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# Multimodal Łódź Fabryczna Station

*Trains of Lodzka Kolej Aglomeracyjna station in Fabryczna station*

*The reconstruction of the Łódź railway node, including the construction of an underground station in the city centre, gave the possibility of profound changes in passenger service of railway and bus long-distance and regional service. As a result, a large and modern multimodal node concentrating all means of transport was created in the city centre. The new station together with the surrounding road infrastructure was opened in December 2016. The assessment of the functionality of this station is the subject of this article.*

The idea of building a new railway station in Łódź – in place of the railway station existing since 1864 – was born in 2007. This was related to the aim of adapting Łódź node for high-speed railway service. The plan was to build a main high-speed railway station on place of Łódź Fabryczna Station. In order to facilitate access to the station it was planned to be a modern multimodal station allowing fast and comfortable access. The station was to be served by all railway services types: high speed, conventional – long-distance and regional and agglomeration. Next to railway station was planned long-distance and regional bus transport station, as it was part of an old station building. Around the station tram and public bus stops were to be built. Creating such hub was supposed to facilitate travel, interchanges, and increasing attractiveness of public transport system.

The study on multimodal station was prepared by a team of SITK Łódź led by Jan Raczyński for local city transport authority (ZDiT) led by Alina Giedryś [1]. Design work was carried out in the railway part by the Spanish company Sener, and then supplemented and extended by the French company Systra, which,



*Entrance to the station from the west*

for the City of Lodz, developed a multimodal node design including bus and tram transport. The contractor for the construction works was a consortium of the Italian company Astaldi and the Polish Torpol. During the construction period, more than one year delay was noted, mainly due to the prolonged procedures for the provision of land for investment. The station complex was commissioned in December 2016. In the next stage, in the coming years, works related to the construction of road infrastructure around the station will be additionally implemented [6, 5].

The new Łódź station and its surroundings have been – starting from the concept phase (2007), feasibility studies (2011) and technical documentation (2013), through the implementation stages (2012–2016) – designed using the best foreign experience in the field of shaping multimodal hubs integrating different modes of transport. Its multi-functionality allows a convenient change system for various means of transport, contributing to shortening the time in the door-to-door travel chain. Rebuilding of the station and creating its underground infrastructure enabled the release of significant railway areas, which are an example of the de-urbanized zone in the city centre and allowed for new urban investments, i.e. for the creation of the New Center of Łódź [4].

The advantage of the historic location of Łódź Fabryczna station was its good connection with the city's tram and bus transport. The station was located near the intersection of 2 important communication routes: north – south (Kilińskiego street) and east – west (Narutowicza street). They were served by 8 tram lines.

Near the station, on Dąbrowskiego Square, there were several bus stops, most of which were a terminus. Bus lines provided commuting to most of the city's regions. The solution was temporary, because the conditions of the travel service did not provide adequate comfort. Moving these stops to a different location was planned yet in the last century.

The concept of the new station assumed the location of all surrounding bus stops along the northern wall of the station complex buildings. It was planned for the travellers comfort to move also the tram lines running near the station closer to the station building, and the location of stops on its western and northern sides. It was also planned to build a new tram line running on the



Central hall of the station

north side of the station heading east to ul. Kopcińskiego and connected to the existing tram line on the north-south axis.

### Functional arrangement of the node

The project of the new node consists of the following projects:

- 1) a new underground railway station;
- 2) a new regional and long-distance bus station;
- 3) a system of tram and city bus stops;
- 4) a set of car parks for private cars;
- 5) parking lot for taxis and cars "Kiss & Ride";
- 6) access road system.

A number of innovative transport solutions have been applied in the multimodal node project, including:

- 1) a high degree of integration of various means of transport by maximally shortening the pathways between them;
- 2) full adjustment of the system to the needs of people with reduced mobility;
- 3) functional and transparent passenger information systems in real time.

In order to obtain full technical and functional integration of the new station, railway and city parts were developed together at the stage of its design and commissioning of the project.

The station has 3 functional levels:

- 1) Level 0 (street level):
  - main passage of the station;
  - 2 main entries: eastern and western;
  - side entrances from the north and south side;
  - 8 bus stops;
  - tram station with 4 platforms.
- 2) Level -1 (8 m underground):
  - train station with a waiting room;
  - 18 ticket offices, commercial buildings and the management center of the station and station;
  - multi-station bus stops;
  - service and technical rooms.
- 3) Level -2 (16.5 m underground):
  - 4 railway platforms with entrances through the system of escalators, lifts and stairs from the -8 m level;
  - 8 railway tracks.



