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AIR POLLUTION OF ZAPORIZHZHIA AND ITS IMPACT ON THE HEALTH OF STUDENT YOUTH

Гришко С. В., Непша О. В. Забруднення повітряного басейну міста Запоріжжя та його вплив на здоров'я студентської молоді.
***Ключові слова*:** *атмосферне повітря, забруднення атмосферного повітря, стаціонарні джерела забруднення, здоров'я населення, забруднювачі, студенти.*

Long-term monitoring of the quality of atmospheric air in the city of Zaporizhzhia shows its consistently high pollution both on the border of sanitary protection zones and in residential areas.

The main contribution to atmospheric pollution is made by industrial enterprises, the emissions of which make up 50-60 % of the total gross emission of harmful substances. Enterprises of almost all branches of industry, including heat supply enterprises, emit harmful chemical compounds into the atmosphere. All this creates a different spectrum, but an intense load on different areas of the city, worsening the ecological situation. About 150 chemical compounds are emitted into the atmosphere of the city, many of them are substances of 1-2 hazard classes (manganese dioxide, benz(a)pyrene, compounds of lead, chromium, etc.) [2].

The main causes of excessive pollution of the atmospheric air of the city by stationary sources of pollution are:

– Outdated technologies and equipment on the basis of which enterprises function. The use of these technologies and equipment does not make it possible to ensure compliance with the standards of maximum permissible emissions of pollutants into the atmosphere established by law. The main enterprises of the city were built in the thirties, but are still functioning today. Thus, the Marteniv furnaces, sintering machines and blast furnaces of Private Joint Stock Company «Zaporizhstal» have been in operation for 50-60 years. Steel furnaces of the private joint-stock company «Dniprospetsstal» are operated for an average of 30-40 years. Coke batteries of the private joint-stock company «Zaporizhkoks» with a service life of up to 20 years, have been operated for more than 25 years.

– Moral and physical obsolescence of a significant part of gas cleaning equipment that is operated at enterprises. The degree of depreciation is from 54 to 80 %. The gas cleaning equipment of enterprises captures mainly only dust,

while the most harmful compounds (nitrogen oxides, carbon, phenol, sulfur, fluorine compounds, etc.) are thrown out without purification.

– Transition of enterprises to non-ecological fuel (coal, fuel oil), which is a source of additional air pollution [1, 2, 4].

The city of Zaporizhzhia is located on both banks of the Dnipro. The development of the city took place in such a way that large industrial enterprises found themselves in close proximity to residential buildings. Many residential buildings are located within the sanitary protection zones of industrial enterprises. Therefore, a yellow-gray haze of smog is often observed over Zaporizhzhia, which is formed by the emissions of industrial enterprises concentrated in a relatively small area. This is also facilitated by the relief of the area, which is an undulating plain with a truss-beam network, which worsens the ventilation of the territory and the conditions for dispersal of dust and gas emissions. At the same time, the system of regulating emissions of harmful substances in the period of unfavorable meteorological conditions works inefficiently [2].

The main enterprises of the city of Zaporizhzhia are located on the industrial site, which is located in the north-eastern part of the city. Thus, atmospheric air pollution over the main areas of the city occurs with wind directions from northwest through north to east. With a southerly wind, the Zavodsky district becomes polluted, in which, in addition to industrial enterprises, people also live. The south-west and west winds contribute to the removal of polluted air outside the city. The wind, the speed of which is 0-4 m/s, pollutes the city regardless of the direction [1-3].

The volume of emissions from motor vehicles is constantly increasing, the share of which in the total volume of emissions is 30-40 %.

The main problems of atmospheric air pollution by mobile sources are: the use of fuel that does not meet modern environmental standards; load of the city's main highways with transit transport; lack of neutralizers in the main mass of cars of domestic brands and old foreign cars.

There are 32 colleges, schools, lyceums and 9 institutions of higher education operating in the city of Zaporizhzhia. Where thousands of students study. Atmospheric air pollution can cause acute and chronic, specific and non-specific effects on the human body, including student youth. The number of patients with hypertension, malignant neoplasms, and pathology of the respiratory organs may increase. Exudative diathesis, allergic dermatitis, acute respiratory diseases with an asthmatic component, Quincke's edema, bronchial asthma are more often registered. Children living in industrial areas with polluted air usually have a health index 2-3 times lower than children in the control area. They may have a changed immune status: decreased immunoglobulin content, etc. [4].

The presence of combinations of chemical substances in atmospheric air can cause a synergistic effect of harmful ingredients. The increase in the frequency of non-specific lung pathology in the population of industrial cities, especially chronic bronchitis, which oncologists consider a precancerous condition, gives

reason to believe that atmospheric air pollution, provoking chronic inflammatory lung diseases, may be one of the reasons for increasing the risk of lung cancer.

In particular, at the present time during the outbreak of the COVID-19 coronavirus infection, air pollution can complicate the course of the disease. It is known that motor vehicles are one of the heaviest polluters of atmospheric air in many countries of the world, including and in Ukraine. The main pollutants include dust particles, nitrogen dioxide and sulfur dioxide, hydrocarbons, aldehydes, carbon monoxide, heavy metals (arsenic, cadmium, nickel, mercury), formaldehyde, undifferentiated dust, benz(a)pyrene. Motor vehicle emissions are particularly dangerous because they are carried out in close proximity to sidewalks in the zone of active pedestrian traffic (for cities and villages) and along routes (green road zones). The largest amount of toxic substances is released during variable engine operation modes, in particular during start and stop, as well as during idling. Therefore, in cities, the maximum concentration of toxic substances is observed at intersections and near traffic lights. At the same time, about 50 % of motor vehicle emissions within the city are on low-speed roads and less than 25 % on high-speed roads [4].

At present, concentrations of harmful substances do not reach extreme values (five times higher than the permissible limit or more), which were registered in the region before 1990. However, the existing level of atmospheric air pollution in the region is critical and may lead to an increase in the number of chronic diseases and negative trends in demographic indicators of the population.

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