

Short Sea Shipping – an Opportunity for Development of the North Port of Split

Short Sea Shipping – prilika za razvoj Sjeverne luke u Splitu

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Summary

The current state of the North Port, part of the Port of Split predetermined for the cargo turnover, shows modest rate traffic. The paper examines if there is a potential for the further development and modernization of the port by integrating the Short Sea Shipping (SSS) services. Analysis regarding the main principles of the SSS concept has been provided for the North Port in order to penetrate and exploit new markets and demands as well as the directions of the future growth, mainly by using intermodal transport services. This implies particularly the revitalization of the Una track and investments in “green” technologies with the purpose of lowering the external costs of transport and positioning on the market as a green port offering lower harbour fees and taxes. With the implementation of new technologies based on sustainable development, eco-friendly mechanization, and port equipment, the North Port could establish new markets positioned in the hinterland and gravitational background of the city of Split and achieve a higher cargo turnover, primarily in the container transport, but also in the other segments of the port business.

Sažetak

Sjeverna luka, dio Luke Split namijenjen teretnom prometu, trenutačno pokazuje skromnu razinu prometa. U članku se ispituje potencijal budućeg razvoja i modernizacije luke integracijom usluga Short Sea Shipping (SSS). Provedena je analiza Sjeverne luke prema glavnim principima samog koncepta SSS-a radi osvajanja i iskorištavanja novih tržišta i potražnje, kao i pravaca budućeg razvitka intermodalnim transportnim uslugama. Posebno se ističe potreba za revitalizacijom Unske pruge i ulaganja u „zelene“ tehnologije s ciljem smanjenja vanjskih troškova prijevoza i pozicioniranja Sjeverne luke kao „zelene“ luke koja, u koordinaciji s Lučkom upravom Split, nudi niže lučke pristojbe i naknade. Implementacijom novih tehnologija temeljenih na održivom razvitku, ekološki prihvatljivoj mehanizaciji i lučkoj opremi, Sjeverna luka mogla bi uspostaviti nova tržišta smještena u svojem zaleđu i gravitacijskom području grada Splita i postići veći promet tereta, osobito u prijevozu kontejnera, ali i drugim segmentima lučkog poslovanja.

KEY WORDS

North Port
Short Sea Shipping
Split
sustainable development

KLJUČNE RIJEČI

Sjeverna luka
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1. INTRODUCTION / Uvod

In 2015, for the first time in records, world seaborne trade volumes were estimated to have exceeded 10 billion tonnes [1]. Maritime sector is facing major challenges in terms of hinterland congestion, traffic growth and lack of high-quality infrastructure. Increased pressure on environmental resources has already required the introduction of greener shipping.

There are several initiatives regarding achieving the sustainability in maritime transport in the European Union, such as Trans-European network (TEN-T), a project of Motorways of the sea (MoS) under the Short Sea Shipping (SSS)

Platform. The general aim of all projects and initiatives is a support of sustainable short-sea routes, maritime corridors, infrastructure development in ports, and sea-based transport services integrated into logistics chains. Requirements placed upon the ports within these networks and new traffic flows are extremely high, and in order to achieve competitiveness, ports should seek for new, improved strategies which can be viewed through strategic alliances or by a development of new technologies in cargo handling and improvement in performing port services. According to statistics, 20% of the goods coming to Europe by sea pass through

just three ports. There is the problem that high performing ports cannot optimally develop their maritime connections with other EU ports increasing the risk of congestion in their hinterland, in particular, road congestion, to the detriment of citizens living there. The structural gap threatens the development of short sea shipping as an alternative to saturated land routes [2].

Through new TEN-T guidelines, 329 ports were identified as key seaports along Europe's coastline and these ports will become part of a unified network boosting growth and competitiveness in Europe's Single Market [3]. Connecting

Europe Facility embarked more than 23 billion € for transport and establishment of TENT-T network southeast as a new sustainable transport network.

In the Republic of Croatia, seven ports are marked on the list of key seaports: Port of Rijeka as core port of Mediterranean corridor, and ports of Split, Zadar, Šibenik, Pula, Dubrovnik and Ploče as comprehensive ports. With 7 key seaports, Croatia has great possibilities for improving maritime access, hinterland connections and port sites [3]. With the application of the two main concepts, Short Sea Shipping and Motorways of the sea, the main Croatian ports in the Adriatic area are tending to integrate its business into the European trade market [4].

