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The practice of adapting a post-industrial facility into a museum of technology

Introduction

Railroad engineering is a branch of technology that has one of the best track records in cultural heritage preservation. This is particularly evident in Poland, which is because most of the country's locomotive types have been preserved, as well as many copies of wagons and back-of-house equipment. At the same time, not a single pre-war copy of a ship used on the Vistula river remains complete, despite the fact that they were still in use in the 1980s¹. The same happened to pre-war Polish flagship aircraft designs, of which only one exists today².

In Europe, railroad antiquities began to find their way into museum institutions as early as three decades after the first lines opened. London's Science Museum in the 1860s displayed a collection of some of England's oldest locomotives [1]. The first European railroad museums opened in the 2nd half of the last decade of the 19th century in Norway's Hamar (1896) (initially very modest, expanded in 1930) [2] and in Bavaria's Nuremberg (1899) – as the Royal Bavarian Railway Museum, being an extension of the Munich Railway Museum, which had been in operation since 1882 [3].

In Poland, the Railway Museum was established in 1928 [4] in a haphazard manner to store exhibits from the 1927 exhibition in Lviv (and later exhibitions in Poznan in 1929 and 1930) [5]. Occupying office space (a wing of the former Warsaw Central Station in Marszałkowska Street, and after its demolition in 1931, in the building that still exists today at 1 Nowy Zjazd Street) [5], it did not include

Until the 1970s the opening of museums, both in Poland and in Europe, did not translate into the preservation (with the exception of station buildings) of monuments of railroad architecture, especially the technical background of railroads. Only extensive modernization, combined with the closure of sections of lines deemed unprofitable and the decommissioning of elements of the old infrastructure, developed such a need.

The first facilities for which the need for systematic protection was noted (in the UK) were signal box buildings (housing signal and turnout control equipment) and steam locomotives. In both cases, these facilities were being decommissioned due to technological advances – the move away from the old ways of controlling traffic and the decommissioning of steam traction [6].

This article is a description of the adaptation of the former steam locomotive depot complex for museum purposes. The author, using his own thirty years of experience (between 1991 and 2022), wishes to familiarize the reader with the problem of reconciling the possibility of showing old technologies with the introduction of new functions to historic buildings. Publications about Polish (and not only) railway museums are usually guides or promotional materials describing their collections. Researchers of issues related to railway museology focus on presenting the history of the creation of individual institutions, without delving into the issue of arranging exhibitions or changing

the protection of rolling stock and railroad equipment until the outbreak of World War II. Protection of this part of the heritage dates only from the 1st half of the 1960s, when the General Directorate of State Railways issued an order to store the last copies of the erased series of steam locomotives. The exhibition of the preserved vehicles dates back to 1973, i.e. to the establishment of the Railway Museum (now as "Stacja Muzeum") on the premises of the Warszawa Główna Station at 1 Towarowa Street.

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¹ The author had the opportunity in 1984 to visit the complete Vistula steamer "Bałtyk" standing in Rynia.

² PZL P11 at the Aviation Museum in Krakow.

the purpose of museum buildings [7]. This is probably due to the fact that the example of adaptation described by the author relates to the territorially and volumetrically largest complex of historic railroad buildings in Poland, where the scale of adaptation work is the largest³.

Protection of railroad monuments in Poland until 1990

In Poland, until the late 1980s, the protection of historic buildings associated with railroads was occasional. The need for their wider protection emerged as a derivative of the economic crisis at the end of the existence of the Polish People's Republic. The suspension of traffic on a number of lines and the end of steam traction, which was extended during the communist period, caused the railroads to abandon many historic buildings [8].

The Railway Museum expressed no interest in preserving or owning historical buildings, treating as worth preserving basically only the rolling stock. This resulted, in addition to the lack of development of the museum, in the inability to properly maintain the movable exhibits in its possession, if only due to the lack of canopies and the most modest technical facilities.

As opposed to a professional museum, the then Polskie Koleje Państwowe (Polish State Railways; PKP) authorities recognized the emerging interest in railroad heritage among domestic and foreign enthusiasts. The important role of monuments in creating a positive image of railroads was demonstrated by the celebrations of the 150th anniversaries of the opening of railroads in Western European countries (starting with the first chronological celebrations in Germany in 1985). PKP was stimulated by the invitation of a Polish representation to the celebration of the 150th anniversary of Dutch railroads in Utrecht. The passage of an active Polish steam locomotive through Germany and the Netherlands aroused great interest, which changed the approach of PKP authorities to the monuments they owned. The Committee for the celebration of the 150th anniversary of railroads in the Polish lands, established by the General Directorate of the PKP at that time, in addition to preparing their concept, was given the task of creating "open-air" railroad museums within PKP structures in 1988 [10]. The Committee proposed organizing outposts in selected locomotive depots that were scheduled for liquidation. They were to have infrastructure that could be adapted for exhibition purposes. It was expected to provide conditions for storing rolling stock collections and carrying out their conservation in the preserved technical facilities. Also important were the architectural and historical qualities of the facility, as well as its location in a region attractive to tourists. As a result of the analyses, it was envisaged that museum facilities would be set up

within the structures of PKP on the grounds of steam locomotive depots in Wolsztyn, Jaworzyna Śląska, Kłodzko and Ełk. This concept was only partially implemented.

In the early 1990s, there was also a demand for broader protection of the decommissioned narrow-gauge railroad networks, operating within the structures of PKP, the State Forestry, mining and sugar ministries. So far, only part of two narrow-gauge railroad systems have been used for tourist and museum purposes, in Żnin on 600 mm track and in Sochaczew on 750 mm track.

