DOI: 10.36137/2023E

INSTYTUT KOLEJNICTWA

Railway Reports – Issue 203 (March 2025) ISSN 0552-2145 (print) ISSN 2544-9451 (on-line) 

# Professor Albert Czeczott – the Founder of the Experimental Division

Andrzej MASSEL[1]

**Summary**

The year 2024 marked the 100th anniversary of the establishment of the Experimental Division at the Ministry of Railways. The unit quickly gained an international recognition and it developed characteristics of 26 steam locomotives by 1938. The continuator and heir to the tradition of the Experimental Division is the Railway Research Institute. The creator and long-term manager of the Division was dr inż. Albert Czeczott (1873–1955), educated at the St. Petersburg Institute of Communication Engineers, an outstanding railway engineer, designer and researcher. Professor Czeczott was the author of many methods for testing rail vehicles, which found application not only in Poland but also abroad. Dynamometer cars used in Poland were built according to his designs; he was also the originator of the idea of using steam locomotives-compressors in research.

**Keywords:** research, rolling stock, steam locomotive, measuring wagon, Experimental Division (Referat Doświadczalny), traction characteristics

## 1. Experimental Division at the Ministry of Railways

The Railway Research Institute continues the tradition of the Experimental Division at the Ministry of Railways. It was formally established by the regulation of the Minister of Railways of 7 April 1924, although its practical operation had already begun a year earlier, in 1923. The Division's task was to determine the essential constructional and operational characteristics of individual types of steam locomotives, especially in relation to new types introduced into service by Polskie Koleje Państwowe. By 1938, the characteristics of 26 steam locomotives were developed. Additionally, the Experimental Division carried out tests of inventions and new types of equipment to assess their value and suitability. A brief history of the Experimental Division is presented in an article published in the 181st issue of Problemy Kolejnictwa (Railway Reports) [21].

The history of the Experimental Division is inextricably linked to the figure of its founder and long-time head – Professor Albert Czeczott. On the 100th anniversary of the establishment of the Experimental Division, it is worth remembering the outstanding researcher, author of innovative methods for testing rail traction vehicles.

## 2. Source materials

A very valuable source of materials concerning Professor A. Czeczott is the collection of the Archives of the Polish Academy of Sciences (APAN). The set of files marked with the III-209 reference number contains many important studies of the Professor in the form of typescripts or their fragments, including:

- Chapter XXVII "Research on rolling stock" (1932, editor inż. A. Krzemieniecki, author: prof. dr inż. A. Czeczott);
- "A short report on the tests of the Ty45 steam locomotive at a load of 2,500 tonnes using pushers on the Tarnowskie Góry – Gdynia line" (June 1947);
- "A report on dynamometric tests on the Osowa – Gdynia section on 10 and 11 June 1949";
- "General information about dynamometer wagons and detailed data on the new PKP dynamometer cars" (1949);
- "A note on brake standards in force as per the regulations" (1953).

[1] Ph.D., D.Sc., Eng.; Railway Research Institute, Director; e-mail: a.massel@ikolej.pl.

The APAN file also contains a typescript of the memoirs about Professor Czeczot by Władysław Orzechowski from 1972, an employee of the then Railway Scientific and Technical Centre (COBiRTK), and previously of the Experimental Division [23]. The memoirs also include lists of published works by prof. A. Czeczott and excerpts from notes published in the industry press after his death [29]. The files also contain photographs of Professor taken at various stages of his life, as well as exceptionally valuable souvenir photographs taken on the occasion of a 100 km/h test run on the Wilno (now Vilnius) – Grodno line.

Extensive knowledge about the work, achievements and accomplishments of Professor Czeczott is provided in the issues of the monthly magazine "Inżynier Kolejowy" (Railway Engineer), published in the years 1924–1939. Many articles by Professor Czeczott included, e.g., an outline of the development and work of the Experimental Division in the years 1923–1927, a description of a new measuring wagon built for the Division in 1930, and information on the experimental facility for testing steam locomotives in Romania. The subject of articles and notes published in "Inżynier Kolejowy" was also tests of individual types of steam locomotives conducted by the Experimental Division, e.g., steam locomotives of the Tr21 and Ty23 series and express steam locomotives Pt31 [1, 6, 25].

