E-ISSN: 2997-9382
American Journal of Technology Advancement
https://semantjournals.org/index.php/AJTA

| Research Article

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Reduction of the Negative Impact of Vehicle Transport on the Environment the Population and the Workers

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Annotation
This article analyzes the negative effects of automobile transport on the environment, public health, and workers working in this field. Harmful gases, noise and vibrations emitted by vehicles have a negative impact on the ecological and social environment. In the study, proposals and recommendations were developed on ways to reduce these effects, including the introduction of environmentally friendly technologies, the development of public transport, the strengthening of technical control, and the increase of environmental culture among the population and employees. It is aimed at solving urgent environmental and social problems for the field of road transport.

Keywords: ecology, toxic substances, ways to reduce, noise, noise level, standards, road transport, environmental hazards, health, exhaust gases, noise, electric transport.

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Introduction.

Today automobile transport has become an integral part of human life, but its impact on the environment creates serious ecological problems. Harmful substances emitted by vehicles in urban and industrial zones pollute the atmosphere and threaten human health. Harmful gases, dust, noise and vibrations emitted by motor vehicles are damaging the ecological balance, reducing air quality and posing a threat to human health. Especially in large cities and industrial centers, this situation has become an urgent problem. Therefore, it is necessary to identify the negative impacts of motor transport and take measures to reduce them. In recent years, various measures to reduce the environmental consequences of road transport have been developed on a global scale [1].

These include the use of electric cars, the development of green energy sources, the improvement of ecological transport infrastructure and the introduction of regulations on environmental protection. This article examines in detail the negative impact of automobile transport on the environment and ways to reduce it.

The main goal of this study is to determine the negative environmental, social and health effects caused by road transport, to develop effective measures to reduce them, and to make proposals for

the formation of an environmentally safe, healthy and sustainable transport system. The tasks of this research are as follows [2].

1. Identifying the main negative impact factors of road transport on the environment, population and workers.
2. Study the level of air pollution, noise, vibration, and other environmental problems.
3. Analysis of advanced methods for reducing negative impacts based on local and foreign experiences.
4. Study of environmentally friendly transport technologies and the possibilities of their implementation.
5. Assessment of the level of environmental safety awareness of the population and workers in the transport sector [3].
6. Development of practical recommendations and measures to reduce negative effects.

Methods. Scientific work within this topic is carried out using the following main methods. Analytical method (analytical approach): Existing scientific articles, statistical data and government reports on the composition of environmental problems, air pollutants, noise and vibrations caused by road transport, and their effects are analyzed.

Method of comparison: environmental transport policies of local and foreign countries, waste reduction experiences are compared and effective strategies are determined.

Monitoring and surveillance method: The composition of atmospheric air, noise level and traffic emissions are monitored in the city's main roads, industrial zones and places with heavy traffic flow.

Questionnaire and interview method: A questionnaire is conducted among representatives of the population and specialists working in the road transport sector on environmental problems and their impact on health. Interviews are conducted about the working conditions of the workers and compliance with safety measures.

Expert assessment method: Through consultations with experts in the fields of ecology, transport engineering and medicine, the real impact of road traffic and recommendations for its reduction are developed.

Statistical analysis method: Based on the results of the survey, monitoring and other research, statistical analysis is carried out through graphs and tables [4].

Literature analysis. Many scientific studies have been conducted on the impact of motor transport on the ecological and social environment. According to the World Health Organization (WHO), atmospheric pollutants in large cities, particularly NO_2, PM10 and PM2.5, are emitted mainly from motor vehicles and pose a direct threat to human health (WHO, 2020). According to the reports of the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan, motor transport makes up 60-70% of the total air pollution sources in the country. This indicator is especially high in big cities. At the same time, the introduction of alternative means of transport - electric, hybrid and hydrogen cars - has been proven to significantly reduce environmental risks. For example, as part of the "Green Deal" strategy adopted in the European Union countries, it is planned to stop the production of gasoline and diesel cars by 2035 (European Commission, 2021). Local scientists A. Karimov (2021) and Sh.Tokhtayev (2022) evaluated the impact of traffic pollution on human health based on medical-statistical methods and showed that the rates of asthma and cardiovascular diseases are high in city centers. They proposed managing traffic flow, expanding public transport, and increasing the number of "green areas." Also, the health of workers in the production process is directly related to gases, dust,

noise, and hazardous substances in automotive service centers. The International Labor Organization (ILO) recommends continuous use of personal protective equipment, air purification systems and increased ventilation for workers in car workshops (ILO, 2019). The negative impacts of road transport include the following [5].

