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Transport, ecology and health

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ABSTRACT: The work is devoted to the analysis of the latest data on the study of socio-hygienic and environmental aspects, the impact of solid and gaseous components of vehicle exhaust gases on human health and the environment of a modern city. The object of the study is the atmospheric air in Tashkent. Recently, as a result of the continued use of motor vehicles for many years in the United States, Europe, Asia and in particular in Uzbekistan, an important question has arisen about the effectiveness and consequences of transport policies for the environment, health and society. Therefore, the main challenge is to promote the development of alternative modes of transport that do not harm health and the environment, which will prevent the negative impact of transport systems on human health .In this study, methods were used to measure the content of carbon monoxide and hydrocarbons in exhaust gases in accordance with GOST. When assessing environmental pollution in cities with multicomponent pollution, it is extremely insufficient to be limited only to the characteristics of the concentrations of harmful substances. Under these conditions, the only criterion for assessing the state of the environment can only be the level of health of the population, established with the help of social, hygienic and environmental monitoring. Full-scale studies of exhaust exhaust gases were carried out in Tashkent in all regions and for all basic parameters.

KEYWORDS: atmospheric air, transport, pollutants, health, ecology, emissions.

I.INTRODUCTION

This paper presents the results of a study of exhaust gases from transport in Tashkent. Transport facilitates our access to work, education, shopping, leisure and other benefits and plays a key role in economic development. However, due to noise, pollution and road traffic accidents, driving on the roads is costly for motorists, other citizens, and society at large. This manifests itself in the form of illness, injury, death, and damage to mental health and social relationships.

Studies of the influence of road transport on the atmosphere of cities and exhaust gases on people have been systematically carried out since the middle of the 20th century and continue to this day [1-10].Today, despite the fact that a large amount of research is being conducted in different countries and attempts are being made to reduce the harm of exhaust from internal combustion engines (including due to new fuel standards), vehicles remain the most powerful factor in urban air pollution [11-14].

It is believed that a car pollutes the environment at the production stage, requiring a large amount of resources and energy for it [10,15,16]. In large cities, a phenomenon such as a photochemical fog that occurs in polluted air is observed, which impedes the photosynthesis of plants by about 1.5–2 times. According to scientific studies [5-11], air pollution in cities contributes to an increase in the number of children with allergic diseases, diseases of the respiratory, urinary systems, circulatory system, blood, skin and subcutaneous tissue. According to the effect on the human body, the components of the exhaust gases are divided into toxic ones - carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons, aldehydes, lead compounds; carcinogenic - benz (a) pyrene, trichloromethane, dichloromethane, acetaldehyde, benzene, formaldehyde; irritating effect - sulfur oxides, hydrocarbons [14-16]. The effect of the listed components on the human body depends on their concentration in the atmosphere and the duration of exposure. An indicator of air pollution from vehicles is carbon monoxide, or carbon monoxide (CO).More than 50% of CO entering the atmosphere is accounted for by motor vehicles. With poor road surfaces, at intersections, when the engine is idling, braking or accelerating, the CO concentration increases 2.5-4 times. In summer, CO2 accumulates in green areas of residential areas, closed courtyards. The average duration of a CO atmosphere is about two months.

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Chronic CO poisoning contributes to a more severe course of cardiovascular pathology (arrhythmia, tachycardia, extra systole, hypotension), physical and mental asthenia is observed, as well as an increase in the content of erythrocytes and hemoglobin, followed by anemia. There are disturbances in the activity of the gastrointestinal tract, the function of the thyroid gland and the adrenal cortex. Immunity suffers, susceptibility to infections increases. According to the WHO, with an increase in the concentration of nitrogen dioxide by 30 μg / m3, the number of lower respiratory tract diseases in children aged 5–12 years increases by 20% [17–20].

