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TECHNICAL, ARCHITECTURAL AND INDUSTRIAL HERITAGE AT THE RAILWAY ŠID - DIMITROVGRAD

Abstract. The Serbian railway Šid - Dimitrovgrad was completed at the end of the 19th century, and besides occasional reconstructions and technological upgrades, it is still in service. The geographical position of the railway route and the historical context at the time of construction and during operation, made that the railway exceeded its local significance and become an important corridor of the European railway network. In recent years, the strategic modernisation of the Serbian railway system, including the Šid - Dimitrovgrad railway, is underway. That is why we have initiated the research of the industrial heritage along the railway, which sometimes dates from the time of construction. Our purpose was to identify, research and document existing railway installations and technical infrastructure, as well as the industrial heritage surrounding the railway.In this article, we present the results of our research and suggest ways to continuously preserve some of the valuable cultural, technical and industrial heritage.

Keywords: Serbian railways, railway history, railway infrastructure, industrial heritage, Orient Express.

1. Introduction

The geographic position of Serbia has contributed to the Serbian railway network to overcome the local importance and become one of the most important rail corridors in Europe.Therefore, initial construction plans were supported by existing European states. The construction of Serbian railways was part of the country's modernization plan at the end of the 19thand 20thcenturies.

The successive building of the Serbian railways provided the shortest direct connections between Western Europe and Bulgaria, Greece and Turkey. Following the recognized advantages, the Serbian factories turned towards the new railway stations. At the same time, Western countries have used the new effective communication to expand their economic and political interests more easily and faster. A good, attractive example of these processes at that time was the European Orient Express train. With minor breaks, it passed alongside the Serbian railways during 1885-1977.

The rapid technological development in the last decades of the 20th and in the 21th century changes the basic concepts of railways - a new infrastructure is being built, adapted to the current high-speed trains. Therefore, the existing railways, technical infrastructure, stations and railway installations are likely to be dismantled and demolished in the future modernization of the Serbian railway network. Without disputing the values of the modern railway, we believe that the current non-selective removal of historical artefacts is the devastation of some of our precious industrial heritage. This is why we chose the Šid - Dimitrovgrad railway. Our objective was to identify, research and document existing facilities and technical infrastructure on the route, which was also used by the well-known Orient Express train. Our research

focused on railways, level crossings, railway signalling, railroad switches, water towers and standpipes, railway station facilities, etc.

In this paper, we present some results of our research, believing that it will help, at least partially, to protect the remaining artefacts of the cultural heritage of Serbian railways.

2. HISTORICAL CONTEXT

The invention of the steam engine in 1784, its application to the steam locomotive, and the development of the railway were some of the most significant results of the industrial revolution. The ease of use of the steam engine (Figure 1) was confirmed in 1825 by the establishment of the first railway in Britain. In the middle of the 19th century, railways connected many European cities. [1] Following the development of railway traffic and the realization of its potential, the Serbian experts examined in 1838 the feasibility of building an "iron road" in the northeast of Serbia. The objective was to construct the railway leading to the Danube. Soon after, negotiations started with the Franco-Serbian Society. The contract was never carried out and construction of the first railways started almost half a century later. [2].

Figure 1. Josip Broz's "Blue Train" steam locomotive at the Belgrade Main railway station, 3 July 2018 (Photo: R. Kulenović)

2.1. Serbian railway network. Following the wars between Serbia and Turkey and the Berlin Congress in 1878, Serbia was officially recognized as independent. It opened up new opportunities for developing and modernizing the country. The provisions agreed between Serbia and Austria-Hungary under the Berlin Peace Treaty concerned mainly the construction of railways, trade and navigation along the Danube. Serbia had committed itself to constructing a railway in three years. At the same time, Austria-Hungary undertook to build the Budapest - Belgrade railway to join its railway network with the Serbian railways. The priorities were to build the Belgrade - Niš railway and link it to Bulgarian and Turkish railways. The formal contract was signed in 1880. The

following year, the government of Serbia and the General Union of Paris signed an agreement for the loan, construction and operation of the railway. Construction officially commenced on 3 July 1881, applying the prescribed technical standards for the entire railway: from Budapest to Thessaloniki and Istanbul. In subsequent years, the Syndicat Général went bankrupt. Soon afterwards, a new French company, the Association for the Construction and Operation of the State Railways of Serbia, was established and construction continued. The Belgrade - Niš Railway was officially completed in January 1884, when the first test run took place. The engineering tests took about several months. At last, the first train had crossed the railway on 20 July 1884. The service promotion was conducted in September. [2]