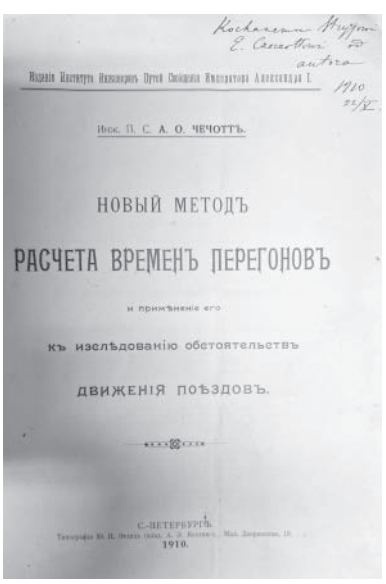
A great source of information about design engineers who shaped the Polish railway in the interwar period, including Professor Czeczot, is the memoirs of prof. Kazimierz Zembrzuski, covering the period from 1928 to 1944 [30]. Another extremely important work is the monograph by Zbigniew Tucholski devoted to prof. Antoni Xiężopolski, the founder of the Polish school of locomotive construction. It contains, e.g., information on the teaching activities of Professor Czeczott at the Warsaw University of Technology [28].

## 3. The life and professional activity of Albert Czeczott in St Petersburg

Albert Czeczott was born on 13 April 1873 in St Petersburg. He was the son of Otton Czeczott (1842–1924), a well-known physician, lecturer in the field of psychiatry and neurology. His mother was Leontyna, née Kukiel (1849–1920). He completed his studies at the St Petersburg Institute of Communication Engineers. This was a highly prestigious university educating engineers working for railways throughout the Russian Empire [27]. Among the Institute's graduates were many Polish engineers who, after 1918, created railway structures in independent Poland, designed and built new railway lines and PKP rolling stock. That group included inż. Julian Eberhardt, head of the Ministry of Railways in 1919, and a deputy minister at that Ministry for many years. The same year as Albert Czeczott (1897), Józef Nowkuński, an outstanding railway engineer and constructor of the Coal Trunk-Line, graduated from the Institute of Communication Engineers [22].

After obtaining his diploma, inż. Albert Czeczott completed several months of a steam locomotive internship and practised at the Technical Bureau of the Nevsky Steam Locomotive Factory in St. Petersburg. In 1898, he started working for the Moscow-Ventspils-Rybinsk Railway, initially as a rail traction controller. The Moscow-Ventspils-Rybinsk Railway (until 1897 the Rybinsk Railway) was a private railway, and the network expanded rapidly at the turn of the 20th century. In the years 1901–1904, a line was built connecting Moscow to the port of Ventspils, as well as a southern line from St Petersburg to Vitebsk. In 1913, the total line length of the Moscow-Ventspils-Rybinsk Railway was 2,475 versts (2,641 km).

In 1899, Albert Czeczott was delegated to the locomotive factory in Graffenstaden near Strasbourg in Alsace (part of the German Reich at that time). His task was to supervise the construction of 20 steam locomotives ordered from that factory by the Rybinsk Railway and to carry out performance tests of these locomotives. The opportunity to gain further foreign experience was the research on using peat in steam locomotives conducted in 1900 in Oldenburg and Bavaria. In the years 1901–1904, he carried out research on tandem steam locomotives with an axle arrangement of 1-4-0 and 2-2-0 on his parent Moscow-Ventspils-Rybinsk Railway. In 1904, he was promoted to the position of head of the rail traction department of that railway. An important stage in Albert Czeczott's professional career was designing steam locomotives at the Putilov Works in St Petersburg and working as chief constructor in that entity from 1910 to 1911.


Инж. П. С. А. О. ЧЕЧОТТЪ.

НОВЫЙ МЕТОДЪ

РАСЧЕТА ВРЕМЕНЪ ПЕРЕГОНОВЪ

и примѣненіе его

къ изслѣдованію обстоятельствъ

ДВИЖЕНІЯ ПОѢЗДОВЪ.

С.-ПЕТЕРБУРГЪ.

1910.

Title page of Albert Czeczott's doctoral thesis (1910) [source: APAN]

In 1910, Albert Czeczott defended his doctoral thesis entitled "A new method for determining train running time with its application to the research on train running conditions". It is worth noting that Albert Czeczott continued research on the subject of determining train running times both in the interwar period and after World War II. In 1914, he was appointed professor and took over the Department of Steam Locomotives and Railway Traction Management at the Institute of Communication Engineers. In 1918, he became head of the Steam Locomotive Laboratory at that Institute. In the years 1919–1922, apart from his main professional activity, he gave lectures at several universities in the then Petrograd, including two institutes of technology (one for men and one for women) at the Civil and Mechanical Faculties, and at the Railway Technical Schools.

## 4. The activity of prof. Czeczott in the Second Polish Republic

In 1923, Professor Czeczott left Soviet Russia and moved to the reborn Poland. He took up a job at the Ministry of Railways, in the Mechanical Engineering Department. Within the structure of the Rolling Stock Construction Department (22), an Experimental Division was established. It was founded on the initiative of the head of the Department, dr Adolf Langrod, later a professor at the AGH University of Krakow and the Cracow University of Technology. Professor Albert Czeczott became the head of the Division.

