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Janusz Kaliński (*Warsaw*)

THE DEVELOPMENT AND ADJUSTMENT OF ROAD AND RAIL TRANSPORTATION NETWORK IN POLAND IN 1918-2000

1. THE HERITAGE OF THE AUSTRIAN, PRUSSIAN, AND RUSSIAN RULE

The period of 123 years of political non-existence of the state of Poland resulted in deep disintegration of the Polish territories under the rule of three neighboring countries that made every effort to blur the old frontier lines, drawing new ones which severed centuries-long economic relations. The unfavorable political circumstances had their influence on transportation which in the 19th century underwent fast developement and modernization.

Changes in transportation were primarily related to the opening of first railroads and the gradual development of a railroad system. In the Kingdom of Poland, a part of Russia, the first railroad connected in 1848 Warsaw with the area of Dąbrowa Górnicza, the most important industrial area of the Kingdom, and the frontier. Its official name, the Warsaw-Vienna Railroad, derived from its farther course. On the territories controlled by Prussia and Austria the first railroads connected, respectively, Poznań and Szczecin, and Kraków and Mysłowice.[1]

The development of railroad transportation on Polish territories gained momentum in the second half of the 19th century along with the development of capitalism. The extension of the railroad network was desirable not only for business circles, but also, for strategic reasons, for the state authorities and the military. Still, there were serious discrepancies between

[1] *Encyklopedia historii gospodarczej Polski do 1945 r* [Encyclopedia of the Economic History of Poland till 1945], vol. 1. Warsaw: Wiedza Powszechna, 1981, p. 313.

the military and the economic postulates, which exerted their influence on the dynamic and directions of the railroads development in Poland.

In the area that belonged to Russia major railroads were built by joint stock companies based on the local investment capital. By granting concessions, the state could influence the course of railroads as well as their technological quality and strategic value. Concessions also specified the time when railroads were to be taken over by the state. According to those rules, a number of railroads were constructed, including an economically important offshoot of the Warsaw-Vienna railroad from Koluszki to Łódź, a line from Warsaw to Białystok, which was a part of a longer route to St. Petersburg, and another one from Warsaw to Terespol, which opened the routes to Moscow and Kiev. All those investments facilitated the access of Polish manufactured goods to the Russian market and allowed for the importation of raw materials.

The strategic concerns determined the construction of a railroad along the Vistula, connecting Kowel, via Lublin, Warsaw, and Modlin, with Mława. The line was connected with the Russian military installations on the middle course of the Vistula. For security reasons, the Russians did not allow for any major investement in railroads west of the Vistula. Consequently, before the outbreak of World War I, the Russian-Prussian frontier (1,000 kms) had seven transit connections, while the Russian-Austrian one (500 kms) only three. There were also few railroads connecting the Kingdom of Poland with Central Russia. Strategists believed that it would slow down the progress of the enemy into the state of the Tsars. A similar role was assigned to the wider Russian track (1,524 mms). Only some lines west of the Vistula - Warsaw-Vienna, Łódź, and Warsaw-Bydgoszcz - were constructed according to the Western standard of 1,435 mms.[2]

On the territories under the Prussian rule and in Silesia the development of transportation was determined by economy. At first, railroads were mostly constructed by private companies, but with time the state started playing a more and more important role. All the main lines were built before 1873. The railroad network was particularly dense in Silesia because of its quickly developing industry. What it showed was a strong connection of economic exchange with Berlin and the western part of Prussia, which made the parallel order lines more significant than others. The first important transverse line (Poznań-Wrocław) was built to connect Silesia with the ports of Szczecin and Gdańsk.

Under the Austrian rule from the very beginning the government had initiative as regards building railroads. Private capital was involved only in local lines. In Galicia, the most important were the Northern Line and the

[2] M. Pisarski, *Koleje polskie* [Polish Railroads]. Warsaw: WKiŁ, 1974, p. 36.