Unloading roads, reducing environmental impact, as well the reduction of the external transport costs by transferring cargo and passengers from land to sea transport is a key goal of the European Commission.

2. SHORT SEA SHIPPING AND MOTORWAYS OF THE SEA CONCEPT / *Short Sea Shipping i Motorways of the Sea concept*

Projects like SSS and Motorways of the sea are impacting the maritime industry. They are tools for tackling the environmental pollution and congestion, development of the maritime transport, improvement in port business and sustainable balance between the increase in traffic and environment protection by creating the new intermodal maritime logistic chain in Europe [4,5]. The aim is to tackle the negative environmental impacts, mainly air pollution, and congestion, by shifting the cargo from road to alternative modes of transport and by combining the two modes of transport to make an intermodal network. In the next fragments, the main features of SSS and Motorways of the sea will be provided in order to indicate the main elements and principles of the projects making, a blueprint for the development of Croatian ports.

2.1. SSS in EU / SSS u EU

Problems related to an excessive increase in traffic, road congestions, increased costs and constant delays in freight delivery followed by lower quality of the transport services in Europe, have led to the creation of short sea shipping [5]. Short sea shipping refers to as “the

movement of cargo and passengers by sea between ports situated in geographical Europe or between those ports and ports situated in the non-European countries having a coastline on the enclosed seas bordering Europe” [6]. The concept SSS includes domestic and international maritime transport, including feeder services along the coast, to and from the islands, rivers, and lakes. It consists of the maritime transport between the Member States of the Union and Norway and Iceland and other States on the Baltic Sea, Black Sea and Mediterranean [6]. During the period of the last 40 years European national and EU transport policy papers have been dealing with the problem of moving cargo from road to sea, inland waterways and rail [7]. The platform is recognized as a future of the European transport system unburdening the overloaded road routes and offering the multimodal maritime transport as an alternative [4]. With the implementation of SSS, the ports become strategic points in the whole logistic chain, forming the new cargo flows, making an alternative to the overcrowded road connection. In order to compensate for the shortcomings of alternative roads, it is necessary to avoid congestion and reduce costs. In general, the term “Short sea shipping” refers as a platform for the movement of freight and passengers between the two relatively close points by water as well as the connection that uses the services of various modes of transport. The aim of European Commission is to create a framework combining the advantages of various modes of transport enabling better efficiency, cost-effectiveness, and sustainability integrating it into the transport chain [5].

There can be found various combinations of the modes of transport, in most cases the combination of short sea shipping and road traffic but often also the combination of ships and rail and inland waterways vessel traffic [5]. With the fact that the project SSS aims for improved environmental performance and energy efficiency while maintaining the same competitiveness and dynamism of the sector in the EU [3], the combination of the maritime and rail transport imposes itself as the best solution. Also, with the fact that road transport has the largest share of total external costs of transport (84%), there is a great need of shifting the

cargo to intermodal transport network with the combination of maritime and rail transport, the mode generating less pressure on the environment and the human health. World trade is expected to grow noticeably in the future, and having in mind that short sea shipping has not yet fulfilled its potential and being less limited by space and other modes, it is imposed as the only mode capable of accommodating these expected volumes [8].

2.2. SSS in Croatia / SSS u Hrvatskoj

According to data from 2015 provided by Eurostat, SSS in the EU is estimated at 1.8 billion tonnes of goods which presented an increase of 0.9 % from the previous year. The Republic of Croatia recorded 11.9 million tonnes of short shipped goods in 2015, an increase of 14.2% related to the previous year [9].

From the definition given by the European Commission, it can be concluded that the SSS also includes the Republic of Croatia as a member of the EU as well as the Port of Split, the port of special international and economic interest for the Republic of Croatia. The term SSS has been initially introduced in the Republic of Croatia within the program “Marco Polo”, the part of the bigger project “Motorways of the sea”. The project Marco Polo persevered to ease road congestion and its attendant pollution by promoting a switch to greener transport modes for European freight traffic [10]. The program generated around 434 million € in environmental benefits reducing 21.9 billion tonne-kilometres of freight off the European roads [11]. In 2005, the Short Sea Shipping Promotion Centre was established in Croatia with the mission of exploiting the advantages that the short-sea shipping may provide at Trans-European and Pan-European level and promote an intermodal mode of transport [12] making a huge step with the aim of development of inter-coastal transport connection in Croatia. The intermodal transport in the Republic of Croatia is still in developmental phase, with the tendency of constant growth in the share of freight transport [5]. The main deficiency of the development of the SSS in the Republic of Croatia and its intermodality can be found in the inadequate and underdeveloped infrastructural, administrative, organizational, technical and technological components [12].