The first years of operation of the Polish experimental facility were very difficult. In 1923, the Experimental Division did not have adequate financial resources, its own measuring instruments, and there was no full-time staff. It only had at its disposal employees delegated from other organisational units of the railway. To carry out the first tests, Professor Czeczott was delegated to the Wilno (Vilnius) Directorate. Within its territory, sections with suitable characteristics were selected. The first measurements were performed in the area of the village of Zelwa, located on the Zelwa – Jeziornica line on the Białystok – Baranowicze section.

For the purpose of the research conducted by the Experimental Division, Professor Czeczott modified the experimental method used since 1885 in Russian railways, which consisted of maintaining constant running conditions on tracks with variable profiles of different railway lines by using hand brakes to regulate and maintain a constant train speed. The improvement meant eliminating the handbrakes and introducing an additional auxiliary steam locomotive to slow down the speeding train on declines and to pull it on inclines. This was a necessary condition for maintaining a constant train speed while accurately measuring coal and water consumption during the operation of the tested steam locomotive. The method was called the "dual traction" method [6, 23].

On 7 April 1924, the Minister of Railways, K. Tyszka, signed a regulation, which was published in the Ministry's Official Journal, formally establishing the Experimental Division. The content of the regulation was as follows: (…) For the purpose of testing steam locomotives and the proper use of tractive force at PKP, by means of systematic measurements, a separate unit is established in Department VI at Section 22 (…) [18]. The regulation stated that the measuring wagon and other wagons handed over to the Head of the Division for the duration of measurements were to be parked at the Warsaw station during longer breaks in the measurements. The measuring wagon was considered to be the seat of the Head of the Division. Measurement and experimental issues arising at PKP were to be forwarded to the Head of the Division for examination by Department VI (Mechanical) at the Ministry [18].

Initially, there were not many full-time employees at the Division. There was only the Head, who also held the function of the measuring wagon manager, three railway engineers, a locksmith for the measuring wagon and the guard of the measuring wagon. The temporary staff consisted of members of the locomotive teams and technicians from the individual Directorates, depending on the area where the research was carried out. Students from the Warsaw University of Technology assisted in the tests, who were delegated to the Division for the duration of their summer internship.

In 1924, the Division already owned a measuring wagon and several other wagons, but it still lacked its own measuring instruments. Therefore, instruments borrowed from industry and universities were used for research purposes for some time [6, 8, 15, 16].

In 1927, the Ministry of Communication published a study entitled "Characteristics of steam locomotives" [3]. This was a manual representing the first attempt to standardise the calculation of steam locomotives' strength and their loads for different values of the longitudinal track gradient and train speed. The "Characteristics" presented new calculation methods developed by prof. A. Czeczott.

To carry out tests and research on newly built steam locomotives as accurately and efficiently as possible, Professor A. Czeczott defined the requirements for a new measuring wagon for the needs of the Experimental Division. The construction of the wagon was undertaken in 1928 at the Lilpop, Rau i Loewenstein steam wagon factory in Warsaw. It was intended not only to extend the current scope of locomotive

research, but also to enable the undertaking of completely new research issues, such as [15, 16]:

- determining the resistance of trains depending on their composition and loading,
- determining the braking conditions of trains and carrying out general brake tests (this was extremely important in view of the widespread introduction of combined brakes in freight traffic on all railways in Europe),
- determining the dynamic effects exerted by a steam locomotive on the track (and vice versa, by the track on the steam locomotive).

Specialist measuring equipment from Amsler, Siemens and Richard was purchased for the wagon. The new measuring wagon was completed in 1930.

In the early 1930s, the Division was involved in the testing of new fast steam locomotives of two series: Pu29 and Pt31 [25]. Tests of the Pt31 steam locomotive, constructed in Chrzanów, at the first locomotive factory in Poland, were carried out in the autumn of 1932. This is how the designer of the steam locomotive, inż. K. Zembrzuski [30], described the tests:

(…) The first steam locomotive.... was sent to Poznań, where the team of prof. Czeczott was preparing an extensive test programme designed by prof. Czeczott. The immediate test supervisor was this time inż. Tadeusz Sejdler, and I took part as the Fablok delegate. The base of the experimental train was one of the tracks at Poznań's main railway station, and I was assigned a separate compartment in one of the sleeping cars. The steam locomotive tests took place on the Poznań – Zbąszyń section, with relatively little scheduled train traffic. As a result, it was possible to complete the designed test programme in a fairly short time. The test results showed that the thermal efficiency of the Pt31 steam locomotive – under its normal operating conditions – remained at the level found in good-quality foreign steam locomotives with a similiar type of engine…. The final stage of testing the steam locomotive, outside the main test programme, was to run an 800-tonne fast train from Poznań to Warsaw, according to the Paris express timetable. Two intermediate stops were assumed – Koło and Kutno. The task was completed with unexpectedly good results, as the achieved journey time was half an hour shorter than expected (…).

