

Ewa Raczyńska-Buława

Lodz Agglomeration Railway – new approach in railway business

The Łódź Agglomeration Railway is a regional train operating company managed in a modern way using IT systems and smart technologies. Despite the deep collapse on railway market of recent 20 years ŁKA successfully recovers the market for public transport by integrating and promoting convenient travels from door to door. What distinguishes it is the high quality of services and the care for the passenger – awarded with the highest prizes for the accessibility policy ŁKA follows the social responsibility path playing a significant role for Lodzkie Voivodship both from economic and social point of view.

Lodz Agglomeration Railway at a glance

The Lodz Agglomeration Railway (ŁKA) started operating in 2014 as one of the youngest agglomeration railway carriers in Poland. It operates within Lodz Voivodship: Lodz–Sieradz, Lodz–Łowicz, Lodz–Kutno, Lodz–Koluszki–Skierniewice. On weekends, the last one is extended to Warsaw (inter-regional fast connection). ŁKA currently has 20 modern electric multiple units FLIRT3 produced by Stadler. Their construction is typical for agglomeration traffic with a maximum speed of 160 km/h, acceleration of at least of 1.1 m/s². Their purchase was co-financed from EU funds. It has introduced a completely new quality in Voivodship rail transport, but also in the whole country – ŁKA was the first carrier operating

only a new rolling stock: air-conditioned, meeting the requirements of TSI PRM, LOC & PAS TSI and TSI Noise.

EMU's are equipped with a modern passenger information system and video monitoring, modern vehicle control system ETCS2 and SHP self-braking system. Another novelty on the national scale was the fact that together with rolling stock were ordered 15 years of rolling stock maintenance performed by their producer in one of the most modern in Europe technical depot built at the Łódź Widzew station. This solution is the most advantageous for the carrier, whose activity could be focused on the provision of transport services and their organization, just getting a serviced and cleaned trains for running. The depot occupies an area of 4.5 ha. Inside it are performed technical inspections, repairs and all activities related to ongoing maintenance. It is equipped with a rolling stock car washer operating in a closed water circulation system, a water removal and refilling system, as well as a de-icing and sintering system. All solutions are environmentally friendly.

Currently, the company is awaiting for a delivery of further EMUs, 14 of them produced by Polish company Newag. Impuls II trains will be similar to FLIRT3, but longer – FLIRTS are double parts and Impulses triple, up to 65 m long. The vehicle's capacity is to be minimum 300 people (for 4 persons / m²), at least 160 seats, including at least 140 permanent seats. The minimum operating speed is to be 160 km/h. The vehicles are to be air-conditioned and adapted

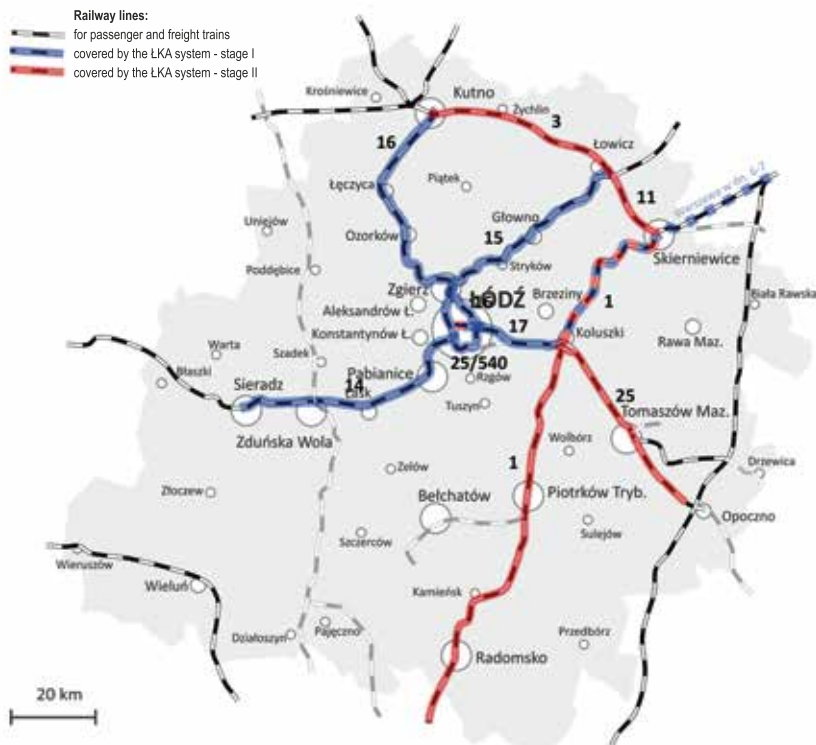
to reduced mobility passengers needs. The purchase of further EZT is a part of the implementation of the second stage of ŁKA system development. Thanks to this ŁKA will start operating to Piotrków Trybunalski, Radomsko, Tomaszów Mazowiecki, Opoczno and on the Kutno–Łowicz–Skierniewice line. The number of connections to Skierniewice will be increased.

