

LEGAL ASPECTS OF NOISE POLLUTION WITH
PARTICULAR REFERENCE TO INDIA

A dissertation submitted in partial fulfilment
of the requirements for the Degree of Master
of Philosophy

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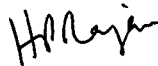
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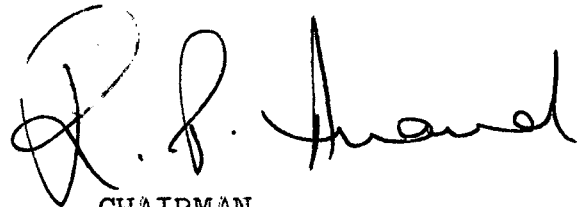
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CERTIFICATE

This dissertation entitled "Legal Aspects of Noise Pollution With Particular Reference to India", by Meraj Khayyam for the Degree of Master of Philosophy has not been previously submitted for any other degree of this or any other University. We recommend that this dissertation should be placed before the examiners for the consideration for the award of the Degree of Master of Philosophy.



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A_C_K_N_O_W_L_E_D_G_E_M_E_N_T

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(MERAJ KHAYYAM)

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CHAPTER I

CHAPTER I

MEANING AND CONCEPT OF NOISE POLLUTION

The post world war period witnessed rapid scientific and technological advancement. This resulted in industrial development in many parts of the world. This, on ^{the} one hand, brought about changes in the style of living of the people and on the other, generated few more problems. Noise pollution is one such problem which is a part of environmental pollution. Noise pollution entails disastrous effects on human health and behaviour. Therefore, of late, it has drawn significant attention of many scientists as well as legal experts.

Noise, in general terms, is defined as unwanted sound which causes undesired psychological and physiological effects on individuals. Noise interferes with the activities and social ends of an individual or group, such as communication, work, rest, recreation and sleep.¹ Noise is defined by scientists as well as other environmentalists in different ways.

Noise can be defined as:

"the displeasure or resentment caused by sound, either by its physical presence or because of implications arising out of its presence".²

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1. Edward H. Rabin and Mortimer D. Schwartz, The Pollution Crisis (New York, 1976), p. 387.
 2. Michael Bryan and William Tempest, "Cause for Concern: Noise Pollution of the Work Environment", International Journal of Environmental Studies, (Exeter, England), Vol. 1, (1971), p. 102.

Noise, in the eyes of physicists, can scientifically be defined as:

"a type of sound in which the components of different frequencies are very numerous and not harmonically related to one another".³

Thus, physicists have, within the perception of noise, in addition to the usual definition of unwanted sound, random electrical or acoustic disturbances. Acoustic noise is, sound with a continuous spectrum, that is, with a very great number of frequencies so close together that they are not easily distinguishable as separate entities.⁴

Encyclopædia of Environmental Science and Engineering has given a somewhat specific definition of noise as:

"Unwanted sound, the degree of likeliness or dislikeliness depends on the presence of a receiver of the noise. The noise pollution involves scientific and engineering aspects of noise generation, propagation, scattering, and absorption, as well as the psychological effects of noisiness and annoyance, physiological effects such as hearing impairment, social considerations, economic considerations, and legal considerations".⁵

According to this definition, the criteria, for declaring a particular sound to be noise, are subjective. The individual's reaction towards a noise determines its nature. Sound is a

3. William Burns, Noise and Man (London, 1968), p. 31.

4. Ibid.

5. Encyclopaedia of Environmental Science and Engineering (New York, 1976), Vol. 2, p. 601.

broader term than noise, since it embraces all the hearing sensation that is detected by ears, whereas noise refers only to sound that is objectionable, harmful and possibly loud.⁶ The sounds which make up noise consist of pressure waves in air. Man is able to tolerate some noise within certain limits without conscious efforts and carry on his normal activities. However, this tolerance is not unlimited.

Noise has become one of the scourges of the modern world. It is an unwanted byproduct of our technological civilization and is becoming increasingly disturbing and dangerous environmental pollutant. There is a growing public awareness and some progress in the fight against air and water pollution, but noise pollution has only recently begun to gain attention. With the increase in the number of motor vehicles, increasing use of diesel engines, introduction of turbo-jet engines in the commercial aircrafts and the advent of supersonic transport, have created a more critical public attitude towards noise in general and has also drawn attention to other sources of unwanted sound which were previously tolerated.

It is important to note that sound is measured in decibels (dB), a scale that increases logarithmically.⁷ Zero

6. James L. Hilderbrand, "Noise Pollution : An Introduction to the Problem and an Outline for Future Legal Research", Columbia Law Review, (New York), Vol. 70:652, 1970, p. 659.

7. The decibel is a unit measure of sound intensity and is calculated from the level at which sound becomes audible to the human ear. One decibel represents the lowest audible sound and each additional decibel represents a tenfold increase in volume. For a discussion

decibel is the lowest level of sound that a young, healthy human ear can detect. A rise of ten decibels is perceived by the human ear as a doubling of loudness. Studies have shown that hearing loss will occur in 20 to 25 per cent of workers exposed to the allowable limit of 90 dB for eight hours a day. A level of 140 dB may be extremely painful to the ear.⁸ Repeated exposure to loud noise destroys the delicate hair-cells in the organ of corti, a part of the cochlea in the inner ear. These cells are responsible for picking up sound - induced pressure waves and transmitting them to nerve cells which in turn carry them to the brain.⁹

Samuel Rosen has stated:

"At an unaccepted or unwanted noise, the pupils dilate, skin, pales, mucus membranes dry; there are intestinal spasms and the adrenal explode secretions".¹⁰

In recent years noise pollution has become a matter of serious concern and is not just confined to highly developed countries alone but is assuming world-wide proportions. The generation of public interest has its motivation in the fact that effects on senses, psychology and health have been rather

of the physical properties and the measurement of sound. See William Burns, n. 3, pp. 10-51. A. Bell, Noise : An Occupational Hazard and Public Nuisance (Geneva, 1966), pp. 58-61.

8. Jane E. Brody, "The Harmful Effects of Noise", The Times of India (New Delhi), 23 November 1982, p.17.

9. William Burns, n. 4, pp. 56-69. See also Rabin and Schwartz, n. 2, p. 409.

10. Hildebrand, n. 7, p. 653.

serious. It is realised that there is something radically wrong with the relationship between technology and assault on our natural resources. Apparently, it seems that the noise pollution is not due to lack of adequate technology, but due to the very success of it.

The problems of noise are not necessarily identical in developed and developing countries. The developing countries have been blamed by many as the sole responsible for creating noise pollution, whereas, the developed countries are experiencing higher noise level than that of the developing countries.¹¹ A Japanese survey, last year, of 4500 students revealed unexplained hearing difficulties in 29, 21 of who were described as head-phone addicts. These 21 students listened to stereo head phones for more than 24 hours a week at volumes averaged 88 dB, the approximate noise level of rush-hour traffic.¹² The explosive rise of noisy equipments in and out of American homes - ranging from snow-mobiles, rock bands, and chain shows to hair dryers, food processors, and stereo head phones - have made nearly every American potentially vulnerable to noise damage.¹³ The Environmental Protection Agency estimated in 1978 that

11. R.P. Anand, "Development and Environment", Indian Journal of International Law (New Delhi), Vol. 20, pp. 8-9.

12. Brody, n. 8, p. 17.

13. Lucy Kavalier, Noise : The New Menace (New York, 1975), pp. 22, 85 and 115.

10 million Americans are exposed to harmful levels of noise off the job.¹⁴ In other developed countries too, the problem is as acute as, if not more than, that of Japan and America. There have been vigorous implementation of some preventive measures in some of the developed countries to reduce the level of noise pollution. As these countries are industrialised and developed, there is the need of regulated industrialisation with a view to decreasing environmental pollution in general and noise pollution in particular.

On the other hand, for the developing countries, the need for development is more than the need for controlling noise pollution. Even the most zealous environmentalist must admit that a poor country will give a higher priority to aspects of his own material well-being than to the preservation or conservation of this surrounding environment. Therefore, most of the developing countries who are presently fighting against poverty, hunger, unemployment and population problems, have not given due emphasis to noise pollution, which presently nowhere figures in their priority list.¹⁵ Only those developing countries, who are industrially more developed and economically better off than that of the majority of the developing countries, have started considering this problem to some extent.

Before dealing with the measures to check noise pollution, it is important to know the causes or sources of noise.

14. Brody, n. 8, p. 17.

15. "Founex Report" (reprinted in Annex 1 to U.N. Doc. A/CONF.48/10, 22 December, 1971), pp. 3-9.

The sources of noise pollution are the gifts of modern science and technology. We can broadly classify these sources into five categories:

1. Industrial or Occupational noise;
2. Aircraft noise;
3. Traffic noise;
4. Construction noise;
5. House-hold noise.

Industrial noise is the highest noise emitting source, which adversely affects man, animals, birds, buildings and structures. Since the industrial revolution, the western nations have been most exposed to such hazards. Noise levels, sufficient to inflict some degree of hearing loss, earlier confined to industrial countries only, are now proliferating on city streets. In developing nations also, due to industrial expansion, noise level is quite high, particularly in the industrial belts. Most of the developing countries are keen on rapid industrial growth and they are persuing it, at the cost of comparatively higher noise exposure to their people.

Another factor of noise emission is aircraft. With the application of jet engines into commercial aircrafts, our environment has become more noisy. Airborne traffic has received a sudden momentum especially in the last 25 years. Every country has put multiple number of jet planes of bigger size to internal as well as international routes, connecting maximum points in different countries. In the vicinity of

the airports and in the areas where low flights are made during take-offs and landings, people are hard hit by the aircraft noise.

There have been increase in the road traffic almost all over the world. This has necessitated the construction of broader highways, thereby helping the vehicles to increase their speed. The increase in population, economic and technological developments have also resulted in the increase in the number of vehicles. The noise of engine, tyres and horns of vehicles have brought noise level to an alarming proportion.

Another peculiar characteristic of big cities is the continuous and rising pace of construction works. Round-the-clock construction of new buildings and demolition of the old ones emit much noise to disturb human health and mind.

Lastly, the use of household equipments such as air-conditioner, radio, television, fans, kitchen equipments, etc., have also been responsible for the noise emission. However, this has been a more important source of noise emission in developed countries only.

Besides, playgrounds, various recreation centres and firing ranges are also the additional sources of noise. The use of loudspeakers in festivals and marriage ceremonies has been a common practice at many places which is also a source of noise pollution.

In the background of all these sources of noise emission, population explosion remains the root-cause. With the increase

of population, there has been a corresponding increase in the need of resource exploitation so as to meet the needs of the increased population. There is a rise in standard of living: - more per capita transportation, more per capita energy usage, more per capita industrial production, and so on and so forth. Each of these factors has led to more noise pollution. For instance, the United States of America has less than 6 per cent of world population but it consumes about one-third the energy and 20 to 50 per cent of many other natural resources used in the world. Although the U.S.A. has abundant natural resources, the pressure of population growth, increased consumption and new technology have strained the supply of these resources and brought about the realisation that 'there are limits to growth'. Rather than strive to live within these limits, the U.S.A. has increased its imports of natural resources.¹⁶

To be very specific, the problem of noise pollution today is quite different from that of yesterday. Large cities today have become centres for scientific and technological activities. Beside this, there is more and more concentration of population and mobility of goods and people in these areas. The induction of labour-saving devices in modern homes also contributes to the increase in noise pollution.

16. Laurent Hodges, Environmental Pollution (New York, 1973), edn. 2, pp. 34-40.

In order to counter noise pollution, different countries as well as international agencies have been taking certain measures. Some industrialised and developed countries have promulgated noise control ordinances after having conducted scientific investigations on noise levels, its sources and on its impacts. These legislations provide the protective measures restricting the industrial expansion within certain codes of conduct. Some of these countries also have taken measures to replace obsolete machineries and equipments emitting more noise, with comparatively quieter ones. There have also been regulations to control the speed, and number of vehicles. Construction equipments, at certain places, also have come under regulations made for controlling noise pollution.

Paradoxically, however, the third world countries, that is, Afro-Asian and Latin American Countries, are making a hard and difficult struggle to overcome their socio-economic problems. The leaders of the third world countries foresee rapid industrialisation and economic development as the panacea for many of their problems they are struggling against.¹⁷ In these nations, the Commission to Study the Organisation of Peace recently observed:-

17. J.P. Raval, "Industries' Involvement in Environmental Problems", Environmental Pollution and Urban Administration : Seminar Proceedings (New Delhi : Indian Institute of Public Administration, 1977), pp. 26-27.

"Anxiety over unbalancing or even destroying the eco-system cannot supersede the immediate demand for food and shelter or the dissatisfaction with endless drudgery, isolation and sickness. Urban congestion, smog and noise count little to a man in relentless search of his next meal, a dry place to sleep and work that will bring him and his family a few amenities".¹⁸

The need for controlling noise pollution is obvious and very important. Now the full-scale participation of every section of our society is a must for controlling noise hazard, since noise has attained a completely changed concept with the developmental pattern of the society. A balanced appreciation of the situation in its proper perspective by all the participating disciplines in the developed as well as the developing countries is necessary, for an effective and meaningful control of noise pollution.

18. Commission to Study the Organisation of Peace, The United Nations and the Human Environment : Twenty-Second Report (New York, 1972), p. 23.

CHAPTER II

CHAPTER II

SOURCES AND EFFECTS OF NOISE POLLUTION

I. SOURCES OF NOISE POLLUTION:

With the rapid pace of industrialisation and technological advancement, the sources of noise pollution have also become infinite in number and diversity. Broadly, we can categorise the sources of noise pollution into four parts:-

1. Industry and Construction;
2. Transportation (Road and Rail traffic);
3. Aircraft and airport; and
4. Household appliances.

A detailed elaboration of each of these sources, is taken up below:

I.1 Industry and Construction Noise:

Occupational and industrial noise is very old and can be experienced back to the days of the Babylonian Empire and to the construction of great Ziggurates (Tower of Babel). Since then certain industries and occupations have been considered noisy enough to impair the workers' hearing capacity. Today many countries have recognised excessive occupational noise as the cause for occupational disease and financial compensation depending on the degree of hearing impairment is granted. In the United states of America, a test was conducted with 55-year-old persons which revealed that non-noisy occupations have rendered 22 per cent of them acoustically impaired, whereas incidences of hearing depreciation

is 46 per cent when they work in noisy environments. A Swedish survey made sometime ago among industrial workers in the age group of 15-20 showed that in 1970 the proportion of those with hearing troubles due to noise was 19.5 per cent as against only 9 per cent in 1950. In U.S.A., compensation claims against hearing loss on occupations are met by the Government at a staggering level of \$ 2 million a year, while it is estimated that 4.5 million American workers who do not file claims might win them if they would.¹ In September, 1968, the Federal Council for Science and Technology issued a report, estimating the U.S. workers experiencing noise conditions unsafe for hearing, to be in excess of 6 million and perhaps as high as 16 million.² A survey by the All India Institute of Medical Sciences of industries around Delhi revealed that 65 per cent of the worksites had noise levels of 90 to 100 dB. The average noise recorded in the industries was 109 dB, the highest i.e. 120 dB is recorded near compressors and generators. In a factory employing over 5,000 workers in Delhi, only 2 per cent workers were exposed to 80 dB, 3.5 per cent were exposed to 80-90 dB and 4,750 workers to over 90 dB.³

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1. James L. Hildebrand, "Noise Pollution : An Introduction to the Problem and an Outline for Future Legal Research", Colombia Law Review (New York), Vol. 70: 652, no. 4, April, 1970, p. 669.
 2. Edward H. Rabin and Mortimer D. Schwartz, ed., The Pollution Crisis (New York, 1976), p. 445.
 3. Usha Rai, "Making a Noise about Noise", Depthnews India, 5 June 1979, p. 2.

