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# Life Cycle Contract for High Speed Rail Projects

The increasing congestion of road infrastructure, and consequently the negative consequences, especially in environmental terms, the need to increase the carrying capacity of existing railway lines, increase the traffic activity of the population and meet the demand of passengers for transportation in regions with high population density, require systemic and long-term solutions that will make it possible to increase the efficiency of the railway system as a whole. One of the tools for improving the efficiency of rail transport is the development of high-speed and high-speed communications.

The development of high-speed traffic serves as an impetus for the export of progressive technologies, becomes the reason for the massive creation of new jobs. The development of high-speed and high-speed rail transport: ensures the improvement of transport links; creates more attractive conditions for passengers; improves the comfort and safety of passenger traffic; reduces travel time. This allows attracting additional passenger traffic from aviation and road transport to railway transport, reducing the loss-making of passenger traffic and the negative impact of transport on the environment. The organization of high-speed and high-speed railway traffic also ensures a reduction in the need for rolling stock, maintaining and further stimulating the scientific, technical and intellectual potential of the country by placing orders at domestic enterprises for the creation of new models of world-class equipment. The operation of infrastructure facilities, such as high-speed railways,

strengthens the country's economic potential not only in the domestic but also in the world market and creates conditions for increasing the mobility of the population and improving the quality of life for decades to come.

Today, many scientists and practitioners are working to improve the efficiency of the operation of high-speed railways. Scientists of the Department "Transport, Organization of Transportation and Traffic" of the South Kazakhstan University named after M.Auezov, who are participants in the Erasmus + project "Economics, ecology and infrastructure on high-speed railways," also contribute to this matter. Among other issues of high-speed rail operation, particular attention is paid to the life-cycle contract methodology, which is an important innovation element. This is a progressive form of public-private partnership, in which the state does not invest in the project, but waits for the contractor to create an object at his own expense, and only after that pays for the service of the working object throughout its life cycle, reaching 30-40 years.

The essence of this contract is to motivate the early construction of the facility with maximum quality, since payments will be received by the contractor after the facility is put into operation. The state in this case is free from the need to control the builder and maintain the staff of the relevant personnel. Thus, the life cycle contract involves the formation of a single contract with the contractor for the provision of service (service) of affordable and high-quality infrastructure throughout the life of the infrastructure objects included in the project. By combining all stages of the project implementation (design, construction, operation) into a single contract, a significant reduction in production and operational risks is achieved, which allows you to significantly reduce costs. The main advantage of a life cycle contract in the construction of high-speed highways is that the state buys the service of a working road, for the first time not investing money in its design, construction and operation.

At the same time, it does not matter what materials and technologies the contractor will choose for the construction of the highway. Only functional, easily verifiable qualities of high-speed highways are significant: train travel time, trunk availability, number of delays, number of failures, accidents, and so on.

The experience of the latest European projects of high-speed highways created according to the life cycle contract scheme confirms that this technique allows saving up to 10-20% of costs, and in Russian conditions - up to 30%. Most high-speed highways in the world are built in this way, and this, as experience shows, is comprehensively justified. For example, in the construction of the Poseirao-Caia highway (part of the Lisbon-Madrid route), the use of a life-cycle contract reduced costs by 40%. As a result, the cost of a high-speed highway was brought to an unprecedented 7 million euros per 1 km (with 16-24 million euros generally accepted in Europe. for 1 km).

Since the 2000s, public-private partnership based on a life cycle contract has become an increasingly popular solution for the implementation of high-speed highway projects in European countries. Over the past 20 years, life-cycle contracts have become one of the most popular public-private partnership schemes around the world and are gradually crowding out concessions (Figure 2.3). They formed the basis of a number of large projects: Amsterdam-Brussels high-speed highways (it is a continuation of the Brussels-Paris highway); the English part of the Paris-London high-speed highway; all high-speed highways in Portugal; three of France's four new high-speed highways; high-speed highways in South Korea. So, in the Netherlands, the implementation of the Amsterdam-Brussels high-speed highway project (HSL Zuid) contributed to a surge in public interest in the life cycle contract methodology. As a result, following this high-speed highway, built in 2003-2007, 10 motorway projects and dozens of projects of state institutions were started according to the life cycle contract scheme, providing savings of up to 10-20% at each of the facilities.

Projects of high-speed highways do not include projects for the formation of a fleet of rolling stock, the provision of services for the transportation of passengers by high-speed trains, as well as the creation of station complexes. High-speed highways do not pay off through ticket sales, but the combined socio-economic effect is multiple of the costs, having a positive impact on the economy of the regions passing the route and the country as a whole. The life cycle contract involves the transfer of the functions of designing, partial financing, construction and maintenance of

highways within 30 years from the moment of commissioning under a single contract to a private partner.

High-speed highway is a fundamentally new high-tech facility, design, construction, equipment and the operation of which requires the availability of highly qualified personnel and sophisticated knowledge-based technology. In this regard, there are certain risks in the implementation of these projects. Taking into account the Kazakh conditions, the following types of risks can be distinguished: risks of accurate forecasting of passenger traffic and public solvency; risks of defects in design and construction; operational risks; risk of speculative actions in relation to the value of land plots in the subjects of the Republic of Kazakhstan, in the territory of which there will be pass the highways; risks of significant increase of project cost during its implementation; social risks (non-acceptance by various participants of the project, mainly by the population).

One of the main tasks for the development of high-speed and high-speed rail traffic as part of the implementation of the Strategy for the Development of Railway Transport in the Republic of Kazakhstan until 2030 is the training of personnel to ensure high-speed and high-speed traffic, which, among other tasks, are carried out by scientists of the Department of Transport, Organization of Transportation and Traffic of the South Kazakhstan University named after M.Auezov.

The high-speed highway is a fundamentally new high-tech facility, the design, construction, equipment and operation of which require the presence of highly qualified personnel and complex knowledge-based technology.

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