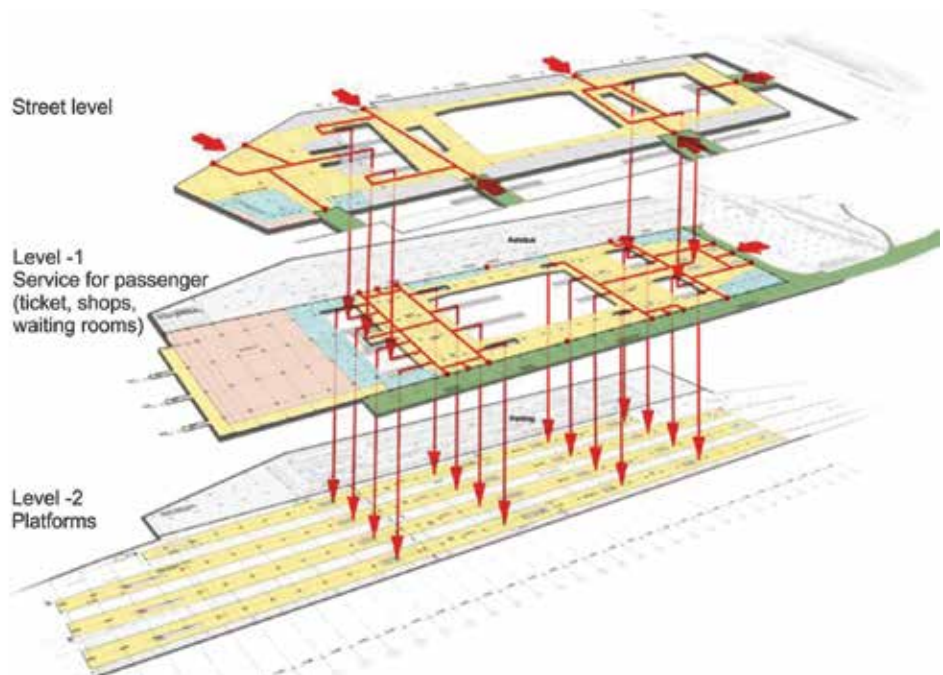
Entrance to the station from the east



Cross-section of the planned Łódź Fabryczna station – view from the west entrance

On the north side of the station, a three-level car park was designed (at the depth of -11.0 m, -14.0 m and -17.0 m) underground parking lot for passenger cars, located under a multi-station bus stop.

Throughout the station, travellers have received clear information, which is provided by integrated systems of voice and visual communication. 56 electronic illuminated boards (including 24 on railway platforms, additionally equipped with clocks), 14 LCD displays and megaphones allow effective access to travellers with messages and information on train arrivals and departures. Arranged at each of the three levels, special SOS posts allow you to quickly call for protection in emergency and crisis situations.



Pedestrian paths between the station levels



Railway platforms

Directions of the main pedestrian flows were predicted along the east-west and north-south axis.

The location of the main entries is as follows:

- 1) from the west, where the main pedestrian traffic zone is located, from the direction of the center and tram and bus transport, an incline leading directly to the station hall level;
- 2) from the eastern side from private cars (K&R parking), taxis;
- 3) from the north from private cars (long-term car parking) and long-distance buses;
- 4) an additional main entrance from the ground level is located on the Dąbrowskiego Square – Kobra Square, perpendicular to the track axis.

In addition to the 3 main entrances accented architecturally, a number of intermediate entrances have been located from the ground level to the space of the station hall, multi-station bus stop.

The entire complex, despite its considerable extent, is characterized by a clear separation of its various users, which allowed

to determine within the station 2 main passenger distribution spaces that independently lead the passenger to the level of both railway and bus platforms. The design aim was to provide the most intuitive orientation in the whole space of the station, with ticket offices, platforms, waiting rooms, toilets, and commercial space. These solutions allow the creation of appropriate passenger and bus exchange zones and lead pedestrians from public transport to destinations points.