According to the observation of a leading acoustical Engineer, Dr. Leo L. Beranek, a man of 30 exposed to work environment with an average noise level of 90 dB for periods as short as 10 years probably can hear no better than men in their 60s and 70s who have worked in a quite environment.⁴ The danger level for most individuals is somewhere between 80 to 85 decibels. Industrial noise is also a source of annoyance for the general community. Mayor John Lindsay of New York city has been quoted as saying:

"This city has an obligation to protect its citizens against all forms of violence, including assault by decibels..... In a modern industrial civilization, I suppose we have to be prepared to tolerate some increase in the sound level, but I see no reason why this city or its people should have to put up with battering shattering noises".⁵

This statement is true for all urban areas now-a-days. In the industries like steel foundaries, Steel rolling mills, knitting and weaving plants, boiler factories, paper mills, sawmills, and aircraft factories, noise level is intense in the working environments there. Due to the location of older residential housing near industrial sites, many non-workers are also victims of high noise levels polluting the surrounding environment.

Construction equipments are also a major source of noise emission. Construction equipments include many types

4. Hildebrand, n. 1, pp. 669-70.

5. Ibid., p. 671.

of machines and devices, varying in size, horsepower-rating, and principles of operation. Equipments powered by Internal Combustion Engines generally provide pollution to the wheels or tracks and/or operating power for the working mechanisms such as buckets, dozers, etc. Exhaust noise is the most important component of engine noise in internal combustion engines; however, noise from the intake - cooling fans, and mechanical and hydraulic transmission and control systems also contribute much.⁶ Others are the impact equipments used for construction work. They include pile drivers, payment breakers, tampers, rock drillers etc. In these equipments engine is the main source of emitting noise.

I.2 Transportation (Road and Rail Traffic):

Traffic noise is the only source of noise which affects most people in the world. Inter-city expressways connecting cities and towns thousands of miles apart, bring the din of the city to the countryside.

Highway noise is the collective contribution of noise produced by trucks, buses, motorcycles, sport cars, and passenger cars with load or faulty mufflers. Noise emission by truck on highway depends on its propulsion system and tyres, propulsion system includes engine, exhaust, intake-fan and other auxiliary equipments in engine compartment. Tyre noise results from interaction of tyres with road surface. It is due to combination of carcass vibration and entrappings

6. Ibid., p. 672.

and subsequent release of air from the tread cavities. Therefore, sound levels are related to the vehicle speed and is approximately 10 to 12 dB(A) for doubling of speed.⁷

Other automobiles like motorcycles, cars, etc., differ from that of trucks in magnitude and spectrum. Here also propulsion of engines and tyres are the noise emitting sources but sound emission differs in engine speed rather than in vehicle speed.

In the rail traffic, rail cars, locomotives, freight classification yards, and construction and maintenance equipments, are the main contributors of noise. Major noise sources are wheel-rail noise and propulsion system from rail cars and locomotives.

Different countries have different levels of traffic noises. The quantum of traffic noise in the Soviet Union cities is upto 95 dB under normal traffic conditions.⁸ Russian drivers keep on racing their vehicles' engines quite frequently at intersections to heat them up in winter season. These vehicles when first built were equipped with poor mufflers, thus emitting intensive noise. In Japan, the roar of traffic (auto) has exaggrated the noise level upto 68 dB.⁹

7. Laurent Hodges, Environmental Pollution (New York, 1977), edn. 2, p. 152.

8. Donald R. Kelley, Kenneth R. Stunkel and Richard R. Wescott, The Economic Superpowers and the Environment (San Francisco, Calif., 1976), p. 105.

9. Ibid., p. 106-7.

In U.S.A. also, traffic noise has reached to an alarming level varying between 70 and 90 dB.¹⁰

I.3 Aircraft Noise:

The noise emitted from jet aircraft and the airport is much irritating to the inhabitants near the airports. Turbo-jet engines affect propulsion through acceleration of air masses. In centrifugal mechanical compressor, gas is heated in a combustion chamber and then accelerated by expansion through a jet nozzle. A gas turbine in the path of the expanding gas serves solely to drive the compressor. These processes produce three types of noise:¹¹

- (a) Inlet noise radiated from the air intake, primarily as a result of compressor noise plus aerodynamic noise;
- (b) Noise radiated from vibrations of the shell of the engine;
- (c) Exhaust noise.

A low-flying jet affects persons on the ground with approximately 115 dB of noise intensity.¹² The airport noise is produced from two sources: (a) from flights operation; and (b) from ground operations. In an airport, the noises which are combined from the operation of different aircrafts combine to act as a complex noise source - complex not only because different aircrafts having different power spectra

10. Ibid., p. 104.

11. Cyril M. Harris, ed., Handbook of Noise Control (New York, 1979), edn. 2, pp. 34-1 to 34-4.

12. Kelley, Stunkel and Wescott, n. 8, p. 104.

and different times of operation are involved, but also because these individual noise sources are scattered over a wide area and many are in motion.

In Japan, the aircraft noise contribution in the total noise nuisances is 23 per cent.¹³ In the U.S.S.R. aircraft noise is not so disturbing comparatively since the airports are located much farther from the city centres. In the U.S.A., the dangerous level of 115-120 dB noise on take-offs has provoked complaints and lawsuits.¹⁴

The effects of sonic boom are clear to the public and severe complaints against its source are being raised, yet booms will be a part of the next generation of supersonic aircraft. Supersonic speed of aircraft means the speed is faster than the speed of sound. This produces pressure or shock waves around the nose and around protruding parts of the plane, much like the waves created by a rapidly moving ship. A cone is formed by these shock waves. The cone encircles and follows the aircraft and intersects with the earth. "As the line of intersection with the earth advances with the movement of the airplane, people living within the width of the intersecting path usually hear two closed-spaced explosive sounds, known as the

13. Ibid., p. 107.

14. Ibid., p. 104.

'Sonic-Boom' " Sonic booms are measured upto the peak levels of 130 dB per boom.¹⁵ It is estimated that a single supersonic transport (SST) flying across a nation will create a 50 to 80 miles wide boom-carpet or "bang-zone" behind it that could startle as many as 20 million people.¹⁶

Sonic booms have exerted damaging effects on the buildings and structures.

I.4 Household Noise & Community Noise:

Modern homes of industrialised countries are equipped with several mechanical gadgets unlike in the developing countries. Consequently, household noise in developed countries has frequently been realised as a disturbing factor and requires attention. The noisiest area of a modern home is the kitchen. It is generally equipped with a number of noise-producing gadgets. An electric blender can produce 98 dB of noise. The simultaneous operation of the exhaust fan, the dishwasher, and the garbage disposer can produce noise to the tune of 100 dB.¹⁷

The household roar is multiplied not only by increasing the number of appliances like air-conditioner, television, exhaust fans, etc., but also by increasing the capacity of their power sources. Another rapid increase in power size

15. David M. Lipscomb, Noise : The Unwanted Sounds (Chicago, 111., 1974), pp. 158-9.

16. Hildebrand, n. 1, p. 681.

17. Ibid., p. 666.

is undergone in music reproduction. A stereo amplifier for home use will generally produce 120 watts or 60 watts of audio-power per channel. The advantage is the momentary peak attainment without distortion of sound.¹⁸

Outdoor noise like that of traffic noise, aircraft noise, community noise etc., reaches inside the dwellings and interferes with the conversation inside. Alongwith this, certain other community noises resulting by the misuse of loudspeakers in odd hours of the day and night or on occasions of marriage, religious ceremonies, political conglomeration, etc. This is a major source of noise pollution particularly in the developing countries where people are mostly traditional.

The problem with indoor noise relates not only to the use of specific appliances but also to the annoyance that sound causes to other persons inhabiting the building. Mostly the houses are not "sound-insulated". One cannot avoid the outside neighbouring noises penetrating into the rooms. The outdoor disturbing sound is that of traffic and aircraft, which is the continuous phenomenon, especially in the urban residential centres. In most of the cities in these developing countries, due to the exploding population rate, residential areas are merged with the industrial areas. Roars and vibrations of the machines in close vicinity add up with the community noises. Cultural and religious celebrations like marriages and festivals with increasing use of loudspeakers make the community life of a thickly populated area, particularly in urban centres, extremely

18. Ibid., p. 667.

strenuous. In the residential centres, coming in the range of overflights and exposure to airports, noise-level becomes painful inside the dwellings. Air traffic also doubles every five years with the doubling of noise-emission. Road traffic exposure to the houses near highways or city subways is also increasing every seven years with the same increase in road traffic horsepower. Use of a large variety of machines and appliances in homes, offices and hospitals have been inflicting a continuous noise-induced harm.

All over the world, it has keenly been observed that it is the population explosion which has been the root-cause of increase in human activities. Human activities are more vigorously directed towards exploration and exploitation of finite material resources for the fulfilment of ever-increasing human needs. This has resulted in the environmental pollution, particularly noise pollution.

II. EFFECTS OF NOISE:

Like other pollutants of the earth's eco-system, noise produces diversified adverse effects and these effects are inter-related.¹⁹ Apart from affecting human beings, noise

19. Ibid., p. 665.

Whenever one experiences noise pollution, there invariably will be air and water pollution. The construction and expansion of big airports enhances not only pollution from jet sound, but also pollution from jet contrails and from the attendant on ground sewage and industrial waste. It was estimated that the proposed Everglade jetport would have added 9,000 to 72,800 tons of carbon monoxide, 4,150 to 6,000 tons of nitrogen oxides, 15,000 to 40,250 tons of hydrocarbons, 1,000 tons of aldehydes and 1,260 to 3,250 tons of particulate to the surrounding atmosphere when it reached the projected operational level of 9,00,000 flights a year.

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affects the environment which includes land, structures, domestic animals and the general eco-system of the earth. Obviously, there cannot be objective measures of the effects of noise, since not only that human-beings have the capacity to adapt but also the capacity of adaptation may vary from environment to environment. Only subjective measures of the effects of noise, hence, can be assessed. The adverse effects of noise can be studied under three broad heads:

1. Physiological effects, which include loss of hearing, occupational deafness, and many noise-induced diseases.
2. Psychological and behavioural effects, which includes annoyance, speech interference, fatigue, psychosomatic disorders, tension-related diseases, sleep interference and mental illness.
3. Sociological effects, which includes effects of noise on human groups and communities.

A detailed study of the aforementioned effects is essential to the adequate understanding of the evils of noise-pollution, which will form the basis of any legal considerations to control and reduce it.

II.1 Physiological Effects of Noise:

The most important direct physiological effects are auditory and inasking effects. Another direct response to noise is startle reaction. Specific auditory responses and non-specific non-auditory responses are also the physiological

effects of noise hazards, for instance, impairment of hearing acuity with age (Presbycusis), effects on cardiovascular and respiratory system, effects on the eye, galvanic skin responses, changes in the blood and other body fluids due to noise, effects on the nervous system, constriction of blood vessels amounting to increased blood pressure, tension in the muscles, increase in the rate of perspiration, kidneys become more active, liver function changes measurably and changes in the brain chemistry have been observed experimentally.²⁰

These are examined below:

(a) Auditory Effects:

The most severe and noticeable effect of noise exposure is temporary or permanent loss of hearing.

Before discussing it in detail, it is necessary to differentiate between hearing level, noise induced threshold shift (NITS), and hearing impairment.

'Hearing level' means the audiometric threshold level of an individual or group in relation to an accepted audiometric standard and is sometimes called - "hearing loss".²¹ Noise induced threshold shift is the quantity of hearing loss attributable to noise alone, after values for presbycusis have

20. Rabin and Schwartz, n. 2, pp. 404-5 and 424-9. See also Patrick F. Cunniff, Noise - Environmental Pollution (New York, 1977), p. 100. See also Alan Bell, An Occupational Hazard and Public Nuisance (Geneva, 1966), pp. 259-61.

21. William Burns, Noise and Man (London, 1968), p. 78.

been deducted.²² Hearing impairment - is generally the hearing level at which individuals start experiencing difficulty in understanding speech.²³ Hearing impairment is defined in the U.S.A. as an arithmetic average of 26 dB or more hearing loss at the frequencies 0.5, 1 and 2 KH Z for 40 years exposure on an 8 hour daily basis.²⁴ Another term which requires explanation is 'Noise-induced temporary threshold shift (NITTS)'. After being exposed to a very noisy environment a person may experience a measurable - hearing loss in sensitivity. But hearing sensitivity is recorded within minutes, hours or days after the termination of the noise.

22. Ibid., pp.134 and 280. Noise induced threshold shift may also be defined as the deviation in decibels, of a measured hearing level from the one previously established.

23. Ibid., p. 272. See also Environmental Health Criteria 12, Noise, (Geneva : World Health Organisation, 1980), p. 33. There are several types of deafness:(1) nerve deafness sometimes called inner ear perceptible or neuro sensory deafness in which noise is the common cause; (2) Conductive hearing loss in which there is interference with the conduction of sound to the inner ear; (3) additive or mixed hearing losses due to a combination of both the above; and (4) functional deafness which is due to psychological factors or to malingering

24. Richard K. Miller, Handbook of Industrial Noise Management (Georgia, 1976), pp. 71-72.

This phenomenon is known as noise-induced temporary threshold shift.²⁵

(b) Noise Induced Permanent Threshold Shift:

The maximum loss occurred due to noise-induced permanent threshold shift is at about 4,000 HZ.²⁶ The rate and extent of loss depends on the severity and duration of the noise exposure, individual susceptibility and the effect on the rate of progression. It might be pointed out that losses due to aging and noise induced losses are similar and difficult to distinguish.

