# D.4.1.2 Analysis on potential market flows of the Port of Split

# Document Control Sheet

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# Contents

# PREFACE

This document is based on a Contract between Port Authority Split (PAS) and University of Split – Faculty of Maritime Studies (FMS). According to the contract terms, the Faculty of Maritime Studies agreed to deliver two documents, “Common methodology for potential traffic flow analysis” and “Analysis on potential market flows of the Port of Split” for the purpose of project “CHARGE - Capitalization and Harmonization of the Adriatic Region Gate of Europe”, in the framework of Italy-Croatia 2014-2020 Programme - Priority Axis 4 “Maritime Transport” – Specific Objective 4.1 “Improve the quality, safety and environmental sustainability of marine and coastal transport services and nodes by promoting multimodality in the Programme area”, coordinated by RAM – Logistics, Infrastructures, Transports S.p.A.

Analysis on potential market flows of the Port of Split was fulfilled according to the second part of contract between PAS and FMS, covering the deliverable D4.1.2. of the project CHARGE, based on the Common methodology, deliverable D4.1.1., which has already been delivered and approved by Port Authority Split as a first part of contract agreement.

The Deliverable D4.1.2. of the project CHARGE provided the analysis of potential market flows of port of Split and Split port area. The statistical performance data for the port of Split has been collected and elaborated, providing the analysis of current traffic flows and trade dynamics of the port of Split and Italian ports with the focus on the ferry and container freight traffic. The observation on the projection of the potential future scenarios of traffic flows between Port of Split and Italian ports has also been indicated in the document. It should be emphasized that all the data used in the statistical analysis were based on the official statistics and documentation, i.e. government sources and Port of Split internal statistic data. The authors are not responsible for the possible differences and deviations between the data, generated by the differentiated methodologies of their internal collection and distribution.

The results indicated in the document and conclusions were created in accordance with the available scientific and professional knowledge from field of transport technology and in accordance with generally accepted rules of science and profession.

# 1 INTRODUCTION

This analysis of potential market flows of the Port of Split is part of the project CHARGE (Capitalization and Harmonization of the Adriatic Region Gate of Europe) which capitalizes the collected results of IPA CBC Programme 2007-2013 CARICA project and other projects like ADRIATICMOS, INTERMODADRIA and EASYCONNECTING from IPA and ADB Multiplatform from South-East Europe having the objective the development of freight transports in the Adriatic area and connectivity to the other EU member states. The research document relates to Work Package (WP) 4 – Enhancing freight traffic flows and connections between the Adriatic ports, of the project CHARGE

The main objective of the WP4 is to foster traffic flows and the connectivity between the Adriatic ports involved in CHARGE and to contribute to the competitiveness of territories served by the existing maritime links while simultaneously increase the perceived value of shared intermodal solutions. Project CHARGE fosters the connectivity between the Adriatic regions and improves decision-making process coordination at CB level in maritime transport for joint strategies implementation and infrastructural investments, with specific attention to Adriatic Motorways of the Sea improvement between Italy and Croatia. CHARGE aims to upgrade intermodal services on existing maritime links between the two shores of the Adriatic Sea to improve traffic flows efficiency and environmental sustainability and resolve critical bottlenecks.

The common approach should lead to the enhancement of Adriatic freight transport, taking into consideration the lessons learned within the 2007-2013 CARICA project. Within the project CHARGE a common methodology for potential traffic flow analysis will be used by all partners for the analysis and definition of the respective outputs. The common methodology has already

been developed by FMS and approved by the PAS, and based on this methodology, an Analysis of the potential market flows of the Port of Split is being developed.

CHARGE project activity 4.1 Joint market analysis aims to assess the potential market between Adriatic Ports, and includes the following segments:

- Elaborating and proposing the common methodology for potential traffic flow analysis for the collection and elaboration of ferry and containers traffic data including areas of origins and destinations of the traffic and typology of the freight.
- Analysis on potential market flows of involved ports, where each involved port collects data and elaborates the analysis on the basis of the agreed methodology

# 2. METHODOLOGY

Methods used in this analysis are:

- Method of compilation: researchers can use scientific papers and studies, predictions and recommendations;
- Method of description: in order to define the main characteristics of the port and port area, sailing routes, intermodal (maritime, road, railway) infrastructure and operation;
- Method of comparison: in order to make certain conclusions and estimations;
- Statistical method: to give insights in certain operation and facts through the interpretation of statistical data;
- Inductive method: In order to give certain conclusions from the given facts, figures and predictions;

The statistics for this report have been collected from the following sources:

- Split Port Authority statistics:
- Split Harbour Office statistics,
- Croatian Ministry of Transportation statistics;
- Croatian Bureau of Statistics;
- Other relevant studies, scientific papers, analysis, etc.

This analysis include several chapters:

- Introduction
- Defining the main characteristics of the port and port area (Port of Split)

- Port traffic statistics
  - Freight traffic statistics
  - Vessel traffic statistics
  - Other related data
- Overview and analysis of the existing traffic flows between Port of Split and Italian ports
- Analysis on potential market flows and projection of future traffic flows between Port of Split and Italian ports
- Potential undesirable effects and points of congestion
- Conclusion

# 3. DEFINING THE MAIN CHARACTERISTICS OF THE PORT OF SPLIT AND SPLIT PORT AREA

The port of Split is situated in the central part of the eastern coast in the Adriatic basin. As for its strategic position it has become one of the most important passenger ports in the Mediterranean, often called as the gateway to the islands. The favorable geostrategic location enabled primarily the development of passenger transport towards the domestic markets mainly situated on central Dalmatian islands and other coastal destinations but also the segment of cruise tourism to various international destinations in the Adriatic and Mediterranean (figure 3.1.).

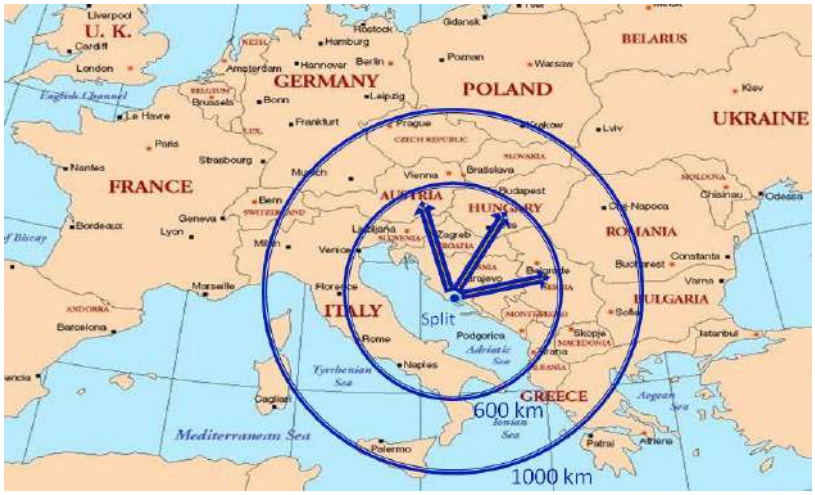


**Figure 3.1 Location of the port of Split**

Source: Luka d.d. Split, 2018

The port is ranked first among Adriatic ports by the number of passengers and vehicles and third among Croatian ports regarding the transport of cargo behind port of Rijeka and port of Ploče. Also, the port of Split is largest port in central Dalmatian region, comprising both passenger and cargo transport as the main port business orientation. According to its purpose, the Port of Split is classified as a port open for international public traffic, while due to its size and importance, it was nominated a port of special (international) economic interest for the Republic of Croatia. The Port of Split has been also classified as a Trans-European Transport Network (TEN-T) comprehensive port for Croatia. Except the passenger transport, the port accommodates freight transport mainly to the destinations in the external environment of the port situated in the hinterland creating its gravitational area. The distance from port and the respective metropolitan areas are presented in table 3.1.

**Table 3.1. Distance from port of Split to respective metropolitan areas**

| DISTANCE | ZAGREB | RIJEKA | LJUBLJANA | ROME | SARAJEVO | PODGORICA | BELGRADE |
|---|---|---|---|---|---|---|---|
| **SPLIT** | Road: 400 km<br>Rail: 420 km | Road: 415 km<br>Rail: 449 km | Road: 540 km<br>Rail: 537 km | Maritime (to Ancona): 137 NM<br>+<br>Rail (from Ancona): 300 km<br>Road (from Ancona): 280 km | Road: 300 km<br>Rail: / | Road: 350 km<br>Rail: / | Road: 795 km<br>Rail: 832 km |

## 3.1. ROAD TRANSPORT

The analysis of the current state of accessibility of transport infrastructure demonstrated the predominance of road infrastructure mode. The essential infrastructural resource for the port is highway A1 connecting the city of Split with the capital Zagreb, the industrial node for the Republic of Croatia, a 400 km long voyage where cargo is later forwarded to other destinations in Croatia and commonly northwestern parts of Bosnia and Herzegovina. The highway A1 connects the port with other central Dalmatian ports, Šibenik and Zadar, and important

southern destinations like Dubrovnik and markets situated in the southern parts of Bosnia and Herzegovina and Montenegro. It should be mentioned that the Port of Split is connected to the Mediterranean corridor, a part of Trans European Transport Network (TEN-T) trough highway A1 on the Bosiljevo node and with Port of Rijeka trough highway A3 continuing from the Bosiljevo node to west. The port is also reachable trough the State road D8, an alternative to the highway A1 connecting it with Pasjak in Slovenia at the northern endpoint of the border and with Montenegrin border crossing at Debeli Brijeg in south providing the connection with all Dalmatian coastal communities in the region of Primorska Hrvatska. On the norther part of the city of Split there is an access road, state road D1 connecting Split with hinterland destinations in Dalmatinska zagora (hinterland).

The capacity on the state roads sections is considerably below the traffic needs, in particular on the section of the state road D8 Trogir – Split – Omiš and crossroads in Solin and Stobreč, which are most burdened in Croatia. The access road to the passenger terminal of the port of Split in the city center, the state road DC-410, has limited capacity, creating congestion and difficulties when accessing and leaving the port especially in summer periods. The port area is the busiest area of the city and one of the busiest in Mediterranean. The bus terminal is also situated in the port area integrating three most important traffic modalities in the radius of 50 meters.

### 3.2 RAIL TRANSPORT

The road modality predominates the overall traffic network in Split area primarily due to the unfavorable spatial infrastructure network of the other transport infrastructure, in particular rail infrastructure. Trough railway connection intended for international cargo traffic M604 in the length of 323 km (Oštarije – Knin – Split), traditionally named Lička railroad, the port of Split (cargo terminal) is connected to Mediterranean rail freight corridor RFC6 with Zagreb, through international main railway line Zagreb-Karlovac-Oštarije (M202), and other important

metropolitan trade destinations in Europe. The specifications of the railway route connecting the port of Split (M 604) are presented in Table 3.2.

The maximum allowed speed on the specific route varies from 65 to 100 km/h while speed limitation varies from 20 to 95 km/h depending on the specific segment of the route and type of the train, which differs from titling trains or trains without titling technique. It should be emphasized that the railway route from Split to Oštarije is not electrified, while the remaining part from Oštarije toward Zagreb is electrified. The maximum length of the train in stations varies from 311 to 720 meters on the M604 railway route, having maximum ascent and decline of 26 ‰ with maximum resistance of the railway line of 29 daN/t and 700 meters of train braking distance. The distance on the railway route between Zagreb and Split is 420 km, having the permissible load on the route from Oštarije to Zagreb of 22.5 t per axle.

**Table 3.2. Specifications of the railway route Split – Knin – Oštarije**

| RAILWAY LINE NUMBER | RAILWAY ROUTE | LENGTH (km) | MAX. SPEED OF THE LINE | SPEED LIMITATION | ELECTRIFICATION | MAX. LENGTH OF THE TRAIN IN STATIONS | MAXIMUM ASCENT AND DECLINE | TRAIN BRAKING DISTANCE | PERMISSIBLE LOAD |
|---|---|---|---|---|---|---|---|---|---|
| M604 | Oštarije – Knin – Split (cargo terminal) | 323 | 65 to 100 km/h | 20 to 95 km/h | NO | 311 to 720 m | 29 daN/t | 700 m | 20 t per axle |

Source: HŽ Infrastructure, 2015

The current capacity flow of the railway line from Split to Zagreb is 2*550 t/day of cargo transport. The allowed load from Split to Oštarije is 20 t per axle, which creates cargo transport difficulties giving the difference in the maximum permissible load on the two railway lines. The railway in Split represents the end point of the Croatian railway network in south. The rail

infrastructure is characterized as inefficient and unreliable, with questionable capacity and throughput as for the undeveloped and poor state of the rail resulting with significant decline in cargo turnover and narrowing the gravitational area. The rail route from Zagreb to suburban area of Split is covered with single track, while the remaining part towards Split center has double track railway lines. The railway passenger station is located in the city center, in the immediate vicinity of the port passenger terminal (approximately 50 m). Besides the connection to road and rail infrastructure of the port of Split, the modernization and improvement of the existing infrastructure should be made in order to perform the process of passenger and cargo flows more efficiently.

### 3.3. AIR TRANSPORT

The port of Split is optimally connected with Split Airport terminal located in Kaštel Štafilić in the distance of approximately 25 km along D8 state road. There is an intention to connect the Split Airport with port passenger terminal via Kaštelanski basin D – Resnik but also towards the other destinations on coast and islands, mainly as for the disburdening the road modality.

### 3.4. MARITIME TRANSPORT

#### 3.4.1. Passenger transport

The port of Split is the largest passenger port in Croatia, therefore, its development is mainly directed to passenger and cruise transport, having favorable implications on the potential future growth of the port as indicated in the Transport Development Strategy of the Republic of Croatia (2017 – 2030), creating multiplicative effect on the whole region especially important for the sustainable development of the islands, as an important segment for Croatia. The passenger terminal is located in the City port basin and connected with islands and other

coastal destinations by ferry, passenger and high speed boats (catamaran) vessels, while also performing regular international passenger trade with Ancona in Italy. The transport of passengers and vehicles is operated by public and private enterprises in national and international transport. The passenger and vehicle traffic flows operated by the state owned company Jadrolinija in the national liner service in the Split area is presented in figure 3.2.

There are five state ferry lines operating from and to the port of Split towards islands of Vis, Lastovo, Korčula, Hvar, Brač and Šolta on an all year turnaround trip. The current state ferry lines and overall daily number of port of calls from port of Split for the year 2018 are presented in Table 3.3. The slight differentiation primarily in fluctuation of port of calls depending on the day of the voyage should be noted. The liner services also include the turnaround voyage (arrivals to the port), which multiplies the values indicated in forthcoming tables.

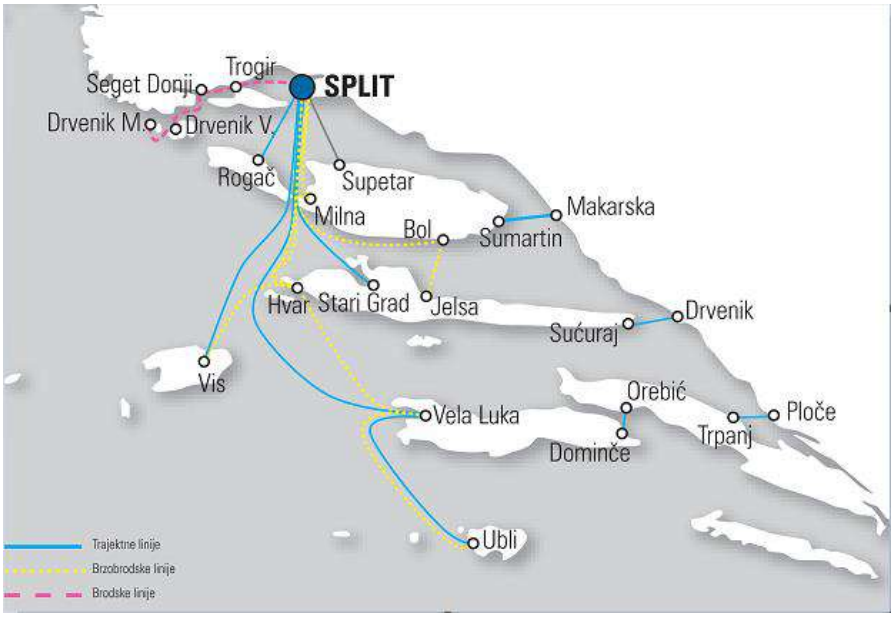


**Figure 3.2. Ferry, catamaran (HSC) and passenger transport operated by state owned company Jadrolinija in Split area**

Source: Jadrolinija, 2018

**Table 3.3. State ferry lines from the Port of Split for 2018 (daily overview)**

| LINE NUMBER | STATE FERRY LINE | NUMBER OF DEPARTURES FROM THE PORT | | |
|---|---|---|---|---|
| | | OFFSEASON (01.01. - 31.05. & 01.10. - 31.12.) | LOW SEASON (01.06. - 28.06. & 03.09. - 30.09.) | HIGH SEASON (29.06 – 02.09) |
| 602 | Split – Vis | 4 | 4 | 6 |
| 604 | Split – Hvar - Vela Luka (Korčula) – Ubli (Lastovo) | OFFSEASON (01.01. - 31.05. & 01.10. - 31.12.) | SEASON (01.06 – 30.09.) | |
| | | 2 | 2 | |
| 631 | Split – Supetar (Brač) | 9 | 12 | 14 |
| 635 | Split – Stari Grad (Hvar) | 4 | 6 | 8 |
| 636 | Split – Rogač (Šolta) | 4 | 5 | 6 |

Source: CLSA, 2018

There is also one state passenger line connecting the port with island of Čiovo and city of Trogir. The frequency of departures from/to the port on a liner turnaround trip on a daily basis, differing on the day of the voyage is presented in Table 3.4.

**Table 3.4. Departures from the port of Split, state passenger line in Port of Split (daily) in 2018**

| LINE NUMBER | STATE PASSENGER LINE | NUMBER OF DEPARTURES FROM THE PORT | | |
|---|---|---|---|---|
| | | OFFSEASON (01.01. - 06.05. & 31.10. - 31.12.) | LOW SEASON (07.05. - 28.06 & 03.09. - 30.10.) | HIGH SEASON (29.06. - 02.09.) |
| 616 | Split – Slatine (Čiovo) – Trogir | 2 | 5 | 7 |

Source: CLSA, 2018

The Port of Split has five state high speed craft (HSC) (catamaran) line connections with central and southern Dalmatian islands, increasing the quality of additional services to passengers

while reducing the time of the voyage. All the above mentioned state ferry, passenger and catamaran lines have public service obligations. There are seven catamaran lines without public service obligations, connecting Split with various destinations on islands and destinations on the coast. The catamaran services with accompanying port of calls from and to Split per day are provided in Table 3.5.

**Table 3.5. HSC (catamaran) departures from the port regarding the state lines and lines without public service obligations (daily trips) in 2018**

| LINE NUMBER | HSC (CATAMARAN) LINE | CATEGORY | NUMBER OF DEPARTURES FROM THE PORT | | |
|---|---|---|---|---|---|
| | | | **OFFSEASON (01.01. - 31.05. & 01.10. - 31.12.)** | **LOW SEASON (01.06. - 28.06. & 03.09. - 30.09.)** | **HIHG SEASON (29.06. - 02.09.)** |
| 9601 | Split – Rogač (Šolta) – Milna (Brač) | State | 2 | 2 | 1 |
| 9602 | Split – Milna (Brač) – Hvar – Vis | State | 1 | 1 | 1 |
| 9603 | Split – Bol (Brač) –Jelsa (Hvar) | State | **OFFSEASON (01.01. - 31.05. & 01.10. -31.12)** | | **SEASON (01.06. - 30.09.)** |
| | | | 1 | | 1 |
| 9604 | Split – Hvar – Vela Luka (Korčula) – Lastovo | State | **OFFSEASON (01.01. - 31.05. & 01.10. -31.12)** | | **SEASON (01.06. - 30.09.)** |
| | | | 1 | | 1 |
| 9608 | Split – Hvar – Prigradica (Korčula) – Korčula | State | **OFFSEASON (01.01. - 31.05. & 01.10. -31.12)** | | **SEASON (01.06. - 30.09.)** |
| | | | 1 | | 1 |
| / | Split – Milna (Brač) – Hvar – Korčula – Pomena (Mljet) – Dubrovnik | without public service obligation | **SEASONAL LINE (16.04. – 27.10.)** | | |
| | | | 1 | | |
| / | Split – Bol (Brač) – Makarska – Korčula – Sobra (Mljet) – Dubrovnik | without public service obligation | **SEASONAL LINE (01.06. – 30.09. )** | | |
| | | | 1 | | |

| | | | | |
|---|---|---|---|---|
| / | Split – Hvar (operated by private concessionaire) | without public service obligation | **LOW SEASON (01.04. - 30.04. & 01.10. - 28.10.)** | **SEASON (01.05. - 30.05. & 01.06. - 30.09.)** |
| | | | 1 | 2 |
| / | Split – Hvar -Korčula | without public service obligation | **SEASONAL LINE (01.06. - 30.09.)** | |
| | | | 1 | |
| 9604S | Split – Hvar (operated by state concessionaire) | without public service obligation | **OFFSEASONAL LINE (1.10 – 27.10.)** | |
| | | | 1 | |
| 9811S | Split – Bol (Brač) – Hvar – Korčula – Dubrovnik (operated by state concessionaire) | without public service obligation | **SEASONAL LINE (1.06. – 1.10.)** | |
| | | | 1 | |
| / | Split – Milna – Hvar & Milna – Split | without public service obligation | **SEASONAL LINE (28.07 – 02.09)** | |
| | | | 1 for Milna and 1 for Hvar | |

Source: CLSA, 2018

The port also has a one direct turnaround international passenger line with Italy enabling the efficient transport of passengers, vehicles (busses, trucks etc.) in the international trade. Two companies Jadrolinija and SNAV are operating on the route Split – Ancona, of which Jadrolinija operates all year on turnaround voyage, calling the port of Stari Grad on Hvar Island in the high season, while SNAV operates only during the high season period. The weekly timetable for 2018 is presented in table 3.6.

