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STRUKTURNA ANALIZA KONTEJNERIZACIJE HRVATSKIH LUKA

STRUCTURAL ANALYSIS OF CROATIAN CONTAINER SEAPORTS

SAŽETAK

U ovome radu izvršena je selektivna analiza relevantnih parametara kontejnerskih morskih luka Republike Hrvatske (Rijeka, Split, Ploče): geoprometni položaj, opremljenost za obavljanje kontejnerskog prometa, ostvareni kontejnerski promet, linijski servisi i povezanost s mediteranskim prekrcajnim lukama. Također, u radu je izvršena komparativna analiza hrvatskih morskih luka osposobljenih za kontejnerski promet s konkurentskim istočnojadranskim lukama Kopar (Slovenija), Trst (Italija) i Bar (Crna Gora), te se razmatraju pravci daljnjeg mogućeg razvoja.

Ključne riječi: *hrvatske kontejnerske luke Rijeka, Ploče i Split, kontejnerski promet, opremljenost luka, koridori, gravitacijsko područje.*

ABSTRACT

The proposed paper deals with relevant traffic parameters of the Croatian container seaports of Rijeka, Ploče and Split: geo – traffic location, quality of seaports equipment for an adequate container handling, realized container traffic, seaports liner services and connections of the Croatian seaports with the corresponding Mediterranean transhipment seaports. A comparative analysis has been made between the Croatian seaports and the competitive Eastern Adriatic seaports of Koper (Republic of Slovenia), Trieste (Republic of Italy) and Bar (Republic of Montenegro). The aim of the paper is to analyse relevant directions of the possible future Croatian container traffic development in interaction with the domestic market, transit traffic market, transhipment traffic for other destinations and inclusion of the Croatian container seaports in the European projects of the "Blue highways".

Key words: *Croatian container seaports of Rijeka, Ploče and Split, container traffic, port equipment and facilities, port infrastructure/superstructure, comparative analysis, future development*

1. UVOD

1.1. GEOPROMETNI POLOŽAJ HRVATSKIH LUKA U KOJIMA SE OBAVLJA KONTEJNERSKI PROMET

Republika Hrvatska ima 6 luka otvorenih za javni promet od međunarodnog gospodarskog značaja (Rijeka, Zadar, Šibenik, Split, Ploče i Dubrovnik). Kontejnerski promet obavlja se u lukama Rijeka, Ploče i Split te će one biti posebno obrađene.

1.1.1. Rijeka

Od svih hrvatskih luka, Rijeka ima prirodno najpovoljniji izlaz na more. Dinarsko gorje se upravo ovdje, u zaleđu sjevernog Jadrana, najviše snižava i sužava, olakšavajući na taj način izlazak na more najvažnijim transeuropskim prometnim pravcima, cestovnim i željezničkim [3]. Luka se nalazi u dobro zaštićenom Riječkom zaljevu koji je s otvorenim morem povezan preko prostranih Velih vrata. Rijeka je povoljno orijentirana prema svjetskim pomorskim pravcima; sjevernojadranski prometni smjer najkraći je put kojim je Europa povezana sa Sredozemljem i (uz Sueski kanal i Gibraltarski tjesnac) sa svjetskim pomorskim lukama. Dovoljne dubine na terminalima (11 m) omogućuju prihvat većih kontejnerskih brodova.

Rijeka je magistralnim cestama preko Republike Slovenije povezana s Italijom (Trst) i Austrijom (Salzburg i Graz), a preko Zagreba s Mađarskom (Budimpešta). Relacija Rijeka – Zagreb osnovni je pravac odvijanja prometa, budući se u Zagrebu sastaju dva za promet prema Rijeci posebno važna prometna pravca, kako cestovna, tako i željeznička [3]:

I. Iz Ukrajine i Slovačke preko Budimpešte i Varaždina - ogranak V.b paneuropskog koridora V., na ovaj se način povezuju baltičke zemlje i zemlje srednje i istočne Europe s Jadranom i zemljama Sredozemlja (Budimpešta – Zagreb – Karlovac – Rijeka – Trst) [2]:

II. Iz Austrije, Češke i Njemačke preko Graza i Maribora - ogranak X.a paneuropskog koridora X., preko Hrvatske i Bosne i Hercegovine, povezuju se sjeverozapadna i srednja Europa sa srednjim Jadranom (Graz – Maribor – Zagreb).

1. INTRODUCTION

1.1. GEO-TRAFFIC LOCATION OF CROATIAN CONTAINER SEAPORTS

The Republic of Croatia has 6 ports open for public traffic of outstanding (international) economic importance: Rijeka, Zadar, Šibenik, Split, Ploče and Dubrovnik. The container traffic takes place in the ports of Rijeka, Split and Ploče. In this paper, the three mentioned seaports will be elaborated.

1.1.1. Rijeka

Among all ports, the port of Rijeka has the most convenient natural exit toward the sea. Here, at the back of the North Adriatic Sea, the Dinaric upland lowers and straitens at its most, facilitating the sea reach to the most eminent transeuropean traffic directions, both roadways and railways [3]. The port is situated in a well protected Gulf of Rijeka, connected with the open sea by the wide Strait of Vela Vrata. The Port of Rijeka is conveniently oriented toward the world's seaborn routes; the North Adriatic traffic direction is the shortest way by which Europe is connected with the Mediterranean and, by the Suez Canal and the Strait of Gibraltar, with the world seaports. With sufficient terminal depths (11 m), acceptance of larger container vessels is rendered possible.

Highways connect Rijeka with Italy (Trieste) and Austria (Salzburg) through the Republic of Slovenia, and with Hungary (Budapest) through Zagreb. The route Rijeka – Zagreb represents the basis for a traffic process, giving that the two essential traffic directions relevant for Rijeka, both road- and railway, intersect in Zagreb [3]:

I. From Ukraine and Slovakian Republic through Budapest and Varaždin: this is the branch VB of the Pan-European Corridor V, connecting the Baltic countries, as well as the countries of Central and Eastern Europe with the Adriatic and the Mediterranean (Budapest – Zagreb – Karlovac – Rijeka – Trieste) [2];

II. From Austria, the Czech Republic and Germany through Graz and Maribor (Slovenia): the branch XA of the Pan-European Corridor X, connecting South-Western and Central Europe with central Adriatic (Graz – Maribor – Zagreb).

Prometni koridor Trst – Ljubljana – Zagreb – Beograd – Skopje – Atena/Sofija – Istanbul povezuje zapadnu i sjeverozapadnu Europu s Bliskim istokom.

Na ovaj način, gravitacijsko područje Rijeke obuhvaća unutrašnjost cjelokupne Hrvatske, Austriju, Bosnu i Hercegovinu, Češku, Njemačku (Bavarsku), Mađarsku, Slovačku i Srbiju.

1.1.2. Ploče

Luka Ploče glavna je luka za južni dio jadranske obale. Kao i Rijeka, nalazi se na dobrom strateškom položaju. Smještena u prirodnom zaljevu, s morske je strane zaštićena poluotokom Pelješcem. Dubine terminala su više nego zadovoljavajuće (13,8 m), a bitan čimbenik ovdje je i blizina ušća rijeke Neretve, kao razvijenog unutarnjeg plovnog puta.

Uz Jadransku magistralu kojom je povezana sa Splitom, Rijekom i Trstom, luka Ploče nalazi se na ishodištu ogranka V.c paneuropskog V. koridora. Ovaj koridor predstavlja povoljnu prometnu vezu između Baltičkog i Jadranskog mora. To su magistralni put i željeznički koridor Ploče – Metković – Mostar – Sarajevo – Zenica – Bosanski Šamac – Osijek – Mađarska.

Luka Ploče obuhvaća gravitacijsko područje jugoistočnog dijela Hrvatske, Bosne i Hercegovine, Crne Gore, Mađarske i Srbije.

1.1.3. Split

Luka Split smještena je na srednjem Jadranu. U novije doba putnički je promet razdvojen od teretnog na način da se južni dio splitske luke uz gradsku jezgru koristi za putnički promet, dok je teretni promet preusmjeren u industrijsku zonu, sjeverni dio luke (Vranjičko – Solinski – Kaštelanski bazen). Dubina mora od 10,5 m omogućava prihvat većih kontejnerskih brodova. Teretna luka je autocestom povezana sa Zagrebom, čime dodiruje europske prometne koridore, te cestom koja je povezuje s većim gradovima Bosne i Hercegovine (Sarajevo, Mostar, Zenica...). Jadranskom magistralom spojena je s Rijekom i Dubrovnikom, a željezničkom prugom s tržištem Hrvatske (tzv. lička pruga) i Bosne i Hercegovine (tzv. unska pruga).

Posebno značenje za luku Split i njezino okružje, ali i za Hrvatsku uopće, imati će buduća jadransko-jonska autocesta koja će povezivati Italiju (Trst) – Rijeku – Zadar – Šibenik

The Corridor Trieste – Ljubljana – Zagreb – Belgrade – Skopje – Athens/Sofia – Istanbul connects Western and North-Western Europe with the Middle East.

In this way, the gravitational area of the Port of Rijeka covers the whole inland of Croatia, as well as Austria, Bosnia and Herzegovina, Czech Republic, Germany (Bavaria), Hungary, Slovak Republic and Serbia.

1.1.2. Ploče

The Port of Ploče is the principal port for the Southern part of the Adriatic coast. Like the Port of Rijeka, it is structurally well situated. Located in a natural gulf and protected on the sea side by the peninsula of Pelješac, the Port of Ploče has more than satisfying terminal depths (13,8 m). Another important factor here is the vicinity of the estuary of important and developed inland waterway, the river Neretva.

Besides the Adriatic highway which connects the port with Split, Rijeka and Trieste, the Port of Ploče is placed on the origin of the branch VC of the Pan-European Corridor V. This traffic direction represents a convenient traffic relation between the Baltic and the Adriatic Sea. These are the highway and rail corridor Ploče – Metković – Mostar – Sarajevo – Zenica – Bosanski Šamac – Osijek – Hungary.

The Port of Ploče covers the gravitational area, consisting of the South-Eastern part of the Republic of Croatia as well as Bosnia and Herzegovina, Montenegro, Hungary and Serbia.

