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Research of pendular migration in the St. Petersburg's agglomeration

Mikhail Petrovich, Leonid Losin, Lyudmila Istomina, Andrey Kostyuchenko, Ilia Reznikov

The retrospective analysis of the dynamics and structure of passenger traffic on the border of the St. Petersburg's agglomeration core by results of complex on-site quantitative investigations of passenger traffics on all means of transport, including the railroad, completed in 1987, 2003 and 2011 is carried out.

The population of the St. Petersburg's agglomeration on January 1, 2012 was about 5,9 million people, the territory area — 11,6 thousand km². The borders, spatial and structural features of the St. Petersburg's agglomeration are defined by JSC "Peterburgsky NIPIGrad" (St. Petersburg Research and Design Institute of Urban Planning) within works on justification of the design solutions of St. Petersburg Master plan 2005

As the core of the St. Petersburg's agglomeration, the central part of the city St. Petersburg with a very high building density was defined (the total area of 65 thousand hectares, about 50% of the whole city territory), including the historical center, industrial belt, regions of an industrial housing estate (see fig. 1).

For agglomerations considerable scales of pendular migrations are typical, thus it is considered that not fewer than 90-95% of daily trips with the labor, business, educational and cultural and community purposes are made within external borders of the agglomeration. The zone of intensive recreational cyclic migrations usually also doesn't go beyond external borders of the city agglomeration, but the share of all the number of such trips within these borders is usually smaller, than in case of labor trips : 75–80%.

When studying the ways of participants movement, one of the tools of the measurement of pendular migration volumes is the registration of the passenger traffic and the vehicles streams on the border of the agglomeration core. The registration results can be also used while creating a mathematical model describing the formation and distribution of the streams in the agglomeration transport network.

The authors of the present article used the materials of the passenger traffic research on the different means of transport conducted for the Leningrad administration in 1987 and also the materials of the research completed by JSC "Peterburgsky NIPIGrad" together with St. Petersburg Means of communication State University in 2003 and 2011.

The results of the above-mentioned research are given in table 1 and in fig. 2.

The total passenger traffic on all entrances to the St. Petersburg's agglomeration core during three hours in the morning period of the working day peak loadings was in 2011 about 169 thousand people, which was 18% more, than in 2003 and 43% more, than in 1987. The exit stream also increased and became about 97 thousand passengers which was 37% more than in 2003 and 11% more than in 1987. It should be noted that the increase in the number of the resident population couldn't affect the increase in the volumes of passengers transportation between the agglomeration core and surrounding settlements. This indicator just now is starting to reach the level of 1987. Probably, the growth of passengers transportation volume is connected with an increase in the general population mobility and with a change in the difference of migratory capacities of St. Petersburg and the Leningrad region.

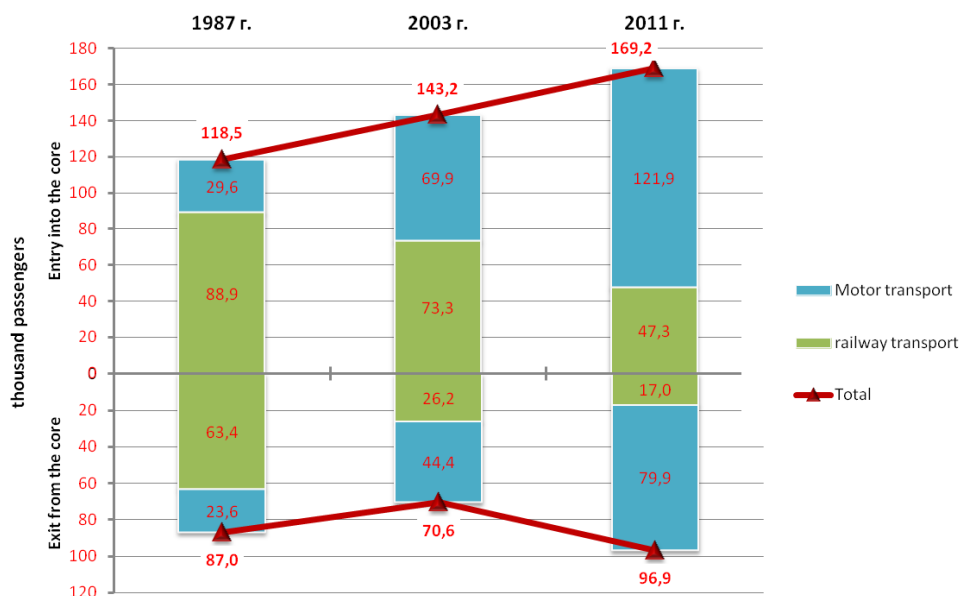


Fig. 2. Retrospective dynamics of passenger traffic on the St. Petersburg's agglomeration core border, thousand passengers during three hours in the morning period of the working day peak loadings

Special attention should be paid at the changing passenger traffics structure. If in 1987 about 80% of trips to the agglomeration core in the morning peak time of the working day were carried out by local trains, by 2011 the reverse picture is observed – more than 70% of trips were made on street transport. The passenger traffics from a core also shows the reduction in a role of the suburban railroad – from 70% in 1987 to 20% in 2011. The motor transport wins when transporting to the zones remote from the railroad stations, in zones with little traffic, during family trips, but often loses in speed even without an overload of highways. And on a number of the directions jams can make the time of a travel to one and a half, and sometimes twice. And on a number of the directions jams can make the time of a travel one and a half, and sometimes twice as much.

Intensive territories development behind the core borders, the predicted increase in the population number and mobility, and, as a result, an increase in pendular migration volumes, demand ensuring reliable transport communications of all St. Petersburg's agglomeration parts. In our opinion, while solving the specified task, we can mention the important role the development of suburban rail passenger traffic due to development of system of stopping points and railway lines, a decrease in intervals, an increase of speed and the organization of new through-routes, increases of comfort and reliability of a trip, introduction of uniform travel documents on the railroad and city (municipal) transport.