**Table 3.6. Weekly number departures from the port of Split in international maritime passenger transport on Split – Ancona traffic flow for the year 2018**

| **LINE NUMBER** | **INTERNATIONAL PASSENGER LINE** | **NUMBER OF DEPARTURES FOROM THE PORT** | | |
|---|---|---|---|---|
| | | **OFFSEASON (01.01. - 31.03. & 28.10. - 31.12)** | **LOW SEASON (01.04. - 02.08. & 27.08. - 26.10.)** | **HIHG SEASON (**03.08. - 17.08. & 18.08. - 26.08.) |
| 53 (operated by Jadrolinija) | Split – Ancona | 2 | 3 | 4 |

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| | | | |
|---|---|---|---|
| / (operated by SNAV) | Split – Ancona | **SEASON (18.04 – 22.07 & 03.09 – 07.10.)** | **HIGH SEASON (23.07 – 02.09)** |
| | | 3-4 | 6 |

Source: Jadrolinija, 2018; SNAV, 2018

Port of Split is increasingly recognized as a cruise destination, evident in the yearly increase of number of port of calls and passengers, where the port is usually a transit port on the scheduled itineraries and connected with other Mediterranean cruise destinations.

### 3.4.2. Cargo transport

The northern part of the port is dedicated to the transport of cargo, equipped with cargo terminals being able to accommodate all types of vessels, depending on the typology of freight, typically including dry bulk products such as iron ore, coal, cement and grain as well as liquid products. Imported cargo is primarily intended for local markets of various industries in port hinterland, but also by supplying the steel industry in Bosnia and Herzegovina. In addition, various goods are exported to the Middle East, including wooden products. General cargo terminals are used to provide trade services to worldwide destinations depending on the demand for commodities, while the container terminal is connected with Mediterranean hub ports predominantly in the Adriatic. The port is directly connected with Freeport container terminal in Malta on the Adriatic X-PRESS 1 (ADX 1) service route jointly operated by CMA-CGM and Maersk on a weekly basis. The potential of the Port of Split for the development in the freight segment was confirmed with the adoption of the Transport Development Strategy of the Republic of Croatia (2017 – 2030) in 2017, indicating the appropriate specialization and proper development of the railway freight infrastructure as the development measures.

## 3.5. CURRENT MARKETS AND HINTERLAND

The current markets served by the port are defined by the purpose of the transport, divided on the passenger transport and cargo transport markets. The main markets regarding the transport of passengers and vehicles (trucks, buses, private cars) are central and south Dalmatian islands with few destinations along the coast, as well as the international market of passenger and vehicle transport with Italy. The international passenger transport flows have the perspective only in the provision of the direct connection with the western part of the Adriatic on the Italian shore and destinations as for the cost effectiveness standpoint and current demand for services.

The gravitational area of the port in the segment of cargo transport is situated in northwest Bosnia and Herzegovina with accompanying destinations in Croatia, mainly in Split-Dalmatia County which represents its hinterland. The main market for the import and export of containers is China, having the largest share in both cargo import and export, having also steady container flows directed to the remaining countries of the Fare East and countries of the Arabian Peninsula and Middle East.

The cruise market depends on the cruise company itineraries, but the positive trends are reflected in the increased demand of city of Split as a destination, which resulted in favorable implications to the cruise business in the port.

The current market of the port of Split depending on the traffic type is presented in figure 3.3.

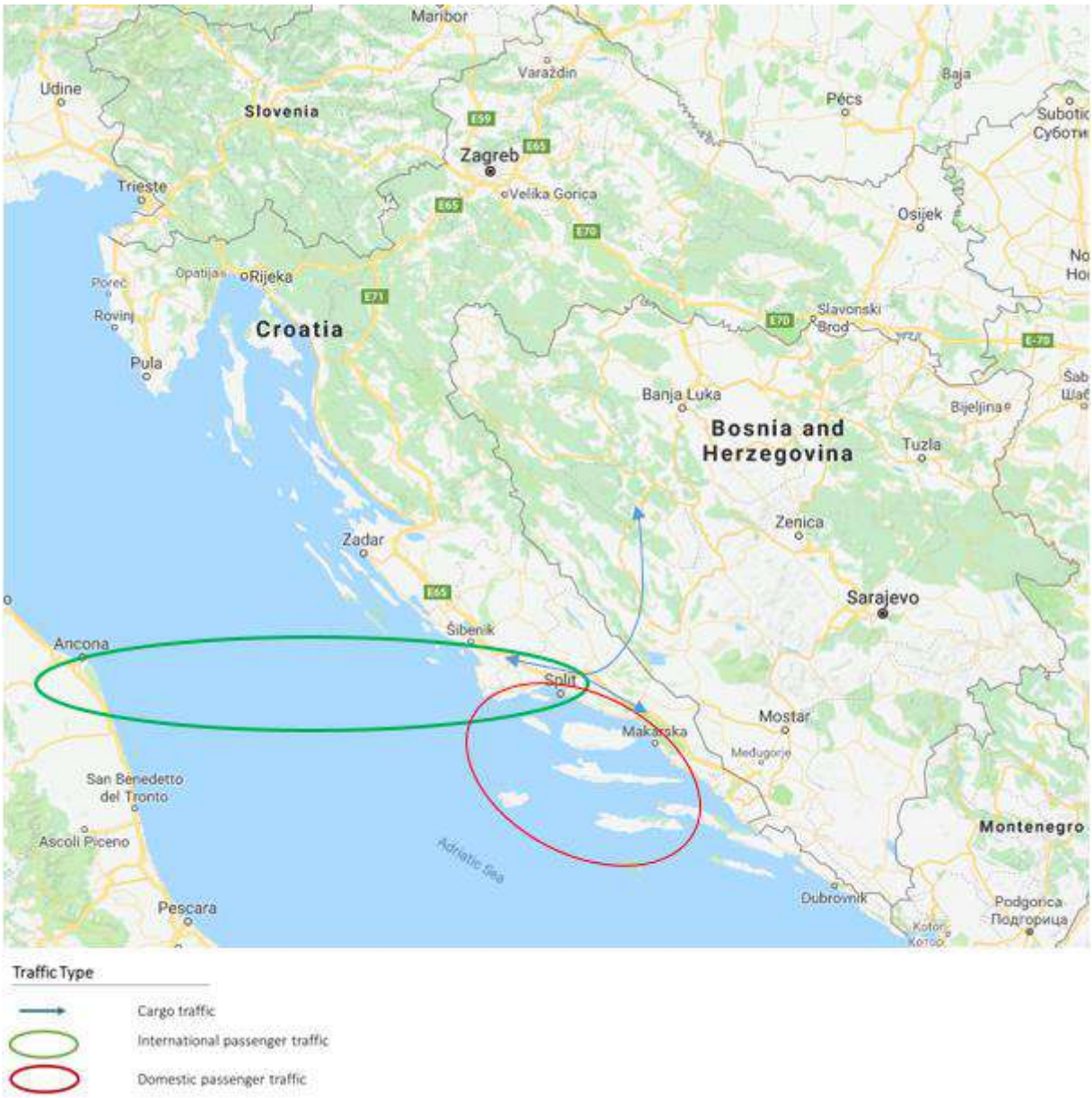



**Figure 3.3 Port of Split current markets**

Source: Maritime & Transport Business Solutions, 2016 - modified; Google Maps, 2018

## 3.6. PORT INFRASTRUCTURE AND RELATED TERMINALS

The Port of Split consists of two dislocated areas, the ferry and cruise terminal predetermined for transport of passengers and vehicles located in the southern part of the city of Split and cargo terminal (traditionally nominated as the North port) in the northern part. The port is divided into seven docking areas as follows: City port basin (passenger, ferry and cruise port), Vranjic - Solin basin (cargo port), Kaštela basin A, Kaštela basin B, Kaštela basin C, Kaštela basin D - Resnik and Komiža basin for fishing needs. The total surface of docking areas is amounted to 81.679051 km$^2$, of which 0.672263 km$^2$ is related to land surface and 81.006788 km$^2$ of surface of the sea, while the total length of operational docks amounts to 6,239 km. The whole port area of the port of Split is under jurisdiction of the Port Authority Split, a non-profit legal person established according to Decree of the Government of the Republic of Croatia on the establishment of Port Authority Split („Official Gazette“ number 45/97, 155/98 and 72/11, 114/14) for the purpose of managing, building and using the Port of Split.

### 3.6.1. Passenger terminals

#### City port basin

The City port basin (Latitude: 43°30.0’ N; Longitude; 16°26.2’ E) is situated in center of Dalmatia having a favorable location sounded by the central Dalmatian islands where the access to the port is enabled by coastal or internal access waterways through Drvenik, Šolta and Brač channel and “Splitska vrata”. It comprises area from the west breakwater to the junction of Obala Lazareta and Obala hrvatskog narodnog preporoda, primarily offering the transport of passengers and vehicles (private cars, trucks, buses) in national and international traffic. The total land surface amounts to 0.102504 km² while the sea surface is 16,690519 km². The City port basin is equipped with 3,643 km length of operational docks, four piers (Sveti Nikola, Sveti Petar, Sveti Duje and Lukobran), three quays and 27 berths being able to provide mooring to

vessels having maximum length of 320 meters on berth. The characteristics of city port basin are presented in Table 3.7.

**Table 3.7. Characteristics of city port basin**

| CITY PORT BASIN | | | | |
|---|---|---|---|---|
| **Name of pier / quay** | **Berth number** | **Purpose of pier / quay** | **Length of pier / quay (m)** | **Depth / Max. Draft (m)** |
| Sv. Nikola pier | 1,2,3 | sailing ship, Ro-Ro passenger catamaran | 55 | 3.4-3.8 |
| Lazaret quay | 4,5,6 | Ro-Ro passenger, catamaran, yachts | 253 | 4.0 |
| Quay of knez Domagoj I | 7,8,9 | Ro-Ro passenger, cruise vessels, yachts | 113 | 4.0 |
| Sv. Petar pier | 10,11,12,13 | Ro-Ro passenger, cruise vessels, yachts | 569,5 | 5.8-7.8 |
| Quay of knez Domagoj II | 14,15 | Ro-Ro passenger, cruise vessels, yachts | 131 | 3.8 |
| Sv. Duje pier | 16,17,18, 19,20 | Ro-Ro passenger, cruise vessels, yachts | 467 | 8.2-7.2 |
| Quay of knez Domagoj III | 21,22 | Ro-Ro passenger, cruise vessels, yachts | 141 | 7.2 |
| Lukobran | 23,24,25 | Ro-Ro passenger, cruise vessels | 407 | 8.2-5.3 |
| Outside berth | 27,28 | Cruise vessels, mega yachts | 560 | 10.7-13.3 |

Source: Peljar I, 2012 © HHI

The cruise terminal situated in the city port basin is along ferry (RO-RO passenger and vehicle), passenger and catamaran vessels essential part of the port business, representing the strategic orientation of the port development indicated in the National Transport Development Strategy of the Republic of Croatia (2017 - 2030). The city port is a main connection to the central and south Dalmatian islands and destinations along the coast of central Dalmatia while also maintaining the weekly and daily traffic flows with Italy, where the frequency depends on the period of the tourism season. The eastern part of the port in the city port basin is equipped by breakwater approximately 400 meters long with the port light installed on the head of the breakwater enabling the protection from the south winds. Berths 23, 24 and 25, intended for

accommodation of cruise, passenger and ro-ro passenger ships in domestic and international traffic are provided on the north (inner) side of the breakwater, while berths 26 and 27 are only intended for mooring of cruise vessels, situated on the north (outer) side of the breakwater. The width of the navigational waterway at the entry to the City port presently reaches 315 m. Sveti Nikola pier and northern part of Sveti Petar pier mostly accommodate catamarans and motorboats, especially in the high tourist periods, while the southern part of the Sveti Petar pier accommodates ferries. Sveti Duje pier is mostly used for accommodation of ferries and passenger ships where the state border crossing area is also located and Lukobran is usually used for mooring ferry and vessels on cruise voyages. The quay of Knez Domagoj I between Sveti Nikola and Sveti Petar piers is used for accommodating smaller sized crafts for tourism purposes and smaller yachts on cruise voyages while the central part of the port between Sveti Duje pier and quay of Knez Domagoj III generally accommodates smaller ferries (figure 3.4.). The maritime passenger terminal of the port Split (building) is located at Sv. Duje pier, with other related services, companies holding a concession for performing activities on the port area.

Considering that port is situated in the city central zone, all forms of the transport system, road, railway and maritime transport are integrated in the port area, enabling the use of intermodal services but also creating difficulties especially in the summer periods. The road infrastructure in the City port basin has limited throughput.

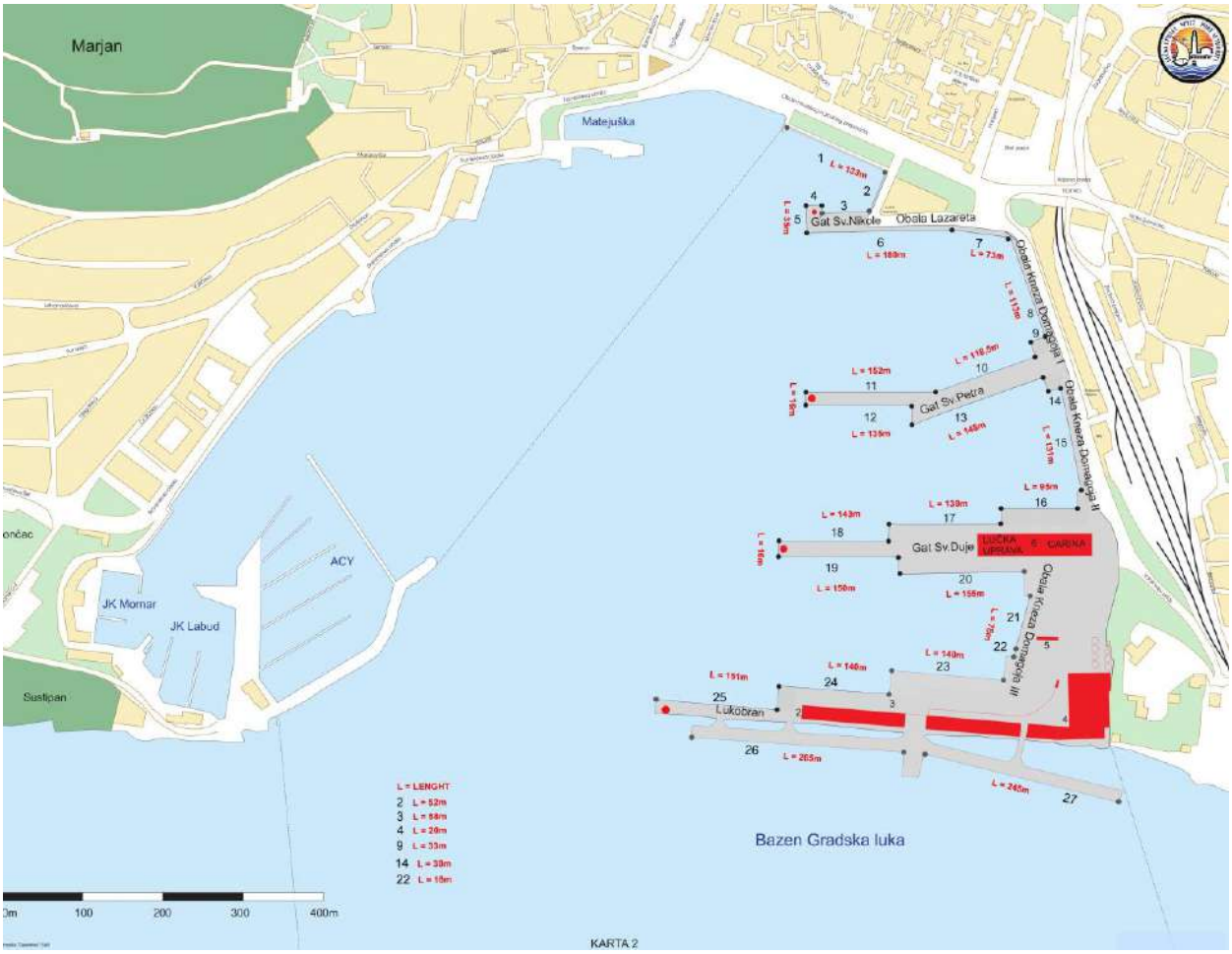



**Figure 3.4. City port basin**

Source: Port Authority Split, 2018

**Kaštela basin D – Resnik**

Kaštela basin D – Resnik (Latitude: 43°31.0' N; Longitude: 16°16.3' E) consists of 0,040 km of operational docks equipped with one 45 meter long berth being able to accommodate vessels with maximum draft of four (4) meters (figure 3.5). The primarily function of Kaštela basin D – Resnik is in integrating the air and maritime transport modes creating an intermodal node, providing the direct passenger transport services from Split airport to destinations along the

coast and islands with tourist or fast boats, evading the use of often congested road towards maritime passenger terminal in the city port basin. Also, the seaplane passenger services are provided in Resnik basin.

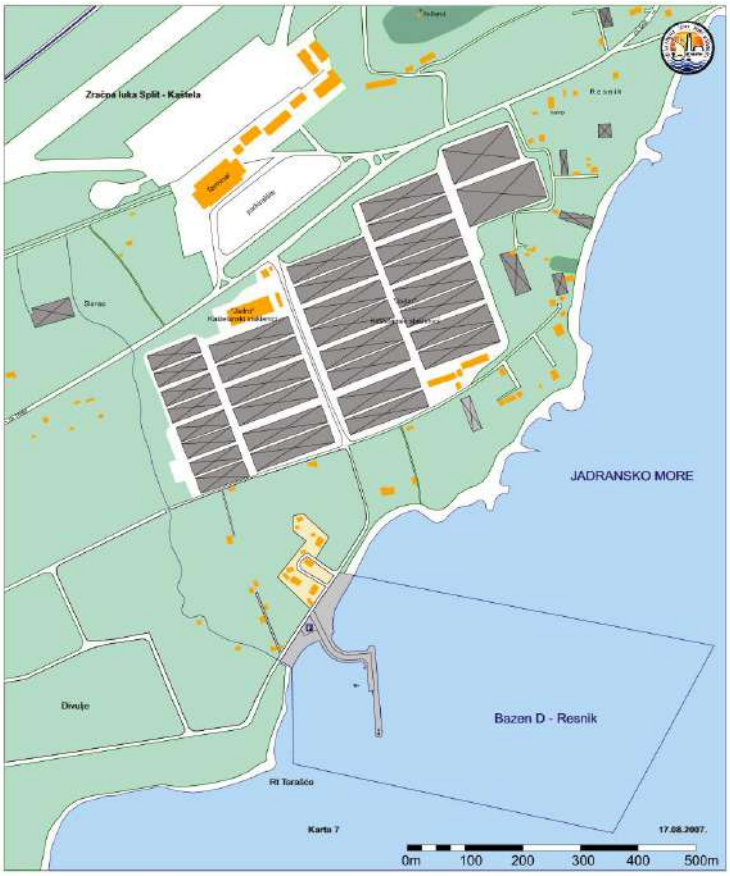



**Figure 3.5. Kaštela basin D – Resnik**

Source: Port Authority Split, 2018

### 3.6.2. Cargo terminals

The cargo terminals of the Port of Split are located in the northern suburb of the city and it comprises five docking areas, Vranjic - Solin basin where the cargo port is located, three cargo

basins Kaštela basin A, Kaštela basin B and Kaštela basin C designated for the purpose of various industries with dislocated Komiža basin for fishing needs.

**Vranjic - Solin basin**

The cargo port is located in the Vranjic - Solin basin (Latitude: 43°31.6' N; Longitude: 16°28.1' E) traditionally nominated as the North port, administered by a primary concessionaire Luka d.d having the cargo vessel and freight manipulation as a primary activity. Terminals for general cargo, bulk and containerized cargo are located in the cargo port, while tanker terminal is located in Kaštela Basin C. It is surrounded by eastern part of Kaštela bay from cape Marjan in the direction 024° to the coast between the ports of Kaštel Sućurac and Kaštel Gomilica, covering the area of Kaštel Sućurac, Solin basin, Vranjic basin and Split shipyard basin at Supaval. The total land surface amounts to 0,539621km² while the sea surface is 0,460km². The port possesses 1,854 km of operational docks, eight berths with maximum draft of 10.3 meters. Northern surface of Vranjic-Solin basin has total length of approximately 710 m with depths from 4.7 m to 10.5 m. On this part of the coast the mobile cranes are situated along with water hydrants for vessels water supply. Along the far eastern part of the coast, in front of the silos, the depths are between 7.9 and 10.5 m. Southern surface in Vranjic-Solin basin has total length of about 840 m with depths varying from 6.5 m to 10.7 m. The equipment for unloading and loading of cargo, water and electrical connections are located in this area with a RO-RO ramp in the bottom of the southern surface (figure 3.6.).

The berths from 1 to 5 are intended for vessel transshipment operations of all types of cargo in accordance with legal provisions. The length of operational dock is 920 meters and the draft along the coast varies from 7.0 to 10.2 meters. The berth number 5 is equipped with RO-RO ramp with a maximum draft of 7.2 meters. Under the Silos surface the berth number 6 is intended for loading and unloading of grain commodity. The length of the surface is 210 m

having a draft along the coastline of 8.6 m but with the use of spacers and pontoons it is possible to berth vessels with maximum draft of 10 m. Berths number 7 and 8 are located on the Obala Vranjic, intended for berthing vessels by the decision of the Split Port Authority. The length of the coast is 500 meters and with draft along the coast is up to 7.3 meters.