In the early stages, generally, noise-induced hearing loss is not recognised, because they do not impair speech communication ability. Therefore, neither the subjective loudness, nor the extent to which noise causes discomfort, annoyance and interference with human activity are reliable indicators of its potential danger to the hearing mechanism.²⁷ Recent investigations reveal that the relationship between NITTS and NIPTS is very uncertain and damage risk criteria should be based in epidemiological rather than on NITTS data.²⁸

The ear, which is the auditory organ of the body, does not have an 'off' or 'on' switch. Therefore, it cannot be

25. Rabin and Schwartz, n. 2, p. 409.

26. Environmental Health Criteria 12, Noise, n.23, p. 34.

27. Bell, n. 20, pp. 28-29.

28. Ibid., p. 29.

a deliberate operating or stopping mechanism. We are, thus, continuously exposed to the sound around us. It has been unanimously accepted by the researchers that noise causes permanent hearing impairment when a person is exposed to a sound level of 85 dB or more over a period of years.²⁹ A noted American surgeon Dr. William H. Stewart observed:

"Calling noise a nuisance is like calling smog an inconvenience. Noise must be considered a hazard to health of people everywhere".³⁰

He considered noise as virus, which should be controlled wherever possible. The observation of Dr. Maurice H. Miller, is that noise level which does not cause discomfort or pain can inflict-hearing damage.³¹

(c) Marking Effects of Noise:

The auditory system has the capability to discriminate between the acoustical signals so that wanted - information - bearing signals in a sound-wave can be identified or separated from the unwanted or noisy parts.³² The ratio of a given desired signal (e.g. speech, music) to that of the interfering noise will determine whether or not the signal can be perceived.

29. "Man's Control of the Environment", Congress Quarterly Series, (Washington D.C.), 1970, p. 40.

30. Lipscomb, n. 15, p. 11.

31. Jane E. Brody, "The Harmful Effects of Noise", Times of India (New Delhi), 23 November 1982, p. 17.

32. Cunniff, n. 2, p. 107. See also Rabin and Schwartz, n. 2, pp. 410-11.

The higher the level of masking noise (i.e. interfering noise) and the more energy it contains at speech frequencies, the greater will be the percentage of the speech signals inaudible to the listener.³³

The important masking effects of communication is revealed in occupational situation where workers fail to hear the warning signals or shouts and meet with accidents.³⁴ The two methods of assessing whether a sound will, and to what extent interfere speech communications, are to find the Articulation Index (A I) or the speech interference level (SIL). We can, thus, measure the degree of masking at a particular occasion.³⁵ Both methods are based on the fact that normal frequencies of human speech is in the range of approximately 200-500 Hz, and this frequency range of the background noise must be assessed for its masking qualities.³⁶

Another effect of noise on human physiology is known as 'Startle Response'. It is primarily a signal of sound for the purpose alarming or protective action against a possible

33. Ibid.

34. Environmental Health Criteria 12, Noise, n.23,
p. 47.

35. Lipscomb, n. 15, p. 194. See also Daryl N. May,
Handbook of Noise Assessment (New York, 1976),
p. 32.

36. Rabin and Schwartz, n. 2, p. 411. See also Burns,
n. 21, p. 111.

danger. Human physiology marks sudden changes like contraction of the flexor muscles of the limbs and the spine and that of the orbital muscles in the nature of response to sudden noise of high frequencies. Circulatory system is sometimes pronounced. Perspiration rate increases too. A study revealed that human beings experience increased startle reaction with the increasing intensity of noise.³⁷ The effect of noise on men of different ages will be different depending upon the degree of exposure during one's life. This effect is known as presbycusis. This takes the form of a progressive deterioration of hearing for hightones.³⁸

The extent of damage due to noise becomes obvious from a study, conducted on the hearing sensitivity of the members of the Mabaan tribe in Sudan. The finding was compared with the Americans working in noise-related industry and otherwise. At the age of 60, Mabaan's average hearing loss is 10 dB, for now-noise-exposed Americans between 10 to 38 dB, and for noise exposed Americans between 38 and 62 dB.³⁹

37. Ibid., pp. 425-27.

38. Burns, n. 21, p. 48.

39. Lucy Kavalier, Noise : The New Menace (New York, 1975), p. 56. In 1962 Dr. Samuel Rosen surveyed the Mabaan tribes in their quiet pastoral life in Sudan and found that the hearing of tribesmen was exceptionally good. Until recently it was generally thought to be physiological effect of aging that the ability to hear high tones gradually diminishes (presbycusis) starting at about age 32 for men and 37 for women. Some doctors believe that presbycusis is not a natural hearing loss but rather is caused by the general noise level in our society.

(d) Effects on Cardiovascular and other Physiological Systems:

The effects of noise on the cardiovascular system is fluctuating and varied. The heart-beat may increase or decrease due to noise, since the effect depends on the type of noise. Generally, noise tends to decrease the output of the heart and to increase or fluctuate the arterial blood pressure and vaso-constriction of peripheral blood vessels.⁴⁰

Sound affects body muscles, which can easily be observed by the body movements or by electrical measurement of muscular activity. Man is then equipped with a set of auditory-muscular reflexes that diverts man's attention towards the source of sound. This reflex gives more muscular tension to human physique. The endocrine system experiences a series of changes due to intense sounds, or other stimuli like cold, pain and injuries. Endocrinologists have noted that adrenal glands become very active in the presence of noise even at the level of 68 dB.⁴¹

The endocrine glands affected by sound may alter the chemical contents of blood in the body. These changes, in turn, can cause changes in hormone levels, and a whole complex of other bio-chemical and physiological changes.⁴²

Other ailments, due to noise are nervous tension, headaches which may extend to neurosis.

40. Karl D. Kryter, The Effects of Noise on Man, (New York, 1970), p. 21.

41. Bell, n. 20, p. 36. See also Rabin and Schwartz, n.2, p.427. See also Lipscomb, n.15, p. 76.

42. Kryter, n. 40, p. 22.

Noise causes blood vessels to constrict reducing the blood supply to key parts of the body. Rabbits exposed to noise for 10 weeks had higher blood cholesterol and more clogging of arteries than normal rabbits.⁴³ Noise effects the whole automatic nervous system, which controls the involuntary functions of the heart, blood vessels, muscles, and glands. An unborn child might be affected by the hormones produced by stress on the mother caused by noise.⁴⁴

Noise causes stress tension and sometimes intolerable nervous strain. People become irritable, insociable and more quarrelsome at work as well as at home. The response to stress consists of three stages - a alarm reaction stage, a stage of resistance, and a stage of exhaustion.⁴⁵ It all depends on the degree of stress exposed to an individual. If a stress is severe and is maintained for a longer period of time, as organism passes from preliminary stages to extreme stage of exhaustion and consequently result into break-down of bodily function and possibly death.⁴⁶ Even mild exposure may cause to continued stress for a long period of time and may include susceptibility to infection and perhaps, specific diseases known as diseases of adaptation. Such diseases may include gastro-intestinal ulcers, some types of high-blood

42. Kryter, n. 40, p. 22.

43. Environmental Health Criteria 12, Noise, n.23, pp.60-61.

44. Ibid., p. 65.

45. Ibid., pp. 58-59.

46. Rabin and Schwartz, n. 2, p. 429.

pressure, and some types of arthritis.⁴⁷

A British study found that people living around London's Heathrow Airport had a much higher rate of admission to mental hospital than people living in quieter near by areas. Also the study revealed that 22 per cent of the respondents complained that often their sleep is disturbed due to aircraft noise. This figure now rose to 50 per cent with the increase in noise level.⁴⁸

Thus, damage may involve far more than hearing acuity in the spheres described above. Though more research is required to define precisely the non-acoustical harm caused by noise, studies thus far suggest that alongwith other physiological harms, increased susceptibility to infection and reproductive problems may also arise.

A study, for instance, found that school children exposed to air-craft noise near Los Angeles International Airport had higher blood-pressure than others in quiet schools. They had also difficulty in solving puzzles and mathematical problems.⁴⁹

It would be be-fitting to conclude the ill-effects of noise on physiological system by quoting Dr. Samuel Rosen of the New York Mt. Sinai Hospital. He viewed:

"you may learn to ignore noise, but your body will never forgive you".⁵⁰

47. Ibid., See also Environmental Health Criteria, 12, Noise, n. 23, p. 64.

48. Ibid., p. 435.

49. Brody, n. 31, p. 17.

50. Lipscomb, n. 15, p. 76.

Now it would be important to consider psychological effects of noise.

II.2 Psychological Effects of Noise:

The most important psychological effect of noise is the interference with sleep. Arousal by noise during sleep depends on many factors including individual peculiarities in the reaction to noise. Maximum permissible noise levels for sleeping has been suggested as 35 dB for optimum sleeping-conditions.⁵¹

It is well observed that steady noises produce less disturbance during sleep as compared to the fluctuating noises. High intensity noises will keep one awoken for sometime but there after, the individual adapts to that intensity of noise and can sleep in that environment. Only very severe noise can disturb sleep and consequently constitute a health hazard.

The air-conditioning industry reports that night-time bed-room noise-level of 33-38 dB results in occasional complaints, while above 48 dB results in numerous complaints and in the range of 100-120 dB noise nearby awakes everyone.⁵³

Apart from sleep interference, noise also interferes with the performance of task by masking the required signals. In absence of performance which involves mutual exchange of messages through sound, steady noise below 90 dB does not

51. Rabin and Schwartz, n. 2, pp. 414-15.

52. Hildebrand, n. 1, pp. 661-2.

53. Environmental Health Criteria 12. Noise, n. 23, pp. 53-55.

normally interfere with the performance of task, but irregular and unpredictable bursts of noise may influence performance in even less than 90 dB level.⁵⁴

Distraction from a task in hand is made due to noise thus, affects task performance. Work which demands a high degree of skill is particularly affected by noise.⁵⁵ The effects of noise on performance has been reported to depend upon intelligence. Under noisy conditions, people with high intelligence showed a decrease in the quality of test performance whereas people with average intelligence showed constant or slightly better performance.⁵⁶

Noise also causes annoyance and irritation. We cannot easily correlate attitudes and feelings, such as discomfort and irritation. In spite of the fact that individual reactions vary widely and some degree of noise adaptation is there, research has shown that social contacts are disturbed in such environments like in industry, in cities and near air-ports.⁵⁷ Sudden noises such as slamming doors, shouts or gun-shots are more alarming because of the lack of warning prior to the shock of noise. Heinous crimes have been committed by persons irritated

54. Hilderbrand, n. 1, p. 660.

55. Frederick A. White, Our Acoustic Environment (New York, 1975), pp. 473-4.

56. M.E. Bryan, and I. Colyer, "Noise : Intellectual Task and Intelligence", Acoustica, (), Vol. 29, pp. 228-33.

57. Rabin and Schwartz, n. 2, pp. 415-16.

by noise. For instance in New York city, a man shot and killed a boy who was playing outside his window. He contended that boy's shouting and noise-making had kept him awoken.⁵⁸

II.3 Sociological Effects of Noise:

The groups of individuals or communities in different parts of the world are exhibiting different personalised and individual responses to noise due to a variety of sociological influences. For example, a group of families belonging to an ethnic background may accept a particular noisy environment which would not be accepted by other ethnic group exposed to different cultural orientation. It has been pointed out that there may be possible national differences in tolerance to road-noise.⁵⁹

In community surveys based on 3,500 people in widely separated areas, it has been found that an ever-increasing number of people are annoyed with increasing level of noise.

II.4 Effects of Noise on Animals and Wildlife:

Noise affects not only human beings but also animals and wildlife. For instance, a starile reflex may stop the brooding cycle of wild game birds for an entire season. The effects of noise on animals are different from that on human-beings. Laboratory Studies on animals have revealed that animals experience hearing loss in a sound pressure of 90 dB

58. Lipscomb, n. 15, p. 83.

59. Kryter, n. 40, p. 25.

or less. It's effect differs from animal to animal. It largely depends upon the frequency characteristic of the sound.⁶⁰ Studies in particular fish and insects have demonstrated that locomotor patterns of fish may be effected. Even death may be caused due to intensive sound. Certain sound exposures may affect the life-span and reproductive capacity of insects.⁶¹ Laboratory experiments show that exposure of 150-160 dB is fatal to certain animals like guines-pigs, rats and poultry. Long-duration exposure of tolerable noise to guines-pigs caused inflammation inside the ear membranes and vital auditory hair-cells were destroyed. Prolonged exposure to excessive noise has made rats lose their productive capacity (fertility), turn homosexual, and eat their young ones. A high intensity (150 dB) exposure kills them through heart-failure.⁶²

The larger farm animals like horses, cattle, swine adapt to high level of noise. Poultry may not adapt to high sound intensity. Loud noises disrupt broodiness (cessation of egg laying and initiation of incubation) in turkeys producing a rapid return to egg production after cessation of noise.

60. Rabin and Schwartz, n. 2, p. 453.

61. Hildebrand, n. 1, p. 664.
According to a report published in the Minneapolis Tribune Compensation paid for the damages caused by an Air Force sonic boom in 1965 to Zack Zaylor, a mink farmer to Frazee, Minnesota, was \$ 37,400. It was because of the death of his minks in their nest boxes owing to the explosive noise.

62. Ibid., pp. 664-5.

Any panic behaviour such as piling up or huddling could well lead to problems of survival of an animal. Those animals which depend on their ears for preying could starve if hearing sensitivity decreases or animals with impairment of hearing could be killed by predators.

II.5 Effects of Sonic Booms on Buildings and Property:

Impulsive noise produced in the shape of sonic-booms are produced by super-sonic air-craft flights. Sonic-booms are the sound pressure waves jumping abruptly to some peak value, then decreasing slowly with time and, finally abruptly jumping again. These waves are shock waves and are audible as two sharp bangs separated by a short-time interval.

When the effects of sonic boom on structures is considered, it should be noted that most of the mechanical energy of the boom is contained in a band of low, inaudible frequencies. Booms can induce transient vibrations in various types of structures. The vibration of each structure is because of the pressure signals distributed over the entire structure. It depends on the structures location, size, shape, type of construction and state of maintenance. The resonance characteristics of the structure, vibrational energy transmitted through the earth also play their role. Therefore, effects of sonic booms on different structures will be highly diversified.

The most susceptible structures to sonic boom are buildings. Generally, damages caused by sonic booms are done to fragile, secondary structures, window-panes and well-plasters.

Thus, noise pollution not only affects the health and behaviour of human-beings and animals, but also causes considerable damage to structures and buildings. Awareness of such ill-effects is a necessary condition and must serve as a basis for any comprehensive legislation on noise control.

CHAPTER III

CHAPTER III

NOISE POLLUTION IN INDIAN URBAN AND INDUSTRIAL CENTRES

India is a second most populous country of the world which has numerous socio-economic problems. Since independence, India is triving hard to overcome these problems and to attain economic self-sufficiency. The main hurdle in its way to progress has been the population explosion which between 1921-71 for instance, increased by 118 per cent as compared to that of the world by 93 per cent and that of the developed nations by 60 per cent only.¹ This necessitated maximum attention towards industrial and agricultural development and the consequent emphasis on technological revolution paying little attention to smaller problems which were the off-shoots of technological and industrial development. One such problem is the problem of noise pollution.

