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The issues of selecting the rolling stock for the implementation of tasks are present in every mode of transport that can handle cargo. One of them is railway transport, which plays an important role in both passenger and freight transport. In this dissertation, the main area of interest is the analysis of freight traffic, especially in the aspect of planning and selection of rolling stock (wagons and locomotives) for the implementation of freight transport on the railway network, with particular emphasis on the aspects of limiting the number of rolling stock at the disposal of a railway undertaking (possibly the administrator of wagons or locomotives)). On the basis of analysis of printed sources and the author's and supervisors experience flowing from among others cooperation with the industry, it was possible to conclude that there are no tools supporting decision making by the railway undertaking in the process of rational selection of rolling stock to perform tasks with limited resources. The above premises caused that the objective of the PhD dissertation is developing a method of selecting rolling stock for the implementation of rail freight tasks, taking into account the limited resources, based on orders placed by customers and in accordance with their expectations. For the purposes of this doctoral dissertation, the selection of rolling stock for the implementation of tasks is understood as: allocating vehicles for the implementation of tasks, routing a train along the railway network and determining the conditions of carriage for a defined transport task, taking into account the allocated rolling stock (locomotives and wagons) and the route. As part of the work, a model for the selection of rolling stock for the implementation of transport tasks with limited resources was prepared, the method and its implementation in the form of the original DST computer application.

The first part of the PhD dissertation concerns theoretical considerations about the problem of railway traffic organization and selection of rolling stock (locomotives and cars) for tasks with limited resources. The first chapter presents an introduction to the research issues concerning the specificity of the organization of work in rail transport, with particular emphasis on cargo transport. The organization and rules of traffic in rail transport were discussed, the research carried out by domestic and foreign research centers on the problem of selecting rolling stock for the implementation of tasks and the issue of planning the work of traction teams in the implementation of freight transport was carried out. The second chapter presents the research problem of the PhD dissertation, its thesis and main and partial objectives of the PhD dissertation. The subject of the third chapter is the characteristics of methods and tools used to solve the problem of selecting the rolling stock for the implementation of tasks in rail transport with limited resources. The fourth chapter discusses the rules and procedures used in the management of wagons, and in chapter five in the management of traction vehicles. The sixth chapter presents the mathematical model of selection of rolling stock for tasks including general assumptions and elements like representation and parameterization of railway network structure and identification of transport tasks. Decision variables, indicators of assessment the quality of solutions and boundary conditions were defined.

The second part of the dissertation concerns utilitarian considerations. The seventh chapter presents the procedure of method selection of rolling stock for tasks. Calculation algorithms for these problems are presented. The eighth chapter is a description of computer implementation of selection of rolling stock for tasks method in the form of the DST application. The application allows you to allocate a locomotive and wagons to perform the task, select the shortest route of transport and define the conditions of transport. The ninth chapter presents the case studies of the selection of rolling stock for tasks method using a computer application for a selected tasks.