**Figure 3.6. Vranjic - Solin basin**

Source: Port Authority Split, 2018

Shore to ship bunkering operations, referring to fuel transfer, are made on berths number 1,2,3,4 and 5. Ship to ship bunkering operation is possible only on berths number 1 and 2. The port invested in the dredging process of the seabed throughout the whole terminal which was finished in the second half of 2018, providing the maximum depth 11.0 meters, however there are areas where the depth is higher than the official one. The container and RO-RO terminal have surface of about 20.000 $m^2$ and directly connected with two railroad tracks and a road for trucks that brings cargo directly to the ships providing the intermodal services. The road and rail networks are stretching thorough the entire port, enabling the provision of intermodal services with limited road modality, as there is no direct connection with highway A1 from two access roads, Solinska road on the eastern part of the port and Put Sjeverne luke road on the western part of the port. There are seven (7) railway tracks with the lengths of individual track

as follows: 836 m, 799 m, 235 m, 532 m, 229 m, 265 m and 110 m. The permissible load per axle is 20 t or 8 t/m. The speed limit on the tracks is 5 km/h while the maximum allowed length of the composition to the track is 30 wagons. There is also a truck parking space in the cargo port with the size of 10,000 $m^2$. Some of the specifications of the Vranjic-Solin basin are shown is table 3.8.

**Table 3.8. Specifications of the Vranjic-Solin basin**

| | | |
|---|---|---|
| **Size of the yard** ($m^2$) | 198,027 | |
| **Open storage area** ($m^2$) | 80,000 | |
| **Closed storage area**<br>**along the operational docks** ($m^2$)<br>**in the background** ($m^2$) | <br>22,400<br>11,400 | |
| **Covered (roofed) storage area** ($m^2$) | 6,000 | |
| **Refrigerated storage area**<br>**in the cargo port**<br>**for fruit (in the cargo port)** | **Size ($m^2$)**<br>3,300<br>2,000 | **Volume ($m^3$)**<br>15,300<br>/ |
| **Grain terminal with silos**<br>**old silos-cells**<br>**new silos**<br>**floor storage area** | **Volume ($m^3$)**<br>20,837<br>28,000<br>25,000 | **Metric tons (MT)**<br>16,250<br>21,840<br>20,000 |

Source: University of Split, 2017; Vukić, Ukić Boljat, Slišković, 2018 – modified; Luka d.d. Split, 2018.

Regarding the port mechanization, the cargo port contains one mobile harbor crane type Liebherr with the capacity of 104 tons on the container terminal. The other port equipment in the container terminal include one container forklift with capacity of 44 t, one reach stacker with capacity of 40 t, one forklift with capacity of 22 t, two container trailers, one container truck and one terminal tractor for container trailer. Bulk terminal is equipped with one mobile harbor crane type Sennebogen 870 with special grab three portal cranes type Ganz with the

capacity of 5 tons. The remaining port mechanization relates to numerous forklifts, tractors, skid and wheel loaders and others.

The main activities of the cargo port are transport and transshipment of diverse commodities, of which the most common dry bulk products are iron ore, coal, cement and grain for key regular clients in the direct hinterland, with various seasonal commodities like sugar, salt, fertilizer and others depending on the demand. Also, there is a high demand in quartzite and slag for industries in Bosnia and Herzegovina. The key general cargo commodities are metal products and wood. Transport of yachts and small vessels especially in the summer periods and special cargo like wind turbines intended for projects in the port hinterland should also be emphasized. The cargo port is also a center for import and distribution of petroleum products for INA concessionaire in Kaštela Basin C intended to supply the regional economy with oil derivatives. Transport of containers recorded a continuous increase in recent years as well as the truck cargo transport to destinations on Croatian islands.

**Kaštela basin A**

Kaštela basin A (Latitude: 43°32.7' N; Longitude: 16°24.9' E) has 0,000445 km² of land surface with 0,23 km² of sea surface. The operational dock is 0.08 km long, equipped with one berth (Sustipan berth) having length of 80 m, maximum depth of 8.5 m being able to accommodate a vessel with maximum length on berth of 100 m. The berth is intended for berthing of vessels at the discretion of Port Authority Split with the consent of Harbor master's office. Kaštela basin A is showed in figure 3.7.


**Figure 3.7. Kaštela basin A**

Source: Port Authority Split, 2018

**Kaštela basin B**

Kaštela basin B (Latitude: 43°32.3' N; Longitude: 16°26.7' E) has 0,016740 km² of land area along with 0,532 km $^2$ of sea surface. On the 0,532 km of operational docks, divided on Sv. Juraj I and Sv. Juraj II shores, five (5) berths are located (figure 3.8.). Berth number 1 has length of 80 m with maximum permittable draft of 9.7 m, and it is used for manipulation of liquefied gas cargo for industry purposes. Berths no. 2 and 3 are located on Sv. Juraj I shore used for berthing of vessels while performing loading processes of cement and cement products and slag unloading for complementary industry located on the shore. The berths are 200 m + 75 m long with a draft in the western part with the use of spacers (pontoons) maximum 8.2 m. Also, these berths are used for shore to ship bunkering operations. Berth no. 4 is situated on the Sv. Juraj II shore having operational dock length of 160 m with 6.60 m draft of along the coast. It is used for vessels performing unloading operations of coal. Berth no. 5 is also on Sv. Juraj II shore,

used for vessels loading and unloading of fuel and gas trucks for the purpose of supply of islands with fossil fuels. The Ro-Ro ramps is 40 m long and draft along the ramp is 2.5 m.

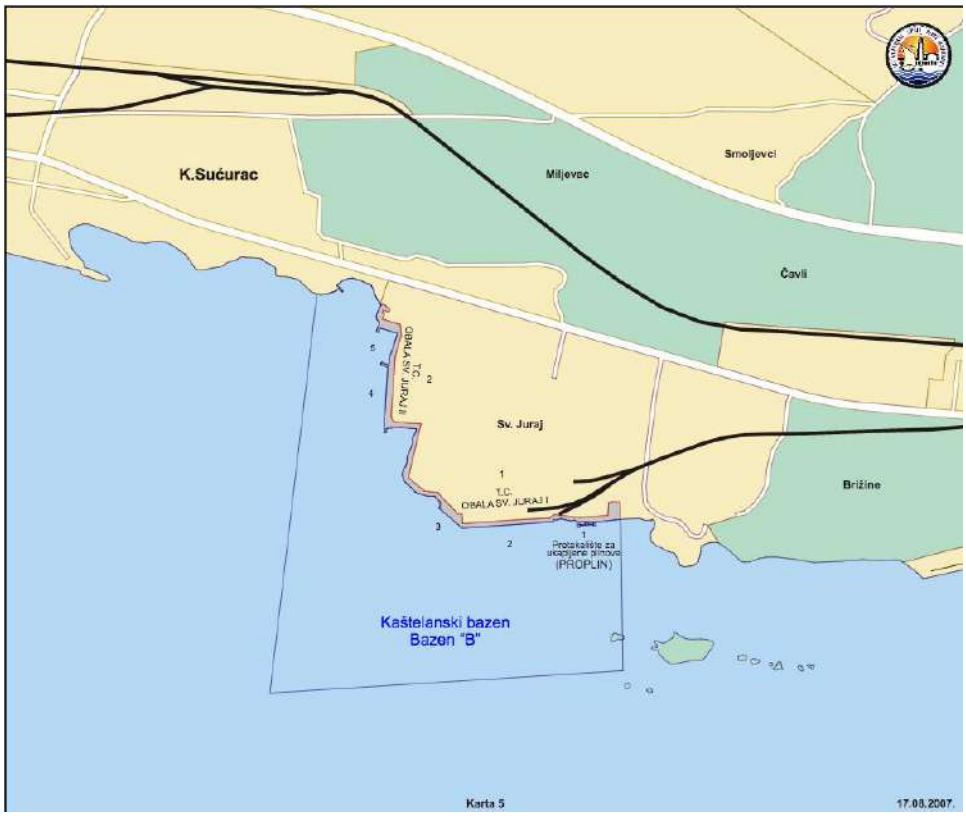



**Figure 3.8. Kaštela basin B**

Source: Port authority Split, 2018

**Kaštela basin C**

Kaštela basin C (Latitude: 43°32.2' N; Longitude: 16°28.3' E) has 0,028767 km² of land area and 0,311 km $^2$ of sea surface. It has eight berths divided into three areas, quay of Sv. Kajo, INA tanker terminal and Brižine coast (figure 3.9.). Berth no. 1 on the quay of Sv. Kajo is used for vessels in domestic and international transport performing loading operations of cement and cement products and unloading of slag. The quay has length of 219 m and draft of 8.2 m with

the use of pontoons (spacers). The bunkering operations are performed by shore to ship fuel transfer. Berths no. 1 and 2 are 150 m long with maximum permitted draft of 11.3 m intended for loading and unloading operations of oil and petroleum products. Berth no. 3 is used for berthing of smaller tanker vessels. It is located on the short coast of Solin, with 103 m of length of and draft up to 6 m. There are four berths on the Brižine coast. Berth no.1 is temporary used for berthing ships in lay-up (out of service), ships carrying out deratization and other needs at the Port Authority Split decision with the approval of the Harbor master's office. Berth no. 2 on the Brižine coast with 70 m of length (the longer side of the pier) and 50 m long berth no. 3 (western part of the pier, the outside part), are used for berthing of fishing vessels and other vessels at the Port Authority Split decision with the approval of the Harbor master's office. Berth no. 3 on the Brižine coast is 50 m long (western part of the pier, the outside segment). Berth no. 4 also on the Brižine coast has 70 m of the operational dock (western part of the pier, inner segment) and intended exclusively for unloading fish and loading of fishing gear and supplies for fishing purposes. The maximum vessels length of stay is limited to two hours.


**Figure 3.9. Kaštela basin C**

Source: Port authority Split, 2018

**Komiža basin**

The Komiža basin is dislocated basin on the island of Vis with 0,001086 km² of land area and 0,062538 km $^2$ of sea surface, having the main purpose of provision of fishing services.

### 3.7. INTERMODAL NODES

Intermodal nodes when combining two modes of transport is, giving the respective infrastructural solutions, a service with additional value for the users in the port of Split and its connected basins, enabling to perform the transport processes more efficiently. The city port basin is, as already mentioned, a traffic hub where the maritime, road and rail modes of traffic are connected in the same area. The maritime passenger terminal combining ferries, cruise vessels, high speed crafts (HSC) (catamarans), small cruisers, sail and tourism vessels and others are integrated with bus and rail terminal providing the services of direct connection to destinations, according to the users travel plans. The access road to the port area is Kralja Zvonimira road which continues through quay of Knez Domagoj. Also from the year 2019, ferry and catamaran sailing schedule are adjusted to the airplane schedules in the Split airport terminal, especially in the evening hours increasing the efficiency and destination reaching capabilities. The intermodal points in the Split city port basin (passenger port) are shown in figure 3.10.

Vranjic-Solin basin also provides intermodal services for cargo transport to destinations depending on the users demand. In the cargo port area, the cargo is transported from ships to rail wagons, which have an access directly on the terminal, and later distributed to destinations and vice versa. The intermodal transport between maritime and road modalities is realized through cargo delivery on container terminal trough Solinska road on the eastern part of the port or trough Put Sjeverne luke road on the western part of the port where bulk and general

cargo terminals are located, and vice versa (figure 3.11.). There is also possibility of road and rail intermodal cargo transshipment and vice versa.

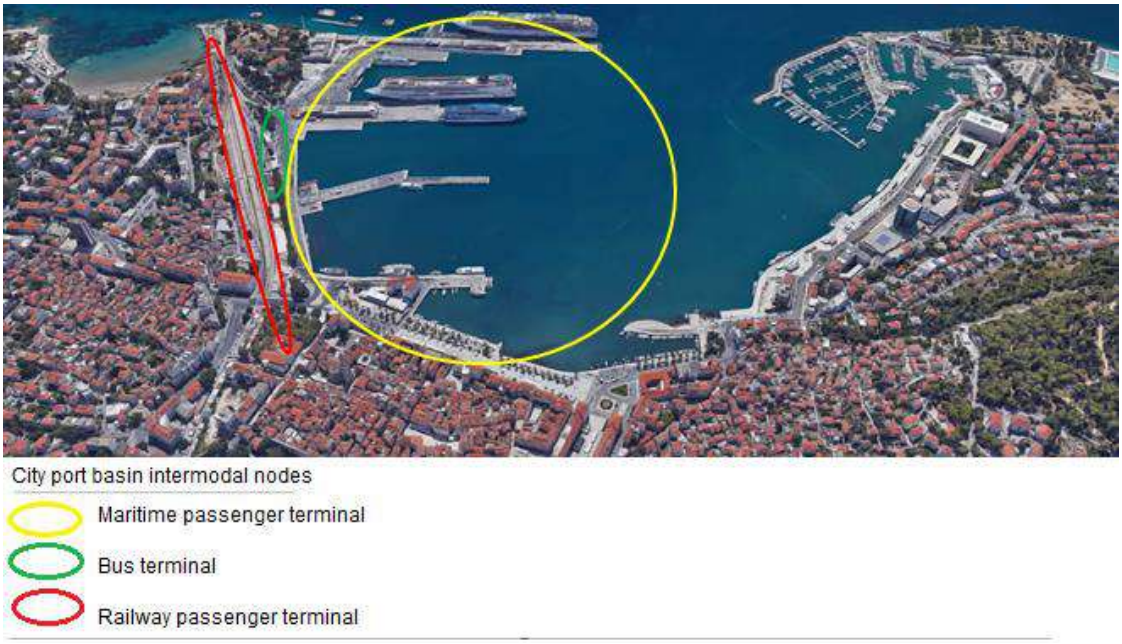



**Figure 3.10. City port basin intermodal nodes**

Source: Google maps, 2018 – modified


**Figure 3.11. Vranjic-Solin basin intermodal nodes**

Source: Google maps, 2018 – modified

The intermodal maritime-road modality is available service in the Kaštela basin A through Dr. Franjo Tuđman road. Kaštela basin B integrates three traffic modalities creating an intermodal connection depending on the industry demands. Vessels operational docks are situated on Sv. Juraj area comprising also a railway line penetrating directly on the shore and two access roads Gmajevac and Krknjač road. Kaštela basin C integrates road, rail and maritime transport into intermodal connections on three terminals. The maritime cargo terminals are reachable from two access streets Brižine road on western part of the basin and Salonitanska road on east and railway lines connecting the terminals with the railway network. The vicinity of Split airport terminal enabled the intermodal passenger transport in Kaštela basin D – Resnik (figure 3.12.), providing the possibilities of integration of air, road and maritime transport. Besides the airport terminal in the vicinity of basin, the basin is connected via Dr. Franjo Tuđman road on the northern part of the pier and continuing to Divulje road which stretches to the pier providing

the passenger transfers by smaller tourist boats and vessels to the destinations in Split surrounding. Furthermore, the seaplane terminal is located in Resnik basin.


**Figure 3.12. Kaštela basin D - Resnik intermodal nodes**

Source: Google maps, 2018 - modified

### 3.8. MODEL OF PORT MANAGEMENT

Port Authority Split was established due to Decree of the Government of the Republic of Croatia on the establishment of Port Authority Split for the purpose of managing, building and using the Port of Split as a port open for international public traffic of special (international) economic interest for the Republic of Croatia. Port Authority is a non-profit legal person who's establishing, organization and activities are regulated by Maritime Domain and Seaports Act. Management and planning are the main activities of port authority for strategic development

of the port of Split. The economic activities are performed by numerous concession holders, private enterprises for performing port activities in the port area.

Based on the Law on Maritime Domains and Seaports, the port authority undertakes the following activities that comprise:

1. taking care of building, maintenance, management, protection and upgrading of maritime domain that represents dock area,
2. building and maintenance of port infrastructure, financed from the budget of port authority's founder,
3. expert control over building, maintenance, management and protection of dock area (port infrastructure and superstructure),
4. ensuring permanent and undisturbed port traffic, technical and technological integrity and safety of navigation,
5. ensuring provision of services of general interest, or those for which other economic subjects have no interest,
6. coordination and supervision of the operation of the concessionaires that perform economic activity in dock area
7. deciding on establishing and managing of a free zone in port area, in accordance with free-zone regulations,
8. other activities specified by law.

The bodies of port authority are Management Board and Director. Management Board is composed of:

1. four representatives of Croatian Government, one of whom is an employee of the harbor master's office in jurisdiction of which is port authority headquarters; they are appointed by Croatian Government,

2. one representative of the county on the territory of which is port authority headquarters located; he is appointed by county government,
3. one representative of the town/city or municipality on the territory of which is port authority headquarters located; he is appointed by town/city or municipal government,
4. one representative of the employees of all concessionaires that perform activities in dock area; he is appointed by the Council.

President of Management Board supervises the work of Management Board. Port authority Management Board on the basis of public competition, at the proposal of competition committee and with consent of Minister, appoints Director of port authority for a period of four years.

As a result of the port reform from 1990s, Port Authority Split currently operates as a public institution based on the "landlord port" model. It manages the port while the port concessionaires perform operations within the port area in accordance with concession agreements. Port authority revenues are port charges, concession fees (according to the type of concession), assets allocated from founders budget and other revenues. Port charges are with port fees nominated as port tariffs. Port charges are fixed and published by port authority and include charge for use of coast, demurrage fee and berth fee. The assets allocated from the budget of the founder of a port can only be used for financing of the building and maintenance of port infrastructure. The other assets belong to port authority within jurisdiction of which these assets are collected, and their purpose are building and maintenance of port superstructure, equipping of port with protection of sea from pollution from ships, maintaining water-depth in port and port anchorage and operating costs of port authority. The possibility to perform port activities, use the existing infrastructure and superstructure, and build new

infrastructure and superstructure are acquired on the basis of a concession. Concession can be granted to a legal or physical person who is registered for business operation and who meets the conditions regulated by Maritime Domain and Seaports Act.

The types of port activities in public ports are:

1. mooring of ships, yachts and fishing vessels, boats intended for sport activities and other boats and floating vessels,
2. loading, unloading, transshipment, transport and storage of goods and other materials, embarkation and disembarkation of passengers and vehicles,
3. other economic activities in direct economic, traffic or technological relation with these activities (ex. supply of ships, providing services to passengers, tugging, port machinery servicing, agency services and forwarding services, representation in customs procedures, quality control activities etc.).

Port Authority Split has two main functions, where the first is related to activities in coastline domestic maritime transport to and from domestic islands. The second function is a commercial role of tourist traffic to the islands, the cruise passenger traffic and commercial freight traffic. These two functions are integrated as for the fact that passengers traveling to islands may be local residents or tourists. The commercial functions of the port authority should be preparing for commercialization, while reducing the need for government funding, in accordance with current activities, which implies monitoring and measuring activities of concessionaire productivity. It should be emphasized that Port Authority Split is the only port authority in Croatia generating profit.

## 3.9. PORT CONCESSIONAIRES AND STAKEHOLDERS

Stakeholders of the port of Split are all subjects, entities, companies and parties having an interest in the industry, and directly or indirectly affected by the business resources (input and output) starting from the state, government, regional and local authorities, community, owners, customers, suppliers, creditors, employees, investors and all other subjects affected by the multiplicative effect of the numerous activities performed in the port area. As already mentioned, the acquisition of concession is the requirement to perform port activities as well as the other economic activities, the use of existing infrastructure and superstructure, but also the construction of new infrastructure and superstructure facilities in the port area. The concession may be provided to legal or physical person upon request or by collecting written offers in compliance with the conditions prescribed by the Maritime Domain and Seaports Act. One concessionaire may be awarded one concessionary activity as a rule, but a concession for performing all of port activities can't be provided to one concessionaire. There are four types of concessions granted by the port authority in the port of Split, as follows:

1. primary (priority) concession
2. concession for performing port activities and other economic activities that requires the use of existing infrastructure and superstructure and/or building of new infrastructure and superstructure in the dock area,
3. concession for performing port activities and other economic activities that does not require exclusive use of the existing infrastructure and superstructure, or building new infrastructure and superstructure in dock area,
4. shipping agencies and freight forwarders activities, performed on the basis of issued permission of port authority

The primary (priority) concession for performing port services in the cargo port of Split located in the Vranjic-Solin basin was granted to a market orientated company Luka d.d. Split. The company provides port-transport services including the use of infrastructure and superstructure facilities for cargo operations (cargo transport, transshipment, cargo storage etc.) in the Split cargo port. There are 50 granted concessions for performing port activities and other economic activities that requires the use of existing infrastructure and superstructure and/or building of new infrastructure and superstructure in the port of Split dock areas (basins) for the year 2018.The list of companies, concession holders, for above mentioned activities along with the respective concession areas and port activities are shown in table 3.9.

