URBAN WATERBORNE PUBLIC TRANSPORT IN THE WORLD: AN OVERVIEW OF PAST AND EXISTING STATE AND POSSIBILITIES OF DEVELOPMENT IN THE CITY OF BELGRADE

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Abstract

Large, medium and smaller cities on sea-river and inland waterways are increasingly looking for ways to expand their offers in urban, line passenger transport. In city of Belgrade, ever since 1941, the largest number of passengers were transported not by buses or trains, but by Sava river and Danube river boats. Crowded ships slowly but surely transported them to all destinations. The first steamboat entered the Sava on August 26, 1838. It was called "Sofia" and was intended to test the navigability of the river. Navigation on Sava began in 1844, but not to Belgrade. It was the Sisak-Zemun line. In the same year, a small steamboat that connected Bečkerek and Timişoara arrived in Belgrade via the river Tamiš.

In all cities, the lack of capacity in the road and railway network creates large costs. Congestion on urban land roads tends to continuously increase and grow. Belgrade is one such city with an interest in further developing its own potential in urban, public line transport.

In this paper, the key features of how urban, public water passenger transport networks are developed in the world with development opportunities in the Belgrade area are presented.

1 INTRODUCTION

In city of Belgrade, ever since 1941, the largest number of passengers were transported not by buses or trains, but by Sava river and Danube river boats. Crowded ships slowly but surely transported them to all destinations. The first steamboat entered the Sava on August 26, 1838. It was called "Sofia" and was intended to test the navigability of the river. Navigation on Sava began in 1844, but not to Belgrade. It was the Sisak-Zemun line. In the same year, a small steamboat that connected Bečkerek and Timişoara arrived in Belgrade via the river Tamiš.

Large, medium and smaller cities on sea-river and inland waterways are increasingly looking for ways to expand their offers in urban, line passenger transport.

Inland waterway transport is the most ecologically clean form of transport, as it has the least harmful impact on the environment compared to other forms of transport. The Republic of Serbia, which is located at the crossroads of European roads, certainly has a favorable geographical position for the development of both cargo and passenger inland water transport. From the point of view of environmental protection, it represents a very important link of the European transport network.

2 THE CASE OF SERBIA

The network of waterways in the Republic of Serbia is about 1,680 kilometers and includes the Danube 588 km, the Sava 211 km, the Tisa river 164 km, the Tamiš 41 km, the Begej 77 km, as well as the Danube-Tisa-Danube Hydrosystem, which covers 599 km. [2].

The Danube River is the most important river in Serbia and one of the most significant in Europe. It represents an extremely important waterway. It stretches through ten states with a total length of 2857 kilometers, of which it flows through Serbia for a length of 588 kilometers from Bezdan to Timok. Apart from Serbia, it also flows through Germany (where it originates), Austria, Slovakia, Croatia, Hungary, Bulgaria, Moldova, Ukraine, Romania and flows into the Black Sea. After the opening of the Rhine-Main-Danube waterway in 1992, it represents a particularly important road as the so-called Corridor VII.

The Sava River is a significantly shorter river than the Danube. It originates in Slovenia and flows into the Danube in Serbia with a total length of 944 km. The course of the Sava River stretches through four countries: Slovenia, Croatia, Bosnia and Herzegovina and Serbia, connecting their main cities except the capital of Bosnia and Herzegovina. The course of the Sava River through Serbia is 211 km.

The length of the river banks of Belgrade is 200 kilometers. There are 16 river islands in that area, the most famous of which are Ada Ciganlija, Veliko ratno ostrvo and Gročanska ada. The Danube flows through the Belgrade area for 60 kilometers from Stari Banovac to Grocka. The Sava flows for 30 kilometers in the area of Belgrade, upstream from Obrenovac all the way to the confluence with the Danube below Kalemegdan at an altitude of 68 meters.