At the same time, there was an increase in civic activity, thanks to the simplification of non-governmental organization (NGO) registration procedures. They began to exert pressure on state owners of monuments and conservation services.

Directions for the protection of railroad monuments in Poland

The emerging in 1990-1995 concepts of monument preservation by the state-owned enterprises that were using them yielded only partial results. In fact, these measures only postponed the definitive withdrawal of the "state" from maintaining museum exhibitions and their use in promoting railroads for about a decade. In the middle of the 1st decade of the 2000s, the Railway Museum, which remained within the structures of PKP, as well as the so-called open-air museums⁴ in Wolsztyn, Jaworzyna Śląska and Kościerzyna, were finally handed over to various local government units. Local governments established business ventures of their own (e.g., Stacja Muzeum) [11] or leased them to other entities (e.g., a private Museum of Industry and Railways in Silesia was established in Jaworzyna Śląska [7]). Narrow-gauge railroad lines were handed over by PKP to the local authorities (county offices, local government authorities), which most often lend rolling stock and equipment to operators who are foundations or associations [12].

In the early 1990s, a number of independent private or community initiatives [13] emerged to organize railroad museum facilities, both on narrow-gauge railroads and facilities on normal track.

It can be hypothesized that national initiatives varied in the scope of preservation depending on the width of the track. "Narrow gauge" projects were always aimed at preserving a given line or network as an aggregate consisting of tracks, buildings and rolling stock. Hence, the so-called "spatial transportation system" was identified as the object of protection⁵. The idea was to leave the narrow-gauge line with its equipment and rolling stock as a complete relic of former transportation technology. Very

³ In the course of adapting the facilities in Skierniewice for exhibition purposes, it was necessary to rely on the technical experience of railway schools (Łódź, Warsaw) or former PKP course training centres (Gdańsk), which in the past organized and had well-equipped vocational workshops. The model was also based on archival studies on the preparation of facilities for the practical education of railway employees, e.g. [9].

⁴ The phrase "open-air museum" is used in the text in the colloquial form that has been adopted for years in the circles of railroad historians and enthusiasts. It does not define the type of exhibition activity carried out, in particular, it loosely refers to the definition of an *open-air museum*, etc.

Such a defined object of conservation protection was indicated, among others, by the author in applications submitted in 1989–1995 by the Polskie Stowarzyszenie Miłośników Kolei (Polish Association of Railway Enthusiasts; PSMK).

often, therefore, objects that would not meet any of the criteria for legal protection on their own were recognized as components of a monument⁶.

In the case of initiatives on the normal track, the primary goal was initially to preserve historic rolling stock, in principle mobile and therefore one that can be stationed anywhere. The preservation of back-of-house facilities was treated as a secondary objective, enabling the storage and preservation of mobile monuments. It was believed that the elements of former railroad buildings, technologically related to the collection on display, could only be a background for the "proper" exhibits. Hence, the choice of locations for some of the current exhibits was not justified by their architectural or historical value⁷. Only as modernization and decommissioning of historic buildings progressed did the need for their protection begin to be recognized.

Initiatives to reactivate narrow-gauge railroads are mostly still in operation today. Unfortunately, due to costs, traffic is largely carried out only on selected sections of the various networks of these railroads. Normal track ventures have to some extent ended in collapse⁸ or half-success⁹. Successful and sustained development of the historic preservation project has occurred in only one case. This project, initiated in 1991, included the protection from liquidation, the takeover from PKP and the successive adaptation for exhibition purposes of the former Lokomotywownia Skierniewice (Skierniewice Steam Locomotive Depot) complex.

History of the Skierniewice Steam Locomotive depot complex

The steam locomotive depot (later Locomotive Depot) in Skierniewice is the oldest of the surviving¹⁰, one of the original five [14], architectural layouts of the technical facilities of the Droga Żelazna Warszawsko-Wiedeńska

⁶ As an example, the Bieszczady Forest Railway, included in the register of monuments (at the request formulated by the author), is preserved in its condition from the period of expansion in 1958–1962, where the only buildings from before this reconstruction are the only two buildings in the Majdan-Cisna station area. One of these buildings is a style-less wooden station building, the other is a wooden warehouse built according to the standardized design of the Imperial Austrian railroad. Even the course of the railroad line coincides with the historical route of 1895 only at the section from Wola Michowa to Cisna, i.e. on about 30% of the total line.

(Warsaw–Vienna Railway; DŻWW), the first railroad line in the Kingdom of Poland¹¹.

This complex, along with the original station buildings, was sited adjacent to the river and the northern part of the park near the former palace of the bishops of Łowicz (then in the possession of the Russian state treasury) [15]. The idea was to conveniently connect the facilities used by the imperial house by modern means of transport [16]. Proximity to the river guaranteed the supply of water consumed by the locomotives. The steam locomotive depot was laid out in 1845 in accordance with the rules of the time¹² – opposite the original¹³ station building¹⁴ – and the necessary buildings were probably erected the following year. These buildings survived until the end of the 1850s. The oldest buildings that still exist today date back to the period of expansion of the DZWW related to the increase in transportation and the extension of the existing Skierniewice-Lowicz branch to the then northern border of the Russian Empire in Aleksandrów Kujawski.

