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THE EFFECT OF ENGINE OPERATING MODES ON EDUCATION TOXIC COMPONENTS

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Annotation: *Road transport is a powerful source of environmental pollution, and the amount of emissions into the atmosphere from it is determined by the size of the fleet and its technical condition. Therefore, the necessary conditions for assessing environmental damage in the management of waste from the operation of motor transport are the tasks of reliably determining the mass of waste generated. The problem of improving environmental safety in the automotive industry is becoming more urgent.*

Keywords: *road transport, sources of pollution, toxic substances, exhaust gases, amount of emissions, environment.*

Motor transport is mainly a consumer of motor fuels of petroleum origin, due to their higher calorific value, which provides lower specific fuel consumption and a sufficiently large range of action; reduced ash content; the possibility of using economical internal combustion engines.

The problems of environmental safety of motor transport are an integral part of the environmental safety of our country. The importance and severity of this problem increases from year to year. One of the important ways to solve this problem is to reduce the toxicity of exhaust gases from working vehicles.

In the modern world, the state of the natural environment is becoming an important factor in social development. The problem of interaction between society and nature is one of the fundamental problems in the history of human civilization. This is due to the outgrowth of the local human influence on nature into a global impact on the resources and components of the entire biosphere. As a result, the foundations of civilization are affected, as natural resources are depleted, and increased environmental pollution occurs. In this regard, environmental management is becoming particularly relevant.

Experts have found that one gasoline passenger car annually consumes more than 4tons of oxygen from the atmosphere, emitting about 800kg of carbon monoxide, 40kg of nitrogen oxides and almost 120-150kg of various hydrocarbons with exhaust gases.

The interaction of society and nature is one of the main problems in the history of human civilization. An analysis of the share of automobile traffic in total environmental damage shows that 95% of air pollution, 49.5% of noise generation and climate impact - 68%. It is known that road transport is the cause of one of the most global problems of the

21st century – 65-70% of air pollution in residential areas with harmful chemicals. It accounts for about 70% of atmospheric pollution. More than 80% of air pollution in Tashkent, Samarkand, Bukhara, and Ferghana is caused by road transport.

The toxic components of engine exhaust gases are a very multicomponent mixture, which includes about 200 components. To classify the composition analysis, all components are reduced to several groups that are similar in chemical structure, properties, and also in the nature of the effect on a living organism.

The first group consists of non-toxic substances: nitrogen, oxygen, water vapor, as well as carbon dioxide (CO_2), the content of which does not reach a level harmful to humans. However, according to scientists, its excessive content in the composition of atmospheric air can lead to global natural changes.

The second group includes carbon monoxide (CO), the presence of which in

large quantities are typical for the exhaust gases of gasoline engines. According to the theory of chain oxidation of hydrocarbons, carbon monoxide is formed in the engine cylinder as an intermediate product of the transformation and decomposition of aldehydes obtained in the stage of the cold-flame process preceding the main gorenje process.

The third group includes nitrogen oxides consisting of nitrogen oxide (NO) and nitrogen dioxide (NO_2). Mechanism and kinetics of formation of nitrogen oxides. They are explained by the results of the thermal reversible reaction of nitrogen in the air under the influence of high temperature and pressure in the engine cylinder.

The content of nitrogen oxides in the exhaust gases is the result of an increased combustion temperature and is also an indicator of the efficiency of fuel combustion in the engine. The largest amount of nitrogen oxides in gasoline engines is observed at a mixture of α=1.05-1.15 and at a combustion temperature of 2000-2200 °C. In addition, it was found that the yield of nitrogen oxide does not depend on the kinetics of their formation, but on decomposition during the cooling process. Moreover, as the exhaust gases cool down and dilute them with air, nitrogen oxide is further oxidized, turning into dioxide, trioxide and tetraoxide.

The fourth group of toxic substances is the most numerous group of hydrocarbons, consisting of representatives of all homologous series: alkanes, alkenes, alkadienes, cyclanes. Of the total number of organic components of exhaust gases, marginal hydrocarbons account for 32%, unsaturated – 27.2%, aromatic – 4%, aldehydes and ketones – 2.2%.

The amount and composition of exhaust gases

Table 1

Components	The amount of exhaust gases, in % of the engines used	
	Petrol	Diesel Engines
Nitrogen	74.0-77.0	76.0-78.0
Oxygen	0.3-8.0	0.5-6.0
Water vapor	3.0-5.5	3.0-6.5
Carbon dioxide	5.0-12.0	1.0-10.0
Carbon monoxide	0.1-10.0	0.1-5.0

Carcinogenic substances	0.2-3.0	0.009-0.5
Aldehydes	0-0.2	0.001-0.009
Sulfur oxides	0-0.002	0-0.003
Soot	0-0.04	0.01-1.1
Benzopyrene	0.01-0.02	До 0.01

In addition, polycyclic aromatic hydrocarbons, of which benzapyrene is a representative, were also found in the composition of the exhaust gases. The mechanism of formation of these substances lies in the fact that they decompose into a number of simple hydrocarbons and free radicals under the influence of thermal processes, and then, under conditions of lack of oxygen, hydrogen atoms are split off from the formed products. The resulting compounds combine with each other into increasingly complex cyclic and then polycyclic structures, i.e. at temperatures from 400 to 800°C, pyrolysis of hydrocarbon fuels occurs, forming polycyclic aromatic hydrocarbons, which can cause some forms of lung cancer.

The fifth group of toxic substances consists of aldehydes (formaldehyde 60%, aliphatic aldehydes 32% and aromatic aldehydes 3%, etc.). Formaldehydes have high toxicity and a sharp unpleasant odor. Of the aliphatic aldehydes, the exhaust gases of cars mainly contain acrolein, which is a transparent yellowish-tinged liquid with an unpleasant pungent odor.

The sixth group of harmful components is soot, which is typical for diesel engines. It is capable of adsorbing carcinogens contained in exhaust gases.

The results of many studies related to the study of the influence of traffic management (car or engine operating modes) on fuel consumption by cars have shown that the level of fuel consumption can be used as an indirect criterion reflecting the emission of harmful substances from exhaust gases by a car, depending on the technical condition of components, assemblies and malfunctions.

Thus, road transport is a powerful source of environmental pollution, and the amount of emissions into the atmosphere from it is determined by the size of the fleet and its technical condition.

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