Innovations: lower costs – higher passenger comfort

ŁKA is the first in Poland to implement innovative organizational and technological solutions related to the management and maintenance of rolling stock.

The described above maintenance by the rolling stock manufacturer in the carrier's modern technical facility has enabled employment and investment reduction together with receiving a passenger high quality service guarantee included in the contract (indicators, guarantees, contractual penalties). However, it also enabled smart fleet management based on automatic self diagnosis and IT solutions.

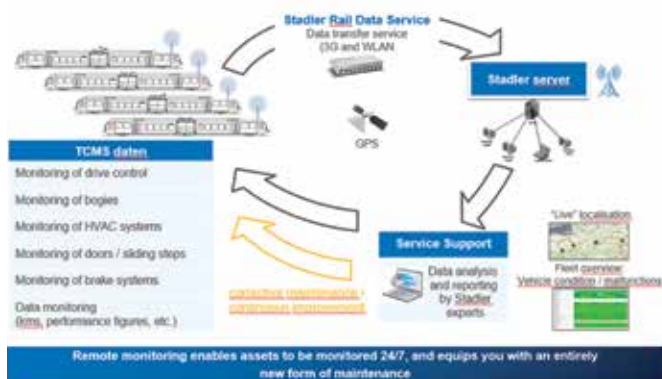
Vehicles are fully equipped with electronic diagnostic systems, enabling the serviceman to directly check the technical condition of each train and its operations online. Each fault is automatically detected and classified by the system regarding its impact on further driving. In case of serious faults, the driver is instructed to return to the back to the depot,



The connection system of the Łódź Agglomeration Railway
Source: ŁKA

RAIL DATA SERVICE

RDS/TWC: The condition of the fleet at a glance and at all times



Monitoring of vehicle state

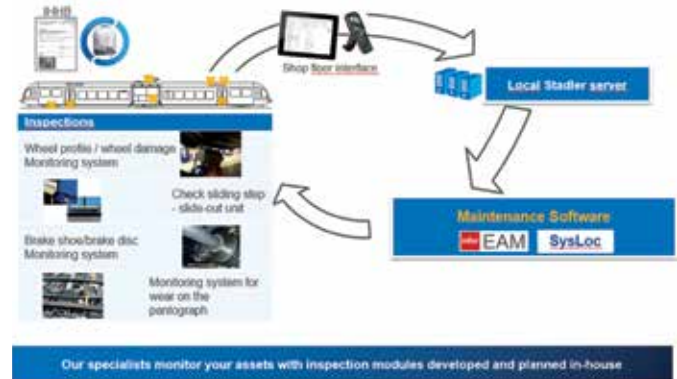
Source: Stadler.

where the service staff awaits already prepared for this specific repair. Vehicle diagnostics system is a basic element for ensuring a high level of passenger train safety. In some situations, it eliminates the human factor and the driver's error. Vehicle diagnostics includes elements such as voltage system, brake system, water supply. Information is given online and in real time. At the end of each day carrier receives a report on each unit watering, energy consumption and mileage. This allows to plan maintenance and watering. Thanks to the automatic vehicle diagnostics, the carrier does not have to call any driver on the vehicle to receive such information.