**Table 3.9. List of companies holding a concession for performing port activities and other economic activities that requires the use of existing infrastructure and superstructure and/or building of new infrastructure and superstructure in the port of Split dock areas (basins)**

| NAME OF THE COMPANY | CONCESSION AREA | PORT ACTIVITY |
|---|---|---|
| AKCELERACIJA d.o.o. | City port basin – part of the port area on the Sv. Nikola pier, Sv. Petar pier, quay of knez Domagoj III and Lukobran | Public lightning services (32 columns) |
| AMEROPA ŽITNI TERMINAL d.o.o. Vranjic | Vranjic-Solin basin | Grain transshipment |
| BRANITELJSKA ZADRUGA LEGIO QUARTA | City port basin | Service activities related to maritime transport |
| BEST OF BRAČ d.o.o. | City port basin | Retail trade of various commercial services |
| BRODOMERKUR d.d. Split | Vranjic-Solin basin | Commercial services |
| BRODOMETALURGIJA d.o.o. Split | Vranjic-Solin basin (open warehouse) | Electro installation services |
| CEMEX Hrvatska d.d. Kaštel Sućurac | Kaštela basin B – Sv. Juraj I and Sv. Juraj II shores<br>Kaštela basin C – Sv Kajo shore | Cement production |
| CRODUX DERIVATI DVA d.o.o. | Vrajnic- Solin basin | Retail trade of motor fuels and lubricant motor oils |
| DALMATINSKE HLADNJAČE | Vranjic-Solin basin | Storage of goods (warehouse) |
| DUJMOVAČA d.o.o. Solin | Vrajnic- Solin basin | Wholesale of wood, construction materials and sanitary equipment |
| EUROPLAKAT d.o.o. | City port basin – on the part of the port area | 18 advertising boards (length: 5.04m: height: 2.35m) on metal constructions illuminated by LED lighting |
| EUROPSKI OBALNI AVIOPRIJEVOZNIK d.o.o. Zagreb | Kaštela basin D – Resnik | Air passenger transport |
| EUROPSKI OBALNI AVIOPRIJEVOZNIK d.o.o. Zagreb | City port basin (berth 21) | Seaplane handling |
| EXTRA OLD j.d.o.o. Split | City port basin (on the connection of the quay of Lazaret and quay of knez Domagoj | Rental and lease of car and other motor vehicle categories |

| | | |
|---|---|---|
| INA d.d. Zagreb | Kaštela basin B – behind the berth no. 5 on the Sv. Juraj II quay (base) | Fuel and gas supply |
| IMPRIMIS d.o.o. Split | City port basin – inside the Maritime passenger terminal of the port Split | Self-service device for hot drinks (position K1) |
| IMPRIMIS d.o.o. Split | City port basin – inside the Maritime passenger terminal of the port Split | Self-service device for hot drinks (position K2) |
| IMPRIMIS d.o.o. Split | City port basin – inside the Maritime passenger terminal of the port Split | Self-service device for hot drinks (position K3) |
| JADROLINIJA | City port basin – part of the port area on the root of Sv. Petar pier | Ticket sales for the maritime and coastal passenger transport (ferry, HSC, passenger ships etc.) |
| PUČKO OTVORENO UČILIŠTE ŽIŽIĆ | Kaštela basin D – Resnik – on the part of the mooring pier | Educational services |
| MATER j.d.o.o. | City port basin – south of the main entrance in the Maritime passenger terminal of the port Split | Luggage storage |
| MATER j.d.o.o.o. | City port basin – Sv. Petar pier | Luggage storage |
| MATER j.d.o.o.o. | City port basin – quay of knez Domagoj | Luggage storage |
| MB KAPETAN LUKA – t.p. Ivan Tomić | City port basin – part of the port area on the root of Sv. Petar pier | Ticket sales for the maritime and coastal passenger transport (HSC – catamaran vessels) |
| MSC krstarenja d.o.o. Dubrovnik | City port basin – inside the Maritime passenger terminal of the port Split | Shipping and travel agency, ticket sales and currency exchange services |
| NAPRID BILI d.o.o. Split | City port basin – inside the Maritime passenger terminal of the port Split | Car rental services |
| Obrt za ugostiteljstvo i usluge „TIN“ – vl. Suzana Babić | City port basin – inside the Maritime passenger terminal of the port Split | Coffee shop |
| PRIVREDNA BANKA ZAGREB d.d. | City port basin – inside the Maritime passenger terminal of the port Split | Banking transactions - ATM (position B2) |
| REA & RIA d.o.o., Split | City port basin – inside the Maritime passenger terminal of the port Split | Currency exchange services |
| RENTAL d.o.o., Split | City port basin – inside the Maritime passenger terminal of the port Split | Car rental services |
| Ribarska zadruga “FRIŠKA RIBA” Split | Kaštela basin C – on the berths no. 2,3 and 4 on the Brižine quay | Fishing services |
| SPLITSKA BANKA d.d. Split | City port basin – inside the Maritime passenger terminal of the port Split | Banking transactions - ATM (position B1) |
| TEHNOSPOJ – INTERIJERI d.o.o. Split | Vranjic-Solin basin (Dujmovača I B, the part of the warehouse) | Furniture production for business and sale premises |
| TISAK d.d. Zagreb | City port basin – in front of the Maritime passenger terminal of the port Split | Retail services |
| VIATOR d.o.o. Split | City port basin – inside the Maritime passenger terminal of the port Split | Car rental services |
| VODOVOD I KANALIZACIJA d.o.o. Split | Vranjic-Solin basin | Water supply – pump station Duje |
| ZAGREBAČKA BANKA d.d. Zagreb | City port basin – inside the Maritime passenger terminal of the port Split | Banking transactions - ATM (position B4) |
| ZUSAMMEN d.o.o. Split | City port basin – Sv. Duje pier | Rental and lease (leasing) of other machinery, equipment and material goods |
| ZUSAMMEN d.o.o. Split | City port basin – Sv. Petar pier | Rental and lease (leasing) of other machinery, equipment and material goods |
| ZUSAMMEN d.o.o. Split | City port basin – Lukobran | Rental and lease (leasing) of other machinery, equipment and material goods |
| ZAJEDNICA PONUDITELJA (Nositelj koncesije Bremen d.o.o.) | City port basin – on the southwest part of the basin (Mandrač) | Travel agency activities |
| TSUNAMI | Kaštela basin D -Resnik | Preparation and serving of beverages |
| VENULA d.o.o. Split | City port basin – on the concrete cube in front of berth 20 | Other retail sales besides shops, stalls and market services |

| | | |
|---|---|---|
| MANTALA j.d.o.o. Split | City port basin – on the concrete cube in front of berth 23 | Preparation and serving of beverages |
| JUŽNA UVALA j.d.o.o. | City port basin – on the Lazaret quay | Soft drinks sale |
| JUŽNA UVALA j.d.o.o. | City port basin – on the Sv. Petar pier | Soft drinks sale |
| AKCELERACIJA d.o.o. Split | City port basin | 151 posts for garbage cans |
| BRODOMETALURGIJA d.o.o. Split | Vranjic-Solin basin | Electro installation services |
| Obrt za mjenjačko poslovanje „PORAT“ vl. Ivana Panić | City port basin – inside the Maritime passenger terminal of the port Split | Currency exchange services |

Source: Port Authority Split, 2018

Concessions when performing port activities and other economic activities that does not require exclusive use of the existing infrastructure and superstructure, or building new infrastructure and superstructure in the port of Split dock areas (basins) are divided by the type of the activity as follows: fumigation and deratization, vessels supply, vessels' fuel supply, cleaning, reception and removal of solid waste, cleaning, reception and removal of liquid waste and sea pollution by liquid and solid waste, goods' quantity and quality control, washing and transport of laundry from vessels, excursion program, collection and transport of animal origin by-products not intended for human nourishment in international traffic categories I and III, mooring and unmooring of ships, yachts, fishing, sports and other boats and floating structures, acceptance and guidance of the vehicles for the purpose of loading and unloading of vehicles from Port's area, unloading of bulk stone and loading and unloading vessels from own production services. The lists of companies related to the specific service are presented in table 3.10.

**Table 3.10. List of companies holding a concession when performing port activities and other economic activities that does not require exclusive use of the existing infrastructure and superstructure, or building new infrastructure and superstructure in the port of Split dock areas (basins)**

| TYPE OF THE ACTIVITY | COMPANY NAME(S) |
|---|---|
| Fumigation and deratization | – CIAN d.o.o.<br>– DEZINSEKCIJA d.o.o. |
| Vessels' supply | – A.M.E.C. RIJEKATEKSTIL d.o.o.<br>– METRO CASH & CARRY D.O.O.<br>– PIK VRBOVEC-MESNA INDUSTRIJA d.d. |

| | |
|---|---|
| | – PREHRAMBENO INDUSTRIJSKI KOMBINAT<br>– VAPORETTO d.o.o.<br>– VELPRO-CENTAR d.o.o. |
| Vessels' fuel supply | – CRODUX DERIVATI DVA d.o.o.<br>– APIOS d.o.o.<br>– INA – Industrija nafte d.d.<br>– ADRIA OIL d.o.o.<br>– RIJEKATANK d.o.o<br>– PETROL d.o.o. |
| Cleaning, reception and removal of solid waste | – ČISTOĆA d.o.o. |
| Cleaning, reception and removal of liquid waste and sea pollution by liquid and solid waste | – CIAN d.o.o.<br>– IND EKO d.o.o.<br>– D.V.D. KAŠTEL GOMILICA d.o.o.<br>– DEZINSEKCIJA d.o.o. |
| Goods' quantity and quality control | – SGS Adriatica d.o.o.<br>– ADRIAINSPEKT d.o.o.<br>– CARGO CONTROL j.d.o.o.<br>– MARIS INSPECTIO d.o.o.<br>– EUROINSPEKT CROATIAKONTROLA d.o.o<br>– INSPECTORATE (CROATIA) Ltd. d.o.o. |
| Cleaning and transport of laundry from vessels | – LINTEA d.o.o.<br>– Obrt DODO<br>– ALBA LUNARIS j.d.o.o. |
| Excursion program services | – AMATHUS TRAVEL d.o.o.<br>– APPLICON TOURS d.o.o.<br>– ADRIATIC DESTINATION MANAGEMENT COMPANY d.o.o. for tourism and travel agency<br>– APODOS d.o.o. Split<br>– CALVADOS CLUB PUTNIČKA AGENCIJA d.o.o. Split<br>– ELITE TRAVEL d.o.o. Dubrovnik<br>– MSC KRSTARENJA d.o.o.<br>– MERKUR 5 d.o.o<br>– DUBROVNIK TRAVEL d.o.o.<br>– GULLIVER TRAVEL d.o.o.<br>– GRAND CIRCLE DUBROVNIK d.o.o. |
| Collection and transport of animal origin by-products not intended for human nourishment in international traffic categories I and III | – SORDES d.o.o.<br>– CIAN d.o.o. |
| Mooring and unmooring of ships, yachts, fishing, sports and other boats and floating structures | – BRANITELJSKA ZADRUGA LEGIO QUARTA |
| Acceptance and guidance of the vehicles for the purpose of loading and unloading of vehicles from Port's area | – BRANITELJSKA ZADRUGA LEGIO QUARTA |
| Bulk stone services | – BILA STRANA d.o.o. |
| Loading and unloading vessels from own production | – ZEPHYR TEHNOLOGIJE d.o.o. |

Source: Port Authority Split, 2018

The fourth concession categories in the port of Split are concessions for shipping agencies and freight forwarders activities, performed on the basis of issued permission of port authority. The list of shipping and freight forwarding agencies are shown in table 3.11.

**Table 3.11. List of shipping and freight forwarding companies holding a concession for the respective activities in the area of the port of Split**

| TYPE OF THE ACTIVITY | COMPANY NAME(S) |
|---|---|
| Agency activities | – ADRIATIK SERVIS d.o.o.<br>– ALIANCA d.o.o.<br>– BANDIĆ MARITIME d.o.o.<br>– BRODSKO UPRAVLJANJE d.o.o.<br>– BWA d.o.o.<br>– CAPRIS CROATIA d.o.o.<br>– JADROAGENT d.d<br>– JADROLINIJA d.d. Rijeka<br>– L.P. POMOĆ JAHTAMA d.o.o.<br>– MSC KRSTARENJA d.o.o.<br>– REA DUBROVNIK d.o.o.<br>– TRANZITAGENT d.o.o.<br>– MAJA –JAHTAŠKE USLUGE<br>– ADRIATIC DESTINATION MANAGEMENT COMPANY d.o.o. for tourism and travel agency<br>– SERVIS BRODOVA NENO d.o.o.<br>– GLOBAL AGENT d.o.o.<br>– ELITE TRAVEL d.o.o. |
| Freight forwarding | – CENTAR ZA KOMBINIRANI TRANSPORT ZAGREB d.d. (CKTZ) |

Source: Port Authority Split, 2018

# 4. PORT TRAFFIC STATISTICS

In 2017 the Port of Split (including the Port of Kaštela) saw 16,885 arrivals, out of which 5.6% in the international maritime traffic. The largest part of the traffic was handled by the City Port of Split, around 88.6% of the total arrivals of vessels into the ports under the jurisdiction of the Port Authority Split. Local ferries made 58.9% of the total arrivals, local fast liner transport amounted to 14.7%, whereas local tourist vessels made 15.8% of the arrivals. The remaining traffic (arrivals) in 2017 included 258 ships in the international liner traffic, 234 cruise ships, 225 towboats, working and other vessels, and 110 yachts.

**Table 4.1 Port of Split – Maritime Traffic**

| MARITIME TRAFFIC – Port of Split | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| Domestic ships – arrivals | 14,503 | 10,927 | 16,477 | 17,519 | 15,753 |
| from foreign port | 192 | 199 | 151 | 174 | 236 |
| from domestic port | 14,314 | 10,728 | 16,326 | 17,345 | 15,517 |
| Foreign ships – arrivals | 855 | 723 | 791 | 808 | 925 |
| from foreign port | 653 | 491 | 587 | 569 | 617 |
| from domestic port | 202 | 232 | 204 | 239 | 308 |
| Domestic ships – departures | 13,701 | 10,911 | 16,464 | 17,510 | 15,758 |
| for foreign port | 187 | 190 | 151 | 174 | 236 |
| for domestic port | 13,514 | 10,721 | 16,313 | 17,336 | 15,522 |
| Foreign ships – departures | 1,260 | 725 | 793 | 799 | 931 |
| for foreign port | 1,080 | 484 | 589 | 564 | 617 |
| for domestic port | 180 | 241 | 204 | 235 | 314 |
| Total number of ships (individual) in international traffic | 632 | 778 | 742 | 643 | 729 |
| Cargo – loaded (t) | 835,882 | 593,544 | 1,008,710 | 2,018,231 | 1,535,454 |
| dangerous cargo | 10,992 | 4,659 | 321,434 | 16,060 | 21,060 |
| Cargo – unloaded (t) | 900,681 | 810,143 | 2,153,376 | 1,114,886 | 2,716,249 |
| dangerous cargo | 366,973 | 438,412 | / | 366,562 | 1,909,673 |
| Passengers – embark | 2,299,148 | 1,691,180 | 2,043,922 | 2,707,497 | 2,536,452 |
| Passengers – disembark | 2,310 697 | 1,667,927 | 2,592,536 | 2,611,864 | 2,405,393 |
| Cars – loaded | 323,704 | 202,502 | 337,021 | 355,893 | 377,907 |
| Cars – unloaded | 323,282 | 213,611 | 330,170 | 352,648 | 367,410 |

Source: Harbour Master's Office report, 2014-2018

In 2017 the passenger traffic amounted to around 5.26 million (of which 92.3% in national traffic), the vehicle traffic amounted to 775,396 (of which 95.2% in national traffic), while the truck traffic amounted to 180,554 (of which 96.4% in national traffic. The entire international truck traffic related to the trade with Italian ports.

The North Port of Split mainly handles cargo ships. In 2017, four Kaštela Basins and Vranjic-Solin Basin saw 2,107 arrivals (1,064 freighters, 204 tankers, 465 fishing vessels, 374 tourist vessels). The overall flow of cargo under the jurisdiction of the Port Authority Split amounted to around 3.1 million tons in 2017 (of which 39.7% exports and 16.5% imports).

The entire traffic flow through the Port of Split over the last 5 years is shown in Table 4.1.

## 4.1. FREIGHT TRAFFIC STATISTIC

This chapter deals with the cargo traffic flow through the Port of Split, including the vehicle traffic. Separate flows of trucks, buses and personal vehicles are presented depending on the available statistics.

### 4.1.1. Vehicle traffic

The total vehicle traffic in the Port of Split has been increasing steadily (Figure 4.1). In 2017 it amounted to 775,396 vehicles, out of which around 5% in the international traffic (Table 4.2).

**Table 4.2. Port of Split – Vehicle traffic (2017)**

| | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| | VEHICLE TRAFFIC | | | | |
| Local | 608,032 | 616,405 | 647,867 | 689,992 | 738,463 |
| Coastal | 1,541 | 1,405 | | | |
| **Total domestic** | 609,573 | 617,810 | 647,867 | 689,992 | 738,463 |
| Ferry | 45,371 | 31,449 | 38,182 | 43,277 | 36,933 |

| | | | | | |
|---|---|---|---|---|---|
| HSC | | 1,891 | | | |
| **Total International** | 45,371 | 33,340 | 38,182 | 43,277 | 36,933 |
| **TOTAL** | **654,944** | **651,150** | **686,049** | **733,269** | **775,396** |

Source: Port Authority Split, 2014-2018

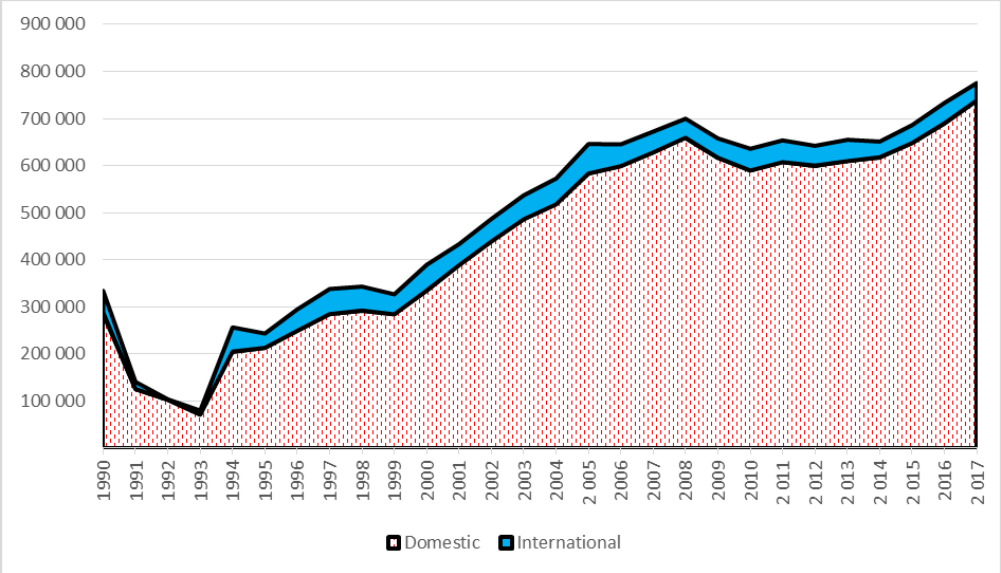



**Figure 4.1. Port of Split – Vehicle traffic (1990-2017)**

Source: Port Authority Split, 2018

### Trucks

In 2017 the flow of trucks through the Port of Split amounted to 181,000 carrying around 967,000 tons of cargo.

**Table 4.3. Port of Split – Truck traffic (2017)**

| | **Local ferry** | | **International ferry** | | **Total** | |
|---|---|---|---|---|---|---|
| | trucks | tones | trucks | tones | trucks | tones |
| January | 8,231 | 41,155 | 348 | 5,220 | 8,579 | 46,375 |
| February | 11,090 | 55,450 | 417 | 6,255 | 11,507 | 61,705 |
| March | 14,740 | 73,700 | 407 | 6,105 | 15,147 | 79,805 |
| April | 14,390 | 71,950 | 662 | 9,930 | 15,052 | 81,880 |
| May | 18,709 | 93,545 | 763 | 11,445 | 19,472 | 104,990 |
| June | 20,205 | 101,025 | 754 | 11,310 | 20,959 | 112,335 |
| July | 19,632 | 98,160 | 757 | 11,355 | 20,389 | 109,515 |

| | | | | | | |
|---|---|---|---|---|---|---|
| August | 17,400 | 87,000 | 512 | 7,680 | 17,912 | 94,680 |
| September | 14,114 | 70,570 | 557 | 8,355 | 14,671 | 78,925 |
| October | 13,358 | 66,790 | 556 | 8,340 | 13,914 | 75,130 |
| November | 11,435 | 57,175 | 408 | 6,120 | 11,843 | 63,295 |
| December | 10,794 | 53,970 | 315 | 4,725 | 11,109 | 58,695 |
| **Total** | 174,098 | 870,490 | 6,456 | 96,840 | 180,554 | 967,330 |

Source: Port Authority Split, 2018

Local traffic prevails in the truck flow, amounting to 96% of the number and around 90% of the cargo carried. The entire international truck traffic refers to the Split-Ancona ferry trade. Table 4.3. shows the truck traffic breakdown by months in 2017, while Figures 4.2. and 4.3. provide an overview of the monthly load over the last 5 years.

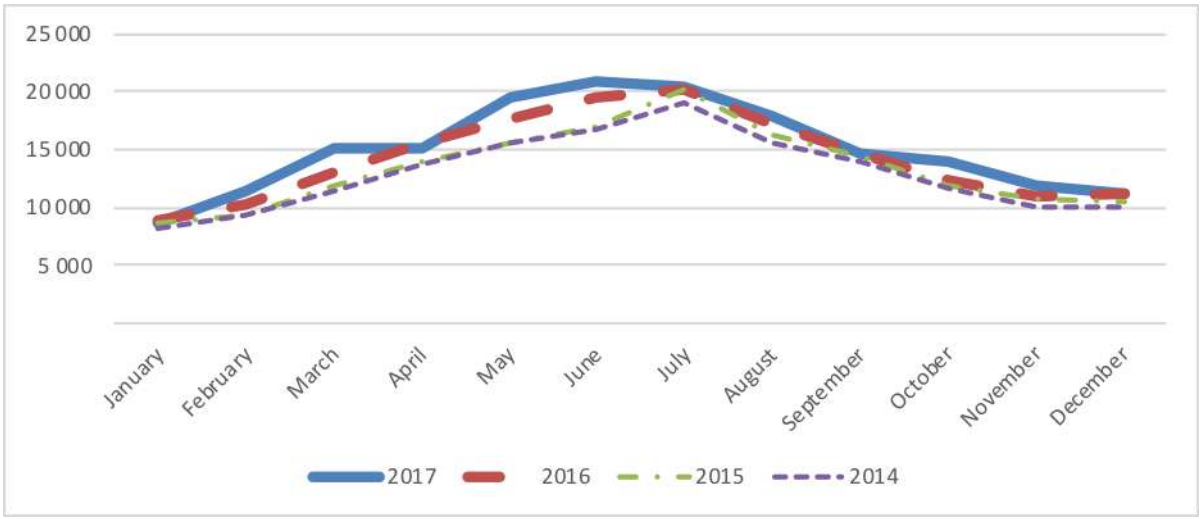



**Figure 4.2. Port of Split - Number of trucks per month, 2014-2017**

Source: Port Authority Split, 2014-2018

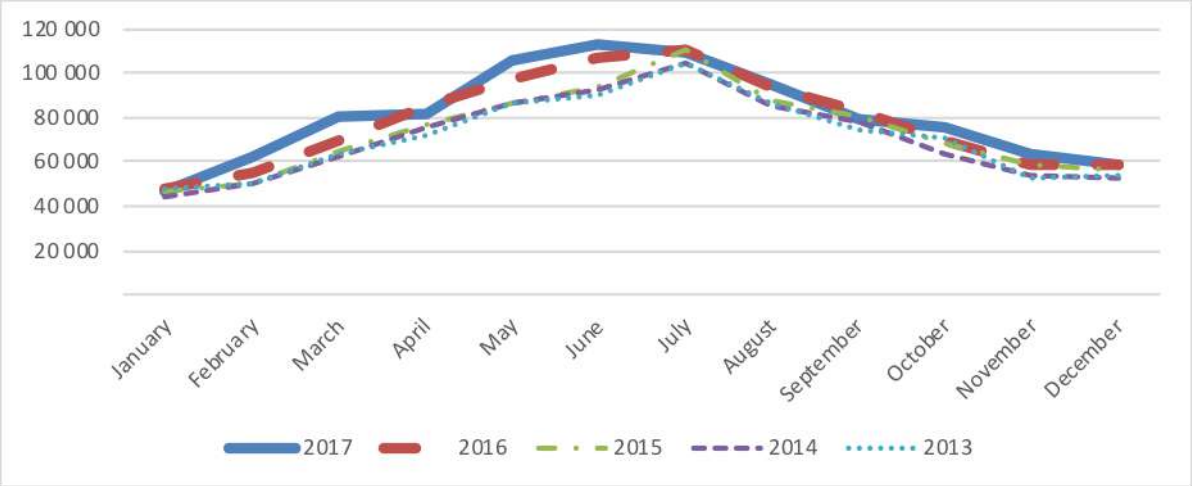



**Figure 4.3. Port of Split, Cargo on trucks per month, 2013-2017**

Source: Port Authority Split, 2014-2018

Figures 4.2. and 4.3. confirm that there have been no significant oscillations in truck traffic over the last five years, in terms of cargo volume and seasonal quality of the traffic flow.