2.3. Motorways of the Sea

Due to fact that positive aspects of maritime transport such as low energy consumption, safety, environmental-friendly transport mode and low infrastructure cost were partly exploited through SSS, the concept of Motorways of the sea was mentioned as a revitalization measure [13].

MoS represent a tool that should implement initiatives to build a European maritime space without barriers, reduce bottlenecks, enable clean, safe and efficient transport system and positively contribute to greenhouse gas (CO₂) reductions.

A network of Motorways of the Sea is intended to concentrate flows of freight on sea-based logistical routes by improvement of existing maritime links but also by establishing new viable and frequent maritime links [14].

Among four corridors designated under the MoS platform, Motorway of the Sea of southeast Europe (connecting the Adriatic Sea to the Ionian Sea and the Eastern Mediterranean, including Cyprus) is especially important for the Republic of Croatia.

Statistical data show billions of tonnes carried through MoS each year. However, in order to function properly, they need efficient ports and hinterland connections, i.e. full integration into overall logistics chain [15].

For successful implementation and development of the MoS network developed a port system and connections with hinterland are crucial factors. From that aspect, if port strives for new customers and full integration in MoS Network, the pressure on the port is tremendous.

Therefore, some of the important elements that should be secured by MoS regarding the ports are: maintaining service schedule, service reliability and total door-to-door transit time [16].

3. PURPOSE AND METHOD OF THE RESEARCH / *Svrha i metode istraživanja*

The research focus in the article is the cargo transport in North Port situated in Vranjic-Solin basin. It represents a great, untapped potential for the city of Split, the surrounding gravitation area as well for the Republic of Croatia. Within the strategy "Maritime development and integrated maritime policy strategy of the Republic of Croatia for the period from 2014 to 2020" by the Government of the Republic of Croatia, the guidelines for the development of the Port of Split have been provided. According to the Strategy, the Port of Split should be evolved and specialized as a port for passenger and RO-RO transport, as well as the cruise port, neglecting the freight transport in the North Port, preventing its development and depriving the strategic importance for the city and the whole region. With the adoption of the Transport Development Strategy of the Republic of Croatia (2017 – 2030) in 2017, the potential of the Port of Split for the development in the freight segment was confirmed, indicating the appropriate specialization and proper development of the railway freight infrastructure [17]. An overview of the port facilities including infrastructure and suprastructure, port mechanization, annual turnover of cargo as well as the turnover related to the type of cargo will be examined. The central

part of the paper are the current problems and deficiencies in port business and operations for the North Port, as well as the future plans for its modernization and tendency of improved competitiveness among Croatian cargo seaports with the implementation of the Short sea shipping and intermodal connection. For the purpose of this, paper this part of the port responsible for the transport of cargo will be traditionally named "North Port" in order to facilitate the understanding.

4. PORT OF SPLIT – AN OVERVIEW / *Luka Split – pregled*

The Port of Split is located in the central part of the eastern coast of the Adriatic basin [18] and situated among important transport corridors of strategic importance for the Republic of Croatia. The port is open for international public traffic and, according to its size and importance, port of special (international) economic interest for the Republic of Croatia. The whole port area of the Port of Split is under jurisdiction of the Split Port Authority. It is divided into seven docking areas with the competence of Split Port Authority as follow: City port basin (car-passenger port), Vranjic-Solin basin (cargo port), Kastela basin A, Kastela basin B, Kastela basin C, Kastela basin D-Resnik and Komiza basin for fishing needs [19].