1.1.3. Split

The Port of Split is situated in the Central Adriatic. Recently, passenger and cargo traffic have been separated, so the Southern part of the port near the city centre is intended for passenger transport, while the facilities for cargo handling are situated in the industrial district in the Northern part of the port (Vranjičko – Solinski – Kaštelanski bazen). The terminal depths of 10,5 metres allow berthing of larger container ships. The container terminal is connected with Zagreb by a highway, and is thus linked with European traffic corridors. Other connections include the road leading to larger cities of the Republic of Bosnia and Herzegovina (Sarajevo, Mostar, Zenica...), the Adriatic highway toward Rijeka and Dubrovnik, and the railway which

– Split – Dubrovnik, Crnu Goru i Grčku (Kalamata).

Gravitacijsko područje luke Split je Hrvatska i Bosna i Hercegovina.

1.2. OPREMLJENOST LUKA ZA OBAVLJANJE KONTEJNERSKOG PROMETA

U komparativnoj analizi opremljenosti hrvatskih luka za obavljanje kontejnerskog prometa priključene su i druge istočnojadranske luke Trst (Italija) i Kopar (Slovenija) kako bi se luku Rijeka moglo promatrati u kontekstu drugih konkurentskih sjevernojadranskih luka. Razlog tome je što se ove tri luke i u lučkom sistemu EU-a promatraju kao jedinstven lučki sustav (engl. *multi-port gateway region*)[4], koji bi na jedinstvenom europskom prometnom tržištu u skoroj budućnosti trebao preuzeti dio prometnih tokova jedinstvene europske TEN-T-e mreže (Slika 1). Osim toga, u ovome trenutku sve tri luke tiču isti kontejnerski brodari s istim (direktnim i feeder) linijskim servisima, pa se mogu vršiti usporedbe. Posebno je važno istaknuti da sve tri luke imaju približno isto gravitacijsko područje, pa postoji stanovita konkurencija među njima. Isto tako, ove luke, kao jedna lučka regija (sjeverni Jadran) konkuriraju sjevernoeuropskim lukama (Antwerpen, Rotterdam, Bremen, Hamburg) za tržišta srednje Europe. Ovdje treba spomenuti i crnomorski prometni pravac, te Dunavski koridor koji će također u budućnosti predstavljati utjecajan čimbenik na srednjoeuropskim tržištima.

Analizi je priljučena i luka Bar (Crna Gora), kako bi se luke Split i Ploče moglo promatrati u širem kontekstu - isti brodari s istim kontejnerskim linijskim servisima (feeder) tiču ove tri južnojadranske luke.

Analiza opremljenosti obrađenih luka ukazuje na velike razlike po nekoliko različitih kriterija (Tablica 1):

– duljini operativne obale
– najvećem dopuštenom gazu brodova
– operativnoj površini za slaganje kontejnera
– broju dizalica
– projiciranom godišnjem prometu.

Po kriteriju duljine operativne obale i mogućnosti priveza kontejnerskih brodova, luka

connects the Port of Split with the Croatian market (rail of Lika) and with the market of the Bosnia and Herzegovina (rail of Una).

The gravitational area of the Port is the Republic of Croatia and the Republic of Bosnia and Herzegovina.

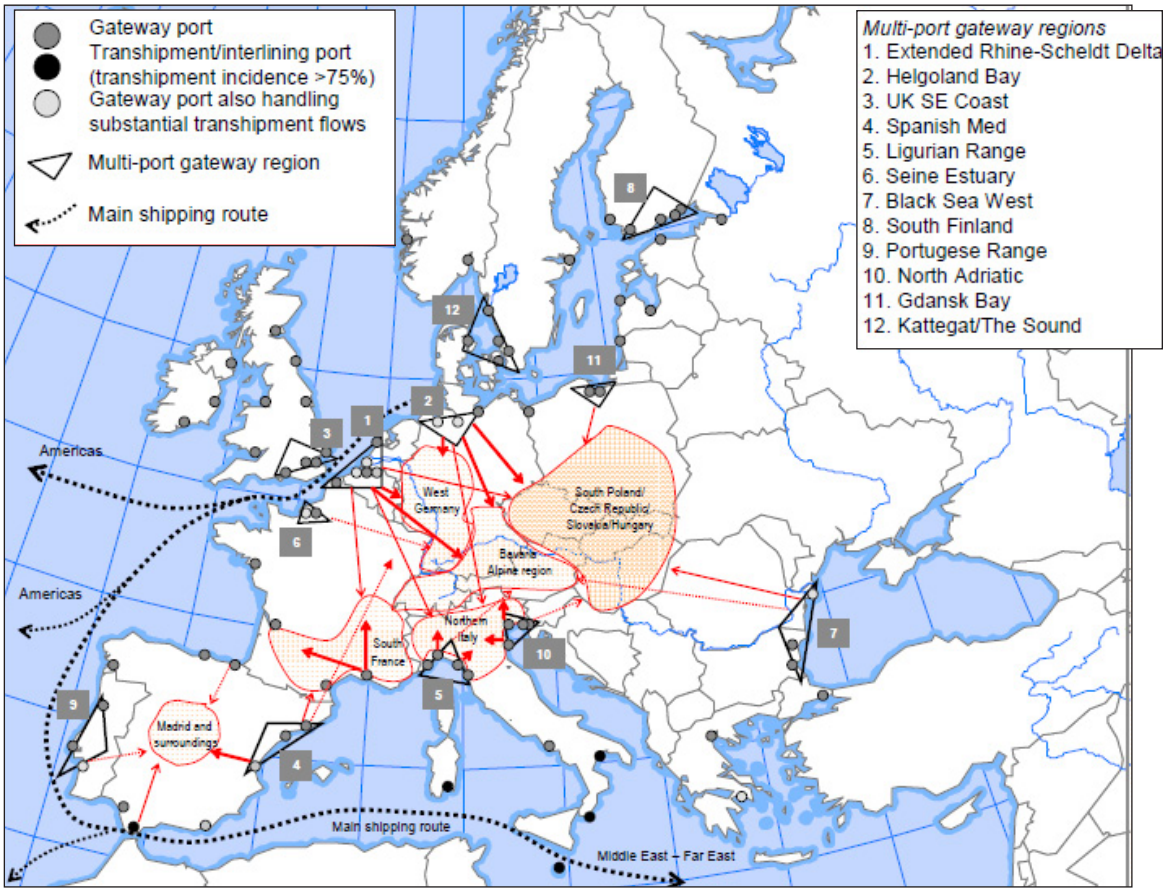
1.2. CONTAINER PORT FACILITIES AND CARGO HANDLING EQUIPMENT

In the comparative analysis of the Croatian container seaports equipment, other relevant Eastern-Adriatic ports are also included. These are the Port of Trieste (Italy) and the Port of Koper (Slovenia). In this manner, the Port of Rijeka can be observed in context with other competitive North Adriatic ports. In the European Union port system, all of these three ports are perceived as a singular port system (*multi-port gateway region*) [4]. In the united European traffic market, the mentioned system/region should take over the part of traffic of the European TEN-T netwok (Figure 1). Moreover, at this moment all three ports are adjoined by the same container carriers, have the same liner services, both direct and feeder, and comparisions among them can be made. It is important to emphasise that the gravitational area of these ports is approximately the same, and there is, to a certain degree, some competition among them. Furthermore, these ports, as a unique port region (North Adriatic), are competing the North European seaports (Antwerpen, Rotterdam, Bremen, Hamburg) for the Central Europe market. The Black Sea traffic route, as well as the Danubian Corridor should be mentioned here as they will, in the future, represent an relevant and fluential factor for Mideuropean markets.

The Port of Bar (Montenegro) is included in the analysis as well, so the Ports of Ploče and Split can be observed in a broader context – on all of these three ports the same lines with the same feeder services operate.

The elaborated ports equipment analysis indicates significant differences taking into consideration several criteria (Table 1):

– length of the quayside
– maximum allowed vessel's draft
– stacking surface
– number of STS cranes
– annual capacity.



Slika 1. Europski kontejnerski lučki sustav, područja logističkih jezgri i gravitacijsko zaleđe
Figure 1 *The European container port system, logistics core regions and hinterland*

Izvor / ***Source***: *Notteboom, ITMMA, 2009.*

Tablica 1. Postrojenja i oprema kontejnerskih terminala (na dan 01.09.2010.)
Table 1 *Container terminal facilities and equipment (as at 01.09.2010.)*

		KOPER, Slovenia	TRIESTE, Italy	RIJEKA, Croatia	PLOČE, Croatia	SPLIT, Croatia	BAR, Montenegro
OBALA / ***QUAYSIDE***	M	596	770	300 + 164	280	200	330
NAJVEĆI DOPUŠTENI GAZ / ***MAX. ALLOWED VSL. DRAF***	M	11,4	17	10,7	13	10,2	11
KONTEJNERSKE DIZALICE / ***STS CRANES***	PCS	8	7	2 + 2*	-	-	1**
OPERATIVNA POVRŠINA / ***STACKING SURFACE***	M2	170.000	400.000	80.000	38.000	20.000	110.000
GODIŠNJI KAPACITET / ***ANNUAL CAPACITY***	TEU	600.000	600.000	250.000	60.000	30.000	95.000
MOBILNE DIZALICE / ***MOBILE CRANE***	PCS	-	-	-	1	1	
Bilješka: *Kontejnerske dizalice stare su 23 i 31 godinu; **Kontejnerska dizalica stara je 32 godine Note: *STS Cranes 23 and 31 years old; **STS Crane 32 years old							

Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

Trst ima najdulju operativnu obalu, ali i najveću dubinu koja omogućava privez brodova s gazom većim nego što ga u ovom trenutku imaju brodovi post-panamax generacije koji dolaze u sjevernojadranske luke. Luka Trst također ima i najveću terminalsku površinu za slaganje kontejnera. Luka Kopar ima najveći broj kontejnerskih mosnih dizalica (brod – obala – brod) i to 4 panamax i 4 post-panamax generacije, dok Trst ima 7 dizalica post-panamax generacije. Luka Rijeka pruža mogućnost za vez dva kontejnerska broda; *Kostrensko pristanište jug* duljine 300 metara s 2 novije kontejnerske dizalice panamax generacije, i *Kostrensko pristanište zapad* duljine 164 metra s 2 kontejnerske mosne dizalice, ali starosti 23, odnosno 31 godinu, što je dostatno za vez i rad manjih feeder brodova.

