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THE ROLE AND IMPORTANCE OF GEOINFORMATION SYSTEMS IN THE CREATION OF A DATABASE IN THE FIELD OF HIGHWAYS

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Abstrast. This article examines the specific problems of creating and developing geographic information systems (GIS) on roads and the main principles and approaches to creating geographic information systems on roads.

Keywords: Geographic information systems (GIS), spatial data, road infrastructure, road management, algorithms, optimal data model, project materials.

In the last three decades of the last century, humanity has rapidly developed so-called geographic information systems, instrumental tools designed to help expand and deepen geographic knowledge. geographic information systems (GIS) help us collect and use spatial data. some components of geographic information systems (GIS) are highly technological, they include modern spatial data storage facilities, advanced telecommunications networks, and advanced computing techniques.

Accounting for data in the field of roads and road infrastructure, most of these services, which have already been transferred to computers, have begun to turn to computer graphics, that is, geographic information technologies, which allow for the connection of electronic maps and existing information with their local appearance. Those who took the first steps in this complex work not only had a convenient work technology, but also became convinced of the economic advantage of reliable data.

The roads have their own characteristics. The specifics of roads place special demands on GIS technologies. A road is not only a part of the road on which motor vehicles travel, but also a complex of technical road structures - bridges, tunnels, overpasses, road signs, and along-road structures. As in other areas, road construction is preceded by exploration and design work. Project materials are currently the most reliable, and in some cases the only cartographic

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material about the state of the road on the ground. Road designers have far surpassed their road service counterparts in terms of electronic maps and are already using electronic graphic materials.

Roads and road structures are very complex and expensive technical structures that require constant monitoring and taking into account their main characteristics. Naturally, various types of data are collected that need to be systematized and analyzed in passporting, diagnostics, and other work. Information systems based on modern computer technologies, particularly geographic information systems, are of great assistance in this. However, there are the following problems with the implementation of geographic information system (GIS) technology:

- Lack of accurate centralized data on the development of information systems;
- Lack of regulatory and other documents that clearly regulate the main rules for creating network information systems;
- The lack of understanding of problems in some areas of road complex management and the development of such systems;
- Inadequate interaction of passengers with other services (geodeticists, ecologists, etc.).

Specific challenges arise in the creation and development of geographic information systems (GIS) on roads. Let's look at some of them and the most serious ones:

1. Selecting the optimal data model. In the field of road management, information about road facilities is relevant due to its complexity and diversity. The data model in the road infrastructure geographic information system (GIS) should be diverse, ensure their reliable storage, compatibility with other systems, and so on.

2. Lack of direct communication at all levels of information systems. Incompatibility of data formats in various geographic information systems (GIS).

3. The problem of collecting and updating information in GIS is relevant in the road industry. Passporting and diagnosing road facilities has always been one of the most pressing issues.

Existing regulatory documents, technologies and road laboratories are significantly outdated or do not meet the requirements of the current situation. What and how to identify as a result of passporting, information accuracy, reliability, are a small part of these tasks. The main principles and approaches to creating a geo-information system for highways are:

1. This system should be created on the basis of accepted regulatory documents and as far as possible compatible with other systems (including inexpensive ones). This condition provides for the use of accepted classifications, numbering, etc.;

When creating a geographic information system, it is necessary to carefully study the issue of choosing the optimal data model, platform, and software used.

2. The geographic information system should be open, that is, replenishable and modifiable;

3. Usually, a user-friendly interface when working with a computer;

Considering that creating such a system requires significant time and material costs, it is necessary to develop such a scheme for its implementation.

To date, geographic information systems are of great importance in road management and have become an integral part of road management in the information society.

Unification and analysis of information layers necessary for assessing all factors influencing the construction and operation of roads can only be carried out using spatial algorithms implemented in the GIS. It is only necessary to decide what information (situation, land users, hydrology, administrative-political boundaries, transport network) is needed for information support, how much it costs, how it can be obtained, and how it should be layered.

The geographic information system (GIS) can monitor the requirements for accounting for the impact of road construction on the surrounding area and, in turn, the dependence of project solutions on the natural conditions of this area throughout the design process. All issues related to the work performed by road-operating organizations after the opening of traffic can be resolved jointly by the author of the project and the road-operating services, who imagine the road as a single complex structure

References

1. Казакбаева Мухаббат Турабаевна, Муҳаммаджонов Муроджон Рустам Угли, Дурдиев Хуршид Давронбек Угли ОЦЕНКА ТОЧНОСТИ ИЗМЕРЕНИЙ ЛИНИЙ И УГЛОВ ПРИ ПОСТРОЕНИИ ПЛАНИРОВОЧНЫХ СЕТЕЙ // Universum: технические науки. 2022. №4-5 (97). URL: https://cyberleninka.ru/article/n/otsenka-tochnosti-izmereniy-liniy-i-uglov-pri-postroenii-planirovochnyh-setey (дата обращения: 10.12.2024).

2. Xudoyqulov R. M. et al. Monitoring of Road Conditions Based on Geographic Information Systems: A Case Study of Yangiyul District of Tashkent Region, Uzbekistan //PSYCHOLOGY AND EDUCATION. – 2021. – Т. 58. – №. 2. – С. 1500-1504.

3. Казакбаева Мухаббат Турабаевна, Каллибеков Айдос Полатович АНАЛИЗ ТОЧНОСТИ ВЫПОЛНЕННЫХ ГЕОДЕЗИЧЕСКИХ РАБОТ ПРИ ДЕТАЛЬНОЙ ПЛАНИРОВКЕ РАБОТ В СТРОИТЕЛЬСТВЕ // Universum: технические науки. 2020. №12-1 (81). URL: https://cyberleninka.ru/article/n/analiz-tochnosti-vypolnennyh-geodezicheskih-rabot-pri-detalnoy-planirovke-rabot-v-stroitelstve (дата обращения: 10.12.2024).

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