During the following years a railway from Niš to the Bulgarian border was completed and in 1888 traffic was established at Caribrod (now Dimitrovgrad). Finally, the railway has become of international importance. Under the contract, the operating rights of the Belgrade - Niš railway were transferred to the French company. This placed Serbia in an unfavourable economic situation. As the Company had made many omissions in its business, the contract was cancelled and the Serbian Railway was nationalized in 1889.[2]

The railway has had an important impact on Serbia's economic and social development. Its construction was one of the main reasons for the rapid industrial development on the route from Belgrade to Niš and Caribrod as well as the exchange of goods to neighbouring countries. The positive effects initiated the extension of the railway to Thessaloniki and Istanbul. During the construction of the railway Belgrade - Niš, the railway Budapest - Belgrade was in the process of construction via Subotica and Novi Sad. It became open for traffic in 1884. A section of the railway, via Sremska Mitrovica to Vinkovci, was completed in 1891.The first railway in Banat was built in 1854, from Oravica, via Jama, Jasenovo and Bela Crkva, to Baziaş, connecting Vienna to the Black Sea in Romania.

After the First World War, a part of the territory of the former Austro-Hungary, across the Sava and Danube rivers, became the part of the new Yugoslav state, and the Serbian Railway network was extended by the existing Austro-Hungarian railways. Some local railways in Vojvodina had to be strengthened, as they were diverted from the local railways to the main ones. One example is the Subotica - Kikinda railway, when the Orient Express route is redirected towards Vienna - Budapest - Belgrade. [2]

Finally, the Serbian railways go through the frequent alternation of opposing periods: periods of prosperity and periods of war destruction. We are witnessing the latest destruction, which took place on 12 April 1999, during the NATO aggression against Serbia. The tragedy at the Grdelica Bridge outweighs the major property damage. NATO aircrafts struck the international train Belgrade - Thessaloniki, killing 59 adult passengers and one 10-year-old child. As well, over 30 passengers were injured. These people were civilians. [3]

2.2. Railway stations. Building the railway network in Serbia included architectural, technical and service infrastructure. The stations were new kinds of buildings, with no predecessors before. They are based on classical architectural language, although the station buildings themselves differ from each other in terms of location, type of building and technical features of the station. [4] The Belgrade - Niš railway extends for 243.5 km. At that time, there were 22 stations. The most important took place in Belgrade and Niš. The Belgrade Main railway station was mentioned for the first time in a modified version of the Rail Convention concluded between Austria-Hungary and Serbia in 1880. The field research and the study of the site of the construction of the Belgrade Main

railway station lasted nearly two years. The final decision was made in 1881 and preparations for the site commenced the following year. [5]

There were several projects, but it is impossible to say which variant was chosen. Although the identity of the architect has not been confirmed, certain facts indicate Wilhelm von Flatich. In particular, the similarity of the Belgrade projects with its Graz, Innsbruck, Trieste and Vienna train stations prevails. The detailed elaboration of the project was performed by the engineer DragutinMilutinović, as he was employed in the Railway Department of the Ministry of Construction and already had the experience in building several railway stations along the Belgrade - Niš railway. Construction was officially launched on 3 April 1883. The main passenger building was completed in late 1885 (Figure 2), more than a year after the railway opened for traffic.

Figure 2. The Belgrade Main railway station, August 8, 2019 (Photo: R. Kulenović)

Originally, the station had three tracks for passenger reception and fifteen tracks for freight trains, two covered platforms and a number of auxiliary buildings. [6] One of the first and certainly the most representative, the Belgrade Main railway station is a significant architectural achievement in Serbia and the representative building, designed in the spirit of academism. Because of its sophisticated solution and dominant position, it reflects the modernisation and development of Serbia by the end of the 19th century.