In 1858, a water tower, still standing today, was erected [17]. In 1862, the first [18] eight-station part of the existing parking hall (in the shape of a fan) and a turntable for steam locomotives (on the site of the current one 15) were built. At the same time, a separate workshop building was erected and the rectangular parking hall, dating from 1846, was adapted into an office and accommodation building. The new fan-shaped parking hall obtained its present-day dimensions by 1878 [19].

The steam locomotive depot complex was severely damaged in October 1914 during the retreat of Russian and later German troops. The fan hall and the turntable [20], [21] were demolished, while only minor damage was done to the workshop and office buildings, as well as the pump house and the former water tower. The hall was provisionally rebuilt during the Prussian occupation, in 1917–1918 18.

An example of a location where the architectural criterion was not taken into account may be the facility in Chabówka, and an example of the absence of both criteria is the display in Zduńska Wola–Karsznice organized at free sections of track on the site of an active locomotive depot.

⁸ Sometimes this collapse took place in an atmosphere of scandal created after the sale or scrapping of exhibits acquired for museum purposes (Krzeszowice, Piotrków Trybunalski, Warsaw).

⁹ In one of the projects (Pyskowice), despite considerable advancement, the steam locomotive depot complex has not been handed over to a new user, and its basic facilities (the main hall, office and dispatch buildings), despite being under conservation protection, suffered a construction disaster or total devastation, the scale of which does not promise the possibility of adaptation under the financing conditions of national social organizations. The second project (Jarocin) is limited by the lack of regulation of the status of the property.

¹⁰ Before that, there was only a steam locomotive depot in Warsaw, existing on land now occupied by Warsaw's Central Station and a complex of PKP residential buildings in Żelazna Street.

¹¹ The Warsaw-Vienna Iron Road was opened to traffic on the Warsaw-Grodzisk section on June 15, 1845. However, it is not the oldest railroad in the current Polish lands – the oldest being the Upper Silesian Railway (Oberschleschische Eisenbahn), which opened on the Wrocław-Oława section on May 14, 1842.

¹² In the 1st half of the 19th century, this was due to the desire to shorten the length of tracks and water pipes within the station.

¹³ The building in question is the original one, designed in 1846 in the "Moorish" style by Adam Idźkowski (1798–1879), which was destroyed in 1945. The current one, reminiscent of English Gothic, was erected about 300 m closer to Warsaw in 1873, designed by Jan Kacper Heurich (1834–1887).

¹⁴ Similar steps were taken in the construction of stations in, for example, Piotrków Trybunalski, Częstochowa or Jaworzyna Śląska (this applies chronologically to the first and second steam locomotive depots, the current one is the third facility of this type).

¹⁵ The axis of rotation of the turntable bridge determines the geometric centre of the circle of the fan-shaped parking hall and the geometric point of contact of the axis of the access tracks, hence once established the axis must remain constant.

¹⁶ Photos of the destruction were published by "Tygodnik Ilustrowany" in issues 47/1914 and 52/1914; they are also depicted in the postcard "Skierniewice Lokomotivschuppen" issued by A.J. Ostrowski in Łódź, probably in 1915.

¹⁷ According to period photos, scans in the author's collection.

¹⁸ A report on the activities of the Directorate of State Railways in Warsaw 1918–1928 on pages 63 and 64 attributed the rebuilding of the facility to the Polish railroad authorities [22]. Meanwhile, in the au-

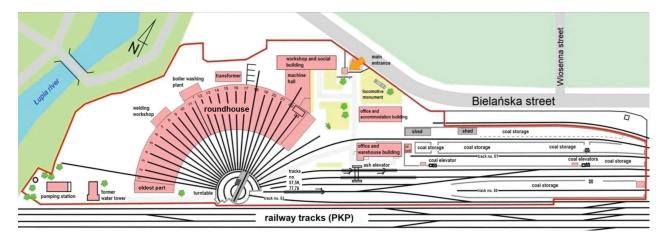


Fig. 1. Plan of the locomotive shed in Skierniewice (source: property owner, cooperation by P. Mierosławski)

II. 1. Plan parowozowni w Skierniewicach (źródło: materiały właściciela obiektu, współopracował P. Mierosławski)

In this condition the steam locomotive depot operated until 1939¹⁹. During the war, the German occupation authorities embarked on a two-stage modernization of the complex.

The first stage of it, implemented since early spring 1940²⁰, consisted in adapting the Skierniewice complex to the increased traffic of steam suburban trains after the destruction of the electric traction on the Warsaw–Żyrardów section²¹. The office, accommodation and workshop building was demolished, and a new one was erected – an office, staff and storage building. The track layout was changed, enlarging the coal entanglements ("zasieki węglowe")²² and expanding the facilities for loading coal onto steam locomotives.

In the second stage, in 1942–1943 (when Skierniewice became one of two steam locomotive depots serving freight traffic from the direction of Zagłębie²³), the repair capacity was expanded. A machining hall and a workshop and staff building were erected. The fan hall was also expanded to extend the tracks of the parking stands. However, elements of the makeshift reconstruction of 1918 were left

in it, a wooden wall with entry gates and a wooden, even unfounded²⁴ roof support structure.

The condition after this expansion lasted until 1963–1964, when the hall was reconstructed. Only then, i.e. after 45 years (!), were its wooden makeshift structures removed. The hall gained a steel roof structure with a high skylight, supported by prefabricated reinforced concrete columns.

In 1985–1988, a (now defunct) container office building and garages were erected on the site.

