AIR QUALITY IN INDUSTRIAL FACTORIES FROM JIU VALLEY. CASE STUDY

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Abstract: This paper studies industrial activities, other than mining, which are carried out on the Jiu Valley and how they affect the environment especially the air. The level of air pollution in the work areas depends on the methods of ensuring clean air as well as the type of pollution source. The study was conducted in 2021 and highlighted the lack of technical equipment and legal measures needed to ensure a clean working environment that does not have negative effects on life.

Keywords: environment, contamination, air, pollution

1. INTRODUCTION

The mining industry is and has always been the most important source of income for the Jiu Valley, but with the passage of time and the desire to move to a greener energy that is more environmentally friendly, coal mining has entered a shadow cone which represented an ideal moment for the other industries to know a greater development.

Thus, small and medium-sized economic operators have started to grow more and more by offering new jobs and ensuring economic growth that is not based solely on coal mining. This development of factories is based only on economic growth, but not on ensuring a clean job that does not affect the quality of life of workers.

Studies have shown that employee productivity depends on their health and well-being. Thus, the type spent at the office or in the production halls is sometimes equal to or greater than that spent at home, so it is very important that the areas where the staff work have a clean and unpolluted environment.

The air quality in the area of offices or production halls is influenced by the quality of construction materials, ventilation systems that often do not exist, the quality of work equipment, etc.

This paper studies the air quality in different working areas of the Jiu Valley and more precisely the level of pollutants released into the atmosphere.

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The level of pollutants in the work areas depends mainly on the methods of ensuring the flow of clean air, but also on the type and location of the pollution sources.

Pollutants released as a result of industrial activities are often impossible to measure exactly because the amounts of pollutants are determined by technical measurements on the gases released in the work area but also in the upper layer of the production halls.

Considering that we spend an average of 40 hours a week at work, it is important to monitor our work area air quality and find purification solutions to maintain good health. The effects of indoor pollution should not be neglected and minimized because, over time, they can lead to the development of chronic diseases.

2. METHODOLOGY AND RESULTS

The present paper monitored the air quality in three factories in the Jiu Valley area, for a period of one year, namely the year 2021. The three studied factories have different fields of activity, namely:

-produces installations and equipment specific to the activities of sorting and recycling of household waste.

-production of electrical installations.

-production of metal structures.

The production activity in these factories is mainly based on the use of welding processes that produce a series of harmful pests both to living organisms and to the environment.

The smoke obtained from the welding processes represents a different mixture of gases, vapors and fine particles such as nitrogen dioxide, carbon dioxide, carbon monoxide, ozone, chromium particles, nickel, zinc, manganese, aluminum, lead, etc.

Taking into account the possibility of the existence of different pollutants in the air in the work areas, we created a system consisting of sensors that measure in real time the concentrations of the released pollutants. For the present paper we have considered only the suspended particles with dimensions between 10 and 2.5 ug/m^3, carbon monoxide and nitrogen dioxide.

The legal limit values set for suspended particles are between 20 ug/$m^3$and 50 ug/m^3, and values above these thresholds are considered dangerous and affect the quality of life on earth. Thus, we can observe that only in February, August and December the registered values fall within the legal limits, this being a result of the decrease of the workload due to the holidays.

For carbon monoxide the maximum permissible values that do not affect human health are 10 ug/m^3.Thus we can observe that in the great majority of the time the lack of adequate ventilation represents a harmful factor on the health, which can be observed in the values registered every month of 2021.

