

TRANSPORT LINKING EFFICIENCY OF AIRPORT

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This work describes the infrastructure of transport at the airport. Analyzes the airport links with the surrounding areas, the possibility to travel by car and train to the airport. Categories of parking at the airport and transfer system between terminals. The work analyzes the internal and external transport infrastructure on selected international airports. Characterizes the current transport infrastructure at famous airports in Slovakia, analyzes the possible development of transport infrastructure at the airports and the possible connection of airport projects on rail transport.

K e y w o r d s: Transport infrastructure, passenger transport, bus transport, rail transport access road, parking, airport development.

1 INTRODUCTION

An important issue for increasing the efficiency of the airport's passenger is easy to access to the airport. Small airports are able to streamline access to the airport via a well-organized bus network, rail is another, a sustainable alternative for airports with higher traffic capacity, or those that already have rail lines in the vicinity of the terminal. It is noticeable increasing trend in the development of combined air and rail transport, because there are more and more contracts are to be signed between air and rail carriers. The passengers has become to use the services comfortably also.

It is anticipated that in the near future about twenty-three million customers will benefit from access to EU airports via rail links coming from places outside its metropolitan area. Here remain a lot of barriers, through fragmentation of information technology for railway over issues relating to legislative and operational responsibilities and activities, coordinating travel plans, joint ticket selling or an income distribution.

This issue is current at developing airports where airport capacity is growing. The related problems of sufficient potential airport infrastructure must be underpinned by the addition of further sprawl airport passenger transport options to and from the airport.

2 TRANSPORT INFRASTRUCTURES IN AIRPORT

The airport consists of a complex of buildings and equipment intended for aircraft operations, the provision of pre-flight and after-flight services for passengers, air freight handling and operation of land-based service, handling and transportation equipment. Each of these activities is provided by different part of the airport.

Private airport area - otherwise known as the airside-protected and is controlled by the part of the airport, which is intended for aircraft movements - take-off, landing, maneuvering the aircraft before or after departure, landing.

Public accessible area - landside - part of the airport, which is the area designated for vehicles

movement, movement of passengers and visitors and air cargo. Landside forms the check-in terminals, driveways, for land vehicles between terminals and its parts, the parts themselves or airport, or for a vehicle used to transport passengers from the city center and the airport.

Prospective trends for the major hub airports are the integration of air and rail transport. For airports catchment today are often constructed interchange terminals of air and rail transport. Airlines have contracts with railway companies and high-speed trains are placed at the airline's reservation systems. These solutions, however, are strongly tied to the size of the airport, the nature of its operations and the associated sufficient number of rail passengers. The applicability of these solutions is also influenced by the fact. That it can ensure sufficient frequency of rail knots in relation to the scope and capacity of aviation. Significant impact in addressing the rail transportation is also the question of the existence of a suitable connection to a wide urban transport network. The fundamental reason for building rail transport may be also problems that arise from traveling by car to the airport. Today a connection to the airport and major cities is often by underground, which is generally very fast, reliable and environmentally friendly. And to top it structurally does not interfere with underground structures airport and its surroundings.

For connection to the airport in these days it is important in many cases to decisive individual car traveling. Its advantage is that it allows free choice of time transport passengers to arrive to the airport and just does not require the loss in waiting for public after arrival. The main disadvantage of IAT is a significant burden on the road network, around the airport and exhalations fumes, noise and substantial environmental load. At the same time car traffic demands is placed on car parking after arriving to the airport. Individual transportation puts the greatest demands on the area for parking cars at the airport complex. For large airports is a typical requirement of 200 to 1,200 parking spaces per million passengers per year, plus 250 to 500 parking spaces for employees. Classic vehicle for the carriage of passengers and their luggage is the bus. The preferential use of bus services to transport passengers to and from the airport is the possibility of using the existing network of roads and bus lane, and the

