

Sea and River Ports-Factors of Logistic and Traffic Development of Bosnia and Herzegovina

Deniz ve nehir limanları Bosna Hersek'in lojistik ve trafik gelişiminin faktörleri

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Abstract: Sea and river traffic have a great economic significance for Bosnia and Herzegovina. Favorable position of sea and river ports, long sea and river tradition and growingly intensive investments in technology of overrun of ports at important sea and river directions. This paper analyzes sea ports Ploče, Metković, Neum, and river ports Brčko, Orašje, Bosanski Šamac, Bosanski Brod and Bosanska Gradiška as factors of logistic and traffic development of Bosnia and Herzegovina. Of all Adriatic ports, Bosnia and Herzegovina is best connected with the port Ploče in the Republic of Croatia. Port Ploče is an Adriatic port that has been developing as a port for trafficking goods from Bosnia and Herzegovina. It is connected to a road and railway from Bosnia and Herzegovina. Bosnia and Herzegovina takes an important geo-strategic position of the Southern Europe. It is an unavoidable area connecting Middle and Eastern Europe to the Adriatic, as well as connecting East of Croatia with its South. The system of traffic infrastructure is one of the key factors that mutually affect economic, social and areal development of Bosnia and Herzegovina. Sea and river traffic in the process of valorization, purpose and usage of the area is seen in the following elements, it enables usage of natural resources, it affects location of economic capacities and population, it affects flows of urbanization, it affects development of settlements and quality of man environment, and it affects and encourages development of less developed areas of Bosnia and Herzegovina.

Keywords: Sea and River Ports, Development, Economy, Bosnia and Herzegovina

1. Introduction

Bosnia and Herzegovina takes an important geostrategic stand in the South Europe. It is found to be an unavoidable area in connecting Middle and East Europe with the Adriatic, and also the East Croatia with its South. Transportation infrastructure system is one of the key factors that mutually affect economic, social and areal development of a certain region, as well as the country itself. The transportation infrastructure in the process of valorization, purpose and use of an area is seen in the following elements: it enables usage of natural resources, it affects location of economic capacities and population, it affects urbanization flows, development of settlements and quality of the environment, and it affects and encourages development of less developed areas. Ports, as a complex system, are an important component of the national transportation system in Bosnia and Herzegovina, because, along with its transportation function, it also has trade, industrial, logistic, tourist and numerous non-economic functions. With an increased manufacture and trade of goods, an increase of the world sea transportation is conditioned, through which usage of ports, as logistics centers in the whole transport and logistic chain in Bosnia and Herzegovina, is intensified as well. (Gačanin, E. 1998.)

Rapid changes, stimulated by technological and information improvement, have stimulated greater competition between ports, which necessarily imposes the need of ports to adjust to the new logistic trends

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and increase in quality of port services to sea ports in Neum, Ploče and Brčko on river Sava. Sea ports, which are an unavoidable link in the transport and logistic chain have a growing obligation to provide efficient and quality services with a high level of security and safety of people, goods and environment, such as the port Ploče, which Bosnia and Herzegovina uses for the economy needs of the neighboring Republic of Croatia. Port Ploče is a sea port, branch of the Pan European Corridor Vc, which leads towards Sarajevo and port Brčko and Budapest, which is why it represents an underlying-destination point of that transportation direction, considering the possibility to attract larger quantities of cargo. Geographic-transportation position of the port Ploče greatly contributes to the development of a port which is exceptionally important for its gravitational area and the economy of Bosnia and Herzegovina. (Nurković, R.2016)

