

Independent Polish railways in the interwar period

History of railways

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First years of independence were not easy for the developing railways. The young state had an important task. The arrangement and mode of railway connections was aligned with the economic and military needs of every occupying power which ruled in the territory of Poland before 1918. Unfortunately, it did not meet the expectations of the newly formed state. In Germany, presenting a high level of economic development, railways were mostly used for economic purposes as a means of mass transport. However, the Russian Empire built railway lines mainly for military purposes. Like the state consisting of territories previously ruled by different countries now needed consolidation, railways were also in the need of a common integrated system to offset the differences and let the sector develop in the new reality.

The Ministry of Railroads

In September 1918 in Poland organised takeovers of the railway network from the occupying forces commenced. The Railway Section attached to the Polish Ministry of Industry and Trade was to take over the lines previously administered by the German Military Railway Directorate in Warsaw and the Austrian Military Railway Directorate in Radom. In the territory under Russian rule, it was the task of the Railway Workers' Mutual Aid Association operating in collaboration with the Polish Military Organisation. In the area where battles took place, after military squads had seized railway lines, their administration was the responsibility of the Ministry of Transport. The network was ultimately taken over after the Polish-Bolshevik war in accordance with the treaty of Riga signed in 1921.

In October 1918 the Regency Council appointed the Ministry of Transport in Warsaw with a railway section which on 8 February 1919 was transformed into the Ministry of Railroads. At the beginning of 1921 the ministry was composed of 7 departments and 4 autonomous divisions. The Sejm appointed the National Railway Council to issue opinions and supervise the development of the railway network, change in tariffs, rules and regulations, and the Technical Council. According to Article 371 of the Treaty of Versailles signed on 28 June 1919, Poland was the owner of all railway equipment east of the Polish and German border. This was also applicable to lines in the territory under Russian rule, which were taken over by the Germans during the war, and on which the gauge was changed into a normal one. In addition, the convention signed between Poland and the Free City of Danzig (Gdańsk) in November 1920 put the railways in the territory of the Free City of Danzig under the administration of the Republic of Poland. With regard to the tense situation and revolutionary unrest in the territory formerly under Prussian rule, the connection between Greater Poland and Berlin had to be terminated, and the Commissariat of the Supreme People's Council in Poznań called Poles to take over railway lines and staff them with Polish people. The situation continued until April 1920, since in Pomerania German workers had to remain in service due to a deficiency of Polish staff.

Rising from the ruins

Poland took over 2,627 miles (4,228 km) of railway lines in the territory formerly under Prussian rule, 2,707 miles (4,357 km) from the former Austrian territory and 4,575 miles (7,362 km) from the

Russians. The country received 4,762 locomotives of 164 types, 10,379 passenger carriages and 111,092 freight wagons. Most of them were in a poor or disastrous technical condition. The railway network in the newly formed country was in ruins. During the war the occupying forces destroyed 41% of bridges, 63% of railway stations, 31% of warehouses, 48% of workshops and engine houses, 81% water stations and water towers, and 22% of houses. They transported away equipment, machines and resources required for the operation of the railways. The Treaty of Versailles did not provide for respective indemnification to Poland. The largest scale of destruction was recorded in territories administered by the new directorates: in Vilnius, Warsaw, Radom, Lviv and Stanyslaviv. The Ministry of Railroads commenced the construction of provisional wooden bridges, replacing them gradually with steel structures using reusable elements. The process of reconstruction continued over the entire interwar period.

The first Polish rail

The occupying forces left behind tracks consisting of 66 types of rails of different quality and with different degree of wear and tear. The first deliveries of new rails and bonds were ordered from Belgium in 1922, and from 1923 supplies were sourced from 4 steel and iron works in Upper Silesia. As late as after 1925 the first Polish rail – S26 (weighing 42.5 kg/m) – was introduced. The rail bond structure was standardised and stronger steel was used for the manufacturing of trackway elements. The rails supplied by steel and iron works were 12- and 18-metres long, and from 1938 – their length was 30 metres. In the interwar period all sleepers were replaced, that is, 50 million pieces of new railway sleepers were laid! This involved an enormous amount of labour. More and more often intermediate rail fasteners were used: first the rails were screwed onto sole plates, and then the sole plates were fastened to sleepers.