Luke Ploče i Split nemaju kontejnerskih mosnih dizalica brod-obala-brod tako da manipulacije obavljaju mobilnim dizalicama, dok luka Bar raspolaže jednom kontejnerskom mosnom dizalicom strarosti 32 godine.

S obzirom da isti kontejnerski servisi tiču luke Kopar, Trst i Rijeku, ograničenost gaza broda na maksimalno 10,7 m u riječkoj luci u ovom trenutku limitira razvoj. Iz tog razloga Rijeka ne može biti prva luka ticanja u rotaciji servisa sjevernojadranskih luka i time u prednosti za pridobivanje tereta za srednjoeuropsko tržište.

1.3. STRUKTURNI ODNOS PUNIH I PRAZNIH KONTEJNERA

U tablici 2. prikazan je kontejnerski promet punim i praznim kontejnerima u 2008. i 2009. godini u hrvatskim lukama. Uočljivo je da promet punim kontejnerima dominira. Nadalje, veliko učešće prometa praznim kontejnerima za terminalske operatore predstavlja i manji prihod, s obzirom da su tarife manje.

With respect to the first criterion, the Port of Trieste is the leading one. The terminal depths are greater than the depths required for Post panamax ships, already operating in the North Adriatic ports. Trieste has also the largest container stacking surface.

The Port of Koper has the largest number of container STS cranes – four of Panamax, and four of Post panamax generation. Trieste operates with 7 Post panamy STS cranes. The Port of Rijeka provides berthing for two container vessels at two berths; *Kostrena quay south*, 300 m in length and two container, Panamax generation STS cranes (relatively newer), and *Kostrena quay west*, 164 m in length and two container cranes, 23 and 31 years old. These cranes are sufficient for berthing and operation with smaller feeder vessels.

In lack of the STS cranes, the Ports of Ploče and Split operate with one mobile crane each. The Port of Bar operates with a 32 years old STS crane.

Considering that the same container services operate in the North Adriatic ports, the draft limitation of 10,7 metres in the Port of Rijeka limits the port development. For this reason, the Port of Rijeka cannot be the first port of call in rotation service of the North Adriatic ports, thus taking advantage of winning over the cargo for the Mideuropean market.

1.3. STRUCTURAL RELATION OF FULL AND EMPTY CONTAINERS

The 2008 and 2009 Croatian seaports full and empty container traffic is shown in Table 2. It can be seen that the traffic with full containers dominates. Moreover, a great share of empty containers traffic represents, for the terminal operators, a lower income, given that the charges are smaller.

Tablica 2. Promet punim i praznim kontejnerima (TEU)
Table 2 *Throughput of full and empty containers (in TEU)*

	RIJEKA		PLOČE		SPLIT	
	PUNI *FULL*	**PRAZNI *EMPTY***	**PUNI *FULL***	**PRAZNI *EMPTY***	**PUNI *FULL* I**	**PRAZNI *EMPTY***
2008	**101 211**	**67 566**	**14 727**	**10 026**	**3 953**	**3204**
2009	75 564	47 179	10 266	8 264	2 983	2429

Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

Analizirajući promet samo punih kontejnera i to u uvozu i izvozu, došlo se do bitnog zaključka o neuravnoteženosti prekomorske robne razmjene preko hrvatskih kontejnerskih luka (Tablica 3). U 2009. godini neuravnoteženost između uvoza i izvoza iznosila je izuzetno nepovoljnih 4 : 1.

Analysing the import and export throughput of full containers only, a significant inference from the imbalance of overseas merchandise exchange through the Croatian container ports appears (Table 3). In 2009, the amount of the imbalance between import and export was unfavourable 4:1

Tablica 3. Promet punim kontejnerima (TEU)
Table 3 *Throughput of full containers (in TEU)*

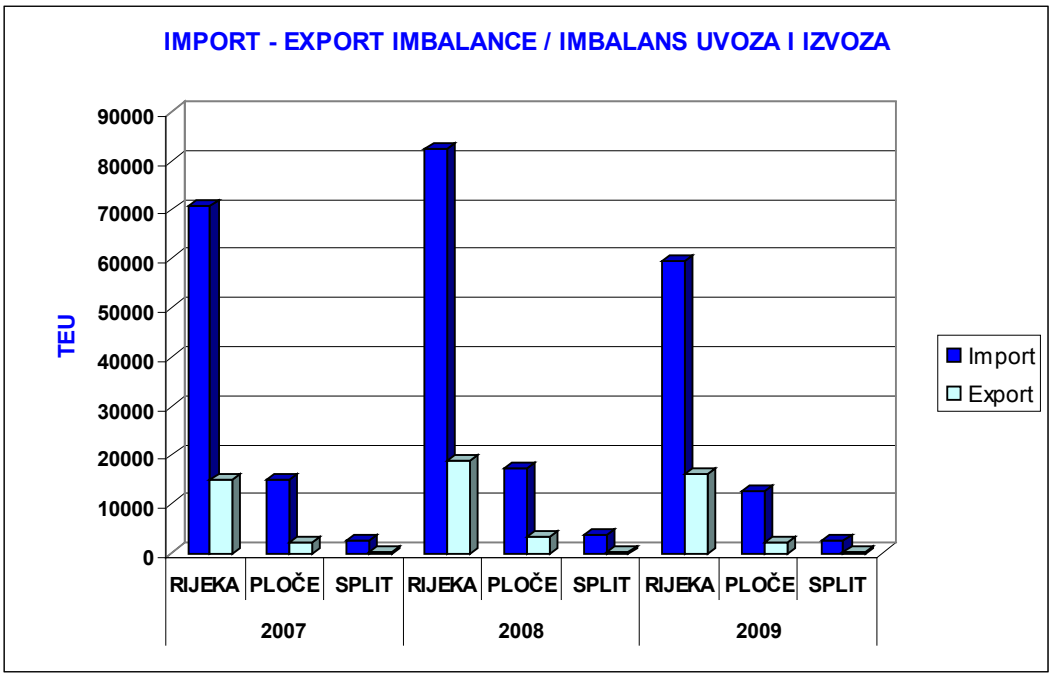
	RIJEKA		PLOČE		SPLIT	
	UVOZ IMPORT	IZVOZ EXPORT	UVOZ IMPORT	IZVOZ EXPORT	UVOZ IMPORT	IZVOZ EXPORT
2008	82 275	18 936	17 389	3 348	3 566	387
2009	59 357	16 207	12 628	2 051	2 662	321

Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

U grafikonu 1 prikazan je odnos između uvoza i izvoza punim kontejnerima iz čega se slikovito nazire strukturni problem kontejnerizacije, jer razlika između uvoza i izvoza za operatora kontejnerskog linijskog servisa predstavlja promet praznim kontejnerima, odnosno potrebu premještaja praznih kontejnera na ishodišna izvozna prekomorska tržišta. Značajni su troškovi manipulacije praznim kontejnerima, skladišnine za prazne kontejnere kao i premješta-

Graph 1 represents the relation between the import and export of full containers. The structural problem of containerization can be seen figuratively. For the container service operators, the difference between import and export represents the traffic of empty containers, that is the need for empty containers to be repositioned to their points of departure. The handling fees for empty containers are significant, as well as the storage fees and repositioning to

Grafikon 1. Usporedba uvoza i izvoza
Graph 1 *Comparison of import and export*



Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

nja na izvozna tržišta. Već je ranije rečeno da je promet praznim kontejnerima također nepovoljan za terminalske operatore jer su tarife za prazne kontejnere manje nego za pune kontejnere.

2. ANALIZA AKTUALNE SITUACIJE PO POJEDINIM LUKAMA

2.1. KONTEJNERSKI PROMET OD 2004. DO 2009. GODINE

U promatranom razdoblju od 2004. do 2009. godine (Tablica 4) najveći ukupni promet ostvarila je luka Kopar, zatim Trst i Rijeka. Na južnom Jadranu najveći promet ostvaruje luka Bar, a zatim luke Ploče i Split, koja je kontejnerski promet počela ostvarivati 2006. godine.

export markets. And, as mentioned before, the empty container traffic is inconvenient for terminal operators because the charges are smaller than for full containers.

2. ANALYSIS OF THE CURRENT SITUATION FOR EACH PORT

2.1. THE 2004-2009 CONTAINER TRAFFIC

During the study period from 2004 – 2009 (Table 4), the largest traffic was realised in the Port of Koper, followed by the Port of Trieste and finally by the Port Rijeka. In the South Adriatic area the largest traffic is realised in the Port of Bar, followed by the Port of Ploče and the Port of Split (which started with its container traffic in 2006).

