NOISE LEVELS AND THE SOURCES OF NOISE POLLUTION IN KARACHI

Pages with reference to book, From 62 To 65

Shabih H. Zaidi (ENT Department, Jinnah Postgraduate Medical Centre, Karachi.)

Abstract

The menace of noise is a by-product of civilization and its hazards are well known. Noise levels were measured in Karachi, at different places and at different times of the night and day, using an Amplaid noise meter. The leq for Karachi came to 80 dB (A), the General Noise Index x (G.N.l.) to 460, and the noise pollution level (N.P.L.) to 99 dB (A). These values are significantly higher ($P<0.01$) than the available international data. The sources of noise production were indentified as, the road traffic, human activity, industrial and civil works, mechanical and engineering workshops. The most noticeable sources of noise pollution in Karachi, are the autorickshaws, trail motor bikes and the fag horns of public transport (JPMA 39:62.1989).

INTRODUCTION

The nuisance value of noise needs no elaboration. It has numerous effects on human beings,[1] affecting their efficiency by playing adversely on their autonomic nervous system, cardiovascular system, and psychae. Exposure to noise can also lead to hyperterision, hyperlipidésis or hyper-proteinemia . However, the most obvious effect of noise is on “Hearing” which has been discussed at length in this article. Karachi is facing a major problem due to excessive noise levels. This study was conducted to establish the noise level in the urban areas of the city, its diurnal variation -and the sources of production. For comparison with other major cities in the world, leq levels, Total Noise Index x(T.N.L) and the General Noise Pollution (G.N.P.) were calculated.

MATERIAL AND METHODS

Four different sites were selected for study namely: M.A. Jinnah Road, Gulshan-e-Iqbal at Civic Centre, the College of Physicians and Surgeons and the Lea Market. The College of Physicians and Surgeons, being situated deep into a residential colony with ample grounds within the boundry walls, enough to eliminate external noise, was taken as control. All recordings were made by the same persons, using an Amplaid noise meter, which has a built-in calibrated condenser microphone. The microphone was guarded by a polyurethane wind screen at the times of recordings, to avoid the effects of wind on recordings. All measurements were made at slow response. “A” weighted sound level measurements which are universally acknowledged[2] as standard notations and were, therefore, used in this study. The measurements were made at 9.00 A.M.
11.00 A.M., 1.00 P.M., 3.00 P.M., 5.00 P14., 7.00 P.M., 9.00 P.M. and midnight. At each site and at each recording, measurements were made at a uniform minimum distance of TO meters from the noise source and the noise meter kept at a uniform height of 1.5 meter from the ground level. At each recording the measurements were made at intervals of 5 minutes and a mean value of ten recordings was taken as a sample. For the second part of this study, i.e., the sources of noise pollution, all areas inundated with traffic noise were visited e.g., mechanical works, building works and offices. Three consecutive days were spent, at two sites, namely Nomaish and at the Civic Centre, counting all the passing vehicles. The intensity of noise produced by each, i.e., buses, trucks, autorickshaws, trait-bikes

and pedestrians were separately measured and carefully recorded.

RESULTS

The diurnal variation of noise level in Karachi is highly significant. The maximum noise-level recorded in the city at the peak rush hour was at Tibet Centre around 5.00 P.M. when it reached an ultimate of 180 dB. In contrast, the lowest level at the quietest spot recorded at 300 A.M. was on main Clifton Road at the coloured fountain which came to 50 dB. There is a noise gradient that one experiences and the variation in the levels are significant. For instance, M.A. Jinnah Road which is the main artery for city transport, the mean levels recorded at different hours of the day were as under: At 9.00 A.M. the noise level at Tibet Centre was between 60-70 dB, at 11.00 A.M. it rose to between 110-120 dB and continued to rise in intensity reaching an unbearable 170-180 dB between 5—7 P.M. By 9.00 P.M. most of the M.A. Jinnah Road south of Tibet Centre was deserted because the shops closed down and the noise level therefore fell to 55-60 dB (Figure I).