Many new urban settlements have emrged in India since independence. Various multi-purpose projects have been set up which affect on the quality of life, the landuse pattern, agricultural and industrial production, transporation, and availability of civic amenities. These have contributed a lot in the transformation of small towns into urban and industrial centres, which have faced several problems, such as :

1. Country Report : India, Habitat - 79 : The United Nations Conference on Human Settlements, Vancouver, May 31 - June 11, 1976 (New Delhi, 1976) p. 9.

- (a) lack of adequate investments on public infrastructure;
- (b) rehabilitation and hygienic problems spreading in the human settlement;
- (c) location of industries, commercial centres;
- (d) Continuous migration from adjoining and far-flung rural as well as urban areas.

With these problems in view, our government has chalked out many "Master Plans" for the betterment and development of our urban settlement. These "Master Plans" have been prepared for 525 towns and cities in the country.² Developments in Delhi, Bombay and Calcutta is taking place in accordance with the recommendations made by the Master Plans. Comprehensive legislation to control urban development has been enacted in various states, such as Madhya Pradesh, Maharashtra, Andhra Pradesh, and Tamil Nadu and Union Territories of Delhi, Goa, Daman and Diu and Pondicherry. In fourteen other states, legislation is under preparation.³

In Bombay, Metropolitan Regional Development Authority was set up in June 1975 to direct balanced development of programmes. Likewise in Delhi, Delhi Development Authority (DDA) was set up in 1957 to implement twenty year Master Plan (1962-81).⁴ The Programme of DDA as other urban authorities include acquisition, development and disposal of land to provide for

2. Ibid., p. 23.

3. Ibid., p. 25.

4. Ibid., p. 29.

residential, industrial, commercial, institutional and recreational needs of the project population of these centres. As a result of implementation of Plans and Programmes for industrial development, construction and transport facilities these occurred significant increase in noise level in these areas.

India is probably the only country in the world where we can experience many sources of noise pollution apart from those related to industrial development and the increase in road and air traffic. These are the community noises emitted out of the misuse of loudspeakers, hooting of vehicle horns, firing of crackers, playing of radios, stereos and television sets at high volumes in our towns and cities. On the occasions of marriage, a political rally or a religious festival, noises are created by free and excess use of loudspeakers. These noises are highly regulated or banned in countries like Sweden, Switzerland, France, Britain and U.S.A. The international standards in any residential area is 50 dB by day or 40 dB by night. Near the hospitals the limit of noise is 20-30 dB.⁵ In India, noise evaluations are made by many agencies. National Physical Laboratory (Delhi) is one which shows that Bombay, Delhi and Calcutta are the noisiest cities in the world. Noise levels in these cities are 85 dB, 89 dB and 87 dB respectively.⁶

5. "Noise Pollution: Need for Effective Control", SCAVENGER, (Bombay), Vol.10, n. 2, April, 1980, p. 23.

6. V.S.P. Kurup, "Our Noisy Environment", Depthnews India (New Delhi), 5 June 1979, p. 2.

A survey of Bombay city shows the levels of noise is different in different localities. The noises of traffic are ranging from 59 to 77 dB from morning to evening in Matunga and from 52 to 60 dB in Institute of Science. The noise level in Collectors' colony is due to Rashtriya Chemicals and Fertilisers (RCF) factory operating round the clock which is about 62 dB outside the dwellings. In Anushaktinagar residential area, noise in day time is 50 dB and even in the mid-night it is 43 dB. In Tarapur Colony, a residential area 100 kms. away from Bombay, noise level outside in early evening (as measured from balcony) is 46 dB.⁷

The trains running from Bombay were also surveyed and found the level of noise inside the train in Dadar is 91 dB, in Bassein Road it is 73 dB, in Virar it is 55 dB, in Safala it is 51 dB, in Palghar it is 51 dB, and in Kelva Road it is 46 dB. The noise level in the moving train is more than 80 dB and increases considerably (96 dB) when the train passes over a bridge. The trains considered the lifeline of Bombay, are contributing a lot in the city's noise.⁸ Bombay has the population which is equally dense to that of Calcutta and with the concentration of industry is relatively quieter than that of Calcutta or Delhi.

7. Mukherji, Mahadevan, and Kapoor, n. 5, pp. 23-24.

8. Ibid., p. 24.

A study of Lucknow city is also made considerably. Noise levels during festival seasons ranged from 70 to 114 dBA there. Lottery-tickets selling on loudspeakers create noise of the tune of 90-100 dBA. Traffic noises are recorded at various points in Lucknow and found that at Gol Darwaza Crossing, it is 80-96 dBA; at Hazrat Ganj (Narahi) ranges from 80-100 dBA; at Charbagh crossing from 90-96 dBA; and at Kaisarganj crossing it is 80-88 dBA. The noise levels due to pressure horns was measured between 88-123 dBA.⁹ In Industrial areas, noise levels were measured in the saw mills, asbestos factory, silver foil manufacturing units, and brass band shops. The noise levels in saw mills, were 90-105 dBA; in silver foil manufacturing unit 93-99 dBA; in brass band shops 97-112 dBA; and in asbestos factory (cutting of asbestos sheets) 85-90 dBA.¹⁰

The city's main noise producing sources are considered vehicular traffic, pressure horns, high-tune music and misuse of loudspeakers on every festival and public meeting.

In textile industry of India also, noise hazard is imminent. The number of work force employed in this industry, is over 1.4 million. Textile centres are Ahmedabad, Bombay, Kanpur, Madras, Madurai and Nagpur. In most of the textile mills in India, noise levels are above the limit of 85 dB.¹¹

9. "Noise Survey in Lucknow", Industrial Toxicology Bulletin, (Lucknow), Vol. 6, nos. 1-3, May 1982, p. 1.

10. Ibid., pp. 1-2.

11. "Hazards of the Textile Industry", Industrial Toxicology Bulletin, Vol. 6, nos. 1-3, May, 1982, p.7.

Those textile mills where shuttle looms are used, noise level is very high as to make it difficult for the workers even to listen to each other. As compared to machines of cotton and silk manufacturing mills, the machines of woolen and jute mills are more noisy. In a large weaving section, noise level ranges from 100-105 dB and in spinning and preparatory departments between 85 and 95 dB.¹² This high level of exposure is very harmful to the health and consequently to the efficiency of the workers.

The traffic noise in the cities has rapidly emerged as a big annoyance. In Delhi, a survey of Daryaganj residents showed a high degree of deafness due to social and avocational factors. The noisiest areas in Delhi are Minto Bridge, Tilak Bridge (during peak traffic hours), Daryaganj, Chandni Chowk, Old and New Delhi Railway Station and Connaught Place near the Regal Cinema.

The noisiest level in these areas is 95 dB whereas the permissible noise for roads with heavy traffic is 80 dB, which can damage the hearing of those with sensitive ears.¹³ According to Dr. B.M. Abrol of the All India Institute of Medical Sciences (AIIMS) who runs a noise trauma Cell, even at mid-night the noise level for hospitals is 40 dB, for residential areas, 50 dB, and for roads with moderate traffic 60 dB.¹⁴

12. Ibid.

13. V.D. Kulshreshtha, "Noise Pollution: Emerging Challenges and Regulations", in S.L. Agarwal, ed., Legal Control of Environmental Pollution (Bombay, 1980), p. 190.

14. Usha Rai, "Making a Noise about Noise", Depthnews India (New Delhi), 5 June 1979, p. 2.

A survey by the AIIMS of the industries around Delhi revealed that 65 per cent of the work sites had noise levels of 90 to 100 dB. The average noise recorded in the industries was 109 dB, the highest - 120 dB - being in the neighbourhood of some compressors and generators. In one large industry in Delhi employing over 5,000 workers, only 2 per cent were in an area where the noise level was around 80 dB, 3.5 per cent were exposed to 80-90 dB and 4,750 workers to over 90 dB.¹⁵

The survey conducted on noise levels in hospitals revealed that at 9 A.M. it varied from 69 dB in Skin Out-Patients-Department (OPD) to 76 dB in the surgical OPD. At noon, the noise level was just two or three degrees lower. Even in the operation theatre, the noise level was 78 dB at 9.A.M. The most significant finding of the study was that even at night the noise level in the closed empty parts of the hospital was higher than outside the hospital. Obviously the architects and engineers who built the hospital did not pay much attention to acoustics.¹⁶ This is one area where there is an urgent need for legislation making it imperative for the architects and engineers to incorporate necessary acoustic designs with a view to reduce noise inside a building.

One of the most important factors contributing to the seriousness of pollution problem in India is the laxity in adherence to rules and regulations meant for maintaining the

15. Ibid.

16. Ibid., p. 2.

level of pollution at a minimum. The laws at present in vogue are with many limitations and need to be updated. There is no rigidity in their enforcement. The importance of such legislations in clearing the environment from its present deplorable state can hardly be over-emphasised. The impact on environment must be one of the principal factors in controlling the grant of licences to the industries, not on paper, but in practice.

The industrialists in general, with a few exceptions, are the major offenders in creating the pollution hazards in the subcontinent. The motivating force being profit alone, complete disregard for environment is exhibited in their operations, which is promoted by laxity in the enforcement of environment laws. Such an attitude is detrimental not only to the growth of the present but also to the welfare of the future generations in regard to the environmental pollutants.

The present trends indicate that the process of urbanisation is irreversible. To a large extent, it is a condition for and a consequence of rapid economic development and industrialisation. It may be desirable to deal with the problems of human settlements both urban and rural and their environmental requirements simultaneously. It would require that programmes and policies for agricultural and rural development are well-coordinated with those for industrialisation and urbanisation ensuring a balanced development which can also save the inhabitants from excessive noise pollution.

Desirable objectives for such an integrated planning may include:

- (a) minimisation of the existing differentials in the standard of living and services between rural and urban settlements, to make each equally attractive from the social, economic and environmental point of view;
- (b) minimising of process of permanent migration to urban centres by establishing better linkages between rural and urban areas and by developing service centres and growth centres to provide adequate distribution of goods and services;
- (c) Co-relating investment mechanism with environmental programme to arrive at Criteria for location of human settlements;
- (d) providing incentives for the development of the under-developed areas to provide greater economic opportunities to them and reduce the environmental pollution in general and noise pollution in particular;
- (e) identifying criteria for appropriate distribution of a large population in a scientific manner for optimum utilization of existing resources.

At present, however, for Indian, economic development stands vital. The country is encountered with varied problems, such as problem of poverty, problem of unemployment, problem

of adverse balance of payment, problem of population explosion and so on and so forth, which are to be checked and overcome first. Therefore, the problem of noise pollution has not yet been proper importance. But as and when the country overcomes the aforesaid problems, control of noise pollution is likely to be given due emphasis. However, it is to be noted that this problem should not be neglected all together; certain effective measures should be taken in a balanced way, in conjunction with industrial growth.

CHAPTER IV

CHAPTER IV

PROTECTIVE MEASURES TAKEN TO ABATE NOISE POLLUTION : A COMPARATIVE STUDY OF INDIA AND OTHER COUNTRIES

Noise pollution of ever-increasing and deteriorating dimension has been alarming by affecting human health and behaviour in diversified ways as already been enumerated in details in the previous chapters. The sources of noise emission have also increased rapidly with the rapid scientific and technological advancements in every walf of life. Control of excessive noise has become necessary. Modern science and technology can abate noise to certain limits. Noise control can, thus be defined as the technology of making noise acceptable through its control and reduction consistent with economic and operational considerations. There are three approaches to the problem of controlling the noise:

- (a) Reduction of noise level at the source;
- (b) To dampen a insulate the places of our work or residence;
- (c) To mask unwanted noises with other more pleasing sounds.

While controlling noise, the major noise-making sources will have to be taken into consideration for applying either of the three aforementioned methods. These sources are:

1. Industrial and Construction Noise;
2. Traffic Noise;
3. Aircraft Noise;
4. Household and Community Noise.

All these four sources have already been elaborated.¹

On the remedial aspect, the developed countries have taken up certain effective measures to abate industrial noise, like producing less noisy industrial and construction equipments. Machines producing sound are wrapped by solid plastics with sound deadening material wherever required. Silencers and mufflers can be attached to some machines for reducing certain noises technological sophistication and advancement is required for applying an effective noise-reducing technique in the machines which involves economic factor as well. To a large extent industrialised countries can afford these measures and are now bound to take them up since many of these countries have to pay heavy amount by way of compensation through courts of law, to the workers who suffer from hearing loss due to intense occupational noise exposure. In the U.S.A., for instance, compensation claims for hearing loss on the job mounted to about \$ 2 million a year in the years 1966 and in the succeeding years. It is estimated that nearly 4.5 million American workers might also get the compensation if they could file claims. With the idea of protection in the U.S.A., the Federal Government has set a maximum sound level of 90 dB (A) during an eight-hour day to the workers.²

1. See Chapter II.

2. James L. Hildebrand, "Noise Pollution: An Introduction to the Problem and an Outline for Future Legal Research", Columbia Law Review, Vol. 70:652, 1970, p. 669.

In taking up noise-abatement measures, mechanism of the machines and equipments and their operating technology are required primarily to be evaluated. Sounds absorbing characteristic shows that it varies with the frequency of sounds. High frequency sounds are more efficiently reduced with the use of sound-absorbing materials than the low-frequency sounds.³

Another measure of noise-abatement in Industries and construction sites adopted is to convert sound energy into heat energy as the law of the conservation of energy proves. Hence, sound-generating devices are provided with sound-absorbent linings, which convert the noise energy into heat energy which may also be used wherever required.

By changing the operation of certain existing devices also noise can be controlled. The mechanical engineering can easily determine the sources of sounds in various kinds of machinery by separating the sounds with the help of a recently developed equipment called "computer-based spectrum analyzer". Attention paid on each source of sound and application of control measures at the source is the best result-oriented way.⁴

Sometimes alternate approach of controlling noises of industrial or construction sites are checked at its paths or

3. David M. Lipscomb, Noise : The Unwanted Sound (Chicago, 1974), p. 256.

4. "Noise : The Fourth Pollutant", Engineering Cornell Quarterly, vol. 15(1), Sept 1980, p. 18.

at the receiving side to some extent. Noise can be checked at the path by sound barriers, that is, materials used for absorbing sound energy in a factory, room, vehicle or appliance. The receiver of the sound can also be protected by the use of ear mufflers or plugs.

In many developed countries, legal measures have been taken to regulate construction noises by imposing a restriction on their emission between 6 P.M. to 7 A.M., in many urban areas of the world because sound is intensely felt at night time.