Transversal Line. The former connected Vienna with Lvov and the Russian border via Cracow, the latter towns south of the Carpathians (Cieszyn, Nowy Sącz, Sanok, and Stanisławów) with the Romanian border.[3]

Poland was not an independent state so that the development of the railroad network in its regions depended on the economic and military needs of the superpowers which partitioned the country at the end of the 18th century. The situation was particularly bad in the Kingdom of Poland since the Russian authorities considered it a borderland. Moreover, railroads often bypassed cities, making their economic growth difficult. Galicia was in a comparably better situation thanks to the involvement of the Austrian state which developed railroads of both economic and strategic significance. Unfortunately, a serious obstacle was the region's economic backwardness and difficult terrain. The most developed in terms of railroads was the part which belonged to Prussia. The density of the railroad network in Silesia and Wielkopolska was higher than in England or France.

Table 1. Density of the railroad lines on Polish territories in 1914

Region	Surface (in sq. kms per one km of railroad)
Galicia	18.7
Kingdom of Poland	24.9
Poznań region	7.8
Pomerania	7.5
Upper Silesia	7.0

Source: *Dziesięciolecie Polskich Kolei Państwowych* 1918-1928. Warsaw: PKP, 1928, p. 10.

Big differences among regions as regards the railroad network density, combined with different rules and regulations, varying technological conditions and facilities in practice resulted in three different railroad systems.

Differences concerning railroad systems had their equivalents in the system of roads. In Wielkopolska, which belonged to Prussia, there were 24.3 kms of roads per 100 sq. kms, under the Austrian rule the number was 30.5 kms, and in the Kingdom of Poland 6.6 kms per 100 sq. kms. In addition, most macadam roads were on the territories under the Prussian rule.[4] At the beginning of the 19th century first macadam roads appeared there to serve the economic needs of Prussia, and particularly of heavily industrialized Silesia. Of primary importance were the roads allowing to transport coal to the ports on the Oder. The roads from Wrocław to Cracow and from

[3] J. Kaliński, "Koleje polskie 1845-1989" [Polish Railroads 1845-1989], *Problemy Ekonomiki Transportu* [Problems of Transport Economics], 1995, no. 2, p. 27.

[4] J. Kaliński, B. Liberadzki, *Transport w Polsce 1918-1978: zarys historii* [An Outline History of Transportation in Poland 1918-1978]. Warsaw: SGPiS, 1986, pp. 8-9.

Poznań to Warsaw connected the area with other parts of Poland. In the Kingdom of Poland, seven roads ran concentrically in various directions from Warsaw. The most important of them led to Cracow and Kalisz, crossing the borders of Austria and Prussia. The Lublin route, built before 1914, allowed for direct communication with Lvov. In the Austrian-occupied part of the country roads ran parallel to the Carpathians or crossed the mountains. The most important was the so-called imperial road running via Cracow, Tarnów, and Rzeszów to Lvov. The only connections with the roads in other parts of Poland were the roads from Cracow to Warsaw and from Cracow to Wrocław, as well as the road from Lvov via Lublin to Warsaw.[5]

2. THE SECOND POLISH REPUBLIC (1918-1939)

Poor transportation infrastructure with varying density was damaged as a result of World War I. The authorities of Poland, which regained its political independence, had to face a complex problem of reconstruction, development, and, first of all, adjustment of the transportation system to the needs of the new state. Adjustment meant the organization of transportation services for the main political and economic centers of the country, foreign trade and transit, and connections with the ports on the Baltic Sea. The hitherto dominating parallel order of the railroads, related to the economic exchange within the German Reich and Russia, had to be corrected by building connections between the South and the North. Of primary importance were the railroads and roads facilitating the transportation of coal from Silesia, as well as railroads in the center of the country, the former Kingdom of Poland.

Already in 1924–1925 several railroad lines were built in Silesia to connect that economically crucial region with other parts of the country without transit across Germany. At first such transit was necessary near Bytom and Kluczbork which were isolated from a strategically important junction of Tarnowskie Góry. One of the major enterprises was a line from Kalety to Podzamcze via Wieluń (115 kms), connecting Silesia with Wielkopolska and Pomerania. That line allowed for a much more convenient connection of Silesia with the Baltic ports and became a starting point of the largest railroad investment in Poland between the world wars, a coal transportation railroad from Silesia to Gdynia (457 kms), built in 1925-1933 with the aid of the French capital. That railroad was essential for the export of Upper Sile-

