

## STUDY ON THE PHONIC POLLUTION DUE TO MINING ACTIVITIES IN LIGNIT CAREERS

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**ABSTRACT:** *The environmental impact of coal exploitation is significant, inevitable and irreversible, with effects on aquatic systems, air, natural mineral resources, ecosystems, climate, geomorphology and landscape, land use and human collectivity.*

*The inclusion of environmental protection measures and the ecological restoration of degraded areas in mining perimeters have the role of controlling and limiting the negative effects of coal exploitation and ensuring the restoration of the affected areas to the natural conditions existing before the exploitation started, both during the mining activity and its closure.*

*Pollution is the modification of biotic and abiotic environmental factors due to the release of pollutants, such as wastes from different sectors of human activities.*

*Nowadays, the interest in reducing pollution is growing, as the protection of nature as well as the population against the risks of this phenomenon has become an indispensable requirement.*

**KEY WORDS:** *noise level, phonic pollution, impact*

### 1. INTRODUCTION

Phonic (or sound) pollution consists of sounds produced by human activity or machinery that affect or unbalance human or animal activity. The English co-dependent of pollution is "noise" that comes from the Latin word "noxia", which could be translated as "injury, wound".

Nowadays, noise pollution along with atmospheric pollution and waste management are serious problems facing Europe's population. According to World Health Organization statistics, half of Europeans live in a permanent noise and a third suffer from insomnia due to noise pollution. Victor Gruen, a well-known urban designer, considers noise to be a "slow dead agent" (Sahoo, 1997), and Goines and Hagler (2007) state that society's ignorance of noise pollution was the same as ignoring the effects of tobacco in the 1950s. Similarly, noise pollution also affects Romania, which does not comply with the sound pollution standards accepted by the World Health

Organization and the European Union. Over 60% of the urban population is affected by noise due to intense road traffic.

The main sources of noise pollution include machinery, cars, trucks and airplanes. Construction equipment, agricultural machinery, and machine amalgam inside the plant can be dangerously noisy. Other objects such as grass cutters, firearms and some toys are equally important sources of noise pollution. Even music, if listened to at a very high volume, especially in headphones, can be as damaging as the noise of a harness. According to WHO, around 120 million people worldwide suffer from hearing impairment due to prolonged exposure to noises. One-third of Europe's employees are exposed to high levels of noise over a quarter of their work schedule, and around 40 million workers have to lift the tone above normal conversation to make themselves heard, at least half of their work program. For the protection of workers, the Noise Directive, which entered into force in all Member States of Europe in February

2006, sets a daily exposure limit of 87 dB. Among the high-risk jobs it can be mentioned: **mining** (pneumatic perforators), machine building industry (molding, cutting, punching,), textile, food, transportation, construction, agriculture, musicians, sanitary units.

## 2. NOISE POLLUTION DUE TO INDUSTRIAL ACTIVITIES IN MINERAL SURFACE CAREERS

A particular category of physical pollutants is noise and vibrations at the level of the local community where they can manifest themselves as physical stress factors. Emissions from the quarry are of several types, as a result of production sources, *fixed and mobile*.

*Fixed sources* include high-capacity, continuous-action machinery for excavation, transport and dumping of mines located in:

*A. Excavation / dump area:*

- EsRc 1400 rotor type excavators,
- A2RsB 6500/90 and MH 4400.170.
- Heaping work machines
- Conveyor belts.

*B. Transport sector - deposit - charging coal:*

- KSS loading / unloading equipment,
- ASG filing equipment,
- Conveyor belts.

*Mobile sources* include:

- bulldozer
- bucket loader
- excavator
- dumper
- compactor

- tractor

The noise emissions from mobile sources in the analyzed area are the result of the activity of:

- supply of material and spare parts at the working point of the technological flow with automotive means;
- electromechanical works and power supply;
- maintenance works on roads, trenches, drains
- environmental protection and ecological restoration.

Employee staff will generally be the most exposed to noise and vibration.

## 3. COMPARATIVE STUDY OF THE NOISE LEVEL IN PINOASA, TISMANA AND JILT CAREERS

The perimeter of the Pinoasa quarry is located in northern Oltenia south of the city of Tg - Jiu, on the right slope of the Jiu river in a hilly area, being delimited as follows:

- to the south, by Timiseni Valley;
- to the east, by Rogojelu's thermal power plant, the village of Rogojelu;
- to the north, by the Tismana career;
- western by the perimeter of natural gas perimeter.