possibility of achieving centers of towns. This gives a chance for the realization of relatively dense frequency connections. Bus transport is strongly depending on the traffic especially at peak times and in these situations there may be unwanted extensions running time if unexpected delays. The advantage of bus services is that buses have a separate bus lane, which is for taxis and buses only. In such cases are prevented an unwanted delays. Problem with bus is that you need a driver, great demands on the purchase and When coming by car, taxi or bus to the airport can be stopped in the zone drop off zone, which is used for performance and passenger disembarkation, or to load passengers and baggage loading. Law in this area is limited, this is mostly free space, but at some airports is a minimal fee. . The airport may have different parking options: short term parking - vehicles intended for use as a palliative agent in the arrival or departure of passengers and their luggage to the departure or arrival of aircraft. This solution allows arrivals to the airport not to have to wait in lines on the footpaths in front of the terminals, or in the drop off zone for a space to circulate around the airport. For short-term parking is appropriate to establish an area or covered parking, which is separate from the parking areas for a long time. The required number of parking spaces for short term parking is relatively small, because each parking space will be used several times a day. Parking can bring high profit to the operator.

We know the different parking options: Enclosed parking - designed for passenger cars with short-term stay outside destinations or for business travelers. This is generally a multi-store, open-plan with a large number of parking spaces. Building such a parking is very expensive, which is also reflected in the price of parking.

Long term airport parking - generally operated independently of the airport operator outside the airport. Usually it is a secure open areas where the parking fee is lower than in an enclosed parking space within the airport.

If anyone has land near the airport, this land can be used as a parking lot. From here you can get to the airport by bus. Such a parking should be cheaper so that they can compete with the price to the airport car parks.

Parking rented vehicles - vehicle operators for the rental business often require parking for customers arriving to the airport. It is not only for the rental companies of cars, but also vans, buses etc, for them it is good to have a certain amount of parking spaces. At the moment when the car is rented, the person who rented the vehicle is responsible for all charges associated with the operation of the vehicle, and of course parking fees.

maintenance. Bus transport requires the construction of platforms before responding Airport buildings and parking areas for buses at the time of parking. Traditional solutions to transport passengers between terminals are specially adapted low-strayed buses, given the short time traffic handled mostly standing room. Modern large airports are very large, made up of several terminals, spaced several kilometers. Some large airports use its own separate underground metro, with stops connected in a circle.

Parking for airport employees - are usually placed on the edges of the airport, outside the normal operating passenger areas.

From the individual car parks we can get to the terminal on foot or by bus, which run at regular intervals. All car parks are protected by CCTV cameras and are regularly inspected by security service.

3 TRANSPORT CONNECTION INTERNATIONAL AIRPORT IN THE WORLD

Frankfurt Airport is the largest airport in Germany. It is also one of the largest airports in Europe and is a major hub for international air transport. The airport was one of the first to introduce the fully automated baggage handling. At the airport, there are two parallel runways and one runway used exclusively for departures. The tracks are long 4000 meters and can not be operated independently of each other, but they can be used simultaneously. Frankfurt International Airport is the third airport in the volume of passengers followed by Heathrow airports London and Paris Charles de Gaulle airport. It is the world's eighth largest airport. Therefore the airport Frankfurt has an extensive, well organized and provided infrastructure.

Vienna International Airport is the international airport. It lies 18 km south-east of Vienna. Originally a military airfield has now three terminals and is among one of the busiest European airports. The Vienna airport can be reached by train, bus, car or taxi. Bus connection is also from Bratislava. From Bratislava can be reached at Vienna airport via A6 motorway (Nord-Ostautobahn) after turning on the motorway A4 (Ostautobahn - direction Vienna), which leads directly to the Vienna airport. The journey takes about 45 minutes and is about 66 km long. To Bratislava can travel via the highway A4 and after city Bruck / Leitha turn to the A6 motorway that leads to the city of Bratislava.

Between the Vienna airport and Bratislava airport and the bus station regularly runs bus at hourly intervals. There is no train connection from Bratislava. Passengers can also take a taxi to transfer to the airport or to Slovakia too. Bus connection is made with Vienna Airport Lines by Vienna, train connection is made with a combination of expression Wien Mitte by

CAT - city airport train and regional train line S7 from Wolfsthal.