[5] E. Brzesko, *Rozwój transportu w Polsce w latach 1918-1939* [The Development of Transportation in Poland 1918-1939]. Szczecin: WSP, 1982, p. 40.

sian products, in particular coal which dominated in the Polish export. It made the railroad connection of the coal basin with the Gdynia port more than 110 kms shorter. Thanks to the coal transportation railroad, the coal supply for the central part of the country, including industry in Lódź, improved as well.[6]

The construction of railroads in the central part of the country was indispensable to connect the main political and economic centers of Poland, until 1918 isolated from one another by the partitions. One of the first new railroad lines, 11 kms between Kutno and Strzałkowo, connected Warsaw with Poznań. A similar purpose was served by the lines connecting Warsaw with Lvov, Cracow, and the Baltic coast. To bypass the territory of the Free City of Gdańsk, a railroad line connected Kokoszki with Gdynia, guaranteeing direct supply for the Gdynia port. In order to improve local urban transportation and boost the economic development of the area of Warsaw, a few new lines were built, too, and the Warsaw junction was electrified. Few railroad investements were completed in the east of Poland, which was caused by the shortage of investment capital.[7]

In 1920-1938 1,770 kms of regular railroads and 367 kms of narrow-gauge railroads were constructed in Poland.[8] They were of primary importance as a factor uniting the Polish territories which throughout the 19th century and later remained politically divided. Thanks to those lines, the economic potential of the country could be adjusted to its internal and export needs, and particular regions could develop more easily. Still, most railroads were located west of the rivers Bug, Vistula, and San, thus continuing the historically conditioned differences in the density of the railroad network between the East and the West. In 1938 in Silesia the density was 18.5 kms of railroads per 100 sq. kms, while in the region of Polesie it was only 2.9 kms.[9] During the twenty years between the world wars, the Polish railroad system was not fully adjusted to the new political and economic conditions.

However, thanks to investments in the development and modernization, trains became faster and more punctual. While right after World War I the technological speed did not exceed 50 kms per hour, and the commer-

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[6] E. Fojcik, "70 lat magistrali Śląsk-Gdynia: rola i znaczenie magistrali węglowej w organizacji przewozów towaruwych PKP" [70 Years of the Silesia-Gdynia Railroad: The Role and Significance of the Coal Transportation Railroad in the Transportation of Goods by the Polish State Railroads], *Przegląd Komunikacyjny* [Communications Review], 2003, no.11, pp.1ff.

[7] Brzosko, p. 100ff.

[8] *Mały Rocznik Statystyczny 1939* [Small Statistical Yearbook 1939]. Warsaw: GUS, 1939, p. 188.

[9] *Mały Rocznik Statystyczny 1939*, p. 188; S. M. Koziarski, *Sieć kolejowa Polski w latach 1918-1992* [The Railroad Network in Poland 1918-1992]. Opole: Instytut Śląski, 1992, p. 39.

cial speed 30 kms per hour, in 1938 it was, respectively, 100 kms per hour and 70 kms per hour. The punctuality of trains reached 95%. Before World War II broke out, traveling by train had become very safe. The number of accidents was constantly decreasing, and the ratio of accidents to trips was better than in the USA, Canada or France.[10]

The roads inherited from Austria, Prussia, and Russia did not constitute a unified system. In the borderland areas there were often no roads at all and, just as in the case of railroads, there were no direct connections among important locations. Hence, reconstruction must have included a number of investments complementing the existing network and adjusting it to the needs of the new state, as well as to the developing automobile transportation. It was estimated that in order to make the road system dense enough and unified, 75,000 kms of new roads had to be built.[11]

The first goal was to mend war damage and make provisional repairs. The construction of new roads and bridges started only after 1922, and at first the pace of building paved roads was rather slow since the state did not have enough financial resources, there was not enough material and proper construction equipment. In 1924-1927 the average was 800 kms new roads per year, only several years before World War II the pace increased to 1,700 kms per year.[12] In the thirties, next to building new roads, the state modernized some old ones starting in Warsaw, Cracow, Lvov, and Poznań. In 1924–1938 Poland built 17,600 kms of new roads and modernized 2,600 kms.[13] Most of the new roads supplemented the local networks. No major automobile roads were constructed and highways were hardly even planned.