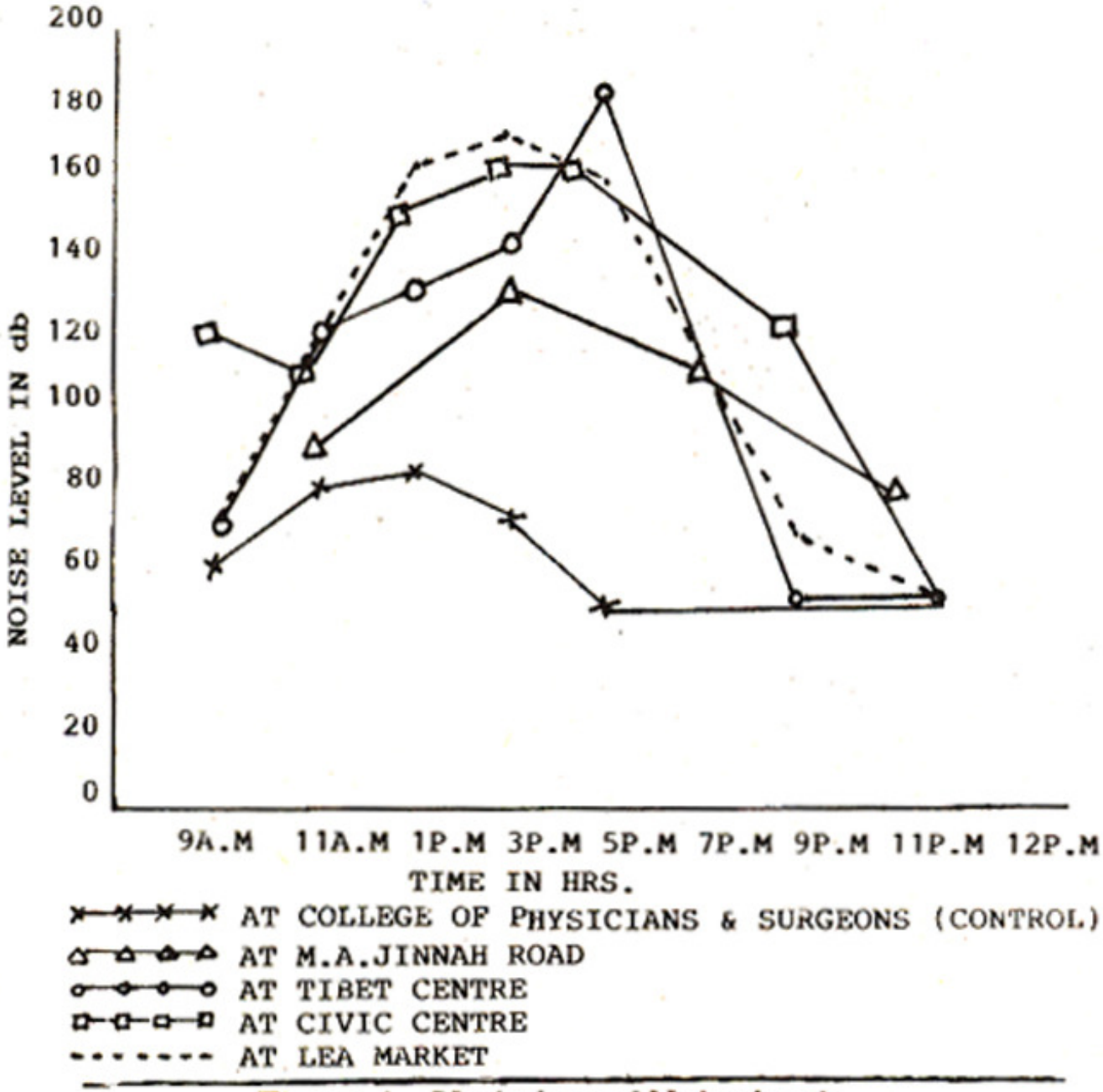

Figure 1. Variation of Noise levels.

The recordings were made at Nomaish, Tibet Centre, Merewether Tower and on Mcleod Road. During the office hours noise levels gradually increased from Nomaish to Tower, and in the after office hours (Figure I). Mcleod Road appeared to be the quietest of roads showing a comparatively low level of 50-60 dB. It means that most of the noise on and in the adjacent areas of M.A. Jinnah Road emanates from the road traffic and the office activities. The noise levels in the Karachi Stock Exchange, were 120-150 dB during the hectic buying and selling hours. Almost identical levels were recorded in the Jodia Bazar, where short bursts of horns made the noise meter needle go berserk dancing between 160-170 dB. In the College of Physicians and Surgeons variation between morning and evening hours were negligible. The peak levels were recorded at about 1.00 P.M. which came to 90 dB and was mostly caused by the movement of students as they finished their lectures and shuffled across the cemented floors and stairs. Otherwise a steady 55-60 dB level was measured in the halls, corridors, museums and library (Figure -I). The Lea Market was chosen for its most disorderly and multifaceted traffic. While at 9.00 A.M. the

levels were 55-65 dB, at 10.00 A.M. it rapidly rose 150-160 dB and kept steadily around that figure throughout most of the afternoon, falling gradually at 530 P.M. At Lea Market (Figure I) the effect of fag horns was also observed, when sudden exposure to that horrendous burst of noise made one jump in the air. It should be interesting to study the effect on pupillaiy activity, the autonomic nervous system, and the C.V.S. in such a situation.