Tablica 4. Promet punim i praznim kontejnerima (TEU)
Table 4 *Containers throughput with full and empty containers (in TEU)*

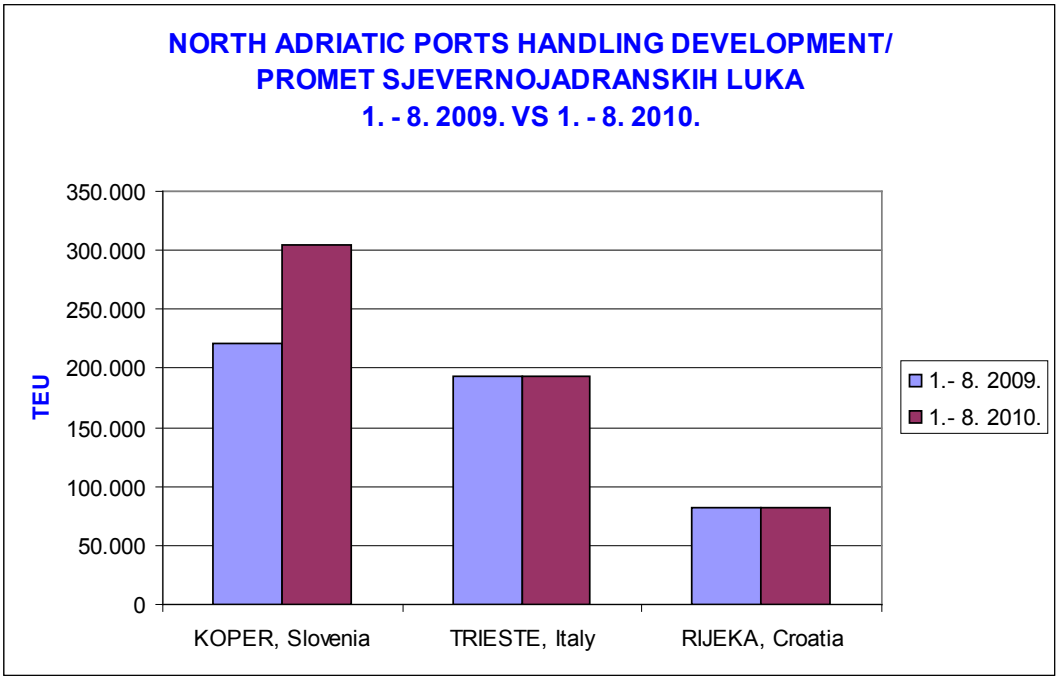
YEAR/ GODINA	KOPER, Slovenia	TRIESTE, Italy	RIJEKA, Croatia	BAR, Montenegro	PLOČE, Croatia	SPLIT, Croatia	TOTAL/ UKUPNO
2004	153 347	177 672	60 864	10 287	14 520	0	415 376
2005	179 745	201 290	76 330	12 284	17 065	0	486 642
2006	218 970	220 661	94 395	16 829	18 150	1 685	570 686
2007	305 648	267 854	145 024	27 095	29 385	5 115	780 121
2008	353 880	338 296	168 777	43 708	35 124	7 157	946 928
2009	343 165	277 245	122 743	34 692	25 931	5 412	809 188

Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

Značajan je podatak da je do 2007. godine luka Trst prednjačila u kontejnerskom prometu, sve dok luka Kopar nije preuzela vodstvo koje se i u 2010. godini povećava. Usporedba kontejnerskog prometa u prvih 8 mjeseci 2009. i 2010. godine pokazuje znakovite razlike. Tijekom 2010. godine u sve tri luke započeo je novi, direktan zajednički servis brodara *HANJIN/HMM/YANG MING/UASC* iz Dalekog istoka za sjeverni Jadran. U lukama Trst i Rijeka promet je u 2010. ostao na razini 2009. godine. Istovremeno, u luci Kopar došlo je do velikog povećanja prometa (Grafikon 2), pa se na osnovi ostvarenog prometa u promatranom razdoblju može zaključiti da je u lukama Trst i Rijeka došlo do preraspodjele istog (postojećeg) prometa na više međusobno konkurentnih brodara, dok je u luci Kopar došlo do povećanja (novog) prometa. Dublja analiza po strukturi tereta u kontejnerima kao i segmentacija krajnjih korisnika pokazuje da je preko luke Kopar

The significant fact is that until 2007, the Port of Trieste was the leading one in the container trade, while the Port of Koper took over this advantage so that in the year 2010 the container traffic is still increasing. Comparing the container traffic in the first eight months of the year 2009 and 2010 there are some differences. During the 2010, in all of the three North Adriatic ports a new, direct container service started with its operation. It is the joint service between the *HANJIN/HMM/YANG MING/UASC* operators from the Far East to the North Adriatic. In the Ports of Trieste and Rijeka, the traffic in 2010 remained as it was in 2009. At the same time, a significant increase in the container traffic appeared in the Port of Koper (Graph 2). Based on the traffic realised during the observed period, it can be concluded that in the Ports of Trieste and Rijeka a redistribution of the same, existing cargo occurred, in a way that the cargo was distributed to several, mutually competitive operators.

Grafikon 2. Usporedba prometa sjevernojadranskih luka
Graph 2 *North Adriatic Ports throughput comparison (in TEU)*



Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

izvršen promet za multinacionalne kompanije u zemljama srednje Europe i to pretežito komponenata koji se u velikim logističko-distributivnim centrima sastavljaju u finalne proizvode. Za ovakvu vrstu tereta koparska luka je tjedno osigurala nekoliko desetaka blok-vlakova do krajnjih destinacija u srednjoj Europi, posebice u Slovačkoj i Mađarskoj. Danas ovakva vrsta prometa ne egzistira preko riječke luke jer preko Rijeke prevladava prijevoz finalnih proizvoda u kontejnerima za tržišta u Hrvatskoj, Srbiji i manjim dijelom za Bosnu i Hercegovinu. Padom kupovne moći krajnjih kupaca i manjom potrebom za zalihama kao posljedicom svjetske ekonomske krize, i lučki promet stagnira.

2.2. PRIKAZ KONTEJNERSKIH LINIJSKIH SERVISA

U tablici 5 prikazani su svi linijski kontejnerski servisi u hrvatskim lukama na dan 01. 09. 2010.

U luci Rijeka čak 13 brodara/operatora pruža kontejnerski servis, od čega su dva direktni servisi iz luka Dalekog istoka brodovima maticama: zajednički servis brodara *CMA CGM* i *MAERSK* obavlja se post-panamax brodovima kapaciteta 6.200 – 6.500 TEU-a, dok se zajed-

At the same time, the container traffic with new cargo seems to be increased in the Port of Koper. Analysing the structure of the container cargoes and the segmentation of the end-users a following conclusion was reached: the Port of Koper realized the traffic for multinational companies from the Mideuropean countries and the cargo was mostly formed of components which were assembled into final products in logistics and distribution centers.

The Port of Koper provided tens of block trains to the end-user destinations in Central Europe for these cargoes, especially in Slovakia and Hungary. Nowadays, this type of traffic does not exist in the Port of Rijeka. The transport of final products prevails for the markets in Croatia, Serbia and partly Bosnia and Herzegovina. Due to the decline in the purchasing power and in lower stock demands as a result of the global economic crisis, the seaport traffic has stagnated.

2.2. REVIEW OF THE CONTAINER LINER SERVICES

Complete liner container services in Croatian seaports as on 1st September 2010 are shown in Table 5.

Tablica 5. Linijski kontejnerski servisi u hrvatskim lukama (na dan 01.09.2010.)
Table 5 *Liner container services at the Croatian ports (as at 1st September 2010)*

SHIPOWNER / OPERATOR	RIJEKA	PLOČE	SPLIT	FEEDER OPERATOR	HUB
CMA CGM	1) DIRECT J.V. SERVICE FROM FAR EAST WITH MOTHER VESSELS* 2) FEEDER VIA MALTA	FEEDER SERVICE VIA MALTA	FEEDER SERVICE VIA MALTA	J.V. CMA CGM / XCL	MALTA
COSCO	FEEDER SERVICE VIA PIRAEUS	NO SERVICE	NO SERVICE	J.V. COSCO / XCL	PIRAEUS
DELMAS	FEEDER SERVICE VIA MALTA	FEEDER SERVICE VIA MALTA	FEEDER SERVICE VIA MALTA	J.V. CMA CGM / XCL	MALTA
EVERGREEN	FEEDER SERVICE VIA TARANTO	FEEDER SERVICE VIA TARANTO	FEEDER SERVICE VIA TARANTO	OWN FEEDER	TARANTO
HAPAG LLOYD	FEEDER SERVICE VIA CAGLIARI	FEEDER SERVICE VIA CAGLIARI / MALTA	FEEDER SERVICE VIA CAGLIARI / MALTA	J.V. CMA CGM / XCL	CAGLIARI
HANJIN	DIRECT J.V. SERVICE FROM FAR EAST**	NO SERVICE	NO SERVICE	-	DIRECT SERVICE
HYUNDAI M.M.	DIRECT J.V. SERVICE FROM FAR EAST**	NO SERVICE	NO SERVICE	-	DIRECT SERVICE
MSC	OWN FEEDER SERVICE VIA GIOIA TAURO	OWN FEEDER SERVICE	NO SERVICE	OWN FEEDER	GIOIA TAURO
MAERSK	1) DIRECT J.V. SERVICE FROM FAR EAST WITH MOTHER VESSELS* 2) FEEDER VIA GIOIA TAURO	FEEDER SERVICE VIA GIOIA TAURO	FEEDER SERVICE VIA GIOIA TAURO	J.V. COSCO / XCL (Rijeka) J.V.CMA CGM / XCL (Ploče, Split)	GIOIA TAURO
CSAV NORASIA	OWN FEEDER SERVICE VIA MALTA	NO SERVICE	NO SERVICE	OWN FEEDER	MALTA
SAFEMARINE	1) DIRECT J.V. SERVICE FROM FAR EAST WITH MOTHER VESSELS* 2) FEEDER VIA GIOIA TAURO	FEEDER SERVICE VIA GIOIA TAURO	FEEDER SERVICE VIA GIOIA TAURO	J.V. COSCO / XCL (Rijeka) J.V. CMA CGM / XCL (Ploče, Split)	GIOIA TAURO
UASC	DIRECT J.V. SERVICE FROM FAR EAST**	NO SERVICE	NO SERVICE	-	DIRECT SERVICE
YANG MING LINE	DIRECT J.V. SERVICE FROM FAR EAST**	NO SERVICE	NO SERVICE	-	DIRECT SERVICE

Izvor: Temeljano na izvorima dobivenim od strane brodara
Source: *Based on data provided by Carriers*

nički servis *HANJIN*/*HMM*/*YML*/*UASC* obavlja brodovima kapaciteta 4.000 – 4.700 TEU-a. Drugi brodari koriste feeder servise iz srednjomediteranskih prekrcajnih (engl. *hub*) luka: Cagliari (*Hapag Lloyd*), Malta (*Delmas, Norasia*), Pireus (*Cosco*), Gioia Tauro (*MSC, Maersk, Safemarine*). Isti linijski servisi posluju u Kopru i u Trstu.

