

# The Evolution of Moscow's Urban Railway Network

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## Subway Development

The first subway construction project was drawn up at the end of 1902 by the Russian engineer, P. I. Balinsky. His plan was discussed at the Moscow Municipal Assembly and provoked a hostile response because it included confiscation of land near surface lines and removal of many houses. The tramway shareholders were worried about competition, so the project was withdrawn.

The first Soviet subway was opened in Moscow on 15 May 1935. It was double-tracked and 11.6-km long with 13 stations. Fifteen four-car trains ran each hour on each track carrying 177,000 passengers daily. By late 1940, the length of subway lines had already reached 23.3 km.

The subway tunnels were built through complex geological conditions with various rock strata. Some tunnels had high rock pressures and large water inflows of 2500 m<sup>3</sup> per hour to overcome.

From the beginning, the stations were built as monuments to the Soviet system. Expensive marbles and other natural stones were used to face the walls. Famous architects took part in planning the subway stations. Some stations became the embodiment of classic architecture. The innovative architectural plans of many other stations were based on the artistic expressiveness of the designs themselves. From the late 1930s to the early 1950s, the architecture of the subway stations was usually associated with a definite theme (for example, Russia's military past), so the artistic aspect of each station is strictly individual. In the late 1950s, a unified design was introduced to accelerate construction and reduce costs. The present architecture is a mix of these different tendencies.

Construction of Moscow's subways continued without interruption and did not stop even during WWII. From the 1960s until the 80s, construction of major

Moscow is one of Russia's oldest cities (the earliest mention dates to 1147) as well as one of Europe's largest cities, covering 1000 km<sup>2</sup> with a population of just under 9 million.

Today's Moscow is the largest transport centre in Russia and the metropolitan transport system links the city core with the more remote suburbs of Greater Moscow. However, most passenger traffic is carried mainly by the Moscow subway, which carries about 9 million people each day, representing more than 50% of all Moscow passenger traffic. The suburban railways also carry 1 million passengers each day from the suburbs into the city. By contrast, railways play a minor role in intercity passenger traffic.

## First Tramways

Moscow's first urban mass transit system was the so-called 'konka' horse-drawn tramcars, which were electrified (and called tramways) in 1899. The first route ran from the Savyolovsky Terminus and is still operating today.

The tramways evolved rapidly and were carrying 2 million passengers a year by 1905. Ten years later, this figure had reached 382 million. By 1915, the number of routes had increased to 31 with a total length of 311 km. The tramway lines were laid along all the central streets passing through Red Square along the side of the Kremlin and out into the suburbs and villa towns that later became Moscow districts. The early rolling stock was imported and the first domestic cars made by the Kolomensky Works appeared in Moscow in 1909.

The rapid growth of tramway lines continued in the 1920s and 1930s and tramways remained the mainstay of Moscow passenger traffic. In 1935, their share of metropolitan passenger traffic was more than 90%. During WWII, they were used extensively to carry military supplies, wounded people and soldiers, and the lines were extended to works, warehouses and hospitals. By 1943, the Moscow tramway network reached its maximum length of more than 550 km, but after the war, the subway gradually began carrying more Moscovites.



Mytishi Terminus of first Moscow suburban electric line built in 1929

(Author)

residential districts far from the city centre necessitated urgent expansion of the subway network by extending existing lines and constructing new ones. As a result, by the late 1990s, only a few Moscow districts are not served by the Moscow subway, which now totals about 250 km (compared to about 150 km in 1973). The subways are the most convenient means of transport for moving inhabitants of recently developed new districts to the centre of Moscow.

The prolonged political crisis of the 1990s of course was negatively reflected in new construction, but construction was still not stopped, although the pace dropped.

The flat rate fare is just the equivalent of US 20 cents, so the subways remain easily available to every Moscovite. As a result of the low fare, the subways are not self-supporting and new construction, as well as some operational costs are subsidized by the Moscow City Government.

Connections with high-speed passenger services and electrified suburban railways have decreased passenger traffic on the main routes and helped eased congestion at central transfer junctions and terminals.

### Suburban Railways

Moscow's suburban railway lines play an important role in transporting people who live outside but work in Moscow, as well as many Moscovites to their *dacha* (country house) near Moscow in the summer.

The history of the suburban electrified railway services began in 1929 when the Northern Railway section between Moscow and Mytishchi (17.7 km) entered operation. In all fairness it must be noted that the first suburban (non-electrified) railway (25.6 km) was opened on 30 October 1837 to connect St. Petersburg (the capital in those days) and Tsarskoe Sero. The 650-km railway

### Change in Moscow Subways over 60 Years

Item	15 May 1935	15 May 1995
Length of lines (km)	11.2	243.6
Number of lines	2	9
Number of stations	13	150
Daily average number of passengers (1000)	177 (1936)	8723
Share of total metropolitan traffic (%)	2	51.7
Rolling stock (cars)	58	4060
Maximum train frequency (each hour)	15	42
Design speed (km/h)	50	90
Average speed (km/h)	26.7	41
Number of staff	1991	24,615

between St. Petersburg and Moscow was opened in 1851. The hard bench third-class carriages on the first Russian railways were at the front of the train and had no roof.

Moscow's suburban railway lines run in 9 directions from 9 terminals. Electric trains run only in radial directions. There is also the Moscow loop line, but there is no direct traffic from the loop into the centre. The Moscow city border has many railway stations, but most do not have a station building, so the electric trains are inconvenient as metropolitan transport. Consequently, although the Moscow suburban railway network exceeds 2000 route-km, it carries just 20% of passengers. In the last decade or so, Moscow car traffic

has increased to a great extent and is reaching a critical point with severe worsening of the Moscow environment. Despite modernization of highways and construction of elevated sections, the road network cannot handle the rapidly increasing number of cars. Under these conditions, the subways, tramways and suburban railway network should be upgraded to play a greater role in passenger transport. ■



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