

TEOFIL LJEWski

THE TRANSPORT SYSTEM IN A RECONSTRUCTED CITY: THE CASE OF WARSAW

Warsaw is a unique example of a city of more than a million inhabitants, which was totally destroyed during World War II and reconstructed in the postwar period. This provided a very rare chance to change and improve the whole transport system, which was already achieved because of the spontaneous reconstruction of many buildings by the former inhabitants who had returned. These often left the urban planners who prepared reconstruction projects in the van. But the most important changes in the transport system could be introduced because of the destruction of the central parts of the city.

These changes comprised first of all the widening of narrow streets and the extending of thoroughfares. On the other hand, the outlets of many local streets were closed so as to reduce the number of crossings with the main streets. So the network of streets which was before the war more equal as regards width, importance and traffic intensity was clearly differentiated from the principal avenues and local streets. On many of these secondary streets only one-way traffic was allowed.

The biggest investments were the constructions of the completely new thoroughfares and motor-ways linking distant districts and joining the external highways. The oldest East-West Route was completed in 1949; this crosses the historic core of Warsaw via a tunnel and due to this innovation, the heavy transit traffic could be diverted from the narrow and winding old streets. This thoroughfare which seemed to be modern and convenient at the beginning, is now too narrow and congested for the present volume of traffic. The planners had not envisaged such an increase in traffic in the span of 30 years.

The newer motor-ways, built mostly in the 1970s, have a much bigger track capacity. They cross the whole city from the north to the south and from the east to the west thus permitting highspeed traffic, which practically does

not impede local or CBD traffic. These motor-ways, unfortunately, have not improved the situation much in the central districts where the concentration of offices and lack of space are responsible for the growing congestion of cars on the streets and parking spaces.

Regarding the pattern of streets and building there can be distinguished the following 5 zones of different systems, originating from succeeding historical periods of urban development:

(1) The oldest core, originating from medieval times, consists of two former towns (the Old Town and the New Town), with two market squares, very narrow streets, is a densely overbuilt area with partly preserved ancient defensive walls. On the southern and western side of this core are some irregular streets with historic buildings from the 17th and 13th c., and among these numerous adjoining palace and churches. This zone is the historic part of Warsaw, covering the smallest area but most attractive for tourists. Some years ago the medieval part was closed to cars and made into a pedestrian area. The finding of parking places for the numerous tourist motor coaches and cars, however, is an acute problem.

(2) The Central Business District covers a much larger area in the middle of left-bank Warsaw and separately a smaller area in the middle of right-bank Warsaw (both districts are separated by a green belt along the banks of the Vistula River.) This district was built mainly in the 19th c. and is characterized by the regular lay-out of streets, parallel and perpendicular to the Vistula. The few older sloping streets were closed or subordinated to the regular network.

This zone is characterized by the highest volume of traffic generated by the concentration of offices, shops, department stores, hotels, restaurants, cinemas, theatres and the location of the Central Railways Station. Some main streets here were widened or extended during the postwar reconstruction and a vast square for ceremonies, meetings and parades, was located in the centre of the district on the site of a former residential quarter. But most of the prewar streets have remained in their former width and cannot contain the actual number of cars, especially for parking purposes. There are almost no underground or many-storied parkings and all car owners must look for parking space on streets and squares for most of the pavements are already occupied.

(3) The next zone surrounding the central district comprises quarters built over mainly just before World War I or in the interwar period, and mainly included into the administrative borders of the city in 1916. These districts have a residential character in the north (Żoliborz), south (Mokotów) and south-west (Ochota), while in the west (Wola) and east (Grochów, Targówek) they contain many industrial plants. The street lay-out is regular in some parts, in others it follows former country roads. Each district is crossed by one or two

arteries leading to the centre of the city and burdened with extremely heavy traffic while the secondary streets are less frequented and have some reserves of parking space.

Circular arteries have been carried through this zone or are under construction or planned so as to divert the interdistrict and transit traffic from the congested city centre. Unfortunately, these arteries were not taken into consideration during the building over of these districts and now extensive demolitions are required which are not easily acceptable in the present economic situation of Poland. Therefore, these essential constructions have been delayed or postponed to a later date.

