

economic growth and conservation of natural resources.

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ECOLOGY OF TRANSPORT

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Today, the problems of environmental pollution from transport infrastructure are quite acute in Ukraine. This is the direct impact of road, railway, aviation and water transport, as well as anthropogenic impact on the environment during the design, construction and operation of linear transport facilities.

The first creators of vehicles were not concerned about how road, sea and air transport can affect the environment. Unfortunately, we have to face consequences that the inventors did not even suspect or think about [1].

Transport ecology is an intensively developing branch of applied ecology. It is characterized by its own concepts, terminology, axiomatics, research methods of interaction of transport processes with the environment. Among all means of transport, motor vehicles remain the main source of atmospheric air pollution and disturbance of the ecological balance. Living and non-living nature in many cases feels the impact of transport and its infrastructure. Areas of natural habitat for various species of mammals, birds, amphibians, etc. are decreasing. As a result of road works, trees and bushes are constantly cut down or uprooted. These plants produce oxygen and provide shelter for birds, insects, etc. The more roadside greenery we destroy through clearing and salinization, the greater the risk that more species of plants and animals will become

extinct. When we talk about air pollution, the consequences are the health of people and other living organisms: exacerbation of cardiovascular and respiratory diseases. There is even a study that residents of cities with polluted air suffer more from the coronavirus disease and more deaths [3].

According to the World Bank, the transport sector in Ukraine accounts for 40% of air pollutants. In 2002, air pollution exceeded national air quality standards in the most populated and industrialized cities of Ukraine. Despite the fact that air quality standards in Ukraine are stricter than the standards recommended by the WHO Recommendations on air quality for Europe, almost all large Ukrainian cities exceeded them. Reducing the impact of air pollution on human health is important both for saving human lives and for reducing economic losses associated with premature deaths and diseases of the working population of countries.

The above gives us the right to talk about the emergence of a new ecological trend - transport ecology, which studies various aspects of the effect of transport objects on the environment. The environment is especially damaged when:

- exceeding the maximum permissible concentrations of harmful (toxic) substances in emissions and discharges, exceeding permissible levels of noise, vibration, discharges or emissions of residual heat, electromagnetic and radioactive radiation, etc.;
- consumption of materials and energy exceeds established standards;
- the content of harmful (toxic) substances in the materials used exceeds the maximum permissible values;
- handling of wastes arising during the life cycle of transport objects is carried out in violation of the established rules.

Motor transport is a source of dangerous chemical pollution of atmospheric air, water bodies, agricultural areas, as well as noise and vibration, which can affect the health of the population. Each car, when burning 1 kg of gasoline, uses 15 kg of air, in particular, 5.5 kg of oxygen. When 1 ton of fuel is burned, 200 kg of carbon monoxide is released into the atmosphere. Motor vehicles account for about 55% of total harmful inputs, which include more than 200 different compounds, including: carbon, lead,

nitrogen oxides, formaldehydes, in particular aromatic hydrocarbon impurities, benzo(a)pyrene, carcinogens, including surfactants, including many mutagens [2].

Road transport also causes a negative impact of acoustic (noise) pollution on central highways. Approximately every second resident of the city suffers from the noise created by road transport. At the same time, open sections of the subway and city trams are a source of significant noise. Harmful effects not only on the population, but also on buildings are caused by vibration along the subway lines. Today, there is a tendency to expand areas of acoustic discomfort in built-up areas.

The human hearing organ has the ability to differentiate signal noise from "background" noise. In order to prevent the negative impact of long-term noise on a person during sleep and rest, the equivalent adjusted noise level indoors should not exceed 30 dB. Traffic noise, both inside and outside urban areas, is the most important source of noise pollution in the EU. About 125 million people are potentially exposed to noise levels greater than 55 dB (as of 2012).

Reducing the effects of constant air and noise pollution on human health is important both for saving human lives and for reducing the economic pressure of deaths and illnesses of the working population on the country's economy. It is possible to improve the existing situation with a comprehensive step-by-step approach to environmental problems.

It is possible to solve this problem through the production and introduction of new (alternative) types of environmentally safe fuel, for example, hydrogen. The main advantage of hydrogen as a fuel is that the transport works almost silently, and instead of carbon dioxide and other substances that pollute the environment, water vapor comes out of the exhaust pipe without any impurities. Poisonous compounds entering the exhaust gases pollute living organisms, and the greenhouse effect, i.e. the increase in temperature on our planet, is accelerated exponentially by the carbon dioxide, methane and nitrogen oxides produced by modern vehicles.

This causes:

- melting of glaciers and increasingly faster rise in sea level (which is the direct cause of floods and even the complete disappearance of entire cities or islands located in

the oceans!);

- climate change and frequent weather anomalies and weather-related events such as monster hurricanes, rain-induced floods, avalanches, mudslides, massive wildfires and hailstorms;

- reduction of fresh water resources (caused by the melting of glaciers, which are a natural source of drinking water).

We have to ensure environmental safety of transport processes. This is a limitation of the action of transport objects, under which the permissible levels of danger do not exceed the threshold of sustainability of ecosystems. It is possible to single out direct and indirect signs of ecosystems going beyond the limits of sustainability. Among the direct ones can be named:

- reduction of resource stocks;
- increase in the concentration of pollutants;
- disturbances in the work of natural mechanisms of pollution removal.

Indirect ones include:

- an increase in capital, material and labor resources aimed at extracting poorer, more distant, scattered resources or at types of activities that were previously performed by nature itself (wastewater treatment, air purification, restoration of nutrients in soils, preservation of biodiversity, etc.), as well as at activities related to protection, ensuring access to the remaining resources;

- an increase in the number of conflicts over the right to own resource sources or waste disposal sites [1].

Conclusion: Without a doubt, the impact of road transport on the environment is huge! Therefore, in Ukraine, and in general throughout the world, it is necessary to develop and implement eco-protective technologies of fuel production, road construction and transport operation as soon as possible.

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HOW TO MAKE UKRAINIAN CITY FRIENDLY WITH A SCOOTER

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At the beginning of the summer of 2021, a new problem appeared in Ukrainian cities, the most unexpected of all: the electric scooter.

This attitude is caused by the behavior of many users when driving on sidewalks, they can be extremely unpredictable indeed. emotional tension has indeed reached a certain peak.

The micro mobility of future cities sounds almost revolutionary, so it's time to discuss what scooters and other micro mobility devices can do to help and hinder.

There is one problem in the transportation system of any large enough city that has not yet been solved in our country. This is especially the problem of the so-called last mile, the very distance that makes you refuse to travel by public transport. Because no matter how fast, convenient, comfortable, and modern the subway is, you still have to drive or walk to the station, and then from the station to your destination.

A person's natural ability to solve the last mile problem is limited to about 15 minutes of walking. This is the maximum time a person is willing to travel on their own. The solution was found in the form of electric scooter sharing, which instantly flooded our cities, but the cities themselves were not ready for it.

In China in 2017, there were similar problems, where cities could not withstand the rapid development of bike-sharing systems and bicycles were simply dumped in piles on the streets. In California, where massive scooter sharing appeared in 2017, thousands of scooters immediately flooded the cities, leading to the service's immense popularity in some and hatred in others. Rallies were held, scooters were run over by