An important practical effect of the tests carried out by the Experimental Division under the leadership of Professor Czeczott was the standardisation of the method of determining the load and journey times of passenger and freight trains in all District Directorates of State Railways. The developed publication served as guidelines necessary due to the increase in train speed on PKP lines. This was mandatory from 15 May 1931 (i.e. from the date the timetable for 1931–1932 came into force). For the purpose of constructing timetables, the travel time of a passenger train was calculated with an accuracy of 15 seconds, and that of a freight train with an accuracy of 1 minute [9]. This issue was the subject of the work of the Eighth Congress of Mechanical Engineers in 1933. Guidelines for traction calculations were developed, including determining train travel times, water and coal usage, and steam locomotive loads. The guidelines were published by the Ministry of Communication in 1934 and recommended for general use [14].


Commemorative photo taken against a dynamometer wagon after a test run on the Vilnius-Grodno section [source: APAN]

The great opion of the tests conducted by the Experimental Division was confirmed by the fact that at the beginning of 1931 the General Directorate of Romanian Railways asked the Ministry of Communication of the Republic of Poland to allow to use the Polish experience in the field of steam locomotive research [4]. The Experimental Division provided comprehensive assistance to the Romanian Railways, which included the development of a detailed design of dynamometric devices for the planned Romanian measuring wagon. In 1932, a group of Romanian specialists received practical training in Poland for several months, while in November 1933, with the participation of Professor Czeczott, the first tests using the finished dynamometer wagon were carried out in Romania [4].

In 1935, at the request of the Association of Małopolska Mines, with the participation of Professor Dawidowski from the AGH University of Science and Technology, Professor Czeczott conducted coal tests using his own methods and measuring wagons of an experimental train. The purpose of the tests was to establish the exact quantitative and qualitative characteristics of various coal assortment used in steam

locomotives. The results were published in "Przegląd Górniczo-Hutniczy" in 1936 [2].

During his work at the Experimental Division, Professor Czeczott worked closely with the Mechanical Department of the Warsaw University of Technology. The head of the Locomotive Construction Division at that Department was prof. Antoni Xiężopolski, an outstanding designer, the founder of the Polish school of steam locomotive construction. At that University, Albert Czeczott gave lectures commissioned by the Construction and Communication Section. He taught the subject "Steam locomotive research". The course programme inclused such topics such as testing steam locomotives on tracks and in laboratories, dynamometer wagons, test methods, measuring instruments, speed, tractive force and resistance testing, water and fuel consumption testing, dynamometer testing and brake testing [28]. Professor Czeczott's work at the Warsaw University was of great benefit to the Experimental Division as it enabled to find the best students for future employment at the Division. For example, in 1926, a group of eight students, under the supervision of Professor Czeczott, observed the testing of an Austrian Tw12 freight steam locomotive (series 80) with a 0-5-0 axle arrangement, equipped with Dabeg system feed pumps and Lentz valve gear, on the Zelwa section [28].

It is worth mentioning that Kazimierz Zembrzuski, completing his studies at the Warsaw University of Technology at that time, worked in the Division from mid-1927 to 1929. In the following years, he became famous as the designer of steam locomotives at the first locomotive factory in Poland in Chrzanów (including the Pt31 and Pm36 express steam locomotives), and then as the successor of prof. A. Xiężopolski at the Locomotive Construction Division at the Warsaw University of Technology [30].


Professor Czeczott with the Ok22 steam locomotive team during rides on the Vilnius - Grodno section [source: APAN]

In the years 1935–1937, Professor Czeczott stayed in Iran. He was invited to Tehran by the Iranian authorities, with the permission of the Ministry of Communication of Poland, to provide expert support for a major transport investment underway – the Trans-Iranian Railway. The railway, built between 1927 and 1938, is almost 1,400 km long and runs from the Caspian Sea to the Persian Gulf. Albert Czeczott took up the position of advisor for traction matters, including the general organisation of the traction service and equipping the new line with locomotives and wagons based on orders from the European market. He actually performed the duties of head of the mechanical service. Based on his practical experience gained while working in the Experimental Division, he developed the assumptions and designs (probably conceptual) of wagons and steam locomotives with 1-4-0 and 1-5-0 axle arrangements. Then, following the failure of the Polish industry's involvement in the production of steam locomotives for Iran, he supervised the construction of locomotives for the Trans-Iranian Railway at the German Krupp factory. In the years 1938–1939, the factory produced 24 steam locomotives with the 1-4-0 axle arrangement, numbered from 41.11 to 41.34 [26]. It is worth mentioning that, apart from Professor Czeczott, many other Polish railway engineers were involved in the construction of the Trans-Iranian Railway, including Anatol Pławiński and Edward Stecewicz.