(4) The next zone comprises the quite new residential districts constructed in the postwar period or actually in course of construction. These cover the vast areas included into the city borders in 1951, which were formerly agricultural lands. These districts mostly consist of huge buildings of about 10 floors; between them broad green belts have been preserved.

Apart from the main thoroughfares the local street grids, according to the architects imagination, are quite different in each quarter; they form complicated figures within the block areas making transit traffic impossible. Extensive parkings have been foreseen, but in some quarters these are already overfilled and the cars park on the pavements or lawns. There are no underground or storied garages and it is only in the few districts with one-family houses that all the plots are provided with garages.

This zone comprises the new industrial districts also. They are the source or destination of heavy goods transports, although the Warsaw industry has a relatively small turnover in tonnage, being mainly specialized in engineering and electronics. Plants with the highest volume of supply, the power stations and the steel mill use railway transport.

(5) The outermost zone, included into Warsaw's border in 1951 or later, has partly preserved its rural character. This comprises agricultural holdings, gardens, allotments, green-houses and large forest areas which have been extended in the postwar period for recreational purposes and for improving the microclimate. These former villages and newer satellite settlements are situated along the railway lines and outlet roads. These are characterized by the prevalence of two-storied houses surrounded by gardens or trees. A dense network of local narrow streets connects these scattered settlements, these streets connect these scattered settlements, these streets, formerly rural lanes, are often unpaved.

The intensity of traffic in this zone is the lowest, only the main outlet roads are used by the many cars and trucks, leaving or entering Warsaw. In recent years the suburban sections of these roads have been extended as two-

carriage motor-ways. Local congestions of traffic can be observed at weekends on the outskirts of woods and on roads leading to artificial lakes and rivers.

Prewar Warsaw occupied an area of 135 Km², i.e. only 28% of the present one. But the number of the population in 1938 had reached 1.3 million, i.e., 81% of the 1980 population. The density of population per 1 Km² was 3 times higher, the buildings were much more compact, with little space available for transportation. Even so, there were no problems with traffic congestion and parking places. The mobility of the population was much smaller and the number of automobiles did not exceed 10,000.

The main reason for smaller mobility was the spatial structure of the city different from the present. The places of work were much more evenly distributed, the industry and manufacturing were characterized by the predomination of smaller plants scattered about the residential quarters. Many craftsmen and businessmen dwelt and worked in the same building. The administration in the city centre employed less officials. The share of unemployed was higher. Most employees walked to their workplace and the use of trams and buses was not as prevalent as it is now.

In the newly reconstructed city the distribution of workplaces has changed. Small industry has disappeared and in its place far bigger plants have been constructed in the separate industrial districts remote from the city centre. The new residential quarters, with a few exceptions, have also developed at some distance from the city centre. The mass-commuting between the out-lying districts was generated in this way. The housing shortage makes a change of residence very complicated and the low fares in municipal transport do not affect the enormous mobility.

Most people use the public transport. About 2/3 of the Warsaw householders are not car owners. Apart from this, the high cost of petrol and fuel rationing have induced car owners to limit the use of their own cars, so many of them use the car only at week-ends and for excursions, and commute by bus or tram daily. Nevertheless the demand for cars is very high, their number is growing rapidly and since 1955 this has doubled in every 5 or 6 years.

The public transport system consists of the tram, bus, and trolleybus services run by the Municipal Transport Enterprise, and the sections of the State Railways crossing the city.

The oldest of these transport facilities are the t r a m s. The first horse-crawn trams were already introduced in 1866, mainly for connctions with the railway stations, situated on both sides of the Vistula river and having different gauges. Electric trams began to circulate in 1908. The length of streets having tram lines on them had reached 35 Km before World War I and 118 Km before

World War II. Now this network is almost of the same length but of another shape.

The oldest tram lines were limited to the central district, these ran along all the main streets and had many stops and crossings. The speed of travel was low, although there was no traffic regulation on this. In the inter-war period the lines were extended to the incorporated new districts and to the outskirts of the city, but the inner network remained almost unchanged.

