



STUDY OF THE SOURCES OF NOISE PRODUCED BY THE EQUIPMENT USED IN THE REDEVELOPMENT OF THE AREAS AFFECTED BY THE LIGNITE EXPLOITATION IN THE NORTH JILȚ EXPLOATATION

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Abstract: *The sources of noise may come from industrial areas, urban transport, areas or objects that constitute large assemblies of people. Industrial areas are an important source of noise. Important sources of noise are the machines used in the process of redeveloping the areas affected by the lignite exploitation. In this paper we propose to study what are the main sources of noise produced by the machines used in the process of redeveloping the areas affected by the lignite exploitation in the North Jilț Quarry.*

Keywords: *noise, equipment, redevelopment.*

1. INTRODUCTION

Noise, an unwanted sound, is made up of a mixture of many different frequencies within a certain range.

Different noises are distinguished by different energy distributions over several frequency ranges.

The technical evolution also brought with it an important source of noise pollution. Noise is considered a "by-product of technological metabolism", which is the most important discomfort factor for the population.

Sounds are vibrations transmitted through an elastic wave-like environment. For certain values of intensity and frequency the sounds are perceived by the human ear, producing auditory sensations.

Sounds can be simple or complex. Disturbing sounds, no matter what their nature, represent noises. Noises have a negative influence on the nervous system, causing fatigue.

In order to reduce the noise level, it is necessary to perform sound insulation works, both in civil and industrial buildings. This is necessary to stop the spread of noise occurring inside and outside the buildings.

Sounds can propagate through the air, being called air sounds or noises, or through solid environments (building elements), being called structural sounds or noises.

Noises produced by strokes are called impact noises and are transmitted both through structure (elements) and through air.

Sounds can be studied and appreciated in two aspects:

a) physical phenomenon (objective), produced by the mechanical vibration of solid and fluid bodies. In this case the sounds are characterized by specific sizes of the oscillations (waves):

- amplitude,
- period,
- wavelength,
- frequency
- pulsation,

as well as by energy quantities:

- sound energy,
- sound pressure,
- sound intensity, etc.

b) physiological phenomenon (subjective), by which the sensation perceived by the auditory organs is understood. In this situation the sounds are characterized by:

- height,
- stamp,
- level of sound strength [2], [5].

2. THEORETICAL CONSIDERATIONS

Placing back in the economic circuit of the degraded areas by mining requires redevelopment, rearranging and modeling, and then their cultivation. Rearranging mining and modeling areas are activities that require several stages of technological, namely the recovery and conservation of topsoil; building heaps, leveling the surface of heaps; land amelioration from waste dumps and topsoil deposit on leveled and improved surfaces. [3], [4]

Noise is defined as an overlapping disordered sounds of different frequencies and intensities that produce an unpleasant aggressive feeling. Sounds, infrasound and ultrasound produced by industry and transport have a harmful action, and also effects on human health, flora and fauna.

In industry noises are of different intensities and frequencies, which are with continuous or intermittent action. In the industrial environment, infrasound's, sounds and ultrasounds overlapping in terms of spectral oscillations generated by machinery and equipment, and in terms of their action on the human body.

Infrasound's belong to inaudible sound spectrum with frequencies of less than 20 Hz. Ultrasounds are having frequencies between 20 kHz, and are produced in nature, industry, or household appliances.

Acceptable limits of noise levels in the environment are determined by the characteristics of outdoor activities, or buildings functional areas considered as protected, or as a source of noise. The maximum allowable in industrial premises is 65 dB and the maximum allowable in residential areas is 55 dB. [2]

3. RESULTS AND DISCUSSIONS

Machinery used for redevelopment dumps in Career North Jilt are: cross pit opreader, conveyors, bulldozers, trucks.

Noise sources for the redevelopment works of areas affected by lignite exploitation come from machinery used in the process.

Measurements of noise levels during the work of redevelopment in the affected areas from the lignite exploitation at Career North Jilt were made with digital meter 4 in 1 PVE222. Digital meter 4 in 1 multifunction for environment was designed to combine the measurement noise, brightness, humidity and temperature measurement (Fig. 1).



Figure 1: Digital meter 4 in 1 PVE-222

Measurements were taken during the day over a period of 5 days, with an interval of 60 minutes in several points.

Measurements were performed in accordance with current standards, during the day. [1]

Measurements were performed on all equipment's used in the process of redeveloping of the waste dumps in the exploitation of lignite from Career North Jilt.

Measurements were performed on conveyor type 2000 mm, dump machine A2RsB – 6500-90, trucks and bulldozers.