According to the number of passengers and vehicles, the Port of Split is ranked first among the Adriatic ports, and third in the Mediterranean [21]. Regarding the transport of cargo, it is ranked third among Croatian ports, behind Port of Rijeka and Port of Ploče [22]. Over the years the Port of Split has



Figure 1 North Port of Split – modified [20]

Slika 1 Sjeverna luka Split – izmijenjeno [20]

become one of the leading ports of call for cruise ships in the Adriatic. In 2016, the port of Split serviced more than 4.9 million passengers and 733,000 vehicles, and on the operational stores 2.75 million tonnes of cargo [19]. The Port of Split has two locations: passenger port in the centre of the city (Gradska Luka) and cargo terminal in the north suburb (North Port) [23]. Together with Split Port Authority, the cargo terminal is administered by a primary concessionaire Luka d.d. Split, and numerous secondary concessionaries for the use of port facilities or provide services to the port. Luka d.d. operates in the Vranjic-Solin basin (North Port) as primary concessionaire [19].

4.1. Analysis of the current condition in the North Port / *Analiza sadašnjeg stanja u Sjevernoj luci*

The freight transshipment in the Port of Split is operated in the northern part of the city of Split, in the Vranjic-Solin basin. The geographic location, modern warehouse equipment, road, and rail connection are the essential part of port competitiveness. The favourable geostrategic position is provided with the surrounding of the Kaštela bay and its

natural protection from the sea by the Split peninsula and island of Čiovo, forming a suitable space to accommodate the North Port. Several important European traffic corridors are located through middle Adriatic and hinterland which provide favourable natural and traffic position for the transport of cargo. The port has a great connection with many of Mediterranean hub-ports and worldwide destinations, and through Malta, Taranto and Gioia Tauro the container terminal is perfectly connected with a variety of big global container ports, whereas the modern highway and railway connect it to entire Europe [24].

According to data provided by the Split Port Authority, the transport of cargo in the Port of Split in 2016 amounted to 2.75 million tonnes with the share of the North Port of 361,268 tonnes of various cargos. When comparing the North Port with the other ports on the eastern part of the Adriatic an oversight occurs considering only the cargo turnover of the North Port when calculating the total cargo turnover in a specific period for the Port of Split and excluding the other terminals, industrial facilities and basins in the Vranjic-Solin and Kastela area. The facilities like "Žitni terminal",

"INA terminal", "Cemex" are the parts of terminals of the Port of Split as the North Port is. This practice is well known and provided by the Port of Rijeka, by including the terminals in Bakar, Omišalj, and Sušak when calculating the total cargo turnover. Keeping that in mind there is also a new calculation. By including the whole basin of the Port of Split, the total annual turnover exceeds 2.71 million tonnes of the turnover in the Port of Ploče accomplished in 2016 [25]. By all parameters, the North Port is a part of a respectable port, suitable for investment and modernization and has great potential in the future. For the purpose of detailed analysis, as well as possible future investments, it is important to demonstrate the technical characteristics of the North Port (Table 1).

The Container and RO-RO terminal have a surface of about 20,000 m² with the annual capacity of about 30,000 TEU, connected with two railroad tracks and a road for trucks that brings containers directly to the ships. The container terminal contains one mobile harbour crane type Liebherr with the capacity of 104 tonnes. The other port equipment related to the movement of the containers are:

Table 1 Technical specifications of Port of Split – North Port

Tablica 1. Tehničke specifikacije Luke Split – Sjeverna luka

<i>Features of Terminal</i>	Linear length of quay (m)	871
	Berths and relative lengths (m)	5 (174.2 m)
	Draught (m)	10.20
	Maximum ship length (m)	200
	Capacity of yard (n° lorries)	150
	Size of yard (m ²)	198,072
<i>Terminal equipment</i>	Number of dedicated entrance gate	2
	Size of parking areas (m ²)	10,000
	Lighting for night-time operations	Yes
	Quay and storage area (m ²)	163,000
	- Closed storage area (m ²)	40,000
	- Open storage area (m ²)	120,000
	- Roofed store area (m ²)	3,000
	Frigo warehouse (m ²)	2,000
	Silos	No
	Liquid cargo storage	No
	Car capacity	/
	Trailer capacity	4
	Trailer handling services	3
Passenger terminal-brief description	/	
Offices, phones, faxes, the Internet	Yes	
<i>Connections of the North Port</i>		
<i>Port infrastructure connections</i>	Number of access to motorways	1 (limited)
	Direct access to railway line	Yes
	Number of road tracks	2