2.1 Navigation safety

The navigation safety is conditioned by the very low density of inland water traffic, which enables safe navigation and the transportation of cargo that is often transported by inland waterways. It is considered that a curve radius of 360 m is necessary for normal navigation. Furthermore, there are shoals that appear at low water levels, while at high water levels, the coast may collapse and the riverbed widen, what reduces the depth. In addition to the above, there are various artificial obstacles on the waterway that disrupt navigation, from unfavorably placed bridges to sunken vessels.

The "Ušće Sava" sector represents a section with a special navigation regime from km 11.00 to the mouth of the river Sava in Belgrade (km 0.00). A special navigation regime applies on this section of the river due to the density of traffic, as well as the number of bridges that cause one-way navigation in a part of this sector. The section is slow during periods of low water - from km 82.00 to the beginning of the "Ušće Sava" sector (km 11.00). This section is characterized by favorable navigation conditions throughout the year, in terms of available depths and widths of the waterway. There are no critical sectors for navigation on this section.

What is characteristic for the river Sava is that it has an extremely low fall, which is why it is not able to carry the sediment brought by the tributaries, but deposits it in the riverbed below the mouth of the tributaries, which is why numerous sandbars and shoals are created, what at low water levels can cause the impossibility of navigation. The water regime of the river Sava has a flow speed of 3 m/s. In order to enable normal and free navigation on the river Sava, it is necessary to provide a curve radius of 360 m. Unfortunately, the waterway of the river Sava is not used enough, and its geostrategic position enables the development of combined and intermodal transport. [2].

According to the new data of the European Union between 2012 and 2022, the number of people killed in maritime transport accidents in the EU's waters or involving EU-registered vessels elsewhere in the world ranged between 24 and 90. The three lowest numbers were recorded in recent years, 30 deaths in 2020, 27 deaths in 2021 and 24 deaths in 2022. A large majority of the EU's maritime transport fatalities in 2022

concerned EU registered vehicles (24 fatalities), while the others (three fatalities) were related to other vessels in the EU's territorial seas. [3]

2.2 Impacts of meteorological, hydrological, hydraulic and morphological characteristics on the inland waterway

The inland waterway is influenced by meteorological, hydrological, hydraulic, morphological and other characteristics that make the natural regime of the waterway, which change in space and time. Meteorological conditions have a very large impact on navigation. The most significant meteorological conditions are the occurrence of ice, wind and fog.

The appearance of *ice* on the waterway affects navigation conditions. At the water measuring stations along the waterway, the characteristic dates of the appearance of ice, ice standing, the start of ice drifts and the date of ice formation on the waterway are registered. For the mode of operation of the waterway, it is necessary to collect the following data [2]:

1. The earliest date of the appearance of ice and ice stagnation,

2. The latest and average date of ice breaking and the river being freed of ice,

3. The maximum possible and average duration of ice and the river being freed of ice,

4. The actual maximum and average duration of ice stagnation and ice drifts and the annual probability of these occurrences.

On the Danube, ice appears in its middle and lower course.

The average duration of the ice-free period on the Upper and Middle Danube is 345 days on the average, and on the Lower Danube this period is 330 days. [2].

The wind causes the appearance of waves, it can drift or turn the ship from the route of the waterway, thereby endangering the safety of navigation. From the point of view of navigation, its safety and the duration of the navigation period, significant data on the characteristics of the wind regime are [2]:

1. Frequency of wind by direction (expressed in promilles)

2. Wind speed in m/s or strength in Beaufort,

3. Representation of wind speed, average occurrences of wind and duration of periods with wind

4. Places on the waterway with the strongest winds.

The most unfavorable influence on the safety of navigation on the Sava River is caused by Košava wind that acts on the lower course of the Sava River. It blows from the southeast and reaches a speed of up to 100 km/h. In the summer months, there is often a sudden storm accompanied by a strong wind, sometimes of storm force, in these cases it is necessary if the vessel is in motion to take shelter along the coast or some other place located in the leeward side. [5].

