



Air Pollution In Uzbekistan And The Solution For For Its Improvement

Zakhro I. Tukhtaeva

Assistant Of The Department Urban Planning And Landscape Architecture, Tashkent
Architectural And Civil-Engineering Institute, Tashkent, Uzbekistan

Copyright: Original content from this work may be used under the terms of the creative commons attributes 4.0 licence.

ABSTRACT

This article examines the modern urbanized environment in which such environmental problems as air pollution, lack of clean water, overgrown industrial areas, degradation of green spaces arise. Urban ecology problems occupy an important place in the entire range of environmental problems. It is necessary to develop a unified concept of ecological and urban development of urban areas.

KEYWORDS

Environmental rehabilitation, sustainable development, urbanization, smart city, green corridor, climate change, preservation of the urban environment.

INTRODUCTION

The design and development of cities require the research of natural environmental conditions. One of the most significant factors taken into consideration in urban planning is the climate, which is an average, long-term regime of atmospheric phenomena

characteristic of each area of the earth's surface. The climate is determined by the geographic location of a given place.

When planning urban planning, the city must be considered as a natural and technogenic ecosystem with ecological patterns that change and transform under human influence. Human activities are also responsible for the deterioration of the ecosystem. Catastrophic climate change, the growth of diseases and infections indicate that the world has reached a critical stage requiring from a person and his consciousness to understand and take urgent measures to preserve and restore the lost components of the environment and public health.

The complex of ecological, economic, socio-hygienic measures for the reclamation of disturbed territories to stabilize the state of the environment involves the implementation of the following measures:

- Elaboration of a "harmonious" or "balanced" model, where a person is inscribed in the environment as a part of it, man and nature complement and help to survive;
- Development and classification of new urban-planning territorial structures and elements that describe an urbanized system evolving into a natural ecosystem;
- Creation and implementation of modern "green" standards in the design of a "green" city to improve environmental friendliness in the integrated development of the territory;

- Formation of principles of the functional and spatial organization of town-planning links of the natural complex with urban infrastructure to optimize the ecological balance of the environment.

Turning to sustainable urban development, it is necessary to consider and analyze the accumulated experience of foreign countries.

MATERIALS AND METHODS

In foreign practice, urban planning projects have been developed and implemented to restore the environment, where a new balance is created in the destroyed or lost health of the urban ecosystem. Giving an example, an experimental air purifier tower built in China resulted in marked improvements in air quality (Figure 1). It sucks in polluted air and heats it with solar energy; the heated air rises through the cooling tower and passes through several layers of cleaning filters. According to the head of the research department, they observed an improvement in air quality over an area of 10 square kilometres in the city; besides, on days of heavy pollution, the tower was able to reduce smog to almost moderate levels. Today, an air purifier tower has become the most efficient and inexpensive method for artificially removing pollutants from the atmosphere.



Figure 1. A tower for air purification in China.

It is known that with the growth of the population, the city itself grows, in turn, environmental problems also increase. This is observed all over the world, including in the Republic of Uzbekistan. When examining the territory of Uzbekistan, one can see the variety of natural components of the urban environment and the unique individual urban-ecological characteristics of each city. The territory of Uzbekistan consists of plains, mountainous and foothill regions, steppes and deserts. For large and small, historically established and new cities, it is necessary to develop individual methods to improve the urban environment, taking into account the characteristics of each territory. The influence

of cities on atmospheric air and the rate of atmospheric emissions occur depending on the density of a settlement, climatic and socio-economic characteristics and functional zoning of territories.

Large cities of Uzbekistan are at the stage of urbanization and in the urbanized environment such environmental problems as air pollution by anthropogenic actions can be observed: overgrown and abandoned industrial areas, urban transport, and degradation of green spaces. In addition to chemical pollution, physical pollution of the environment is also developing in modern cities, caused by the

processes of propagation of acoustic, vibration and electromagnetic waves.

In the coming years, our country will need to implement an extensive program of ecological rehabilitation of cities. For example, you need to prepare a model of a smart green city; rehabilitate and create new green corridors along major highways; build towers for air purification; develop a modern solution and improve the existing urban infrastructure; to reconstruct the improvement of urban areas and industrial areas with the introduction of treatment facilities and the creation of sanitary protective landscaping.