First structures of the Polish State Railways

Each of the invaders introduced different rules of traffic and signalling. For example, Austrians required left-hand traffic and time-based departures, while Prussians determined the time of departure based on distance travelled. They used different railway signalling and train traffic security equipment. In September 1926 the President of the Republic of Poland established an enterprise called the Polish State Railways (Polish acronym: PKP) which assumed the task of administering and using real property owned by railways, and became the owner of all movable assets. The organisation of services was slightly different in each of the formerly partitioned territories. Only in 1931 was a uniform structure, divided into traffic and commercial, road and mechanical sections, introduced. The following central units were established: the State Railways Studies and Design Bureau (1926), Central Wagon Counting Bureau, Central Bureau for Material Supplies for the State Railways, Warsaw Railway Junction Electrification Bureau and Motor Transport Bureau of the Polish State Railways. In 1934 the Railroad Guard Service (Polish acronym: SOK) was formed.

Locomotives from various parts of the world

The needs of the railway industry and the impossibility to procure rolling stock from local suppliers, made railway authorities buy 175 locomotives of the 7001 type (Tr20) from the American Baldwin factory, 100 engines of German origin (19 Ok1, 80 Tp3 and 1 Om101) from France, 165 locomotives from Germany, 186 from Austria, 100 from Belgium and 41 from other countries. In addition, they purchased 301 passenger carriages and 15,500 freight wagons, including four-axle American covered wagons, coal and flat wagons.

Wagons made in Poland

As early as 1919 the government decided to build 3 plants producing railway carriages and wagons and 3 locomotive factories, giving them a guarantee of long-term contracts. In 1920–1921 the L. Zieleniewski Railway Carriages Factory was established in Ostrów Wielkopolski. In 1927 it was bought by the state authorities and renamed as the Carriage and Wagon Workshops (and after World War II - ZNTK "Ostrów"). The production of carriages and wagons (covered and adapted to the transportation of live fish) was undertaken in 1921 by the Blast Furnace and Ostrów Plant Joint Stock Company in Ostrowiec Świętokrzyski. The factory also produced snowploughs, railway cranes, and small locomotives, components for steam locomotives, cars, tanks, cannons and steel structures. To the order of the Soviet and Polish trade mission in 1932 the factory built 36 dumping wagons for the transportation of magnesite ore, according to an innovative design by the engineer Mieczysław Radwan.

A carriage and wagon production division in Chorzów operated from 1895 in the Unified Royal and Laura Steelworks Company (after World War II renamed Konstal). In the interwar period the company supplied mainly freight wagons: coal wagons, covered wagons, flat wagons, mail carriages, beer tankers, jar wagons for the transportation of acids, kerosene, tar, wagons for the transportation of cattle, wagons for the transportation of hot ingots and billets for steelworks, and in addition it produced tramways.

First Locomotive Factory

There were no locomotive manufacturers in Poland. Thus, the Warsaw Steam Locomotive Construction Joint Stock Company was incorporated and the First Steam Locomotive Factory in

Poland JS Company was established in Chrzanów. During the construction of the factory in Chrzanów the assembly of Tr21 steam locomotives was commenced using the components and based on the design prepared by a manufacturer from Vienna – Staats-Eisenbahn-Gesellschaft (StEG). Boilers were supplied by Fitzner and Gamper factory from Sosnowiec. The first engine was released from production on 7 April 1922, and the first locomotive assembled from domestic subassemblies – in February 1924. Apart from the aforementioned, the factory in Chrzanów built narrow-gauge steam locomotives, diesel locomotives, and locomotives for export to Morocco, Bulgaria, Lithuania, Latvia and the USSR, rotary snowploughs for the Polish State Railways, diesel road rollers, and draisines.