On the Danube, the critical wind strength from the point of view of navigation safety is 6º according to Beaufort, what corresponds to wind speeds of 10.8 to 13.8 m/s in downstream navigation. For upstream sailing, the critical wind strength is 8º according to Beaufort, what corresponds to wind speeds of 17.2 to 20.7 m/s. The most dangerous wind that occurs on the Danube is "košava".

According to the provisions of the Danube Commission, the wind limit for downstream navigation is 6º per Beaufort (12.4 m/s), and for upstream navigation it is 8º per Beaufort (18.2 m/s). East and South-east winds prevail on the Middle Danube. [2].

Fog, or visibility, greatly affects the safety of navigation. Fog is divided according to the level of visibility [2**¡Error! No se encuentra el origen de la referencia.**]: 1. Light fog - when horizontal visibility is possible at a distance of up to 1 km. ($v_d = 1000m$)

2. Moderate fog, when $v_d < 500\,m$

3. Strong fog when $v_d < 200\,m$

Those fogs that last longer than 5 hours represent a danger for navigation.

The most frequent occurrence of fog occurs in October, November, December and January. At the end of winter and beginning of spring, the number of days when fog is present decreases significantly, and in summer this number of days is from one to two. [2].

The river courses are variable in their length, the profile has three characteristic parts of the course, and those are the upper, middle and lower. The upper course is characterized by large drops, high flow speeds, large drifts and it is very unfavorable for navigation. The middle course starts from the part where the river leaves the mountain area. The lower courses of the rivers are naturally the most favorable for navigation, because they can accommodate much larger ships and structures. [2].

The design of vessels and supporting terminal infrastructure is also a key consideration in finding the right balance for each city. [1]

3 TECHNICAL, TECHNOLOGICAL AND FUNCTIONAL CHARACTERISTICS OF WATER, PUBLIC PASSENGER TRANSPORT IN CITIES ON RIVER-CANAL WATERWAYS: ANALYSIS OF CHARACTERISTIC CASE STUDIES

The following table provides data with basic characteristics such as the river that passes through the city, the number of inhabitants, the area of the city and the population density.

City	**River**	**Number of inhabitants city center**	**Number of inhabitants with surroundings**	**Number of inhabitants**	**City area km²**	**Population density (per km²**
Bordeaux **(France)**	Garonne	257 804	796 273	-	49	5283,5
Brisbane **(Australia)**	Brisbane	-	-	2 308 700	15826	2600
Budapest **(Hungary)**	Danube (Budim and Pest)	1 752 286	-	-	7626	230
Dresden **(Germany)**	Elbe	-	-	529 781 (2012. год)	328,80	1611,25
Hamburg **(Germany)**	Elbe	-	-	1 800 000	755	2300
Lisbon **(Portugal)**	Taho	505 526 (2017. год)	2 800 000		100,05	5052,73
London **(Great Britain)**	Thames	-	-	8 700 000	1572	5518
Rotterdam **(Netherlands)**	Mesa	-	-	1 015 215	325,79	2969
Moscow **(Russia)**	Moscow	12 400 000	17 000 000	-	2511	4938
Gothenburg **(Sweden)**	Gotha	-	-	570000	447,76	1200
Stockholm **(Sweden)**	Lake Mo. Lorraine which flows	1000000	-	-	188	4900

	into the Baltic					
New York **(USA)**	Hudson and East River	8500000	-	-	1213,37	5518

Table 1. Basic characteristics of the considered cities (Source: UITP International Association of Public Transport, Waterborne Public Transport – evolution, general overview and networks, 2016.)

The following table together with maximum level of water level oscillations shows what kind of natural limitations and obstacles can interrupt and suspend navigation in different cities of the world.