According to AirVisual, which monitors air quality, Uzbekistan ranked 16th in the ranking of countries with the most polluted air.

According to AirVisual criteria, this means that the concentration of airborne contaminants is acceptable, but people who are sensitive to contamination should be protected.

In the capital of Uzbekistan - Tashkent, the level of urban atmospheric air pollution is measured by the Air Pollution Index (API). API values less than 5 points correspond to a reduced level of pollution. API is calculated by comparing the observed concentrations of pollutants with the maximum permissible concentrations (MPC) established for them. Potentially hazardous to public health are concentrations with MPC values greater than 1.0. For example, the average score of the API in Mirzo Ulugbek Avenue and the territory of the former "Aviagorodok" is characterized by values of 1.2 points, and the nitrogen dioxide indicator is increased on the streets of Fargona

Yuli, Elbek, Dzharkurgan, Mirzo Ulugbek Avenue.

The main mobile source of pollutants, in particular nitrogen dioxide, is urban transport (70-90% of pollutant emissions). More than 460 thousand vehicles are registered in Tashkent, including almost 400 thousand personal cars. The total volume of harmful transport emissions into the atmosphere is about 400 thousand tons annually. The use of transport as a percentage in the city of Tashkent as of 2020 is cars 93%, trucks 5.82%, buses 0.20%, and minibuses 0.41%, special transport 0.41%.

About 75% of the vehicles registered in the capital operate on gasoline and diesel engines and 25% on gas. At the same time, cars running on diesel fuel emit 208 kg of pollutants per ton of fuel and three times less when running on gas.

Road transport is the main cause of air pollution.

Substances emitted by car engines and the release of small particles of rubber and metals into the air, as well as grains of asphalt, accumulate in the atmospheric air in large quantities on highways. This fine dust remains in the air over busy roads and highways in large quantities. The largest amount of pollutants is emitted during acceleration since at this moment the engine consumes the largest amount of fuel, which means that at this moment the exhaust gas emissions are most intense. The relative proportion of hydrocarbons and carbon monoxide in the total mass of emissions is highest during braking and idling, while the proportion of nitrogen oxides is highest during acceleration.

Therefore, this speed is not only the safest for traffic, but it also does not cause much harm to the atmosphere.

But, in domestic settlements, the movement of vehicles is allowed at a speed of no more than 70 km / h, and in residential areas and adjacent

territories (a piece of land between houses) no more than 30 km / h.

According to Table 1, it is understandable that the smallest amount allocated in electric vehicles.

CO₂ emission by various modes of transport

Table 1.

Type of transport	CO ₂ emission by various modes of transport kg / 1person / 1km
A pedestrian	CO ₂ from just breathing
Cyclist	CO ₂ from just breathing
Motorcyclist	0.094 kg CO ₂ released
The car on gasoline	0.1 kg of CO ₂ released
Electric cars	0.043 kg CO ₂ released
Bus	Emitted 0.069 kg CO ₂
Underground	Emitted 0.065 kg CO ₂
Tram / trolleybus	Emitted 0.042 kg CO ₂

Emissions from cars not only pollute the atmosphere but also affect human health. People living near highways are much more likely to develop cancer and are exposed to the harmful effects of high concentrations of the following toxic substances: nitrogen dioxide, nitrogen, carbon monoxide, formaldehyde, sulfur dioxide, lead, hydrocarbons, suspended solids, etc. All these substances are foreign to the human body, therefore, the immune system tries to get rid of them, but since the increase in harmful substances is large, the body does not have time to excrete them, and these substances accumulate and interfere with the proper functioning of the human body.

RESULT AND DISCUSSION

The decision to improve atmospheric emissions from vehicles are the following:

- The most promising solution is the creation of green corridors or multi-tiered landscaping near highways;
- Replacement of gasoline fuel with gas, electric cars;
- Creation of barrier filters, which are systems of squares and parks, for cities with different landscapes;
- Creation of a system of parks for cities with mountainous or hollow locations in the lower points of hollows and squares in closed and

open car parks, in which the highest concentration of toxic emissions is observed;

- Application for cities with a flat location of a special way of placing green zones: squares are located along the wind rose behind car parks, and parks in the form of elongated rectangles are located along the wind rose on opposite

sides of the city, so that air masses entering the city and leaving him, passed through the filtering forest belt.