The scope of traffic of passengers and goods of a port is the measure of its success, role and significant in a certain area. However, we may not get a complete image, because there are elements missing from it, elements such as technical-technological and organizational-economic structure, level of developments, degree of connection, and finally, synchronization of all factors in the structure of a port and its surroundings in Bosnia and Herzegovina. Through adequate legislative measures and development programmes, a country may stimulate or weaken development of ports, which is also a consequence of faster or slower integration of a country in world transportation and economic flows. The method and the size of investment into development of sea and river ports in Bosnia and Herzegovina is different, considering their importance and specialization of certain ports, which needs to be defined in accordance with logistic and geo-transportation predispositions of certain ports. Development of ports in Bosnia and Herzegovina should be founded on compatibility of port and transportation politics aiming at development and measures of the European transportation politics. European Commission guidelines clearly emphasize the demand to establish high standards on port services market in order to realize transparent procedures and high quality, where the development strategy of Bosnia and Herzegovina for sea and river ports demands respecting of existing operation conditions, problems and specifics. (Nurković, 2007)

Considering the fact that growth of container traffic is realizing much faster than it is followed by the growth of infrastructure, ports are forced to expand and adapt their capacities to new terms and conditions. The trend of fast growth and all changes also relates to container traffic of sea and river ports, and their success depends exactly on available capacities and quantity of overrun cargo. Bosnia and Herzegovina is a sea-oriented country with an exit to sea through a little city of Neum. Tourist orientation of Neum has disabled its growth into an industrial port. Bosnia and Herzegovina has oriented itself to the port Ploče as an exit to the sea. According to the above mentioned, advantages of these ports are determined through building Corridor Vc of these ports. Logistics of services offered by ports attract traffic, increase income and they are an important factor of development of sea and river ports. This connection is primarily expressed through movement of basic economic indicators, such as national product, employment, investments and personal spending on one side, and quantity of trafficked goods and passengers, scope of traffic demand, number and content of transportation means on the other side. In a developed economy, traffic affects all aspects of society and all present subjects, that is, interest groups, which is all justified by data about shares of traffic sector in the total national product of some European countries. (Gačanin, 1998.)

2. Methods and Sources of Data

Development trends of sea ports are connected with many technological, organizational, economic, logistic, and other factors of global and regional character. These factors are further analyzed in this paper. The objective of this paper has a theme of sea and river port development in Bosnia and Herzegovina. According to that, aims of this paper may be determined, and are as follows:

- Explain and name basic features of sea ports,

- Present the analysis of conditions for planning and development of sea ports,
- Explain capacity planning of sea and river ports,
- Present the role of port politics in the development of sea ports, and
- Present development trends of sea ports in Bosnia and Herzegovina.(Gačanin, 1998.)

During the writing of this paper, books, articles and data from network pages were used. The named literature is also used through processing of secondary publications. The following methods were used: induction and deduction-induction methods were used in such cases where, on the basis of analysis of individual facts, we draw conclusions about general judgement; deductive method was used in such cases where special and individual conclusions are drawn from general judgements. Analysis and synthesis method was used in such cases where it was necessary to parse complex terms, judgements and conclusions onto their simpler components and elements; synthesis method was used in such cases where certain concepts were explained through synthesis of simple judgements into more complex ones; concretization method was used in such cases where the research subject was concretely understood as a unity of general and special. (Boeing Commercial Airplanes 2010)

3. Analysis of Existing Position of Sea and River Ports on International Significance for Bosnia and Herzegovina

Bosnia and Herzegovina has a great role and significance from sea and river ports as potential significance founded on favorable geographic and traffic position. Law on maritime goods and sea and river ports represents a basis of development of Bosnian and Herzegovinian sea and river ports and the whole geographic area. This Law determines and defines the role and significance of certain ports in economic development of Bosnia and Herzegovina. According to the Law, ports are classified into three groups: ports with exceptional (international) significance for Bosnia and Herzegovina, ports with regional significance, and ports with local significance. Different macro-regional geographic position of these three groups of Bosnian and Herzegovinian ports (ports of the North, Middle and South Adriatic) is also seen in their very important geo-traffic position and function in relation to the gravitational area. Through the development plan of Bosnia and Herzegovina for sea and river ports until 2025, large investments for port modernization are planned, which represents a foundation for realization of a greater port turnover, a more intensive development of ground and maritime business, and giving of concessions to domestic and foreign investors (Dundović; Kesić, 2001).