**Buses**

In the year of 2017, the volume of bus traffic amounted to 4,177, of which 26% in the international traffic. The traffic flow of buses by months is presented in Table 4.4. The entire international bus traffic refers to the Split-Ancona ferry trade.

**Table 4.4. Port of Split – Bus traffic**

| | 2013 | | 2014 | | 2015 | | 2016 | | | 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local | Int. | Local | Int. | Local | Int. | Local | Int. | | Local | Int. |
| January | 10 | | 21 | 37 | 18 | 26 | 28 | 23 | | 17 | 21 |
| February | 26 | | 25 | 15 | 13 | 8 | 22 | 4 | | 9 | 3 |
| March | 58 | | 27 | 50 | 56 | 35 | 35 | 40 | | 26 | 8 |
| April | 108 | | 160 | 173 | 146 | 148 | 149 | 88 | | 203 | 123 |
| May | 370 | | 398 | 227 | 380 | 166 | 391 | 114 | | 480 | 112 |
| June | 424 | | 491 | 268 | 479 | 242 | 433 | 183 | | 582 | 150 |
| July | 295 | | 375 | 259 | 395 | 207 | 330 | 131 | | 332 | 109 |
| August | 215 | | 342 | 397 | 348 | 323 | 344 | 263 | | 359 | 244 |
| September | 693 | | 591 | 334 | 546 | 271 | 601 | 215 | | 589 | 159 |
| October | 264 | | 327 | 192 | 403 | 171 | 398 | 169 | | 436 | 107 |
| November | 36 | | 23 | 42 | 30 | 27 | 69 | 37 | | 46 | 17 |
| December | 20 | | 20 | 14 | 31 | 17 | 18 | 6 | | 29 | 16 |
| Total | 2519 | 2008 | 2800 | 2008 | 2845 | 1641 | 2818 | 1273 | | 3108 | 1069 |
| | 4527 | | 4808 | | 4486 | | 4091 | | | 4177 | |

Source: Port Authority Split, 2014-2018

The overall bus traffic has experienced a decline since 2014, primarily due to the decrease in international traffic.

**Personal vehicle traffic**

The traffic of personal vehicles steadily increased to reach almost 600,000 vehicles in 2017. The share of the international traffic was about 6%.

**Table 4.5. Port of Split – Personal vehicle traffic**

| | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Local | Int. | Local | Int. | Local | Int. | Local | Int. | Local | Int. |
| January | 13 050 | 1 191 | 12 834 | 949 | 12 565 | 855 | 13 718 | 951 | 13 477 | 832 |
| February | 12 430 | 868 | 12 157 | 819 | 11 809 | 723 | 13 564 | 717 | 14 926 | 763 |
| March | 16 668 | 1 616 | 17 132 | 1 116 | 16 468 | 1 037 | 20 408 | 1 154 | 21 328 | 898 |
| April | 23 425 | 2 443 | 25 680 | 2 128 | 24 911 | 2 045 | 25 181 | 1 882 | 30 948 | 2 426 |
| May | 33 742 | 2 867 | 31 355 | 2 358 | 33 874 | 2 736 | 37 205 | 3 140 | 38 461 | 2 454 |
| June | 50 548 | 3 767 | 52 456 | 2 878 | 55 018 | 3 570 | 54 063 | 4 311 | 64 853 | 3 941 |
| July | 88 213 | 6 275 | 85 406 | 4 772 | 94 766 | 6 098 | 105 197 | 7 178 | 111 984 | 5 779 |
| August | 112 275 | 15 428 | 119 131 | 9 302 | 124 047 | 12 570 | 122 841 | 14 661 | 127 464 | 12 301 |
| September | 50 024 | 4 965 | 51 624 | 3 489 | 57 146 | 4 211 | 62 529 | 5 062 | 65 174 | 3 900 |
| October | 25 646 | 2 958 | 26 514 | 1 828 | 27 259 | 2 519 | 31 715 | 2 342 | 33 166 | 1 840 |
| November | 17 437 | 1 453 | 15 990 | 1 026 | 17 973 | 995 | 18 615 | 944 | 20 454 | 955 |
| December | 15 757 | 1 540 | 15 164 | 784 | 16 832 | 823 | 18 355 | 935 | 19 022 | 844 |
| **Total** | **459 215** | **45 371** | **465 443** | **31 449** | **492 668** | **38 182** | **523 391** | **43 277** | **561 257** | **36 933** |
| | **504 586** | | **496 892** | | **530 850** | | **566 668** | | **598 190** | |

Source: Port Authority Split, 2014-2018

**Figure 4.4. Port of Split, Personal vehicle traffic, 2017**

Source: Port Authority Split, 2018

The volume of personal vehicle traffic has a great seasonal quality, i.e. the traffic volume is multiplied during summer months (Figure 4.4).

### 4.1.2. Container traffic

The Port of Split handled 115,624 tons of containerized cargo in 2017, the total volume of TEU being 11,207. Over the last 5 years, the volume of TEU traffic has been increasing steadily. In 2017 it was approximately 121% larger than in 2013. Unlike passenger and vehicle traffic, the container traffic does not have seasonal features (Tables 4.7, 4.8; Figures 4.5, 4.6).

**Table 4.6. Container traffic 2013-2017**

| | | Discharging | | | | |
|---|---|---|---|---|---|---|
| | | **2017** | **2016** | **2015** | **2014** | **2013** |
| **F** | **20'** | 709 | 958 | 1047 | 528 | 549 |
| | **40'** | 314 | 392 | 260 | 237 | 302 |
| **E** | **20'** | 987 | 388 | 99 | 270 | 66 |
| | **40'** | 1652 | 1412 | 1498 | 1771 | 661 |
| **Total (CTN)** | | 3662 | 3150 | 2904 | 2806 | 1578 |
| **TEU** | | **5628** | **4954** | **4662** | 4814 | 2541 |
| | | | | | | |
| | | **Loading** | | | | |
| **F** | **20'** | 1570 | 960 | 565 | 676 | 452 |
| | **40'** | 1822 | 1518 | 1671 | 1891 | 839 |
| **E** | **20'** | 101 | 451 | 491 | 62 | 155 |
| | **40'** | 132 | 288 | 90 | 71 | 118 |
| **Total (CTN)** | | 3625 | 3217 | 2817 | 2700 | 1564 |
| **TEU** | | **5579** | **5023** | 4578 | 4662 | 2521 |
| | | **Total** | | | | |
| **Total (CTN)** | | 7287 | 6367 | 5721 | 5506 | 3142 |
| **TEU** | | 11207 | 9977 | 9240 | 9476 | 5062 |

Source: Port Authority Split, 2014-2018

**Table 4.7. Container Traffic in 2017 (t)**

| | *t* |
|---|---|
| *January* | *8 732* |
| *February* | *12 529* |
| *March* | *7 627* |
| *April* | *10 011* |
| *May* | *7 743* |
| *June* | *10 061* |
| *July* | *9 438* |
| *August* | *7 177* |
| *September* | *10 741* |
| *October* | *9 318* |
| *November* | *11 748* |
| *December* | *10 499* |
| ***Total*** | *115 624* |

Source: Port Authority Split, 2018

**Table 4.8. Container traffic in 2017 by months**

| | | DISCHARGING | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **I.** | **II.** | **III.** | **IV.** | **V.** | **VI.** | **VII.** | **VIII.** | **IX.** | **X.** | **XI.** | **XII.** | **TOTAL** |
| **F** | **20'** | 127 | 130 | 63 | 122 | 42 | 48 | 23 | 29 | 18 | 49 | 22 | 36 | 709 |
| | **40'** | 12 | 36 | 16 | 22 | 42 | 32 | 21 | 23 | 8 | 46 | 32 | 24 | 314 |
| **E** | **20'** | 130 | 0 | 0 | 40 | 0 | 90 | 225 | 51 | 160 | 31 | 125 | 135 | 987 |
| | **40'** | 44 | 55 | 174 | 110 | 141 | 20 | 220 | 4 | 237 | 200 | 250 | 197 | 1652 |
| **Total (CTN)** | | 313 | 221 | 253 | 294 | 225 | 190 | 489 | 107 | 423 | 326 | 429 | 392 | 3662 |
| **TEU** | | **369** | **312** | **443** | **426** | **408** | **242** | **730** | **134** | **668** | **572** | **711** | **613** | **5628** |
| | | **LOADING** | | | | | | | | | | | | |
| | | **I.** | **II.** | **III.** | **IV.** | **V.** | **VI.** | **VII.** | **VIII.** | **IX.** | **X.** | **XI.** | **XII.** | **TOTAL** |
| **F** | **20'** | 109 | 199 | 85 | 89 | 107 | 183 | 176 | 108 | 175 | 67 | 123 | 149 | 1570 |
| | **40'** | 83 | 132 | 111 | 156 | 123 | 151 | 131 | 141 | 181 | 187 | 246 | 180 | 1822 |
| **E** | **20'** | 0 | 4 | 1 | 0 | 50 | 2 | 0 | 2 | 1 | 1 | 0 | 40 | 101 |
| | **40'** | 10 | 29 | 9 | 10 | 25 | 9 | 12 | 4 | 8 | 4 | 7 | 5 | 132 |
| **Total (CTN)** | | 202 | 364 | 206 | 255 | 305 | 345 | 319 | 255 | 365 | 259 | 376 | 374 | 3625 |
| **TEU** | | **295** | **525** | **326** | **421** | **453** | **505** | **462** | **400** | **554** | **450** | **629** | **559** | **5579** |
| | | **TOTAL DISCHARGING/LOADING** | | | | | | | | | | | | |
| | | **I.** | **II.** | **III.** | **IV.** | **V.** | **VI.** | **VII.** | **VIII.** | **IX.** | **X.** | **XI.** | **XII.** | **TOTAL** |
| **Total (CTN)** | | 515 | 585 | 459 | 549 | 530 | 535 | 808 | 362 | 788 | 585 | 805 | 766 | 7287 |
| **TEU** | | 664 | 837 | 769 | 847 | 861 | 747 | 1192 | 534 | 1222 | 1022 | 1340 | 1172 | 11207 |

Source: Port Authority Split, 2014-2018

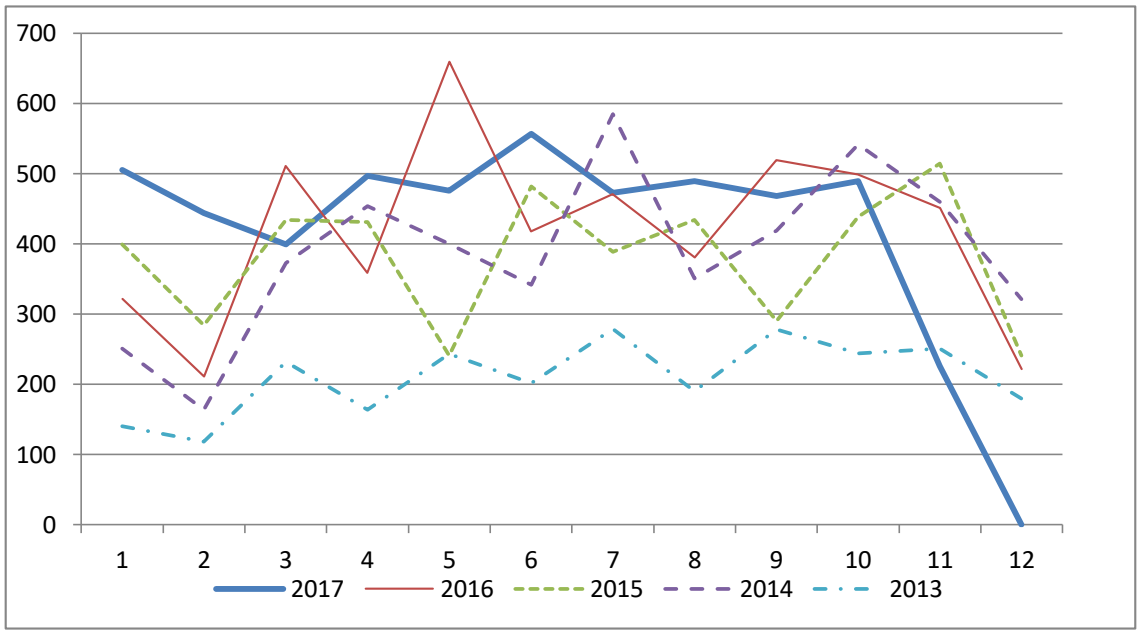



**Figure 4.5. Container traffic 2013-2017, by months – loading**

Source: Port Authority Split, 2014-2018

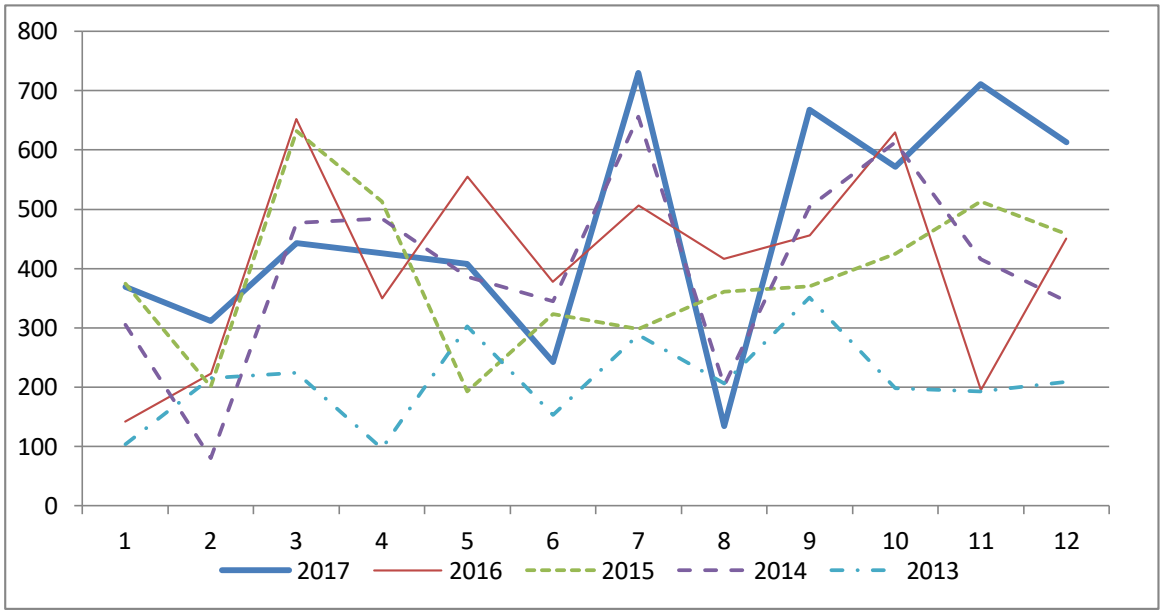



**Figure 4.6. Container traffic 2013-2017 by months – discharging**

Source: LOC, 2014-2018

### 4.1.3. Cargo traffic

In the year of 2017 the total cargo traffic handled by the Port of Split amounted to 3,136,347 tons. Table 4.9. presents the structure of the cargo while Figure 4.7. shows the cargo flow from 1990 to 2017]. Almost all cargo traffic is handled by the North Port of Split in the basins of the Bay of Kaštela. General and bulk cargoes prevail (Table 4.10.). Cargoes handled by the City Port of Split (in City Port basin) mainly refer to water, fuel and supplies. In 2017 the City Port handled 220 tons of water, 43 tons of fuel and 11 tons of other cargoes.

**Table 4.9. Cargo traffic in the City Port of Split**

| | | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| **No.** | **type of cargo** | **tones (t)** | **tones (t)** | **tones (t)** | **tones (t)** |
| 1 | Coal, petroleum coke | 156,667 | 147,099 | 137,628 | 146,434 |
| 2 | Oil and derivates | 463,793 | 435,685 | 364,982 | 444,028 |
| 3 | Bananas | 25,928 | 8,804 | | |
| 4 | Salt | 31,260 | 57,530 | 33,550 | 23,400 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Metallurgy products | 14,993 | | | |
| 6 | Iron | 55,278 | 27,385 | 39,904 | 46,328 |
| 7 | Frozen fish | | | | |
| 8 | Cement | 503,908 | 387,556 | 242,006 | 385,696 |
| 9 | Bagged cement | | 34,995 | 13,516 | |
| 10 | Other construction material | | | | |
| 11 | Iron silicates | 2,997 | | | |
| 12 | Sugar | 48,890 | 63,474 | 31,171 | 12,061 |
| 13 | Lime | 5,592 | 5,292 | 2,825 | 1,513 |
| 14 | Cement clinker | 344,553 | 374,081 | 215,409 | 345,252 |
| 15 | Stone (in bulk) | 3,340 | 10,522 | 26,001 | 158,550 |
| 16 | Asphalt | 3,409 | 1,328 | 706 | 1,198 |
| 17 | Pebble | | | | 11,010 |
| 18 | Cinder | 225,438 | 201,760 | 232,685 | 231,164 |
| 19 | Containers | 82,636 | 90,298 | 100,571 | 115,624 |
| 20 | Chemical fertilizers | | | 33,000 | |
| 21 | Grain | 330,460 | 366,700 | 316,613 | 220,186 |
| 22 | Alcohol | | | | |
| 23 | Water | 340 | | | 220 |
| 24 | Explosives | | 1,038 | 1,179 | 1,209 |
| 25 | Timber | | 3,442 | 1,629 | 10,053 |
| 26 | Other goods | 866,971 | 885,319 | 951,411 | 982,421 |
| | **TOTAL** | **3,166,453** | **3,102,308** | **2,744,786** | **3,136,347** |

Source: Port Authority Split, 2014-2018

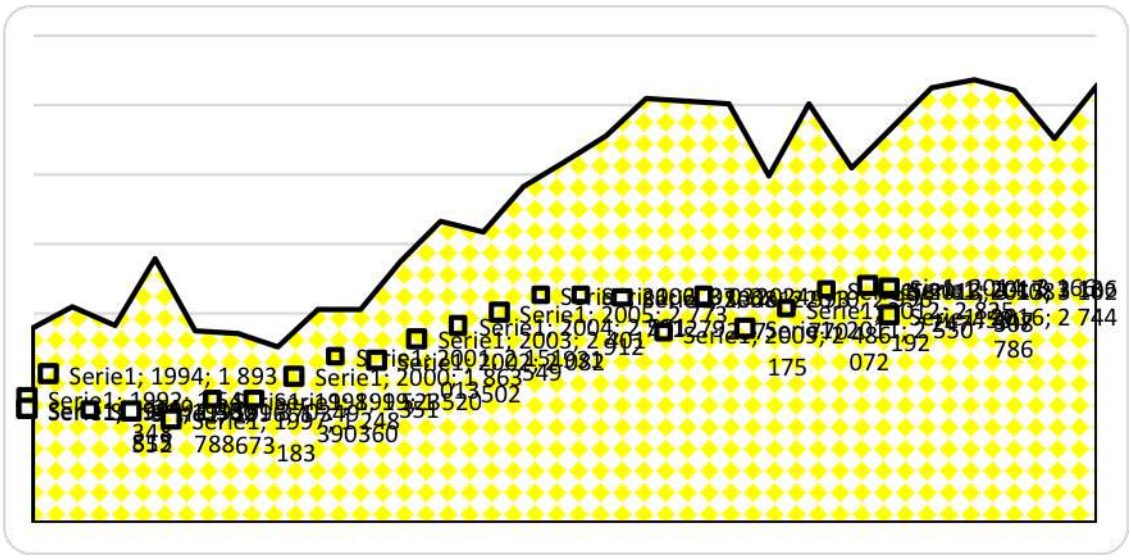



**Figure 4.7. Cargo traffic in period 1990-2017**

Source: LOC, 2018

D.4.1.2 – Analysis on potential market flows of Port of Split

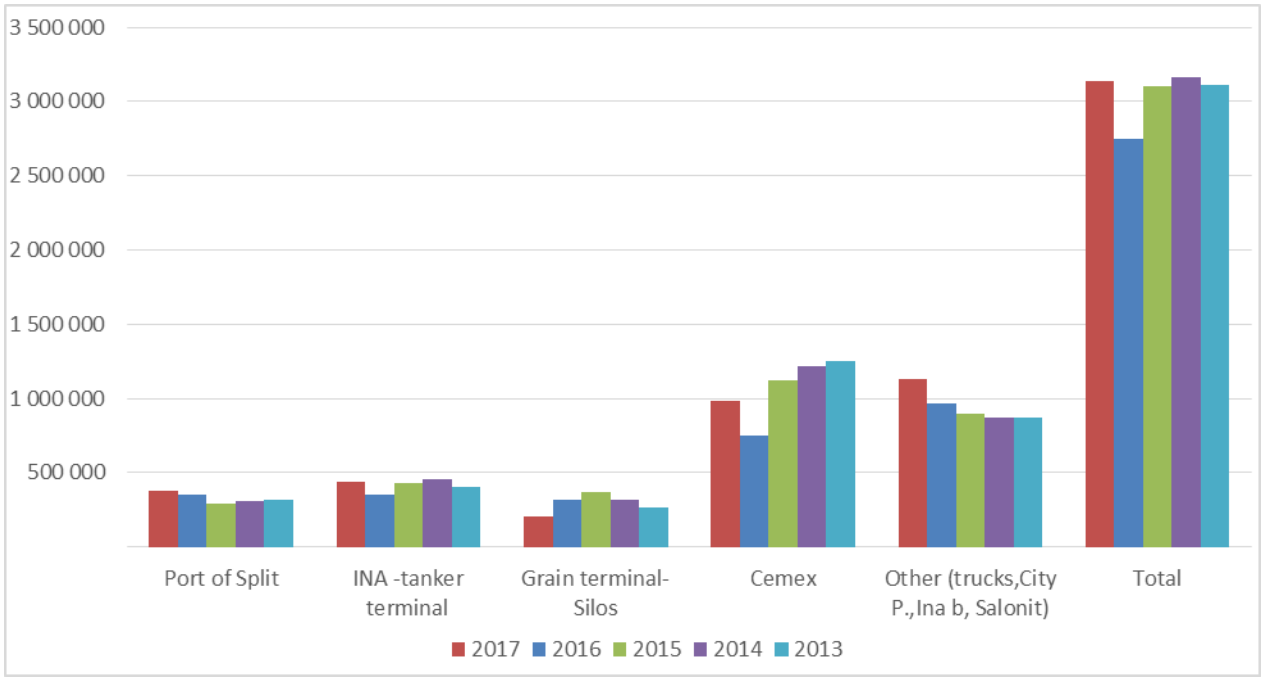



**Figure 4.8. Cargo traffic by terminals**

Source: LOC, 2014-2018

**Table 4.10. Cargo traffic by cargo group**

| | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| **Bulk** | 1,697,883 | 1,700,591 | 1,646,535 | 1,320,829 | 1,580,983 |
| **General** | 994,409 | 1,000,791 | 1,019,050 | 1,057,796 | 1,109,586 |
| **Liquid** | 415,955 | 465,071 | 436,723 | 366,161 | 445,778 |
| **Total** | **3,108,247** | **3,166,453** | **3,102,308** | **2,744,786** | **3,136,347** |

Source: LOC, 2014-2018

Most of the traffic occurred between Split and other Croatia's ports. In 2017 the import amounted to 17% of the cargo flow, while the export amounted to 40%. Figure 4.7. shows the flow of import / export over the last five years.