A total change in the tram lines system resulted from the war damage of 1939-1945 and the reconstruction plans. The trams were entirely withdrawn from the lines on the historic part of the city. In the central district only the lines on the principal thoroughfares have been left, and these partly run on separated track-ways thus reducing the possibility of hindrance by automobiles. There are no turns on crossings and almost all the tram lines run straight through the central district from north to south or from east to west.

New lines have been built or extended in the suburbs. Here, they run almost entirely on separated track-ways. In the 1960s, the tendency towards the withdrawal of trams was a dominating one and some of the even recently built lines were closed down. Because of the oil crisis this tendency was discontinued and now new tram lines are planned or are even in the course of construction.

Since 1972 the most important means of city transport in Warsaw are the buses, in that year they surpassed the trams as regards the number of passengers carried. The bus transport system has been developed several times from its first beginnings, in the years 1920-1925, again in 1928 and then after World War II. Regarding the length of routes that of the network is about 5 times longer than that of the trams. The number of vehicles is about twice higher and the number of passengers carried in the city is about 50% higher.

The bus lines are of a different type. Some are long-route ones and cross the whole city thus connecting the distant suburbs; several of them are "express" buses with a limited number of stops. Others connect the city centre with a suburb, another group operates only in the suburbs beyond the central part of the city. A few lines cross the city border and serve the traffic to satellite towns and villages. Finally, there is a type of "green" line, operating only at weekends to the popular recreation areas.

Buses are the most flexible means of city transport, these often change their routes according to the demand. Some lines compete with the trams or railways, being more convenient because of a higher frequency. In the rush hours some additional lines are introduced along shorter distances.

Trolley buses were operated in Warsaw from 1946 to 1973. The maximal length of their routes was about 1960, they ran along 41 Km of

streets, had 127 buses and carried about 90 million passengers a year. They ran along some of the main streets (in the historic part of the city, too) and along some secondary ones in the central districts. They were found to be uneconomical and impeded the automobile traffic and were discontinued in 1973, just at the beginning of the discussion the trolley buses were re-introduced in 1983 along a suburban line.

An underground railway has been planned in Warsaw, for about 60 years, but the economic and political situation has not permitted the realization of it. In 1951 the construction of a deep tunnel underground was started, but after few years abandoned because of geological difficulties (sandy soils with water) and the high cost. In 1982 the construction of a shallow underground tunnel was initiated, the first line in a south-north direction will be 23 Km long with 23 stations and will cross the city centre under the principal business street.

The city transport system is supplemented by railways which first of all serve the suburban and long-distance traffic as also a great part of the city traffic thanks to the 37 railway stations and stops located in the Warsaw area. Most of these stops were located in the interwar and postwar years, though almost all the routes have existed since the 19th c. But in the first period of their existence the railways were of little significance for local traffic since there was practically no commuting and there were no satellite settlements around Warsaw.

It was only after 1890 that the construction of local narrow gauge lines began. These ran in 5 directions from Warsaw, in the interwar period one more standard gauge line with electric traction was added. These lines had many stops and contributed to the development of the suburban settlements. Also on the 7 main standard gauge lines the local traffic increased, especially after the introducing of many additional stops and the electrification of the suburban sections of the first 3 lines since 1935.

In the postwar period all the other main lines were electrified and further stops introduced. But at the same time all the narrow gauge railways were gradually closed down for they were too slow with their steam engines and ran along streets where they impeded the automobile traffic.

Now almost all the railway lines converge on two stations, Warsaw West and Warsaw East; they are connected by a four-track line, completed in 1933, which crosses the centre of the city through a tunnel. On this line two central stations are situated, one for long-distance trains and the other for suburban trains. Access to the city is therefore very convenient. All the trains carry about 200,000 passengers daily and the majority of these are daily commuters.

In conclusion, it is obvious that the transport system of Warsaw was changed through the destruction of the city. But the changes were not as radical as one could expect after the large-scale devastation. They refer first of all to the central district where the amount of rubble was the biggest and where this event was used for a more general improving of the living conditions. Many densely built up areas have relieved congestion, many ruined buildings have been replaced by lawns and parks, several streets have been widened.

But the transportation space in general increased insufficiently, the planners did not expect such an increase of traffic as well as the number of cars. Almost no large car parks have been constructed, the largest one utilises the square intended for parades. The lack of traffic immediately after the war was not taken advantage of for the construction of underground installations such as garages, subways, double-level junctions and an underground railway. Only the State Railways used this period to extend the railway tunnel under the city to four tracks.