It is indisputable that Bosnian and Herzegovinian ports, that have been categorized as main ports thus far, do not have the same significance of the economic development of our country. Therefore, ports should be ranked in accordance with their role and significance, and the selective state politics should be run according to that criteria. Even though in the short term, the country still must help development of certain river ports, in the long run, the development will be explicitly left to the market. It is necessary to create a clear distinction between freight and passenger ports, and also considering concentration of traffic and limited investments, stimulate port development: Neum and Brcko, while stimulation of development of passenger traffic should be especially directed to port development. Greater number of planned projects have goals to improve infrastructure and construction of buildings in the sense of better ground connectivity of Bosnia and Herzegovina, through sea and river ports, with surrounding countries (Croatia, Serbia and Montenegro), where important factors are increasing of importance and attractiveness of traffic directions. (Borel, 2012)

3.1. Port Neum

Bosnia and Herzegovina is a country with an exit to the sea through port Neum. Neum has developed as tourist and trade center. Its geo-strategic position is held important due to its surroundings. It is made up of industrial area of Bosnia and Herzegovina in the background, and the Republic of Croatia with ports Dubrovnik and Ploce. Even though, port Neum has satisfactory natural conditions, for example, sea gauge of approximately 24 m and sheltering of port from natural disasters, port Neum is not held the best option for development of an industrial port. The reason behind it is developed tourist buildings, poor traffic connection to the background, closed off sea, and poor circulation of sea currents which could be an aggravating factor of environment protection. Road infrastructure network of Bosnia and Herzegovina is made up of 10% highways and around 4 % regional roads, while freeways are being built. (Agency for Statistics of Bosnia and Herzegovina, Sarajevo, 2008-2017)

Port Neum has all the predispositions to become the most developed port on the Adriatic – by the deepness of the sea, which is 23 meters in average making it one of the greatest depths in the Adriatic, and by its avenue of approach, considering that it would be located in the bay, and there would not be any threats of large waves. Maritime association plan is accepted and included in the areal plan of the Federation of Bosnia and Herzegovina, with a special area of ports in Maloston bay 10.5 km long. “If the Corridor Vc does not end up in Neum, and if a port is not built in that city, our Pan European route will not be financially profitable nor will it realize its main goal, being connection of the Adriatic sea with the Baltic”, in transport traffic. “According to various studies, such as the one by British firm ‘Scott Wilson’, which created the development plan of the Corridor Vc, it is predicted that most of the transport in the future will go by water. Another thing that was established according to the study is that ports in the Adriatic are used in a very small scope. Currently, there is a large interest that all ports from Salonika to Trieste be improved and much bigger scope of transport be enabled through them.” Port Neum would be connected to transport at Danube, which would open up large transport and financial possibilities. “If Bosnia and Herzegovina would have its port, it will be able to export goods to all parts of the world.” According to the prediction by the Maritime association, construction of port and railway in Neum would not exceed more than 200 million Euros. “I will mention certain Talgo trains bought from Spain for 65 million Euros. Those are trains adapted for future development of railroad traffic. Two Koncar trains cost 20 million Euros. Therefore, only trains cost 85 million Euros. 200 million Euro investment we are talking about, would enable those trains to be used since those trains are already invested for.” It is still unclear if the implementation of the plan about port construction in Neum will take place. In the meantime, Mayor of Neum municipality, Zivko Matusko, has spoken that such plan would destroy tourist orientation of Neum, and it would endanger plant and animal world in the Maloston bay. (Dundović, et.al., 2006)

3.2. Port Ploce

Port Ploce is located at the Southern part of the Adriatic coast in a natural bay, North-East from the mouth or river Neretva, with potentially large gravitational area which includes part of Croatia and is used for the economic needs of Bosnia and Herzegovina. In this paper, we analyze the influence and significance of the construction of new traffic corridors on development of port Ploce. By creation of channel Bosanski Samac – Vukovar, Pan European road direction Vc Budapest – Osijek – Sarajevo – Ploce, as well as part of Adriatic freeway Split – Ploce, port Ploce gains an important traffic significance in combined transport with sub-Danube countries.(www.port-authority-ploce.hr) The middle Adriatic maritime connection is seen as a natural extension of Corridor Vc which will enable connection of the south regions through port Ploce with the countries of the Middle and Eastern Europe. In the new conditions of modern port terminals, it should become of the most important ports on the Adriatic coast (Dundović, et.al, 2006).