Traffic noise can be abated in a number of ways. One solution is that very busy roads should be constructed in ditches that is 15-20 feet below the normal land surface. The lined streets, trees on both sides of the roads, as well as fences, earth-banks, and so forth, help in absorbing noise and protecting the roadside buildings from the effects of noise to the extent of 10 dB.⁵

As regards the application of noise reduction techniques in the engines of the vehicles, improved forms of engine designs, and propulation like that of gas-turbine or electrically operated vehicles are invented. But these vehicles will take time to be commercially produced. In America, a new type of engine called 'Wankel Engine' is developed which, instead of

5. S.L. Agarwal, ed. Legal Control of Environmental Pollution, (New Delhi, 1980), p. 178.

being an internal combustion engine, employs a rotor in a casing in place of the common piston in a cylinder. But this type of engine was not produced by General Motors Corporation, commercially, although a Japanese automobile company 'Mazda' is successfully selling rotary engine cars in America. In spite of consuming equivalent fuel comparable to conventional cars the rotary engine cars meet all fume and noise emission requirements.⁶

Another measure to abate traffic noise is to convert individual automobile transportation in to mass transportation which should be fast, efficient and quiet. But cities' local trains are at present one of the most important sources of urban noise pollution, which require feasible engineering measures to abate rail noise.

In the new generation of mass transportation, trains which operate at the approximating speed of 250 miles an hour, are fitted with air-cushion replacing wheels which virtually eliminate friction, and also the linear electric motor that pulls the trains in almost complete silence.⁷ Almost every country experiencing traffic noise problem, has promulgated enactments regulating traffic flow in order to abate excessive noise.

6. Hildebrand, n. 1, p. 673.

7. Ibid., pp. 674-75.

Unlike the industrial noise, aircraft noise is complex and its sources are not completely identified. It is, therefore, difficult to prescribe and apply controlling measures.

The controlling measures for the jet aircraft noise, which is experienced by people inhabiting near the airports or near the flight paths, involve the alteration of flight patterns and runways, and reduced power thrusts on takeoffs, etc. However, it is apprehended that these procedures might endanger the safety of the aircraft.

There are some other remedies for minimising noise levels at the airports. In the first place, operators at every airport should adhere to the uniformly agreed reduced noise level. For instance, at London's Heathrow airport, there is a maximum permissible perceived noise level of 110 dB by day and 102-dB by night.⁸ Aircraft at different airports are subject to different noise-emitting regulations, and the principle of preferential runways is widely applied. Intense noise of the aircrafts at the busy airports has irritated the citizens dwelling around these airports so much so that their protests over aircraft noise have prevented the airport expansion, and the creation of new airport.⁹ For instance, the disturbance due to intense noise of the aircrafts and at the airports has brought about the resentment in the public so much so that prior to the introduction of jet-powered commercial aircraft,

8. William Burns, Noise and Man (London, 1968), p. 214.

9. Ibid., pp. 214-15.

an estimated \$ 50 million was spent in U.S.A. on research and development by industry to perfect in-flight sound suppressors for jet power-planes. By 1965, the industry had invested an estimated \$ 150 million in installation of in-flight suppressors.¹⁰

In all the afore-mentioned sources of noise pollution, either or all of the three protective measures can be taken according to the merits of the respective noise-emitting sources. All these measures are scientific and technological but there is a dire need of effective and comprehensive noise controlling Legal regulations for enforcing protective measures in every country. In most of the industrialised countries there is a good framework of noise abatement enactments, but in developing countries like India, there are stray cases of regulations for noise abatement.

Recently, performance standards specifying maximum allowable noise limits at fixed points, have been introduced in order to strengthen noise ordinances. Also some laws now determine the allowable noise emission levels on transportation vehicles, construction equipments and other major sources of noise in the society.

In case of legal response to the emerging noise problems, remedies are provided by way of either private or public remedies.

Private remedies are based on the public nuisance statutes, or on the common law of nuisance, through individual

10. Hildebrand, n. 1, p. 679.

law suits in a court of law, whereas public remedies consist of regulatory and remedial legislation for controlling noise, broadly.

In the United States of America, the Congress enacted the most important environmental statute named as The National Environmental Policy Act of 1969 (NEPA)¹¹, which was implemented since 1st of January, 1970. This act defined general policies and goals, and required for taking up the subsequent measures by various federal agencies and state legislatures. Specifically, the following aspects affecting the quality of human environment have been incorporated in the act for the guideline of all federal agencies:

- (a) The environmental impact of the proposed action;
- (b) In case of implementation of the proposed action, any adverse environmental effects that cannot be avoided;
- (c) Alternatives to the proposed action; and
- (d) Link between the short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

The federal government is permitted also to use 'all practicable means' to implement courses of action that include 'appropriate consideration' to general environmental values, in addition to economic and technological considerations.

The Environmental Protection Agency (EPA) was directed by the President of the U.S.A. signed on 31st December, 1970, under Title IV of Public Law 91-604, that "a full and complete

11. The National Environmental Policy Act of 1969,
42 USC SS 4321-4347.

investigation and study of noise and its effect on public health and welfare" will be conducted.¹² The Noise Control Act of 1972 provides for the consultation with the EPA administrator of all federal agencies in prescribing standards or regulations respecting noise. Today the EPA, through its Office of Noise Abatement and Control, is the major agency for developing noise standards and advising on all aspects of federal noise control legislation.

Under the Department of Transportation (DOT) Act of 1966, the Secretary of DOT is directed to "promote and undertake research and development relating to transportation, including noise abatement, with particular attention to aircraft noise". In November 1969, the Federal Aviation Administration (FAA) published the Federal Aviation Regulation (FAR) Part 36 - Noise Standards : Aircraft Type Certification. This rule defines noise limits that certain subsonic jet aircraft must meet at prescribed locations in different airport runways during takeoff and landing operations. Additional restrictions are imposed to reduce the aircraft noise at flight positions at the airport. For landing and sideline sites, the noise level ranges from 102 to 108 Environmental Protection Noise Level decibel (EPNL dB), and for takeoff from 93 to 108 EPNL dB.

epnl

12. Summary of Noise Programmes in the Federal Government, U.S. Environmental Protection Agency (Washington, D.C., 1971), p. 11.

In the Federal Aviation Act of 1958 an amendment was made in 1969 by adding section 1431 by Public Law 90-411 which includes:

"Control and abatement of aircraft noise and sonic boom - consultations; standards; rules and regulations".¹³

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13. Public Law 90-411, 82 Stat. 395 (1968) reads as follows:
- Section 611(a) In order to afford present and future relief and protection to the public from unnecessary aircraft noise and sonic boom; the Administrator of the Federal Aviation Administration, after consultation with the Secretary of Transportation, shall prescribe and amend standards for the measurement of aircraft noise and sonic boom and shall prescribe and amend such rules and regulations as he may find necessary to provide for the control and abatement of aircraft noise and sonic boom including the application of such standards, rules and regulations in the issuance, amendment, modifications, suspension, or revocation of any certificate authorized by this title.
- Section 611(b) In prescribing and amending standards, rules and regulations under this section, the administrator shall- (i) Consider relevant available data relating to aircraft noise and sonic boom including the results of research, development, testing and evaluation activities conducted pursuant to this act and the Department of Transportation Act; (ii) Consult with such Federal, State and Inter-State agencies as he deems appropriate; (iii) Consider whether any proposed standard, rule or regulation is consistent with the highest degree of safety in air commerce or air transportation in the public interest; (iv) Consider whether any proposed standard, rule or regulation is economically reasonable technologically practicable and appropriate for the particular type of aircraft, aircraft engine, appliance, or certificate to which it will apply; and (v) Consider the extent to which such standard, rule or regulation will contribute to carrying out the purposes of this section.
- Section 611(c) In any action to amend, modify, suspend or revoke a certificate in which violation of aircraft noise or sonic boom standards, rules or regulations is at issue, the certificate holder shall have the same notice and appeal rights as are contained in sec. 609, and in any appeal to The National Transportation Safety Board; the Board may amend, modify or reverse the order of the administrator if it finds that control or abatement of aircraft noise or sonic boom and the public interests do not require the affirmation of such order,

This law forms a part of an overall noise control programme encompassing eight basic areas: aircraft noise research, aircraft operation, sonic boom research, airport and land use, natural environment, legal, structures, and human response.

In April 1972, the Federal Highway Administration (FHWA) passed a Policy and Procedure Memorandum (PPM) 90-2, which gives the standards for highway noise levels according to the different land uses. This Act will not approve plans and specifications for any proposed project on any Federal-aid system for which location approval has not yet been secured. It can be done when adequate measures are taken for implementing the appropriate noise level standards.

Certain noise standards have been prescribed by EPA for motor vehicles engaged in inter-state commerce. The standards apply to motor carriers whose gross vehicle weight

Contd...

or that such order is not consistent with safety in air commerce or air transportation. In November, 1969, the Federal Aviation Administration issued a regulation intended to reduce by half the amount of noise produced by jet aircraft landing and takeoffs. "The new rule, which sets maximum noise level will at first apply only to the big new jets scheduled to appear at airports within the next year. But it is expected that similar regulations will be ordered for current jet planes".

rating or gross combination weight rating exceed 100,000 lb.

Some of the important aspects of this federal law are:

(a) Standards for Highway Operations;

(86 dBA at 50 ft. with speed limits of 35 m/h or less, 90 dBA at 50 ft. with speed limits of more than 35 m/h.

(b) Standard for Operation under Stationary Test:

88 dBA at 50 ft. from the longitudinal centre line of the vehicle with the engine accelerated from idle.

(c) Visual Exhaust System Inspection:

Vehicle must be free from defects that affect sound reduction: equipped with muffler or other noise dissipative device: not equipped with any cut-out, by-pass, or similar device.

(d) No vehicle shall have a tire having a tread pattern which as originally manufactured, or as newly retreated, is composed primarily of cavities in the tread which are not vented by grooves to the tire shoulder or circumferentially to each other around the tire.

Most of the States in the U.S.A. have their own motor vehicle statutes or codes requiring mufflers on automobiles, trucks, and buses to prevent excessive or unusual noise. However, these statutes do not have well-defined maximum decibel level, and or, therefore, very difficult to enforce.

At least two states (New York and Connecticut) have attempted to limit traffic noise through comprehensive anti-noise legislation fixing maximum decibel noise levels for motor vehicles. In New York State, vehicles are legally restricted to a decibel level of 88.¹⁴ In California State, noise levels in excess of 82 decibels for passenger cars and 92 decibels for trucks and buses are fixed.¹⁵

The Bureau of Labour Standards, U.S. Department of Labour, in May 1969, has added Walsh-Healey Public Contract Act.¹⁶ This act requires that contracts entered into by any agency of the U.S.A. for the manufacture or furnishing of materials, supplies, articles, and equipment in any amount exceeding \$ 10,000 must contain, among other things, the stipulation that, "no part of such contract will be performed nor will any of the materials, supplies, articles, or equivalent to be manufactured or furnished under said contract be manufactured or fabricated in any plants, factories, buildings, or surroundings or under working conditions which are unsanitary or hazardous to the health and safety of employees engaged in the performance of said contract".¹⁷

14. N.Y. Vehicles & Traffic Law, SS. 386 (McKinney Supp. 1968-69).

15. California Vehicles Code, SS. 23130 (West Supp.1969).

16. Walsh-Healey Public Contract Act, 34, Federal Register, 7948 (20 May 1969).

17. Walsh-Healey Public Contracts Act, Federal Register, 20 May 1969.

A specific section 50-204.10 of the act deals with the protection of employees against noise that is deemed hazardous. Specifically, the act gives stress on the feasible engineering or administrative control to protect the hearing of employees.

Another act, that is The Occupational Safety and Health Act of 1970 (OSHA) is an addition to the authority of the Department of Labour. It authorises the Secretary of Labour to promulgate occupational noise levels that will be applicable to all companies engaged in inter-state commerce. A commission for reviewing these standards is also created under this act. Civil fines upto \$ 10,000 can be imposed on the defaulters.

At the Federal level, general environmental noise abatement has been emphasised by the Noise Pollution and Abatement Act of 1970 within EPA. This act necessitated research and studies into environmental noise pollution.

For the purpose of protecting public health and welfare from noise hazards, the Noise Control Act of 1972 (Public Law 92-574) was passed by the President on October 28, 1972. This act formulates policies for federal noise abatement and control under the supervision of the Administrator of EPA.¹⁸

18. The complete text is contained in the Congressional Record - Senate S 18638, 18 October 1972.

Some salient features are:

"the promulgation of regulations to limit noise from the operations and make recommendations to the Federal Aviation Administration (FAA) to reduce noise levels from aircraft; publish noise effects on the public health and welfare; promulgate regulations limiting noise emission of products sold within the United States; promulgate labelling regulations; co-ordinating all federal noise research and control programmes and conduct research and provide technical assistance to state and local governments; and provide public information on notice."

This act provides for a division of powers between the federal government and state and local governments. The primary federal responsibility is to set standards of noise. The states and other political sub-divisions retain rights and authorities to enforce control on environment noise through licencing, regulations or restriction of the use, operation or movement of noise sources.

Alongwith the modern noise enactments specifically delimiting the noise emission from sources in the society, certain general nuisance regulations are necessary to be incorporated for meeting unforeseen noise annoyance cases which violate the ordinance. The model ordinance published by the National Institute of Municipal Law Officers (NIMLO), Washington, D.C., recommends the following language:

"It shall be unlawful for any person to make, continue, or cause to be made or continued any excessive, unnecessary or unusually loud noise or any noise which either annoys, disturbs, injures or endangers the comfort, repose, health, place or safety of others, within the limits of the city".

The nuisances covered under this regulation will include horns, radio playing, phonographs, loudspeakers, and shouting, etc.

Reviewing some recent court decisions on noise nuisances provides a glimpse of some of the legal principles in the battle to control noise. Noise may be a nuisance and may be either categorised as a private or public nuisance.

In this private nuisance action, plaintiff sued the dependant against his ready-mix concrete plant whose operation emits noise, and demanded for damages based on plaintiffs' claim that the plant was a nuisance.

The plaintiff acquired his property first and thereafter dependant purchased the adjacent property and built plant.

The plaintiffs' allegation that the loud noise of the plant particularly early in the morning and in the evening disturbs conversation in his house, since there is no other plant in the area.

The Court held:

A fair test of nuisance is ordinarily one of fact, and not of law, depending on all the attending or surrounding circumstances. Each case of this nature depends on its own facts. The Court found that dependant's plant constituted a nuisance.

The decision was based on the principle:

"Noises may be of such character and intensity as to unreasonably interfere with the comfort and enjoyment of private property as to constitute a nuisance and in such cases injury to the health of the complaining party need not be shown".