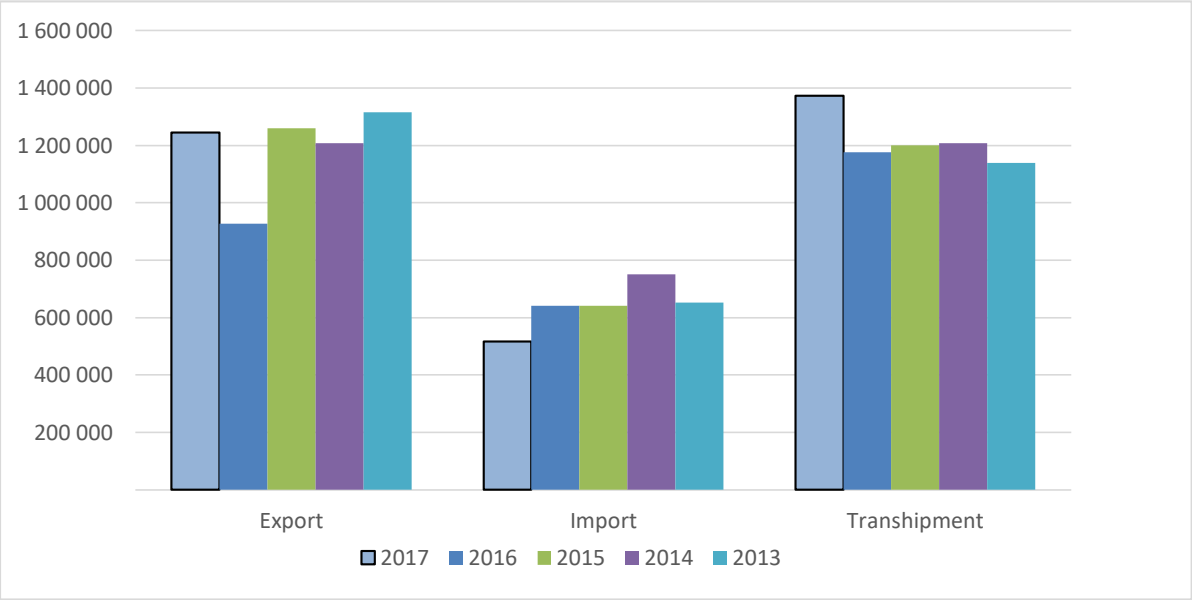



**Figure 4.9. Cargo traffic – export / import**

Source: LOC, 2014-2018

Over the year the cargo traffic handled by the Port of Split does not oscillate much, i.e. the fluctuations are much smaller than in the traffic of passengers and vehicles. There is a slight increase in traffic during summer, but this only refers to the slightly higher demand for certain goods during the tourist season. The traffic of major industrial goods does not oscillate. Table 4.11. presents the seasonal cargo traffic at major Split terminals in 2017, while Figure 4.10. shows the seasonal quality of the overall traffic flow over the last five years.

**Table 4.11. Cargo traffic by months – 2017 (t)**

| | City Port | CP-trucks | INA Base | Salonit-V. | Port Split | Grain term. | INA Tank.term. | Cemex | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| January | | 46 375 | 362 | 12 000 | 35 897 | 56 035 | 22 653 | 65 642 | 238 964 |
| February | | 61 705 | 450 | 9 000 | 30 552 | 16 868 | 19 653 | 84 287 | 222 515 |
| March | | 79 805 | 977 | 12 000 | 17 817 | 12 319 | 23 302 | 129 066 | 275 286 |
| April | | 81 880 | 846 | 12 000 | 48 846 | 10 255 | 27 322 | 50 237 | 231 386 |
| May | | 104 990 | 885 | 14 510 | 23 324 | 11 521 | 42 974 | 62 002 | 260 206 |
| June | | 112 335 | 2 506 | 12 000 | 73 104 | 10 851 | 42 204 | 104 566 | 357 566 |
| July | 220 | 109 515 | 1 774 | 18 000 | 33 166 | 23 035 | 51 124 | 97 205 | 334 039 |
| August | | 94 680 | 1 865 | 12 000 | 16 977 | 17 663 | 73 616 | 76 414 | 293 215 |
| September | | 78 925 | 939 | 10 000 | 17 657 | 12 925 | 43 952 | 82 645 | 247 043 |
| October | | 75 130 | 693 | 12 000 | 30 263 | 24 010 | 32 597 | 78 557 | 253 250 |
| November | 54 | 63 295 | 544 | 15 300 | 35 967 | 11 995 | 29 500 | 92 812 | 249 467 |
| December | | 58 695 | 485 | 11 300 | 16 555 | | 26 273 | 60102 | 173 410 |
| **Total** | **274** | **967 330** | **12 326** | **150 110** | **380 125** | **207 477** | **435 170** | **983 535** | **3 136 347** |

Source: LOC, 2018

**Figure 4.10. Overall traffic flow by months over the last 5 years**

Source: LOC, 2014-2018

### 4.1.4. Passenger traffic

Passenger traffic in the Port of Split has been steadily increasing over the last 20 years (Figure 4.11) and amounted to 5 million passengers in 2017. Most of the flow refers to local traffic between Split and the neighboring islands: around 93% of the overall passenger traffic. The international traffic of passengers refers to liner trades with Italian port (in 2017 there was only one: Split-Ancona), and to passengers on cruise ships.

**Table 4.12. Port of Split – Passenger traffic**

| Type | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| | NUMBER OF PASSENGERS | | | | |
| Local ferry lines | 2,962,042 | 2,937,118 | 3,245,455 | 3,483,727 | 3,708,066 |
| HSC | 762,209 | 869,671 | 815,783 | 714,034 | 835,753 |
| Local line Split-Trogir-Slatine | | | 88,852 | 102,393 | 113,202 |
| Local line - other | 142,977 | 134,243 | | 1,801 | 865 |
| Local cruise | | | | 100,705 | 117,643 |
| Tour of excursion boats | 77,531 | 104,229 | 118,677 | 91,721 | 93,451 |
| Hydroplanes (domestic) | | | 17,549 | 15,785 | |
| **TOTAL LOCAL** | **3,944,759** | **4,045,261** | **4,286,316** | **4,510,166** | **4,868,980** |
| **COASTAL** | **11,031** | **8,180** | | | |
| **TOTAL DOMESTIC** | **3,955,790** | **4,053,441** | **4,286,316** | **4,510,166** | **4,868,980** |
| International ferry | 276,671 | 205,411 | 211,038 | 191,846 | 159,942 |
| International HSC | | 8,724 | | | |
| Hydroplanes (international) | | | | 2,381 | |
| Cruise | 189,107 | 184,062 | 271,445 | 278,259 | 232,244 |
| Other | | | 24,427 | | |
| **TOTAL INTERNATIONAL** | **465,778** | **398,197** | **506,910** | **472,486** | **392,186** |
| **TOTAL** | **4,421,568** | **4,451,638** | **4,793,226** | **4,982,652** | **5,261,166** |

Source: Port Authority Split, 2014-2018

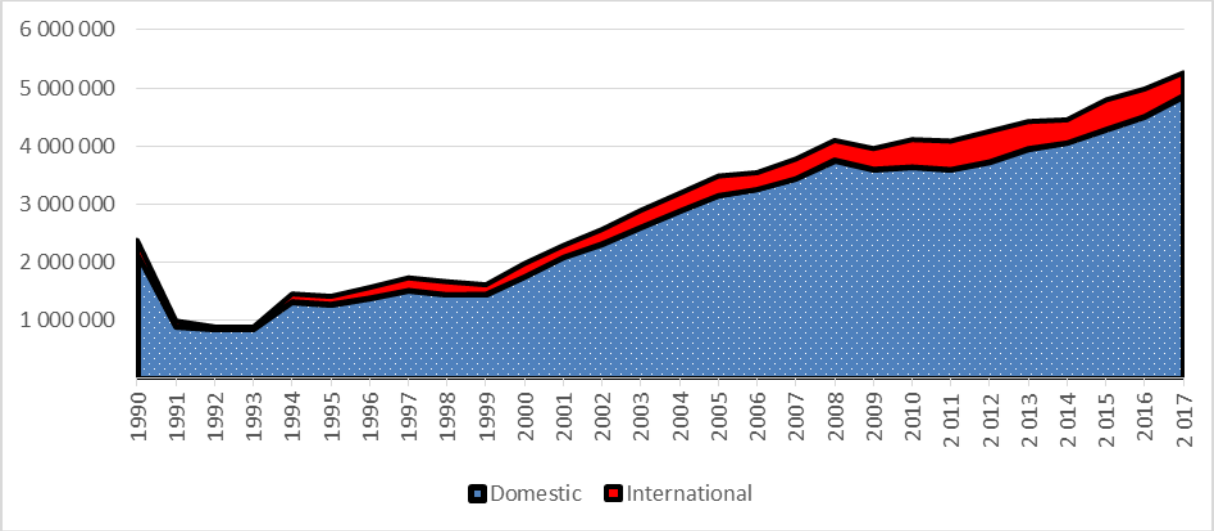



**Figure 4.11. Port of Split – Passengers traffic 1990-2017**

Source: Port Authority Split, 2018

**Table 4.13. Port of Split – Total passenger traffic by months**

| | 2013 | | | 2014 | | | 2015 | | 2016 | | 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local | Coastal | Int. | Local | Coastal | Int. | Local | Int. | Local | Int. | Local | Int. |
| January | 135 895 | | 5 421 | 130 097 | | 4 467 | 127 331 | 3 639 | 134 361 | 3 360 | 125 226 | 3 009 |
| February | 136 213 | | 2 682 | 129 211 | | 2 419 | 122 241 | 2 093 | 137 931 | 1 992 | 147 904 | 1 871 |
| March | 162 871 | | 12 631 | 173 657 | | 5 646 | 159 110 | 4 599 | 187 089 | 10 352 | 194 329 | 5 118 |
| April | 218 431 | | 23 685 | 225 872 | | 35 173 | 233 703 | 26 019 | 231 188 | 26 287 | 262 481 | 27 565 |
| May | 307 664 | | 45 409 | 293 843 | 75 | 40 925 | 346 169 | 67 491 | 353 844 | 45 661 | 381 703 | 35 135 |
| June | 442 479 | 1 527 | 59 913 | 453 016 | 1 236 | 50 873 | 518 506 | 58 857 | 491 325 | 57 793 | 594 614 | 45 334 |
| July | 719 474 | 3 115 | 53 395 | 732 117 | 2 198 | 60 510 | 779 438 | 68 404 | 856 783 | 77 076 | 953 215 | 56 817 |
| August | 827 359 | 4 046 | 116 380 | 905 645 | 3 089 | 91 730 | 920 484 | 101 661 | 949 064 | 107 861 | 1 014 108 | 83 363 |
| September | 439 410 | 2 343 | 69 204 | 447 155 | 1 582 | 64 138 | 487 157 | 70 792 | 537 836 | 66 039 | 565 575 | 51 296 |
| October | 242 524 | | 49 330 | 247 933 | | 34 781 | 254 073 | 46 100 | 292 928 | 46 983 | 300 880 | 47 079 |
| November | 155 351 | | 21 031 | 155 067 | | 4 700 | 169 172 | 29 953 | 168 188 | 24 733 | 171 498 | 22 239 |
| December | 157 088 | | 6 697 | 151 648 | | 2 835 | 168 932 | 27 302 | 169 629 | 4 349 | 157 447 | 13 360 |
| **Total** | **3 944 759** | **11 031** | **465 778** | **4 045 261** | **8 180** | **398 197** | **4 286 316** | **506 910** | **4 510 166** | **472 486** | **4 868 980** | **392 186** |
| | **4 421 568** | | | **4 451 638** | | | **4 793 226** | | **4 982 652** | | **5 261 166** | |

Source: Port Authority Split, 2014-2018

Passenger traffic in the Port of Split has a significant seasonal quality. Over the summer months the passenger flow is several times higher than in winter (Figure 4.12). The dynamics of the local ferry traffic is shown in Table 4.14, whereas the dynamics of the international traffic is

presented in Tables 4.15. and 4.16. The great seasonal quality of the international passenger traffic is particularly effected by passengers on cruise ships that do not call at the port in winter months. On a yearly basis, the cruise ship passenger traffic contributed to 59% of the overall international passenger traffic in 2017.

**Figure 4.12. Port of Split – Total passenger traffic by months – 2017**

Source: Port Authority Split, 2018

**Table 4.14. Port of Split – Dynamics of the local passenger traffic**

| | *Local ferry* | *HSC* | *Excursion* | *Local cruise* | *Split - Postira* | *Split-Trogir-Slatine* | *2017* | 2016 |
|---|---|---|---|---|---|---|---|---|
| *January* | *111 847* | *13 379* | | | | | *125 226* | *134 361* |
| *February* | *129 599* | *18 305* | | | | | *147 904* | *137 931* |
| *March* | *171 521* | *22 808* | | | | | *194 329* | *187 042* |
| *April* | *229 834* | *29 530* | *1 327* | *1 790* | | | *262 481* | *229 185* |
| *May* | *293 173* | *58 342* | *11 621* | *13 213* | | *5 354* | *381 703* | *343 894* |
| *June* | *411 356* | *125 018* | *19 535* | *22 834* | | *15 716* | *594 459* | *487 269* |
| *July* | *686 509* | *182 421* | *22 230* | *25 233* | *155* | *36 112* | *952 660* | *849 031* |
| *August* | *741 935* | *185 988* | *21 585* | *25 534* | *710* | *39 066* | *1 014 818* | *951 949* |
| *September* | *395 261* | *117 823* | *14 149* | *22 711* | | *15 631* | *565 575* | *539 024* |
| *October* | *240 887* | *49 388* | *3 004* | *6 278* | | *1 323* | *300 880* | *306 716* |
| *November* | *154 015* | *17 433* | | *50* | | | *171 498* | *173 996* |
| *December* | *142 129* | *15 318* | | | | | *157 447* | *169 768* |
| ***Total*** | ***3 708 066*** | ***835 753*** | ***93 451*** | ***117 643*** | ***865*** | ***113 202*** | ***4 868 980*** | ***4 510 166*** |

Source: Port Authority Split, 2018

**Table 4.15. Port of Split – International ferry traffic**

| | *2016* | | *2017* | |
|---|---|---|---|---|
| | *Passeng.* | *Vehicle* | *Passeng.* | *Vehicle* |
| *January* | *3 159* | *951* | *2 825* | *832* |
| *February* | *1 667* | *717* | *1 690* | *763* |
| *March* | *5 337* | *1 154* | *2 553* | *898* |
| *April* | *8 755* | *1 882* | *12 497* | *2 426* |
| *May* | *13 373* | *3 140* | *10 692* | *2 454* |
| *June* | *19 636* | *4 311* | *17 203* | *3 941* |
| *July* | *31 463* | *7 178* | *25 174* | *5 779* |
| *August* | *63 339* | *14 661* | *54 811* | *12 301* |
| *September* | *23 418* | *5 062* | *17 008* | *3 900* |
| *October* | *14 051* | *2 342* | *9 931* | *1 840* |
| *November* | *4 733* | *944* | *3 035* | *955* |
| *December* | *2 915* | *935* | *2 523* | *844* |
| ***Total*** | ***191 846*** | ***43 277*** | ***159 942*** | ***36 933*** |

Source: Port Authority Split, 2018

The international (ferry) liner traffic almost entirely relates to the Split-Ancona trade run. In 2017 it amounted to 191,846 passengers. In 2015 and 2016 the City Port of Split handled a

number of passengers carried by hydro-planes, with trends promising further increase in this type of traffic. However, due to legal requirements, the entire project has been suspended. In 2016, hydroplanes carried 17,785 passengers in local traffic and 2,381 passengers in international traffic (Table 4.17).

**Table 4.16. Port of Split – Cruise ship traffic**

| | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2 015 | | 2 016 | | 2 017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. | Arriv. | Passeng. |
| January | 7 | 294 | 6 | 299 | 1 | 51 | 2 | 94 | 3 | 147 | 3 | 118 | 4 | 136 | 4 | 184 |
| February | 5 | 242 | 6 | 301 | 3 | 141 | 6 | 295 | 5 | 237 | 6 | 262 | 5 | 166 | 4 | 181 |
| March | 3 | 199 | 4 | 205 | 2 | 98 | 6 | 4 091 | 6 | 255 | 6 | 622 | 11 | 4 767 | 7 | 2 565 |
| April | 19 | 13 001 | 11 | 9 729 | 14 | 11 480 | 10 | 6 535 | 21 | 19 501 | 14 | 12 478 | 18 | 17 318 | 12 | 15 068 |
| May | 33 | 22 290 | 26 | 17 765 | 36 | 24 469 | 27 | 25 414 | 35 | 22 955 | 43 | 51 442 | 35 | 32 125 | 28 | 24 443 |
| June | 34 | 23 163 | 37 | 25 329 | 46 | 39 242 | 32 | 29 959 | 32 | 26 803 | 32 | 34 259 | 37 | 37 805 | 26 | 28 131 |
| July | 26 | 21 584 | 35 | 31 496 | 32 | 41 557 | 26 | 17 029 | 26 | 28 698 | 29 | 35 421 | 34 | 44 794 | 26 | 31 643 |
| August | 41 | 31 249 | 37 | 31 074 | 36 | 38 027 | 28 | 30 815 | 32 | 29 122 | 30 | 34 208 | 37 | 44 161 | 32 | 28 552 |
| September | 33 | 22 684 | 41 | 32 284 | 42 | 39 953 | 36 | 32 394 | 39 | 36 503 | 43 | 45 233 | 46 | 42 621 | 33 | 34 288 |
| October | 37 | 28 331 | 29 | 25 750 | 42 | 41 948 | 32 | 27 093 | 23 | 19 373 | 28 | 30 736 | 34 | 32 932 | 39 | 37 148 |
| November | 13 | 9 043 | 16 | 6 302 | 9 | 8 220 | 12 | 14 757 | 4 | 179 | 21 | 26 405 | 16 | 20 000 | 13 | 19 204 |
| December | 6 | 298 | 4 | 1 429 | 6 | 265 | 8 | 631 | 7 | 289 | 6 | 261 | 9 | 1 434 | 10 | 10 837 |
| **Total** | **257** | **172 378** | **252** | **181 963** | **269** | **245 451** | **225** | **189 107** | **233** | **184 062** | **261** | **271 445** | **286** | **278 259** | **234** | **232 244** |

Source: Port Authority Split, 2018

**Table 4.17. Hydroplanes – passenger traffic**

| | DOMESTIC (CITY BASIN) | | INTERNATIONAL (CITY BASIN) | | RESNIK (AIRPORT) | | TOTAL 2016 (LOCAL) | TOTAL 2015 (LOCAL) | TOTAL 2016 (INTERNAT.) |
|---|---|---|---|---|---|---|---|---|---|
| | Depar. | Arriv. | Depar. | Arriv. | Depar. | Arriv. | Total | Total | Total |
| January | 284 | 261 | 33 | 32 | | | 545 | 210 | 65 |
| February | 208 | 333 | 76 | 83 | 46 | 16 | 603 | 146 | 159 |
| March | 353 | 470 | 102 | 146 | 9 | | 832 | 255 | 248 |
| April | 494 | 424 | 103 | 111 | 67 | 91 | 1,076 | 471 | 214 |
| May | 751 | 642 | 88 | 75 | 194 | 57 | 1,744 | 997 | 163 |
| June | 1,401 | 1,550 | 187 | 165 | 180 | 227 | 3,358 | 2,142 | 352 |
| July | 2,181 | 2,252 | 416 | 403 | 194 | 157 | 4,784 | 3,044 | 819 |
| August | 832 | 736 | 204 | 157 | 161 | 221 | 1,950 | 4,502 | 361 |
| September | 399 | 494 | | | | | 893 | 2,961 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| October | | | | | | | | 1,058 | |
| November | | | | | | | | 949 | |
| December | | | | | | | | 814 | |
| **TOTAL** | **6,903** | **7,162** | **1,209** | **1,172** | **851** | **869** | **15,785** | **17,549** | **2,381** |

Source: Port Authority Split, 2018

## 4.2. VESSEL TRAFFIC STATISTICS

In the year of 2017 the Port of Split saw 18,546 arrivals, of which 88.6% in the City Port of Split. 234 cruise ships called at the port. Table 4.18. shows the total traffic of vessels in the Port of Split over the last five years and Table 4.19. provides the breakdown of the vessels by type in 2017.

