ABSTRACT

A noise prediction model is needed for creating healthy and noise free environment, thus enabling prediction and investigation of noise level in advance during planning and designing (Brown and Macdonald 2003). A mathematical model for road traffic noise in urban situation making use of grid coordinates in order to measure the noise due to direct propagation, diffraction and deflection was developed (Clayden et al. 1974). Bodsworth and Lawrence have investigated the contribution of heavy vehicles such as trucks and buses on the noise profile of a traffic stream to urban traffic noise by showing a number of heavy vehicles playing a major role in road traffic noise (Bodsworth and Lawrence 1978). A computer model for predicting noise levels generated by urban road traffic under interrupted flow conditions was developed (Radwan and Oldham 1987). Applicability of autoregressive integrated moving averages (ARIMA) modeling, a special class of time series techniques for the development forecast models of road traffic noise was investigated by Kumar and Jain in Delhi city (Kumar and Jain 1999).

Recent studies have shown that more than 20% of the world's population live in unacceptable conditions and a sound level which is over 60% of the population of Europe is exposed to worrying levels of noise during the day, and over 30% during the night. In Romania this percentage is lower due to lower intensities at night and the fact that a large percentage of the population (45%) lives in rural areas where traffic is very low. It is proved that the road traffic noise has a contribution of approximately 80% of all urban noise under present circumstances, becoming an important issue due to land-use planning adapted from the past. Noise in the city often exceeds the threshold of 55 decibels, which is the maximum extent permitted by CPCB.

The main objective of this work is to develop a road traffic noise prediction model for the busy corridors of Chennai. The sub-objectives of this project are as follows:

1. To collect and analyse details relating to the existing noise level in the study area
2. To generate the noise maps using GIS to find out the extent of area affected due to road traffic noise
3. To study the effect of speed and volume on road traffic noise by using regression analysis and GIS
4. To develop 3D model for study area to analyse the vertical and horizontal direction of noise influence.

Noise pollution has always been a problem, but today it has become a major problem. Although there are several sources of noise such as industry, trains, aircraft, motor vehicles, this study focusses on road traffic noise.

Sound Level Meter was used for measuring the equivalent continuous noise level (L_{eq}). All measurements were 'A' weighted.

Measurements of noise levels were carried out in the commercial zones of Chennai City. The noiselevels were used for developing a noise model by multiple linear regression. In addition to it, noise maps for the different locations were generated using Arc GIS version 10.3 and areas affected by noise were determined. 3D noise model was also developed to study the effects of noise on four busiest locations in Chennai city. The results obtained in this study show the city suffering from severe noise pollution due to road traffic. The noise level in first floor is less than that in ground floor when volume and speed are increased. But noise levels increase when traffic volume increases. Similarly increase in speed also results in the increase of noise levels.