In Britain, Noise Abatement Act was promulgated on 27th November, 1960 for abating excessive noise. The administration of the Act rests upon each local authority in England, Scotland and Wales and local authorities now have considerable experience in the operation of the Act. Section I, sub-section I states :

"subject to the provisions of the section, noise or vibration which is nuisance shall be a statutory nuisance for the purposes of Part III of the Public Health Act, 1936, and the provisions of that Act shall have effects accordingly as in sub-section (1) to (4) of this section".¹⁹

The word nuisance is not defined in either the Noise Abatement Act 1960 or the Public Health Act, 1936, but in a Government Circular No. 58/60 of the Ministry of Housing and Local Government, noise or vibration is defined as a nuisance if it is considered so in Common Law.

The Common Law Consideration of noise and vibration to be an offence depends on it's compliance to these principles which are established in the Chancery Division of High Court, the Court of Appeal and the House of Lords, as follows:²⁰

19. C. Duerden, Noise Abatement (London, 1971), p. 179.

20. Ibid., p. 180.

1. There must be material interference with property or personal comfort.

Nuisance is defined as 'an inconvenience materially interfering with the ordinary comfort, physically, of human existence, not merely according to elegant or dainty modes of living, but according to plain and sober and simple notions among the English people'.²¹

The matter complained of substantially interferes with personal comfort.

2. It is no Defence for the Defendant to show that he has taken all reasonable steps and care to prevent noise.

The making or causing of such a noise as materially interferes with the comfort a neighbour, when judged by the standard to which referred to in the definition of nuisance in *Walter v. Selfe* (1851),²² constitutes an actionable nuisance, and it is no answer to say that the best known means have been taken to reduce or prevent the noise complained of, or that the cause of the nuisance is the exercise of a business or trade in a reasonable and proper manner.²³

21. Walter v. Selfe, (1851) 4 De G. and Sm. 315.

22. Ibid.

23. Halsey v. Esso Petroleum Co., Ltd., (1961) 2 All E.R. 145.

3. The noise need not be injurious to health.
The question can be one of interfering with ordinary comfort. The principle has been laid down that every person is entitled, as against his neighbour, to the comfortable and healthful enjoyment of the property occupied by him.²⁴
4. Temporary and Transient Noise will not generally be accepted as a Nuisance.
In respect of operations of this character, such as demolition of building, if they are reasonably carried out, and all proper and reasonable steps are taken to ensure that no undue inconvenience is caused to neighbours, whether from noise, dust or other reasons, the neighbours must put up with it.²⁵
5. The Courts do not seek to apply a Fixed Standard of Comfort.
If a man lives in a town, it is necessary that he should subject himself to the consequences of those operations of trade which may be carried out in his immediate locality, which are actually necessary for trade and commerce, and also for the enjoyment of the property and for the benefit of the inhabitants of the town and of the public at large.²⁶

24. Vanderpant v. Mayfair Hotel Co., (1930) 1 Ch. 138.

25. Andreae v. Selfridge, (1937) 3 All. E.R. 255.

26. Halsey v. Esso Ltd., (1961).

6. It is no defence to show that the plaintiff came to the nuisance.

It is no defence that the business had been in existence for three years before the plaintiff's arrival, for he came to the house.....with all the rights which the Common Law affords,²⁷ unless a nuisance has been continuously in action for 20 years only to the plaintiff or to his predecessors in title a prescriptive right to continue it is acquired as an easement on that particular line on which it exists.

7. The Courts will not interfere with building operations conducted in a reasonable manner.

Pile driving during daylight hours is not a ground which would warrant interference by the court, but pile driving at night is unreasonable and an injunction will be granted.²⁸

8. Malice may be a significant factor.

The plaintiff, a former, was granted an injunction restraining his neighbour from firing guns so as to frighten the foxes during the breeding season. The firing of the guns was held to be malicious because it was an act of spite due to a quarrel.²⁹

These eight principles are the basis for deciding whether noise or vibration is a statutory nuisance at Common Law

27. Bliss v. Hall, (1838) 4 Bing. N.C. 183.

28. De Keyser's Royal Hotel v. Spicer Bros. and Minter, (1914) 30 T.L.R. 257.

29. Hollywood Silver Fox Farm v. Emmitt, (1936) 1 All E.R. 825.

All these principles will give two impressions.³⁰ One is that no case deals with prevention of noise but with the noise allegedly creating a nuisance. The remedy suggested is the adequate sound insulation at the source of noise. Another is that the abatement procedure do not deal with the transient noise, for example, a road breaker without a muffler. No abatement action can be taken by the local authority until the nuisance order, is obtained. Then it is too late to implement. It should be pointed out that the local authority can take action only under these sections if the similar noise is likely to recur on the same premises. The instances are the Airport Authority Act of 1956 with powers for the Board of Trade to direct the British Airports Authority on noise abatement measures and for the Board to require the authority to introduce a sound proofing scheme.³¹ In March 1970, an Air Navigation (Noise Certification) Order was placed before the parliament by the British Government. It anticipates an international aircrafts noise certification scheme in the formulation of which the U.K. plays a leading role. This scheme provides that with a few minor exceptions, subsonic jet aircraft developed from now on, will be allowed to land or take off in the U.K. only when they have a certificate from their respective countries' governments, of registration that they comply with certain defined noise standards.

An Advisory Council on Noise had been set up in 1970 to advise the Government on all forms of noise, alongwith the

30. Ibid., p. 185.

31. Pollution of Noise Section. 41 : Aircraft : The Protection of the Environment (London : Her Majesty's Stationery Office, May, 1970).

formation of the Royal Committee on Environmental Pollution in February, 1970. The Department of Environment was formed on 15 October 1970.³²

For controlling traffic noise, a Road Traffic Act of 1960 was enacted, empowering the Ministry of Transport to make regulations relating to "equipment and the use of motor vehicles".

A British regulation enacted in 1969 governs the limitation of noise emission from all passenger cars and trucks manufactured after 1 April 1970. The noise limits for passenger cars and trucks shall be 85 dB, for motor cycles and mechanically propelled two-wheeled vehicles noise limit is dB. Proposed limits for new vehicles after October 1973 are comparable to the Swiss Vehicular Codes.³³

The aircraft noise problem is still uncontrollable. The example is London's Heathrow airport. Operations are directly over the city's dense population and traffic has increased enormously. Legislation was passed to assist nearby residents to the airport by way of grant for sound insulation.³⁴

Noise control in building construction has been affected through the Ministry of Public Buildings and Works. One of the

32. Frederick A. White, Our Acoustic Environment (New York, 1975), p. 331.

33. Ibid.

34. Ministry of Foreign Affairs, Japan, "Development of Environmental Protection in Japan", Information Bulletin (Tokyo), vol. 18, no. 1, 1 January, 1971, p. 5.

institutes that sponsors is the Building Research Station in Garston, England, which provided specific recommendations and informations on building codes, sound insulation, design schemes, etc., of the building.³⁵

These statutes and regulations are controlling the ever-increasing levels of noise to a considerable extent. There is a need of more comprehensive and effective legal mechanism for noise abatement since certain areas, like aircraft noise, require more efficient legislation.

Japan's rapid urbanisation and industrialization is changing drastically the social environment of the country. In these circumstances, the Japanese Government is improving the pollution abatement facilities and carrying out new urban policies. Simultaneously, the government submitted 14 bills, including an amendment to the Basic Law for Environmental Pollution Control, to the 64th Extraordinary session of the Diet, starting on November 24, 1970. The Environmental Pollution Control Law contains noise pollution as a form of Environmental disruption.³⁶

Japan's major noise problem areas are restricted to some localities, where activities like factory operation, construction work, and automobiles, railways, and the airtraffic are counted. The enactment of the Basic Law for Environmental pollution control of August 1967 is the basis for the measures

35. White, n. 20, p. 331.

36. Ministry of Foreign Affairs, Japan, "Development of Environmental Protection in Japan", Information Bulletin, vol. 15, no. 12, 15 June, 1968, p. 70.

of environmental pollution control in Japan. Soon after Noise Regulation Law was enacted in June, 1968, and later on amended in 1970 and 1971.³⁷

Back in 1954, the Metropolitan Government laid down a set of regulations to prevent noise, fixing the maximum permissible level to 75 decibels with the ever-increasing problems of noise in Japan in the past decade. The Metropolitan Government carried out a survey of noise in Tokyo from 1965 to 1966. On the basis of the survey report based on the assessment of the traffic noise level, public nuisances to the schools, aircraft noise level, construction noise level, etc., effective noise abatement measures have been taken.³⁸ Certain standard noise limits have been fixed for different localities and on different noise sources. For instance, in exclusive residential and educational areas, noise level of 50 dB is fixed as standard. For commercial, semi-industrial areas, the standard noise level fixed is 60 dB. For very busy quarters, 70 dB is the standard noise level.³⁹ The Metropolitan Government has sanctioned 330 million yen in that year's budget for construction of sound absorbing facilities at 150 classrooms for abating noise levels, by 15 to 35 dB in the schools.⁴⁰

37. Ibid., p. 7.

38. Ibid., p. 70.

39. Ibid., p. 72.

40. Ibid., p. 73.

As regards the aircraft and airport noise at Tokyo International Airport, Pollution Research Institute of the Metropolitan Government is undertaking an extensive first-ever survey of jetliner noise with the help of experts. Other public institutions and private bodies are also carrying out diverse projects on noise abatement. The Noise Abatement Law on Public and Private Airports and vicinities (1966) established maximum exposure for school children and in hospitals due to airport overflights. The law was also made applicable to U.S. Air Force bases in Japan.⁴¹ Thus, currently there are noise abatement laws on noise abatement administered by one or more of the following agencies:

1. Japanese Environmental Protection Agency;
2. Ministry of Transportation:
 - (a) Aviation Bureau,
 - (b) Highway Transportation Division,
3. Ministry of International Trade and Industry;
4. Food Agency;
5. Ministry of Health and Welfare;
6. Ministry of Construction;
7. Agency for Defence Equipment;
8. Ministry of Postal Service.

The Metropolitan Government is controlling various noises with the help of Metropolitan police department enforcing the

41. White, n. 20, p. 334.

effective laws and regulations, for instance, traffic noise is controlled by the Road Traffic Law and safety standards of vehicles for road transportation. The Metropolitan Regulations for the prevention of noise are applied to industrial noise and general noises as well.⁴² For the first time in Japan, the Metropolitan Government has enforced a systematic watch patrol against environmental hazards.

Alongwith the legal control, the development of techniques for preventing environmental pollution is making remarkable strides forward. According to a survey by the Japan Industrial Machinery Manufacturer's Association, Japan's production of pollution control equipment in 1970 amounted to 1946000 million yen, an increase of 36.3 per cent, over 142800 million yen for 1969 and a mounting figure of about 450000 million yen in 1975.⁴³

Federal Republic of Germany (FRG) is also experiencing noise as one of the biggest problems in the country. Surveys are conducted for assessing the noise emission levels at different sources. Many administrative and technical measures are taken to combat noise. The Emission Protection Law of the FRG contains adequate regulations for protecting against road and rail traffic noise. This lays down the maximum nose output for motor and rail vehicles. Certain other technical measures,

42. "Development of Environmental Protection in Japan", n. 22, p. 75.

43. Ibid., p. 88.

for instance, speed limits and ban on heavy lorries, the division of roads into traffic lanes of differing speeds, are adopted for reducing traffic noise. The serving up of motors when idling or travelling in low gear is a punishable offence. Similar is the case with the needless running of motors and the starting up of motor cycles in gateways. Noise-free zones in the neighbourhood of hospital, old peoples' homes and schools as well as health resorts and during religious services, are laid down by the road traffic ordinance.⁴⁴

Other noises emitted from building sites are regulated by the General Administrative Regulations for Building Machinery, the use of silencers and sound-damping procedures for restricting building hours. For controlling commercial and industrial noises within tolerable limits, regulations for the fitting of silencers and the use of low-noise level transport system are also promulgated. Many other anti-noise ordinances reduce domestic and leisure noises, for instance, restaurants and public houses must have double doors at the entrance.⁴⁵

The Law for Protection against flying noise and other supplementary legislations have established "noise-protection areas". Another provisions for abating flying noise are the

44. Hilde Simek, Environment Protection in the FRG (Bonn, 1979), pp. 9.

45. Ibid., p. 10.

ban on the overflight of supersonic aircraft, and the re-organisation of the airport areas. Sound-proof hangers have been built on heavily-used German airports. Sound curtain walls have been built and trees planted for shielding the neighbourhood.

In 1978, "Basic Principles for a programme of action against noise" was announced by the Federal Ministry.⁴⁶ The government has made the infringement of any environmental enactment as punishable by law. The draft law against environmental crimes approved by the Federal Cabinet in autumn, 1978, will standardise and incorporate various other offences against the environment included in the legislation. Public has also welcomed this draft law for the offence of pollution of noise alongwith other environmental degrading factors. These are considered as the "classical" crimes.

The developing countries have also taken steps to control noise pollution. In Malaysia, noise pollution has been considered a health hazard and in the factory and Machinery Act, 1967 (Revised-1974) of the Law of Malaysia Act 139, certain provisions in Articles 22(2), 22(3), 24, 31, 32(1), 33(2) deal with the general health protective measures to be taken by the factory owners to reduce the hazard.⁴⁷

The provisions in section 22(2) relate to any factory in which if the health of a worker or the public is adversely

46. Ibid.

47. Laws of Malaysia, Act 139 : Factories and Machinery Act, 1967, as Revised upto 1974.

affected by any process therein, the chief inspector will direct the occupier of that factory to modify the process in the manner as to reduce the possibility of injury to health.

Section 22(3) deals with the provision of medical examination by the occupier of any worker employed in the factory, who suffers from or is likely to suffer from hearing loss due to excessive exposure to industrial noise of high sound pressure level (mentioned in the third schedule).

Section 24 deals with the bodily injury caused to a person working therein exposed to noise and such protective measures, for instance protective clothing for reducing noise effects ~~ii~~ and appliances like ear-mufflers, etc., should be taken to avoid the injury.

Section 32 deals with the nature of injury to the worker due to occupational hazard and that includes the hearing loss included in the Third Schedule, and the person unable to resume his normal duty for more than four days, than a criminal proceeding ought to be instituted against the person responsible.

Apart from these noise abatement provisions in the factory and relating to the machines, other noises are also taken heed of. The Department of Environment of Malaysia is dealing with all these noise hazards cases and makes necessary assessments.