ŁKA also possess modern rolling stock management IT systems allowing to control automatically vehicle location and punctuality,

STADLER RAIL MAINTENANCE SOFTWARE

SRMS: All maintenance processes displayed in a single system



IT solution in maintenance process

Source: Stadler.

driver's work, as well as occupancy in the vehicle (automatic passenger counters). It enables efficient and effective day-to-day fleet management as well as maintaining a high level of safety.

Innovation also have changed train drivers work management. Each driver has a RFID card that allows identification. The driver locates the card in the computer and automatically logs in to it (without having to manually fill in information about himself). Then they immediately choose the train route - he can see on the computer display nearest and chooses one of them. His position is defined according to the GPS data. Driver's log is putting automatically on passenger information and is also visible in a dispatcher system. In addition, the IT systems are simplifying drivers and train staff working time management.

Ilość	Data z	Prędkość	Prędkość	Obrot	Tętno	Zł. Napięcie	Moc	Rezerwa	Współczynnik	Opóźnienie	Data plan. uruch.	Data plan. zakon.	Czas DP	Wzrost	Wzrost	Wzrost
L4368-001	10:02:00	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 10:02:04	2017-09-01 10:02:04	0	0	0	28
L4368-002	12:21:09	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:08	2017-09-01 12:21:08	0	0	0	9
L4368-003	12:21:31	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:31	2017-09-01 12:21:31	0	0	0	6
L4368-004	12:21:32	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:31	2017-09-01 12:21:31	0	0	0	17
L4368-006	12:20:56	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:20:55	2017-09-01 12:20:55	0	0	0	3
L4368-007	2017-08-31 10:20:00	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-08-31 10:20:00	2017-08-31 10:20:00	0	0	0	22
L4368-008	12:21:07	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:06	2017-09-01 12:21:06	0	0	0	68
L4368-009	12:21:30	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:29	2017-09-01 12:21:29	0	0	0	36
L4368-010	12:21:31	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:21:30	2017-09-01 12:21:30	0	0	0	1
L4368-011	12:20:46	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 12:20:46	2017-09-01 12:20:46	0	0	0	1
L4368-012	10:02:04	0 km/h	0 km/h	0	0	0	0	0	0	0	2017-09-01 10:02:04	2017-09-01 10:02:04	0	0	0	23

Dispatcher's rolling stock management IT system

Source: Stadler.



ŁKA train on Lodz Radogoszcz Zachód stop
Source: ŁKA.

IT innovations also facilitate the work of analysts and undertaking management decisions. ŁKA analytical systems are based on the fleet management system and sales system. It is possible to check passengers volumes and adjust trains frequency and length. Every train has passenger counters at each doors. This significantly reduces the cost of measuring passenger volumes and gives real time information instead of results of 1-2 traditional outsourced measurements. This allows to follow current trends and fluctuations and in consequence to further reduce costs. Data obtained gives the information on passengers numbers in each train, lines, sections, stations and stops. The second source of information is sales system data enabling to analyze tickets sales: their types, number, distribution channels, discounts, etc.

Modern services model

The biggest competitor for public transport is individual road transport. In the Lodz voivodship statistically, every second inhabitant owns a car (Poland ranks 7th place in the EU in terms of the number of cars per 1000 inhabitants – after Lichtenstein, Luxemburg,



Lifts for passengers on wheelchairs
Source: ŁKA.