- Reforestation of lawns of streets running across the city is also increasing, especially on the leeward side (see Fig. 2).

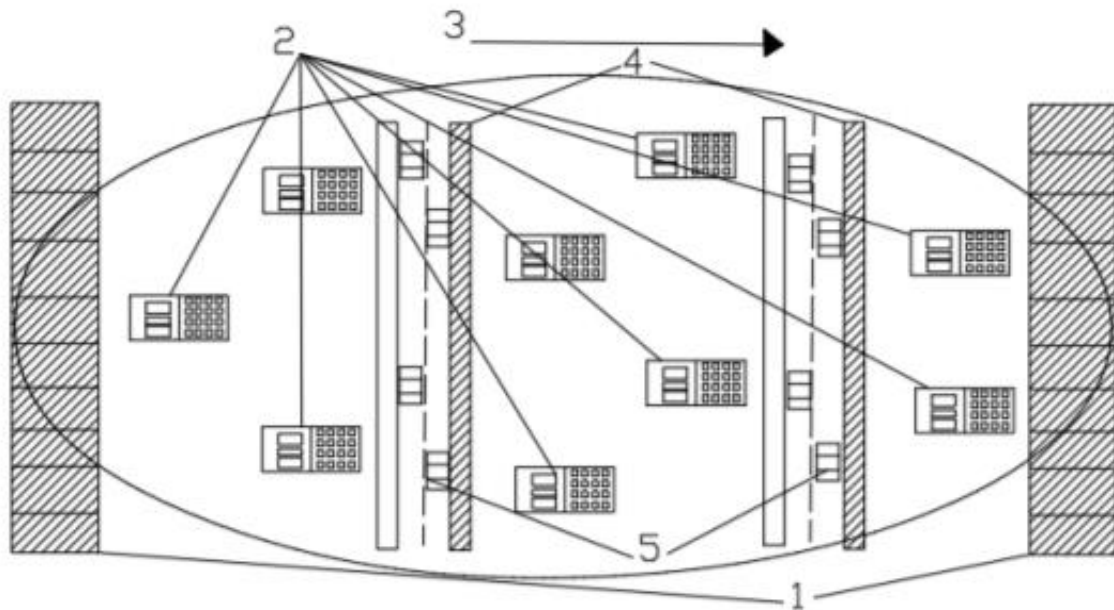


Figure 2. A city with flat location: 1-parks; 2-system of squares; 3-main directions for the wind rose; 4 lawns reinforced with forest plantations; 5-vehicles

Four-lane traffic in each direction, being the most promising according to the statement of road and environmental experts, allows us to conclude that Peoples' Friendship Avenue, Furkat Street, Abdulla Kodiriy Street, Bunyodkor Avenue, which have a capacity and a green zone, are a kind of sanitary cordon between the highway and residential buildings.

CONCLUSION

The development of an ecological remediation scheme and the creation of green spaces along the roads, the construction of ring highways outside the city will reduce the harmful effects of emissions on the environment in half, and the construction of an

air purifier tower will reduce smog and improve air quality.

REFERENCES

1. Concept of environmental protection of the Republic of Uzbekistan until 2030. - Decree of the President of the Republic of Uzbekistan dated October 30, 2019, No.UP-5863.
2. Egorova O.S., Burkeeva D.R., Gogol E.V., Tunakova Y.A. Assessment of the contribution of road traffic flows to air pollution in Kazan // Bulletin of Kazan Technological University. 2014. No.16. pp. 141-142
3. Vasilev M.A., Dubtsov S.N., Zhokhova N.V., Paley A.A., Pisanko Y.V., Tolpygin L.I., Assessment of the level of concentration of aerosol particles in

road cars and power lines in comparison with background readings of submicron particles of natural atmosphere. 2016. No.580. p. 99-109.

4. Sherbatyuk A.P. Influence of emissions from vehicles on the quality of atmospheric air in Russian cities // Bulletin of the Zabaikal State University. 2014. No. 5. S. 59-64
5. Data from API: Center of the Hydrometeorological Service of the Republic of Uzbekistan. <http://www.meteo.uz>.