1. Ecological influence. Many harmful gases (carbon dioxide, nitrogen oxide, sulfur dioxide, etc.) are released into the atmosphere as a result of the operation of cars. These substances cause air pollution, global warming, acid rain and ecological imbalance.

2. Impact on the health of the population. Emissions from cars seriously threaten not only the air, but also human health. In many cases, problems such as bronchial asthma, cardiovascular diseases, and allergic reactions are associated with car emissions.

3. Noise and vibration problem. The large number of vehicles, especially in large cities, and the density of traffic flow lead to an increase in noise levels. This negatively affects the mental state of the population, sleep quality, and work productivity.

4. Negative factors in production. The processes of production, maintenance, and disposal of vehicles also cause environmental problems. Workers' constant exposure to harmful gases and chemicals poses a risk to their health [6].

Main part. When burning any fuel, various combustion emissions are released. These emissions have a significant impact on human health and the environment. Factories, factories and motor transport enterprises in cities are the main sources of environmental pollution. If factories and factories are located in one specific place and pollute it, then cars affect the area where they operate. Car transport is currently considered more polluting than factories and plants. The biggest problem at the moment is to reduce these emissions, which are shown in Figure 1.

The main harmful emissions emitted by cars, currently more than 200 toxic emissions have been identified in the gas formed from fuel combustion. The most toxic include carbon monoxide - CO, unburned hydrocarbons - CN, nitrogen oxides - NOx. Many countries have introduced standards for these emissions. In our country, the regulation of emissions from fuel combustion was introduced in 1970 based on the instructions issued by the European Economic Commission of the UN (EECOON).

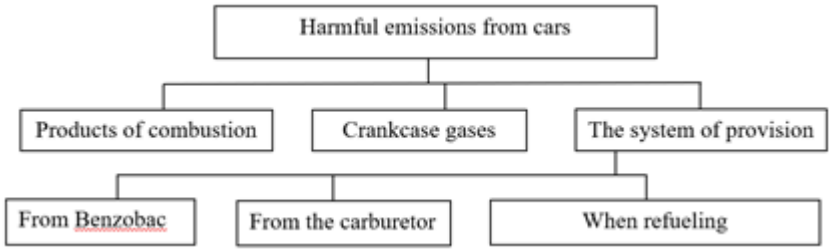

Figure 1. Toxic waste emitted during the operation of the car.

Waste gases also contain harmless products: oxygen, carbon dioxide, nitrogen, sulfur. But nitrogen forms an oxide at high temperature and pressure, which is extremely toxic. According to many sources, toxic products in exhaust gases are not always in the same volume. It depends on the type of engines, operating mode, how they are tuned, engine maintenance and fuel quality [7].

A diesel engine is less harmful than a carburetor engine. Less SO, NOx and SN are emitted during the operation of diesel engines, but the amount of soot is greater. This can be seen in the table below. The complex indicator shows how much fresh air is needed to neutralize exhaust gases. It can be seen that diesel engines are much more harmless than carburetor engines (33% less harmful). The composition of the exhaust gases is the same for both engines as we can see below,

but we must not ignore the presence of lead compounds in carbureted engines and barium compounds in diesel engines. These compounds are formed by:

- as a result of adding ethyl alcohol to increase the anti-detonation properties of gasoline (this alcohol contains lead).
- a special anti-smoke barium substance is added to reduce the ignition of diesel fuel, and it plays a major role in the harmfulness of exhaust gases during engine operation.

2. To reduce the toxicity of waste gases, work is being carried out in 2 different directions:

I - Improvement of the engine operation mode, use of various auxiliary equipment and high-quality fuel, performing adjustment work.

II - Production of low-harmful engines: gas-turbine, external combustion-Stirling engine, eletromobiles, etc [8].

According to the data of the World Health Organization, environmental damage caused by the operation of motor transport is characterized by the following indicators: for example, in the USA, 142 million tons of if harmful substances are released into the atmosphere, 86 mln. tons is produced as a result of the operation of cars. In a car, you can see 3 different sources of environmental pollution: exhaust gases, crankcase gases, and harmful substances formed as a result of fuel combustion (from the fuel tank, carburetor, etc.). Stations for determining the composition of waste gases should be established at all ATCs. On the other hand, a pass must be given to the owners of private cars in the TTKS. It is necessary to note that exhaust gases are not above the norm in this ticket [9].