Italy, Malta, Finland and Cyprus). That is why it is extremely important to create a comfortable and competitive public transport offer able to be attractive in regard to a passenger car. The most important is to provide transport from door to door which is not an easy task on Polish transport market. In Poland, there is no system of a regional publicly owned bus transport system – there is only private one. In order to run local bus it is only necessary to inform a suitable transport office. Creating a train – bus offer is only possible in case of ordering bus services integrated with train timetable (a very successful model implemented in Małopolska Voivodship) or an agreement between train and bus operator (model implemented in ŁKA – a common ticket with bus company PKS Sieradz). Multimodal integration is difficult also from the point of view of ensuring accessibility, functioning of passenger information, concessions entitlements other in rail transport, others in intercity bus transport and still others in public transport).

ŁKA since its beginnings tends to integrate with other modes of transport. In November 2013, the first agreement was signed between the Voivodship authorities, ŁKA and representatives of local governments along the Łódź–Sieradz and Łódź–Łowicz lines. In November 2014, such an agreement was also signed with the local governments of cities and municipalities located on the Łódź–Kozłuski and Łódź–Kutno lines. It assumes the timetable integration of city and railway transport, as well as creating one common and integrated ticket – Wspólny Bilet Aglomeracyjny (WBA). This integration concerns cities: Lodz, Pabianice, Zgierz, Łask, Zduńska Wola, Sieradz, Łowicz, Stryków and Głowno.

WBA allows passengers to travel by ŁKA and Przewozy Regionalne trains and public transport in Łódź and, depending on the purchased ticket, in Zgierz, Pabianice, Stryków, Łowicz, Głowno, Łask, Zduńska Wola, and Sieradz. Ticket prices are varied and dependent on the route. There are 4 ticket zones. Historically there was also a 5th zone – covering only Lodz. However in April 2017 a full ticket integration of ŁKA and local public transport in Łódź have been implemented. This integration means that a passenger can travel with a city transport ticket in ŁKA within Lodz city borders, but also he can travel on A zone (incl. Lodz, Zgierz, Pabianice) train ticket in Lodz local city transport.

Multimodal integration is also the policy goal pursued by the infrastructure manager within the framework of infrastructure investments (partially implemented together with the Voivodship). As a result of the successive policy of railway lines modernization on a large part of the station and stops the multimodal integration of rail transport with the individual car and bicycle was provided. This applies to most stations and stops on the Lodz–Łowicz line and all on the Lodz–Skierniewice line. It should be emphasized that the possibility of parking the car is also given at most stations and stops on the Łódź–Sieradz line and the Łódź–Kutno line. Together with creating ŁKA in Lodz and its agglomeration were modernized several stations and stops aiming to provide integration of rail transport with individual car and bicycle transport, as well as public transport. Each of the modernized stops were adapted to the reduced mobility passengers. With a few exceptions, new car parks were created at stops and stations. The most important modernization project was rebuilding Lodz Fabryczna station – the main Lodz station which was rebuilt as an underground station in order to connect this terminus station to the second largest station Lodz Kaliska and among others to facilitate travelling by train in Lodz and Lodz agglomeration. The tunnel project is now at construction project stage and its' opening is planned on 2022.

ŁKA plans to further develop multimodal transport integration with regional and urban transport, but also individual with cycling and car transport. In the second development stage ŁKA the number of stops located in the area of Łódź and Pabianice will also be increased – creating small multimodal nodes that facilitate traveling in the agglomeration area. The most important stops will be located in the tunnel, in the city center – the Centrum and Manufaktura. The Centrum stop will provide the opportunity to reach offices located in the city center, as well as the possibility of taking further city transport. The Manufaktura stop will provide access to the Manufaktura shopping center, which also has a recreational and cultural function. This will contribute to the reduction of road congestion generated by this center.

Passenger rights – accessibility strategy

On May 9, 2018, ŁKA was granted by the President of Poland the “Accessibility Leader” award in “Facility network” category for a coherent and thought-out policy of increasing accessibility of its services for people with disabilities and reduced mobility passengers.

ŁKA has consistently pursued such policy since the beginning. The basic assumption is to guarantee maximum mobility freedom for reduced mobility passengers, comparable to other passengers mobility.