In 1938, after returning from Iran, Professor Czeczott resumed his experimental work and carried out tests on two Pm36 express steam locomotives: one with a streamlined cover and the other without it. The tests took place at the Białystok – Wilno section of the Warsaw – Wilno – Turmont line, the former Warsaw-Petersburg Railway. The tests were carried out after the return of the streamlined steam locomotive (Pm36-1) from the International Exhibition of Art and Technology in Paris, where the locomotive received a distinction. According to the research programme, the steam locomotives were to run express trains at the highest commercial speed in Poland on this section. On behalf of Fablok, inż. Gieżyński was delegated for the entire duration of the tests, while the steam locomotive's designer, inż. K. Zembrzuski, also participated on several occasions [30]. Confirmation of the tests of Pm36 locomotives on the former St Petersburg-Warsaw main line is evidenced by their listing as assigned at the time (for example, in July 1938) to the Vilnius Directorate, to the steam locomotives depot in Białystok.

In 1939, prof. Czeczott carried out dynamometer tests to determine the motion resistance of freight wagons. The tests were carried out for the French–Polish Rail Association, which operated the Coal Trunk-Line, along which heavy freight trains carrying

coal to the port in Gdynia [23]. The studies showed a previously unknown phenomenon of reduced resistance at high speeds.

## 5. Professor Czeczott and the reconstruction of the Experimental Division after World War II

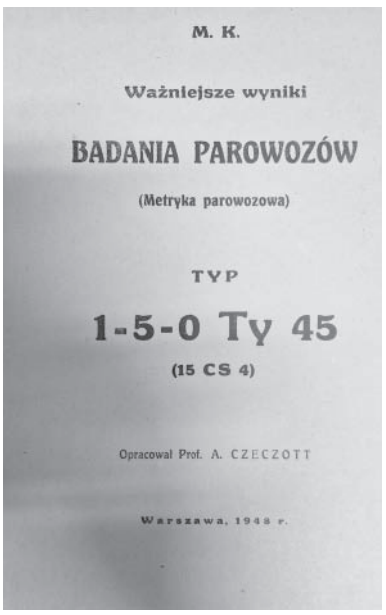
During World War II, the Experimental Division suffered great losses. Some of the Professor's closest collaborators were killed, including inż. Jakub Pinczower. The measuring wagon, the apparatus, the archives and a lot of experimental materials were destroyed. However, the results of the Pm36 steam locomotive tests, which the author did not manage to submit to the Ministry of Communication, were saved, preserved in prof. Czeczott's personal collections, as well as the results of the tests of the resistance of freight train wagons.

In 1945, in the first days after the liberation of Warsaw, Professor Czeczott reported for work at the Ministry of Communication. On 6 February 1945, he was accepted to work in the Mechanical Department and immediately, with innate energy and passion, he began to organise the Independent Experimental Division and became its head. The Division was immediately given the first task to perform. This was to collect all the characteristics of steam locomotives tested before the outbreak of the war and to establish the characteristics of steam locomotives left by the occupiers, as well as those of steam locomotives built for PKP in domestic factories.

The difficulties that the Experimental Division had to face in the first years of its operation after World War II resulted from the lack of appropriate personnel, financial resources, measuring wagons and measuring equipment. In such conditions, constant "improvisation" was necessary. Professor Czeczott developed a new, simplified method of testing locomotives, which he called the "method of testing steam locomotives without the use of indicators and a dynamometer". The method was based on testing the acceleration of a train pulled by a tested steam locomotive on a track with a constant gradient (without profile bends), at a constant cylinder filling. In this way, tests were carried out on German wartime-built steam locomotives and steam locomotives built in Polish factories according to preserved German documentation, i.e., the Ty2 Ty4, Ty42 and Ty43 series. The tests also covered steam locomotives of the new Polish Ty45 series, American and British steam locomotives received as part of UNRRA assistance and those purchased from America (Tr201, Tr202, Tr203 series). The results of individual tests were developed by the Division in a standardised manner in the form of the so-called steam locomotive metrics [10, 11, 12]. Conducting tests of several series of steam locomotives with similar purposes within a short period of time naturally led to a comparison of the results. For example, the SITK RP Bulletin of 1948 contained such comparisons for the Ty43-series steam locomotive of German construction and the Ty45-series steam locomotive of Polish design. The locomotives were characterised by a similar driving weight (Ty45 – 86.5 tonnes, Ty43 – 85.5 tonnes), both had a steam engine with two external cylinders in a twin arrange-

a)

b)