The main reason for such failures was the economic situation and the simultaneous destruction of most cities in the country. There were no funds for more radical reconstruction, even so the development of Warsaw contributed to a drop in the standard of living throughout the country. Similarly the extensive transport investments during the economic boom of the early 1970s contributed to the subsequent economic collapse.

TABLE 1. DEVELOPMENT OF WARSAW

Year (end)	Area in Km ²	Population in '000s	Paved streets and pavements in ha	Automobiles
1564	0.3	5	.	—
1655	3	10	.	—
1770	16	30 ^a	16	—
1830	20	145	123 ^b	—
1890	37	456	163 ^c	—
1913	37	845	239	.
1918	115	758	360 ^d	.
1938	135	1295	738	9747
1944	135	162	.	10767 ^e
1951	412	865	.	17867 ^f
1960	430	1157	.	30845
1970	430	1316	1513	83700
1980	485	1596	.	373846 ^g

^a 1764 ^b 1847 ^c 1896 ^d 1916 ^e 1946 ^f 1955 ^g Voivodship of Warsaw

TABLE 2. DEVELOPMENT OF PUBLIC CITY TRANSPORT IN WARSAW

Years	Cabs	Taxis	Length of routes in Km	Trams		Buses	
				Number of tram-cars	Passengers in million	Length of routes in Km	Number of buses
1883	995	—	—	100 ^a	—	—	—
1900	3509	—	29	284 ^a	21,2	—	—
1913	3402	—	35	262	86,3	—	—
1922	1124	65	47 ^b	295 ^b	137,3 ^b	—	—
1928	1288	2655	96 ^c	671 ^c	242,1 ^c	3	61
1938	1006	2306	118	710	275,6	64	11
1946	362	22	74	289	125,9	34	109
1955	—	1876 ^d	97	744	561,4	194	43
1965	—	2574	125	884	903,3	391	250
1975	—	3478	113	900	635,6	545	1002
1982	ab. 10	5971 ^e	116	934	604,5	576	2058
							1889

