

## THE DAMAGING COMPONENT NOISE OF THE ENVIRONMENT PRESENT POLLUTION

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**ABSTRACT:** In contrast to many other environmental problems, noise pollution continues to increase thanks to industrial, social and transportation field development. The paper analyze specific aspects on the impacts of noise on health. The impact of phonic pollution on human health beings depend on the person’s character, the complexity, type and intensity of noises. These can be either immediate and transient, or long-term, leading to physical exhaustion and nervousness, insomnia, bulimia, chronic arterial high blood pressure, anxiety, depressive even aggressive behaviors, as well as traumatic consequences, lesions, all of a sudden produced by a loud noise, even short-term ones, seriously and irreversibly damaging both hearing and health.

**KEY WORDS:** noise pollution, noise health impact, sound, human health, vibrations.

**1. INTRODUCTION.** Noise pollution is a major problem in cities around the world. Noise is defined as unwanted sound. Environmental noise consists of all the unwanted sounds in our communities except that which originates in the workplace. Environmental noise pollution, a form of air pollution, is a threat to health and well-being. It is more severe and widespread than ever before, and it will continue to increase in magnitude and severity because of population growth, urbanization, and the associated growth in the use of increasingly powerful, varied, and highly mobile sources of noise. It will also continue to grow because of sustained growth in highway, rail, and air traffic, which remain major sources of environmental noise. In factory workplace, workers are exposed to high noise due to machinery in routine.

Phonic (sonorous) pollution represents an important component of the environment pollution, both by having a harmful character and by being present in all the compartments of modern life, sonorous pollution is a major problem for all the economically developed countries, as well as for the ones in the

process of economic development. This is a consequence of the anthropic activity.

*Phonic pollution* represents a continuous aggression, determined by various noises produced by cars, tools, industrial and household appliances, either within or outside buildings.

*Noise* can be defined as sonorous vibrations with no recurrent character, spreading throughout different environments (air, water, etc.) negatively affecting the human ear. According to Larousse, noise constitutes an assembly of sounds having no harmony.



*Figure nr.1.Noise pollution*

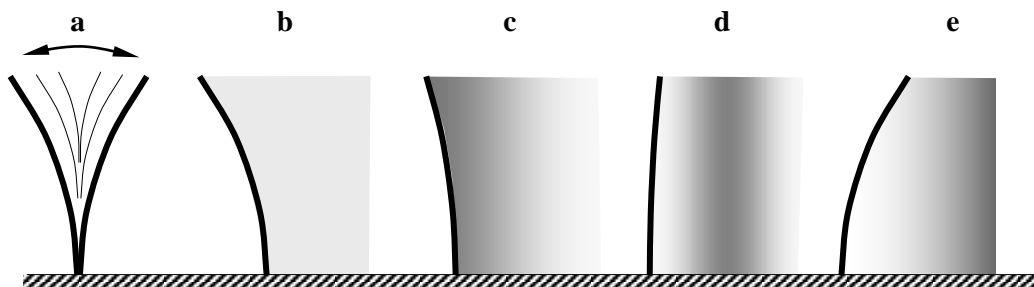
**2. ASPECTS REGARDING SOUNDS AND VIBRATIONS.**

Physically, sound represents an undulating movement of the material particles of a certain environment. Hearing is a vital function for both survival and communication, a function affected by the sonorous pollution. Sound is a form of physical energy created by the vibrating objects. These *vibrations* are being transmitted as either high or low pressure waves irradiating from the surface of the object. Phone is the measurement unit of the hearing intensity level, representing the height level of the standard sound having a

frequency of 1000 Hz, whose acoustic pressure is equal to the threshold pressure (the minimal acoustic pressure, for a given frequency, producing a perceivable hearing sensation by humans:  $p_{a,0}=2.10^{-5}$  N/m<sup>2</sup>). *Frequency* (the number of vibrations cycles produced within one second). Generally, the hearing beach (the audibility surface) is comprised between 16 and 16 000 Hz (cycles/s). The sounds under 16 Hz are called *infra-sounds*, whereas those above 20000 Hz-*ultra-sounds*.

**Table nr. 1.** Values of the hearing intensity level.

Nr. crt.	Practical conditions	La (phones)
1	The rustle of leaves	10
2	Quiet street, with homes	30
3	Moderate transport street	60
4	Office for copying documents with writing machines	70
5	Discotheque	110
6	Plane engine, at about 5 m away	120



**Figure nr. 2.** Transmitting sonorous waves by air. a. the vibration of an elastic blade; b. c. d. e. compression and relaxation stages of the air.

