Review of public policy for reducing the transport environmental impact

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The transport infrastructure influenced the wildlife and landscapes by the direct destruction of biotopes. The main impacts are paving the road or water canal, chemical pollution of the environment by vehicle engine emissions, petrol, oil and lubricant, flushing of contaminants and anti-ice chemicals with rainwater and dust forms of chemical compounds; isolation of individual parts of biotopes, populations, organisms or dividing ecosystems into parts (fragmentation); collisions of living organisms with vehicles; changing of landscapes, influencing the hydrological network; oppression of internal species. It is indicated that each mode of transport pollutes the environment, but a significant advantage – 85% of all the pollution is carried out by road transport. Accordingly, the main measures to prevent the negative impact of transport on the environment should be the following: improvement and implementation of the legal mechanism regulating the reduction of harmful effects of mobile sources on the air and effective public administration to reduce mobile sources' harmful effects air. This strategy should be focused on the basic principles of sustainable development. It is proved that satisfaction of transport needs should not conflict with environmental and health priorities and disrupt future generations' interests.

Keywords: transport infrastructure, the impact of transport, public policy, environmental priorities, sustainable development.

Introduction

Ukraine is located at the intersection of migratory routes of many types of wild animals. The main threat to biodiversity is human activities and the destruction of natural habitats of flora and fauna. Destruction of the natural environment occurs because of land plowing, deforestation with a subsequent change of land use, drainage or watering of territories, intensification of the transport and road complex, and fragmentation of landscapes, industrial, housing, and summer cottage construction. However, it is worth highlighting of transport system from limiting factors on wild animal populations.

Besides, our time is characterized by an unprecedented scale of transport. Transport serves industry and agriculture, most of it is involved in people serving. Accordingly, the damage is increasing because transport affects the environment. Roads, railways, and traffic disrupt environmental processes, increase mortality of animals and birds, and lead to ecosystem degradation and population isolation. Many wild animals are dying on the roads, which fall under cars' wheels or collide with them in flight.

It is necessary to pay attention to multiple studies on the impact of transport on the environment. Among such studies, it is advisable to distinguish the following authors' works: D. Albalate, G. Bel, G. Currie, A. Delbos, S. Farber, A. Páez. However, the development of mechanisms of public policy improving concerning transport impact on ecology remains insufficiently researched.

The work's analytical basis is the legislative of the state regulating transport impacts on the environment, scientific achievements of domestic and foreign researchers, and public authorities' statistical data.

Results

Today there are no useful developments in animal protection from motor transport in our country. Much attention is paid to these problems abroad. For example, in Central Arizona (USA), building underpasses and bridges for animals' passage is situated along highways of state significance, representing a high probability of collisions with wild animals. This practice is implemented in all countries that care about the conservation of wild fauna and safety movement since animals create not only dangerous situations on the roads but also are full-fledged components of natural ecosystems (Banister & Hall, 1981; Church et al., 2000; Geurs et al., 2006).

Transport infrastructure has the following impact on wildlife and landscapes:
- Direct destruction of biotopes when paving the road or water canal or conducting other construction;
- Chemical pollution of the environment by vehicle engine emissions, sources of petrol, oil, and lubricants;
- Flushing of contaminants and anti-ice chemicals with rainwater and dust forms of chemical compounds;
- Isolation of individual parts of biotopes, populations, organisms or dividing ecosystems into parts (fragmentation);
- Collisions of living organisms with vehicles;
- Changing of landscapes, influencing the hydrological network;
- Oppression of internal species (Cass et al., 2005; Albalate & Bel, 2010).

Significant influence occurs in space, causing fragmentation of landscapes and species habitats, fragmentation of individual areas up to such dimensions that lead to the disappearance of individual species or their communities.