Source: Made by authors; according to Dundović, Žgaljić, Jugović, 2012 – modified, using data provided by the North Port

- 1 container forklift - capacity 44t
- 1 reach stacker - capacity 40t
- 1 forklift – capacity 22t
- 2 container trailers
- 1 container truck
- 1 terminal tractor for container trailer

One of the biggest advantages of the port is a large amount of open (120,000 m²) and indoor (40,000 m²) storage areas divided into seven warehouses. It is important to emphasize 2,000 m² of refrigerated storage areas for fresh and frozen meat, fish and fruit. There is also a Truck terminal that provides parking for all types of vehicles. Terminal for bulk is equipped with one mobile harbour crane type Sennebogen 870 with special grab and three portal cranes type Ganz with the capacity of 5 tonnes. The other port equipment relates to numerous forklifts, tractors, skid and wheel loaders and other mechanization essential for the movement and turnover of the cargo.

Port activities in the area of the North Port of Split are performed on the total area of 198,072 m². The majority of the area is under concession and has the status of Free Zone, thus besides port services, it is possible to acquire

various services, goods, and products [24]. The Free zone is established with the purpose of stimulating business activity, investments in the Port of Split, exemptions from the customs dues and tax benefits.

The port is suited to accommodate vessels up to 200 meters with the maximum draft of 10.2 m on the quay of the total length of 871 m. This operational quay is divided into five berths as follows in Table 2.

Table 2 Main berth characteristics in the North Port

Tablica 2. Glavne karakteristike veza u Sjevernoj luci

Operational quay	Length (m)	Draft (m)
Berth 1	149	8.6
Berth 2	181	7.8
Berth 3	155	7.3
Berth 4	188	10.2
Berth 5	198	10.2
RO-RO ramp	20	7.2

Source: Made by authors using data provided by the North Port

The main business orientation related to the type of cargo is general

cargo, bulk, conditioned cargo, special and heavy cargo and container transport. It must be noted that the container traffic achieved a positive effect over the years with an average growth rate of 25% since 2006. The main export markets related to transport of cargo are the export of wood to United Arab Emirates and stone to China. Also, the export of scrap metal to Turkey should not be neglected. Regarding the import, the main products are coal, sugar and mineral fertilizers, bananas from Ecuador and salt from Tunis and Egypt. In recent years, the transport of yachts has been recorded as a new increasing segment of business in the North port, and has a seasonal character. The North Port exports more goods than it imports, so it represents a favourable strategic framework and position when compared to the other ports in the Adriatic and Mediterranean. The port generated 253,985 tonnes of cargo in 2009, and 410,842 tonnes in 2011, which represented an increase of 62% of cargo transport. The data provided for the year 2016 shows a noticeable drop in turnover amounted to 361,286 tonnes of various cargoes. The reasons can be

Table 3 Analytical overview of the cargo movement (t) in the North Port in the period 2009 – 2016

Tablica 3. Analitički pregled kretanja tereta (t) u Sjevernoj luci u razdoblju 2009. – 2016.

Type of cargo	2009.	2010.	2011.	2012.	2013.	2014.	2015.	2016.
Bananas and citrus fruits	25,324	24,130	24,313	33,296	41,433	29,648	8,761	0
Cement	40,348	11,886	0	0	0	0	0	0
Coal	0	0	8,674	0	0	0	0	0
Containers (tonnes)	44,830	58,943	67,291	70,274	56,677	87,063	91,685	101,647
Ferrous metallurgy	12,516	0	0	0	0	0	0	0
Frozen fish	7,735	2,516	0	3,411	3,290	0	3,767	0
Tubes/Gas tubes	0	11,064	0	931	0	0	0	0
Iron (wire, bars)	0	0	0	0	42,200	28,945	4,997	4,997
Lime	1,400	1,077	2,054	6,150	8,270	6,938	5,306	2,825
Mineral fertilizers	0	0	68,127	30,445	41,178	0	3,274	33,000
Metal profiles	0	0	1,367	0	0	0	0	0
Petroleum coke	18,915	26,600	6,715	9,710	3,857	15,844	25,522	89,089
Quartz	0	0	0	0	0	0	0	4,985
Salt	43,405	60,584	74,060	62,028	47,188	31,260	57,553	33,523
Scrap metal	42,059	70,873	140,390	113,448	51,388	49,905	27,384	34,908
Sheet metal	0	0	43	0	0	1,021	1,000	0
Slag	0	0	0	0	0	2,103	0	7,701
Soya	3,817	6,148	13,637	0	2,682	22,718	0	0
Stone aggregate	0	0	0	0	2,148	0	0	0
Sugar	2,500	0	0	53,000	49,166	26,390	60,202	31,171
Sugar beet pulp	0	0	1,639	7,511	0	0	0	10,423
Sulphur	5,950	0	0	0	0	0	0	0
Timber	0	0	0	0	996	0	0	3,510
Urea	0	11,461	0	0	0	0	0	0
Various type of cargo	5,186	4,162	2,532	5,166	3,824	1,822	9,463	3,489
TOTAL	253,985	289,444	410,842	395,370	354,297	303,657	298,914	361,268

