

NOISE POLLUTION IN THE COURSE OF THE STEPS OF PREPARING THE MINING FIELD FOR THE OPERATION OF THE OPEN CAST MINE PINOASA

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

Key words: pollutants, parameters, noise level monitoring

1. Introduction

The perimeter of the Timiseni-Pinoasa open-cast-mine is situated to the West of the Rogojelu Thermal Power Station, delimited to the South by Valea Timiseni or Timiseni Valley, to the East by the Rogojelu mine perimeter, to the Nord the open-pit-mines Tismana I and Tismana II, and to the West by the Glavan Hill or Dealul lui Glăvan. The exploration network is appropriate for opening and capitalizing coal through surface mining work.

The opening of the Pinoasa mining perimeter was carried out between 1983-1987, by putting into operation large capacity equipment (starting in 1987) in order to achieve a production capacity of 8000 thousand t / year.

The opening mining work was preceded by the execution of the protection works against the inflow of water coming from both the perimeter of the exploitation and the groundwater horizon, by realizing the South - Timiseni slope guard channel , respectively hydro - technical work at the external dump.

For the collection, management and evacuation of the water from the perimeter of operation, there were built stage channels and pump stations at the quarry hearth, with discharge into the Timișeni Guard Channel. During the period 1983-2000, the pace of the opening works increased and the production of coal oscillated from 5270 thousand tons / average discovery ratio of 8.1 m³ / t in the period 1983-1990, to 10196 thousand tons during 1991- 2000 / Average discovery ratio of 6.7 m³ / ton.

During the period 2001-2010, the modernization of the first large capacity equipment was carried out, with coal production recording oscillations from 1,700 thousand tonnes / average discovery ratio of 6.2 m³ / ton in 2001, to 1690 thousand tonnes in 2010 / average discovery ratio of 5.1 m³ / ton, with a significant increase of 1777 thousand tons in 2008 / average discovery ratio of 6.6 m³ / ton.

Surface Equipment For the start of mining operations it was necessary to carry out surface construction works, which ensure the proper development of the technological works, the interventions and the service of the open-cast-mine.

2. Noise pollution generated by mining activities

A particular category of physical pollutants is noise and vibrations in the local community where they can manifest themselves as physical stress factors.

The main receptors, at which the impact may be significant, are:

- the inhabitants of the village of Pinoasa on the northern boundary at approx. 250 m from the open-pit-mine boundary;
- the inhabitants of the village of Rogojelu on the eastern boundary at approx. 150 m from the open-cast-mine operation limit and approx. 250 m of the surface area required for deforestation (currently 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 operating range of the open-pit-mine and approx. 3500 m of the surface area required for grubbing or deforestation.

3. Characterization of the noise level at the limit of the inhabited area

Stage of mining field preparation for exploitation (ground clearance and soil recovery) Machinery that performs specific technological operations will produce noise and vibration primarily felt by workers in working lanes. The highest levels of noise and vibration can be recorded at the stage of realizing the investment by:- mining field preparation works for exploitation mainly represented by deforestation, fertile soil recovery and the decommissioning of the displaced inhabitants' households;- supply of material and spare parts at the working point on the technological flow with automotive means;- electromechanical and power supply;- maintenance of roads, ditches, canals;- environmental protection and ecological restoration. The main receptors have been identified, the impact of which can be significant: for the inhabitants of Pinoasa, Rogojelu and Timiseni; The acoustic power for different equipment used is:- truck - 107 dB (A)- tractor - 110 dB (A)- charger - 112 dB (A)- motorcycle engine - 110 dB (A)- bulldozer - 115 dB (A)- excavator - 117 dB (A) For the calculation of the noise level resulting from the machines and means of transport, the following formula can be used:

$$L_p = L_w - 10 \log(r^2) - 8 \quad (1)$$

in which:

L_p - the noise level

L_w - acoustic power

r - distance from the noise source (used in the case of noise propagation from a point source on a flat ground).

Based on acoustic power data and based on the aforementioned relationship, the noise levels resulting from the used transport equipment and means can be determined at different distances from the noise source. These are presented in the table

Table 1. Noise level resulting from the machines used for different types of works

| Front distance by the source of noise (m) | Noise level | | | | | |
|---|-------------|---------|---------------|---------|-----------|-----------|
| | Truck | Tractor | Motor-hacksaw | Charger | 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 |

It is estimated that the noise level will reach 90 dB for short periods of time. This is the maximum estimated value to be produced on site; it results that sound pollution has significant effects only in the vicinity of work sources, not affecting neighboring local communities. As an average in the inhabited area, the sound pollution will be kept below 65 dB, the maximum permissible noise level at the boundary of industrial enclosures in urban areas, according to STAS 10009-88. Only the car transport activity, when vehicles pass through the localities, can cause disturbing noise and vibration. The value of the noise level calculated at the nearest home is purely indicative and represents the maximum noise level recorded at the boundary of the protected receiver due to the activity of the proposed target, in the absence of other sources of noise in the area. The high level of noise and vibration will be perceived with greater amplitude in these receptors, leading to migration to other "more favorable" areas of survival.

Conclusions

The management of potential noise and vibration impact categories on the careers and residents of neighboring communities is a key factor in designing, planning and implementing any modern mining activities as they can affect the health and work capacity of workers as well as the comfort residents in nearby human settlements, and in situations where vibration occurs - the physical integrity of potentially sensitive buildings. If predicted noise levels near protected buildings combined with noise source levels may exceed the limit levels according to STAS 10009/88, one or more protective measures shall be taken.

I. Stage of mining field preparation for exploitation mainly represented by soil removal and fertile soil recovery. Taking into account the relatively large distance from the inhabited areas, it is not considered necessary to adopt special measures to reduce / prevent the impact than the maintenance and proper operation of the machinery. Also for the transport of wood from the perimeter of exploitation to the various beneficiaries, the following measures will be observed:

- Transport will be carried out at reduced speed to reduce the noise and vibrations that can be caused;
- Respecting the approved transport routes and timetable

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