The First Steam Locomotive Factory in Chrzanów - the 1920s

Cegielski also manufactures locomotives

In 1926, the Hipolit Cegielski Machine Factory in Poznań, a company with 75-year-long history, undertook the production of steam locomotives (series Ty23, OK127, Pu29, OKz32, and Ty37). By 1939 “Cegielski” had produced 341 locomotives for the Polish State Railways and 13 for export purposes. The factory also built various types of freight wagons: covered wagons, coal wagons, flat wagons, refrigerator cars, swine transporters, two- and four-axle tankers, jar wagons for the transportation of acid, chlorine tankers, six-axle well wagons, and wagons for the transportation of live fish. From 1928 the company also produced sleeping and restaurant cars.

The Warsaw Steam Locomotive Construction Joint Stock Company undertook the assembly of Austrian 270 series (Tr12 and Ty23) locomotives. In March 1924, the factory released the first Tr12 locomotive assembled from components produced in Poland. As a consequence of the economic crisis, in 1934 the company was bought by the Ostrów Plant and renamed as the Steam Locomotive Factory of the Ostrów Plant. The factory continued to produce steam locomotives (in total the

Factory manufactured 320 engines), narrow-gauge rail cars and locomotive boilers.

Outstanding Polish design engineers

Rolling stock and railway equipment could not have been produced had it not been for the experienced engineers managing the design offices and manufacturing plants.

The Polish railway industry in the interwar period had excellent staff educated at universities in Europe and Russia. The following professors were outstanding designers of steam locomotives: Antoni Xiężopolski (1861-1951) – the creator of the Pt31, OKz32, Pm36, Ty37; Albert Czechtott (1873-1955) – the head of an autonomous experimental section at the mechanical department of the Ministry of Transport; Franciszek Tatała (1903-1984) – the holder of the pressure compensator patent; Kazimierz Zembrzusiński (1905-1981) – a steam locomotive designer and construction theorist; and Adolf Langrod (1876-1968) – a steam locomotive, wagon, brakes and traction network designer and construction theorist.

The builders and designers of railway lines worth a mention include Stanisław Rawicz-Kosiński (1847-1923) – the builder of the lines in Galicia, Józef Nowkuński (1866-1952) – the builder of the Kalety-Podzamcze line and the Silesia-Ports coal trunk line, Aleksander Wasiutyński (1859-1944) – the creator of a series of types of rails for the Russian railway industry, a designer and builder of the cross-city line in Warsaw, and Roman Podolski (1873-1954) – a pioneer in the electrification of railways.

Bathroom systems and other Polish innovations

Polish technical thought contributed many creative solutions to the railway industry. Innovative structures included axial bearings by Marcin Czarkowski (1869-1936); adjustable brakes by engineer Henryk Suchanek, thanks to which a vehicle fitted with such brakes could be connected with Hardy's vacuum brakes and pressure brakes; an air-conditioning system for restaurant cars designed by engineer Stanisław Rodowicz; and a cooling system by Professor Stanisław Sokołowski. In addition, the Polish streamlined Pm36 steam locomotive won a gold medal at the International Exposition of Art and Technology organised in 1937 in Paris. A tourist train made of a 2nd and 3rd class sleeping car, a bathroom and a bar carriage attached to the locomotive received an honourable mention. In total 9 series of steam locomotives were designed employing the best solutions, such as velocity meters, central lubrication, boiler scale control system, coal combustion enhancement, improved boiler capacity and smoke control.

Up until 1939 Polish factories produced 959 four-axle passenger carriages and 665 two- and three-axle carriages. More than 900 wagons and carriages were imported. Out of 153.3 thousand freight wagons on the routes of the Second Polish Republic, 45 thousand were supplied by Polish manufacturers. Repairs were performed by the main workshops of the Polish State Railways in Brest, Bydgoszcz, Lviv, Łapy, Nowy Sącz, Ostrów Wielkopolski, Piotrowice Śląskie, Poznań, Radom, Pruszków, Stanyslaviv, Stryi, Tarnów, Tczew, Warsaw-Praga and Eastern Warsaw.



A drawing of the L. Zieleniewski Factory in Sanok

New railway connections

The young country had to face an important task. The arrangement and routing of railways matched the economic and military needs of each of the occupying forces. The entity formed after the integration of three railway networks lacked direct connections between important economic centres: Silesia and Kraków were not connected to Warsaw and the coast, Greater Poland had no railway connection with Warsaw and local connections were scarce on both sides of the old boundaries between the former partitioned territories.