PKP operated the complex in a gradually limited capacity until mid-1992, after which they decided to abandon it. In December 1992, the authorities of the then Warsaw Central Railway Department suggested that the current owner take it over for museum purposes.

PKP lent the complex without delay, however, the transfer of ownership of the main part of the complex took place in 2002, and the rest of it in 2018.

Preserved buildings and structures

The Skierniewice steam locomotive depot is located on today's western end of the station plain, bounded by the scarp of the Łupia River and Bielańska and Łowicka Streets, on the opposite side of the railroad line to the station (Fig. 1). It is an architectural premise typical of the 2nd half of the 19th century [23] designed to service steam locomotives, with a central element in the form of a spacious stabling and repair roundhouse hall in the shape of a fan²⁵ with a turntable²⁶ [24] located on the axis. The

thor's collection there is a photo of a group of Prussian railwaymen posing in front of the already rebuilt steam locomotive depot hall, dated April 1918.

¹⁹ The freeze on modernization of the complex during the Second Polish Republic was due to the loss of traction significance of the Skierniewice steam locomotive depot in the late 1920s. In April 1939, there were already only 16 locomotives stationed in Skierniewice (that is, seven fewer than the number of positions in the depot) serving only local traffic [16, p. 314].

²⁰ The author established this period on the basis of a mason's signature with the date 16.04.1940, made on the masonry joint of the foundation of the well of one of the water cranes.

²¹ Although electric train traffic was opened on 1.06.1940, at the turn of 1939/1940, i.e. at the time of the decision to expand the Skierniewice complex, the German authorities were against the reconstruction of the electric traction (copies of correspondence in the author's collection).

²² This is the name used by PKP for coal depots in steam locomotives, to distinguish it from the depots used as commercial yards in expedition and freight storage areas.

²³ As of 30.03.1943, 57 locomotives were stationed in Skierniewice, 41 more than before the outbreak of war [16, p. 329].

²⁴ The columns and braces of the substructure rested on foundations (presumably anchored) lying on the floor of the hall – this can be seen in photographic documentation from the modernization period in 1963 (in the author's collection).

²⁵ In the 19th century, other hall layouts were also used – circular with a turntable in the building (e.g. Warszawa Praga), rectangular or composed of several fans (e.g. Katowice, Nysa).

²⁶ A turntable is a rotating bridge used either to put steam locomotives on the hall tracks or to change their direction of travel. The Skierniewice turntable is one of the two existing cases of a sectoral turntable



Fig. 2. View of the roundhouse (photo by P. Mierosławski)

Il. 2. Widok hali wachlarzowej (fot. P. Mierosławski)

hall's original (1878) dimensions include 24 stalls²⁷, with one of them converted to office and storage space around 1890 (Fig. 2).

Adjacent to the hall is a rectangular machining section with a two-story workshop and staff building. It was erected in 1942–1943.

The complex also includes free-standing buildings – a two-story office and lodging building and a one-story office and storage building, erected between 1940 and 1941, a water tower dating from 1858²⁸ expanded around 1884 and adapted around 1900 for social facilities, and a steam pumping station from 1880 with a surface water intake from the Skierniewka River.

In addition to the buildings, the complete technical infrastructure needed to operate and maintain steam traction locomotives has been preserved. It includes a 23 m diameter turntable (1949 type design), water cranes with a capacity of 5 m³/min (1922–1940), coal shaft lifts of the Teudtloff system (1939–1941), and a trail crane (1940). The structures (except for the coal lifts) were maintained in working condition.

The total area of the complex of locomotive depot buildings is 3.77 hectares, and the total length of the railroad track is 3.2 km. The entire complex, i.e. the site, buildings and structures, is listed in the register of monuments of

the former Skierniewice province (No. 964A). Boundaries of conservation protection coincide with the outline of the fence, i.e. with the boundaries of two plots²⁹.

Architectural qualities of the complex

The area of the complex fits into the triangle of neighbouring Skierniewice monuments, which also includes the park and palace layout of the bishops of Łowicz and the Sobediana garden with a palace designed by the creator of the original station, Adam Idźkowski. The complex is part of a collection of former Viennese Railway buildings preserved in Skierniewice: the station (1873), a residential building with utility facilities (1875), the "SkB" signal box (circa 1905), and is the point of several specially marked tourist routes, such as the urban route of "Viennese" objects and the railroad/car route "Szlakiem Kolei Wiedeńskiej" ("Along the Vienna Railway"), "Industrial Mazowsze".

The complex includes buildings from different eras of the development of industrial architecture. The oldest of them – the former water tower – refers in its style to the farm and residential buildings of the nearby palace settlement (Fig. 3). Technical buildings³⁰ (hall, pumping station

in Poland, with an incomplete angle of rotation. More extensively in: [24, pp. 401-432].

²⁷ At the time, it was one of the largest roundhouse halls in the Russian Empire.

²⁸ The design of the tower may have come from the atelier of Henryk Marconi – builder of many waterworks in the Kingdom, including the first Warsaw waterworks, completed in 1855–1856.

²⁹ Plot 2/2 and 2/6 of precinct 9 of the city of Skierniewice.

³⁰ Demolished in 1940, the office and lodging building, erected in 1860–1865, was the only one to receive plastered elevations, which was probably due to the fact that it was created from the reconstruction of an earlier building of a completely different nature, and an aesthetically pleasing brick elevation would have been impossible in such a case. The building can be seen on postcards (in the background) from around 1910 depicting the Skierniewice train station.



