

THE CURRENT STAGE OF AIR POLLUTION IN THE AREA OF JILT SOUTH QUARRY

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Abstract: This paper presents the current stage of air pollution with particulate matter in the influence area of Jilt South quarry from Gorj County. The determination of the content of particulate matter was made according to the standard 10195/75. The interpretation of particulate matter results was made in accordance with the provisions of the standard 12574/87. The measurement principle for particulate matters is based on putting the PM10 fraction on a nitrocellulose filter with $\Phi=47\text{mm}$, separated from the particles and on their gravimetric determination. Comparing the values achieved for air quality indicators resulted at present, with the values from the previous years (2007), we notice an improvement of air quality in the quarry area.

Keywords: air, pollution, quarry

Introduction

The Jilt South Quarry is located in the north-west part of Oltenia, respectively in the south-west of Gorj County, on the territory of Mătășari, Slivilești, Dragotești and Negomir

The perimeter of the quarry is conventionally marked as follows:

- North – by the mine perimeter of Jilt North quarry;
- West – by the perimeter of Ploștina and Leurda mines;
- South – by the perimeter of Tehomir mine;
- East – by the industrial area of Jilt basin.

At present the activity of Jilt South quarry develops in six excavation steps, using 8 rotor excavators SchRs 1400 type. The mining mass is excavated and discharged on the front belts. Their driving direction is from west to east, being determined by the organization of the collecting system and direction directing the mining masses

discharged from the excavation steps.[1,2,3]

At the output from the operating steps, belts are coupled to the transport circuits to the waste dump of the coal deposit.

The excavated material resulting from the technological excavation fronts is carried on belts to the distribution core and directed in the interior dump, and the coal is distributed on one of the belts lines and directed towards the coal deposit.

Experimental

The monitoring points of the particulate matters resulted from the activity developed in Jilt South quarry were located especially in inhabited areas[4,5]. Therefore, samples were collected and particulate matters concentrations were determined in 2 points:

P1 – located south-east from the coal deposit and loading point;

P2 – located south from the quarry and deposit.

Measurements were made using the gravimetric method, according to STAS 1095/75.

The PM10 fraction was determined from particulate matters, which are the particles from a stable volume.

The measurement principle is based on putting the PM10 fraction on a nitrocellulose filter with $\Phi=47\text{mm}$, separated from the particles and on their gravimetric determination.

In this case as well, measurements were made in the influence area of the activities of Jilt South quarry located closest to the protected area (inhibited areas), these activities being connected to coal storage and loading for dispatching to beneficiaries. Therefore, sampling was made in four distinct points located as follows:

P1 – located east, approximately 50 m from the loading point of the coal in boxcars;

P2 – located north-east, 150 m from the loading point and storehouse;

P3 – located north-east, at about 30 m from the school in the area and 400 m from the storehouse;

P4 – located south-east from the storehouse and loading point, at 250 m from the sources and 20 m from the closest house.

Results and discussions

The results of the particulate matters measurements made in 2010 – 2011 are presented in table 1. Particulate matters in the influence area of Jilt South quarry.

Table 1

Sampling period	2010		2011		CMA STAS 12574/87 17 g/m ² /month
	Sampling point		Sampling point		
	P1	P2	P1	P2	
Jan.	8,04	8,18	5,67	9,14	
Feb.	8,75	2,13	5,54	6,23	
Mar.	13,80	6,63	9,51	7,63	
Apr.	16,18	10,29	9,67	11,14	
May	5,56	11,88	6,26	15,21	
June	9,65	13,11	13,07	10,28	
July	3,25	16,08	5,19	14,61	
Aug.	7,86	12,76	11,76	11,83	
Sept.	10,60	10,48	14,08	13,16	
Oct.	2,49	10,17	12,71	9,32	
Nov.	12,53	9,13	10,27	11,27	
Dec.	10,27	7,02	7,93	-	

Analysing the measurements results in the two sampling points for the two studied

years, we notice that there are no records of excesses in any of the sampling points.

The closest value to the maximum admitted concentration was recorded in April 2010 in point P1 (16,18 g/m²/month), which is 95,2 % of the limit admitted value.

The lowest concentration was recorded in 2010 as well, but in point P2 (2,13 g/m²/month) and it was only 12,53 % of the maximum admitted concentration.