^a Horse-drawn trams^b 1920^c 1930^d 1958^e 1979^f In the voivodship of Warsaw

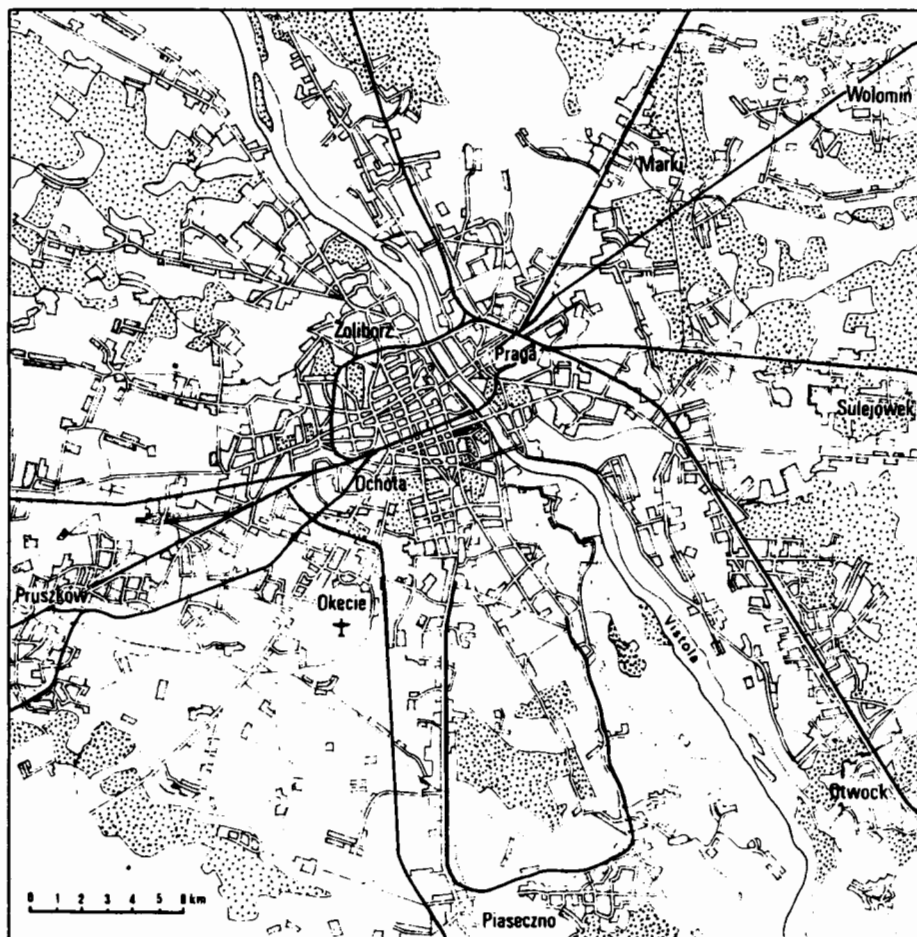


FIG. 1 - THE RAILWAY NETWORK OF WARSAW

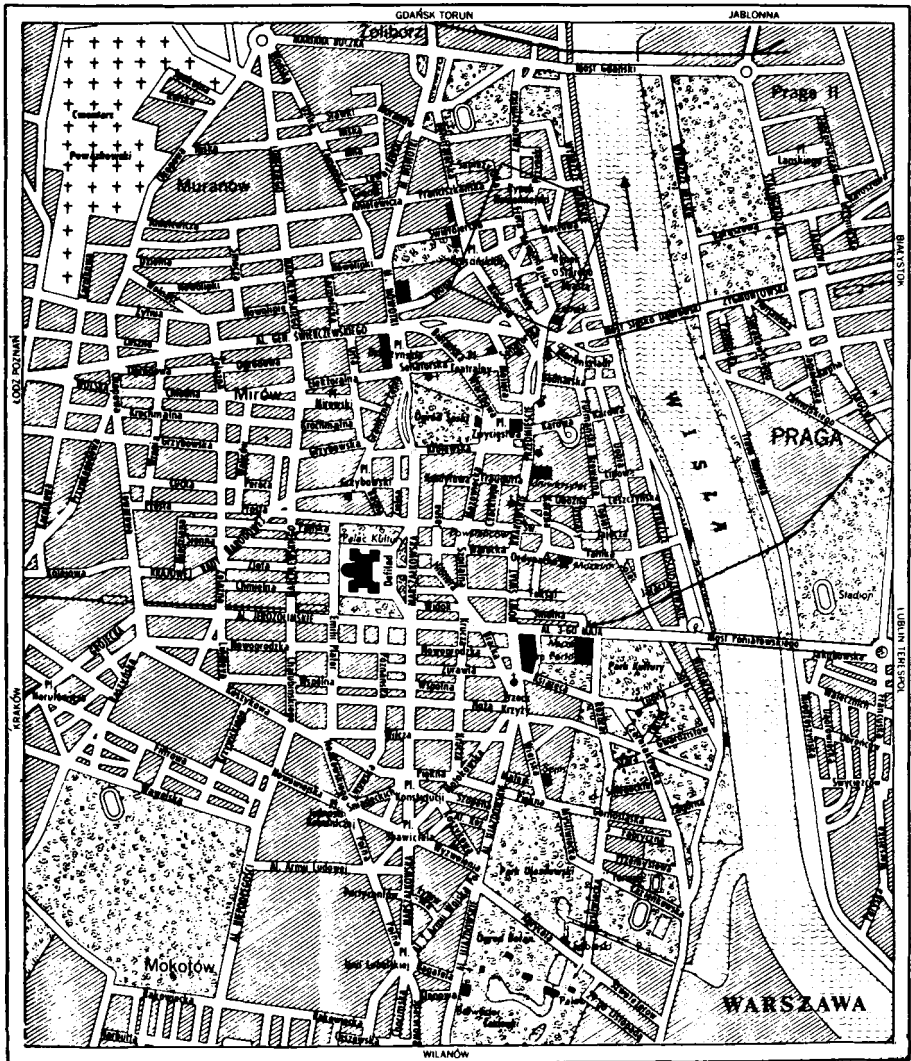


FIG. 2 - THE HISTORICAL CENTER OF WARSAW