## THE IMPACT OF NOISES AND VIBRATIONS ON HUMAN HEALTH.

The potential health effects of noise pollution are numerous, pervasive, persistent, medically and socially significant. Noise produces direct and cumulative adverse effects that impair health and that degrade residential, social and working environment with corresponding real (economic) and intangible (well-being) losses. Noise represents an important public health problem that can lead to hearing loss, sleep disruption, cardiovascular disease, social handicaps, reduced productivity, negative social behaviour, annoyance reactions, absenteeism and accidents. It can impair the ability to enjoy one's property and leisure time and increases the frequency of antisocial behaviour. Noise adversely affects general health and well-being in the same way as does chronic stress. It adversely affects future generations by degrading residential, social, and learning environments with corresponding economic losses.

The effects depend on the person's character, on the complexity, type and intensity of the noises. The immediate transient effects consist in cardiovascular diseases (rise of the cardiac rhythm and of the arterial pressure), attention diminishment and of the memorizing capacity, restlessness, eyesight lowering, gastro-intestinal diseases. Yet, the long-term effects lead to physical exhaustion and nervousness, insomnia, bulimia, chronic arterial high pressure, anxiety, both depressive and aggressive behaviors. The noise may produce a phenomenon of auditory exhaustion, sonorous traumatism, as well as professional deafness at the level of the auditory organ.

1. *AUDITORY EXHAUSTION* is characterized by a temporary lowering of the auditory perception threshold; it increases once with the intensity increase, frequency and exposure period to the noise. Thus, a noise having the intensity above 92 dB and a frequency comprised between 500-800 Hz brings about a temporary

decrease of hearing, after 60 minutes of exposure.

2. *SONOROUS TRAUMATISM*, suddenly produced by a loud noise, even for a short period, can bring about the break of the ear drum. Such situations occur in case of explosions, shots, massive gases eruptions from pressurized recipients. After healing the wound, deafness for sounds having a frequency above 9000 Hz may persist.

3. *PROFESSIONAL DEAFNESS* is caused by carrying out certain activities seriously exposed to noises. Deafness caused by noises is characterized by an irreversible final loss of hearing.

The anthropic activity, sometimes natural causes may lead to a disorderly superposition of sounds, therefore producing noises.

The damaging effect of noise is directly proportional to its duration, so, when it surpasses the tolerance limit, it can give birth to a dangerous psychosis to human beings. The effects of sonorous pollution are caused by infra-sounds, ultra-sounds and noises.

The frequency of the component sounds, even if some cannot be heard by human beings (infra-sounds, ultra-sounds), has damaging effects, manifested in mental disorders, lowering of physical and intellectual working strength. Research has shown that 85% of noise sources are due to automobiles, planes, helicopters, 7% to industrial activities, 4% to railways and 4% to constructions.

Unlike other types of pollution, phonic pollution continuously increases, producing more and more discontent on population. Consequently, the effects produced by sonorous pollution are not only medical, but social too, bringing about:

-poor hearing, which can be accompanied by tinnitus (noises

within the ears), appearing at frequencies comprised between 3000-6000 Hz;

-the difficulty of understanding speaking, as a secondary effect to sonorous pollution;

-sleeping disorders-this is the major effect of phonic pollution during the night or as a consequence to daylight noise; continuous sleep is a condition for a both mental and physiological good state, its lack leading to arterial high pressure increase, palpitations, vaso-constriction, breath alterations, cardiac arrhythmia; for a peaceful sleep, the sound level should be of about 30 dB;

-physiological functions damaging, for the continuously exposed workers to noise, for people living in the nearby of airports; after a long exposure, permanent effects occur, such as high blood pressure, myocardium ischaemia, reflexes alterations;

-mental diseases; sonorous pollution itself does not lead to mental diseases, but it can accelerate or intensify their latent development; exposure to high levels of noise can be associated with neuroses occurrence;

-cognitive proficiency damages: reading, attention, problem solving, memorizing, intellectual capacity;

-social and behavioral effects (such as indisposition, sorrow) which are generally complex , subtle, indirect, and they are the result of several non-auditory variables interaction; noises over 80 dB diminish civilized behavior and increase aggressiveness; the effects are stronger when the intensity of the sound is accompanied by low frequency vibrations or when the sound is accompanied by sonorous impulses;

-mixed effects on health caused by noise and other combined sources; there are various sounds belonging to various sources in the environment, and when combined, they can have a cumulative effect on organisms,

especially on the night sleeping quality;

### 3.CONCLUSION

Phonic pollution effects on human beings are complex , manifested at both physical and psychological levels. Being aware of these effects is a premise for the most accurate methods of phonic pollution reduction, so necessary for all living beings. The aim of enlightened governmental controls should be to protect citizens from the adverse effects of airborne pollution, including those produced by noise. People have the right to choose the nature of their acoustical environment; it should not be imposed by others.

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