According to regulation No. 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers’ rights and obligations, railway undertakings are obliged to provide to reduced mobility passengers an unpaid assistance on the train as well as during boarding and disembarking. This help is offered after prior notification for at least 48 hours before the journey. In the absence of notification, the carrier is obliged to make all reasonable efforts to provide assistance in such a way that a reduced mobility passenger can travel. The European practice shows that these 48 hours are treated more as a requirement for a passenger with reduced mobility and which significantly limits the freedom of mobility of these people. „As a blind man I need assistance to ensure I catch the right train. For a wheelchair user, what is needed may be a ramp to board the train at the station of their choice. However, EU law requires us to give 2 days’ notice to get the assistance we need, even for our daily commutes. Think about it. I am blind, so I can’t drive. Travelling by train should be easy but in reality, this is what happens: If there’s good weather and I want to go to the beach, I can’t travel by train. If I have an urgent family issue and need to travel to another city to see relatives, I can’t travel by train. If I urgently need to see a doctor in another city, I can’t travel by train. We can’t travel like everyone else. It is frustrating, annoying and time-consuming. In short, it is unacceptable.” – Yannis Vardakastanis, President of the European Disability Forum (<http://www.edf-feph.org/newsroom/news/no-more-excuses-equal-access-rail-travel-overdue>).

In the ŁKA opinion current means of communication, the requirements for infrastructure and rolling stock accessibility followed by their ongoing modernization, such long notification is not only troublesome for passengers and seriously limits the competitiveness of rail transport, but is completely unnecessary from the perspective of the railway undertaking. Changing the notification habit will not be easy as it will be necessary to implement appropriate procedures, suitable training for employees but above all it requires a serious change in thinking about a reduced mobility passenger as a full-fledged customer of the carrier. It requires the implementation of accessibility throughout the entire transport process – the



ŁKA train on Lodz Niciarniana stop

Source: ŁKA.

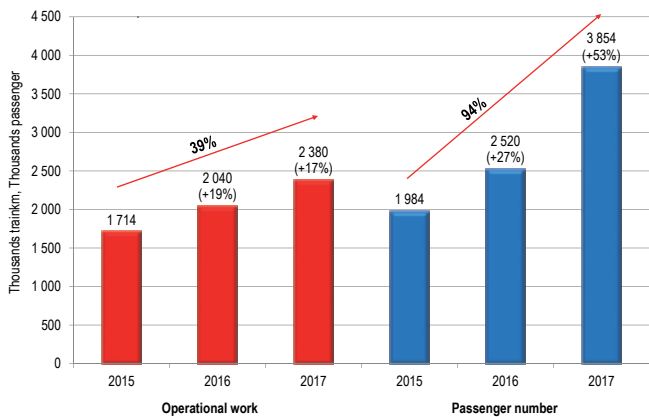
passenger must be able to freely plan a trip, purchase a ticket at any suitable time – including the Internet, travel in full comfort and safety at any possible time – same as other passengers. However it has to be underlined that most of legal provisions preparing railway undertakings for such change are already long time on the market. ŁKA policy covers the entire journey – from its planning (accessible website with the possibility of connecting the call center with a sign language interpreter assistance; accessible Passenger Service Center at Łódź Fabryczna Station), ticket purchase (ticket offices are all equipped with induction loops, online sign language interpreter connection, ticket machines on board each train are also available for wheelchair users), until travelling itself (low-floor trains, equipped with wheelchair lifts, Braille signs; access to an online sign language interpreter; properly trained onboard staff).