Despite its historical and architectural values, as well as the fact that it was declared a monument of great importance (October 6, 1981) [7], the Belgrade Main railway station has been closed to traffic on June 30, 2018. The last train, from Belgrade to Budapest, departed the Belgrade Main railway station on June 30, 2018 at 21:20h. If she were alive, Agatha Christie would probably say, "The file is closed!".

Meanwhile, the platforms, station infrastructure and trackswere taken away and the future became uncertain (Figure 3). Some unofficial reports indicate that one of the Belgrade's museums will be located at the Belgrade Main railway station.

Figure 3. Removed tracks and platforms at the Belgrade Main railway station, August 23, 2019 (Photo: A. Vlajić)

2.3. Industrial plants along the railway Šid – Dimitrovgrad. In the early 20th century, the new railways provided functional and efficient transportation. Our current research confirms that "former industrial plants" are often located in close proximity to the railways (Figure 4).

Based on the results of our field research at railway stations and their immediate vicinity, we present a list of past and some existing plants:

- Šid: Meat industry Srem;
- Ruma: the mill, Shoes factory Fruška Gora / Falc;
- Sremska Mitrovica: the grain warehouse, the mill, Shipyard Mačvanska Mitrovica, the Brewery (devastated), Varda Laćarak (devastated);
- Indjija: the mill;
- Stara Pazova: the mill, the brickyard;
- Zemun Polje: the Corn Institute
- Belgrade: Milan Vape Paper Factory, the State Printing House / BIGZ, Toolbox Rad;
- Topčider: Mint, Garage of Court Compositions;
- Rakovica: Engine industry Rakovica, SP Foundry;
- Mladenovac: Slaughterhouse / Meat Industry (currently being demolished), the mill;
- Smederevska Palanka (Figure 4): Jasenica / Goša
- Velika Plana: Old Slaughterhouse/Meat industry Velika Plana /Perkon;
- Lapovo: the mill;
- Jagodina: Brewery Kosovljanin, Klefiš Slaughterhouse / Meat industry Yuhor, the mill;
- Ćuprija: Sugar factory, MIP Foundry;

- Paracin: Serbian Glass Factory / SFS, Paraćinka, Teokarević Textile Factory;
- Adrovac: the briquetting plant of Aleksinac Mines;
- Niš and CrveniKrst: Roškov's mill, Mechanical industry Niš / MIN, Textile factory MitaRistić (devastated); Brewery Apelovac (partially preserved), Brickyard LAF, Tobacco monopoly; Tobacco industry Nis / DIN, Bridge workshop CrveniKrst, Rubber factory Vulkan, the Tannery, Military tailoring workshop, Foundry Pejić / Prosveta;
- Niška Banja: Water supply Niš;
- Jelašnica: Hydropower plant Sveta Petka near Ostrovica, Quarry / MajdanOstrovica;
- Bela Palanka: Watermill Vrelo;
- Sićevo: Sićevo Hydropower Plant, Sićevo Winery;
- Pirot: Rubber Industry Tigar;
- Sukovo: Jerma mine's briquetting plant;
- Dimitrovgrad: Rubber Industry / GID

Figure 4. The grain warehouses, mill and the station's warehouse at the Smederevska Palanka railway station, July 29, 2020 (Photo: Z. Cvetković)

The state of their preservation coincides with the general state of the industrial heritage in Serbia. Namely, many factories did not work, the buildings were emptied or nearly destroyed. Occasionally they are used as warehouses. These days, partly survive certain plants that have changed their purpose.