In India, a step could not as yet have been taken towards this direction specifically whereas a few cases of

noise hazards have been given proper attention to, long back in few states, such as Bihar, Andhra Pradesh, Orissa, Kerala, Tamil Nadu, Maharashtra and Delhi as dealt with below:

The enactments on the use of loudspeaker as well as town nuisance acts are the two major fields upon which these states had enacted legislation long back. For instance, Andhra Pradesh Town Nuisance Act, 1889; Bihar Control of Uses and Play of Loudspeakers Act, 1955; Town Nuisance Act, Delhi, 1889; Show Nuisance Act, Bombay and Kerala, 1953; Madras Town Nuisance Act, 1889; and Town Nuisance Act, Orissa, 1889. These acts have the noise abatement provisions but these provisions are not quite adequate and have been obsolete to confront with the newly emerging levels of noise hazard. Motor Vehicles Act of 1939 and Indian Factories Act, 1948 are the only two fulfilled sets of legislations which include certain provisions on noise abatement on motor vehicles and in the factories. But the rapidly changing face of industrial, scientific and technological development in the country, has necessitated drastic modifications in these obsolete legislations which do not confront with the newly emerging situations. Government of India has constituted The National Committee on Environment Planning and Coordination (NCEPC) in 1972 to identify and investigate problems and propose solutions for improving human environment in the context of growth and distribution of population and economic development. In 1981, a separate Department of Environment has been established

by the Government for purposes of considering the overall environmental aspects affecting general public.

The ordinary legal remedies are absolutely inadequate to meet the growing needs for affective control of noise pollution. Tort remedies under the law of Nuisance and out-dated Municipal Laws are insufficient safeguards to protect individual rights, public health and safety against the inroads of noise pollution. Since modern scientific and audiometric concepts are lacking in our country, we are not succeeding in overcoming this menace. Unless individual outlook changes and we are fully informed of the serious effects we are encountered to, quieting process cannot get the desired results. This requires environmental education to be imparted to our large population.

In our legal framework, certain provisions are there in the Indian Penal Code and Law of Tort, regarding the public nuisances. Indian Penal Code under section-268 provides for public nuisance which public in general has caused common injury. Excessive noise emission is also covered under this section, and the person(s) responsible for causing such nuisances are likely to be prosecuted.⁴⁸

48. Ratan Lal Dhiraj Lal, Indian Penal Code (Bombay, 1972). See also, Kiron Mal Bishambar Dayal v. The State, A.I.R. 1958 Punjab. 11(12). Bhandari, C.J. Observed: "It has been established by the evidence on record that the factory in the present case created distressing noises and vibrations which render the occupation of the property in the neighbourhood unsafe and uncomfortable. It seems to me that the existance of the factory is a nuisance for the expression 'nuisance' includes every act or illegal omission which causes danger or annoyance to the public or the people in general who dwell or occupy property in the vicinity".

In the Law of Tort, noise is covered under public or private nuisance. Noise may either be public nuisance or private nuisance. Public nuisance is a crime and is interference with the rights of public in general, whereas private nuisance is a civil wrong. It is unreasonable interference; interference with the use or enjoyment of land and have caused some damage to others' property.

There are few cases on the nuisance of noise, which will highlight the points more clearly:

In the Heath v. Mayor of Brighton,⁴⁹ the Court refused to grant injunction to the trustees of a Brighton Church to restrain "a buzzing noise" from the defendant's power station. It was found in this case that the noise did not cause annoyance to any other person but the trustees, nor was the noise such as could disturb the attention of ordinary persons attending the church.

In Christie v. Davey,⁵⁰ the defendant being irritated by considerable amount of music lessons by the plaintiff, a music teacher, living in the adjoining house, disturbed the plaintiff by hammering against the party wall, beating of trays, whistling and shrieking. The Court granted an injunction against the defendant J. North said, "In my opinion the noises which were made in the defendant's house were not of legitimate kind".

49. Heath v. Mayor of Brighton, (1908) 98 L.T. 718; 24 T.L.R. 414.

50. Christie v. Davey (1893) 1 Ch. 316.

In Ball v. Ray (1873),⁵¹ it was contended that disturbances to neighbours throughout the night by the noises of horses in a building which was converted into a stable was a nuisance.

In Bellamy v. Wells (1800)⁵² and similarly in Wakler v. Brewster (1867),⁵³ it was held that attraction of large and noisy crowd outside a club kept open till 3 A.M. and also collection of noisy and disorderly people outside a building in which entertainments by music and fireworks have been arranged for profit, are both the instances of nuisance.

In a recent case Radhey Shyam v. Gur Prasad,⁵⁴ plaintiff alleged that the proposed flour mill of the defendant would cause nuisance to the plaintiffs, who were occupying the first floor portion of the same premise and plaintiffs would lose their peace on account of rattling noise of the flour mill. Heald, that substantial addition to the noise in a noisy locality by running of the mill seriously interfered with the physical comfort of the plaintiffs and thus, amounted to nuisance and the plaintiffs were granted injunction.

These are the nuisance cases under the law of Tort which gives relief to the affected person from noise but it depends on the nature of the case as to whether a particular noise amounts to nuisance or not.

51. Ball v. Ray (1873) L.R. 8 Ch. App. 467.

52. Bellamy v. Wells (1800) 60 L.J. Ch. 156.

53. Wakler v. Brewster (1867), L.R. 5 Eq. 25.

54. Radhey Shyam v. Gur Prasad, A.I.R. 1978 All. 86.

In the Motor Vehicles Act, 1939, there are certain provisions which directly or indirectly affect in reducing the noise emission by the automobiles. Chapter V contains certain sub-sections in section-70(1) which impose restrictions on the construction equipment, and maintenance of Motor Vehicles due to excessive noise emission by or caused to vehicle; certain restrictions are on the use of audible signals at certain times or places like hospitals, schools, etc; and prohibiting the carrying of appliances likely to cause annoyance or danger.⁵⁵ On the basis of these provisions enumerated under Chapter V, certificate of fitness (Sec. 38) and issuance of permit (Sec. 59(1)(a) and cancellation of permit under section-60 and the claims permissible under section-110(1) are regulated. In spite of these provisions of Motor Vehicles Act, noise pollution created by fast increasing vehicles on the Indian roads is increasing and now has exceeded more than the levels in many advanced countries.

The industrial noise can be abated to some extent by the effective implementation of the Factories Act, 1948. Under section-41, necessary safety measures by providing equipments and devices and other measures should be taken if so required. Section-89(1) provides for the notification of the contact of noise-induced hearing loss, (exposure to high noise levels) (specified in (22) of the schedule of Notifiable Diseases)

55. The Factories Act, 1948 (as modified upto 1 May, 1977) (New Delhi : Govt. of India, Ministry of Law, Justice and Company Affairs), Section-41, Section 87(a) (c) (d) (e) (f) and Section-88.

to the prescribed authorities. The Doctor's report of hearing loss should immediately be made to the concerned authorities. Under Section-90(1) prompt enquiry is instituted in the cause of occupational disease, and if found guilty can be dragged for redress in the Court of Law. In spite of so many safeguards in the Act preventing against noise hazards, occupational noise has reached to an alarmingly harmful level and no effective implementation of these rules and regulations are made for getting redress by the workers.

In view of the recent resentments among the public inhabiting near Delhi and Bombay airports, certain protective measures are taken. In Delhi as well as at other major Indian airports restrictions on the use of certain equipments and limitations on operations particularly during night, are implemented here for reducing noise.

In Bombay's Santa Cruz Airport, the Following measures have been adopted to give relief to the residents in its vicinity:⁵⁶

1. aircraft using runway 27 to climb straight ahead to 1500 feet and execute turn only when clear of land;
2. aircraft not to fly low in the circuit area and that the circuit height for training aircraft should be 2000 AGL and this height has to be maintained till the aircraft is turning base leg;

56. G.S. Gupta, "Noise Pollution at Airports", in V. Ramamurti, ed., Proceedings of the National Symposium on Port and Airport Sanitation, Bombay, 26-31 December, 1977 (New Delhi, 1978), pp. 150-1.

3. training flights not to be undertaken beyond 22.00 hours and even during day light hours on Sundays;
4. aircraft belonging to flying clubs not to fly east of railway line and thus avoid fly over populated area;
5. no height operations to take place at Juhu.

Alongwith these measures, India is abiding by the rules and regulations and adopting the technical procedures laid down by the International Civil Aviation Organisation (ICAO) since India is a member of ICAO. Annex-16 of the ICAO contains all the rules and regulations regarding the control of aircraft and airport noise. India also does not have sufficient domestic technical capabilities to regulate it's air traffic. Almost all the problems of ICAO member nations are encountered by India also and it is taking measures to abate aircraft and airport noise according to the ICAO guidelines.

Eight Chapters of Annex-16 of the ICAO deal in detail with the airport noise. The broad outlines are as follows:⁵⁷

Chapter-I contains the administrative aspects of the aircraft noise control by aircraft noise certification.

Chapter-II contains the subsonic jet aeroplanes - application for certificate of air worthiness for the prototype accepted before 6 October 1977.

Chapter-III contains the application for certificate of airworthiness for the prototype accepted on or after 6 October, 1977.

57. International Standards and Recommended Practices: Environmental Protection: Annex-16, To the Convention on International Civil Aviation (Geneva:ICAO, 1981), vol. 1 (Aircraft Noise), edn. 1,

Chapter-V deals with the propeller-driven aeroplanes over 5700 kg.

Chapter-VI deals with the plans not exceeding 5700 kg.

Chapter-VII deals with propeller-driven strole-aeroplanes, and

Chapter-VIII deals with the helicopters.

The Indian noise quantum and it's abatement measures are quite inadequate as is the case of many developing nations. These nations are experiencing environmental problems, attitudes and preferences which are by and large identical to one another. National sovereignty requires that developing countries, as well as others, be given the maximum scope to design their internal environment and developmental priorities. Moreover, population pressures and the necessity for rapid economic development may induce them to use technology which produce quick payoffs at the expense of grave, longer term costs to other nations' environments as well as their own.

CHAPTER V

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ROLE OF INTERNATIONAL AND REGIONAL AGENCIES

The environmental protection problem is not the same in developing countries as in the developed ones. This divergence springs, naturally, from different perceptions of national interests and national problems which have been elaborated in the Founex report. According to the report, the effects of developments pattern change the environmental issues. In the developed nations, noise pollution, for instance, has increased to a harmful proportion. This is the outcome of a high level of economic development, creation of large productivity in industry and agriculture, the growth of complex systems of transportation and communication and of massive urban conglomeration. But on the other hand, unlike the developed world, millions of peoples in Latin America, Africa and Asia, are engaged in a better struggle for survival, and are faced with the task of rapid industrialisation and utilization of all available resources. Although increasing attention is being paid in many countries to health problem arising from noise, only in a few countries there has been some systematic attempt to assess the extent of the problem on a national scale. However, there are indications of increased international co-operation in the area of noise control.

1 1. "Founex Report" (reprinted in Annex 1 to U.N. Doc. A/CONF. 48/10, 22 December 1971), pp. 3-10.

As far as the remedial measures are concerned, developed countries have promulgated noise abatement enactments for controlling industrial traffic, aircraft and other noises. But in the developing nations, there is dearth of specialised hands who could carry out an extensive and intensive noise assessment survey in all the developmental projects and consequently could derive a legislative framework.

The General Assembly in its 36th session on 2nd February 1982, session of a special character of the Governing Council of the U.N.E.P., adopted a resolution which said:²

"The General Assembly..... governed that there is need to serve the sense of urgency and commitment by Government for national and international cooperative action protect and enhance the environment, which found expression at the United Nations Conference on the Human Environment, held at Stockholm from 5 to 16 June, 1972."

In the same session of the G.A. (Agenda No. 69 (j) No. A/RES/36/192), a resolution was also adopted by the General Assembly on "International Co-operation in the field of the environment", which runs as follows:

"The General Assembly..... calls upon the UNEP to continue to play its role fully in the implementation of the International Development Strategy for Third United Nations Development Decade and stress the needs for all governments and bodies of the U.N. system to take environmental considerations fully into account where participating in the negotiations and conferences organised by the U.N. on subjects other than the environment."³

2 2. G.A.O.R., session-36, No. A/RES/36/189, Agenda item 69 (j), 2nd Feb., 1982.
3. G.A.O.R., Session-36, No. A/RES/36/192, Agenda No. 69 (j), 2nd Feb., 1982.

These resolutions stress on the need of giving attention to the environmental aspects of the development process in all the member nations of the United Nations Organisation (U.N.O.). It urges that environmental problems of which noise pollution is a part, will be discussed and evaluated and will be tried to be abated in every inter-governmental negotiations, and conferences organised by the U.N. through its specialised agencies.

In an International Covenant on Economic, Social and Cultural Rights, embodied legal obligations, was unanimously adopted in 1966 by the General Assembly. In Article-12 of the covenant specifically recognises the rights of each person to the enjoyment of the highest attainable standard of health. Para-2 of the same article outline the scope of the protection and includes the improvements of all aspects of environmental and industrial hygiene faced with the growing problem of environmental pollution.

In 1972, United Nations Conference on the Human Environment was convened in Stockholm, with the aim of the possibilities of co-operation to "eliminate the impairment of human environment", and to organise a worldwide defense against pollution. The Conference adopted unanimously a declaration of principles on the Human Environment. It states:

"Man has the fundamental right to freedom, equality and adequate condition of life, in an environment of a quality which permits a life of dignity and well being..."⁴

Another principle-8 favours the provision of clear and working environment and states:

"Economic and Social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that is necessary for the improvement of the quality of life."⁵

In another principle-21 of the Declaration, the Conference states:

"States have in accordance with the charter of the United Nations and the principle of International Law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction."⁶

Thus, the Conference provides for a rightful exploitation of national resources but restricts these activities with its by-products within the national jurisdiction and resulting into environmental degradation.

In the 'Action Plan' for the Human Environment', the Conference has made a particular mention of noise in the recommendation-14 which reads as follows:

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4. United Nations Conference on Human Environment, Stockholm, (U.N., 1972).
 5. Ibid., Principle - 9.
 6. Ibid., Principle - 21.

"It is recommended that the inter-governmental body for environmental affairs to be established within the United Nations should ensure that the required surveys shall be made concerning the need and the technical possibilities for developing internationally agreed standards for measuring and limiting noise emissions and that, if it is deemed advisable, such standards shall be applied in the production of means of transportation and..... to developing countries."⁷

Apart from the Stockholm Conference in 1972, various international bodies like United Nations Environmental programme (UNEP), International Labour Organisation (ILO), World Health Organisation (WHO) and a host of other bodies⁸, are concerned with the problems of noise pollution.

The contribution of International Labour Organisation (ILO) has been immense towards curbing the evils of the occupational noise. This is in fulfilment of the purpose of the ILO to ensure that minimum international standards exist for the adequate protection of workers in respect to the conditions of their employment. There are several recommendations and conventions of the ILO concerning occupational Health Services in places of employment. In a Recommendation No. 112, "The General Conference of the ILO, having concerned at Geneva by the General Body of the International Labour Office, and having

7. Ibid., Recommendation - 14.

8. A.K. Sharma and Archana Sharma, ed. Impact of the Development of Science and Technology on Environment, (Varanasi, 1981), p. 31.

met in its 43rd session on 3 June 1959, decided on 24th June 1959, the following recommendations:

"Protecting the workers against any health hazard which may arise out of their work or the conditions in which it is carried on."⁹

This recommendation includes any health hazard including noise which is an occupational evil, the workers should be protected.