DISCUSSION

The effects and major sources of production of noise have been the subject of study elsewhere in the. world also[3-6]. In Karachi major contributors to noise pollution were as follows: Road Traffic[7] is the major source of noise production in the urban areas. The largest part is played by autorickshaws that ply on the roads without a silencer[8,9] (Figure 2).

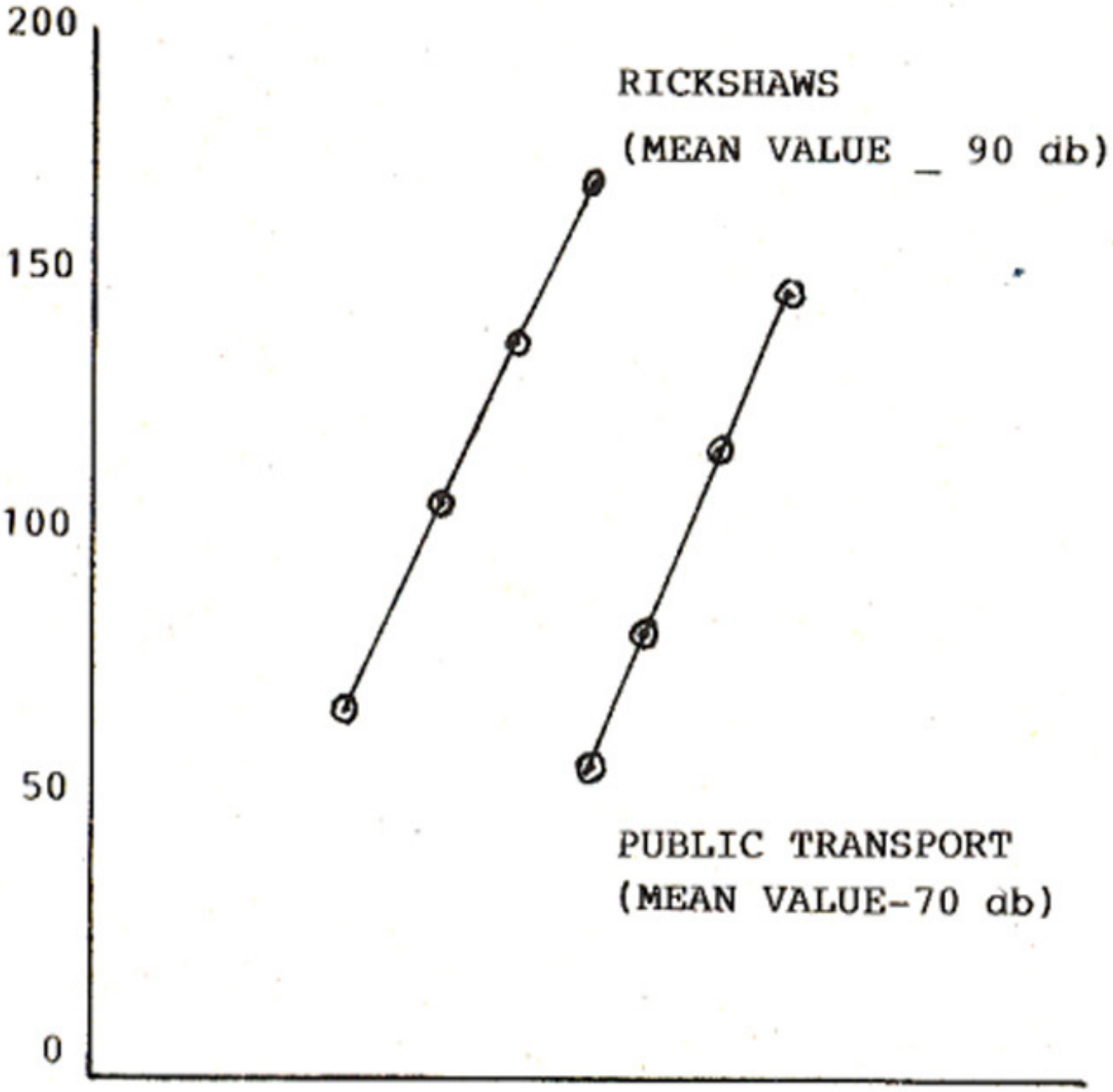

Figure 2. Comparative Values of Noise Producers.