(a) Ty45 series steam locomotive [source: Railway Research Institute], (b) Cover of "Metryka parowozowa" (steam locomotive metrics) containing the results of the Ty45 steam locomotive test [source: APAN]

ment, and both were equipped with a boiler with 16 atm pressure boiler. Despite these similarities, they differed significantly. The traction characteristics of both steam locomotives developed by Professor Czeczott showed that the Ty45 steam locomotive could pull a train weighing $Q$ = 2,200 tonnes at a speed of 50 km/h on a level track ($i$ = 0), while the Ty43 steam locomotive could pull a similar train at a speed of only 40 km/h. It was also found that the steam distribution in the Ty43, depending on the conditions, was approximately 20–30% higher [19].

Finally, in 1948, the Experimental Division carried out tests on the Ty246 steam locomotives recently purchased from the United States, intended to pull heavy freight trains on the Coal Trunk-Line [24]. Also for this series of steam locomotives, steam locomotive metrics were prepared in 1950 [13].

In 1947, on the initiative of the Director of the Mechanical Department, Wacław Młodecki, the construction of a new dynamometer wagon was undertaken. The wagon was built in Poland under the supervision of Professor Czeczott, according to the general instructions and project and based on the pre-war wagon design. Józef Szunejko, an employee of the Experimental Division, who had already been involved in the construction of a dynamometer wagon for the Romanian railways in 1933, played a special role in that project. He was assisted by Mr. Komorowski, an employee of the District Directorate of State Railways in Gdańsk. The wagon was built at ZNTK (the Railway Rolling Stock Repair and Manufacturing Works) in Bydgoszcz, and partly (at the request of that company) – at the Stalowa Wola Steelworks. It was only necessary to purchase specialised instruments such as manometers, counters, pyrometers, etc. When designing and producing the proper dynamometric equipment, the results of the tests with the pre-war wagon were taken into account, which allowed for the improvement or simplification of some details and retention of the previous layout. Integrators were removed, as they were considered unnecessary, complicated and not precise enough. Instead, it was possible to increase the scale of the tape charts. The recording speedometer was completely modified. However, the friction drive of the speedometer and tape feed from the wagon axle, which had passed the test on the previous wagon, was retained [7]. Construction of the wagon began on 20 August 1947 and was completed on 1 February 1949 [5]. In March 1949, the Experimental Division received the new dynamometer wagon, number 900.

The Division also received three steam locomotives-compressors (resistance locomotives) which were adapted at ZNTK in Gdańsk to generate artificial resistance replacing the normal resistance of a long set of freight wagons during dynamometric tests [5]. The resistance steam locomotive operated without a fire in the furnace, with the gear set in the opposite direction to the train's motion. Cold air from the outside was drawn into the cylinders, compressed and forced into the boiler. Such reverse operation of the cylinders caused resistance, which could be modified within certain limits by adjusting the gear. The maximum resistance value was approximately 4000–5000 kg (or 40–50 kN). Three compressors of that type were able to absorb almost the entire work of a powerful modern steam locomotive. As a result, it was no longer necessary to form very long trains (up to 200 axles) for testing purposes. With the approval of the then Minister of Communication, J. Rabanowski, the steam locomotives-compressors were marked with letters "Cz", which was an abbreviation of Czeczott's surname. It is worth mentioning that the idea of using compressors was the original idea of Professor Czeczott and was first introduced into Polish railways in 1929.

In 1951, the Railway Scientific and Research Institute (INBK) was established based on the Experimental Division of the Ministry of Communication. All trained engineering and technical staff of the Division were transferred to the Institute. Within the INBK structure, the Steam and Diesel Locomotive Department was established, which developed very quickly, covering with its research an increasingly wide range of issues related to the mechanics of rail vehicle movement. The Department had the aforementioned dynamometer wagon and steam locomotives at its disposal. Two test trains were assigned and a wagon crew was assembled: one for traction research and the other for thermal tests. In addition, to fulfil the tasks assigned to the Institute, the engineers who were the staff of the first train gave lectures on traction calculations concerning the loads and running times of trains on the main lines and participated in conferences were train schedules were discussed (during which the train loads and the locomotive series assigned to service them were determined). This is a clear reference to the subject of Professor Czeczott's works, both from the period of his professional activity in St Petersburg (including his doctoral thesis) and in the pre-war Experimental Division.