Fig. 3. Former water tower (photo by P. Mierosławski)

Il. 3. Dawna wieża wodna (fot. P. Mierosławski)

with chimney) built in the following decades of the 19th century were erected with sparingly decorated (pilasters, protruding lintels, cornices) façades made of facing brick, according to the solutions proposed³¹ by VDEV³² [25].

On the other hand, the buildings from 1940–1943 were built on the basis of typical designs, developed as part of the expansion of the "Eastern Railway" (Ostbahn) operating in the General Government³³ [26]. Two stages of the construction of these buildings are evident, differing in the shape of the roof, the dimensions of the window openings and the form of the woodwork. The two buildings constructed in 1940–1941 – an office and social building (Fig. 4) and a storage building (Fig. 5) – have their counterparts on the premises of the locomotive depot in Sochaczew³⁴, and the workshop and social building erected in

1943 (Fig. 6) is almost identical (although having a "mirror image" of the layout of the rooms) to the locomotive depot building in Sędziszów, which performs similar functions.

The buildings constructed in Skierniewice, like other Eastern Railway project developments³⁵, were undoubtedly to receive (which did not happen) plastered façades (Fig. 7).

The buildings were constructed (at least in part) with materials ordered centrally in Germany. Roofing was made of high-quality ceramic plain tiles, from G. Sturm of Freiwaldau³⁶ and Kodersdorfer Werke AG³⁷, imported from hundreds of kilometres away. One of the buildings was covered with a perishable concrete plain tile, now being replaced entirely with ceramic.

The buildings use burnt brick in the load-bearing and curtain walls, and lime-cement only in the partitions.

The surviving design documentation for buildings from the 1940–1941 period bears the stamps of Warsaw companies – Przedsiębiorstwo Inżynieryjno-Budowlane inż. Ryszard Łapiński and Biuro Budowlane inż. Wacław

³¹ It is worth noting that the ornamentation of the brick façades of buildings on the Warsaw–Vienna Railway (almost identical to the designs of the Prussian railroads), differs from the ornamentation of the brick façades of buildings constructed on the railroads owned by the Russian Treasury.

³² VDEV (Verein deutscher Eisenbahnverwaltungen) – the Association of German Railway Administrations, an organization founded in 1847, bringing together dozens of railroad administrations from areas including Germany, Austria and Hungary to disseminate technical standards. The Warsaw–Vienna Iron Road was a member of VDEV, thus benefiting from Western European technical documentation. For more on VDEV, see: [25, p. 93].

³³ For more on this type of building, e.g.: [26, p. 281].

³⁴ The same form of windows, probably industrially made, and a similar building block were also used, for example, in the area incor-

porated into the Reich, in a residential building for railroad workers in Kutno.

³⁵ The buildings of the Eastern Railway, despite many similarities with the buildings of the German Reichsbahn (DR) Railway operating, for example, in the areas of Poland annexed to the Reich, did not receive the "fashionable" on the territory of the DR façades of clinker bricks, having in each layer a distinctive layout: head-over-truck-over-truck.

Now Gozdnica, located on the Lusatian Neisse River.

³⁷ Kodersdorf in the Upper Lusatia region of Germany (Saxony).



Fig. 4. Office and accommodation building (photo by P. Mierosławski)
II. 4. Budynek biurowo-noclegowy (fot. P. Mierosławski)



Fig. 6. Workshop and social building (photo by P. Mierosławski)

II. 6. Budynek warsztatowo-socjalny (fot. P. Mierosławski)



Fig. 5. Office and warehouse building (photo by P. Mierosławski)II. 5. Budynek biurowo-magazynowy (fot. P. Mierosławski)



Fig. 7. View of the machine hall (photo by P. Mierosławski)
Il. 7. Widok hali maszyn (fot. P. Mierosławski)

König. Both of these companies operated in Warsaw in the pre- [27] and post-war [28] periods, which may suggest that the Germans entrusted the adaptation of designs or the execution to Polish private companies.

The concept of a steam locomotive depot as a living museum

In a technical museum, the undeniable educational value is the presentation of working exhibits. Thus, the concept of a "living" museum is most appropriate in this case [29]. Technical relics should be exhibited³⁸ with the presentation of their working technology and original purpose. At the same time, this ensures that the exhibits are maintained in a condition close to that of normal operation.

The concept of a living museum in the case of buildings and structures related to technology also has many advantages, the most important of which is to ensure the maintenance of the specialized installations in the facility and fulfilling an educational function. A technical monument, upon decommissioning or changing its original pur-

pose, loses some of the characteristics of a monument by losing the statutorily designated "testimony of a bygone era" [30, Article 3(1)], while its maintenance meets the statutory disposition of "monument protection" [30, Article 5(1), (4) and (5)]. Therefore, efforts should be made to maintain selected elements of the object's technical functionality as a link in the chain of the technology it represents. This postulate is met by a number of railroad museum facilities, both domestically and internationally. Among the domestic facilities, a mention should be made of:

- The steam locomotive depot in Wolsztyn, where a 1907–1909 hall with a water tower and a post-war but 1930s-style social building are still in use according to their original purpose,
- The open-air rolling stock museum in Chabówka, although gathered in a less historically valuable complex of buildings, plays the role of a living museum, just like Wolsztyn, fulfilling all the original technical functions,
- The Museum of Industry and Railways in Jaworzyna Śląska, which has a spacious fan hall dating back to the early 20th century, and modest technical facilities that are still in operation.

In addition, a mention should be made of a number of active, museum-quality narrow-gauge railroads, led by the

³⁸ This is the author's belief.