In another Recommendation No. 97 which was passed on 4th June 1953, it states:

"Measures are taken to eliminate or reduce as far as possible noise and vibration which constitutes a danger to the health of workers."

This recommendation clearly categorises the noise and vibration as occupational hazards which should be reduced to a minimum level. In the same recommendation, provision for national regulations for providing legal protection has been given to all the states.

There are certain conventions concerning the protection of workers from occupational hazards in the working environment due to noise and vibration. For this purpose ILO has given the explanation as follows:

- "(a) the term 'noise' covers all sounds which can result in hearing impairment or the harm to health or otherwise dangerous;
- (b) the term 'vibration' covers any vibration which is transmitted to the human body through solid structures is harmful to health or otherwise dangerous".

9, Recommendation No. 112, International Labour Conventions and Recommendations, 1919-1981, (Geneva, 1982).

The Convention under Articles - 4,5,6,7 elaborates the noise protection measures which are as stated:

Article - 4 (1): "National Laws or regulations shall prescribe that measures be taken for the prevention and control of and protection against occupational hazards to the working environment due to air pollution, noise and vibration."

(2): "Provisions concerning the Practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods."

Under Article-7(1), workers shall be required to comply with safety procedures relating to the prevention and control of, and protection against occupational hazards due to air pollution, noise and vibration in the working environment.

Under this convention, preventive and protective measures are prescribed under Article-8 which are as stated:

Article - 8 (1): "The competent authority shall establish criteria for determining the hazards of exposure to air pollution, noise and vibration in the working environments....."

Article - 9 (1): "As far as possible, the working environment shall be kept free from any hazard due to air pollution, noise or vibration
(a) by Technical measures applied or added to existing plant or processes or otherwise.
(b) by supplementary organisational measures."

Article - 10 provides for the alternative measures to protect workers from noise vibration in case of failure of the measures taken under Article-9.

Article - 11 (1) provides for the supervisory provisions at suitable intervals, places as determined by competent authority of the health of workers from noise and vibration and medical examination should be periodically done.

Article - 11 (3) provides for an alternative employment for those found to be medically advised so or to support that workers through social sincerity measures.

Article - 12 provides for a prescribed operating condition of the process, substances, machinery and equipments in order to reduce 'noise and vibration'.

Article - 13 states:

"All persons concerned shall be adequately and suitably:
(a) informed of potential occupational hazard in the working environments due to air pollution, noise and vibration, and
(b) instructed in the measures available for the prevention and control of and protection against, those hazards."

Article - 15 deals with the appointments of competent persons to deal with matters pertaining to the prevention and control of noise and vibration in the working environment.

Another Recommendation No. 156 provides for the protection of workers against occupational hazards in the working environment due to noise and vibration. Prevention and protection measures are states as follows:

- (1) (a) "the competent authority should prescribe the nature, frequency and other conditions of monitoring of air pollution, noise and vibration in the working environments to be carried out on the employer's responsibility. (b) special monitoring in relation to the exposure units referred to in Article - 8 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, should be undertaken in the working environment when machinery or installations are first put into use or significantly modified or when new processes are introduced."
- (2) "Processes involving air pollution, noise or vibration in the working environments as defined in Article-3 of the Working Environments (Air Pollution, Noise and Vibration) Convention, 1977, should be replaced as far as possible by processes involving less or no air pollution, noise or vibration."

The ILO has fixed the standards for the emission levels of machinery and installations in appropriate cases under this recommendation and an obligation to ensure compliance with these standards should be placed on the manufacturer or the supplier of the machinery or installations. The workers' health supervision provided in Article-11 of the Working Environment (Air Pollution, Noise and Vibration) Convention, 1977, should include -

- (a) a pre-assignment medical examination;
- (b) periodic medical examination at suitable intervals;
- (c) biological or other tests or investigations which may be necessary to control the degree of exposure and supervise the state of health of the worker concerned;

The Convention also provides for the measures to promote training and information of all persons concerned relating to prevention and protection against occupational hazards in the working environment due to noise and vibration.

With the exception of the United States, where the competence to legislate on most of these matters covered in the Covenant resides in individual states, the Convention has been ratified by most major industrial nations including the Soviet-Union, but only a few of newly developing nations. The Recommendation, although not contractually binding, gives rise to certain legal obligations which limit municipal discretion. A state, for example, is under an obligation to submit the Recommendation to the competent national authority within 18 months and to inform the Director General of the ILO, of the measures taken to discharge their obligation as well as to report the position of their law and practice on the matter dealt with in the Recommendation.

As for the control of aircraft noise, in nearly 149 member nations of International Civil Aviation Organisation (ICAO), this international agency has done remarkable job in reducing the aircraft noise during flights as well as at the landings and take offs. Supersonic overflights are also regulated by ICAO so as to avoid its boom effect on the urban population inhabiting near the international airports and other areas as well.

There are regional agencies also which deal with the environmental aspects of different regional development and try to correct the illeffects of these hazards. One such agency is European Economic Commission (EEC). Community's many policies are connected to a lesser or greater extent to combating environmental deterioration.

International and regional agencies are not sufficient to take up and implement environmental guidelines in different countries because developmental aspects of the countries are under domestic jurisdiction. International agencies can impart recommendations and help to the national agencies to execute the domestic regulations only. For this purpose the role of national agencies is immense in improving and maintaining the country's environment. As also the effects of hazards like noise is confined to one nation, its remedy should be local. At the national level, environmental agencies are set up in almost all the industrialised countries. In India as well as other developing countries, attempts are being made to establish similar agencies to tackle environmental problems alongwith the developmental aspects which have been elaborated earlier.

The factories Act of 1948, amended in 1976, includes many provisions, for controlling pollution including noise. The Motor Vehicles Act, 1939, amended in 1971 also includes noise abatement provisions in automobile traffic rules.

Besides many national bodies have been protecting environment in India like the National Environmental and Engineering Research Institute of Nagpur; National Botanical Research Institute; National Remote Sensing Agency, Hyderabad; National Institute of Occupational Health and the Central Board for the Prevention of Control of Water Pollution.

The National Committee for Environment Planning and Coordination (NCEPC) is the most important organisation involved in environmental problems, which was set up in 1972 primarily at the initiative of the Prime Minister after the U.N. Conference on Human Environment in Stockholm. The main objective of this committee is to identify, investigate and propose solution to problems of environmental degradation resulting from haphazard development, and population explosion. This Committee also keeps a close vigil over the industrial and other economic development within the country. It had recommended after studying the Industries (Development and Regulation) Act, 1951, that stern steps should be taken to ensure that new industrial units follow steps to check pollution right at the planning stage itself. It advises the government on environmental policies through two distinct sub-committees, Environment Research Committee and Man and Biosphere Committee. The NCEPC finances the projects involving effluents, metals, pesticides, air, water, and noise pollution. It conducts seminars, Symposia and Curriculum development in environmental education in collaboration with appropriate agencies like the

University Grants Commission and National Council for Education Research and Training. Unplanned industrial development has posed a threat to our environment. This has led to the setting up a panel to review the existing legislative measures and administrative arrangements, required for correcting the environmental pollution. A Parliamentary Committee headed by the Deputy Chairman, Planning Commission, submitted a report and the Scientific Community is anxious for adequate steps to be taken for safeguarding our national heritage. This recommendation has led to the establishment of Department of Science and Technology with the powers for initiating legislation. The inclusion of a Clause on Ecology and Environment in the framework of the Sixth Five Year Plan (1980-85), Chapter H. P. 29) indeed indicates a pragmatic approach to the problem and has added a new dimension to our national planning.

These measures towards environmental protection can be taken up by the national agencies but the problem can only be satisfactorily tackled if attacked at the grassroot level - the local level. Municipal bodies have been forced to become polluters because of their inability to enforce the environmental protection laws and other laws properly and rigorously. Sufficient powers have been conferred upon the local bodies to deal sternly with individual polluters, whether they are indulged in domestic or industrial activities.¹⁰

10. M.K. Balachandran, "Environmental Pollution and the Law: Environmental Pollution and Urban Administration" Centre for Urban Studies: Indian Institute of Public Administration (New Delhi) Dec. 1977, p. 52.

CONCLUSION

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Unwanted noise is increasing incessantly in almost all the industrial and urban centres of the world. But the problems of noise are not identical in developed and developing countries.

In the late sixties, in most of the industrialised or developed nations noise pollution started becoming visible because of over-industrialisation. Quite a few protective measures are taken to abate noise. Anti-noise legislations are enacted and applied on noise sources. The noise tolerance capacity of the people in these countries is also very low due to their affluence, rising living standards and better working and living conditions. This necessitated a considerable reduction of noise level.

On the other hand, in the developing nations, the matter of great concern is under-development. The pressing basic requirements of the exploding population has necessitated an improved economic conditions through industrialisation. Priority has to be given to control of lethal and severely incapacitating diseases than to the occupational diseases or the diseases contacted due to noise. Although people have the susceptibility to higher noise level in developing countries than the developed ones, still they should not be exposed to the intensive noise which is harmful to human physiology. Difficulty will arise in noise measurement in different industries and occupations. For this purpose,

help and assistance may be sought from the role of national, regional and international agencies to abate noise which have already been discussed in the Chapter-V. National agencies are having the maximum liability since the noise pollution is in most cases local problem. Local remedies will, therefore, be most effective. National level legislations should be promulgated and implicated according to the needs and requirements in individual industry and other sources like traffic and construction work, etc. Before the promulgation of uniform and basic control laws, a general survey of the problem including its methods, instruments to be utilised and standards should be taken; the definition of harmful noise levels by intensity, frequency and duration of exposure should be given and the persons, places and circumstances where law applies should be mentioned. The law should also provide for the details of enforcement agencies and penalties for infringement. Medical examination should be certain specific standard so as to apply effectively on the event of noise-induced hearing loss. Individual and collective protective devices from noises should bear instructions regarding their uses categorically.

On the regional levels, there are many agencies like European Economic Commission (EEC), Organisation for Economic Co-operation and Development (OECD), etc. These agencies are responsible for taking all sorts of developmental actions in any of the member nations according to the provisions of their

agreements. It generally includes the provisions regarding environmental pollution and many steps have been taken to modify the developmental pattern so as to improve the environment. These agencies have an opportunity to play an important role in the member countries, since they have a say in the matters of national jurisdiction. Backed by a stronger political will on the part of member countries, these agencies can play a better role towards improving environment with the help of better technological and financial aid.

On international level, there are also a few agencies like International Labour Organisation (ILO), World Health Organisation(WHO), etc., who are contributing a lot towards a better environment by reducing environmental pollution including noise pollution, through expert know-how and other assistance to the countries. WHO is mainly concerned with the health and welfare of the people at large. Protection from diseases - occupational and otherwise, are the main field of activity of this organisation. ILO looks after the welfare of the industrial workers throughout the world. It advocates better working conditions in different occupations, suggests measures for analysis of occupational diseases and their remedies, etc. ILO gives comprehensive recommendations to all it's member nations persuading them to enforce these specific measures through their national legislations. These global agencies propagate environmental education among the people throughout the world. They should carry out their

obligations through international conferences, demonstrations and monetary incentives. A comprehensive educational programme on noise must apply to architects, factory inspectors, industrial medical officers, machine designers and manufactures, suppliers of measuring equipments, engineers, trade union officials and factory managers. The medical aspect of noise pollution is the hearing impairment which should be taken care of by WHO by way of establishing a body of experts in each country with thorough knowledge of the subject. These experts should be fully capable of developing and directing the control activities against noise pollution.

Above all, there is the United Nations Organisation (UNO) which is taking due measures to reduce environmental pollution including noise pollution through it's specialised agency United Nations Environment Programme (UNEP) having it's secretariat at Nairobi (Kenya). The United Nations Conference on Human Environment in Stockholm in 1972 and the conference on "Urban Habitat" in 1976 have discussed in detail the environment pollution where there was an unanimous agreement on the need for decentralisation of cities and metropolitan areas for reducing concentration of population. These should be used as guidelines by those entrusted with the solution of the environmental problems of industrial centres and urban conlomerations in the developing nations. The U.N. Charter has provided for equal State Soverignty to the member states to exploit their own resources pursuant to their own

environmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. Thus, international law is also directed towards environmental protection against noise and other pollutants in the process of national development. This has also been clearly mentioned in the provisions of the Stockholm Declaration. Only through further concerted efforts can a truly global environmental law be established.

In the Indian situation, noise pollution is becoming day-by-day an alarming factor in the industries, by the side of highways and nearby international airports. The developmental process is gaining momentum rapidly, thus, bringing up a simultaneous increase of noise. The existing technology which is the catalyst of our industrialisation lacks the precautionary measures from its side-effects which emit noise. Proper modification should be brought about in these technologies. Other measures may include a thorough scrutiny at various levels of the proposed Council on Environmental Quality for granting of industrial licences may be made public for inviting reactions from public at large, and the reviewing agency should take necessary steps to control noise accordingly.

Another remedy of excessive noise is to create incentive for the use of quiet technology so that noise may be reduced at its source which requires latest scientific research and inventions in this sphere. A large portion of noise from air

and vehicular traffic can be reduced by modifying the engine designs.

Mutual exchange of knowledge on this problem between different nations is vital. Health Information Centre of the ILO has made a praiseworthy attempt to break down this isolation and brought about substantial co-ordination on this count. With a view to bring about proper co-ordination and a comprehensive analysis of the problem, not only publications and periodicals on the subject, but also setting up of permanent committees entrusted with the periodic review and summarising world's literature of importance, is necessary.

There has been very few systematic attempt to assess the extent of the problem on the national scale. Reliable and comprehensive data are not sufficiently available. Medical reports and records are not adequately complete to determine the magnitude and diversity of the problem of hearing impairments resulting from noise pollution. In most of the countries, there is a lack of a large scale audiometric and screening programmes for locating cases. There should be encouragement of doctors for carrying out hearing assessment and to record the result in reference to recognised standards.

To sum up, a genuine inter-disciplinary approach to deal with the problem of noise pollution is a matter of great urgency. Mere legislation will not solve this problem to any satisfactory extent, and therefore, the need for waging a war against noise on all fronts. It is vital to build up

public opinion against noise pollution and to launch a noise abatement programme. The role of mass-media, here, can be of utmost importance. Public relations and liaison between local administration, health departments and business organisation should encourage voluntary actions in this regard. Citizens individually and in groups have a certain role to play to suggest new legislation on this count, both at central and state levels. It requires a concerted effort of all concerned with various sectors of the economic development of the country in order to meet the challenge posed by noise pollution.

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