Source: Made by authors using data provided by the North Port

found in the loss of Border Inspection Point (BIP) for refrigerated cargo in the year 2014 and unfavourable economic activities resulted in the decrease in cargo transport. The segmentation of transported cargo in the period from 2009 - 2016 can be found in Table 3.

Since 2009 the port increased transport of containers by 127%, so in 2016 amounted 101,647 tonnes. It remained one of the few sectors, showing an increase in comparison with the previous years, along with the transport of mineral fertilizers. The data from the Table 3 indicates negative trends regarding the transport of scrap metal, mainly because of the drop in the price on the world market [26]. Due to the higher temperatures in winter periods the shipping of salt suffered a significant decrease in 2016 as well as transport of bananas and citrus fruits caused by the actions of Agrokor Group, largest privately owned company in Republic of Croatia and its acquisition of Mercator, a Slovenian multinational retail corporation, which resulted in a change in business plan moving the transport of bananas and citrus fruit to the port of Koper [26]. The negative trend in the transport of other goods is also present but hardly predictable, mostly because of the nature and need of individual cargo.

4.2. Feeder service line in the port / Linijska usluga razvoza u luci

One of the important elements of the development of SSS is a feeder service providing separate short-sea shipping services that mediate between small ports and large vessels [27]. It is a modern way of organizing container transport, supplying larger container ships and hub terminals. The major global container operators operate the feeder service, and such form of container transport is important for successful functioning and development of the leading Croatian ports [28]. Before the economic crisis in 2008, the regular international feeder services operated by the companies like Maersk, Evergreen, Hapag – Lloyd, CMA CGM and others which were calling in the North Port more than 100 times in a year. Due to the crisis, the major container operators suffered heavy losses and had to cut their rising expenses. For the North Port, it has been manifested in the loss of the majority of feeder lines.

The feeder line calling in the North Port operated by CMA CGM in Intra-Mediterranean in 2015 and 2016 was as follows:

- Feeder service in Intra-Mediterranean: Freeport (Malta) – Bar (Montenegro) with the five ports of call: Bar (Montenegro) – Durres (Albania) – Ploče (Croatia) – Split (Croatia) – Freeport (Malta)

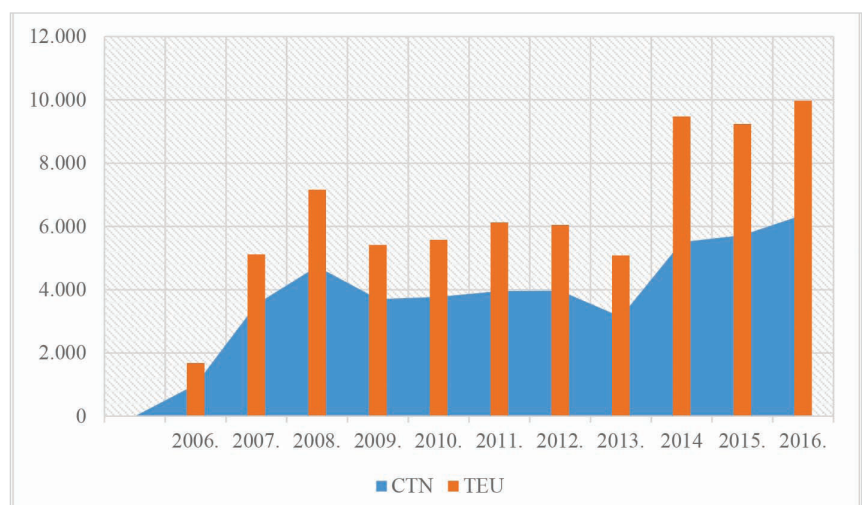
In late 2016 the feeder company CMA CGM FRANCE S.A. operating in the North Port changed its business orientation related to the transport of containers from the “mother” ships and hub ports located in Malta with the North Port. The existing feeder vessels, owned by the CMA CGM, were replaced by chartering the cargo space on the X-PRESS Container line vessels lowering the expenses and costs. X-PRESS Container line vessels operate on the weekly schedule on the route: Freeport (Malta) – Bar (Montenegro) – Durres (Albania) – Ploče (Croatia) – Split (Croatia) – Freeport (Malta). The possibility of adjustment of the feeder line, depending on the customer needs, should be emphasized. The feeder service contributes to the annual turnover of container transport integrating the port in the global container flows. In the year 2016, the feeder service noted 9,977 imported/exported containers through the North Port, an 8% increase related to the previous year when it had generated 9,240 containers.