City	**Maximum level of water level oscillation [m]**	**Types of water**	**Natural limitations and obstacles that can interrupt and suspend navigation**
Bordeaux (France)	1	Sweet	Wind, fog, stumps, floods
Brisbane (Australia)	3	Sweet-salty	Floods, rocky shoals, fog
Budapest (Hungary)	8	Sweet	Wind, fog, ice, shallow water
Dresden (Germany)	1,6	Sweet	Flooding or low water levels
Hamburg (Germany)	3,6	Sweet-salty	Extreme high tide, ice
Lisbon (Portugal)	4	Salty	Wind, fog
London (Great Britain)	7	Sweet-salty	Fog
Rotterdam (Netherlands)	1	Sweet-salty	Wind, fog, ice
Moscow (Russia)	No data	Sweet	Ice, fog, low temperatures, sailing in broken ice is predicted
Gothenburg (Sweden)	No data	Sweet-salty	Ice, high water levels, wind
Stockholm (Sweden)	No data	Sweet-salty	Ice, high water levels
New York (USA)	No data	Sweet-salty	Ice, fog, wind

Table 2. Natural environment and constraints (Source: UITP International Association of Public Transport, Waterborne Public Transport – evolution, general overview and networks, 2016.)

We can see that in different continents and cities in the world the challenges the inhabitants confront with are sometimes quite similar. Unfortunately the effects of climate change will not help us all in providing better conditions for navigation around the globe.

Many cities have been hesitant in large scale investment in water based modes due in large part to the low economic return value when compared to the carrying capacity of other transit modes. [1]

4 CASE STUDY ANALYSIS: NEW YORK - PUBLIC WATER PASSENGER TRANSPORTATION ON THE EAST RIVER AND HUDSON RIVER AND THE OPPORTUNITY FOR ITS EXPANSION

A large number of bridges and tunnels connecting Manhattan and mainland parts of New York and New Jersey were built in New York during the 20th century. This caused the participation of water passenger transport to decline sharply until the 80s of the last century, when regular lines to Staten Island (Richmond) were introduced. These lines were taken over by private individuals who covered all costs without any subsidies. Private individuals later developed transportation between New Jersey and New York City without subsidies:

• primary "point-to-point" lines for high-density passenger flows (crossing from coast to coast);

• short lines in terms of costs, efficient, especially in fuel consumption;
• significant time savings compared to other transit alternatives (and other modes) and generally accepted by passengers with higher incomes and the ability to pay higher freight rates (ticket price).

No direct operating subsidies were required for these services, as they benefit from indirect capital investments through the use of public infrastructure and berths at both ends of the line. On these lines, the most represented passengers are those who live near the pier, i.e. on the shores.

These passenger flows are stable even today. The main limitations for the use of these lines are competitive and more affordable forms of passenger transport, such as the subway and buses.

Transports have to be compared, what is difficult for water passenger transport in the cases of overlapping with metro lines and on longer lines. Population density in coastal zones was limited due to the historical use of the coast for industrial purposes. However, in the last two decades, the use of the coastal belt for housing, retail, recreation and employment in the high-tech sectors has encouraged the development of shipping lines with limited subsidies.

The East River Ferry line is the most frequently used shipping line, serving about 1.2 million passengers a year, or about 3000-3250 passengers a day. The freight (ticket price) of $4 covers 64% of the ship's operating costs. The $2.22 per passenger subsidy matches the subsidy per passenger for local buses.

With the exception of the underground railway (metro), the shipping system is competitive in terms of the level of subsidy.

The East River Ferry line is connected with two passenger markets: business and tourist-recreational trips. Business trips are the most common on working days, and recreational-tourist trips on weekdays. Seasonal variations in passenger flows on the water are large comparing to the summer and winter periods, what is insignificant in land modes of public transport. From November to March, business trips dominate comparing to the tourist-recreational trips and vice versa from April to October.

Economic forecasts have confirmed that higher demand for public water passenger transportation is influencing the growth of retail housing space prices and apartment rentals in New York's coastal areas. This type affects the prices of apartments more than the prices of commercial premises.