Fig. 8. Pumping station (photo by P. Mierosławski)

Il. 8. Pompownia (fot. P. Mierosławski)

Upper Silesian, Żnin, Rogowska and Raciborski Ore railroads. Narrow-gauge railroads, however, generally (though not always) play a significantly smaller role of buildings and a larger role of linear infrastructure facilities than museums on normal track.

Railway-related establishments that meet all the postulates of a living museum of technology are more than a hundred on our continent. Great Britain and Germany are leaders in this field, where there are dozens of such centres each. Examples of establishments organized in former steam locomotive sheds include:

- Museum of the German Railway History Society (DGEG) in Bochum-Dahlhausen, with active workshop facilities and rolling stock [31],
- Museum of the Swiss Federal Railway (SBB) History Foundation "La Rotonde" in Délémont [32].

An example of a museum that also meets the definition of a living museum is the rebuilt steam locomotive shed of the former Berlin-Anhalt Railway (BAE) from 1874 [33], which is one of the facilities of the Museum of Technology and Communication in Berlin. This steam locomotive shed, which is part of a complex of spacious, modern exhibition buildings and adjacent to the decommissioned tracks of the Anhalt Railway Station (Park am Gleisdreieck), which has been turned into a park [34], has nevertheless lost a lot of the features of its former technological identity, despite the meticulousness of its reconstruction.

Challenges of the adaptation process of a post-industrial facility

The main challenge of the process of adapting a post-industrial facility is to adopt methods of preservation and operation that will allow the monument to retain selected technical functionalities. The implementation of such an outlined process is significantly more complex than in the case of adapting a post-industrial facility to a new function, such as residential, office or commercial. In the case of such a change, adaptation is based solely on construction work. Maintaining the original functions, on the other hand, requires works not only of a construction nature, but also related to the protection of specialized technical equipment.

A separate issue is usually the poor technical condition. Such a facility before adaptation is sometimes underinvested or improperly operated, and often abandoned. This gives rise to the need to carry out ad hoc rescue work simultaneously with planned adaptation. Renovation work on historic technical infrastructure to preserve their historic value must be carried out taking into account current technical standards and safety regulations. Often these goals are seemingly mutually exclusive, so the revitalization must be carried out by people with extensive experience in both current and past technologies represented in the facility. This results in a significant increase in costs, the need to use compromise technical solutions or to change previously made decisions on the future scope of operation or display of historic buildings.

Challenges of adaptation to museum function of Skierniewice steam locomotive depot

The efforts of the current owner, the Polskie Stowarzy-szenie Miłośników Kolei (Polish Association of Railway Enthusiasts, PSMK), to organize a museum facility began in 1988 with the collection of rolling stock. Initially, few elements of the collection could easily be made available as so-called monuments on sites such as those of PKP. With the growth of the collection and the difficulties in securing it, the search for a permanent place for it began.

The experience of cooperation with PKP during the organization of railroad "open-air museums" determined the direction of efforts, while for organizational reasons it was limited only to the area of central Poland. It was the Skierniewice Locomotive Depot, scheduled for liquidation, that was chosen. Despite PKP's quick decision to transfer the complex for museum purposes, the entire procedures were spread out over 25 years due to the unregulated legal status of the land and changes in regulations crucial to the process. The prolongation of the handover process made it impossible to carry out renovation work in a planned manner, which, in view of the ensemble's inclusion in the register of historical monuments and the significant scope of the work, had to be preceded each time by applying for a building permit, which the formal owner was not interested in.

The locomotive depot was significantly neglected when the Association took it over – as it was scheduled for liquidation (Fig. 8). The abandoned buildings had not had their plumbing drained before winter, and the interiors (most notably the stairwells) had been devastated during removals. The buildings had previously not undergone inspections for many years, and were also partially unprotected against theft. The state of repair was also influenced by the quality of the construction work carried out previously. Due to a lack of funds and materials, the works were carried out by low-skilled brigades, using far-reaching savings and substitute solutions.

In addition to the condition of the buildings, the challenge was the condition of key technical infrastructure, including the turntable, lifts and water intake facilities, as well as the catastrophic condition of parts of the track with wooden ties that had exceeded their useful life. A significant risk factor was the lack of several hundred meters of fencing, leaving the facilities vulnerable to theft and vandalism.

The long life of the Skierniewice steam locomotive plant has resulted in a build-up of installations. For a century and a half, for example, independent water supply networks were built here, including two for drinking water (one with a deep-water intake) and for 80 years a modified industrial water network with its own river intake. The water mains were made of cast-iron socket pipes, no longer used for years. The separation of the complex from the active railroad junction resulted in common installations. Therefore, despite the separation, common medium- and low-voltage cable routes are still in place, traction and lighting poles of the adjacent railroad line are sited. Elements of land drainage and storm water drainage, as well as industrial water connections are shared. This required the conclusion of relevant contractual agreements.

Development of a concept for renovation and adaptation works

The scale of the complex and limited funding forced the PSMK to select an expert team of people with experience in steam traction railroads. The team developed the basis of the adaptation concept in writing, with the assumption that it would be updated periodically.

Adopting a written form provided the opportunity to adapt the concept to the changing state of knowledge. It was drawn from archival documentation and iconography, obtained from a search in archives (primarily PKP units) that lasted several years. Design documentation from 1940–1943 became the basis for building inventories, while postwar sketches were a source of knowledge about underground installations³⁹. The development and constant modification of the concept of work in a complex of such a scale as the locomotive shed makes it possible to get used to the necessity of spreading tasks over many years and the lack of quick, spectacular successes. In the case of a non-governmental, community-based organization, this allows maintaining continuity and an even pace of works.

