

APPLICATION OF ENVIRONMENTAL MONITORING SYSTEMS AS PART OF INTELLIGENT TRANSPORT SYSTEMS

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Summary: In article it is spoken about need of use of intellectual transport systems for an assessment of an ecological situation in the cities and the scheme of the organization of environmental monitoring of an urban environment is provided.

1. INTRODUCTION

The modern transport system should be considered as one of the most significant components of social and economic development of the cities and regions. In the field the most objective methods of collecting and information processing about parameters of transport streams for the purpose of safety, resource-saving and environmental friendliness have to be used.

Level of negative technogenic influence of highways is defined on components of environment by various transport and road factors:

- Conditions and the movement organization on city highways;
- Operational condition of the vehicles moving in a transport stream;
- Structure of a transport stream by the form the engine of vehicles making it;
- Look and quality of the motor fuel applied by cars, making a transport stream;
- Character of transported freight;
- Skill level of drivers.

Thus, as criteria of an optimality of an ecological state of environment (its quality) the following parameters can serve:

- Concentration of polluting substances in atmospheric air;
- Equivalent noise level;
- Impurity of surface sewage from highways.

Therefore, management of quality of environment at operation of the motor transport has to be directed on regulation to acceptable level of these parameters.

2. INTRODUCTION OF INTELLECTUAL TRANSPORT SYSTEMS ^[1,2]

The present stage of development of the Russian society is characterized by active introduction of information, navigation, geoinformation and telecommunication technologies at

the state, regional and municipal levels. In regions intellectual transport system (ITS) introduction with a main objective - optimization of capacity of a street road network begins.

From the point of view of environment protection against harmful effects of motor transport, such approach gives positive ecological effect for the account:

- Uses of technologies of redistribution of load of roads;
- Operational management of traffic light objects;
- Indirect management of transport streams;
- Restrictions of entrance on separate sites of roads;
- Managements of loading of parkings.

The specified actions allow to solve a problem of redistribution of places of concentration of transport (jams) in places where the ecological situation isn't so significant as in inhabited massifs or recreation areas.

However, it is necessary to apply an integrated approach in decrease in negative influence of motor transport on environment which consists in integration of a subsystem of environmental monitoring into structure of ITS (figure 1).

The main components of such subsystem have to be:

- Information and measuring devices (various sensors and measuring devices, systems of video surveillance, GLONASS-GPS system, mobile devices);
- The monitoring center (collecting and information processing about an ecological situation, interaction with an automated control system for traffic);
- Regional system of the notification (finishing of information on violations of an ecological situation to inhabitants of the region through Internet, mobile communication, mass media).

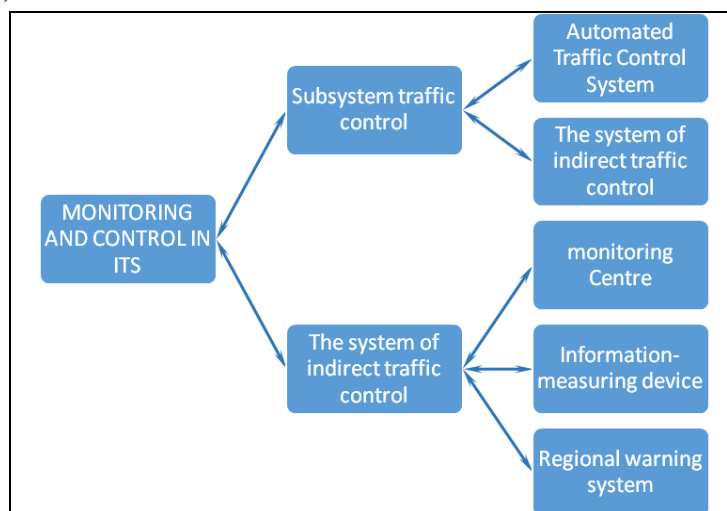


Figure 1. Segment of intellectual transport system

Creation of a subsystem of environmental monitoring has to be carried out together with the main objects of infrastructure as the operated parameters used for environmental monitoring, characteristics of a transport stream are: intensity, high-speed mode, structure, and also characteristics of quality of regulation of traffic (existence and type of crossings, stopping

points, number of intersections with adjustable movement, a ratio of duration of various phases of work of traffic lights, level of use of the carriageway, and also existence of the automated control facilities by movement).

Objects of a subsystem have to function in a zone of influence of city highways as, first, they are the most powerful source of negative technogenic impact on components of environment of the city centers, secondly, the factors characterizing level of this influence, are really operated from the point of view of elaboration of practical nature protection actions.

The adverse effect of the motor transport on an ecological situation of the regional centers of Russia can be lowered at the expense of carrying out a number of actions:

- The town-planning: construction of highways bypassing the cities and settlements; isolation of buildings from roads, sidewalks multirow landings of bushes and trees; placement of inhabited and especially child care facilities in the depth of quarters, far away from roads; constructions of traffic intersections at different levels, highways doublers;
- On the organization of movement of city transport: restriction of journey of lorries around the city; organization of optimum work of traffic lights and traffic intersections; optimization of speed of movement of cars (at 60 km/h the smallest pollution); expansion of transportations of passengers with electrotransport;
- The technical: adjustment of internal combustion engines; decrease, replacement and complete elimination of lead in fuel; gasoline replacement with the methanol squeezed and liquefied by gas; neutralization of exhaust gases; filtration of exhaust gases of diesels from soot; transition to electric cars.

3. CONCLUSION

In the conditions of the regional centers where carrying out technical and town-planning actions is complicated, the most perspective direction of fight against negative impact on ecology of motor transport is creation of ITS with obligatory existence of a subsystem of environmental monitoring.

As a result of introduction of such systems the main problems of the regional centers are solved: ecological indicators of inhabited quarters improve, jams in the most loaded sites of road networks are partially or completely liquidated, the number of road accidents decreases.

Introduction of intellectual transport systems of different scale is the most perspective way of development of automobilization, considering high rates of introduction of innovative technologies and a pressing need of the country in more effective use of transport resources at simultaneous decrease in negative impact of automobilization on environment and the population.

References

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