The financial resources for road construction came from the state budget and from the local administration. The biggest road investments were made in the central part of the country, in the areas of Warsaw, Kielce, Lublin, and Łódź where the automobile traffic was increasing most rapidly. The most neglected in that respect were the eastern regions of Stanisławów, Polesie, and Tarnopol.

Consequently, as in the case of railroads, the density and quality of roads was significantly different in the East and in the West. In Silesia, there were 54 kms of macadam roads per 100 sq. kms, while in Polesie only 2.9 kms.[14] The biggest changes for the better took place in the central regions

[10] Kaliński, Liberadzki, p. 35.

[11] K. Jasiewicz, "Transport i łączność" [Transportation and Communication], in: *Problemy gospodarcze II Rzeczypospolitej* [Economic Problems of the Second Polish Republic]. Warsaw: PWE, 1989, p. 206.

[12] Brzosko, p. 137.

[13] *Mały Rocznik Statystyczny* [Small Statistical Yearbook] *1939*, p. 197.

[14] *Mały Rocznik Statystyczny* [Small Statistical Yearbook] *1939*, p. 188.

which underwent industrialization (the Central Industrial District was developed). In the East, many districts had only ground roads which were passable depending on the weather. The generally low and varying level of road construction was one of the factors halting the economic growth of Poland between the world wars, and particularly the development of automobile transportation.

In 1918-1939, the progress in adjusting transportation to the economic needs of the country was significant only in railroad transportation. The state failed to eliminate the differences in the infrastructure of land transportation between the western and eastern regions of Poland. The process of the integration of transportation in the new state was not advanced enough. Poland was economically too weak and its regained independence lasted only for twenty years.

3. THE PEOPLE'S POLAND (1944-1989)

Next to enormous damage, World War II brought about deep structural transformations caused by the changes of political borders of many countries and the rise of the new economic space of Poland. The general condition of transportation after the war was estimated as critical. Almost 11,000 kms of railroads were disassembled or could not be used. Moreover, after mid-1945 about 4,500 kms of railroads were not accessible to Polish trains, since the tracks were widened to 1,524 mms to suit the Soviet-made cars and engines. For several years, they were used for transit between the USSR and occupied Germany.

However, since the territories acquired by Poland in the West had good economic infrastructure, not only the length, but also density of railroads in the West increased. Although the Soviets managed to disassemble some of the railroad lines in the new western and northern territories of Poland, the increase of regular, wide-gauge railroads was 4,800 kms, while the network density increased from 4.6 kms per 100 sq. kms in 1939 to 7.4 kms per 100 sq. kms in mid-1946.[15]

The increase of the railroad network in the West made the discrepancy between regions even deeper. It was estimated that in order to improve the situation 3,400 kms of new railroads had to be built.[16] The state could not

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[15] Kaliński, Liberadzki, p. 67.

[16] M. Łopuszyński, *Podstawowe zagadnienia polityki komunikacyjnej* [Basic Problems of Transportation and Communication Policy]. Warsaw: Wydawnictwa Techniczne, 1947, p. 290.

afford such spending, while the advocates of automobile transportation had their doubts as well.

In the years of reconstruction (1944-1949), next to the investments in necessary reparations restoring the *status quo ante*, some efforts were taken to adjust the course of railroads to the needs of the changed territory of the country. The role of the Polish Rail in the transit between the USSR and the Soviet occupation zone of Germany had to be taken into account, too. Some new lines supplemented the existing network (Tomaszów Mazowiecki-Radom), while newly constructed stations on the Polish-Soviet border (Małaszewicze, Medyka) allowed for indispensable reloading of goods caused by the difference in the track width. In a short time, railroad transportation became efficient enough to satisfy both the internal needs of Poland and transit obligations.

That period of balance was very short, since the country was heavily industrialized and transportation services were much needed, while the transportation investment plans were not fulfilled. As regards new railroad lines, the six-year plan (1950-1955) was completed only in 60%. One of the major achievements was the western part of the ring railroad of Warsaw (160 kms between Skierniewice and Łuków), making the Soviet-German transit easier. Several lines were also built around Upper Silesia and in connection with the construction of Nowa Huta steelworks. The frontier changes made it necessary to correct the railroad network near Hrebenne, Sokółka, and Turoszów.