In case of the occupied areas, measurements were made at a height of 1.5 m above the ground and at a distance of 2 m from the facade of the house.

Data from these measurements are presented in Table 1.

Table 1: Noise values obtained at machinery used in the redevelopment of waste dumps.

Nr. crt.	Measuring point	Measured noise values (dB)
1	Band conveyor type 2000 mm	86
2	Cross pit opreader A2RsB – 6500-90	79
3	Truck	78
4	Bulldozer	73
5	Background dump	63

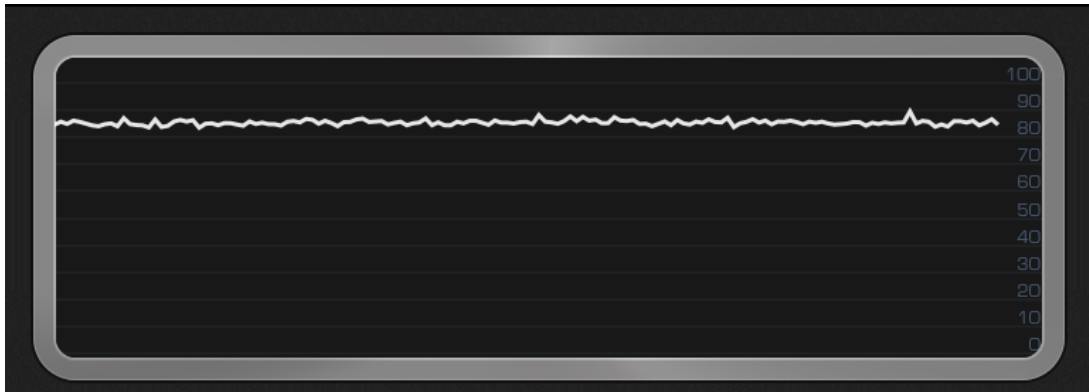


Figure 2: The amount of noise for the band conveyor type 2000 mm

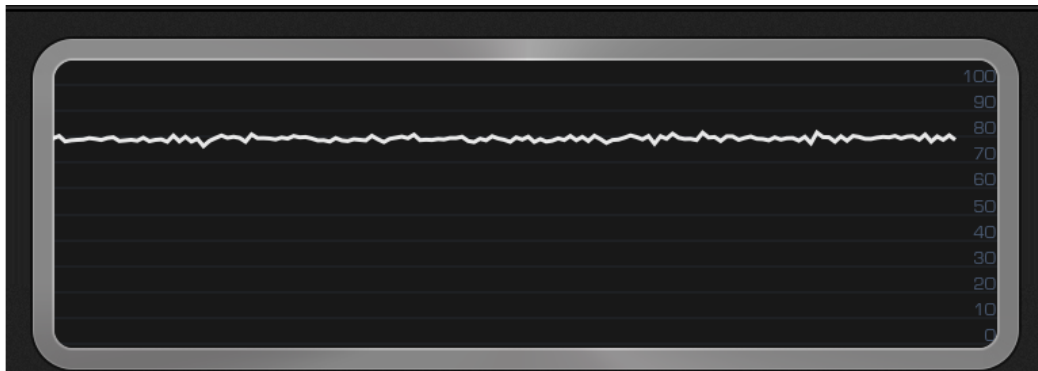


Figure 3: The amount of noise for the cross pit opreader A2RsB – 6500-90

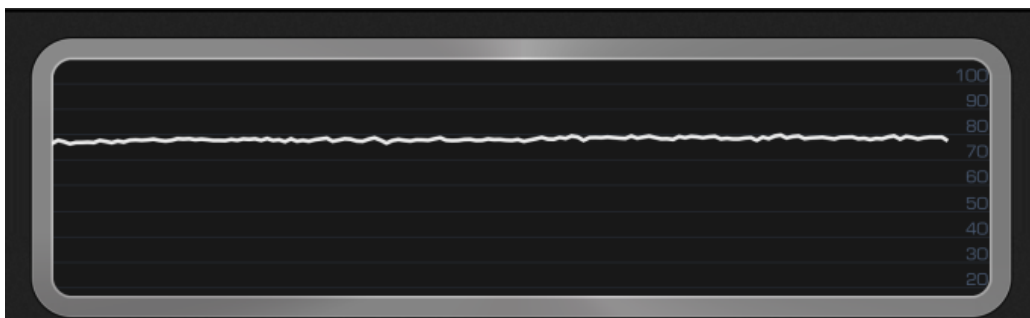


Figure 4: The amount of noise for the trucks used in the redevelopment of the waste dumps in the lignite carriers North Jilt