The planned adaptation of the complex to a museum role, as specified in the concept, was straightforward in view of the overlap between most of its former and planned functions. Only one function, related to the maintenance of the former office and storage space, did not correspond to the new, exhibition one. But the adaptation of office or storage space to an exhibition function does not cause significant interference with the structure or layout of the various buildings.

Included in the concept of work, the preliminary inventory of facilities and the analysis of the functions assigned to them was the basis for the development (and subsequent modification) of functional-utility programs drawn up for the execution of construction projects necessary to obtain building permits.

The process of planned adaptation

After preparing a concept for the work, the work began with a detailed inventory of the condition of buildings, structures and external installations. Consideration was given to reconciling the maintenance of historic infrastructure in accordance with current technical standards. The order of needs was defined and the work plan was divided into salvage, planned renovation and planned adaptation.

Work began in 1993, with the departure of PKP employees, and the lack of title to the property meant that, despite the definition of a schedule for the work, most activities were initially ad hoc. Initial activities were limited to:

- cleaning up the area,
- security against theft (reinforcement of entrances, glazing, repair and replenishment of window coverings, remaking of main hall gates locks, permanent closure of unused entrances),
 - reviews of electrical and water supply systems,
 - reconstruction of the heating system (portable stoves),
 - ad hoc roof repairs,
- maintaining the efficiency of the turntable, tracks and turnouts.

The stage of planned renovation and adaptation works began after the transfer of the complex to ownership, which made it possible to seek public support and obtain construction permits. Beginning in 2001, among other things:

- construction projects for all facilities have been completed and permits obtained,
- all the missing tracks in the workshop hall (25% were missing) and the entrance gate were rebuilt,
- 75% of the roofing of the main hall was replaced, and the remaining 25% was repaired,
 - 30% of the main hall's glass skylight was rebuilt,
- the roof was rebuilt and the interior of the oldest part of the hall was rebuilt (shell) for exhibition purposes,
- a major repair of the track and turnout (about 35%) and the turntable was carried out,
- the team's electrical system was repaired, and redundant lighting poles were eliminated,
- comprehensive roof repairs were carried out on four buildings; two buildings under repair,
- redundant outbuildings and garages were demolished,
- approximately 20% of the area has been adapted for display,
- sick trees were removed, new plantings were made in accordance with the guidelines.

The overall advancement of the renovation and adaptation project should be assessed at 40%. It should be mentioned that along with the renovation of the buildings, repairs to exhibits and equipment are being carried out. Each group of works is systematically phased in terms of currently identified needs and resources. During the phasing, changes were made as dictated by the originally unforeseen growth of specialized sections of the collection. Adaptation for exhibition purposes of the buildings of the main hall, machining hall, forge, foundry was limited, apart from renovation, to the delineation of passageways, escape routes and new sanitary facilities.

³⁹ Secondary surveying maps produced contained a number of significant misrepresentations and simplifications.



Fig. 9. The oldest part of the roundhouse (photo by P. Mierosławski)

Il. 9. Najstarsza część hali wachlarzowej (fot. P. Mierosławski)

The only case of deep interference in the existing layout of the building was the comprehensive reconstruction of the so-called "Łowicz annex" 40, i.e. the position of the main steam locomotive hall, rebuilt around 1890, for workshop facilities (Fig. 9). This part of the hall, extended "economically" in 1942-1943, suffered a construction disaster in 2006. The crumpled beams of the ceiling above the first floor collapsed, along with a part of the roof truss supported on it. The incident occurred despite relieving the beams with the removal of the ceiling's clay topping and shoring. After the demolition of the damaged interior, provision was made for the display of large-scale equipment (semaphores, indicators, signal boxes). This was achieved by partially introducing a single-box layout (eliminating the ceiling over the first floor on about 40% of the area). The ceiling over the first floor was also eliminated, referring to the layout of the 1862–1890 building, without interfering with its external shape.

The ceilings left over part of the first floor were made as a reinforced concrete slab on steel beams, reinforced in the areas of exhibit loading. This yielded 205 m² of space suitable for exhibiting equipment up to 9.5 m in height and weighing up to 3,000 kg. The largest size exhibit (arm semaphore) was set up before the roof reconstruction was completed.

The rooms in the office and storage buildings, except for modifications to the electrical and telecommunications systems and the removal of secondary partition walls, were not altered. During the adaptation, there was no intention to interfere with the structure of the buildings, and the changes restored the original layout of the rooms. This layout has a major impact on the shape of the exhibition.

An important part of the exhibition planning was the delineation of tour (and evacuation) routes and photography spaces with regulation of direct access to the exhibits.

For safety reasons, a maximum number of simultaneous visitors has been set for each exhibit. The principle of visiting with a trained guide has been adopted, which makes it possible to dispense with stationary staff in individual rooms. These conditions are important for an active technical exposition, as it involves ensuring the safety of visitors – who do not have adequate safety training. This poses the need to anticipate and minimize potential hazards already at the design stage.

The layout of the buildings has forced the location of bulky and heavy objects indoors on the non-basement first floor, which sometimes separates the displays to the detriment of the cognitive process.

Due to the fact that the former office buildings are, in part, social facilities for volunteers (staff), it became necessary to set aside areas in these premises that are inaccessible to the public.