In the 1970s, because of the increasing pace of industrialization, some new major and minor railroad lines were built, and electrification of railroads advanced. In 1977, a line from Zawiercie to Grodzisk Mazowiecki (226 kms), which had been designed in the 1950s, was finally opened as a fragment of the Central Railroad Line (CMK) from Silesia to Gdańsk. Next to the CMK, among major railroad investements of that period one should also mention the Steelwork-Sulphur Line (LHS) (397 kms), with a wide track (1,524 mms) from the Polish-Soviet border to Katowice Steelworks. It allowed for direct transportation of the Soviet iron ore and Polish sulphur by wide-track cars. Besides, the great reloading stations ("dry ports") on the eastern border were developed and modernized.

Since the 1970s, along the construction of new lines, some small, hardly used ones were closed and their functions were taken over by automobile transportation. That process pertained particularly to narrow-gauge railroads, so popular between the world wars. In 1981-1989, their length was reduced by almost 500 kms. In the late 1980s and early 1990s transportation services were suspended on ca. 1,700 kms.[17] In consequence, the actual in-

[17] Koziarski, p. 116ff.

crease of the regular railroad network was low and in 1950-1989 amounted to ca. 2,000 kms. The density of the network did not change much, either: from, respectively, 7.2 kms in 1950 to 7.8 kms per 100 sq. kms in 1989.[18]

Table 2. Network of regular railroad lines in 1950-1989

Specification	1950	1960	1970	1980	1989
Length of lines (thousands of kms)	22.5	23.2	23.3	24.4	24.3
Per 100 sq. kms	7.2	7.4	7.4	7.8	7.8

Source: *Rocznik Statystyczny 1990*. Warsaw: GUS, 1991, pp. XL-XLI.

The newly constructed railroads did not affect strong spatial differentiation of the railroad network as regards density. The comparable data from similar administrative units indicate that in 1950 the density of railroad lines in the region of Katowice, most developed in that respect, was 18.2 kms per 100 sq. kms, while in the least developed region of Lublin it was 4.6 kms. In 1973, it was, respectively, 18.5 kms and 4.4 kms per 100 sq. kms.[19] The continuing difference proved that the infrastructure in the East remained neglected. The parallel system of the main railroad lines was not significantly modified under the influence of strategic factors which forced Poland to increase its transportation capacity on the East-West axis. There were no direct, straight-line connections between some major Polish cities, e.g., between Warsaw and Wrocław, Warsaw and Rzeszów, and even Warsaw and Łódź.[20]

Even though the frontiers had changed, the railroads constructed between the world wars still played a crucial role. Since the Polish economy was for the most part founded upon heavy industry and mining, the line from Silesia to Gdynia was of primary importance. Since 1945 it has been serving also the city of Gdańsk, with its new North Port for bulk cargo handling. In the southern part of the line the transported cargo increased as well, as the Rybnik Coal Basin and Katowice Steelworks were developed.[21]

Unlike in railroad transportation, in automobile transportation the change of frontiers decreased the total length of connections, but increased the length of macadam roads from 63,000 kms to 94,000 kms. The density of macadam roads increased from 16.5 kms per 100 sq. kms to 30.2 kms per

[18] Kaliński, pp. 32-34.

[19] *Rocznik Statystyczny Transportu 1945-1966* [Statistical Yearbook of Transportation 1945-1966]. Warsaw: GUS, 1967, p. 38; *Rocznik Statystyczny 1974* [Statistical Yearbook 1974]. Warsaw: GUS, 1974, p. 386.

[20] T. Lijewski, *Geografia transportu Polski* [Geography of Transportation in Poland]. Warsaw: PWE, 1977, p. 43.

[21] Fojcik, p. 4.