One of the first newly built lines was the Kutno-Koło-Konin-Strzałkowo line (1921), shortening the passage from Poznań to Warsaw, and the Gdynia-Kokoszki line (1921), bypassing the Free City of Danzig. Also, Puck was connected to Hel. Railway sidings were built in Upper Silesia, including: the Hajduki-Kochłowiec siding (1924), bypassing the German junction in Gliwice, Makoszowy-Mizerów siding (1924), Brzezine-Bluszczów siding (1925), connecting the Polish railway network with the western part of Upper Silesia, Pawłowice Śląskie-Chybie siding (1924), and Chorzów-Szarlej siding (1925) bypassing the Bytom junction. The military narrow-gauge line between Nasielsk and Sierpc was replaced with a normal-gauge line (1924).

Coal was transported from Silesia to the northern parts of Poland a long way through Częstochowa and Warsaw. Unfortunately, the stations on the former Warsaw-Vienna Railroad were not capable of ensuring efficient railway traffic. Thus, the stations in Częstochowa and Łazy were first expanded. Trains from Upper Silesia ran in transit to Greater Poland through the German territory on the Lubliniec-Olesno-Kluczbork line, which considerably increased the cost of transport. The customs war between Poland and Germany, which started in 1925, accelerated the decision to build the Kalety-Herby-Wieluń-Podzamcze line continuing via Kępno to Greater Poland. The 114-kilometre-long single-track line (although the route was prepared for a double track line) with 8 stations and a passing loop, designed by a team of young engineers under the supervision of Józef Nowkuński, was opened after little more than one year from construction commencing (1926). Its significance is testified by the fact that in 1928 as many as 32 pairs of freight trains (more than half of which weighed 2 thousand tons) were in operation on that line. A second track was laid one year later. In 1927, 5 thousand wagons a day departed from the expanded station in Tarnowskie Góry. The lines: Płock-Kutno-Zgierz (1925), Nasielsk-Sierpc-Toruń (1937) and Płock-Sierpc-Brodnica (1937) filled the gaps in the railway network in the territory that was formerly under Russian rule. The Warsaw-Radom and Tunel-Kraków connection (1934) brought the city of Krakus closer to the capital city of Poland. Also, large freight stations in Katowice Ligota, Chybie, Czarnolesie, Wodzisław Śląski and Rybnik and the former border stations in Sosnowiec, Mysłowice, Szczakowa, Trzebinia, Dąbrowa Górnicza and Będzin were modernised.

Major investments in the interwar period

The largest railway investment in the interwar period, completed in 1928-1933, was the 301 mile (485 kilometres) long Silesia-Ports coal trunk line. Built by the state and completed by joint stock company French-Polish Rail Association, the line started in Herby and ran through Chorzew Siemkowice - Zduńska Wola Karsznice (1930) - Inowrocław (1933) - Nowa Wieś Wielka - Bydgoszcz Wschód (1930) - Maksymilianowo (1928) - Wierzchucin (1930) - Bąk (1930) - Kościerzyna (1928) - Somonino to Gdynia (1930). The route covered existing sections, made available by the Polish State Railways in exchange for allowing their own passenger traffic on that line. The line was the backbone of railway transport in the Second Polish Republic.

Modern port station in Gdynia

In Gdynia, the construction of the seaport coincided with the building of a modern port station with many groups of tracks that were 169 miles (272 kilometres) long, with a shunting yard fitted with the then state-of-the-art coal transfer equipment such as cranes and wagon tipplers. It could unload 3,600 wagons in 60 trains a day. Traction services were provided by 126 Ty23 type steam locomotives parked in the engine houses in Karsznice (62 vehicles) and Kapuściska (64 vehicles). The railway, popularly referred to as the "French rail", alleviated other lines from the transport of coal which accounted for 98% of cargo transit on that route. Over 18 years the Polish State Railways built about 1,025 miles (1,650 km) of lines in total.