3. The Orient express

While the railway conquered Europe and the rest of the world, John Nagelmackers, son of a Belgian banker, founded the International Sleeping-Car Company (Compagnie Internationale des Wagons-Lits). It was based on the luxury bed car of the American Railway. His vision was a train that would go through Europe and terminate its journey to the Orient. Its first trial took place in 1883. The train was named "Orient Express". The original itinerary was officially opened on October 4, 1883. The train was leaving Paris, stopping in Munich and Vienna. Between Giurgiu in Romania and Ruse in

Bulgaria, passengers crossed the Danube by ferry. The journey continued by train to Varna, then by ferry to Istanbul. [8]

In 1885, a route from Vienna via Belgrade to Niš started operating. The section Niš - Plovdiv passengers passed by carriage and after that, they continue by train. Finally, in 1889, the Niš - Plovdiv railway was completed, getting the uninterrupted train journey to Istanbul. The distance of 3094 km took 80 hours. [9] Following World War I, in 1919, the Simplon Tunnel opened in Switzerland and a new route was introduced. The route began in Zurich, passing through Milan, Venice and Trieste, continued along Yugoslavia, passing through Ljubljana, Zagreb and Belgrade, then Sofia to Istanbul. The railway, known as the Simplon Orient Express, operated until 1977.

The Orient Express celebrated its golden years in the thirties. These years, apart from the Simplon Orient Express, two other trains were in service: the Orient Express Tours (via Budapest and Bucharest) and the Arlberg Orient Express (via Budapest and Belgrade to Athens). [10] At that time, the Orient Express gained a reputation for comfort and luxury. It was very popular amongst members of the royal families, the nobility, artists, diplomats, politicians, and the richer society. Some of them were Emperor Haile Selassie, Josephine Baker, Leopold II, Mata Hari, Isadora Duncan, Lawrence of Arabia, Agatha Christie, etc. Also, the Orient Express was inspiring novelist, such as Joseph Kessel, Paul Morand, Graham Greene, Vladimir Nabokov and Ernest Hemingway [11]. At the same time, the lavish ambience of the train and the mystique of the Balkan countries were the challenging ambience for the worldwide success of Agatha Christie's crime fiction: “Murder on the Orient Express” (1934). In addition to various editions, the novel has been adapted for radio (1992), cinema (1974, 2017), television (2001, 2010, and 2015), and theatre (2015). [12]

The train was not operating in the Second World War. After the war, the lines were re-established and, with minor modifications, the train ran until 1977, when the journey from Paris to Istanbul and Athens was finally cancelled. After 1977, the Orient Express continued to operate from Paris to Vienna, providing links to Budapest and Bucharest. The line was becoming shorter and shorter and the last journey of the Orient Express, from Strasbourg to Vienna, took place on 12 December 2009. [10]

In addition to well-known facts and attractive stories about the Orient Express, El Gammal Blanche analyses the phenomenon of the Orient Express from an another angle, placing it in the context of "economic and political domination, and beyond that, a vector of hegemonic dreams" in the first half of the 20th century. [13]

4. Following the Orient express railway from Šid to Dimitrovgrad

After 130 years, since the first passage of the Orient Express across Serbia and almost 90 years after the first edition of the Agatha Christie’s novel “Murder on the Orient-Express“, we travelled along the well-known railway from Šid to Dimitrovgrad. The real and fictitious phenomenon of the Orient Express was only a framework that helped us to better understand and perceive the exceptional importance of the Serbian railways by the end of the XIX and during the first half of the 20th century.

The main goals of our research were to identify and document the architectural and technical heritage preserved on the railway, at stations and at stops. Furthermore, we have planned to list and systematize important industrial plants that gravitate towards the Šid - Dimitrovgrad railway. Our research was conducted from June to November 2020. According to our GPS device, the railway is 451.5 km long (Figure 5). On our journey we visited 93 railway stations and stops and made more than 5,800

images that we have permanently archived. Archived images are originals in RAW and JPEG formats that have not been intentionally post-processed.

The railway station articles we published on the National Geography, Culture and Tradition Magazine's website (http://www.srbijaplus.net). Web pages are semantically annotated by JSON-LD format and .og metatags, using thematic vocabularies [14, 15].