100 sq. kms.[22] Just like in the case of railroads, the greatest increase took place in the western part of the country, where Poland took over a few formerly German highways. As a result, although the least developed regions had been incorporated into the USSR, the discrepancy between the East and the West persisted. In 1954, in the region of Wrocław there were 55 kms of paved roads per 100 sq. kms, while in the region of Lublin only 13.1 kms.[23]

In the 1940s, emphasis fell on the repairs of pavement and reconstruction of bridges. In the following years, the state started developing the road network to adjust it to the growing automobile traffic. Since in the late 1950s Poland was still hardly motorized, the existing roads fulfilled the needs, but in the highly industrialized areas (Silesia) and around Warsaw there were too few roads to serve fast traffic and the growing number of heavy vehicles.[24]

A significant increase in road length took place in the 1960s. Most investments were made in the eastern regions to eliminate the disproportion in the density of paved roads in different parts of the country. As a result, the gap between regions with the best and the poorest road infrastructure was diminished. In 1960, the region of Wrocław had 58.6 kms of roads per 100 sq. kms and the region of Lublin 16.9 kms per 100 sq. kms, while in 1970, respectively, 57.1 kms per 100 sq. kms and 27.5 kms per 100 sq. kms.[25] However, the qualitative changes for the better were minor. The pavements used were usually light, inappropriate for the traffic of heavy vehicles. Few ring-roads and double-lane roads were constructed. Fragments of highways, the total length of which was 272 kms, were located in various areas of the country, and their condition did not allow for normal use.

Only in the 1970s more financial resources were spent on major throughfares. The construction of express roads, with parameters close to those of highways, was initiated, with the longest express road Warsaw-Katowice. Its fragment from Piotrków to Częstochowa (105 kms) was built anew with the intention to transform it into a highway. Other express roads were built mainly near big cities because of their growing traffic congestion.[26] In 1976 a fragment of a highway between Katowice and Cracow was begun, but its first 30 kms were finished as late as in 1983. Similarly time-consuming was also the construction of express roads (in Silesia, near

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[22] Kaliński, Liberadzki, p. 68.

[23] K. Lewandowski, "Sieć dróg państwowych w okresie 1945-1965" [State Roads Network 1945-1965], *Drogownictwo* [Road Building and Industry], 1964, nos. 7-8, p. 177.

[24] E. Buszma, "Rozbudowa i przebudowa sieci drogowej" [The Development and Reconstruction of the Road Network], *Drogownictwo* [Road Building and Industry], 1959, no. 10, p. 243.

[25] *Rocznik Statystyczny 1961* [Statistical Yearbook 1961]. Warsaw: GUS, 1961, 241; *Rocznik Statystyczny 1971* [Yearbook of Statistics 1971]. Warsaw: GUS 1971, p. 351.

[26] Kaliński, Liberadzki, p. 136.

Kielce, Poznań, and Szczecin) and ring-roads (Gdańsk-Sopot-Gdynia, Goleniów, Grójec, Września). The reason for that were ecomomic problems of Poland in the late 1970s and early 1980s. Road investments were reduced throughout the 1980s. What was finished was the Katowice-Cracow highway (62 kms), 52 kms of a highway near Poznań and 16 kms near Łódź. Besides, 7 kms of an express road were built near Katowice, and the pavement of several road fragments was improved.[27]

In general, in 1946-1989 the length of public roads with macadam pavement increased from 95.8 kms to 158.8 kms, i.e. by 65%.[28] However, that increase in length did not mean significant improvement of quality. Few double-lane roads were built and their pavement remained mostly unimproved, the program of highway construction advanced very slowly, there were few new ring-roads around cities and few new bridges. As the number of automobiles was increasing and railroad transportation turned out inefficient, the existing roads were congested and, consequently, often damaged.