Of all Adriatic ports, Bosnia and Herzegovina is best connected with port Ploce in the Republic of Croatia. Port Ploce is an Adriatic port which was developed as a port for traffic of goods from Bosnia and Herzegovina. It is connected by road and railroad to Bosnia and Herzegovina. Development of port Ploce in further future is held limited due to impossibility of spatial expansion of the port. Therefore, it is necessary to control cargo for smaller ships to pool Metkovic. Metkovic pool is the integral part of port Ploce. Limitation for ships is 4.5 m at the entrance of the mouth of river Neretva, 5 m for sailing on river, and 14 m height when sailing under the Rogotin Bridge. Port Metkovic is an international maritime port. Development of the coastal traffic would enable orientation of Bosnia and Herzegovina to other Adriatic and Mediterranean ports (Jelicic, 2013).

Table 1. Traffic of goods by movement directions for needs of Bosnia and Herzegovina from 1991 – 2017 (in 000 tons)

| Years | 1991 | 2001 | 2010 | 2015 | 2016 | 2017 |
|--------|-------|-------|-------|------|------|------|
| Import | 1,24 | 2,91 | 4,43 | 3,00 | 3,19 | 3,19 |
| Export | 5,55 | 3,65 | 7,20 | 3,20 | 3,19 | 4,34 |
| Total | 1,799 | 10,60 | 11,63 | 6,20 | 6,35 | 7,53 |

Source: Archives Port Ploce,1991-2017

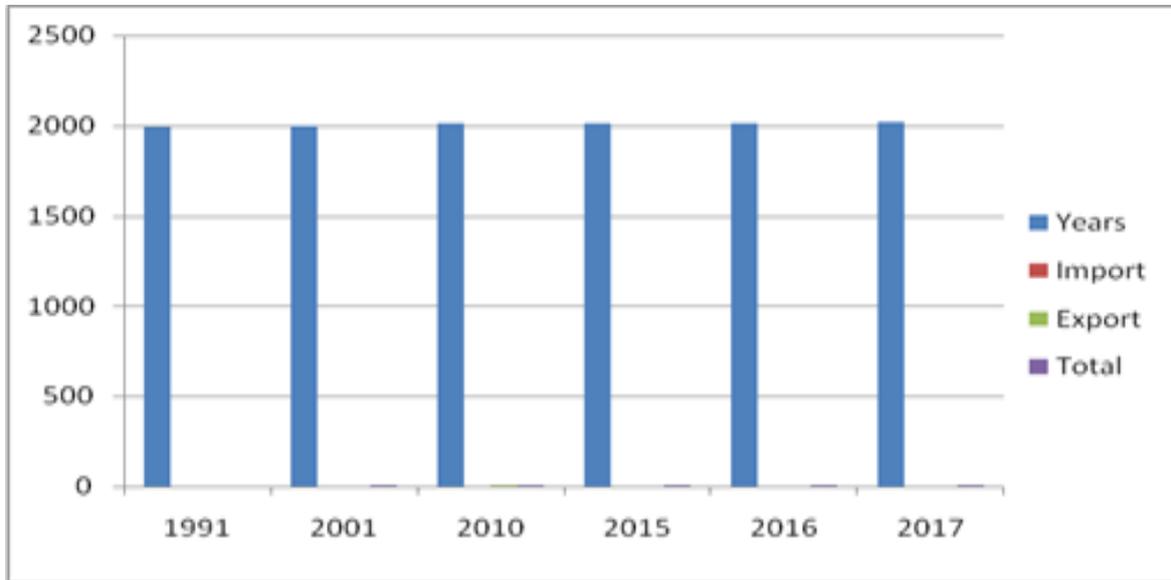


Figure 1: Traffic of goods by movement directions for needs of Bosnia and Herzegovina from 1991 – 2017 (in 000 tons)