## Railway station

The building surface is 45 169,12 m<sup>2</sup> with 1462,99 m<sup>2</sup> of useable area for services. The structure of the building is made of steel with 10 000 triangular glass panels. Inside the building are located replicas of the old facade. There are 4 platforms and 8 tracks located on level -2 (16,5 m underground). 3 of them are 400 m long and 1 is 300 m long. There are designed for regional, long distance and high-speed railway services. To the station leads 1700 m of a twin-tube tunnel built as a top-down construction. In the tunnel and in the area of the station are built 12,5 km of tracks with rigid catenary of 3 kV.

## Bus station

The multifunctional station for long-distance and regional buses is located within the entire complex on its north side. Its capacity was designed for 72 departures and arrivals in the rush hour. It has 24 sites located on the -1 level, which is 8 m below the ground level.

The bus station has its own passenger information system separate from the railways and located at the positions of the room for the needs of ticket offices.

Between the train and bus sections are located shared waiting rooms with glass walls for passengers. The bus section is accessible directly from the main hall of the station but also has its own entries through elevators and staircases to the level of city transport stops and to the level of parking lots for passenger cars.



Regional and long-distance bus stops



A waiting room shared by bus and rail travelers



Road system of Łódź Fabryczna station

Source: Road and Transport Authority in Łódź.

## Road system and city public transport

The main objective of the project of the new multimodal hub was to connect public city transport to the railway station. Therefore, as part of the project, tramway tracks were rebuilt. The tracks on Kilińskiego Street were modernized and a new track was built along the northern wall of the station. Most tram lines stop at the tram stop located in front of the main entrance to the station.

The new infrastructure enables very fast and barrier-free access, also for people with reduced mobility, transfer from long-distance and regional trains and buses to city transport.

The capacity of underground parking lots for passenger cars, amounting to 900 places, was determined based on



Common stops for trams and city buses

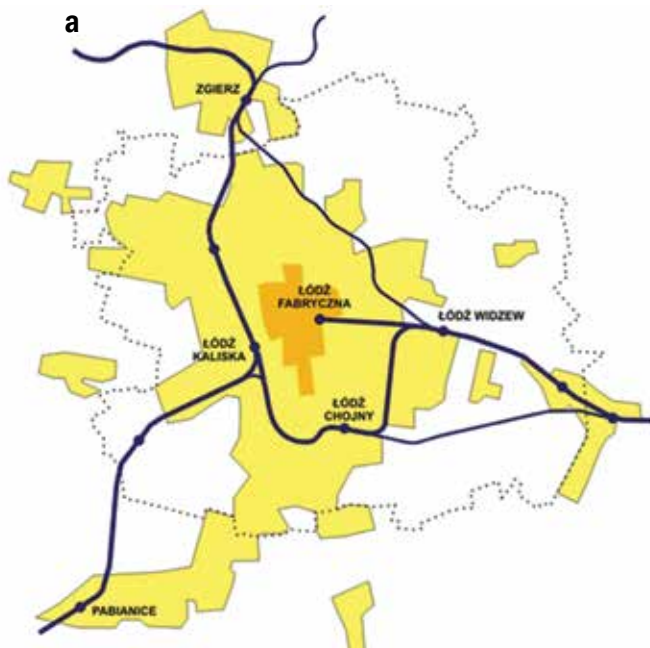
comparisons with similar facilities in Western Europe – assuming that access to the station is ensured mainly thanks to the dense urban public transport network.

Railway station is also easily accessible by bicycle. Public bike system station is located conveniently next to the railway station.

Expected for the target period (year 2040) the share of individual means of transport used to get to the Łódź Fabryczna station (railway and long-distance and regional bus section) is presented in Tab. 1.

### Development perspectives

The construction of the multimodal railway station is the first stage of the Łódź transport node modernization. By the end of



- Built-up area
- Inner city area
- Passenger railway with the station
- Freight railway