To sum up, it should be said that the period of the communist rule was characterized by preferences for the transportation infrastructure necessary to industrialize the country and develop new urban centers. The investment programs had to take into account the transit from the USSR to the GDR, and the military needs of the Warsaw Pact. Consequently, the parallel system of main railroad lines and roads was upheld, while the discrepancy between the western and eastern regions of Poland as regards railroads persisted. As far as roads were concerned, the spatial contrast was somewhat attenuated. That process could be handled with precision because in 1975 the administrative division of the country was significantly modified. Still, in 1955 the region of Wrocław had 55.4 kms of roads per 100 sq. kms, while the region of Lublin only 14.4 kms per 100 sq. kms. Till 1973, the density of the road system in the former area increased to 55.9 kms, while in the latter to 32.3 kms per 100 sq. kms.[29]

4. THE REPUBLIC OF POLAND (1989-2000)

The political and economic changes initiated in 1989 brought about fundamental changes in transportation. At first, both cargo and passenger transportation volume sharply decreased, and a decision was made to re-

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[27] M. Rolla, "Sieć drogowa w XX wieku" [Road Network in the 20th Century], *Drogownictwo* [Road Building and Industry], 2000, no. 12, pp. 364-366.

[28] *Rocznik Statystyczny 1990* [Statistical Yearbook 1990]. Warsaw: GUS, 1990, pp. XL-XLI.

[29] *Rocznik Statystyczny Transportu* [Transportation Yearbook] *1945-1966*, p. 38; *Rocznik Statystyczny* [Statistical Yearbook] *1974*, p. 386.

store road transportation faster than railroad one. The main cause of the crisis was a decrease of production in the raw material and fuel sectors developed after World War II, which required most transportation services, and temporary reduction of investment. A major improvement came only in 1995 as a result of an economic boom and development of the private sector in transportation services, particularly in automobile transportation. Private entrepreneurs started transporting more and more cargo at the cost of the public sector. Another change was an increase of international transportation. The intensity of automobile traffic on main throughfares doubled, indicating their inefficiency. At the same time, the Polish State Rail transported fewer and fewer goods and passengers so that the company's deficit kept increasing.

Structural changes in the Polish economy brought about the need to adjust the infrastructure to the new conditions. Another problem was preparing Poland to join the European Union. Hence, the increase of the transportation capacity of the road system and modernization of railroads became an urgent issue. The government and independent experts shared a view that the road network had to be developed, including highways and express roads, while the existing roads had to be reconstructed. As regards railroad transportation, it was emphasized that the main lines had to be modernized as well, while the services offered to big urban centers needed much improvement. It was commonly stressed that the location of Poland between Western Europe and Russia was particularly convenient for transit in both directions. The main obstacle was inefficient transportation infrastructure, in particular poor roads.

The modernization and adjustment of the network of land transportation routes depended on the financial resources of the state, while from the beginning of the systemic transformation two of the main problems were budget deficit and low level of capital accumulation. It turned out that the aid of international institutions and financial organizations was necessary. In 1990-2000 Poland received 5.1 billion USD of credit from the World Bank, out of which 0.8 billion was to be used for the development of transportation system. The European Investment Bank gave 0.9 billion EURO to spend on the modernization of highways and major railroad lines. The PHARE fund spent 3.9 billion USD mainly on the development of road infrastructure. In consequence, 45% of the funds to be spent on roads came from foreign sources.[30]

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[30] T. Suwara, "Ewolucja wskaźników drogowych" [Evolution of Road Parameters], *Drogownictwo* [Road Building and Industry], 2000, no. 10, pp. 291-292; *Rozwój infrastruktury transportu* [The Development of Transportation Infrastructure], ed. K. Wojewódzka-Król. Gdańsk: WUG, 2002, p. 153ff.

The local and foreign financial resources allowed Poland to modernize the railroad lines from Kunowice to Warsaw and from Warsaw to Terespol on the throughfare from Berlin to Moscow. Among other modernized railroads there were lines from Silesia to Warsaw, from Warsaw to Gdańsk, and from Wrocław to Cracow. A few projects of highway and express road construction were prepared as well: in the first place, of the parallel highways A2 (Berlin - Poznań - Warsaw - Moscow) and A4 (Lepizig - Katowice - Cracow - Lviv - Kiev) and of the meridian highway A1 (Gdańsk - Łódź - Katowice - the state border). What made the highway development program difficult to implement, though, were financial problems of the state and little interest of private capital. As a result, a few short fragments of highways between Wrocław and Katowice (A4) were built, the roads from Katowice to Cracow (A4) and near Poznań (A2) were modernized, and a highway bridge with connecting roads was constructed near Toruń (A1). Some existing roads obtained new pavements following Western European standards and the construction of ring-roads started all over the country. Fragments of old roads were transformed into express roads. New container terminals were built and the existing ones were modernized.