Zurich airport was opened in 1953. Located is in the canton of Zurich, north of the centre of Zurich. It is Switzerland's largest international airport. It is home to the Swiss national airline Swiss International Air Lines and charter airline Edelweiss Air. All responsibility for air traffic is managed by control company Skyguide. In 2003 was completed extended reconstruction plan, which included the construction of a new hangar, terminal, and a small underground metro, connecting terminals. Zurich airport station is located under the new terminal. In addition to the above-mentioned link between airports buildings at the airport there are national long-distance trains, regional and S-Bahn trains, usually going to and from the Zurich main station.

London Heathrow Airport is situated on the west of London in Hillingdon. Name of the airport is according to the settlement Heathrow, which was in 1944 demolished for construction of the airport. Heathrow is for the number of passengers the busiest airport in Europe and the third in the world after Hartsfield-Jackson in Atlanta and Capital in Beijing (as of 2011). According to the number of passengers handled at international flights it is a largest airport in the world.

The airport has five passenger terminals, with signs from 1 to 5 and a terminal for transport. Today has Heathrow just two parallel runways of sufficient length for landing all the latest types of aircraft.

Transport to the airport is close from to the M4 motorway to check-in terminals 1, 2 and 3 and the M25 motorway to the check-in terminals 4 and 5. There are parking areas for short and long term parking divided into zones, which run on the airport at a certain intervals buses. Transport for public is provided by four subway stations - Terminals 1, 2, 3, Terminal 4, Terminal 5 and Hatton Cross and two stops Heathrow Express, which are faster but more expensive transport options. Regular connection is every 15 minutes.

4 ANALYSES OF PROPOSAL FOR EFFECTIVE AIRPORT TRANSPORT CONNECTIONS TO OTHER MODES OF TRANSPORT IN THE REGION AIRPORT

Bratislava Airport

In Bratislava Region is the dominant element of aviation airport MR Stefanik. This airport is prepared for the robust development of not only personal transport, but also for freight.

Currently, we can get easily to the airport Bratislava by car, taxi or bus. The airport is located on the east edge of the capital city Bratislava with the direct access to the highway D1.

Bratislava Airport has a number of parking options. Bratislava Airport Parking is free for 15 minutes in all parking spaces.

Regional Development of International Airport M.R. Stefanik in Bratislava/Ivanka with the separate passenger and freight transport should be supported with quality links to the system of highways, roads and railways. The airport will greatly contribute to its representation of international airspace and provide services such as diversionary airport for Vienna, Budapest and Brno, thanks to its better climate and weather conditions. As the airport has a bus connection to Bratislava, it was also considered the possibility of connecting the trolley tracks to Bratislava airport. Of course, an integral part of the infrastructure development of passenger and freight traffic to and from Bratislava airport it is also necessary to build an underground railway, tram connection and the associated build roads.

To the long-term aim of developing rail transport belongs the connection of rail corridors in the city of Bratislava, project TEN-T No. 17, including airport connections MR Stefanik to the rail infrastructure. The project railway corridor Paris - Bratislava, which will pass through the city, also solve the problem of connection between airport M. R. Stefanik and the railway line. The suggestion has a two connection options – estakada or tunnel. It is now in the process of public hearings.

Project engineering and construction for this is doing company DI Corridor, which was made by Dopravoprojekt and Infraprojekt.

Although Bratislava airport is currently one of the most used airports in the Slovak Republic, the planned development of the traffic at the airport is the need of connection between airport and rail transport and the motorway network.

More than 340 airports will form the airport network TEN-T and 82 of them will be part of the core network. These airport projects are mainly related to connecting airports to railways, optimize existing infrastructures and increasing airport capacity. All of this is contributing to the development and increasing airport capacity.