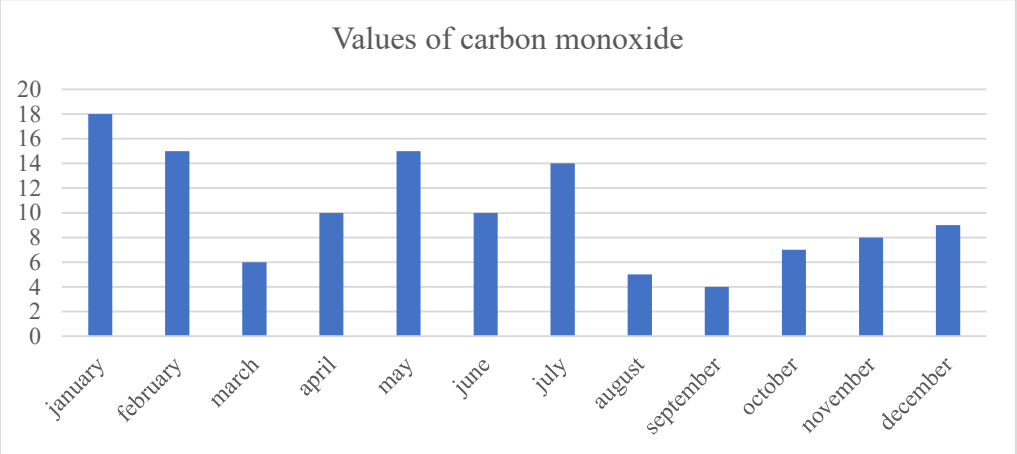

Fig.1 Graphical representation for the values of PM 10 particles

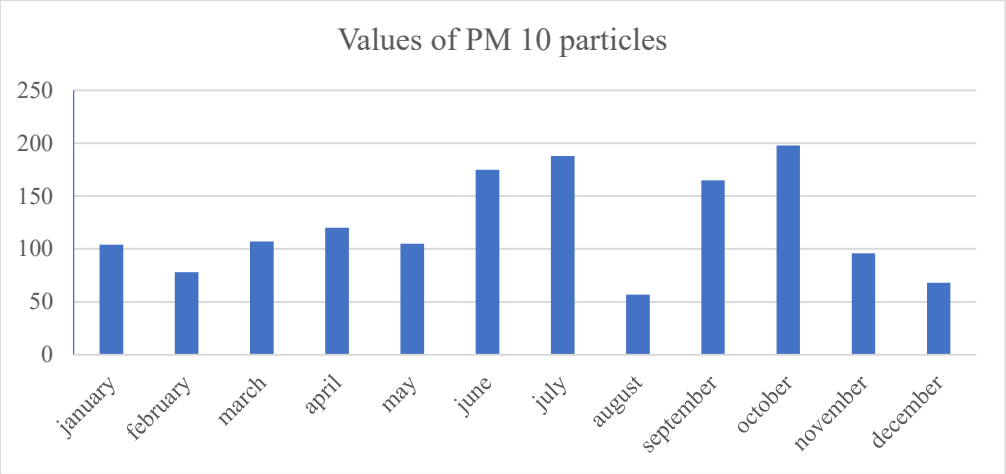

Fig.2 Graphical representation for the values of carbon monoxide

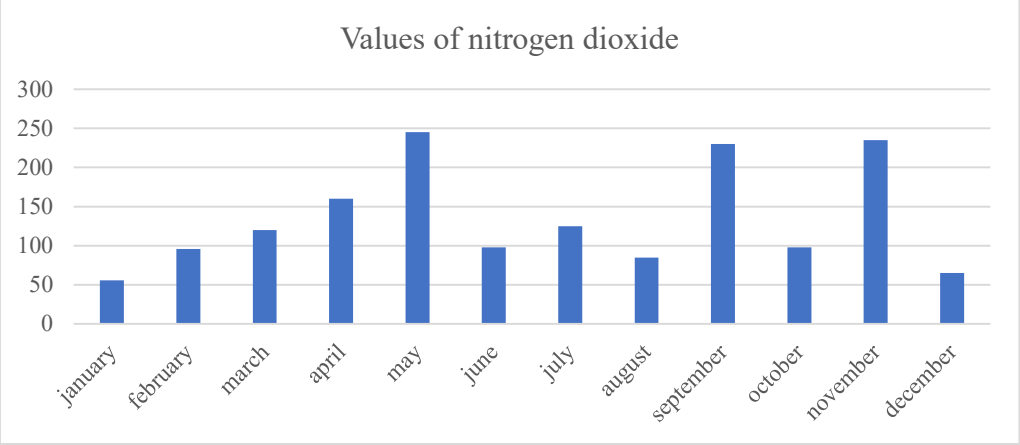

Fig.3 Graphical representation for the values of nitrogen dioxide

Nitrogen dioxide, that toxic gas, red-brown with a characteristic pungent odor, registers values that exceed the legal values established by law, namely the values of 40-120 ug/m^3

The maximum values recorded by them reaching up to 268 ug/m^3 which is a great exceeding of the level of values that do not affect human health.

Thus the figures 1, 2 and 3 presented above show the averages of the values recorded during the study year. In these graphical representations we can observe that the average monthly values registered for each polluting element exceed the values established by the Romanian legislation.

3. CONCLUSIONS

A very good way to reduce the pollutants and prevent them from spreading in the atmosphere is to capture them in the well where they are produced with the help of air ventilation stations.

It is very important that in companies the ventilation is carried out properly with high-performance air filters so that the volatile organic compounds released into the atmosphere do not affect human health.

In conclusion, it is very important that all companies offer ventilation systems that ensure a clean, healthy and comfortable environment for buildings of all sizes and with different applications because in a completely enclosed room of a building, air can not enter or exit easily from the room, which causes air pollutants to remain and accumulate in the room. This could affect the health of the people in the room. Ventilation is essential for diluting and removing these air pollutants

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