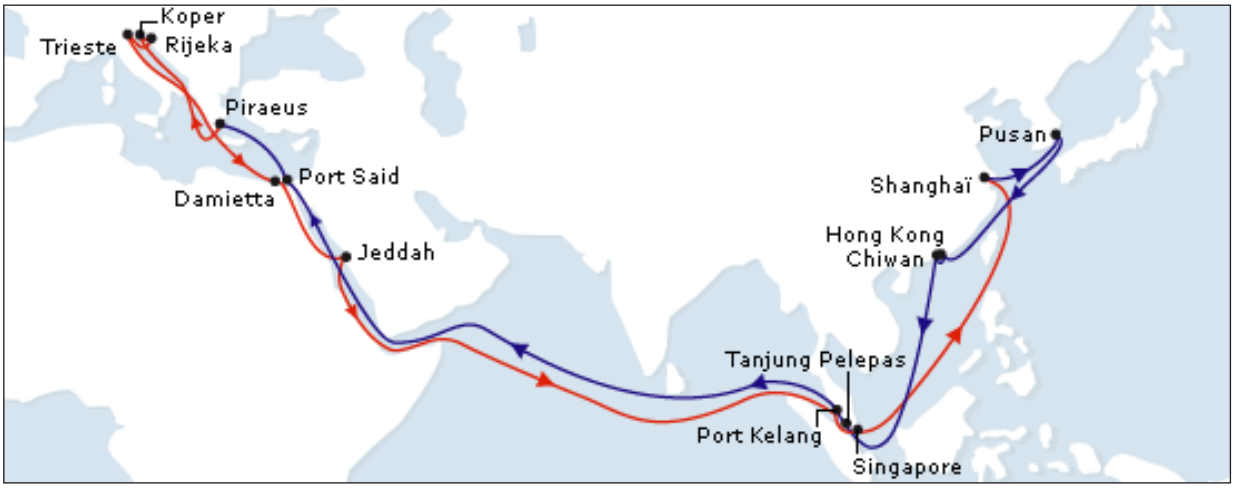
Prisutnost velikog broja najvećih svjetskih kontejnerskih brodara, direktni servisi brodovima maticama i povezanost feeder servisima sa svim srednjomediteranskim prekrcajnim lukama, pokazatelji su osposobljenosti sjevernojadranskih luka za prihvat velikih kontejnerskih brodova i distribuciju tereta u zemlje zaleđa.

U lukama Ploče i Split, kao i u luci Bar, posluju isključivo feeder servisi preko ranije spomenutih srednjo-mediteranskih prekrcajnih luka. Za očekivati je da će takva situacija ostati ista sve dok južnojadranske luke ne izgrade odgovarajuću infra i suprastrukturu za prihvat brodova matica u direktnom servisu i dok se ne osigura neophodna količina tereta koja bi ekonomski opravdala uspostavu direktnih servisa.

Up to 13 operators provide container services in the Port of Rijeka, of which two are direct services from the ports of the Far East; joint services of *CMA CGM* and *MAERSK* is carried out with Post panamax vessels with a capacity of 6200 – 6500 TEU, while the joint service of *HANJIN*/*HMM*/*YML*/*UASC* operates with vessels of the capacity of 4000 – 4700 TEU. Other operators use feeder services from Central Mediterranean hub ports. They are: Cagliari (*Hapag Lloyd*), Malta (*Delmas, Norasia*), Piraeus (*Cosco*) and Gioia Tauro (*MSC, Maersk, Safemarine*). The same liner services are operating in the Ports of Koper and Trieste.

The presence of a number of the world's largest container operators, direct services with mother ships and the connection of feeder services with all Central Mediterranean hub ports indicate that the North Adriatic ports are capable of receiving large container vessels and of distributing of cargo to the hinterland countries.

In the Ports of Ploče and Split, as well as in the Port of Bar strictly feeder services operate through the above mentioned Mediterranean



Slika 2. Primjeri direktnih servisa naprometnim pravcima između Dalekog istoka i sjevernog Mediterana
Figure 2 *Typical examples of direct service on trade routes from Far East to North Adriatic*

Izvor / ***Source:*** www.cma-cgm.com

2.3. PRIKAZ KOPNENE POVEZANOSTI SA ZALEĐEM

Dobra kopnena povezanost sa zaleđem (cestovna, željeznička i riječna) osigurava konkurentnost i potencijalni teret pojedine luke. Ova je povezanost važna za domaći promet iz nacionalne prekomorske vanjskotrgovinske razmjene, ali posebno za tranzitne terete zemalja u gravitacijskom području pojedine luke. Starije definicije o presudnoj važnosti zemljopisnog položaja luke u određivanju prometnih tokova danas imaju manju važnost u odnosu na logističke kriterije koje postavljaju velike multinacionalne kompanije i brodari/operatori linijskih servisa. Rukovodeći se kriterijima prikladne dubine terminala, zagarantiranog veza broda u točno određeno vrijeme, produktivnosti rada i mreže blok-vlakova do odredišta u zaleđu (gdje su multinacionalne kompanije pozicionirale logističko-distribucijske centre) brodari određuju rotaciju servisa, odnosno redoslijed luka ticanja i na taj način predodređuju prometne tokove.

Multiplikacija koridora donosi promjene u odnosima između luka i zaleđa. Naime, strateško je opredjeljenje svake luke osigurati čim bolju kopnenu povezanost sa zaleđem, kako bi proširenjem gravitacijskog područja osigurala veću količinu tereta. S druge strane, zemlje u zaleđu žele imati više opcija na raspolaganju i nametnuti tržišnu utakmicu između luka kako bi osigurale najbrži, najfleksibilniji i najjeftiniji servis svojim korisnicima. Na slici 1 vidi se kako veliko tržište južne Poljske, Češke, Slovačke i Mađarske ima na raspolaganju više prometnih hub ports. It can be expected that this situation will remain the same until the appropriate infrastructure and superstructure is built in these ports and the acceptance of mother ships for direct service is rendered possible. To justify the realisation of this service, a necessarry volume of traffic has to be guaranteed.

2.3. LAND CONNECTIONS WITH THE HINTERLAND

An adequate connection of the ports with the hinterland (by rail, road and inland waterways) ensures a competition and a potential cargo in certain port. This connection is essential for the home transport from the national overseas foreign trade, but especially for transit cargo for the countries in the gravitational area of the respective port.

Nowadays, the previous definitions regarding the crucial importance of the geo–location of individual ports for the traffic flows determination, are no longer adequate due to the logistic criteria defined by large multinational companies and liner service operators. Guided by the criteria of an adequate depth, berth guaranteed in a specific time, crane productivity and network of block trains to destinations in the hinterland[1], the operators determine the service rotation, that is the order of ports of call, thus predeterminating the traffic flows.

[1] Where the logistic and distribution centers are positioned by multinational companies.

koridora i konkurenciju više luka: sjevernojadranskih, sjevernoeuropskih i crnomorskih.

U tablici 6 prikazani su redovni kontejnerski vlakovi koji prometuju između sjevernojadranskih luka i zemalja u gravitacijskom području pojedine luke. Uočljivo je da najveća mreža blok-vlakova za odredišta u srednjoj Europi, kao i koncentracija željezničkih operatera postoji u Kopru (*Adria Kombi, ICF, Metrans, Navismart, ICA, Adria Transport*). Zbog ove su činjenice brodari/operatori direktnih brodskih servisa izabrali luku Kopar kao prvu luku ticanja u sjevernom Jadranu, predodređujući na taj način najkraće tranzitno vrijeme prijevoza kontejnera do Kopra, a potom iz Kopra do odredišta u srednjoj Europi, u odnosu na Trst i Rijeku. U ovim razlozima treba tražiti odgovor zašto je u promatranom razdoblju od prvih osam mjeseci 2010. u odnosu na 2009. Kopar ostvario povećanje prometa od 38%, dok su Rijeka i Trst ostali na gotovo istom prometu (Grafikon 2).

Iz južnih jadranskih luka Split, Ploče i Bar ne prometuju regularni blok-vlakovi, iako postoji mogućnost svakodnevne otpreme kontejnera željeznicom u režimu pojedinačnih isporuka.

Odnos otpreme kontejnera iz hrvatskih luka cestovnim putem (kamionima) je 75%, u odnosu na otpremu željeznicom od samo 25%. Ovakav odnos rezultat je veće fleksibilnosti cestov-

The corridor multiplication leads to changes between the ports and the hinterland. Namely, the strategic commitment of each port is to ensure the best possible connection with the hinterland, spreading the gravitational area and ensuring a larger amount of the cargo. On the other hand, the hinterland countries search for more available options, imposing competition between the ports to ensure the fastest, most flexible, most effective and cheapest service for its users. Figure 1 demonstrates that large markets of South Poland, the Czech Republic, the Republic of Slovakia and Hungary have, at their disposal, several traffic corridors and the competition among a certain number of ports - the North Adriatic, North European and Black Sea ports.

Regular container trains operating between the North Adriatic ports and the hinterland countries are shown in Table 6. It is obvious from this that the largest network of block trains for mideuropean destinations, as well as rail operators concetration, resides in the Port of Koper (*Adria Kombi, ICF, Metrans, Navismart, ICA, Adria Transport*). That is why direct service shippers/operators have chosen this port as the first port of call in the North Adriatic, thus predeterminating the shortest transit time of container transport to the Port of Koper, and then from the port to the final destinations in the Middle Europe, in relation to the Ports of Trieste and

Tablica 6. Redovite željezničke veze sa zaleđem
Table 6 *Regular railway connections with hinterland origins and destinations (as at 1st September 2010)*

DRŽAVA *COUNTRY*	KOPER, Slovenia	TRIESTE, Italy	Rijeka, Croatia
SLOVENIA	Ljubljana, Maribor	-	-
ITALY	-	Padova, Milano, Bologna, Cervignano, Fernetti	-
CROATIA	Zagreb	-	Zagreb
AUSTRIA	Graz, Villach	Villach, Graz, Wien, Linz, Salzburg, Wolfurth	-
HUNGARY	Budapest, Szolnik, Budaors, Torokbalint	Budapest, Zahony	Budapest
SLOVAKIA	Zilina, Bratislava, Dunajska Streda	-	-
CZECH REP.	Vratimov	Prague	-
GERMANY	Munchen	Munchen, Ulm, Ludwigshaffen, Koln, Duisburg, Leipzig, Berlin	-
SERBIA	Belgrade	-	Belgrade

Izvor: Temeljeno na podacima dobivenim od strane Lučkih uprava i operatera kontejnerskih terminala
Source: *Based on data provided by Port Authorities and Container terminal operators*

nog prometa, bržeg tranzitnog vremena, manjeg broja kopnenih manipulacija, bržeg carinskog postupka i jednostavnije dokumentacije. Iako je željeznički promet na duljim relacijama jeftiniji u odnosu na cestovni promet, spomenuti kriteriji još uvijek prevladavaju kod odabira transportne grane.