II.MATERIALS AND METHODS

The determination of all basic parameters, namely exhaust gases and harmful emissions, was carried out in accordance with GOSTs, such as:

- GOST 17.2.2.03 - "Nature protection. atmosphere. standards and methods for measuring the content of carbon monoxide and hydrocarbons in the exhaust gases of cars with gasoline engines. safety requirements";
- O'zDSt 2305: 2011 - Nature Conservation. Atmosphere. Norms and methods for measuring the content of carbon monoxide and hydrocarbons in the exhaust gases of gas-cylinder vehicles in operation ";
- GOST R 41.24-2003 - "Uniform regulations concerning: I. Certification of engines with compression ignition with respect to smoke; II. Certification of motor vehicles for the installation of type-certified compression ignition engines; III. Smoke certification for vehicles with compression ignition engines; IV. Measurements of engine power ";
- GOST R 52033-2003 "Cars with gasoline engines. Emissions of pollutants with exhaust gases. Norms and methods of control when assessing technical condition".

III. RESULTS AND DISCUSSIONS

The experimental part was carried out throughout the territory of the Republic of Uzbekistan and in the city of Tashkent, where the main parameters regarding the exhaust gases and the atmosphere were collected.

It is noted that, from the point of view of human health, the most harmful components of exhaust gases are solid nano- and micro-particles of soot, ozone, carbon monoxide, sulfur oxides and, as has recently been shown, carbon nano-materials [21]. When the fuel mixture is burned, carbonaceous particles are formed with sizes from 1 to 300 nm. In addition, the particles include various metals that get there from engine wear and elements of exhaust gas treatment systems [22]. The effects of particulate matter on human mortality have been reliably shown.

In the Republic of Uzbekistan in 2019, according to preliminary data (table 1), 2,449,087 thousand tons of pollutants were emitted into the atmosphere. Including 166,037 thousand tons of solids (6.7%), 313.02 thousand tons of sulfur dioxide (12.7%), 1,145,284 thousand tons of carbon monoxide (46.5%), 253,309 thousand tons of nitrogen oxides (10.3%), hydrocarbons 508 363 thousand tons (20.7%) and other 62 475 thousand tons.

Table 1
DYNAMICS Pollutants emitted into the atmosphere in 2015-2019 (thousand tons)

Name	Of the year				
	2015	2016	2017	2018	2019
Total	2487,4	2556,2	2586,8	2449,0	2449,5
From industrial enterprises	975,4	1009,5	1010,7	888,7	889,0
From transport	1512,0	1546,7	1576,1	1560,3	1560,5

It follows from the table that the main polluting emissions into the atmosphere come not from industrial enterprises, but from transport.

The results of the analysis carried out in 2019 show that almost 60% of emissions from fixed sources (including 38.8% of enterprises for the extraction, processing and transportation of fuel (Uzbekneftegaz JSC) and 21.3% in the energy sector (JSC Uzbekenergo), in the energy sector, 19.5% - in the metallurgical sector (AGMK JSC, NMMC, Uzmetkombinat JSC, 2.3% in the construction industry (cement, lime, brick-sand-gravel enterprises) 16, 7 percent - to the share of other manufacturing enterprises.

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Table 2
Emissions of pollutants in the Republic of Uzbekistan and administrative territories, thousand tons

Administrative territory	2015 y.	2016 y.	2017 y.	2018 y.
Republic of Karakalpakstan	32,8	30,6	37,7	34,0
Areas:				
Andijan	18,5	36,7	15,8	15,9
Bukhara	55,6	58,5	63,8	74,8
Jizzakh	70,2	63,4	5,2	11,8
Kashkadarya	176,3	167,9	165,7	152,2
Navoi	47,0	57,4	44,1	49,9
Namangan	7,8	15,8	15,9	15,2
Samarkand	54,7	51,6	37,1	52,1
Surkhandarya	3,1	3,2	3,2	5,1
Syrdarya	66,1	68,9	59,6	60,5
Tashkent	370,6	318,7	302,9	336,6
Fergana	38,9	103,2	60,1	53,2
Khorezm	5,0	5,2	9,2	7,0
Tashkent city	28,4	27,1	33,1	15,3
The Republic of Uzbekistan	**975,1**	**1 008,1**	**853,5**	**883,7**

Table 3
Average annual concentrations of total particulate matter in the atmospheric air of the cities of Uzbekistan in 2015–2019, (in shares of MPC)