4.3. Container traffic and flows of the feeder service / Prijevoz robe u kontejnerima i kretanja usluge razvoza

Transport of containers should be analysed separately due to the continuous increase in turnover. It has emerged itself as the most important business segment for the North Port with the annual turnover of 9,977 TEU in the year 2016 (Figure 2).

Figure 2 shows container traffic in the Port of Split for 10 year period (2006 - 2016). The highest increment in turnover of 203.56 % is registered in 2007. It is important to highlight positive trend for the past three years (2014 - 2016) where the constant growth of container traffic is recorded. The main export destinations, i.e. transit states provided by the feeder container transport service in 2016 were China and UAE, with the 81% of the total share of the export. The other notable export destinations were Vietnam (3.48%), Oman (2.60%) and Malta (2.25%). Regarding the import, China and Ecuador predominate with 86.62% of overall share, while the other significant origins were containers from USA in the share of 3.9% and Spain (3.44%).

Container flows are mainly directed to the countries of the Arabian Peninsula and the Middle East as well as the countries of the Far East. It can be concluded that the main destinations regarding the transport of containers for the North Port are situated outside the gravitational area and the hinterland of the port and Republic of Croatia. With the existing infrastructural



*TEU - Twenty-foot equivalent unit
*CTN - Number of containers

Source: Made by author using Croatian Bureau of Statistic data and data provided by the North port
Figure 2 Overview of container traffic in the North Port in the period 2006 – 2016
Slika 2. Pregled prijevoza robe u kontejnerima u Sjevernoj luci u razdoblju 2006. – 2016.

resources like highway A1 connecting the city of Split with the capital Zagreb, the industrial node for the Republic of Croatia, and railroads, Lička on the one hand, connecting the port with Zagreb and other European countries and "Una track" railroad on the other hand, connecting it with Bosnia and Herzegovina, an unused potential occurs with the great possibility of intermodal connectivity and transport. Knowing the fact that demand in the port is conditioned by its hinterland, the North Port needs to endeavour to create favourable infrastructural and economic conditions in order to attract container companies and its cargo. It can be realized only by investing in the sustainability and new technologies, providing services based on the environmentally friendly systems and offering discounts in harbour dues rates encouraging positive environmental practices while ships operate at the port.

4.4. SSS as an opportunity for development of the North Port / SSS kao prilika za razvoj Sjeverne luke

As already mentioned, Short Sea shipping promotes maritime transport and intermodality as the main transport service in the transport of goods. It provides better safety conditions, it is more energy efficient and more environmentally friendly. Development in this mode of transport represents an enormous potential for the Republic of Croatia [4].

Modernization of the existing railroad is fundamental for the integration of the North Port in the intermodal transport chain. Without the adequate rail connection, the idea and aim of the platform SSS lose its purpose. Generally, the whole rail infrastructure of the Republic of Croatia is extremely underdeveloped and almost the entire rail network needs to be reconstructed. With the fact that only 36% of the total network is electrified and only 9.3% of the network is covered with the double tracks the effectiveness of the railway is significantly reduced and reflected in a low commercial speed, frequent cancellations and delays, and relatively frequent train accidents [29].