At the opening of the quarry hearth and the creation of the necessary space for the internal dump, it was foreseen to deposit the tailings excavated in the external waste dumps: Valea Negomir heap, Garla over heap and Tismana over heap

The main receptors, at which impact of noise level can be significant, are:

- the inhabitants of the village Pinoasa on the northern boundary at approx. 250 m from the career boundary;
- the inhabitants of Rogojelu village on the eastern boundary at approx. 150 m from the deforestation limit (at present the farms in the Rogojelu Valley, located in the mining perimeter, are being resettled);

- the inhabitants of Timiseni village on the southern boundary at approx. 250 m from the working range of the quarry and approx. 250 m of the surface boundary required for the surface area required for grubbing. The noise levels from the vehicles and the means of transport used at different distances from the noise source are shown in Table 1

Table 1.

Front distance by the source of noise (m)	Noise level					
	Truck	Tractor	Moto-saw	Loader	Bulldozer	Excavator
50	65 dB	68 dB	68 dB	75 dB	73 dB	75 dB
100	59 dB	62 dB	62 dB	64 dB	67 dB	69 dB
200	53 dB	56 dB	56 dB	58 dB	61 dB	63 dB
250	51 dB	54 dB	54 dB	61 dB	59 dB	61 dB
1000	39 dB	42 dB	48 dB	44 dB	42 dB	49 dB

Emissions from the quarry are of several types, as a result of production sources, fixed and mobile. In the category of fixed sources are included high-capacity machines, with continuous action, for excavation, transport and dumping of mines:

- rotor excavators type SchRs 1400x30/7.
- A2RsB 6300.90 dumper machines;
- Heaping work machines
- Belt conveyors.

Mobile sources include: bulldozers

- bucket – loader, excavator, dumper, compactor, tractor.

The noise emissions from mobile sources in the analyzed area are the result of:

- supply of materials and spare parts at the point of work on the technological flow with means of car;
- preparation, sowing, greening, etc., required by the advance of the work fronts;

Levels of noise resulting from lignite exploitation at different distances from source are presented in the table 2.

Table 2

Work equipment	The acoustic power $L_w$ dB (A)	Front distance by the source of noise (m)	Noise level (dB)
Excavator SchRs 1400	115-125	100	67-77
		200	61-71
		250	59 - 69
Conveyor belts	85-90	100	37-42
		200	31-36
		250	29 - 34
Heaping work machines	119	100	71
		200	65
		250	63
Bulldozer	115	100	67
		200	61
		250	59
Bucket loader	112	100	64
		200	58
		250	56
Dumper	107	100	59
		200	53
		250	51
Tractor	110	100	62
		200	56
		250	54

The exploitation perimeter of the Jilt quarry is administratively located in the south-west of Gorj County, on the territory of the settlements of Matasari, Runcurel, Dragotesti, Croici, Slivilesti, Negomir, Farcasesti, Ciuperceni and Miculesti.

Table 3 shows the noise level for the equipment and means of transport used in the exploitation process at different distances from the noise source.

Regarding the activity of excavation, transport and dumping, on-site, as it is carried out in open spaces, there is no need for mitigation and reduction of noise and vibration levels other than those of proper maintenance and operation.

The noise level resulting from excavation, transport and dump at the habitable boundary is shown in Table 4.

Table 3

Front distance by the source of noise (m)	Noise level (dB)						STAS 10009/1988
	Bulldozer	Excavator	Loader	Dumper	Compactor	Tractor	
50	73	75	70	65	64	68	
100	67	69	64	59	57	62	
200	61	63	58	53	51	56	65 dB

Table 4.

Work equipment	The acoustic power L <sub>w</sub> dB(A)	Front distance by the source of noise (m)	Noise level (dB)
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		200	61-71
Conveyor belt	85-90	100	37-42
		200	31-36
Heaping work machines	119	100	71
		200	75

Taking into account the distance between machine work areas to the nearest receiver (inhabited limit) and topography of the ground, it can be estimated that the sound levels will be less than 65 dB (A).

#### 4. CONCLUSIONS

Important forms of pollution include noise pollution, especially in industrialized areas, which can seriously affect the quality of life.

The efficiency of solutions to reduce noise levels to the limits allowed by the rules can be ensured under the following conditions:

- periodically measuring noise levels, informing the affected community and drawing up appropriate programs of measures;
- the achievement of the measures established in the technical studies (environmental balance, impact study, compliance program, etc.), under the conditions of medium-term cost balancing (2-4 years).

EU Directives and the actions of international bodies require the implementation of new strategies (ecological development, ecological economy, etc.), aiming at:

- reducing energy consumption;
- increasing the share of renewable energy

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