**Table 4.18. Total traffic of vessels in the Port of Split**

| | City Port basin | Other basins | Total |
|---|---|---|---|
| **2013.** | 15,107 | 1,115 | 16,222 |
| **2014.** | 15,604 | 1,100 | 16,704 |
| **2015.** | 16,856 | 1,086 | 17,942 |
| **2016.** | 17,721 | 1,474 | 19,195 |
| **2017.** | 16,439 | 2,107 | 18,546 |

Source: Port Authority Split, 2014-2018

### 4.2.1. Breakdown of vessel traffic by type

The Port of Split comprises two main basins, the City Port of Split and the North Port (basins within the Bay of Kaštela). The City Port almost exclusively accommodates passenger and ro-ro passenger vessels (Table 4.19), whereas the North Port primarily accommodates cargo ships and other vessels. The vessels calling at the City Port include 38% of those under 500 GT and 3% larger than 10,000 GT. Most of the vessels handled by the North Port are under 500 GT, around 52%, while 4% of them are over 10,000 GT (Figure 4.13).

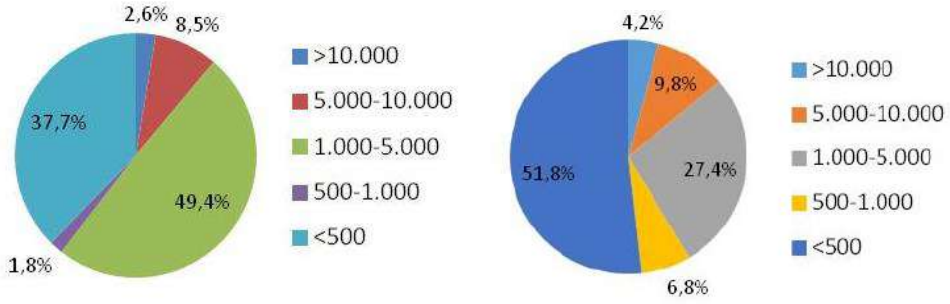



**Figure 4.13. Breakdown of the vessel traffic calling at the City Port (left) and the North Port (right) by vessel size, 2017**

Source: CIMIS, 2018

**Table 4.19. City Port of Split – breakdown of traffic by vessel type**

| | Arrivals | | | | |
|---|---|---|---|---|---|
| | **2013.** | **2014.** | **2015.** | **2016.** | **2017.** |
| **Domestic ferry liners** | 9,416 | 9,879 | 9,409 | 10,845 | 9,686 |
| **Domestic HSC** | 2,355 | 2,091 | 2,687 | 2,790 | 2,424 |
| **International liners** | 450 | 313 | 365 | 326 | 258 |
| **Tourist vessels** | 2,391 | 2,864 | 3,248 | 2,386 | 2,610 |
| **Yachts** | 125 | 105 | 89 | 91 | 110 |
| **Cruise ships** | 226 | 232 | 262 | 285 | 234 |
| **Excursion boats** | | | | | 892 |
| **Hydroplanes** | | | 664 | 293 | |
| **Other (tugs, working...)** | 144 | 120 | 132 | 705 | 225 |
| **Total** | 15,107 | 15,604 | 16,856 | 17,721 | 16,439 |

Source: Port Authority Split, 2014-2018

With regard to the overall arrivals / departures, the average daily traffic in the Port of Split (including all basins) amounts to around 51 vessels. The actual daily traffic flow varies considerably throughout the year and is much higher in summer months. Figure 4.14 shows the monthly traffic of vessels at the Port of Split.

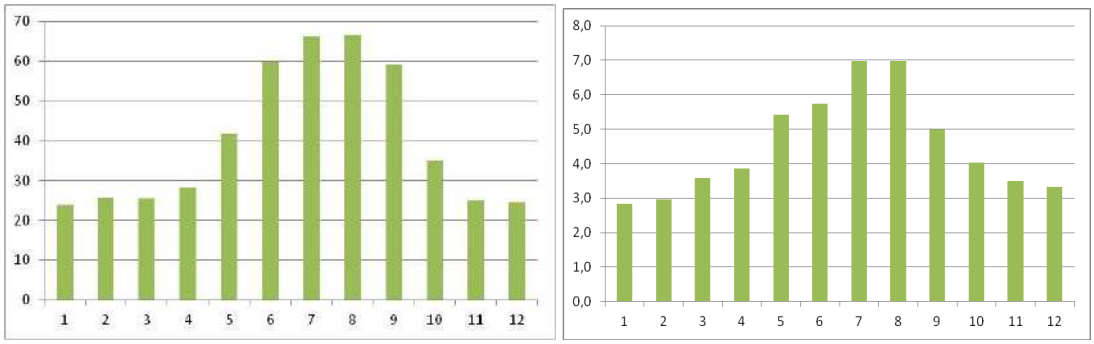



**Figure 4.14. Average daily arrivals at the City Port (left) and other basins (right)**

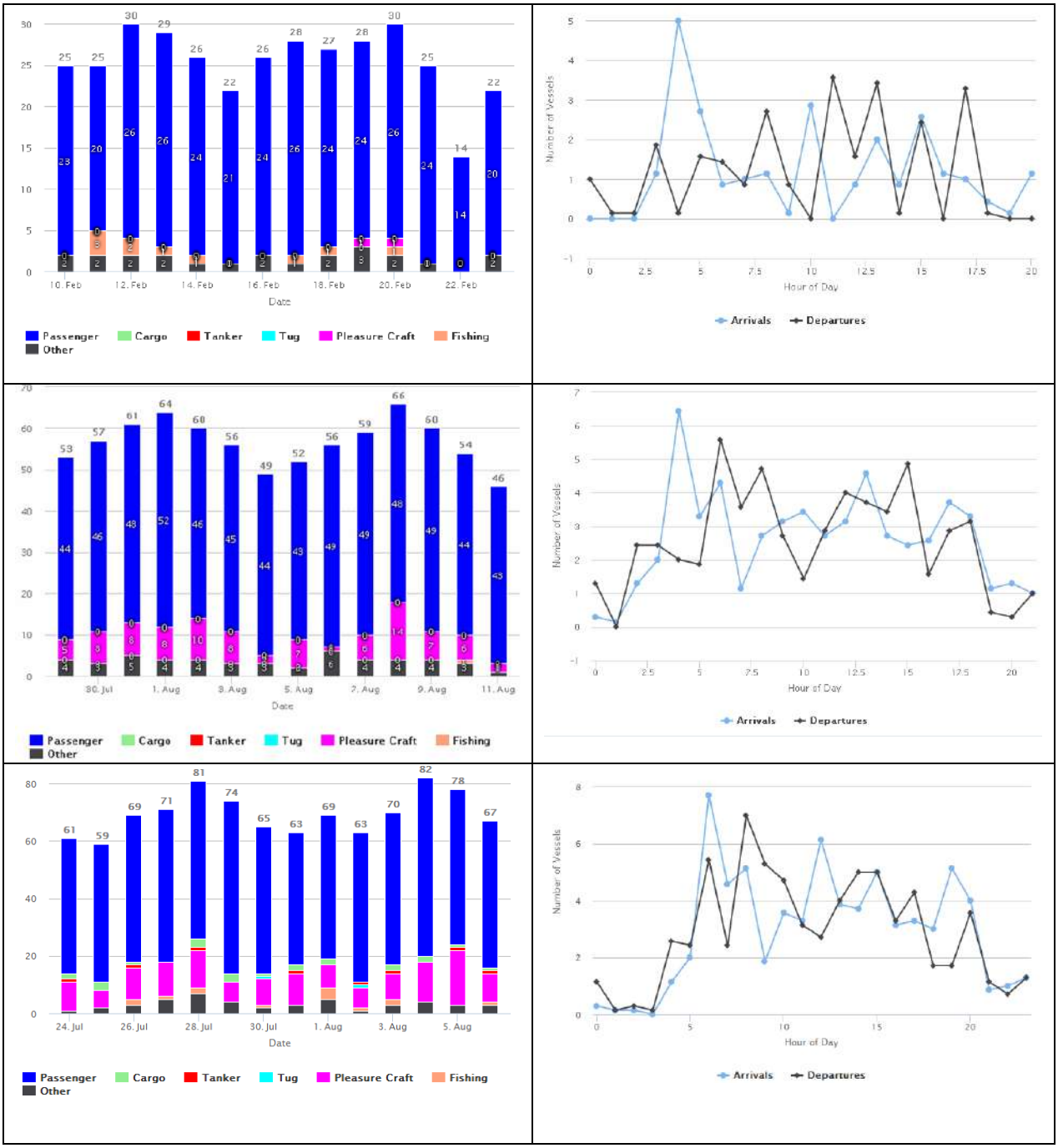
Source: CIMIS, 2017

Local liner traffic makes the largest part of the traffic at the Port of Split; the traffic volume varies throughout the year and the increased flow during summer season is noticeable in Table 4.20). Figure 4.15. provides several examples of the daily distribution of traffic, based on AIS data.

**Table 4.20. Local liner traffic at the City Port of Split**

| Liner trade | Season (daily - departures) | Off season | Vessel |
|---|---|---|---|
| Split – Supetar (Brač) | 14/12 | 8-9 | Ro-ro pass. (Jadrolinija) |
| Makarska – Sumartin (Brač) | 5-4 | 3 | Ro-ro pass. (Jadrolinija) |
| Split – Stari Grad (Hvar) | 7 | 3 | Ro-ro pass. (Jadrolinija) |
| Drvenik – Sućuraj (Hvar) | 11/10/9 | 6/7/8 | Ro-ro pass. (Jadrolinija) |
| Split – Rogač (Šolta) | 6/5 | 4 | Ro-ro pass. (Jadrolinija) |
| Split – Vis | 3-2 | 2 | Ro-ro pass. (Jadrolinija) |
| Split – Vela Luka – Ubli (Lastovo) | 4 | 2-1 | Ro-ro pass. (Jadrolinija) |
| Split – Trogir – Drvenik V/M | 4-3 | 3 | Ro-ro pass. (Jadrolinija) |
| Split – Bol – Jelsa (Hvar) | 1 | 1 | HSC (Jadrolinija) |
| Split – Milna – Hvar | 1 | / | HSC (Jadrolinija) |
| Split – Hvar – Vela Luka – Ubli | 1 | 1 | HSC (Jadrolinija) |
| Split – Hvar – Prigradica – Korčula | 1 | 1 | HSC (Jadrolinija) |
| Split – Hvar – Korčula | 1 | 1 | HSC (Jadrolinija) |
| Split – Milna – Hvar – Vis | 1 | 1 | HSC (Kapetan Luka) |
| Split/Brač/Hvar/Korčula/Mljet/Dubrovnik | 1 | 0/3-4 per week | HSC |
| Komiža – Porat (Biševo) | 1 | 4 per week | Vessel |
| Bura Line | 9-4 | / | Vessel |

Source: Port Authority Split, 2017


Date
10. Feb
12. Feb
14. Feb
16. Feb
18. Feb
20. Feb
22. Feb
Passenger
Cargo
Tanker
Tug
Pleasure Craft
Fishing
Other
Number of Vessels
Hour of Day
Arrivals
Departures
30. Jul
1. Aug
3. Aug
5. Aug
7. Aug
9. Aug
11. Aug
24. Jul
26. Jul
28. Jul
30. Jul
1. Aug
3. Aug
5. Aug

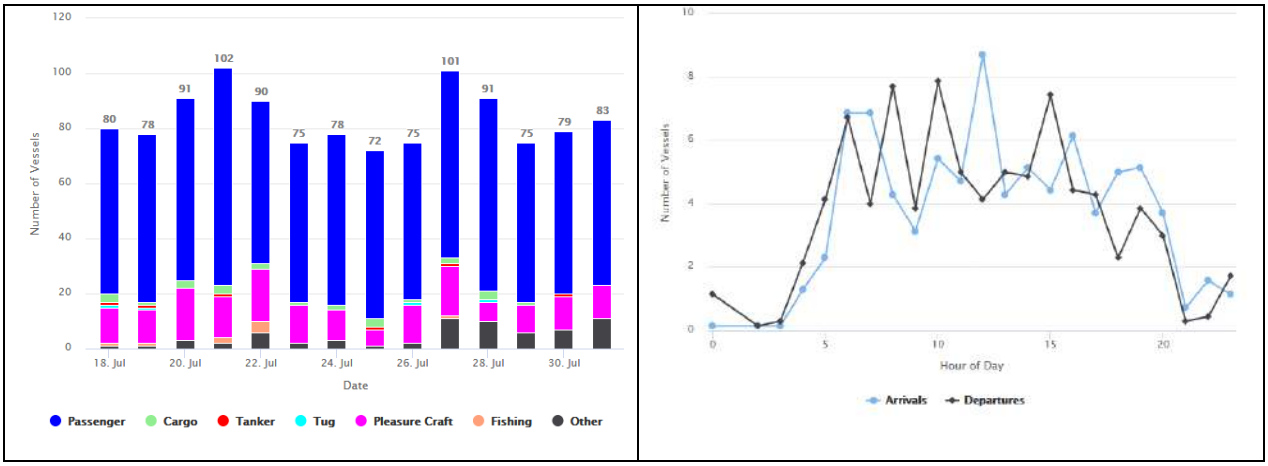



**Figure 4.15. Daily arrivals at the Port of Split –** Feb./Aug. 2015; Aug. 2017, July 2018

Source: Marine traffic, 2018 © Marine Traffic

In summer months, when the traffic volume is the largest, over 100 arrivals are expected daily, while in winter time the number of arrivals drops to around 25-30. It is also worth noting that most of traffic occurs between 8 a.m. and 8 p.m. Likewise, the seasonal quality of the vessel traffic is also emphasized when accommodating cruise ships and vessels in international liner traffic.

**Table 4.21. Number of arrivals in the international liner traffic by months**

| | | SNAV Aurelia | Zadar | Marko Polo | Dubrovnik | Total arrivals |
|---|---|---|---|---|---|---|
| January | | | | | 8 | 8 |
| February | | | | 1 | 7 | 8 |
| March | | | | 9 | | 9 |
| April | | 15 | | 13 | | 28 |
| May | | 17 | | 13 | | 30 |
| June | | 13 | | 13 | | 26 |
| July | | 26 | | 12 | | 38 |
| August | | 27 | | 18 | | 45 |
| September | | 17 | | 13 | | 30 |
| October | | 4 | | 12 | | 16 |
| November | | | 2 | 9 | | 11 |
| December | | | | 1 | 8 | 9 |
| **Total** | | **119** | **2** | **114** | **23** | **2** |

Source: LOC – passengers, 2018

There were 258 arrivals in the international liner passenger traffic. Around 54% of this volume relates to the national shipper Jadrolinija, the rest relates to SNAV. During summer season, the traffic flow is 5-6 times higher than off the season (Table 4.21). As for cruise ships, their traffic is almost 10 times higher during the season than off the season (Table 4.16).

Here are the details on the traffic in the North Port of Split with the breakdown by basin and type of vessel.

**Table 4.22. Arrivals of cargo and other vessels by basins in 2017**

| | Arrivals |
|---|---|
| VRANJIC-SOLIN BASIN (cargo)<br>(Yachts, tourist and excursion) | 269<br>331 |
| KAŠTELA BASIN – A (tourist) | 20 |
| KAŠTELA BASIN – B (cargo) | 747 |
| KAŠTELA BASIN – C (cargo)<br>Tankers<br>Fishing vessels | 48<br>204<br>465 |
| KAŠTELA BASIN – D (tourist, excursion) | 23 |
| TOTAL: | 2107 |

Source: Port Authority Split, 2017

a) Kaštela basin B:

- Sv. Juraj I / St. George I (berths 1-3): 231 arrivals (cement, cinder)
- Sv. Juraj I / St. George II (berths 4-5): 516 arrivals (cinder, dangerous cargo)

b) Kaštela basin C:

- St. Kajo quay (berth 1): 48 arrivals (cement, cinder)
- INA – tanker terminal (berth 1/2): 127 arrivals (tankers)
- Mala obala / Little quay (berth 3): 77 arrivals (small tankers)
- Brižine quay (berths 1-4): 465 arrivals / departures (fishing vessels)

c) Kaštela basin D:

- Resnik quay: 24 arrivals (tourist / excursion)

### 4.2.2. Traffic of smaller vessels

Unlike the traffic flow of larger vessels, boats and smaller vessels are hard to observe as there is no systematic way of their monitoring. Furthermore, smaller vessels are not liners and the intensity of their movement is much higher during season. Their traffic volume can only be roughly estimated on the basis of their number in the registers of vessels and, additionally, according to the records provided by the excursion agencies.

In 2017, 323 fishing vessels were registered in the Republic of Croatia, having the overall tonnage of 28,350 GT, while the fishing boats amounted to 7,263. There were 104 fishing vessels with Split as their port of registry, while the fishing boats registered in Split amounted to 953, in addition to 28 boats registered at Kaštela. The overall number of boats with Split (including Kaštela) as their port of registry amounted to 7,533 in 2017. There 879 yachts. More details are provided in Table 4.23.

**Table 4.23. Breakdown of vessels having Split and Kaštela as their ports of registry**

| Serial No. | DATA TITLE | Port of Split and branch offices | | TOTAL Split-Dalmatia County 2017 | TOTAL Split-Dalmatia County 2016 | TOTAL Split-Dalmatia County 2015 |
|---|---|---|---|---|---|---|
| | | SPLIT | KAŠTELA | | | |
| **1.** | **Total ships registered** | 534 | | 534 | 551 | 539 |
| **1.1.** | **Merchant ships** | 420 | | 420 | 403 | 395 |
| 1.1.1. | Cargo | 54 | | 54 | 136 | 135 |
| 1.1.2. | Passenger | 306 | | 306 | 217 | 212 |
| 1.1.3. | Technical craft | 60 | | 60 | 50 | 48 |
| **1.2.** | **Fishing vessels** | 104 | | 104 | 143 | 139 |
| **1.3.** | **Public vessels** | 10 | | 10 | 5 | 5 |
| **2.** | **Vessels under construction** | 42 | | 42 | 46 | 41 |
| **3.** | **Newly registered vessels** | 30 | | 30 | 15 | 23 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4.** | **Vessels deleted from the registry** | 33 | | 33 | 34 | 34 |
| **5.** | **Total vessels registered** | 7,300 | 233 | 24,484 | 23,500 | 22,221 |
| **5.1.** | **Commercial vessels** | 638 | 52 | 3.702 | 3,118 | 2,906 |
| **5.1.1.** | For cargo transport | 61 | 4 | 80 | 58 | 55 |
| **5.1.2.** | For passenger transport | 158 | 29 | 725 | 1,912 | 1,929 |
| **5.1.3.** | Fishing boats | 114 | 28 | 953 | 1,148 | 922 |
| **5.1.4.** | Boats for charter | 328 | 94 | 1,944 | | |
| **5.2.** | **Public boats** | 23 | | 26 | 28 | 30 |
| **5.3.** | **Personal boats** | 6,616 | 78 | 20,756 | 20,354 | 19,285 |
| **6.** | **Newly registered boats** | 474 | 132 | 1,566 | 1,405 | 1,182 |
| **7.** | **Boats deleted from the registry** | 152 | 54 | 722 | 888 | 827 |
| **8.** | **Total yachts registered** | 879 | | 879 | 814 | 756 |
| 8.1. | Commercial yachts | 679 | | 679 | 626 | 571 |
| 8.2. | Personal yachts | 200 | | 200 | 188 | 185 |
| **9.** | **Newly registered yachts** | 144 | | 144 | 114 | 80 |
| **10.** | **Yachts deleted from the registry** | 49 | | 49 | 56 | 61 |

Source Harbour Master's Office report, 2018.

At the end of 2017 the County of Split-Dalmatia had a sea area of 427,330 $m^2$ available for yachting, with a total of 2,414 berths, including 593 dry berths. Croatia's total sea area amounted to 3,711,951 $m^2$, with a total of 17,067 berths. In 2017 there were 1,928 vessels at permanent moorings in the ports of nautical tourism in the County of Split-Dalmatia, including 593 power boats, 1,191 sailboats and 144 other boats. Of all available permanent moorings, 86.3% were sea berths. Over the same year there were 55,412 boats in transit in the County of Split-Dalmatia (10,851 power boats, 41,020 sailboats, 3,541 other craft).

