Development of the agglomeration rail passenger transportation in Warsaw

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Abstract: Some reasons of present situation in the Warsaw agglomeration passenger transportation and some tendencies of the development of the rail urban and suburban transportation network have been presented in the paper.

Key words: rail passenger transportation, subway, rail operators, tramway

1. Introduction
Warsaw is a rapidly developing capital of Poland with the population of nearly 2 million inhabitants. Population of Warsaw agglomeration (within the radius of nearly 40 km) approaches 2,5 million. It is evident that this huge quantity of people requires high quality of the urban transport. The main mean of the urban transport in Warsaw is still a bus. Some new quarters in Warsaw can be achieved only by bus. This is a result of the long term negligence of the Polish government and Warsaw authorities. Some communication arteries of Warsaw have achieved their bus communication capacity in the peak hours, when bus comes to the bus stop every 20 seconds. The construction of the subway had been postponed several times before final decision in 1982, forced upon a political situation after year 1981 events. All above mentioned circumstances resulted in necessity of the essential reconstruction of the passenger transport in Warsaw agglomeration.

2. Tramway communication in Warsaw
The first horse-driven tramway line, 7,6 km long have begun regular operation in Warsaw in 1866. The first electrified tramway line were in operation in 1908. A dynamical development of the Warsaw tramway network followed after the 1st World War (years 1918- 1939). The Warsaw uprising (1944) and a systematical destruction of the left-side Warsaw carried out by Germans after the uprising fall caused a necessity of the reconstruction of the city tramway network after the 2nd World War. As the main arteries of the left-hand side Warsaw had been totally destroyed it was possible to widen the main streets during the reconstruction of Warsaw and to separate tramway traffic from the streets. The result of this situation was

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relatively good tramway service, with the majority of the tramway lines built apart from the streets. At present 25 tramway lines are operational [2].

Last two years were very successful for the Warsaw tramways. Last year a new 2.2 km long tramway line was opened, connecting Młociny and Bemowo district. It should improve a quality of tramway service in the eastern part of Warsaw. It has been the first segment of the tramway network built for a long time. The total cost of the project was 28 million PLN, 15.6 million PLN was a grant of the EU. The next big investment in tramway network has been a modernization of the 11.7 km long connection of the Banacha junction with Gocławek junction (Fig. 1). Total cost of the project is about 240 million PLN, a half of the net cost (97.4 million PLN) is a grant from the EU [2].

![Fig.1. Modernization of the Pętna Babnacha – Pętna Gocławek connection (in red)](image)
A map has been published on the web side www.tw.waw.pl

The second direction of the Warsaw tramway network improvement is a modernization of the tramway stock. A present (data on the 1st of September, 2006) situation has been shown in Table 1.

<table>
<thead>
<tr>
<th>Depot</th>
<th>13N</th>
<th>105N</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>f</th>
<th>g</th>
<th>m</th>
<th>Total</th>
<th>105Nz</th>
<th>105MWAS</th>
<th>105N2K</th>
<th>112N</th>
<th>116N</th>
<th>116Na/1</th>
<th>Total</th>
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<td>102</td>
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<tr>
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<td>281</td>
<td>5</td>
<td>22</td>
<td>4</td>
<td>2</td>
<td>14</td>
<td></td>
<td>368</td>
<td>4</td>
<td>132</td>
<td>2</td>
<td>28</td>
<td>166</td>
<td></td>
<td>859</td>
</tr>
</tbody>
</table>

Table 1: A present inventory of the Warsaw tramways

Wagons type 13N are the oldest – they were produced about 40 years ago by Konstal Chorzów works. Series 105N wagons had been delivered by the same factory from the early 70'ties and have got a traditional DC power train. 12 105N wagons were modernized in R-1
depot – 2 of them have 105NWAS mark and 10 are modernized 105N version called 105N2K. An experience collected during 105N2K testing and operation enabled delivering of the quite new 105N2K wagons. The newest type of the trams are 116N, produced by Alstom Konstal Chorzów with AC drive train. A modernization of some 105N wagons as well as a purchase of the new tramways are planned.

