

OPTIMIZING TRAFFIC FLOW MANAGEMENT USING TRANSPORT MODELLING SOFTWARE

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The transport problems of Ukraine are well known and are still quite relevant - the increase in the level of motorization and, as a result, the steadily increasing intensity of traffic, the exhaustion of the capacity of highways and road network and traffic jams during peak hours at its key nodes, etc. The difficulties of formalizing the processes of traffic flow creating a need for more modern, information-based approach and one of the ways to study this problem may be the application of new principles for the development of the theory of transport modeling.

Modern modeling of the movement parameters of transport and passenger flows on public and individual passenger transport routes is based on data on the structure of transport demand, travel purposes, types of transportation and time periods. Programs for modeling traffic flows are usually divided into programs related to micro-, mesa- and macro- levels of modeling, as well as programs that support several levels at once [1]. At the micro level, vehicles are viewed as individual entities with their own characteristics and behavior. Here, the “reasonable driver” models predominate, in which the acceleration of a car is described by some function of the speed of this car, the distance to the car in front and the speed relative to the leader [2]. At the meso level, individual cars are not modeled, but the behavioral characteristics of drivers are taken into account. This level includes cluster models that operate with groups of cars moving at a short distance from each other at approximately the same speed, and use probability distributions to describe speeds of vehicles on certain sections. At the macro level, the transport network is considered as a single whole, and vehicle flows are considered as particle flows in liquid media. Packages for macro- and meso- modeling allows to solve such problems as planning transport infrastructure and public transport, graphical processing of the network, analysis and assessment of transport networks, forecasting planned activities, creating a platform for transport information systems. Microsimulation packages for traffic flows are rapidly developing due to the increase in computing power, 3D visualization capabilities and processing of large amounts of available data collected from millions of vehicles and take into account data on vehicle speeds and routes. Improving modeling techniques can become an important milestone in the long process of overcoming the current problems of the transport and planning infrastructure of Ukraine. Modern software used to support decision-making in the design and management of traffic flows does not yet cover all their parameters and characteristics, offering only a simplified representation of the research object with an emphasis on its various aspects. Particular attention, depending on the tasks, is paid to the level (coarseness) of the model, the quality of the available data, the capabilities of calibration and verification of the model, as well as visual interface tools.

The most promising task at the moment seems to be the creation of hybrid systems that make it possible to simultaneously study various characteristics of traffic flows at several levels of abstraction. To develop the scientific and technical basis of such software, a more detailed study and comparison of modeling and calculation algorithms is necessary.

REFERENCES

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