Results. In addition to the toxic gases released as a result of the operation of cars, the noise emitted from them also affects the human body. Table 1 shows the noise levels that are most common. As the noise level increases, the duration of people's work in it decreases sharply. If the level of noise is 90 dB, then a person can work for 8 hours. For every 5 dB increase in noise level, people's performance in it decreases by 2 times.

Table 1. Noise sources and levels

Sound source	Height, dB
Airplane engine, 5m away	116
Factory noises	200-100
Orchestra, in the subway	80
Typing organization (mashburo)	60-80
Noisy streets	60-90 and higher
Clockwork, 50 cm away	30
The rustling of leaves	10

A person can be in a noise of 115 dB for 15 minutes. If the noise reaches 140 dB, it is considered dangerous for a person, and a person will have pain in the ear, and may be injured and prohibited from working. As a result of car noise, the driver's ability to work decreases, reaction time increases, and road traffic accidents can occur.

Loud noise has a negative effect on the human body, headaches and dizziness, pupils dilate, heart rate accelerates, nervous system malfunctions, etc. Research has shown that at 88 dB of noise, the driver's ability to think decreases by 10%, and if it is 95 dB, it decreases by 20%.

The main source of noise in cars is the engine and muffler, the next source is the operation of tires. As the load on the tire increases, the noise also increases. Reducing the noise emitted by cars is mainly to improve their engines. The UN and the European Commission propose to produce and operate cars with a noise level of less than 82 - 92 dB. For example, in England, it is not

allowed to use trucks with a noise level of 85-92 db. In this case, the upper scale refers to cars with a carrying capacity of 12 tons. In Japan, since 1971, the norm of 80 db for trucks and 70 db for passenger cars has been introduced. In the USA, the standard for trucks is 86 db.

Car manufacturing plants later began to overcome the above problems by installing 2-3 stage mufflers in the exhaust system, which improved the combustion process in engines. Currently, in order not to harm the drivers' ability to work, the engine of many buses is installed at the back. In this case, the driver is less affected by 8-10 dB of noise. It is well known that the main source of noise in the city is the movement of cars. Therefore, currently, the construction of buildings and the division of roads into lanes must also be carried out in accordance with state standards [10].

Thus, it is possible to reduce noise by rationally solving the problem of engine location in a car, covering the under-hood space with sound-absorbing materials, and improving the components and systems of the car. Reducing the level of ignition is carried out with the help of special additives and neutralizers. Currently, the following dimers are used to measure the level of ignition: UFMD-1P and SIDA-107 manufactured in MDX, MK - 3 in England, and DRM - 2 in Hungary.

- According to the results of surveys, 68% of the population felt that the quality of the air worsened due to car emissions, and 52% said that they suffer from constant noise [12].
- According to the results of ecological monitoring, it was found that PM2.5 and NOx gases are 1.5-2 times higher than the permissible norm in the areas located along the main roads in the city.
- Harmful emissions have decreased by 40% in enterprises using hybrid and electric cars.
- In cases where the annual technical inspection of vehicles and environmental inspections were not carried out, the emission norm was 30-35% higher [13].

Discussion. The obtained results show that the impact of automobile transport on the environment and health is serious. Widespread introduction of electric vehicles, development of public transport and strengthening of technical control are the main directions to reduce this problem. At the same time, increasing the ecological culture of the population is also an important factor. Health threats are reduced by providing workers with protective equipment and observing safety rules. International experience also shows that the introduction of strict standards for the control of transport emissions (Euro-6) in European countries has significantly reduced negative effects. This shows the need to strengthen the environmental policy in the conditions of Uzbekistan [14].

Conclusion

Although road transport is an integral part of development, the environmental and social problems associated with it cannot be ignored. These problems can be prevented, reduced or completely eliminated through the joint action of each member of society, the state and the private sector. By developing green transport, we take a step towards a healthy future. Reducing the impact of road transport on the environment and human health is an urgent problem. Based on the results of the study, the following conclusions were drawn:

- ✓ It is necessary to widely introduce electric and hybrid vehicles;
- ✓ Ecological control and technical inspections should be carried out regularly;
- ✓ It is important to raise awareness of the population and workers on environmental safety;
- ✓ It is necessary to promote the concept of green transport in state policy [15].

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