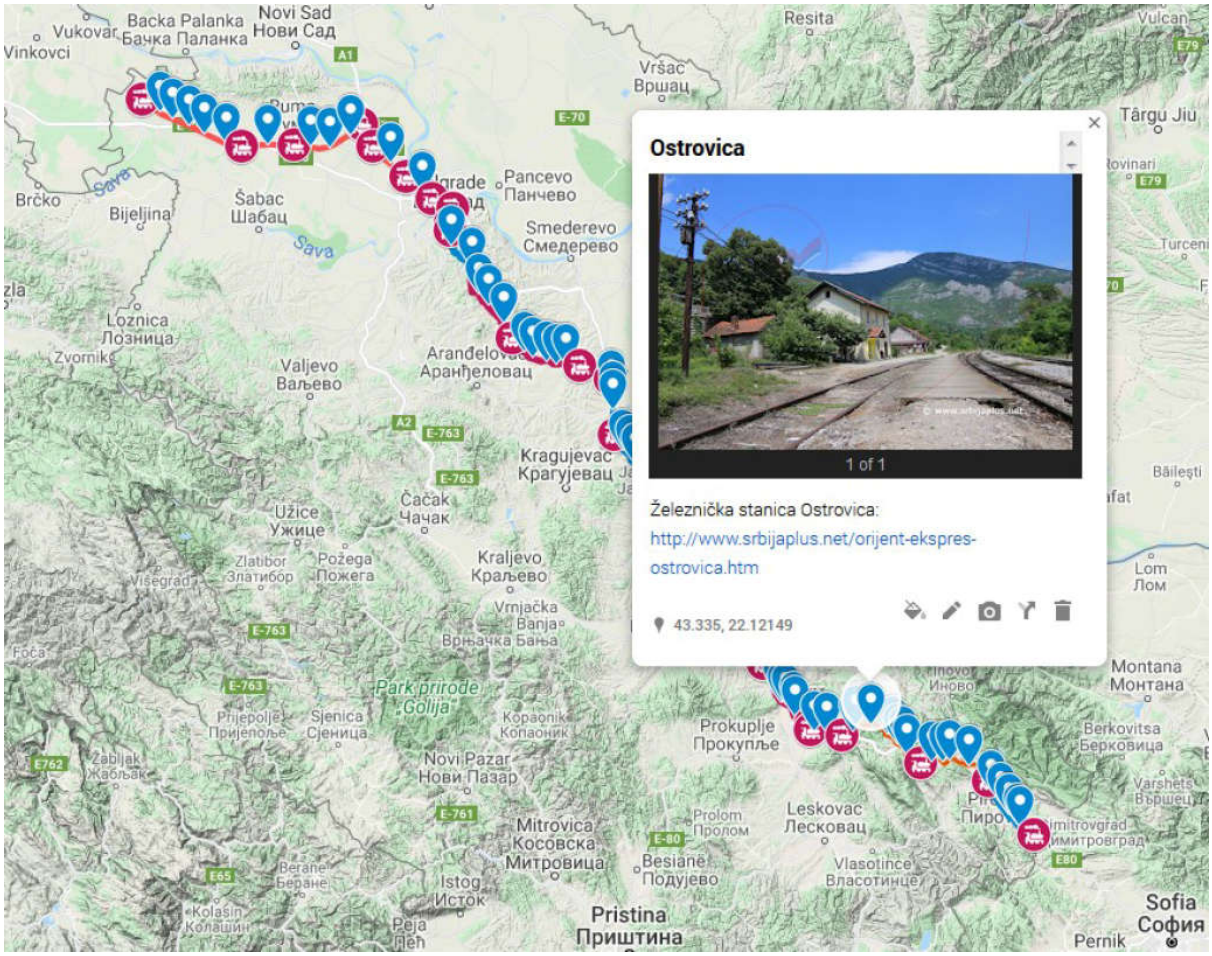

Figure 5. GPS tracks with viewpoints of visited stations and railway stops (Screenshot: http://www.srbijaplus.net/orijent-ekspres-pruga-kroz-srbiju.htm)

The research and imaging has included:

- Railway route (rail, traffic lights and signals, railroad switches, level crossing barriers, railway facilities, surroundings, etc.).
- Railway station buildings (architecture, office premises, waiting rooms, cash desks, and residential buildings).
- Control towers and control panels.
- Station tracks and platforms.
- Accompanying railway facilities and railway guard houses.
- Water supply towers and standpipes for steam locomotives.
- Revolving platforms, or turntables and service channels.
- Station warehouses and industrial facilities nearby to stations, etc.