Figure 2: Areal conception of ports in Bosnia and Herzegovina, 2018
Source: Author R.,Nurković

3.3. Port Brcko

It is located on the right shore of river Sava and it is famous for its rich tradition of offering port services. It takes an area of 14 ha of the right shore of river Sava and it is in the center of Brcko and it represents a significant potential and a resource which deserves attention. Also, besides the advantages, such position also has its flaws, and they are reflected in the limited possibility of further development and also the problems of access to traffic. In close proximity of the operative part of shore, there are three anchorages, formed according to technological operations and types of goods. (Agency for Statistics of Bosnia and Herzegovina, Sarajevo, 2008-2017) The length of the constructed operative shore is 104 m along the diagonal wharf and 76 m along the vertical wharf. Besides the operative shore, there are four runaway tracks with the total length of 2,586 m. Port Brcko is connected to the main railway station by single track line. It has 61,000 m² of open and 11,000 m² of closed warehouse space. Before 1990, 6 – 8 million tons of cargo was transported annually on average (Table 2 and Figure 3). The current state is the result of a long period of poor or no maintenance of the waterway. Steiner, (Tatalović & Bajić, 2010).

Table 2. Traffic of goods through port Brcko by movement directions for needs of Bosnia and Herzegovina from 1991 – 2017 (in 000 tons)

| Years | 2010 | 2015 | 2016 | 2017 |
|--------|--------|--------|---------|---------|
| Import | 45.722 | 39.234 | 117.165 | 106.370 |
| Export | - | 32.158 | 32.021 | 19.089 |
| Total | 45.722 | 71.392 | 149.186 | 125.459 |

Source: Archives Port Brčko,2010-2017.

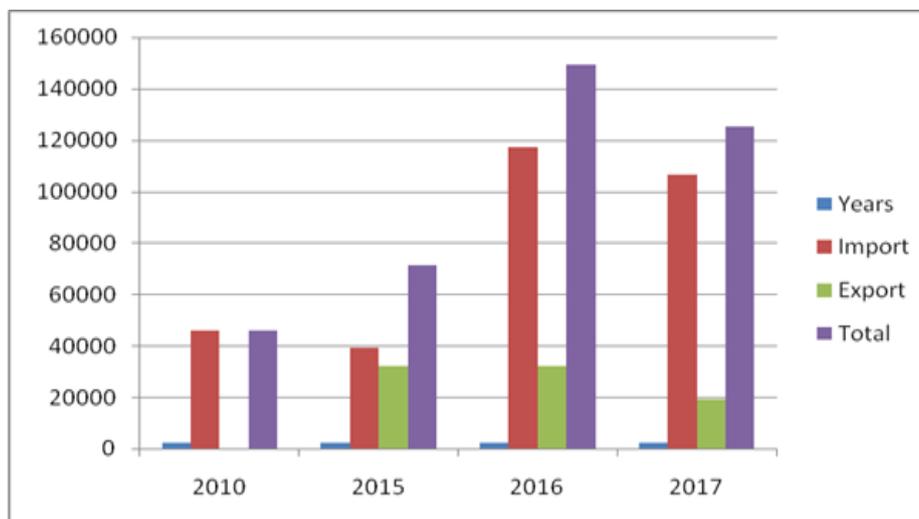


Figure 3: Traffic of goods through port Brcko by movement directions for needs of Bosnia and Herzegovina from 1991 – 2017 (in 000 tons)