Žilina Airport

The importance of the airport Žilina is in facilitating of access especially for foreign business people because of the entry of foreign investment and trade cooperations with companies in Žilina. Also important are visits by foreign entrepreneurs. Žilina Airport is located at the crossroads of important European corridors – rail, road and water transport in the future too. Area of the airport and the whole area has a direct connection to the highway D1, so south - north of SR. There will be the motorway junction and the beginning of the D3 motorway in the direction to

the east of Slovakia. At the same time through this locality is running main railway line Bratislava - Žilina, to which there is connection via existing station Dolný Hričov.

Interconnection airport - highway - rail creates an ideal place to create industrial zones with activities in industry, transport, tourism. The upcoming project is focused on the development of the airport and its surroundings. The aim of the project is the introduction of scheduled passenger air transport connecting to the major transit airports in Western Europe, introduction of cargo in relation to bonded warehouses, logistics and freight centers, the creation of an industrial zone of operations and technology centers which are linked to transport, especially air, construction of civil objects focusing on accommodation, transport equipment, recreational - sport activities.

Kosice Airport

Kosice Airport is located about 6 km south of the city center. Today we can get to the airport Košice by car, public transport or taxi. You can choose from 6 reputable car rentals on the airport Košice. They are located in a building across the arrivals terminal, respectively departure lounge. Avis, Buchbinder, Kosice and Kosice self-governing region seek to commission integrated rail transport. The project preparation ISKD in the Košice region began back in the nineties. The cooperation agreement with the Ministry of Railways and the city Kosice Slovakia was signed in December 2006. The result of this collaboration was to start preparing design studies integrated processing of passenger rail transport in the Košice region. Its output is now to prepare projects for road construction technology and technology of project KORID. There is a key factor in the public passenger transport that directly affects the economic and social development of the region and its settlements. One of the basic principles of an integrated transport system in and around Kosice is the gradual expansion of the urban rail transport system into the whole region. Košice city is the only city that has the same tramway gauge as the railway tracks. This was the reason for designing a project KORID.

If we manage to carry out the project of an integrated transport system KORID in the Košice region, it would increase the competitiveness of stagnating regions, would create new jobs, would accelerate transport for passengers traveling to work, would reduce burdens on the environment, would increase tourism connections between Kosice airport to the downstream transport.

The driveway to Košice airport is the only one access point to the airport today. In a case of an accident on the motorway or natural disaster like snow calamity the airport would be completely separated from the world. The airport requires a connection to any other mode of

transport. Therefore the suggestion of connecting Košice airport to rail transport is one of the best plans for the airport Košice.

4 CONCLUSION

In the view of the possible implementation there is interface between air and rail transport, which can have significant economic benefits but at the same time the positive impact on the environment around the airport. As a first is to link the airport with the city, which helps reducing road traffic and improves air quality in the area of airports, the other is a connection with the region, apart of already mentioned advantages, represents an additional contribution to the expansion of the airport catchment area, the connection between the airport and major metropolitan areas through high-speed Railroad. The development of combined transport should be in line with the passengers who are deciding on the market and should be encouraged and suit airport and the passengers.

A key condition for the effective functioning of airports is easy access to the airport. Smaller airports organize access to the airport via optimal transfer by bus. If necessary capacity increases traffic to and from the airport is the completion of rail transport the most appropriate solution.

In my work I mentioned selected international airports. Availability of information on the airport web site was sufficient. Passengers who is looking for information has a distinctly and clearly explained ways to get to the airport, what are the parking options at airports and of course the passenger has good information about the airport and flights.

Slovak airports and their online informations do not get behind to foreign ones. Bratislava Airport has clearly breakdown and well organized site. Passengers will learn all the necessary information.

Kosice Airport has a briefly but clearly described the possibility of getting to the airport, but the possibility of parking is missing. Of course, we must keep in mind when moving from the city to the airport that the airport has only one access road and therefore we should count on unpredictable factors and passengers who rush to the airport must expect delays. In the case of obstructing the access road by accident or bad weather, there is no way to get to the airport. This shows the necessity the alternative transport of finishing. There is running project, which is under negotiation, where it is suggested to connect the Kosice airport to rail transport. Certainly, thinking of increasing capacity at the airport we have to think about the increasing in capacity driveways, or soon to complete a project to add a rail to the airport Košice.

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