In order to save on fuel cost, rickshaw owners use greater proportion of oil to petrol thus producing the menace of carbon loaded fumes and terrible noise in the range of 100-140 dB. A treatise on the influence of age and sex on hearing threshold. With the advancing age, vulnerability to noise increase in direct proportion. As most of the rickshaw drivers are middle aged, it is a subject for our future study to evaluate their hearing acuity after many years in this occupation. Another source of noise production in Karachi is the horn blowing, a phenomenon which is inexplicable and extremely irritating. A fag horn, produces a noise of 120.130 dB and is a common source of noise pollution in buses and trucks. Of course the commonest source of traffic noise is the moving traffic itself, with the engines reviving

up, unoiled, ungreased, usually worn out, and mostly unmaintained (Figure 3).

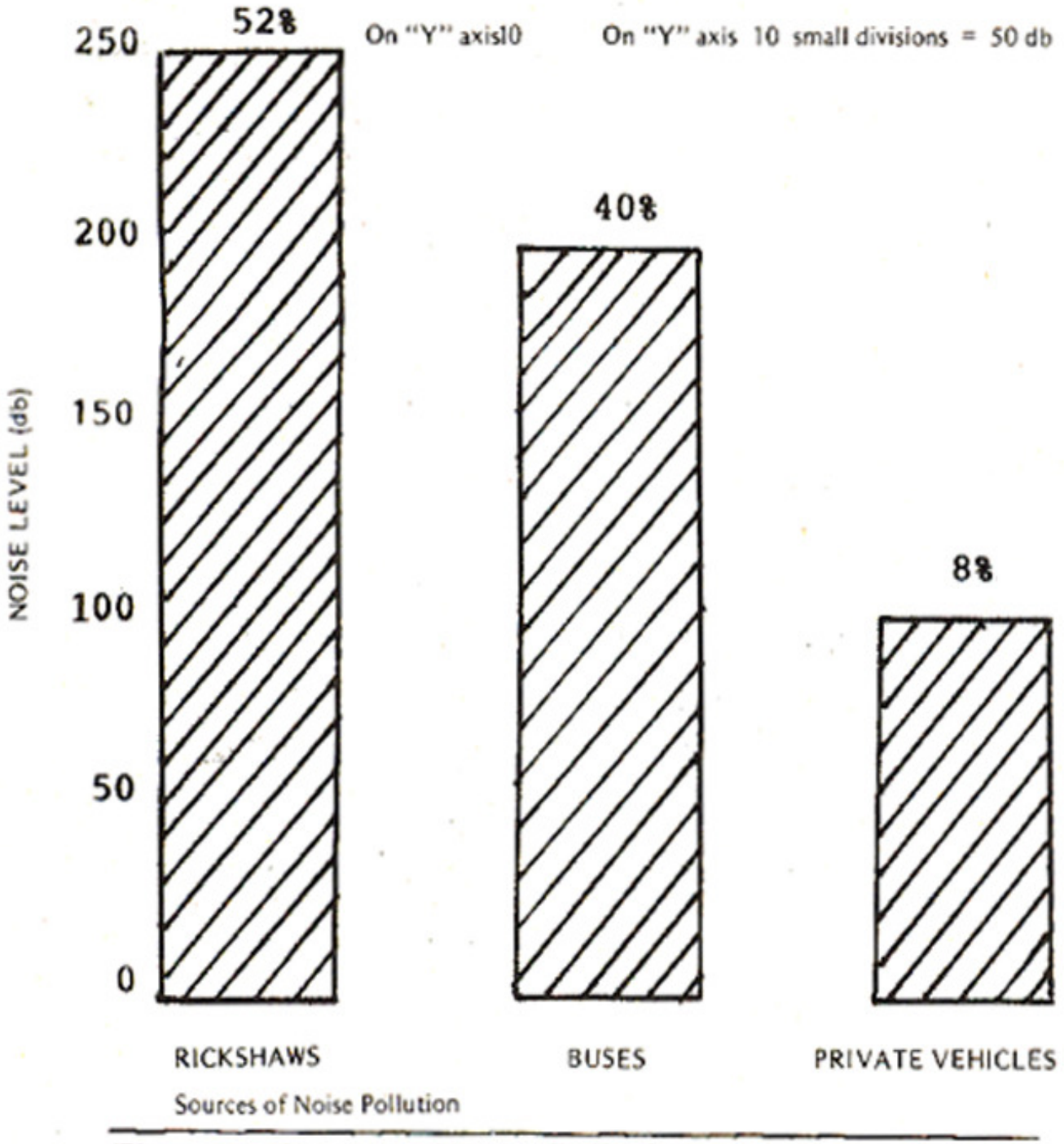

Figure 3. Sources of Noise Pollution.