In the first years of the INBK's operation, Professor A. Czeczott took part in the Institute's tests of a new series of steam locomotives: the TKt48 freight tank locomotive and the Ol49 light passenger steam locomotive. Moreover, in the years 1953–1955, Professor Czeczott took part in comparative studies of various types of coal from a dozen or so mines used in steam locomotives. This is also a clear reference to similar tests carried out by Professor Czeczott almost twenty years earlier. The purpose of the research was to develop characteristics of coal and a new railway classification defining the degree of usefulness of particular

types of coal, and – moreover – to establish norms of coal consumption for various types of steam locomotives. This served to introduce the economic management of traction coal in PKP [23]. One of the last studies in which Professor A. Czeczott participated was the tests of the Ty51 freight steam locomotive of Polish design, conducted by the Institute in the period from May to November 1954. The results of the tests were elaborated by inż. Wiktor Kowalewski [23].

Professor Albert Czeczott remained professionally active practically until the end of his life [17]. At the beginning of 1955, he began to fall ill and, after the illness lasting several months, he died on 3 November 1955. He was buried at the Powązki cemetery in Warsaw. For his outstanding achievements, Professor Albert Czeczott was awarded many prestigious state decorations, including the Gold Cross of Merit twice (in 1938 and in 1948), the Knight's Cross of the Order of Polonia Restituta (in 1953) and the Medal of the Tenth Anniversary of the People's Republic of Poland (in 1955).

Władysław Orzechowski wrote in his memoirs about the Professor: (…) In teamwork, he was a good and fair educator; he was able to take care of the proper shaping of interpersonal relations, ensuring effective and efficient work. He was liked by everyone and highly appreciated by his colleagues, co-workers and superiors, who always showed him gratitude, great respect and trusted him (…) [23]. In turn, as it was written in "Sygnały" in 1955, (…) he had a reputation as an extremely modest man, even though his name constantly appeared in Soviet, French and English specialist literature. Many railway workers remember the short Professor wearing an enormous sheepskin coat, a string with a pencil around his waist, and the way he fiercely discussed professional matters with his good friend Wiktor Kowalewski. Cheerful and witty, he always said kind words to those around him and good jokes to his closest friends (…) [20].

## References


1. Badania nowych typów parowozów PKP [Research on new types of PKP steam locomotives], Inżynier Kolejowy, 1926, nr 10, s. 288.
2. Czeczott A.: *Badanie węgli Zagłębia Krakowskiego* [Research on coals of the Kraków Basin], Przegląd Górniczo-Hutniczy, 1936.
3. Czeczott A.: *Charakterystyka parowozów. Typy i obciążeniai* [Characteristics of steam locomotives. Types and loads], Ministerstwo Komunikacji, Warszawa,1927.
4. Czeczott A.: *Nowa placówka doświadczalna rumuńska do badań parowozów* [New Romanian experimental facility for testing steam locomotives], Inżynier Kolejowy, 1936, nr 5, s. 171–173.
5. Czeczott A.: *Odbudowa referatu doświadczalnego PKP* [Reconstruction of the PKP experimental department], Przegląd Kolejowy, 1951, nr 7, s. 270–272.
6. Czeczott A.: *O dotychczasowych wynikach badań parowozów Tr21 i Ty23*, *dokonywanych z ramienia Ministerstwa Kolei* [About the results of tests of the Tr21 and Ty23 steam locomotives carried out on behalf of the Ministry of Railways], Inżynier Kolejowy, 1925, nr 5., s. 102–110.
7. Czeczott A: *O wagonach dynamometrycznych i szczegółowe dane dotyczące nowego dynamometrycznego wagonu P.K.P.* [maszynopis] [About dynamometric wagons and detailed data on the new P.K.P. dynamometric wagon, typescript], APAN Albert Czeczott (1873–1955, kolejnictwo), III-209.
8. Czeczott A.: *Pokaz Referatu Doświadczalnego Ministerstwa Komunikacji na Powszechnej Wystawie Krajowej w Poznaniu* [A show by the Experimental Department of the Ministry of Communication at the General National Exhibition in Poznań], Inżynier Kolejowy, 1929, nr 7, s. 207–209.
9. Czeczott A.: *Ujednostajnienie we wszystkich DOKP sposobu określania obciążenia i czasów jazdy pociągów osobowych i towarowych* [Unification of the method of determining the load and travel times of passenger and freight trains in all DOKPs], Protokoły VIII Zjazdu Inżynierów Wydziałów Mechanicznych, 1933.
10. Czeczott A.: *Ważniejsze wyniki badania parowozów (Metryka parowozowa*), Typ 1-4-0 Tr201 (203) [Important results of the steam locomotive test (Steam locomotive metrics), Type 1-4-0 Tr201 (203)], Ministerstwo Komunikacji, Warszawa, 1948.
11. Czeczott A.: *Ważniejsze wyniki badania parowozów (Metryka parowozowa*), *Typ 1-5-0 Ty43* [Important results of the steam locomotive test (Steam locomotive metrics), Type 1-5-0 Ty43], Ministerstwo Komunikacji, Warszawa, 1948.
12. Czeczott A.: *Ważniejsze wyniki badania parowozów (Metryka parowozowa). Typ 1-5-0 Ty45* [Important results of the steam locomotive test (Steam locomotive metrics). Type 1-5-0 Ty45], Ministerstwo Komunikacji, Warszawa, 1948.
13. Czeczott A.: *Ważniejsze wyniki badania parowozów (Metryka parowozowa). Typ 1-5-0 Ty246* [Important results of the steam locomotive test (Steam locomotive metrics). Type 1-5-0 Ty246], Ministerstwo Komunikacji, Warszawa, 1950.
14. Czeczott A.: *Wskazówki do obliczeń trakcyjnych, Określanie czasu jazdy pociągów, rozchodu wody i węgla i obciążenia parowozów* [Tips for traction calculations, Determining train running times, water and coal usage and steam locomotive loads], Ministerstwo Komunikacji, Warszawa, 1934.
15. Czeczott A.: *Zarys rozwoju i pracy Referatu Doświadczalnego za czas 1923–1927 r. i projekt nowe-*