Development of Lodz TEN-T node: a) current status, b) future status

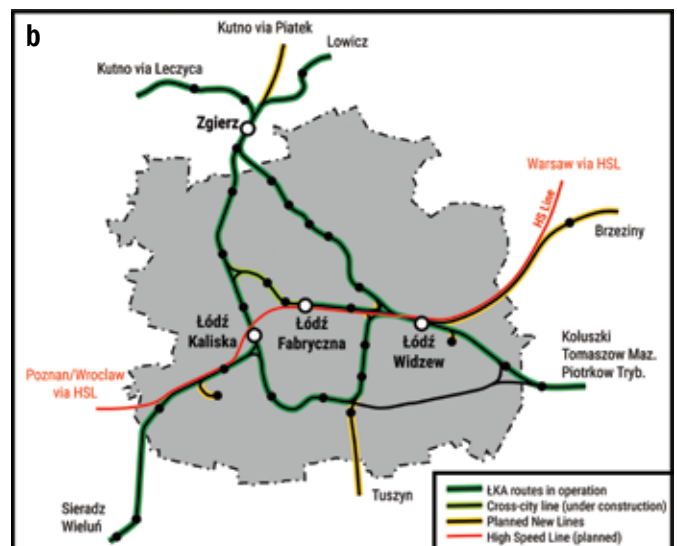
Tab. 1. Modal split in Łódź Fabryczna access – prognosis for 2040 [1]

Pedestrian and bicycle – 9%	Taxi – 6%	Private cars – 24%	City busses – 18%	Trams – 34%	Regional trains – 9%
Cars – 30%			Public transport – 61%		

2022, will be built a new line in the tunnel under the city centre. This tunnel will connect two major railway stations Łódź Fabryczna and Łódź Kaliska changing radically the public transport system. In the tunnel there will be two railway stops allowing quick access to the city centre and interconnected to urban transport. Nowadays getting to the centre by train was only possible for passengers travelling from the direction of Warsaw, Skierniewice and Koluszki, which represents only one of 4 lines coming to Łódź. This will result in shortening travel time and increasing service quality for the majority of Łódź voivodship citizens without any doubts leading towards a modal split more favourable for public transport system.

The station is currently accused of being too big for the city and unable to generate higher passengers flows. This is related to the lack of the tunnel and the early development phase of the New City Centre project. At the turn of 2017–2018 were opened 2 big office buildings – one is on the construction phase and 2 are still in the design phase. This area was the example of the city centre devitalisation – additionally closed for years of the construction period and in majority inaccessible by public transport. Poor quality apartments located in the nearby old town were long time deserted and whole parts of the city centre (for example Kilińskiego street) is still mostly not inhabited. The city has already started a major revitalisation project aimed on increasing the city centre attractiveness for inhabitants. There are still some major problems to overcome regarding urban transport – underinvested, slow, inaccessible for ageing society and very poorly rated by citizens. What will have to change is the perception of the city centre transport service – nowadays the accent is put on individual transport still faster than public transport despite narrow streets and some steps towards giving the priority to the public transport.

The current station problem it's its accessibility by car – the owner of the parking part of the station is the city of Łódź – offering this facility as a public parking for offices located in





A path for bicycles around the station and a city bike station

the city centre. This leads to the lack of parking places for long distance trains and busses. The city is also an owner of the bus station – not having previous experience in managing this kind of facility. This leads to the problems of conformity with a regulation no 181/2011 concerning the rights of passengers in bus and coach transport, elevators malfunctioning and probable lack of funding for starting a proper passengers service. Currently, not all buses leave from the new station. Part of the line is still serviced at the temporary, peripheral Łódź Kaliska station. Private busses use parking places and urban city transport stops in the city centre as their terminus stops.

The problem of the Łódź transport node is the low long distance trains accessibility – both related to the travel time and to the frequency. Due to the highly developed road and highway infrastructure the need of attracting passengers by the higher service quality is of an utmost importance. Currently led renovation works lead towards major difficulties for passengers (closing the line from Łódź to the North – one way and highly devitalised line) might only give the same travel time for the journey from Łódź to Gdańsk as on the highway but will not increase the line capacity leading towards higher trains frequency. Without the new high speed line construction or a great modernisation of the existing ones it is not possible to offer passengers going to Wrocław or to Poznań an attractive service in comparison to individual car transport travel. The problem of the attractiveness of those relations is a very low frequency of trains and a very poor hours adjustment regarding business passengers or weekend tourists.



Łódzka Kolej Aglomeracyjna Network – status planned in 2020

Despite good accessibility for physically impaired passengers, other reduced mobility passengers are still in need of searching for assistance. Hearing impaired passengers can use Łódź Agglomeration Railways ticket offices and information centre – as they are offered the possibility of online sign language assistance. But visually impaired passengers are reporting the lack of possibility to learn the station and to find the platform – despite special paths they still need assistance.

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