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Development of Moscow underground space plans, results, perspectives

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Abstract

The article discusses main transport problems of Moscow (Russia), proposes solutions by development of underground space and describes built transport objects in Moscow, as well as designed ones and objects under construction.

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1. Introduction

Lately, the pace of underground space development in large cities substantively increased. In our country, the main places of underground development are Moscow, Saint Petersburg, Yekaterinburg and Kazan. The main reason for the raise of underground development in large cities consists in lack of city territories. Constructions of different destination for underground placement include engineering services and utility networks, transport objects, malls, cultural and entertaining complexes, catering establishments, consumer service enterprises, communications agencies, warehouses, manufactures, underground premises of residential buildings, civil defense shelters, special constructions, and so on.

Moscow has the highest development dynamics among Russian megalopolises. Transportation remains one of the biggest Moscow problems.

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2. Main Issue

Nowadays, railways, waterways, airways and auto-roads connect Moscow with other regions of Russia. Nine existing Moscow railway terminals provide transportation of passengers and freight traffic by 11 railway lines. Total volume of passengers' transportation surpasses 605mln passengers per year. Four Moscow airports transport c. 30mln passengers per year (30 percent of total Russian air passengers' transportation). The main purpose of the water transportation system is freight transport. Over year, 10mln tons passes through 3 cargo ports and 23 cargo terminals. Two riverside stations serve for passengers' needs. Motor vehicles provide transportation of c. 6mn passengers and 10mln tons yearly by 13 highways [1].

Table 1 shows the main performance data of Moscow transport infrastructure before the beginning of its complex reconstruction.

Table 1. Performance data of Moscow transport infrastructure (2010).

№	Parameter	Value
1	Private transport	27 14.7 ths
2	Municipal transport, including:	
2.1.	Buses:	10 499 pc
	route network	15 044.1 km
	lines	1 247
	passengers per year	1 882.9 mln passengers
2.2.	Trolley buses:	1 601 pc
	route network	940.6 km
	lines	85
	passengers per year	465.5 mln passengers
2.3.	Trams:	917 pc
	route network	415.1 km
	lines	38
	passengers per year	276.0 mln passengers
2.4.	Moscow Underground:	
	total passengers route in double line counting	278.8 km
	stations	172
	lines	13
	passengers per year	2 475.6 mln passengers
3.	Moscow Railway:	
	Railway terminals	9
	total railway length	782.1 km
	Passengers per year	605.6 mln passengers
	including suburban passengers	574.5 mln passengers
	Freight traffic	97.7 mln tons
4.	Air transport:	
	Airports	4
	Air companies based here	109
	Passengers per year	29.6 mln passengers
	Freight and post traffic per year	287.4 ths tons

Internal city transportation is carried out by different kinds of municipal (Underground, buses, trolley buses, trams) and private (taxi, motor vehicles) transport, the passengers flow is c. 17 mln passengers per day, including 11 mln transported by municipal transport (Table 2). To compare: transportation system in Greater Tokyo Area carries 62.6 mln passengers per day, including 40.6 mln by municipal transport; in Paris – 23 mln passengers per day, including 8.73 mln by municipal transport; in London – 20.4 mln passengers per day, including 9.5 mln by municipal transport; in New York – 20.2 mln passengers per day, including 7.1 mln by municipal transport; in

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