*go wagonu dynamometrycznego dla P.K.P* [Outline of the development and work of the Experimental Department for the period 1923–1927 and the design of a new dynamometric wagon for the P.K.P.], Inżynier Kolejowy, 1928, nr 9, s. 270–274.
16. Czeczott A.: *Zarys rozwoju i pracy Referatu Doświadczalnego za czas 1923–1927 r. i projekt nowego wagonu dynamometrycznego dla P.K.P (dokończenie)* [Outline of the development and work of the Experimental Department for the period 1923–1927 and the design of a new dynamometric wagon for the Polish State Railways (completed)], Inżynier Kolejowy, 1928, nr 10, s. 310–314.
17. Czekała B.: *W sztafecie pokoleń. Prof. Albert Czeczott* [In the relay of generations. Prof. Albert Czeczott], Nowe Sygnały, 1995, nr 7.
18. Dziennik Urzędowy Ministerstwa Kolei 1924, nr 7, poz. 36, s. 102–103.
19. Garbacik R., Garbacik K.: *Ty43 - lokomotywa wojenna* [Ty43 – war locomotive], Eurosprinter. Rybnik, 2018.
20. Kaszyc Z.: *Mechanik, którego kochali ruchowcy* [The mechanic that the movers loved], Sygnały, nr 46, 20 listopada 1955 r.
21. Massel A.: *Od Referatu Doświadczalnego Ministerstwa Kolei Żelaznych do Instytutu Kolejnictwa* [From the Experimental Department of the Ministry of Railways to the Railway Institute], Problemy Kolejnictwa, 2018, z. 181, s. 7–16.
22. Moczulski M., Paszke A.: *Józef Nowkuński budowniczy linii kolejowych* [Józef Nowkuński, the builder of railway lines], Stowarzyszenia Inżynierów i Techników Komunikacji RP Oddział w Katowicach, Katowice, 2015.
23. Orzechowski W.: *Prof. dr inż. Albert Czeczott wspomnienia* [Prof. Dr. Eng. Albert Czeczott memoirs], COBiRTK, Warszawa, kwiecień 1972.
24. Roszak T.: *Parowozy amerykańskie na PKP* [American steam locomotives on PKP], Kolpress, Poznań, 2014.
25. Seidler T.: *Badania nowych parowozów pospiesznych P.K.P.* [Tests of new P.K.P. express steam locomotives], Inżynier Kolejowy, 1934, nr 2, s. 39–42.
26. Szulc P.: *Z cukru i herbaty. Historia Kolei Transirańskiej* [From sugar and tea. The history of the Trans-Iranian Railway], Świat kolei, 2017, nr 11, s. 20–29.
27. Tucholski Z.: *Czeczott Albert* [Albert Czeczott], http://www.polskipetersburg.pl/hasla/czeczott-albert [available: 15.03.2025].
28. Tucholski Z.: *Profesor Antoni Xiężopolski. Twórca polskiej szkoły budowy lokomotyw* [Professor Antoni Xiężopolski. Founder of the Polish School of Locomotive Construction], Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2015.
29. Wspomnienie o profesorze A. Czeczocie [In Memory of Professor A. Czeczot], Przegląd Kolejowy Mechaniczny, 1955, nr 12, s. 383.
30. Zembrzuski K.: *W Biurze Konstrukcyjnym Pierwszej Fabryki Lokomotyw w Polsce. Wspomnienia 1928–1944* [In the Design Office of the First Locomotive Factory in Poland. Memories 1928–1944], Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2015.