Modern society cannot function not without transport. Now both freight and public vehicles are used, supplied with various types of energy to provide traffic. The following vehicles are currently in use in different parts of the world:
- Automobile ones (buses, cars, minibusses);
- Railway ones (metro, trains, electric trains);
- Water ones (boats, container vessels, tankers, ferries, cruise vessels);
Even though transport allows accelerating the time of all movements of people on the surface of the Earth and by air and water, various vehicles impact the environment.

Improvement and implementation of the legal mechanism regulating reduction of harmful effects of mobile sources on air;

Effective cooperation of specialists in the field of mechanical engineering, technical operation of vehicles, organization of transport, traffic, road construction, and urban transport planning;

Improvement of a system of rationing of the impact of mobile sources on atmospheric air;

Introduction of resource and energy-saving materials and technologies;
Accordingly, the priority measures for reducing mobile sources' harmful effects on atmospheric air should be the following.

1. Normative legal regulation in reducing the harmful effects of transport on atmospheric air.
   1.1. Development and implementation of regulatory legal and technical regulatory legal acts in the field of reducing the harmful effects of transport on atmospheric air, focused on:
   - Improvement of a system of rationing of emissions of pollutants, the smoke of the fulfilled gases of vehicles and issue from aircraft on fuel;
   - Rationing of carbon dioxide emissions from vehicles' exhaust gases;
   - Restriction of entry and phasing out of vehicles and engines with the highest exhaust emissions;
   - Promotion of production and operation of vehicles that fit modern environmental safety requirements;
   - Implementation of international norms and standards of environmental safety requirements for vehicles;
   - Promotion of production and use of motor fuels with improved environmental performance;
   - Promotion of strategic assessment of the impact of transport complex and transport infrastructure on air;
   - Introduction and implementation of new measures in the development of the transport sector and expected results.

2. Modernization and organization of new technologies of design and production of mobile equipment consider environmental safety.
   2.1. Improving vehicle design, fuel efficiency, and environmental friendliness as follows:
   - Improvement of the working process of internal combustion engines by optimization of supply of fuel, the formation of mixtures, combustion, using micro-processes;
   - Introduction of low-toxic and economical methods of equipment adjustment;
   - Development and implementation of exhaust gas neutralizers;
   - Improving the strength characteristics of materials, use of substitute materials;
   - Reduction of cars' weight;
   - Structural reduction of aerodynamic drag of automobiles.

   3.1. Improving the environmental performance of fuel:
   - Reduction of sulfur, benzene, and aromatic hydrocarbons in gasoline and diesel fuel;
   - Increase of the cetane number of diesel fuel;
   - Absence of metal-containing additives in gasoline and diesel fuel.

3.2. Partial replacement of petrol and diesel with non–petroleum energy sources.

4. Improving fuel economy and environmental safety of vehicles during operation.
   4.1. Increase in vehicle productivity:
   - Increase of vehicle utilization factor;
   - Increase of vehicle mileage utilization;
   - Optimization of transportation process planning and organization;
   - Use of the specialized rolling stock corresponding to the transportation of different cargo types.

4.2. Improvement of road conditions, design parameters of roads, their technical condition.

4.3. Creation of optimal density of the road network, ensuring organization of transportation along rational routes.

4.4. Improving traffic management:
   - Application of modern schemes, means, and technologies of organization of traffic;
   - Introduction of the automated systems of monitoring and management of traffic flows;
   - Increase of road capacity;
   - Increase of the speed of vehicles;
   - Reduction of traffic unevenness;
   - Transport zoning of urban areas, use of the system of administrative and economic mechanisms to limit the use of personal vehicles in the busiest zones;
   - Development of the car rental system, including parking spaces and electric car rental.

4.5. Implementation of efficient transport systems, improvement of transport infrastructure:
   - Development of multimodal transport, ensuring the interaction of different modes of transport;
   - Optimizing of the structure of urban buildings in order to reduce the transport needs of the population;
   - Integrated consideration of transport factors in the development of architectural and planning solutions;
References


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