3. RAZVOJNI PROJEKTI HRVATSKIH KONTEJNERSKIH LUKA

3.1. LUČKA INFRASTRUKTURA, LUČKA SUPRASTRUKTURA I KOPNENA INFRASTRUKTURA

3.1.1. Rijeka

U luci Rijeka postoji nekoliko razvojnih projekata.

Projekt proširenja kontejnerskog terminala Brajdica obuhvaća produženje postojeće obale za novih 330 m, uz dubinu mora od 14,5 m. Nakon produljenja i rekonstrukcije koja se predviđa za 2013. godinu, računa se da bi kontejnerski terminal Brajdica mogao zadovoljiti prometnu potražnju od 300 000 TEU-a godišnje. U završnoj fazi realizacije je državna cesta D404, spojna cesta između terminala Brajdica i riječke zaobilaznice. U tijeku su intenzivne aktivnosti za nabavku 2 nove mosne kontejnerske dizalice, kao i odabir strateškog partnera.

Projekt novog kontejnerskog terminala na Zagrebačkom pristaništu u riječkoj luci podrazumijeva gradnju novog kontejnerskog terminala u ukupnoj dužini od 680 m s dubinom od 17 m. Prva faza od 400 m obale ima planirani završetak radova 2015. godine, dok druga faza od 280 m obale i ukupno planiranog prometa od 670. 000 TEU-a godišnje ima planirani završetak radova 2017. godine.

Planira se i izgradnja spojne ceste D403 između novog terminala i riječke zaobilaznice. Dugoročni projekt predstavlja izgradnju kontejnerskog terminala izvan urbane zone grada Rijeke, na otoku Krku, na način da bude prometno integriran željezničkim i cestovnim vezama sa zaleđem, od 2017. godine nadalje. Na taj projekt nadovezuje se i projekt izgradnje novog mosta Krk – kopno, kao i projekt izgradnje nove ravničarske pruge koja bi bila povezana s novim mostom i povezala Rijeku i Botovo na mađarskoj granici [5].

Rijeka. These are the reasons where the answer concerning the traffic increase has to be looked for, where in the first eight months of the year 2010 with regard to the year 2009, the Port of Koper increased its traffic for 38%, while Trieste and Rijeka remained on almost the same traffic volume (Graph 2).

From the Southern-Adriatic ports of Split, Ploče i Bar, regular block trains do not operate, although there is a possibility of daily shipment of containers by rail in the regime of single shipment deliveries.

The ratio of container shipments from Croatian ports by road (trucks) is 75% in comparision with the shipment by rail which is 25%. This ratio is the result of a greater flexibility in the road transport, faster transit time, less cargo handling, faster custom procedures and simpler documentation processes. Although the train service is cheaper at longer distances as compared to the road transport, these criteria still prevail in the selection of the means of transport.

3. CROATIAN SEAPORTS DEVELOPMENT PROJECTS

3.1. INFRASTRUCTURE AND SUPERSTRUCTURE OF THE PORTS AND LAND INFRASTRUCTURE

3.1.1. Rijeka

In the Port of Rijeka, there are several development projects.

The container terminal expansion project includes the extension of the existing Brajdica quay for another 330 m, with a sea depth of 14,5 m. The extension and reconstruction planned for the year 2013 could meet the traffic requirements of 300 000 TEUs per year. A link between the Brajdica terminal and the detour of Rijeka, a state road D404, is in the final phase of realisation. There are intense activities for the purchase of 2 new STS cranes, and for the selection of a strategic partner.

The project of a new container terminal on the Zagreb pier in the Port of Rijeka includes the construction of a 680 m new terminal, with a depth of 17 m. The first phase in the construction of the 400 metre long coast is planned for completion in the year 2015, while the second phase of the 280 m long coastline with a total planned turnover of 670 000 TEU per year is expected in 2017.

3.1.2. Ploče

U luci Ploče u kolovozu 2010. godine svečano je otvoren novi kontejnerski terminal koji ima površinu od 38.000 m^2, duljinu operativne obale 280 m i dubinu akvatorija 13,8 m. Planirani godišnji kapacitet je 60.000 TEU-a. Očekuje se da će kontejnerski terminal početi s operativnim radom u studenom 2010. godine. U završnoj fazi realizacije je nabavka mosne kontejnerske dizalice (brod – obala – brod).

Razvojnim projektom u drugoj fazi, predviđa se izgradnja obale za dodatnih 150 m. Konačnom izgradnjom terminala planira se ukupna površina od 23 ha i godišnji kapacitet od 100.000 TEUa.

U kratkoročnom planu je dovršetak izgradnje autoceste do Ploča i direktna veza luke s autocestom. U tijeku su intenzivne aktivnosti na izgradnji autoceste kroz Bosnu i Hercegovinu na trasi Koridora V.c, kao i obnova željezničke infrastrukture.

3.1.3. Split

S obzirom da kontejnerska luka Split isključivo servisira potrebe lokalnih uvoznika i izvoznika, bez učešća tranzitnog prometa iz šireg gravitacijskog područja, postojeći lučki kapaciteti dostatni su za višegodišnji očekivani promet. Luka je spojena na autocestu i željezničkim kolosijekom spojena je na ličku prugu za Zagreb i unsku prugu za Bosnu i Hercegovinu.

Lučkim kratkoročnim razvojnim projektima planira se nabavka nove mobilne dizalice, ali isto tako u dugoročnim planovima planira se i proširenje kontejnerskog terminala kao i modernizacija željeznice na ličkoj i unskoj trasi.

Ovdje treba istaknuti i da sve ostale istočnojadranske kontejnerske luke imaju velike razvojne planove; luka Kopar planira graditi potpuno novi kontejnerski terminal s projiciranim godišnjim prometom od 1 milijun TEU-a. Luka Trst također planira nove kapacitete s godišnjim prometom od 1,2 milijuna TEU-a, a luka Bar u svojim razvojnim planovima planira lučke kapacitete s kojima bi se ostvarivala godišnji promet od 500.000 TEU-a.

Realizacija razvojnih planova ovisit će o investicijskim mogućnostima, strateškim partnerima i razvoju prometa. Svi ovi razvojni planovi podrazumijevaju velike rekonstrukcije i una-

There is also a plan for the construction of the connection road D403 between the new terminal and the Rijeka detour road. A more long-term project includes the construction of a new container terminal outside the urban zone of the city of Rijeka, namely on the island of Krk, in a way that it will be integrated by the means of transport with the road and railway connections with the hinterland, starting in 2017 onwards. Two more projects need to be mentioned: the construction of a brand new bridge which will connect the Island of Krk with the mainland, as well as the construction of the new lowland railroad line, linked with the bridge, and connecting the Port of Rijeka with the Botovo settlement, near the Croatian border with Hungary [5].

3.1.2. Ploče

The new container terminal was formally opened in August 2010. The terminal has a stacking surface of 38 000 m^2, 280 m long quayside with a depth of 13,8 m. The annual capacity of 60 000 TEU is planned. It is expected that the terminal will start with itsoperations in November 2010. In the final phase of this project realisation is the purchase of a new container STS crane.

The second phase of the development project includes an additional 150 m of coastline. At the end there will be 23 ha of stacking surface planned, with an annual capacity of 100 000 TEU.

In the short run, a finalisation of the highway toward Ploče, enabling the connection of the port with the highway is planned. The construction of the highway through the Republic of Bosnia and Herzegovina is in progress[2], as well as the renewal of the rail infrastructure.

3.1.3. Split

Given that the Port of Split (its container part) is only servicing the needs of local importers and exporters without participating into the transit traffic from a wider area of gravitation, the existing port facilities are sufficient for the expected perennial traffic. The port is connected to the highway and rail-connected to the rail of Lika towards Zagreb and to the rail of Una towards Bosnia and Herzegovina.

The short-term development project includes the purchase of a new mobile container crane,

[2] That is on the route of the Paneuropean Corridor VC.

pređenja u željezničkoj i cestovnoj povezanosti sa zaleđem koja je "qonditio sine qua non" za razvoj luka i ostvarenje planiranog prometa.

3.2. MOGUĆNOSTI DALJNJEG RAZVOJA KONTEJNERSKOG PROMETA U HRVATSKIM LUKAMA

Daljnji razvoj kontejnerskog prometa u hrvatskim lukama može se sagledati kroz nekoliko segmenata, dio kojih se već sada ostvaruje, i dio koji već postoji u drugim svjetskim kontejnerskim lukama, i čija iskustva se mogu primijeniti i na hrvatske kontejnerske luke:

- promet za nacionalno tržište
- promet za tranzitno tržište
- promet prekrcaja kontejnera (regionalna hub luka)
- promet generiran razvojem logističko-distribucijskog centra blizu luke
- promet generiran povezivanjem s logističko-distribucijskim centrima multinacionalnih kompanija
- promet generiran razvojem projekata "plavih autocesta"
- promet generiran razvojem poslova popravaka i održavanja kontejnera
- promet generiran lociranjem depoa leasing kompanija.

3.2.1. Promet za nacionalno tržište

Već danas hrvatske luke ostvaruju ovaj segment poslovanja, jer se hrvatska prekomorska robna razmjena gotovo u potpunosti ostvaruje preko hrvatskih luka. Ova komponenta je moguća jer u današnjim uvjetima brodari/operatori linijskih kontejnerskih servisa pružaju uslugu prijevoza za sva prekomorska tržišta, bilo direktnim ili feeder servisima. U prije navedenom tekstu (poglavlje 2.2) obrađeni su svi linijski servisi u hrvatskim lukama i njihova povezanost s prekrcajnim lukama u srednjem Mediteranu.