The construction of the coal mine was one of the main railway investments in Poland in the interwar period

Freezer cars cooled with dry ice

In 1927 a system enabling the transportation of perishable goods was put into operation. Such goods

were transported in freezer cars on appointed routes, along which dry ice stores were maintained at major stations (also on the frontier). This facilitated the transit of, for example: meat from Romania to France, fish from Latvia to Poland, meat from Poland to Germany, France and Switzerland, and bacon, poultry, butter and eggs to England by means of 550 freight wagons (1939). Trains with wagons cooled by dry ice completed the longest route of 699 miles (1,225 km) from Zaliszkyki to the port in Gdynia in a few days. The only manufacturer of dry ice was located in Krynica, from where ice in special containers was supplied to various storage facilities. During the times of imperial and royal rule it took 54 hours for such trains to travel from Stanislaviv to Vienna, 43 hours from Lviv, and 18 hours from Kraków. The Polish State Railways transported up to 85.9 million tons of goods per year (1929).

Courier and luxury trains first to passenger trains

In the interwar period trains were assigned a different priority. The highest priority had rescue trains on their way to an accident site, followed by: first degree of seniority (luxury, courier, fast trains), second degree (passenger limited stop, passenger, suburban, mixed passenger and freight, military and sanitary, service and inspection trains), third degree (mixed freight and passenger, fast freight trains, freight trains carrying food, and long-distance freight trains) and fourth degree (wagon transfer trains). Trains of international significance passing through Poland were, among other lines, Nord Express from Paris (Calais and Ostend) via Cologne, Hannover, Berlin (where it was split into 3 parts), Frankfurt on the Oder, Poznań, and Kutno to Warsaw. The second part from Berlin travelled through Frankfurt on the Oder, Krzyż, Piła, Chojnice, Tczew, Malbork, Königsberg (Kaliningrad), and Kaunas to Riga. The third part from Berlin was sent through Frankfurt on the Oder, Wrocław, Opole, Bytom, Katowice, Kraków, Lviv, Stanyslaviv, and Chernivtsi to Bucharest.

Fast like arrows

The interwar Polish State Railways had no need to be ashamed of the speed of transport. Trains pulled by steam locomotives were allowed to develop the highest speed – 68 mph (110 km/h) – on the section from Poznań to Zbąszyń. Trains travelled at 62 mph (100 km/h) on the Łapy-Białystok-Hrodna-Vilnius route and on the route from Warsaw to Radom. On the other hand, “rail car” sets could reach 75 mph (120 km/h) on the route from Warsaw to Katowice, Łódź Fabryczna, Łapy and Poznań. Their commercial speed at the Warsaw–Koluszki section was up to 59.5 mph (95.8 km/h). At the end of the interwar period the fastest train was the Nord Express whose route was extended to Moscow. Its commercial speed at the Zbąszyń-Poznań section was 58 mph (93.4 km/h), and on the Warsaw-Stołpce section 52.6 mph (84.6 km/h). It took 7 hours and 15 minutes for the train to travel from Warsaw to Berlin.

Warsaw Main Railway Station

An important project completed in the interwar period was the construction of the Warsaw Main Railway Station (1931–1939) above 8 tracks laid in a cut. The design by Professors Czesław Przybylski and Andrzej Pszenicki provided for a steel, riveted structure with a reinforced concrete slab over the tracks. The slab was to be the foundation for 130×85 m buildings with a 26-metre-tall main departures hall and a 14-metre-tall arrivals hall connected by a five-storey office building.

Success after 20-year efforts

Thanks to organisational efforts in less than 20 years it was possible to introduce efficient railway authorities and services, integrate separate systems of transport created by 3 disparate occupying forces in the past, set up a national rolling stock industry, educate railway staff, reconstruct and improve the technical condition of railway lines, increase train speed and achieve high degree of

punctuality of trains. Railwaymen were a strong occupational group in which engine drivers were regarded as the elite. The Polish State Railways had 16 trade unions in addition to self-help associations such as, for example, Rodzina Kolejowa (the Railway Family). Industry magazines were issued for respective services. In Technika Parowozowa (Steam Locomotive Technology), a supplement to Maszynista (The Engine Driver – published by the Engine Drivers' Trade Union), in 1929 the competition for the most beautiful PKP steam locomotive was announced. The winner was Ok22, "since the voices in support of her beauty, emphasized her grandness and looks; a beautiful design makes a harmonious whole; 3 tied wheels, 2 bogie wheels in an assembly with a delicate mechanism (trailing and steam valve) are a fine view; a shapely smoke-box, a pretty narrow tank and sander, proportional short funnel, beautiful slanted booth, and lovely paint coat enhance her beauty, excellent location of the boiler and effective performance". These words prove that railwaymen really loved their engines.