4.1. The railway route. Mostly, the railway follows the ancient roads and corridors. They diverge in the Bagrdan region, where the railway runs along the riverbed of the Velika Morava River. After the gorge, their routes meet again. Further, the railway's builders had to overcome difficult sections in the area of Ražanj, along the Južna Morava River and in the part of the Sićevo gorge. Due to inaccessible terrain and sparsely populated areas, the surrounding landscape remained the same as when the railway was built.

Following the railway, we found that the former level crossing barriers have been replaced by half-barriers, previous traffic signs were replaced by new standard traffic signs and the most of the former guard houses are abandoned (Figure 6).

Figure 6. The protected crossing at Čiflik, July 16, 2020 (Photo: Z. Cvetković)
The half-barrier and old signallamp

4.2. Railway stations and stops. The station concept dates from the time they were built. Dominates the station building that contains office facilities, a waiting room for passengers and a cash desk. The station façades are standard and contain the name of the station, the announcement bells and the official clock (Figure 7). Fountains and toilets can also be found. At major stations, there are warehouses and buildings for railway employees.

The construction of stations and stops used standard projects. We have not seen the official documents of that period and our conclusion is based on personal perception.

4.3. Technical devices. The most important technical devices are railway signals and semaphores, railroad switches, winches for remote lowering of ramps at level crossings, official phones and similar. We have found that some of the original technical devices are still operational. In most stations we faced to old, hand railroad switches (Figure 8).

Figure 7. Ostrovica railway station, July 16, 2020 (Photo: Z. Cvetković)
The station name, announcement bells, official clock, winches for remote lowering of barriers at the protected level crossings

Figure 8. The handrailroad switch,Batajnica, November3, 2020 (Photo: Z. Cvetković)

In certain stations (Ruma, Ripanj, Niš), there are remote railroad switchesand traffic lights control panels. The manufacturing facilities were Siemens and EI Nis (Figure 9).