3.2.2. Promet za tranzitno tržište

I za promet prema tranzitnom tržište u zaleđu hrvatskih luka može se ustvrditi da djelomično postoji. Preko luke Rijeka danas se ostvaruje tranzitni promet za Srbiju i Bosnu i

while in the long run it is planned to extend the container terminal. The is also a plan for the modernisation of the Lika and Una rails.

It should be noted that all the other Eastern container seaports have great development plans; the Port of Koper is planning to build a brand new container terminal with a projected annual turnover of 1 million TEU. The Port of Trieste is also planning to build new facilities with an annual turnover of 1,2 million TEU, while the Port of Bar is planning to build additional port facilities with which an annual turnover of 500 000 TEU would be realised.

The realisation of the development plans will depend on investment opportunities, strategic partners and development operations. All of these development projects include major reconstructions and improvements in road and rail connections with the hinterland, which is "conditio sine qua non" ¸for the port development and achievment of the planned operations.

3.2. POSSIBILITIES OF FURTHER CONTAINER TRAFFIC DEVELOPMENT IN CROATIAN SEAPORTS

A further development of the container traffic in Croatian seaports can be seen through several segments, part of which is already in process, and a part already exists in other world container ports, whose experiences can be applied on the Croatian container ports:

- the national market traffic
- the transit market traffic
- transhipment container traffic (regional hub port)
- traffic generated by the development of logistics and distribution center near ports
- traffic generated by connecting logistics and distribution centers of multinational companies
- traffic generated by "Highways of the Sea" development projects
- traffic generated by the development of container repairs and maintenance works
- traffic generated by locating the depot leasing companies.

3.2.1. The national market traffic

Today, the Croatian ports have accomplished this segment, because the Croatian overseas

Hercegovinu, a preko Ploča za Bosnu i Hercegovinu. Iz ove konstatacije izvodi se zaključak da se preko hrvatskih luka, u današnjem trenutku ne obavlja tranzitni promet za cijelo postojeće gravitacijsko područje, odnosno za Austriju, Mađarsku, Češku, Slovačku i Njemačku (Bavarsku). Stoga u razvijanju kopnene povezanosti, posebno željezničkim blok-vlakovima, leži veliki potencijal daljnjeg razvoja kontejnerskog prometa. Bez razvoja ove komponente prometa, sva ulaganja u lučku infrastrukturu i suprastrukturu neće povratiti investiciju.

3.2.3. Promet prekrcaja kontejnera (regionalna *hub* luka)

Svaka luka ima mogućnost obavljanja prekrcaja kontejnera (engl. *transhipment*) na način da se u toj luci iskrcavaju kontejneri s brodova, čije je odredište neka druga luka u regiji, i da se ti isti kontejneri prekrcavaju na druge brodove za krajnju odredišnu luku. One luke koje imaju direktne servise brodovima maticama imaju veliku prednost i mogućnost organizacije prekrcaja kontejnera za druge luke u regiji, koje nemaju direktan servis. Konkretan primjer za ovu djelatnost ima luka Trst, koja korisnicima nudi prekrcaj kontejnera s brodova matica u direktnom servisu na feeder brodove za krajnje odredišne luke Veneciju, Ravennu i Anconu. Operator feeder servisa u direktnoj je funkciji luke Trst i privlačenja dodatnog, prekrcajnog tereta.

Na istim osnovama ova mogućnost postoji i u luci Rijeka, jer ima direktne linijske servise i malu udaljenost do drugih manjih jadranskih luka. Na ovaj način, klasično poimanje gravitacijskog područja samo na tržišta u zaleđu se nadopunjuje i dodatnim gravitacijskim područjem na manje luke u regiji (Slika 3).

3.2.4. Promet generiran razvojem logističko-distribucijskog centra blizu luke

Ovakva razvojna mogućnost danas nije iskorištena u hrvatskim lukama. Logističko-distribucijski centar smješten u neposrednoj blizini kontejnerskog terminala, prema svjetskim iskustvima u direktnoj je funkciji privlačenja robnih tokova i stvaranja najviše dodatnih vrijednosti na osnovnu lučku, pretovarnu funkciju. Logističko-distribucijski centar predstavlja suvremeni objekt u kojem se pribire, čuva, dorađuje i priprema roba za daljnju distribuciju do kupaca.

trade is almost entirely realised through Croatian ports. This component is possible because at current conditions, liner service operators are providing transportation services for all overseas markets, either direct or by feeder services. In the foregoing text (section 2.2) all liner services in the Croatian seaports are elaborated, as well as their connection with the hub ports in the Central Mediterranean.

3.2.2. The transit market traffic

For the transit market traffic in the hinterland of the Croatian ports, it can also be argued that it partially exists. Through the Port of Rijeka, the transit traffic for Serbia and Bosnia and Herzegovina is realised, and through the Port of Ploče for Bosnia and Herzegovina. From these observations it can be concluded that at this moment the transit traffic through Croatian ports is not carried out for the whole gravitational area, i.e. Austria, Hungary, the Czech Republic, the Republic of Slovakia and Germany (Bavaria). Therefore, in land transport connection development, especially by means of railway block trains, lies a great potential for the further container traffic development. Without the development of this component of transport, investments in the port infrastructure and superstructure will not be recovered.

3.2.3. Transhipment container traffic (regional *hub* port)

Each port has the ability of the container transhipment in a way that the containerized cargo is unloaded from ships in a specific port, reaching its destination to the assigned seaports in the region, and that then these containers are transhipped to other ships for the final ports of destination. Ports with direct services by mother ships have a great advantage and possibility for organising transhipment for other seaports in the region, which have no direct services. An example of this activity is the Port of Trieste, which offers the transhipment of containers from mother ships in direct services to the final destination at the Ports of Venezia, Ravenna and Ancona. The feeder service operator is in a direct function of the Port of Trieste and in the attraction of additional, transhipment cargo.

On the same basis, this option exists in the Port of Rijeka, because it has a direct liner service and a short distance to other, smaller ports in the Adriatic. In this way, the classical understanding

Slika 3. Gravitacijsko područje sačinjeno do zaleđa i pročelja
Figure 3 *Gravitation area consisted of hinterland and foreland*

Izvor: Izradili autori
Source: *Made by authors*

Luka Rijeka ima velike mogućnosti razvoja ovoga segmenta poslovanja u okviru industrijske zone Kukuljanovo, koja ima povoljan geoprometni položaj i neophodnu infrastrukturu [2]. Na ovo se nadovezuje i projekt velikog logističkog centra Miklavja u općini Matulji.

Planirani projekt "Cargo centar Zagreb" također je u funkciji privlačenja novih tereta, jer se u okviru ovoga Centra planira intermodalno povezivanje luke Rijeka, riječne luke Sisak te zračne luke Zagreb s europskim željezničkim i cestovnim pravcima.

3.2.5. Promet generiran povezivanjem s logističko-distribucijskim centrima multinacionalnih komapanija

Ovakva razvojna mogućnost danas nije iskorištena u hrvatskim lukama. Velike multinacionalne kompanije, koje su u zemljama srednje Europe locirale svoje logističko-distribucijske

of the strictly hinterland gravitational field is supplemented with an additional gravitational area into smaller ports in the region (Figure 3)

3.2.4. Traffic generated by the development of logistics and distribution centers near seaports

Such development opportunity has not been used within Croatian ports. A logistics and distribution center, located near the container terminal, according to global experiences is in direct function of attrracting traffic flows and producing most additional values at the basic port, cargo handling function. A logistic and distribution center is a modern facility which collects, preserves, upgrades and prepares goods for the further distribution to customers.

The Port of Rijeka has great possibilities in the development of this segment, and that is within the industrial zone of Kukuljanovo,

centre, još uvijek u svojim godišnjim *tenderima* (tražeći najpovoljniju ponudu organizacije prekomorskog prijevoza) ne uključuju luku Rijeka. Iako svi linijski servisi koji posluju u lukama Kopar i Trst posluju i u Rijeci, pa bi bilo logično da se u razmatranje uzme i mogućnost prijevoza preko Rijeke, još uvijek prevladava mišljenje da preko Rijeke ne postoji mogućnost efikasne, brze i pouzdane željezničke otpreme blok-vlakovima do krajnjih odredišta u srednjoj Europi.

Proširenjem kontejnerskog terminala u Rijeci, većom dubinom koja će omogućiti da Rijeka bude prva luka ticanja u redoslijedu ticanja luka u sjevernom Jadranu (i na taj način omogućiti prednost / kraće vrijeme otpreme kontejnera u odnosu na druge luke), rekonstrukcijom pruge, ubrzanim carinskim procedurama u luci i na graničnim prijelazima – luka Rijeka će biti u ravnopravnoj utakmici s drugim konkurentskim lukama za pridobivanje velikih količina tereta koji je namijenjen multinacionalnim kompanijama sada lociranim u srednjoj Europi, a ubuduće vjerojatno i u Hrvatskoj, Srbiji i Bosni i Hercegovini.

Veliki iskorak i povećanje prometa u luci Kopar rezultat je preusmjeravanja tereta (iz sjevernoeuropskih luka) za logističko-distribucijske centre velikih multinacionalnih kompanija (na primjer: *Kia, Philips, Sony, Samsun*g i dr.) lociranih u srednjoj Europi.

3.2.6. Promet generiran razvojem projekata "plavih autocesta"

Ovakva razvojna mogućnost danas nije iskorištena u hrvatskim lukama.

Razvojna mogućnost ovoga segmenta daljnjeg razvoja kontejnerskog i RO-RO prometa leži u europskim programima prebacivanja tereta "s ceste" na priobalnu plovidbu (engl. *short sea shipping*), željeznicu i unutarnju plovidbu, a koji su potaknuti ekološkim razlozima i sadašnjim velikim gužvama na europskim autocestama.

Konkretan primjer ove razvojne mogućnosti predviđen je projektom "Euroorient" koji pretpostavlja multimodalnu liniju za prijevoz roba u kontejnerima između Bliskog istoka i srednje Europe, na način da se prijevoz kontejnera vrši željeznicom u početnom i završnom dijelu, a brodovima za prijevoz kontejnera u srednjem dijelu puta. Kopnena ishodišta roba koja se prevoze u kontejnerima su na Bliskom istoku, odakle se preko luka Izmir i Bandirma kontej-

which has a favourable geo–traffic location and a required infrastructure [2]. Thereis an additional project added to, that is a large logistics and distribution center Miklavja in Matulji.