Lessons from practice

The practice of adaptation of the former Locomotive Depot in Skierniewice has shown that the transformation of a post-industrial facility into a technical museum requires the involvement of the investor-user, who should not expect the designer to have an idea of the target functions of the adapted facility. The role of the investor is crucial in developing a concept for the development and function of the facility. He or she must, on the basis of his/her own knowledge and experience, outline the expected concept of future use (in the case of Skierniewice, the investor's own development concept was confronted with concepts made, for example, as diploma theses of students of the Warsaw and Lodz Universities of Technology, or as works of a promotional nature prepared by professional architectural offices). The most important thing is the development of a detailed program by the investor (the requirements of the ordering party within the framework of the functional-utility program specified in the regulations) and its agreement with the designer as to the possibility of implementing the given concept.

Direct and continuous cooperation with the designer at all stages of design work avoids possible disputes arising either from the designer's misinformation or lack of realism in the investor's expectations. The investor for historic post-industrial buildings should look for designers, first of all, with experience in the field of industrial construction (with authorizations in accordance with the requirements of conservation services).

The practice acquired in Skierniewice indicated that the lack of ongoing cooperation at the designer—investor line and the lack of experience of the designer in the field of industrial construction lead to the impossibility of implementing the prepared construction project (there was such a case).

It is very important for the investor to cooperate with conservation services, including the transfer of knowledge of techniques and technological processes related to a given facility.

During the implementation phase, it is necessary for the investor's representatives to constantly supervise the

⁴⁰ The customary name for the oldest part of the roundhouse hall came about because of the direct proximity of this part of the hall to the tracks of railroad line No. 11 Skierniewice–Łowicz.

conduct of construction work and to be in close contact with the construction manager and supervisor.

The investor and the designer should keep in mind that the so-called proven contractor may not be able to cope with the selected specialized work (there was such a case).

The complex of the Skierniewice Steam Locomotive Depot is an example of the success of many years of renovation and adaptation work conducted by an investor that is a non-governmental organization, basing its activities solely on the unpaid work of volunteers.

Translated by Michał Goszczyński

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Abstract

The practice of adapting a post-industrial facility into a museum of technology

The subject of the article is the adaptation of the historic Steam Locomotive Works in Skierniewice for the purposes of a "living" technical museum. The author, using his own thirty years of experience, presented the problem of reconciling the possibility of showing the old technologies of railroad work with the introduction of new functions to historic buildings. The article describes reaching a compromise between the need to preserve historic equipment and infrastructure, as well as the visual qualities of individual objects, with the requirements of current regulations and the desire to show the gathered collection in a way that is interesting and safe for visitors.

The example presented in the paper concerns the territorially and cubically largest complex of historic railroad buildings in Poland, where the scale of adaptation works is the largest. The complex is also the oldest surviving relic of the technical facilities of the first Polish railroad line – the Warsaw–Vienna Iron Road. It was built in 1845 and went through several phases of expansion. At present, it preserves buildings from 1859–1943 and technical structures related to the operation of steam locomotives. In 1992, with the end of operation by the railway, the complex was loaned, and in 2002 it was transferred to a non-governmental organization for museum purposes. It is listed in the register of historical monuments under No. 964A.

The Skierniewice Locomotive Deport is an example of the success of many years of renovation and adaptation work conducted by an investor that is a non-governmental organization with a modest budget and bases its activities solely on the unpaid work of volunteers.

Key words: historic preservation, railroad monuments, living museum

Streszczenie

Z praktyki adaptacji obiektu poprzemysłowego na muzeum techniki

Tematem artykułu jest adaptacja na cele "żywego" muzeum technicznego zabytkowej parowozowni w Skierniewicach. Autor, korzystając z własnych, trzydziestoletnich doświadczeń, przedstawił problematykę godzenia możliwości pokazywania dawnych technologii pracy kolei z wprowadzaniem do zabytkowych obiektów nowych funkcji. W artykule opisano dochodzenie do kompromisu między koniecznością zachowania zabytkowych urządzeń i infrastruktury oraz wizualnych walorów poszczególnych obiektów z wymogami obecnych przepisów i dążenia do pokazywania zgromadzonej kolekcji w sposób ciekawy i bezpieczny dla zwiedzających.

Przedstawiony w pracy przykład dotyczy największego terytorialnie i kubaturowo zespołu zabytkowych obiektów kolejowych w Polsce, w którym skala prac przystosowawczych jest największa. Zespół ten jest również najstarszym zachowanym reliktem zaplecza technicznego pierwszej polskiej linii kolejowej – Drogi Żelaznej Warszawsko-Wiedeńskiej. Powstał w 1845 r. i przeszedł kilka faz rozbudowy. Obecnie zachowane są w nim obiekty z lat 1859–1943 oraz budowle techniczne związane z obsługą lokomotyw parowych. W roku 1992, z chwilą zakończenia eksploatacji przez kolej zespół został użyczony, a w roku 2002 przekazany na własność organizacji pozarządowej na cele muzealne. Jest wpisany do rejestru zabytków pod nr 964A.

Kompleks skierniewickiej parowozowni jest przykładem sukcesu prowadzenia wieloletnich prac remontowo-adaptacyjnych przez inwestora będącego organizacją pozarządową, posiadającą skromny budżet i opierającą działalność wyłącznie na nieodpłatnej pracy wolontariuszy.

Słowa kluczowe: ochrona zabytków, zabytki kolejnictwa, żywe muzeum