The calculation showed that public water transport increases the value of apartments in a circle with a diameter of 200 m by 8% and from 200 to 400 m by 2.5% from the pier. This impact drops to less than 1% for apartments more than 1500 m away from the landing. The average indicator of 200 m from the stop of public, passenger transport is consistent with data in the literature on the impact of public transport on housing prices.

In order to consider opportunities for expanding public, water passenger transportation in New York, an assessment was made for 58 locations for docking on the river banks, including existing piers. All places are described in relation to social-demographic conditions, physical characteristics and development flows, recreational-tourist needs and convenience in choosing a place in emergency situations (interruptions in other forms of public transport).

Each place is described according to the following characteristics:
• population – population censuses;
• employment - censuses;
• business trips - lists;
• planned development - Department for City Planning;
• comparative analysis of travel time;
• accessibility in changing and transit;
• waterway depths and navigational restrictions;
• suitability of the place for emergency situations.

The choice of mode of public transport predicts the degree of capture (conquest) of the market for a specific mode based on its characteristics: ticket price, travel time and frequency comparing to the same characteristics of competing modes.

Priority berths are selected according to the following characteristics:
• Potential for users looking for the boat service. A detailed assessment of the potential of binding for business trips and tourist-cultural-recreational needs.
• Port proximity to existing transit services for some shipping lines determined not to be competitive.

• Physically restricted sites include navigational conditions (depths and hydrometeorological conditions), capital costs (construction of land and water infrastructure, maintenance, etc.) and environmental mitigation costs can be very high.

Other limitations include: passenger accessibility to/from shore, available parking spaces in areas where passenger cars are picked up/departed, limited potential for network connectivity related to longer travel times and higher operating costs.

The identification of lines was performed first on simple lines, the so-called "point-to-point" with passenger number forecast and peer-to-peer ranking of ship service competitiveness. For each line, detailed estimates of the ship's operating costs were made:

• Propulsion energy costs;
• Labor costs including costs when ships are not working;
• Maintenance (hull and hauling to the dock);
• Lease or amortization;
• Insurance and administration;
• General expenses: anchorage costs, office space, supply costs, uniforms, etc. They depend on fleet size, management size, number of passengers carried and market conditions. Typical daily rates for a benchmark boat - a medium catamaran are $570/h.

Operating costs are used to determine revenues and estimate subsidies for each line under different fare and frequency scenarios. In addition to operating costs, the capital costs required for each berth location are determined, including new infrastructure for docking ships. Capital costs include land and water infrastructure (lifetime 25-30 years): bicycle parking, ticket machines, ...

When berths on a line are combined there are two distinct effects: (1) operating costs per passenger will be reduced if one ship serves multiple berths each with its own number of passengers, (2) the greater number of berths along the route leads to an increase in the time spent on arrival maneuvering /departure from berths and the waiting time of passengers for embarkation/disembarkation. Longer travel times for passengers at most terminals cause an inevitable decrease in passenger numbers. Shorter frequencies require more passengers and higher revenues to combine higher operating costs associated with more ships and lower subsidies. Longer frequencies of ship services require fewer passengers and higher ticket prices (freight charges).

After several private ferry initiatives in the 2010s, the city's own NYC Ferry Service initiated in May 2017 to solve the waterfront's inaccessibility by public transport. The ferry is a rather affordable, luxurious, and convenient mode of transport between neighborhoods (often located in different boroughs) that were thus far separated by water. In the meantime, the success of the ferry as a pleasant, luxurious, and efficient mode of public transport is clear, and the network is expanding rapidly. Additionally, the ferry's operating hours are limited to the daytime, making alternative modes of public transportation still necessary. [6]

Comparative analysis of costs for waterway transport systems towards other modes of transport including: optimized vessel designs, investments costs, operating costs, supporting infra-structure maintenance systems costs etc from a societal point of view are important aspects that need to be considered. [1]

When integrating the waterways and seaborne journeys into a public transport system it is important to know how comfort influences the travellers decisions and what comfort mechanisms to consider in system design. [1]

In order to reach more benefits within the transport system such as increased attractiveness in public transport, higher sustainability and decreased costs new ways of working together between the business sector and the public sector need to be developed. [1]

5 LEGAL PROVISIONS

The corona virus pandemic has had a negative impact on the international river traffic. Thus, in 2020, 1% of the results from 2019 were achieved in Serbia, and the Port Management Agency announced that 15 dockings at international passenger piers and 1.164 uses of the coast were recorded in Serbia. Cruising has been

suspended throughout Europe. And in Belgrade alone, more than 100.000 boarding and disembarking passengers were recorded in 2019.