ŁKA doesn't limit its activities solely for the benefit of its passengers. The company has joined, for example, governmental Ac-

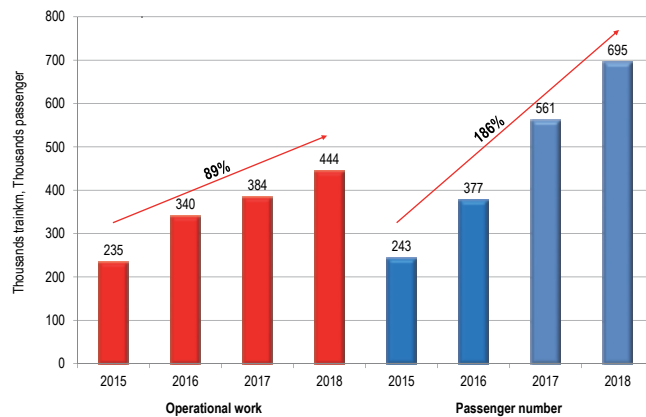


Average number of trips per inhabitant of the region in 2017

Source: UTK.



Operational work and passenger number in ŁKA in 2015-2017
Source: ŁKA.



Operational work and passenger number in January - February in 2015-2018
Source: ŁKA.

cessibility Plus Program – as the only railway undertaking and the only public transport operator ŁKA among the 30 first signatories of the Partnership's Declaration. The aim of the program is, inter alia, to standardize accessibility requirements throughout the country. One of the biggest problems with accessibility is its implementation in Poland in the entire transport system. Currently, the high level of accessibility applies only to railway carriers and several long-distance bus carriers. Regional bus transport is not physically accessible to people with physical disabilities (especially for people using wheelchairs). Urban transport is also out of the reach of these people in many particularly small cities (including the majority of tram lines being the basis of urban transport in Łódź). There is a lack of uniform guidelines for accessibility standards similar to those of TSI PRM, both for station buildings, stops and interchanges, as well as for rolling stock – tram and bus. In Łódź, for example, a blind passenger getting off the train must remember that in a moment he will enter a system of other guide paths markings. The ticket concessions system in urban transport is determined by the resolutions of local authorities, varying depending on the city. They usually do not apply to joint tariff offers due to their different dimensions and different entitlements to discounts. This is making reduced mobility passengers journey particularly difficult and also limits the competitiveness of public transport.

Growing passenger market in figures

ŁKA was created in difficult market conditions where railway role particularly in Lodzkie Voivodship in modal split was negligible. Railway was generally not a part of Lodz and Lodz agglomeration transport system. There was no multimodal integration between individual public transport modes. The quality of transport was low – transport service was carried out with the old EN57 fleet – without air conditioning, loud and inaccessible to reduced mobility passengers. Step by step ŁKA began to regain transport market being more and more popular particularly as a transport mode in Lodz and Lodz agglomeration. In 2017, the largest increase in the number of passengers in Poland was in Lodzkie Voivodship – from 9.7 million in 2016 to 12.8 million in 2017 (an increase of almost 32%).

In ŁKA in 2016, the increase in passenger numbers compared to 2015 was 27%, but in 2017 the increase was already 53% – no doubt due to the already mentioned tariff integration in Lodz and the re-opening of Lodz Fabryczna station (since 2011 the trains have not reached the city center as a result of the total recon-

struction of the station). What is more important, from 2015 to 2017, the number of passengers has increased by 94%, however the operational work only by 39%. Thus, high efficiency of services is noticeable. This trend will also continue in 2018.

Conclusions

The Łódź Agglomeration Railway is a young and dynamically developing railway undertaking that consistently implements its development plans adapted to the development of the infrastructure manager's offer. Proper identification of the customer's demand for modern and comfortable rail travel and multimodal integration within transport system giving the freedom of door-to-door travel, high quality offered services, and consistently implemented external communication policy focused on dialogue with the passenger and higher presence in local community – these factors have determined the Company's visible success on the transport market of the Lodz region.

ŁKA development plans assume an increase in the number of offered connections possible thanks to the project for the purchase of new trains. After 2020, due to the construction of the tunnel under Lodz center, direct access to the city center from the north and east will be possible. The density of the stops network will also be increased. The continuation of multimodal integration remains important – including creating bus regional transport system giving the access to ŁKA trains also to inhabitants of smaller cities outside the railway network. It is also particularly important to maintain the current quality of passenger service and services offered – in particular, the highly-rated comfort of travel (in the face of growing demand).



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