... and some failures

However, not all things were so beautiful. The failed but costly purchase of 3,300 sets of the French Pyram instruments for smokeless combustion of coal in steam locomotives echoed strongly in 1935. The equipment cost 35 million francs and it took another million to install them. The units feeding steam to the furnace (decreasing the share of air in the combustion of coal) and to the smoke-box (to prevent sparks), were in addition supposed to save fuel. The operating principle was similar to that of the Langner equipment used on a small scale, but the degree of automation was higher. The fallible, expensive and unreliable equipment that was difficult to operate did not improve the quality of performance of steam locomotives or allow coal savings.

The rise of diesel power

The occupying powers left the Polish State Railways with a limited number of rail cars of different types. The most numerous group consisted of twenty Wittfeld's two-car accumulator sets (built from 1907 to 1914), with a range of up to 81 miles (130 kilometres) and a capacity of 150 passengers. They were in operation in the area of the Poznań and Toruń directorates. In the territory of the Kraków directorate five Komarek two-axle third class steam cars with 32 seats were in service. They carried passengers on the route from Skarżysko to Ostrowiec Świętokrzyski, Radom and Końskie. In 1928 a Clayton steam wagon was bought for the Tarnów-Szczucin line. At the same time, the Lilpop, Rau and Loewenstein Factory assembled a self-propelled wagon for the Puck-Hel line using Sentinel-Camel's subassemblies, and the "Cegielski" Factory in 1931 supplied 9 steam-powered wagons according to modified documentation. Thus, various attempts were made at giving up steam locomotives, but still steam was used to power the vehicles.

Wagon testing

The first diesel rail cars were put into service by narrow-gauge railways: in Wilanów and Gniezno. In 1926, the railway in Wilanów bought such wagons in Germany. The four-axle self-propelled wagons were produced by the Lilpop Factory. Also, the Warsaw Commuter Railway Workshops built a number of wagons and small diesel locomotives of various design. On the other hand, the first normal-gauge diesel wagon (Ganz) with a trailer car was put into service in 1928 on the line between Kraków and Kocmyrów. Simultaneously, experiments were carried out involving an extremely fallible diesel wagon produced in 1910 by Düsseldorfer Eisenbahnbedarf. Despite it being completely refurbished in 1931, its performance was still unsatisfactory and it was phased out. The period 1931-1932 was a time when different models hired from the manufacturers were tested but they failed to meet expectations. In 1933 an Austrian manufacturer, Austro-Daimler-Puch, offered a T2x640 H4 rail car with two petrol engines and wheels with pneumatic tyres which absorbed shock during the ride. The wagon passed the test and was purchased for the rail car depot in Kraków. Due

to its elongated shape, it was referred to as “Luxtorpeda”.

Luxtorpeda and other diesel wagons

Good performance of this machine encouraged domestic manufacturers to take an interest in the production of diesel wagons. Having introduced improvements and changes according to the modernised Austrian documentation, the factory in Chrzanów produced 5 Luxtorpedas in 1936. The machines supplemented the rolling stock of the Polish State Railways after test rides from Kraków to Zakopane, Krynica, and to Warsaw and Lviv. The maximum travelling speed was set at 72 mph (115 km/h). A ride by a Luxtorpeda from Kraków to Zakopane considerably reduced the travelling time. Even though the train arrived in Rabka, it took 2 hours and 18 minutes to complete the whole route. A Luxtorpeda wagon had driver booths on both ends. Changing the direction of travel, which happened twice on this line, the driver had to walk from the booth on one end of the wagon to the one on the other end.

