# THE EFFECTS OF PHONIC POLLUTION ON HUMAN ORGANISM

**Crina-Adriana Drăgănescu (Gurică),** University of Petrosani, Petrosani, ROMANIA
**Emilia Simona Mocanu (Irod)** *Colegiul Tehnic "General Gheorghe Magheru", Tg*-Jiu, ROMANIA

**ABSTRACT:** The effects of phonic pollution on human 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 :** phonic pollution, noise, sound, vibrations, influence**.**

## 1. INTRODUCTION

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.

## 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: pa,o=2.10-5 N/m2). 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 |

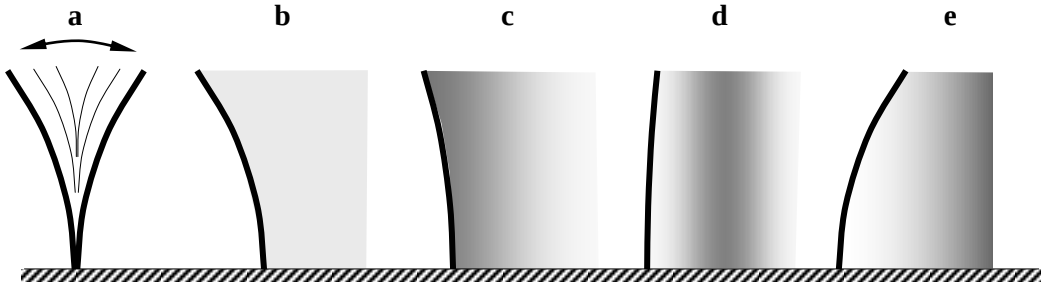


**Figure nr. 1.** Transmitting sonorous waves by air. a. the vibration of an elastic blade; b. c. d. e. compresion and relaxation stages of the air.

## 3. THE INFLUENCE OF NOISES AND VIBRATIONS ON HUMAN ORGANISM

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 arhytmia; 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.

## REFERENCES

[1]Andronescu M, The management of noise in the building sites, Technical Publishing House, Bucharest, 1996.

[2]Călinoiu M, Environment strategies, Sitech Publishing House, 2003.

[3] Ciarnau R., a.o, Ecology and environment protection, a textbook for x th grade, the Economical Publishing House Preuniversitaria.

[4] Dumitrescu L., Environment pollution and protection, Universitas Publishing House, Petroşani, 2014.