Regarding the annual average values in the two sampling points for the two years, we notice that each time they were higher in P2, that is 9,82 in 2010 and 10,89 in 2011, 9,08 and 9,38, respectively in P1.

Comparing the values resulted in these two years with those from 2007, for instance, we notice a substantial improvement (Fig.1).

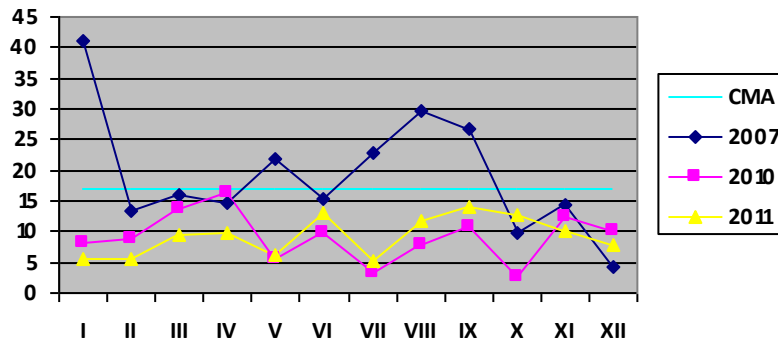


Fig.1. Variation of particulate matters concentrations in Jilt South area (P1)

Therefore, analysing these values, we notice that in 2007, in P1, of the 12 recorded values, 5 exceeded the maximum admitted concentration, which means of frequency of excesses of 41,6 %.

The highest concentration of particulate matters recorded in 2007 (41,03 g/m²/month) was 2,41 times higher than the maximum admitted concentration and 2,53 times over the highest value recorded in P1 in 2010.

In point P2 the situation is also different. Therefore, in 2007 the frequency of excesses was 16,6 % as compared to 2010 and 2011 when it was 0. In this point, the highest concentration of particulate matters recorded in 2007 (18,04 g/m²/month) was only 1,06 times over the highest value recorded in P2 in 2010 .

The results of particulate matters measurements are presented in table 2.

Suspension matters PM10 in the influence area of Jilt South quarry (2010).

Table 2.

Sampling point	Concentration (µg/m ³)	Sampling point	Concentration (µg/m ³)	AC
P1	38,61	P3	33,64	0 µg/m ³
	34,29		59,21	
	49,42		61,47	
P2	41,36	P4	29,81	
	32,24		57,39	

	35,16		64,35	
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The first observation is that excesses of the maximum admitted concentration are found

only in the points located farther from pollution sources (fig.2).

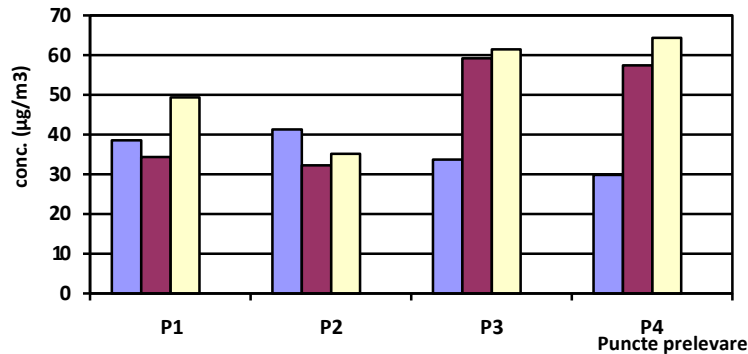


Fig. 2. The variation of PM₁₀ concentrations on Jilt South area

Therefore, in the point located north-east and at about 400 m from pollution sources, two out of three measurements were over the maximum admitted value. In this case, excesses were 18 %, and 23 % respectively over the maximum admitted value.

The same happens in point P4, located south-east and about 250 from pollution sources. In this case, excesses were 15% and 29% respectively over the admitted limit.

In the other sampling points, values were within the admitted maximum values, the lowest concentrations being recorded in P2.

Conclusions

- Comparing the values resulted for these two air quality indicators from 2010 and 2011, with the values from the previous years (2007), we notice an improvement of the situation which means that excesses frequency has been lower lately.

- The same applies to particulate matters (PM₁₀), whose values were lower than in previous years.

- Rendering the lands degraded by the mining activity from Jilt South quarry to the economic circuit is based on rearranging works which require time and especially a financial effort.

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