New designs were also adopted by other domestic manufacturers. In 1934 the Lilpop, Rau and Loewenstein Factory supplied 2 four-axle and 12 two-axle rail cars along with trailer cars. Up to 1939 the Cegielski Factory produced 28 four-axle rail cars with Saurer motors, and the combined Royal and Laura Steelworks built a wagon with the Diesel-Siemens motor. Fablok in Chrzanów commenced its adventure with diesel traction from 10 covered and 10 open draisines ordered by the Polish State Railways (1930). The first diesel locomotive of domestic origin was the G1C produced in Chrzanów. It was a two-axle locomotive with a 60 HP Diesel-Warchalowski motor (1930). Regrettably, it was not effective on a mine siding due to insufficient motor power and was returned to the manufacturer. As regards the needs of private customers, according to the documentation bought from the Deutz factory, Fablok produced 12 two-axle normal-gauge locomotives of 3 types, one three-axle locomotive and one prototype.



Electric locomotives on the route

Railway lines departed from Warsaw in a radial arrangement and were connected by a ring line. The capital city of a revived Poland needed an enhanced transport system. In 1918 the Ministry of Railways (still under German occupation) established the Committee for the Reconstruction of the Warsaw Railway Junction headed by Professor Aleksander Wasiutyński. As a result, in July 1919 the Sejm adopted an act on the reconstruction of the Warsaw railway junction, signed along with the decree concerning the expropriation of land for the purposes of the aforementioned investment by the Head of State, Józef Piłsudski. Goods traffic was to be routed on the old ring rail line, whereas passenger traffic, on the cross-city line passing through the centre of Warsaw, continuing on the bridge across the Vistula to Warszawa Wschodnia (Eastern Warsaw) station. A provisional main railway station, Warszawa Główna, was built along with holding stations Warszawa Szczęśliwice and Warszawa Grochów. In the centre tracks were laid in a cut and 0.6 mile (1 km) long tunnel under Aleje Jerozolimskie and further on the new bridge across the Vistula. But a significant problem emerged: steam locomotives could not run in a long tunnel. This had a predominant effect on the commencement of electrification of the Warsaw junction.

Electrification of the Warsaw railway junction

In 1919, Professor Roman Podoski set up an inter-ministry Railway Electrification Studies Bureau. Based on analyses carried out in 1921, a system of 3 kV direct current generated by rectifier substations erected approximately every 16 miles (25 km) along the line. The government was made to electrify the whole Warsaw junction stage by stage and detailed designs were developed. Equipment and vehicles were supplied by UK manufacturers: English Electric and Metropolitan Vickers. The English set up the technical and commercial Contractors Committee for the Electrification of Polish Railways with an office in Warsaw. As agreed, everything that could be manufactured in Poland was produced on site.

A huge amount of work was performed over three years. 66 miles (106 km) of railway lines, 12 stations and 18 stops, 62 miles (100 km) of feeders, 6 traction substations, and 162 miles (260 km) of traction network were reconstructed and electrified. Also 2 electric locomotive depots and main electric traction workshops were built. 76 three-wagon electric units E91 and E92, fitted with equipment of English origin were built. They could carry 536 passengers. In addition, 6 four-axle EL.100 "heavyweight" locomotives (including four built in Chrzanów) and 4 four-axle EL.200 "lightweight" locomotives built in the Cegielski Factory were produced. On 15 December 1936 the first electrified section, Pruszków-Warsaw-Otwock, was put into service. Six months later, an electric train arrived in Grodzisk and Żyrardów, and in December 1937 - in Mińsk Mazowiecki.

Apart from electrifying the railway network before the outbreak of war, Polish State Railways introduced modern teletechnical equipment on a large scale. This involved the laying of teletechnical cable lines, the introduction of teleprinters, new automatic exchanges, telephone equipment, dispatching units and counter safety locks, aerial networks, etc. From 1927 the privately-owned Electric Commuter Railway was in operation in Warsaw. It was supplied with 600 V DC and provided suburban passenger traffic services on the Warsaw-Komorów-Podkowa Leśna-Grodzisk Mazowiecki route, with annexed connections to Włochy and Milanówek.

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