Cities	2015 y.	2016y.	2017y.	2018y.	2019y.
Almalyk	0,7	0,7	0,7	0,7	0,7
Angren	0,7	0,7	0,7	0,7	0,7
Andijan	0,7	0,7	**1,3**	0,7	0,7
Bekabad	0,7	0,7	0,7	0,7	0,7
Bukhara	0,7	0,7	**1,3**	**1,3**	**1,3**
Denau	0,7	0,7	0,7	0,7	0,7
Kokand	0,7	0,7	**1,3**	0,7	0,7
Navoi	0,7	0,7	0,7	0,7	0,7
Namangan	0,7	0,7	0,7	0,7	0,7
Nukus	**2,0**	**2,7**	**2,7**	**2,0**	**2,0**
Sariasia	0,7	0,7	0,7	0,7	0,7
Tashkent city	0,7	0,7	**1,3**	**1,3**	0,7
Chirchik	0	0,7	0	0	0

The amount of harmful substances emitted into the atmosphere from vehicles exceeds the established norms. On the fact of violations, 3,500 drivers were fined, 2,472 (2,054 in 2018) drivers for pollutants in exhaust gases exceeded the norms established by state standards by employees of the Road Safety Service, in accordance with the relevant articles of the Code of Administrative Responsibility for a total amount of 157,680.0 thousand sums. (2018 - 113,982.8 thousand sums), as well as 2,989 (876 in 2018) Measures have been taken to direct vehicles to service stations to eliminate emergency situations.

As a result of the implementation of air protection measures (introduction of dust and gas cleaning equipment, conversion of cars to gas fuel, an increase in the share of operated diesel vehicles, renewal of rolling stock, completion of the development of unleaded gasoline by the Fergana Refinery, transfer of certain sections of the railway to electric traction, implementation of a national the use of ODS, the national strategy for reducing greenhouse gas emissions) as a whole in the republic, there has been a tendency to stabilize the environmental situation in the field of air basin protection.

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All these measures will significantly contribute to reducing the incidence of the population in the context of the coronavirus pandemic.

Moreover, during 2006-2007, a number of decrees of the President of the Republic of Uzbekistan were adopted, aimed at technical re-equipment of the main sectors of the economy, as well as stabilization and reduction of emissions of pollutants into the atmosphere. For instance:

- "On measures to implement investment projects within the Clean Development Mechanism of the Kyoto Protocol" for the implementation of a set of measures to reduce greenhouse gas emissions (December 6, 2006, No. PP-525);

- "On measures for the further development of production at the Samarkand Automobile Plant and the renewal of the republic's vehicle fleet", aimed at introducing from March 1, 2007 environmental standards for road transport not lower than Euro-2, and from January 1, 2010 - not lower than Euro- 3 (December 14, 2006 No. PP-531);

- "On measures for the implementation of the project" Electrification of the Tashkent (Tukimachi) - Angren railway section with the participation of the German Development Bank and the Kuwait Fund for Arab Economic Development, which determines the reduction of pollutant emissions in railway transport (dated February 19, 2007 No. PP-582);

- On the Programs of modernization, technical and technological re-equipment of enterprises of the building materials industry, chemical, automobile industry, OJSC "Almalyk AGMK", APO "Uzmetkombinat" and others for the period 2007-2011, which provide for the implementation of measures for environmental protection, including reduction of pollution air basin.

In Uzbekistan, on the initiative of President Sh. Mirziyoyev, a set of measures is being taken in the transport sector, especially for the development of the automotive industry, road transport communications, ensuring the safety and greening of transport.

Certain successes have been achieved in the development and implementation of an optimal system for the movement of vehicles by improving the layout, measures are being taken to improve the environmental quality of fuel, as well as the transition of vehicles to compressed natural gas and other alternative or renewable energy resources.

VI. CONCLUSION.

Summing up the results of the research, the following conclusions can be drawn:

1. Automobile transport has a significant impact on the quality of atmospheric air, causing an increase in morbidity among the population of large cities.

2. In large cities, there is a phenomenon of the type of photochemical fog that occurs in polluted air, which impedes the photosynthesis of plants by about 1.5–2 times.

3. More than 50% of CO entering the atmosphere is accounted for by motor vehicles. With poor road surfaces, at intersections, when the engine is idling, braking or accelerating, the CO concentration increases 2.5-4 times.

4. For a comprehensive solution of the above problems, we consider it necessary to develop the scientific foundations of a strategy for environmentally sustainable transport. (Sustainable transport for Tashkent city)

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