The first decade of the transformation did not bring any significant changes in the structure of the transportation system. In 2000 Poland had 250,000 kms of macadam roads, yet their density of 79.9 kms per 100 sq. kms was by 1/3 lower than in the European Union. Besides, most roads did not meet the requirements of today's transportation both as regards the transportation capacity and safety. The total length of express roads and highways was still quite modest: respectively 193 kms and 358 kms. The density of paved roads was not proportional: in Silesia it was 159.7 per 100 sq. kms, while in Warmia and Masuria only 50.6 kms per 100 sq. kms.

The length of the railroad network was 22,500 kms, and its density 7.2 kms per 100 sq. kms. Even though the average density was not different from the one in the United Europe, just as in the case of roads there were marked differences among particular regions. In Silesia the density of railroads was 15.9 per 100 sq. kms, while in Podlasie only 3.9 per 100 sq. kms. Moreover, the road infrastructure of railroads was not adjusted to Western European standards. There were only 39% of bi- and multitrack lines and high speed lines. The signalization and safety systems were obsolete. Only as regards electrification (ca. 53% of all lines) Poland represented the European standard.[31]

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[31] A. S. Grzelakowski, "Transport w realizacji Strategii Lizbońskiej" [Transportation in the Lisbon Strategy], *Przegląd Komunikacyjny*, 2003, nos. 7-8, p. 3; *Transport – wyniki działalności w 2000 r.* [Transportation – Operation Results in 2000]. Warsaw: GUS, 2001, pp. 12, 22-23.

Table 3. Changes of the density of railroad and road transportation networks in the regions of the highest and lowest density in 1950 (1955) - 2000

Region	Density of hard pavement roads	Density of railroads
	(in kms per 100 sq. kms)	
Year	1955	1950
Wrocław	55.4	13.7
Katowice	41.5	18.2
Białystok	18.5	5.0
Lublin	14.4	4.6
Year	2000	2000
Silesia	159.7	15.9
Podlasie	52.4	3.9
Warmia-Masuria	50.6	6.2

Source: *Rocznik Statystyczny Transportu 1945-1966*. Warsaw: GUS, 1967, pp. 38, 409-411; *Transport - wyniki działalności w 2000 r.* Warsaw: GUS, 2001, pp. 12, 22-23.

An analysis of the changes in the state of the transportation network on the present territory of Poland leads to the following conclusions. The density of railroads did not change in 1946-2000 significantly - from 6.7 kms to 6.9 kms per 100 sq. kms. That was a result of the development of some railroad lines till the 1970s, and then closing down of some lines in the later decades. What changed favorably over the same period was the density of paved roads: from 30.7 kms to 79.9 kms per 100 sq. kms.[32] The accessibility of the road transportation network increased as well and the quality parameters of roads improved. Still, the progress in quality did not satisfy the needs, particularly as regards express roads. The changes of the administrative division of Poland in the late 1990s made the comparisons as regards the transportation system more real. They indicate that over the last fifty years the difference in road density between the best and the least developed regions did not change significantly. In the mid-20th century the least developed region of Lublin reached 26% of the density of roads in the most developed region of Wrocław. Until 2000 the same parameter increased to 32%. Such was the relationship between the density of paved roads between Silesia (formerly the region of Katowice) and Warmia and Masuria (formerly the region of Olsztyn). As regards the railroad system, the density in the least developed region of Podlasie (formerly the region of Białystok) for over half a century amounted to 25% of that of the most developed region of Silesia (formerly the region of Katowice).[33] More considerable quantita-

[32] *Rocznik Statystyczny Rzeczypospolitej Polskiej 2001* [Statistical Yearbook of the Republic of Poland]. Warsaw: GUS, 2001, pp. L-LI.

[33] Author's own calculations based on Table III.

tive changes took place in the road system, which eventually led to the reduction of historical differences in the transportation network of the West and the East of Poland. However, both in road and in railroad transportation the modernization of routes was delayed, which, in combination with the economy highly dependent on transportation services and high social mobility, lead to systematic congestion of the transportation infrastructure.