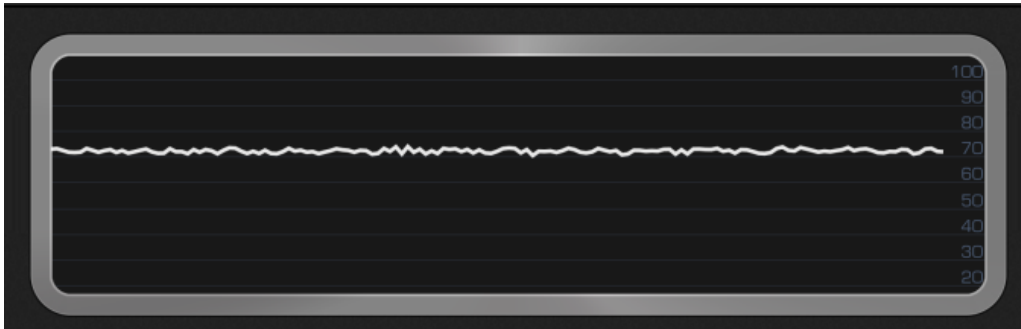


Figure 5: The amount of noise for the bulldozers used in the redevelopment of the waste dumps in the lignite carriers from North Jilt

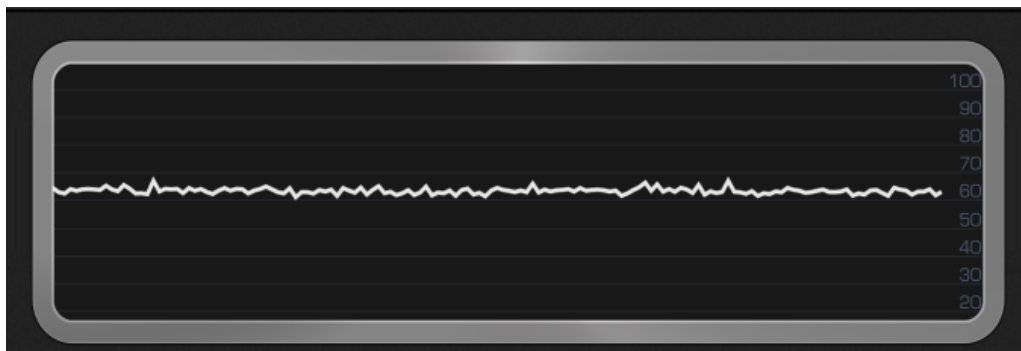


Figure 6: Background sound recorded near the sterile dump

Noise produced by equipment's used for rearrangement work of the affected areas by the exploitation of lignite in North Jilt exceeds the maximum allowable 65 dB during the day, in the perimeter of career as shown in Table 1.

3. CONCLUSION

Noise produced by equipment's used for rearrangement work of the areas affected by the exploitation of lignite in Career North Jilt exceeds the maximum allowable up to 21 dB.

This level of noise can decrease productivity; produce accidents due to reduced speech intelligibility and different temporal or permanent trauma such as being hypertension or heart disease. Noise affects man but also flora, fauna and surrounding areas.

To reduce the noise level can act directly on the equipment or the use of acoustic and soundproofing panels.

REFERENCES

- [1] A. C. Stanci, A. Stanci: Methods to Reduce the Noise Pollution Produced by Band Conveyors, *J Environ Prot Ecol*, 15 (1), 242 (2014)
- [2] Albulescu M., 2009, Poluarea fonică, *Știința și Viața Noastră – Revistă de Informare*, Asociația de Promovare a Științei, Tehnicii și Informării Corecte și a Proiectului NanoPol, nr.1, <http://www.revista-informare.ro>
- [3] D. FODOR, M. LAZĂR: Ocuparea și Reabilitarea Ecologică a Terenurilor în Zona Olteniei, *Buletinul AGIR* nr. 3 iulie-septembrie, București, 2006
- [4] G. E. MOCUTA: Noise Pollution Emitted as a Consequence of the Urban Transport Development. *J Environ Prot Ecol*, 13 (2A), 852 (2012).
- [5] I L LĂPUȘAN, M ARGHIR: Research and Developments on Noise Pollution in Industrial Environments, A XIII-a Conferință Națională multidisciplinară – cu participare internațională, "Profesorul Dorin PAVEL-fondatorul hidroenergeticii românești", Sebeș, 2013.