The main obstacle for the North Port is exactly the poor condition of the rail infrastructure. As previously said the rail is not electrified and burdened with continuous problems of maintenance and delays. Today, as mentioned by

Rathman [4] instead of competition between ports there is rather a competition between transport routes. Without modernization and investment in the railway, the transport route leading to and from the North Port is incapable of achieving the competitiveness in the region as for uncertainty in on time delivery of goods and cargo, increasing costs by using the diesel rail transport, increasing the total cost of transport and rising the environmental external costs. The revitalization of "Una track" railroad is considered of vital importance, not only for the port of Split but also for all central Dalmatian ports (Zadar, Šibenik). It links the Adriatic with Central and Eastern Europe, so the reopening of the route would uncover the new potential markets mostly situated in Hungary, Czech Republic, Bosnia and Herzegovina and Serbia. The most of the freight transport was passing through Una track before; it was shorter and lower route of the railway line, which allowed higher speeds [30]. The various political decisions, lack of political will, historical facts and events as well as political relations between countries in this region postponed its reconstruction.

According to Statistical Reports for the Republic of Croatia [31] the gravitational area of cargo flows on the Mediterranean Corridor, the part of the Trans-European Transport Network, is predominantly Serbia and the city of Zagreb, with the smaller share in Bosnia and Herzegovina. With the fact that the Port of Rijeka exports the majority of its cargo by this route, the reconstruction of the "Una track" railroad would make the North Port of Split competitive with the above-mentioned transport route in the freight transport, taking into account the distance and transport costs. The first advantage is a component of distance, manifested in shortened maritime route to the North Port of Split for export markets situated in Serbia, and Bosnia-Herzegovina, compared with the port of Rijeka, and the abbreviated rail route to Serbia. The other huge advantage is the fact that Una track is completely electrified lowering the transport costs and external costs mainly in the part of environmental impacts. From the city of Knin to Novska (passing through "Federation of Bosnia and Herzegovina" and "Republika Srpska" - two constitutional and legal entities of Bosnia and Herzegovina) the rail

continues and connects with the Rhine-Danube Corridor, offering expansion to the new and uncovered markets and possibilities.

In order to position itself on the market and efforts to make it more competitive, the North Port needs to turn the own business orientation and focus towards the green technologies. Investing in the port mechanization with low emission of air pollutants like NO_x, SO_x, VOC, PM and CO₂, using the renewable energy sources on the shore (i.e. cold ironing) and, with the coordination of the Split Port Authority, by offering discounts for port charges, taxes or dues for vessels with a high environmental performance the North Port would turn toward sustainability and gather a larger market share.

Preserving the current relationships with the existing partners in the feeder service that is recognized as indispensable, just as well as a tendency to attract new important clients in that segment of business are the indicators of the good perspective for the port. Some of the recent clients previously lost by the influence of economic crisis have made interest for the reopening of the business in the North Port, and the inclusion of the port in the creation of new transport routes [26].

The North Port has made a plan for the development of port operations and the investment plan due to the extension of the concession up to the year 2035, in the amount of 16 million €, with already 7 million € invested in the previous years. Particular projects are focused on the improvement of the container terminal showing a significant increase within the years, and support of logistic operations through the modernization of the container terminal and various investments in warehouses, and building a logistics centre. Split Port Authority has secured the resources for the dredging of the port area, an important aspect of the port infrastructure, making a possibility of providing berths for larger vessels and adequate drafts.

The level of alignment of the transport and port infrastructure will have an impact on further development of the North Port. An initiative of the inclusion of Adriatic-Ionian Transport Corridor in the Trans-European Transport Network would certainly have a positive effect on the development of the port of Split.

It would connect Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, and Greece allowing the use of three different modes of transport: road, rail, and coastal shipping.

5. CONCLUSIONS / Zaključci

With the favourable geographic position and expected growth of the freight transportation market, the North Port should become a generator for the development of Split, its hinterland, and the Republic of Croatia. Implementation of new insights based on the reduced pressure on the environment, green technologies and principles of sustainability, as well as the possibility of short sea shipping and intermodal transport, e.g. revitalization of Una track, are the important segments for the port business and development. Coordination with the local community and state is an important aspect in gathering new markets and clients. The tendency of the future increase, especially in container transport, enables the perspective of the North Port to establish a respectable cargo transport.

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