Yet another means of urban noise in Karachi is the building machinery. At a common office building site, the cement mixer, the noise of the engine used for lifting the mortar to the top, compounded with the calls and shouts of menfolk produced a noise of 140 dB, to which the working force is exposed for 8—12 hrs daily almost throughout the year (Figure 4).

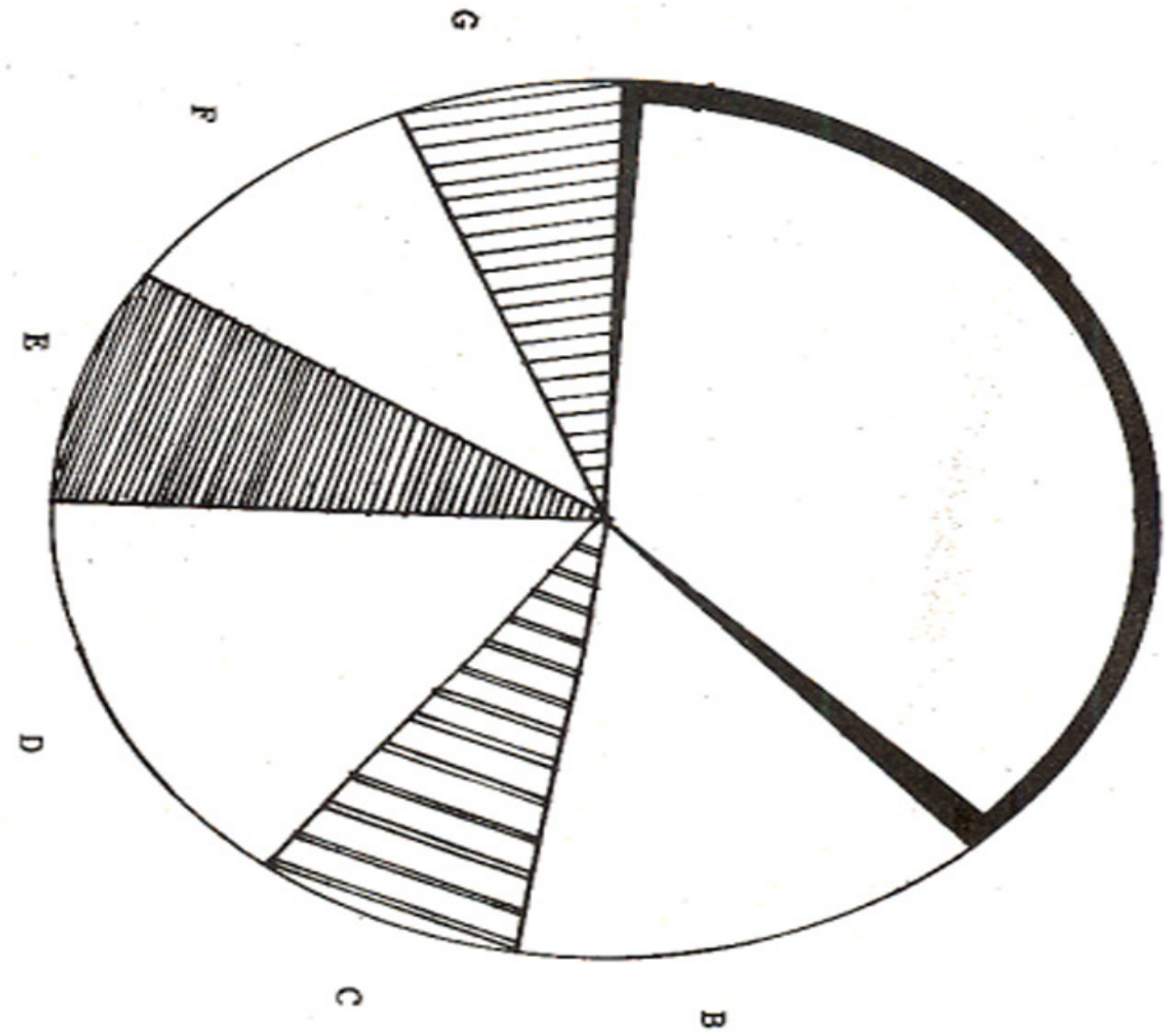

Figure 4. Sources of Noise Pollution.