Each river with its basin have their own different habitats and types that enrich life in the basin – lives of people of different cultures, peoples and countries. The same is with river Sava, which flows through four countries: the Republic of Slovenia, the Republic of Croatia, Bosnia and Herzegovina and the Republic of Serbia. River Sava also connects three capital cities of the four mentioned countries: Ljubljana in Slovenia, Zagreb in Croatia and Belgrade in Serbia. The fourth capital city – Sarajevo in Bosnia and Herzegovina also belongs to the basin of river Sava. River Sava is the third longest confluence of river Danube, however, it is the one with the largest average flow. It is created by merging two smaller rivers in Slovenia, Sava Dolinka and Sava Bohinjka, into a unified flow at Radovljica, and it further flows through Croatia, Bosnia and Herzegovina, Serbia, and into river Danube in Belgrade (Serbia).

River Sava is a mountainous river until Ljubljana, and further towards Zagreb, its fall is significantly decreasing and it becomes a plain river. From Radovljica, river Sava flows through Kranj and Ljubljana pit, and then through Litija-Krsko canyon that is 90 km long. At Brezica, it flows into Panonian basin and through its southern edge, it flows all the way to the mouth. The average longitudinal drop, from the mouth of Kupa into Sava and all the way to the mouth into Danube, is 42 mm/km, which results in strong meander which is characteristic for plain rivers. Due to such short drop, river Sava is not able to bring in silts as it is usually brought in by confluences, it actually deposits silts in its basin under the mouth of confluences thus creating many sandbars and shoals, which, along with its low water levels, it makes even harder to enable sailing through it at certain times. The regime of water of river Sava is rainy-snowy with an averages speed of flow of 3.2 m/s. The length of river Sava, from its source located in western Slovenian mountains to its mouth in Belgrade, is 944 km. Its basin, with an area of 97,713 km² includes a large part of territories of Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, and a small part of territory of Albania. With its average flow of 1,700 m³/s, river Sava represents the most significant confluence of river Danube, because it contributes with almost 25% of the total flow of Danube. This mains that the sustainable

development of river Sava basin has a significant influence on the basin area of river Danube. (www.port-authority-ploce.hr)

3.4. Port Samac

With its geographic position that it assumes, it represents the real example of the inter-modal platform on waterway, and with the close proximity of Corridor Vc and Corridor X with a good connection to the middle of Bosnia and Herzegovina, it contributes to the recognition of this port as very important for the economy of our country. It takes an area of 58.8 ha, and it is located on river Sava, between Zagreb (Croatia/EU) and Belgrade (Serbia). Port Samac is the only river port in Bosnia and Herzegovina with container transport of goods. River Sava is open for sailing 160 days per year, when its higher water level enables sailing with deeper gauge. From Samac to Danube, the length of river Sava is 304 km, where it connect with water way 3,500 km long from North to Black sea. Port Samac is connected to Corridor Vc and the railroad Samac – Luka Ploce (Croatia/EU) on the Adriatic sea. Port Samac takes area of 588,342 m².

4. Conclusion

Sea and river ports in Bosnia and Herzegovina are the key segment of development of traffic and economy of maritime countries. Through improvement and development of port and logistic services, ports attract new freight and consumers, where they contribute to an increase of trade in certain traffic direction. Quality port service is the foundation upon which it is possible to realize competitive position of a certain port, where all participants in port and trade systems and port surroundings benefit.

Within the Bosnian and Herzegovinian port system, the most significant ports, considering realized traffic of cargo, are ports Ploce and Brcko, while in passenger traffic, the most significant traffic with container trend of growth belongs to port Samac. Pan European transport corridors include the most important sea ports and maritime directions and they connect to the existing ground corridors. Including sea ports in development-investment project, there will be contribution to the modernization of port, road, and railroad infrastructure as a foundational assumption of competitiveness on European and global markets of port services.

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TÜCAUM 30. Yıl Uluslararası Coğrafya Sempozyumu
International Geography Symposium on the 30th Anniversary of TUCAUM
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