The Water Transport Development Strategy of the Republic of Serbia from 2015 to 2025 *("Official Gazette of RS" No. 3/20145 and 66/2020)* identifies shortcomings, best available practices in the field of inland navigation within the European Union and indicates short-term goals from area of water transport development and suggests ways to fulfill them. This strategy shows the basics of European Union law in the area of water transport, provides an insight into the legislation of the Republic of Serbia in this area, as well as areas in which harmonization is needed, including the regulations governing public water transport. [7]

The Strategy also indicates a distinction between public law, i.e. strategic and administrative management of ports, which is carried out by the Agency for Port Management, and management of commercial port activity, which is left to port operators (private sector) as entities that are the holders of economic activities in the port. According to the Law, the port area is determined by the Government, on the proposal of the Agency for Port Management, what created the assumption that through the potential expansion of port areas, the port system of the Republic of Serbia will be opened to other interested port operators. The management and exploitation of the port or the pier for the purpose of carrying out the activity of river transport of passengers must be regulated by a special contract or in another way that will allow the concessionaire the right to use the port and the pier within the scope of performing the entrusted activity. The concrete solution of this issue will depend on the intention of the public body when preparing the proposal for the concession act, i.e. the feasibility study of the project. [7]

The strategy points to the lack of passenger piers in the Republic of Serbia, where there were currently only three operational passenger piers in Belgrade, Novi Sad and Donji Milanovac. One of the causes is the lack of technical and legal norms related to the construction, exploitation and classification of passenger piers. According to this strategy, 16 municipalities in Serbia have the greatest potential for the development of passenger piers - on the Danube they are: Apatin, Bačka Palanka, Sremski Karlovci, Smederevo, Kostolac, Veliko Gradište, Golubac, Lepenski vir, Kladovo and Negotin. On the Sava - Šabac and Sremska Mitrovica, and on the Tisza River - Kanjiža, Senta, Bečej and Titel.

The town of Šabac also got an international pier. This newly opened international pier on the Sava will contribute to the development of tourism and the city's economy. On December 11, as part of the "Sail Serbia" project, the city of Šabac entered the A class on the nautical map of Serbia. The opening of the international passenger pier in Šabac will contribute to the further development of cruising in Serbia. In addition, in the coming period, intensive work will be done on the establishment of liner shipping between Šabac, Sremska Mitrovica and Belgrade.

We should not forget to mention that the development of regulations and legal framework has to be in line with technical development.

The regulations of the European Union for transport and public transport, although they are not applicable in the Republic of Serbia, are of importance for the Republic of Serbia on the basis of the Agreement on Stabilization and Association with the European Union, which entered into force on September the 1st , 2013. By signing this agreement, the obligations of establishing a free trade zone and harmonizing legislation with EU law have been taken over, what also means harmonizing regulations in the area of traffic. Regulation of traffic according to the law of the European Union, but with taking into account the national specificities and needs of users, is carried out with the aim of its optimization and adaptation, and in accordance with the basic principles of environmental protection.