The planned project "Cargo Centar Zagreb" is also in the function of attracting new cargoes. Within the framework of this center, the intermodal connection of the Port of Rijeka, the inland Port of Sisak and the Zagreb airport with the European rail and road traffic directions is planned.

3.2.5. Traffic generated by connecting logistics and distribution centers of multinational companies

Today, there is no such opportunity used in Croatian ports. Large multinational companies, which have located their logistics and distribution centers in the Central European countries, in their annual tenders,[3] do not include the Port of Rijeka. Although all liner services operating in the Ports of Koper and Trieste are operating in the Port of Rijeka (so it would be logical to take into consideration the possibility of transporting through the Port of Rijeka), there is still a perception that there is not any possibility of an effective, fast and reliable dispatch of block trains to the final destinations in Central Europe.

With the extension of the port container terminal, a greater depth which will enable the Port of Rijeka to be the first port of call in North Adriatic (ensuring in that way the advantage of a faster freight shipping in relation to other ports), with the rail renewal, accelerated custom procedures in the port and at the border crossings – the Port of Rijeka will be in equal competition with other ports for winning over large amounts of cargo designed for multinational companies, now located in the Central Europe, and in the future probably in Croatia, Bosnia and Herzegovina and Serbia.

A large step forward and a traffic increase in the Port of Koper is a result of the redirection of cargo (from the North-european ports) to logistics and distribution centers of large multinational companies (e.g. *Kia, Philips, Sony, Samsung* etc.) located in Central Europe.

3.2.6. Traffic generated by the "Highways of the Sea" development projects

Such development opportunity is not exploited in the ports of Croatia. The "Highways of

[3] Searching for best offer for oversea transportation organisation.

nerskim brodovima prevoze do hrvatskih luka Ploče i Rijeka i otuda nastavljaju svoj neprekinuti put u kontejnerima na željeznici prema srednjoeuropskim odredištima u Mađarskoj, Austriji, Njemačkoj i dr. [1].

3.2.7. Promet generiran razvojem poslova popravaka i održavanja kontejnera

Iako u hrvatskim kontejnerskim lukama postoji mogućnost popravka i održavanja kontejnerske opreme, zbog iznimno nekonkurentnih visokih troškova, nijedan brodar koji je vlasnik kontejnera ne preferira popravak kontejnera u hrvatskim lukama. Ovaj segment poslovanja, pored logističko-distribucijskog centra, pruža velike mogućnosti usluga s dodatnom vrijednošću i generira dodatni promet.

3.2.8. Promet generiran lociranjem depoa leasing kompanija

Ovaj segment poslovanja nadovezuje se na prethodni segment mogućnosti popravka i održavanja kontejnerske opreme. Razvojna perspektiva, koja također pruža mogućnosti usluge s dodatnom vrijednošću, danas nije iskorištena u hrvatskim lukama, tako da leasing kompanije u hrvatskim lukama nemaju službene depoe, odnosno mjesta na kojima postoji mogućnost uzimanja kontejnera u najam ili vraćanja kontejnera iz najma. Uobičajeno je da se prilikom vraćanja kontejnera iz najma izvrši provjera ispravnosti i da se izvrše neophodni popravci, a sve to uz pripadajuće terminalske manipulacije. Stoga je ovaj segment poslovanja u direktnoj vezi s dobro razvijenom radionicom za popravak kontejnera.

4. ZAKLJUČAK

Luke sjevernog Jadrana već danas participiraju u globalnoj redistribuciji dijela prometnih tokova, prvenstveno između Dalekog istoka i srednje Europe.

Sjevernojadranske luke Rijeka, Kopar i Trst, koje treba sagledavati kao jedinstveni lučki sustav, osposobljene su za prihvat kontejnerskih brodova post-panamax generacije i direktnih linijskih servisa.

Najznačajniji svjetski linijski kontejnerski brodari/operatori pružaju linijske servise u istočnojadranskim lukama.

the Sea" segment development of container (and RO-RO) traffic lies within the European programmes of cargo shiftings from the road to short sea shipping, railways and inland waterways shipping. These actions are induced by environmental considerations and the presence of traffic jams on the European highways.

A concrete example of this feature is provided with the "Euroorient" project, which assumes the multimodal transport line for merchandise container transportation between the Middle East and Central Europe, in a way that the transportation of containers is carried by rail in the initial and final section, and with container vessels in the middle of the venture. The transported goods starting points are in the Middle East, from where they are transported, through the ports of Izmir and Bandirma, with container vessels to the Ports of Rijeka and Ploče in Croatia, continuing their uninterrupted carriage (by rail) towards Mideuropean destinations in Hungary, Austria, Germany etc [1].

3.2.7. Traffic generated by the development of container repairs and maintenance works

Although the possibility of repairing and maintaining container equipments exist in Croatian ports, none of the operators, as container owner, prefers to repair containers in Croatian ports. The reason are uncompetitive, high expenses. This segment of activities, besides logistics and distribution centers, offers great service possibilities with additional values and generates additional traffic.

3.2.8. Traffic generated by locating the depot leasing companies

This segment is associated with container maintenance and repair works. The development opportunity, which also offers services with an additional value, is not exploited in Croatian ports. Leasing companies do not have an official depot, that are locations where containers can be rented or hired out. It is usual that at the time the containers are returned back from the lease, the same are checked for the conditions they are found in and requirely repaired, all with associated terminal manipulations. Therefore, this segment activity is in direct relation with well-formed container repair workshops.

Luka Kopar prednjači s organizacijom efikasnih željezničkih blok-vlakova prema destinacijama u srednjoj Europi, čime je ostvarila prednost u kontejnerskom prometu u odnosu na druge luke, i time pokazuje da je odlična kopnena povezanost odlučujući preduvjet za razvoj lučkog prometa.

Južnojadranske luke Split, Ploče i Bar, u uvjetima slabo razvijene lučke suprastrukture i željezničke povezanosti sa zaleđem, do daljnjega teško mogu računati na uspostavu direktnih linijskih servisa.

Sve luke istočnog Jadrana imaju razvojne infrastrukturne planove i planove ulaganja u suprastrukturu, kao i planove neophodnih ulaganja u razvoj kopnene povezanosti sa zaleđem. Dinamiku realizacije razvojnih planova bit će potrebno uskladiti s prometnom potražnjom i usklađenom razvoju svih istočnojadranskih luka.

Postoje brojne mogućnosti daljnjeg razvoja kontejnerskog prometa u hrvatskim lukama, te je potrebno iskoristiti već postojeća iskustva drugih svjetskih kontejnerskih luka, s posebnim akcentom na usluge koje omogućavaju veću dodatnu vrijednost.

4. CONCLUSION

Nowadays, the ports of the North Adriatic area are already participating in the global redistribution of the part of traffic flows, primarily those between the Far East and Central Europe.

The North Adriatic ports, Rijeka, Koper and Trieste, which need to be observed as a single port system, are qualified for the receipt of container vessels of Post panamax generation and direct liner services.

The world's largest global container liner operators provide liner services in the ports of the Eastern Adriatic area.

The Port of Koper is in lead in terms of the organisation of effective railway block trains toward Central Europe, and has thus realised an advantage in the container traffic in relation to other ports. In this way it can be seen that excellent land connection represents acrucial precondition for the port traffic development.

In the near future, the South Adriatic ports of Split, Ploče and Bar can hardly count on the realisation of the direct service, because of a weakly developed port superstructure and railway connections with the hinterland.

Infrastructural development plans, superstructural investment plans, as well as plans for essential investments in the development of land connection with the hinterland are projected in all Eastern Adriatic ports. There will be a need for the coordination in the dynamics of the mentioned plans and projects realisation with traffic demands and harmonising all of the Eastern Adriatic ports.

There are numerous opportunities for a further development of the container traffic in Croatian seaports. It is necessary to make use of the existing experiences of other world container ports, with particular emphasis on services which are contributing to greater additional values.

LITERATURA / *REFERENCES*

[1] Intermodalni prijevoz u Hrvatskoj, Zagreb, IPC Dunav – Jadran, 2007., str. 132.

[2] Kesić B., A. Jugović, N. Perko, Potrebe i mogućnosti organizacije logističko-distribucijskog centra u riječkoj regiji, Pomorski zbornik, 42 (2004), str. 187-208.

[3] Mencer, I., M. Črnjar, Prilog gospodarskoj strategiji razvitka Republike Hrvatske: riječki prometni pravac, Ekonomski pregled, 51 (2000), 9-10, str. 1053-1074.

[4] Noteboom, T, Economic analysis of the European seaport system (Report serving as input of the discussion on the TEN-T policy), Antwerp, ITMMA –University of Antwerp, 2009., str. 60.

[5] Prostorno i prometno integralna studija PGŽ-a i Grada Rijeke, Rijeka, Pomorski fakultet u Rijeci, 2010.

Korišteni internet linkovi:

http://www.espo.be/Home.aspx	European Sea Ports Organisation
http://www.lukarijeka.hr/index_hr.aspx	Luka Rijeka
http://www.luka-kp.si/eng/	Luka Koper
http://www.trieste-marine-terminal.com/index.php	Luka Trieste
http://www.portauthority.hr/rijeka/lucka_uprava_rijeka.shtml	Lučka uprava Rijeka
http://www.portsplit.com/	Lučka uprava Split
http://www.port-authority-ploce.hr/index_eng.asp	Lučka uprava Ploče
http://www.luka-ploce.hr/en/index_en.php	Luka Ploče
http://www.lukasplit.hr/	Luka Split
http://www.lukabar.me/eng/Port_of_Bar.htm	Luka Bar
http://www.cma-cgm.com/	CMA CGM France
http://www.mmpi.hr/default.aspx?id=480	Ministarstvo mora, prometa i infrastrukture
http://www.adriatic-gate.hr/	Jadranska vrata Rijeka
http://www.privredni.hr	Privredni vjesnik