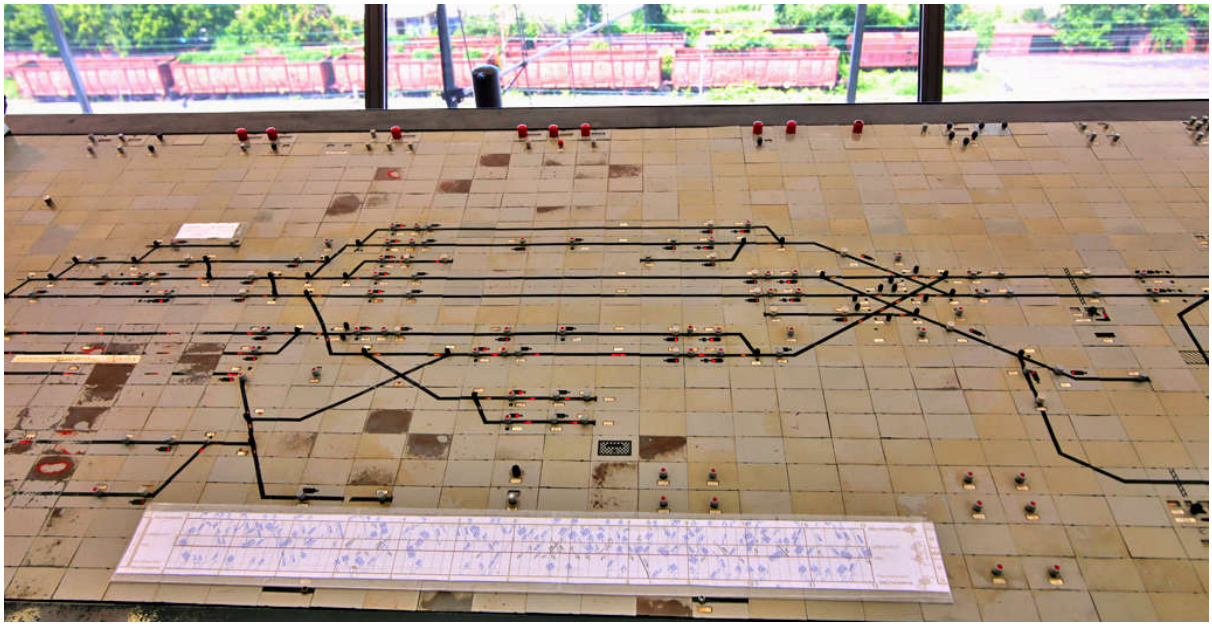

Figure 9. The controlpanel at the Niš railway station, July 31, 2020 (Photo: Z. Cvetković)

Some crossings are protected by old barriers. The barriers are driven from guardhouses in the vicinity of the crossings (Figure 10). When there were no railroad guardhouse, the gates are remotely controlled from the station, using mechanical winches to lower and lift the level barriers (Figure 7).

Figure 10. Winches for remote lowering and liftingbarriers at the level crossings in Srećkovac, July 15, 2020 (Photo: Z. Cvetković)

4.4. Water towers and standpipes. Certainly, the water towers were the most recognizable buildings of the old station. In addition to supplying water for steam locomotives, the water towers dominated the vicinity, showing the way to the station. The base of the water tower is the wooden construction. They were at all main stations. In the meantime, most of them have been destroyed, but some valuable and beautiful examples of water towers still exist (Figure 11).

Figure 11. Water tower at the Ćuprija railway station, July 29, 2020 (Photo: Z. Cvetković)

The standpipes are part of the station system for filling steam locomotives. These are located beside the tracks. While travelling from Šid to Dimitrovgrad, we discovered only a few, but incomplete (Figure 12).

4.5. Revolving platforms or turntables. Revolving platforms or turntables were important facilities of range stations, especially in the era of the steam locomotive. They had been used in service workshops, or to turn around steam locomotives for a return trip. They were removed during the reconstruction and conversion of stations. One functional revolving platform still exists in the yard of MIP Foundry in Ćuprija (Figure 13).

Revolving platforms or turntables were important facilities of range stations, especially at the time of the steam engine. They had been used in service workshops, or to rotate around steam locomotives on a return journey. They were taken away when the stations were rebuilt and converted. A functional turntable remains at the courtyard of the MIP foundry in Ćuprija.

Figure 12. The standpipes at the Mladenovacrailway station, July 7, 2020 (Photo: Z. Cvetković)

Figure 13. Revolving platform atthe MIP Foundry in Ćuprija, July 29, 2020
(Photo: Z. Cvetković)

5. Conclusions and recommendations

Our research focused on the technical, architectural and industrial heritage of the Šid - Dimitrovgrad railway. Along the way, we visited 93 stations and stops, recorded the railway's GPS tracks and made more than 5,800 images. The railway remained the same as when it was built. Certain sections have been rebuilt over time and a detailed modernization of the railway is underway in recent years.

Most of the old railway buildings and auxiliary installations still exist and are in use. Some of the older technical devices are operational (manual switches, winchesfor lifting and loweringrailroad level barriers, for example). Water towers and standpipes for steam locomotives, revolving platforms, guardrails and certain railway stops are unused.

The results of our research show that there are less and less artefacts of the past and that they are likely to disappear in the very near future. It is very clear that modernizing and improving the railway cannot be based on old equipment and infrastructure. However, we believethat it would be worthwhile protecting certain parts of the stations and preserving their authenticity. It is absolutely possible and operational to preserve, in addition to new ones, the existing buildings at the stations. We also believe that certain auxiliary tracks, as well as technical devices (hand switches, traffic lights and signals) could be permanently maintained at station sites.We assume that no significant financial resources are required - simply do not remove them. Their future attractiveness is certainly evident, and will permanently preserve our railways' cultural heritage. It would be particularly important and interesting to preserve the last water towers, as they are outstanding symbols of the centenary history of the Serbian railways.

According to our knowledge, a large number of railways in Vojvodina, especially in Banat, do not operate. So we intend to extend our research in the future to those parts of the Serbian railway network.

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Notes

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