After analysing the international legislative sphere, as particularly relevant we shall mention the following international regulations: Directive 2009/45/EC of the European Parliament and of the Council of 6 May 2009 on safety rules and standards for passenger ships (OJ L 163, 25.6.2009, p. 1–140) and Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonized river information services (RIS) on inland waterways in the Community, (OJ L 255, 30.9.2005, p. 152–159.) [8] [9]

Directive 2009/45/EC of the European Parliament and of the Council of 6 May 2009 on safety rules and standards for passenger ships (OJ L 163, 25.6.2009, p. 1–140) in detail regulates all aspects of passenger

transport in inland waters, necessary licenses and approvals, technical requirements for vessels and their safety, as well as their classification. The provisions of the Directive are largely part of our Law on Navigation and Ports on Internal Waters of the Republic of Serbia. [8]

According to Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonized river information services (RIS) on inland waterways in the Community, (OJ L 255, 30.9.2005, p. 152–159.) the RIS system is designed to improve the safety, efficiency and environmental acceptability of inland navigation. [4] The provisions of this Directive have also found a place in the Law on Navigation and Ports in Internal Waters of the Republic of Serbia. [9]

In the Republic of Serbia the Law on navigation and ports on inland waters *("Official Gazette of RS" No. 73/2010, 121/2012, 18/2015, 96/2015, 92/2016, 104/2016, 113/2017, 41/2018 and 95/2018, 37/2019, 9/2020, 52/2021*) is the basic law that regulates the area of water traffic and navigation in the internal waters of the Republic of Serbia. With this Law, the basic provisions of the positive regulations of the European Union were introduced into the domestic legislation. [10]

The law provides the possibility of public transport on internal waters of the Republic of Serbia, specifies that the provisions governing the ship's ability to navigate are also applied to boats used for public transport (Article 97), as well as the documents and books that a boat used for public transport on inland waters must have (Article 128). [10]

Ports and piers are defined by this Law as goods of general interest, and port land and port infrastructure are the property of the Republic of Serbia (see: Article 214). [10]

The law foresees the possibility of establishing a pier as a pier for the operator's own needs, within the scope of his activities. However, this possibility is available only for the needs of reloading of goods, not explicitly for the transportation of passengers (see Article 239). [10]

The Law on Merchant Shipping *("Official Gazette of RS", No. 96/2015 and 113/2017)* regulates transport and access to the market, legal status of the ship, liability and limitation of liability for claims in inland navigation and maritime claims, contracts, navigational accidents, non-contractual liability, stoppage of the ship, execution and security on board, applicable law and exclusive jurisdiction of the courts of the Republic of Serbia for disputes in the field of commercial navigation with a foreign element, recognition and execution of court decisions in the field of commercial navigation, as well as supervision. [11]

According to this law, public transport of passengers is carried out in liner or free shipping. When performing public transportation of passengers, the route, fare and other conditions of transportation are regulated by the contract between the carrier and the user of the transportation. (Article 5.) [11]

Public transport can be carried out by a ship, a boat for commercial purposes or a ferry that must meet the conditions prescribed by the law regulating navigation and ports on inland waters, as well as the conditions prescribed by the law regulating the state affiliation and registration of vessels (Article 6). [11]

Transportation of passengers in liner shipping between two ports, i.e. piers on the territory of the Republic of Serbia, is carried out by a domestic vessel on the route and according to the sailing order that have been determined in advance. Transportation is performed as local liner shipping on the territory of a local self-government unit or as intercity liner shipping on the territory of two or more local self-government units. (Article 7, paragraphs 1 and 2) [11]

The organization of local liner shipping is regulated and ensured by the local self-government unit on whose territory local liner shipping is carried out. Places and conditions for the installation of floating facilities for the docking of vessels that transport passengers in domestic liner shipping, as well as the persons who manage the floating facilities for the docking of these vessels, are determined by the local self-government unit on whose territory liner shipping is carried out, with previously obtained design conditions that refer to international and interstate waterways issued by the Directorate for Waterways, i.e. the authorized legal entity for technical maintenance of the waterway for state waterways and waterways on the territory of the autonomous province, as well as nautical design conditions issued by the competent port authority. (Article 7, paragraphs 3 and 4) [11]

The presence of a central publicly owned transport authority that is able to manage and plan a city-wide network is beneficial for facilitating this connection and the consideration of water transport as a key transport mode. [1]

