measures to be applied to abate the traffic noise impacts. Public consultations and involvement is also important in noise reduction on highways. Unless improvements are made in noise source control and land use control, noise abatement efforts by highway agencies will produce meagre results at great public cost. This does not mean that highway planners and designers should abandon their noise abatement efforts in the development of highway projects.

R.P. Indoria

(R.P. Indoria)
Secretary General