While air traffic is a major source of noise poilution in the neighbourhood of busy airports like the Heathrow or O'Hare[10] it is not such a significant factor in Karachi, due to comparatively thinner and scattered pollution in the neighbourhood of airport which itself is comparatively less busier. However, occasional sonic boom noticed in the skies of Karachi, when a squadron of fighter planes traverse the

horizon can be extremely damaging, as the shock waves thus generated lead to acute pressure fluctuations in the atmosphere which can be recorded in the typical forms called 'N' waves, [1] having the effect of a thunder and can severely damage the susceptible ear. It has been estimated that a sonic boom can be heard over more than 50 K.M. on either side of the flight path, and can be quite menacing to the population in terms of hearing, annoyance, irritability, sleeplessness[10,11], In an office, apart from the noise produced by human communication the levels of which were measured during the study to as high as 80 dB another source of humming noise was the sound and vibration produced by the airconditioning plarts and improperly functioning tube lights. In a modern International Banking headquarter in Karachi such noise was found to be 60-70 dB during office hours and had produced tinnitus in a few employees. The source of this noise being innumerable tube lights and the humming of air conditioning plant. Amongst the occupational sources of noise, there are two exemplary sources namely the steel mills and the Karachi Shipyard. At the furnace operating plant the noise level was measured to be as high as 160-180 dB and human communication was impossible(Figure 4). At the shipbreaking and building sites the noise was upto 150 dB almost intolerable for more than a few minutes. Recent research and analysis of most of the available data indicates that the noise levels must be below 60 dB to assure the safety of cochlea[12]. In fact according to the Federal Registrar of USA for noise pollution, [11] it is mandatory that noise mufflers, or ear protecting device must be used at a level of 85 dB if exposed on 8 hourly basis. This warning gets stricter for over 90 dB, the exposure time is halved for every increase of 5 dB. Infact according to the report of WHO[1], a safe level of hearing would be an Leq of 70 dB (A) averaged over a 24 hours period, in Karachi this level came to 80 dB (A). Therefore, it is hardly surprising to see so many people with impaired hearing. No figures are available for occupational loss in factories, but this study indicates that the general environmental noise in Karachi is 99 dB which means that the noise levels measured at Leq in dB (A) at potential sources of noise/ production in textiles, steel works, cement factories, shipyard, etc should be considerably higher, thus accounting for a vast 'at risk' population.

ACKNOWLEDGEMENT

The author is grateful to Dr. Shamim Azam and Dr. Tariq Siddiqui.

REFERENCES

1. World Health organization Noise (Environmental Health Criteria 12). Geneva, WHO, 1980.
2. I.S.O. (Organization for International Standardization), Acoustic assessment of noise with respect to community response, 1971.
3. Ward, W.D. and Nelson, J. Effects of noise on hearing threshold. ASHA report, 1969; 4:40.
4. Miler, J:D. Effects of noise on people. J. Acoust. Soc. Ant., 1974;56:729.
5. Ward, D.W. General auditory effects of noise: Otolaryngol. Clin. North Am., 1979; 20: 473.
6. Singh, A-P. et al. Effects of chronic and acute exposure of noise, on physiological function in man. Int. Arch. Occup. Environ. Health, 1985;3: 132.
7. Shaikh, Gil., Rizvi, S. S. H. et a!. Traffic noise in Karachi. Pakistan J. Sci. Ind. Res., 1987; 30:197.
8. Nanji, B. Noise pollution. Letter to the Editor, Daily Dawn, 6 December,1987.
9. Chotani, A.H. Air, noise pollution. Letter to the Editor, Daily Dawn, Wed. 6 May, 1987.
10. Warren, C.H.E. The sonic boom generation and proportion. J. Sound Vib., 1972; 20:485.
11. Health and Welfare Canada Noise Hazard and control. Ottawa, Department of National Health and Welfare, 1979, p.97 (Report No. 79-EHD-29).
12. Schimdak, M., Margolis, B. and Handerson, T.L. Effects of the level of noise interruption on

temporary threshold shift. Am. Ind. Hyg. Assoc.J., 1975;5:351.