Chapter 2 of the Law on Merchant Shipping deals with access to the market, that is, conditions for the performance of certain activities in inland and maritime navigation. In accordance with Article 19 of the Law, public transport on inland waterways can only be carried out by a natural or legal person who meets the prescribed professional qualification requirements for carrying out the activity of an inland navigation carrier, even when he intends to perform this activity only for a certain period of time as a subcontractor for some other legal entity that carries out transport activities on inland waterways. A natural person fulfills the requirements of professional qualification by passing an exam to obtain a certificate of qualification for carrying out the activities of an inland waterway transporter or by documenting the practical experience achieved in a commercial company for transport on inland waterways, or by a combination of these two methods. A legal entity fulfills the requirements of professional competence, if at least one employee fulfills the condition related to a natural person, provided that the employee permanently manages the transportation business at the operational level. After the procedure of determining that a natural or legal person meets the requirements of professional competence in the areas of business that are included in the activity of inland navigation carrier, the ministry issues an authorization for the performance of inland navigation carrier activity. [11]

Now we have three piers on the Sava: Sremska Mitrovica, Šabac and Belgrade. It is also planned to purchase an ecological tourist boat that would be used for tourist tours on the River Sava.

The most popular river in the world for river cruises - the Danube, passes through our country and represents Serbia's great tourist potential. With the two largest urban centers on its coast - Belgrade and Novi Sad, it also represents the European traffic corridor 7. It is an integral part of the trans-European navigation system Danube-Main-Rhine, which connects the Black Sea with the North Sea, connecting the west and east of Europe.

6 CONCLUSION

Cities are built near water for a good reason! However, every city with its network of waterways is a special case and the solutions for each such case are different.

Those who know history well have not forgotten that once, not so long ago, the railway question and the influence and control of the lower Danube were the reason for the conflict between Russia and Austro-Hungary, which led to the World War I. The importance of waterways and the desire to manage them has not changed in the past and now. Today, perhaps the knowledge we have and the shared experiences we have gained are greater, so we are expected to do the best we can, taught by the experience of our ancestors.

Cities are looking for the new ways to expand their public transport offering. Cities have designed their networks in different ways in order to meet local needs. This may depend of population density and topographical constraints. However, one of the common tasks is integration with other modes of transport. It is noticed that the most successful cities have sought to include the planning of water transport early in transport and land use planning policies.

In all cities, the lack of capacity in the road and railway network creates large costs. Congestion on urban land roads tends to continuously increase and grow. Belgrade is one such city with an interest in further developing its own potential in urban, public line transport.

In this paper, the key features of how urban, public water passenger transport networks are developed in the world with development opportunities in the Belgrade area are presented.

As expected, the results of a survey of public water passenger transportation in New York City predict that this type will decline with increases in freight (price), time spent on board, and passenger access time. Research has shown that the probability of choosing this type is lower in the female population.

The question is how many passengers will want to pay for the boat service if they have the subway and the bus at their disposal. For subway users (generally looking for a shorter trip) the willingness to pay for boat service was up to $1.15 for express bus users (expected longer travel time) the value of boat service was $1.92,

all characteristics being the same. However, the ship service will most likely be chosen under equal conditions by users with the highest incomes (over 100,000 dollars per year), even though it is part of an integrated tariff structure. The aim should be to find realistic solutions that are achievable from a cost perspective but also attractive to passengers during whole year.

An increase in travel time comparing to the metro reduces the probability that users will take the ferry service. Similarly, an increase in freight rates and frequency reduces the choice of shipping service. However, it depends on the characteristics of the lines in both forms.

The long-term goal is to identify transport systems and technical solutions for the waterways that can be adapted to urban environment and complete the land-based transport systems in order to achieve an global sustainable urban mobility.

Expecting to be the good host od the EXPO 2027, working on the long waited subway in the city, Belgrade is proud of its rivers and ready to welcome all those coming to visit it.

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