3. Warsaw subway

The first plans of the Warsaw Subway were considered 70 years ago and were based on the idea of the construction of two crossing lines. In 1927, geological drillings took place. As the cost was beyond the city's financial resources, the talks began with the Western financial centres. The economic and financial crisis of the 1930s slowed down the negotiations. The studies over the subway project were revived in 1938. The Office of Underground Railway Study and Design began to update the plans made several years before. A new project featured a city network of the total length of 46km; and the investment was to be completed in stages over the next 35 years. Significant progress was made till September 1939. A completed design included a general plan of the subway, a profile of two lines and plans of intersections of the tunnel with the water supply and sewage systems. A major part of these materials disappeared during the 1944 Warsaw Uprising. During the war, 80% of buildings were destroyed but the idea of underground transportation was not forgotten [1].

The project was revived in 1945 and involved a fast, light railway system connecting northern and southern outskirts with the centre of Warsaw. Along the east-west axis, it would have run from Wola, across the city centre, to Gocław and Wawer. The total length was to be 64km, including 26km in a shallow tunnel. In 1950, the government decided of the construction of a deep subway. The State Company “Metroproject” developed a conceptual design of the subway lines along the north-south and east-west axes. Military reasons and geopolitics proved to be more important than transportation needs of the city. Drilling of a deep tunnel under the bottom of the Vistula River began with he width big enough for the regular railway. In 1953 the construction was interrupted as it was too difficult, and, most importantly, too expensive.

In the early 1980s some statements appeared indicating that even intensive road development and individual car ownership would not solve the transportation problems of Warsaw. In January 1982, Wojciech Jaruzelski announced in the Parliament the decision of starting the construction of the first subway line in Warsaw next year. 15th April 1983 was the symbolic date of driving in the first pile of the slot lining wall into the ground. Before the dramatic changes in Poland's political and social system, the subway construction was in a difficult situation. As a result of a political situation, from 1985 amounts allocated for the subway in the state budget were significantly lower than the initial financial schedule. The available resources and means were moved towards finishing the south segment of the subway. According to the agreement between Poland and the USSR, signed by the governments, railway rolling stock for the subway line, 90 cars, were supposed to be a Soviet Union gift for Warsaw. From this number 10 cars were delivered at the turn of 1989/1990. The rest of the gift was recalled and cancelled due to the collapse and disintegration of the Soviet Union. After that, a decision was taken to purchase 32 cars from St. Petersburg. They were delivered to Warsaw in 1994. They differ from the serial production of the manufacturer by their atoxic and incombustible parts. On 7th April 1995, the first regular train ran along the subway 1st segment [1].

On 17th June 1996, the City Council of Warsaw passed the resolution to continue the extension of the Warsaw Subway 1st line from A13 Centrum Station to A23 Młociny Station.
At present the last segment of the first subway line is under construction. It should be finished in next two years time. In August 1998 Alstom Konstal was awarded a contract for the delivery of 108 state-of-the-art cars for the Warsaw subway. The last part of the trains was delivered in 2004. Last year a resolution of the City Council of Warsaw approved the plans of the second and the third subway lines in Warsaw. A construction of the second line should start next year. The line will connect the western part of Warsaw with the east part, for the first time the subway line will cross the Vistula river. A subway tunnel is to be constructed. The works should be finished till 2020. A third line will start at Dworzec Wileński station and will head south, to the south-east part of Warsaw [1].

4. Railway agglomeration transport operators

On the basis of the Railway Commercialization and Restructurisation Act passed by the Parliament the railway infrastructure was separated from the operators. As a result a PKP Group was formed which consisted of about 30 railway enterprises. Among them Koleje Mazowieckie was established, a joint-stock company of the PKP and the Mazovian District authority. This is a main regional passenger transport operator. The results of the KM activity are rather promising. A process of the liquidation of the local railway connection was stopped. A new stock deliveries were realized in 2006 and are planned for this year [5].

The another operator formed on the basis of the Railway Commercialization and Restructurisation Act is a WKD (Warszawskie Koleje Dojazdowe) – an independent operator of a few suburban DC lines, which was established in the 1920s and then incorporated to PKP after the 2nd World War [5].

The youngest railway operator in Warsaw region is SKM – Szybkie Koleje Miejskie, which is a company owned by Warsaw Transport Authority (Zakład Transportu Miejskiego). Trains operated by SKM, subway, tramways and buses should complement each other by forming a complete urban transport network [4].

5. Conclusion

After a few years break citizens of Warsaw have a common ticket for all means of urban transport. This is a result of the better transport policy of Warsaw City Hall. It has been understood that only a harmonisation of all means of urban transport can give a synergy effect. A better utilisation of the means of rail transport gives not only ecological advantages but also gives a chance to improve a quality of the transport services and a number of satisfied passengers.

6. Literature:

[1] www.metro.waw.pl