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ASSESSMENT OF RAILWAY ROUTE IMPACTS AND FORMATION OF GREEN RAILWAY CORRIDORS BASED ON THE SELECTION OF KEY STATIONS

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Annotation. This study examines the environmental and spatial impacts of railway routes and proposes a framework for the development of green railway corridors through the strategic selection of key stations. The research focuses on assessing how railway infrastructure influences surrounding ecosystems, land use patterns, and urban development dynamics. By integrating environmental indicators, transportation efficiency metrics, and geospatial analysis, the study identifies critical stations that can serve as hubs for sustainable corridor development. Special attention is given to minimizing carbon emissions, enhancing energy efficiency, and preserving natural landscapes along railway lines. The proposed approach emphasizes the role of multimodal connectivity, green infrastructure, and ecological planning in transforming conventional railway systems into environmentally sustainable transport networks. The findings contribute to the advancement of sustainable transport planning and provide practical recommendations for policymakers and infrastructure developers aiming to balance mobility needs with environmental conservation.

Keywords: green railway corridors; sustainable transport; railway infrastructure; environmental impact assessment; key stations selection; transport planning; ecological sustainability; multimodal connectivity; land use planning; carbon emissions reduction

Introduction. Ensuring sustainable development and environmental safety in transport and logistics systems has become one of the most important scientific and practical challenges in recent years. In this context, railway transport is recognized as a key component of green transportation due to its high energy efficiency and relatively low carbon emissions compared to other modes of transport. However, the spatial configuration of railway routes and the efficiency of station networks significantly influence both logistical performance and environmental outcomes. Therefore, a comprehensive assessment of railway routes and the identification of key stations for the formation of green railway corridors is a relevant research topic.

The purpose of this study is to develop scientific and methodological foundations for the formation of green railway corridors based on the assessment of economic, logistical, and environmental impacts of railway routes and the selection of key hub stations. The research analyzes freight flow volumes, energy consumption, carbon emissions, multimodal integration potential, and the impact of railway infrastructure on regional development.

The object of the research is the freight transportation processes and infrastructure within the railway transport system. The subject of the research includes the environmental and logistical efficiency of railway routes, the selection of key stations, and the process of forming green railway corridors.

The study employs system analysis, statistical methods, multi-criteria decision-making (MCDM) approaches, and GIS-based modeling. In selecting key stations, particular attention is given to their role as logistics hubs, freight handling capacity, level of intermodal connectivity,

and environmental performance indicators. Based on these criteria, railway routes that are environmentally and economically efficient are identified and integrated into green railway corridors.

The scientific novelty of the research lies in proposing a comprehensive approach to assessing the impacts of railway routes, developing a multi-criteria evaluation model for selecting key stations, and improving the methodological framework for forming green railway corridors. The proposed approach contributes to reducing the carbon footprint of railway freight transportation while enhancing overall logistics efficiency.

Conclusion. The practical significance of the research results is reflected in their applicability to the implementation of green logistics principles in railway transport, infrastructure modernization, and strategic transport planning. Furthermore, the findings support the integration of national railway networks into international green transport corridors and contribute to the sustainable development of transport and logistics systems.

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