**Table 4.24. Nautical ports (2017)**

| | **Total** | **Anchorage** | **Mooring** | **Marinas** | | | | | **Uncategorized nautical ports** |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Land marina | 1st cat. | 2nd cat. | 3rd cat. | Categorized and marked by anchors | |
| **Republic of Croatia** | 140 | 61 | 7 | 13 | 5 | 16 | 17 | 19 | 3 |
| **Split-Dalmatia County** | 27 | 12 | 1 | 2 | / | 3 | 3 | 5 | 1 |

Source: Croatian Bureau of Statistics, 2017

### Table 4.25. Number of yachts in nautical ports (2017)

| | Total | Power boats | Sailboats | Other |
|---|---|---|---|---|
| **Republic of Croatia** | 13,433 | 6,568 | 6,296 | 596 |
| sea | 11,641 | 5,314 | 5,928 | 399 |
| **Split-Dalmatia County** | 1,928 | 593 | 1,191 | 144 |
| sea | 1,664 | 414 | 1,119 | 131 |
| land | 264 | 179 | 72 | 13 |

Source: Croatian Bureau of Statistics, 2017

### Table 4.26. Number of yachts in transit (2017)

| | Total | Power boats | Sailboats | Other |
|---|---|---|---|---|
| **Republic of Croatia** | 201,896 | 60,841 | 131,666 | 9,389 |
| sea | 199,623 | 59,218 | 131,084 | 9,321 |
| **Split-Dalmatia County** | 55,412 | 10,851 | 41,020 | 3,541 |
| sea | 55,182 | 10,755 | 40,919 | 3,508 |
| land | 560 | 96 | 101 | 33 |

Source: Croatian Bureau of Statistics, 2017

### Table 4.27. Marinas in Split-Dalmatia County

| Marina | Position | Berths (sea) | Dry berths |
|---|---|---|---|
| ACI Marina Split | Split – City Port | 355 | 30 |
| Marina Kaštela | Kaštel Gomilica | 420 | 200 |
| ACI Marina Trogir | Trogir | 180 | 60 |
| Marina Zirona | Drvenik Veli | 140 | / |
| Marina Agana | Marina | 134 | 70 |
| ACI Marina Milna | Brač | 185 | 15 |
| Vlaška Milna | Brač | 90 | 74 |
| ACI Marina Vrboska | Hvar | 85 | 30 |
| ACI Marina Palmižana | Hvar | 164 | / |
| Marina Tučepi | Tučepi | 150 | / |
| Marina Podgora | Podgora | 220 | / |
| Yacht Club Seget | Seget Donji | 23 | 90 |
| Lav | Podstrana | 74 | / |
| Baška Voda | Baška Voda | 30 | / |
| Marina Ramova | Krvavica | 200 | 100 |

Source: Lušić and Pušić, 2016

D.4.1.2 – Analysis on potential market flows of Port of Split

Given the smaller vessels, boats and yachts that are not fitted with AIS equipment, and are therefore impossible to track, the traffic volume around the entrance and in close vicinity of the Port of Split is much larger than previously presented by figures referring to ship traffic. In addition, the Bay of Kaštela is home to a large number of boats and other smaller craft whose movement may result in limited traffic of ships. This is particularly the case in summer months.

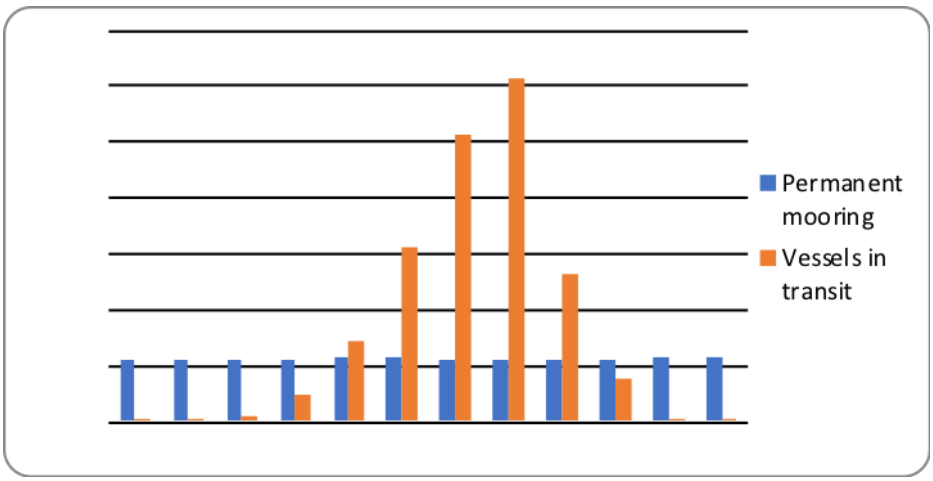



**Figure 4.16. Usage of sea moorings in 2017**
Source: Croatian Bureau of Statistics, 2017

### 4.2.3. Other traffic

In 2015 the City Port of Split became a hydroplane terminal. The sea lane allocated for taking off and landing of hydroplanes was in the close vicinity of the port, intersecting the already established sea shipping routes, including those running towards the Bay of Kaštela. The south-western part of the Mornar Sports Port served as an alternative terminal in case of adverse weather conditions. A considerable traffic volume was recorded in 2015 and 2016 (Table 4.17); however, this form of traffic has been suspended since October 2016. Other traffic taking place in the immediate vicinity of the Port of Split and in Kaštela Bay relates to sports, recreational,

commercial, military and other activities that are occasionally carried out in the port or its neighborhood.

The City Port of Split is home to ACI Marina Split featuring around 355 sea berths and 30 dry berths. Deep inside the port there is a Cove of Matejuška accommodating around 100 boats for recreation and small-scale fishing. Moreover, there are a number of commercial and supply boats that call at the port. Their traffic is particularly increased in summer time. A particular threat to safety of navigation arises from “massive” departure of tourist vessels during weekly change-overs and during local or regional sailboat regattas or similar events (Figure 4.17). According to recent research, the traffic density at the entrance to the Port of Split is not high, with the exception of the smaller vessels.

**Figure 4.17. Sports and recreational nautical activities**

Source: http://splitinfo.tripod.com/

Apart from the very port, the most critical navigation point is the strait between the islands of Brač and Šolta, named Splitska Vrata (the Split Gates). About 1 NM long and less than 0.5 NM wide, with the islet of Mrduja located in the middle, the strait represents a potential hazard to navigation. It has been estimated that ship grounding is likely to occur once in 4-5 years and

ship collision once in 70 or more years (not taking smaller vessels into consideration. When taking into account smaller vessels, yachts and boats, the probability of sea accidents at Splitska Vrata is much higher. On average, in the area of Split-Dalmatia County there are dozens of grounding and several collisions involving smaller vessels per year. In 2017, in the area under jurisdiction of the Republic of Croatia, there were 51 search and rescue missions due to grounding and 29 due to collision or impact. Over the last several years there have been no collisions or groundings of ships in the very Port of Split, with the exception of impacts (onto the quay) that occur once in 2-3 years on average. As expected, the probability of grounding, impact and collision with smaller vessels is the highest in access areas and within the port itself. As for the probability of sea accidents in the open sea and seaways between the Adriatic's east and west coast, collision presents a potential risk, especially in the areas where the transverse routes intersect the main longitudinal seaways, i.e. between Palagruža Island and the entrance to TSS Northern Adriatic.

### 4.3. MAIN ACCESS SEAWAYS

The main fairways leading to the Port of Split and Kaštela basins run through Splitska Vrata (the Split Gate), Drvenik Channel, Šolta Channel and Brač Channel. The passage through Splitska Vrata is the busiest as it presents the shortest connection between the City of Split and the open sea, as well as between Split and Middle Adriatic islands that gravitate towards Split. The other busy traffic flows include the seaways connecting the City Port of Split with the neighboring islands, in particular the routes Split – Supetar (Brač Island) and Split – Rogač (Šolta Island). Figure 4.18 shows the main navigation routes to and from Split as well as the intensity of traffic.

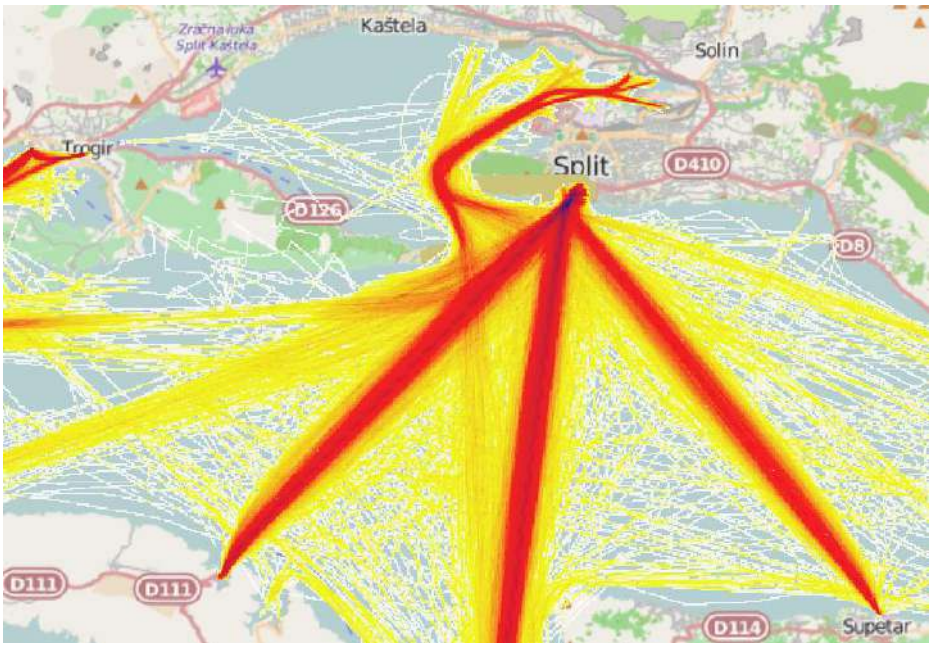
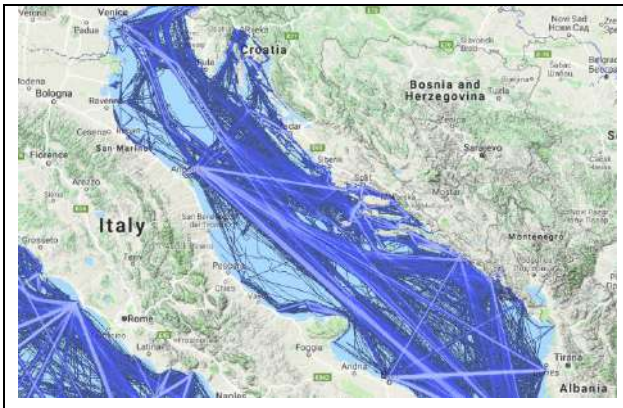



**Figure 4.18. Main access seaways to the Port of Split**

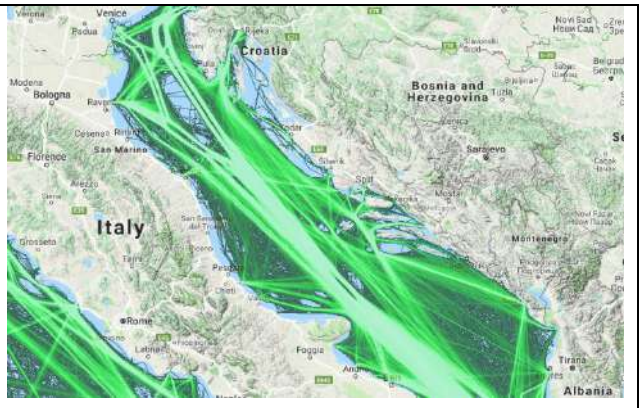
Source: Faculty of Maritime Studies Split, 2017

### 4.3.1. Intensity of traffic flows

The largest volume of sea traffic in the wider area of Split relates to passenger vessels that connect the Port of Split with the neighboring islands and their ports. To a great extent, these routes run through the Splitska Vrata and the Drvenik Channel. Cargo and other ships use all of the three main access seaways, while the dangerous cargo ships, mainly tankers, are directed through the Drvenik Channel. Tourist vessels do not have established routes. Figures 4.19 and 4.20 present the density of traffic flows for various types of vessels. The busiest seaways run through the open sea in the middle of the Adriatic Sea. The busiest transverse seaway connecting the west and east Adriatic coasts is used by ships plying between Split and Ancona.




Passenger




Cargo

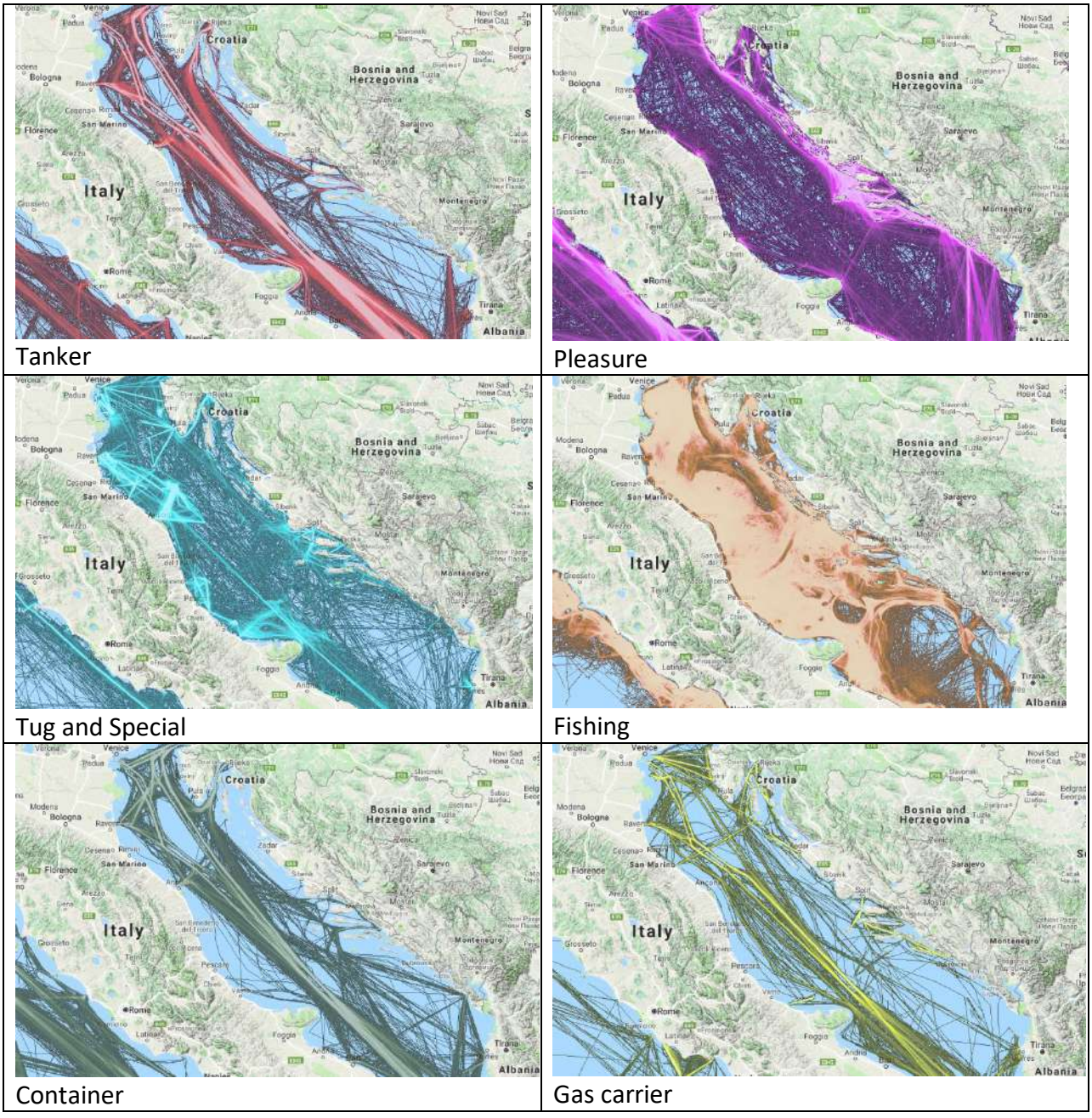
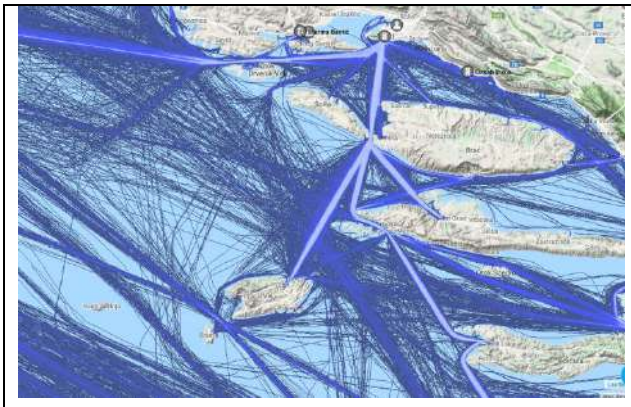
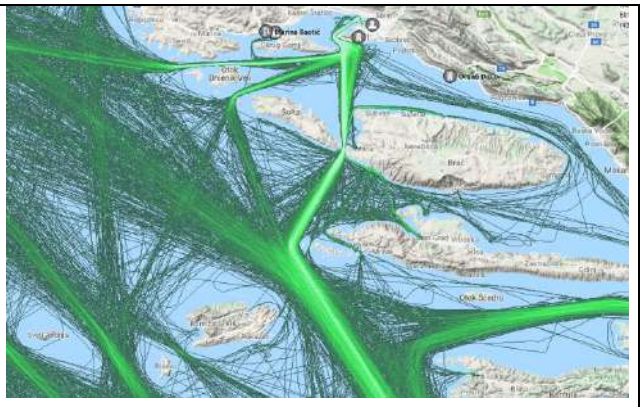



**Figure 4.19. Density of sea traffic in the Adriatic Sea (AIS data, 2017)**

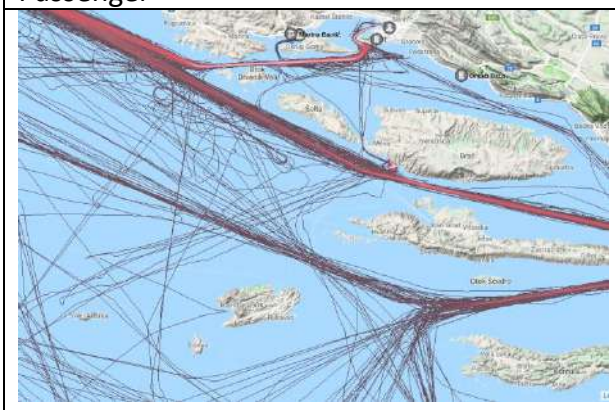
Source: Marine Traffic, 2017



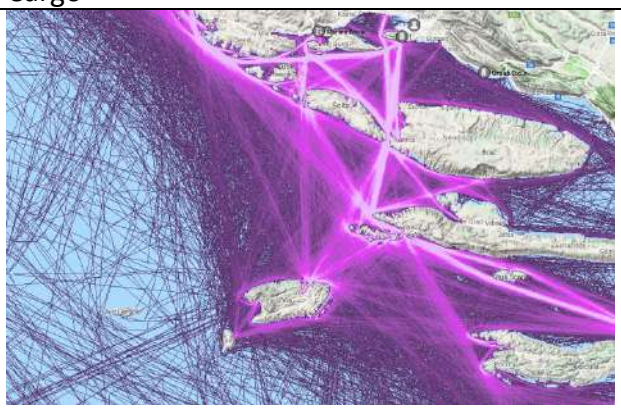
Passenger



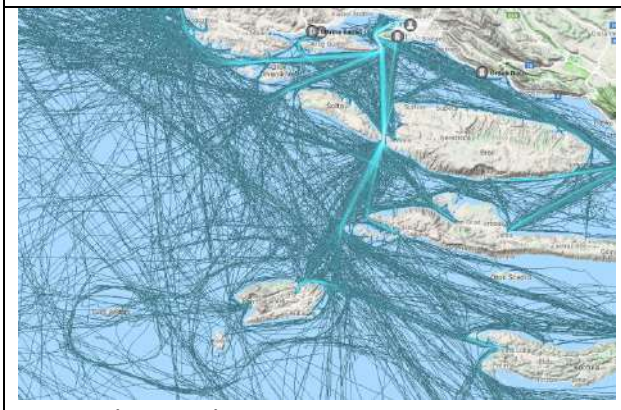
Cargo



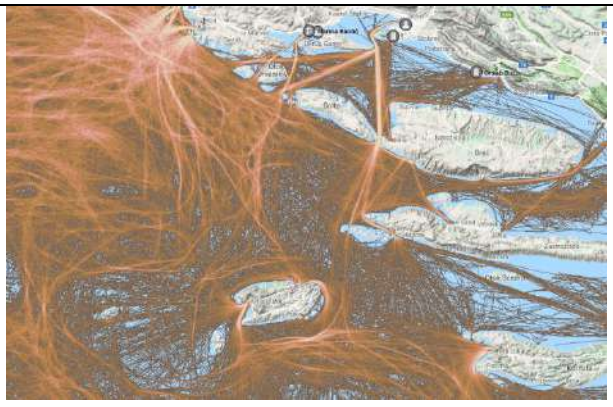
Tanker



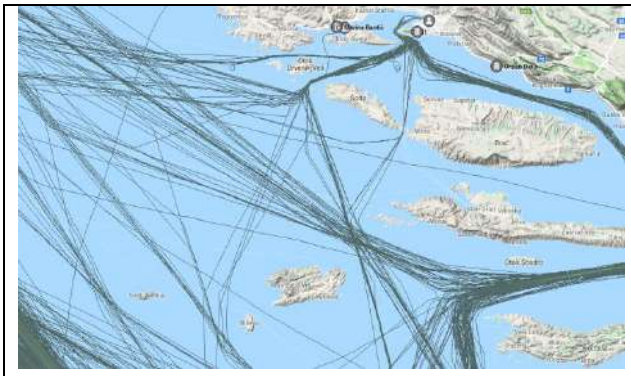
Pleasure



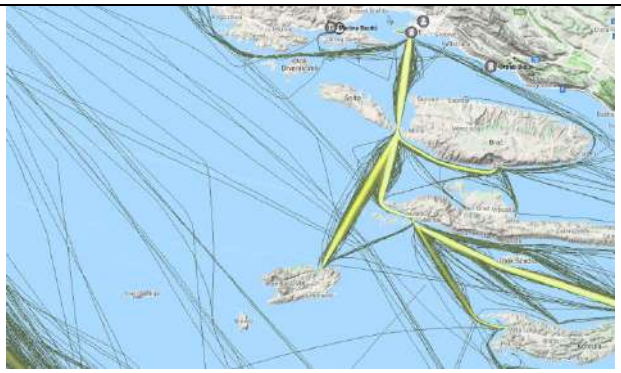
Tug and Special



Fishing



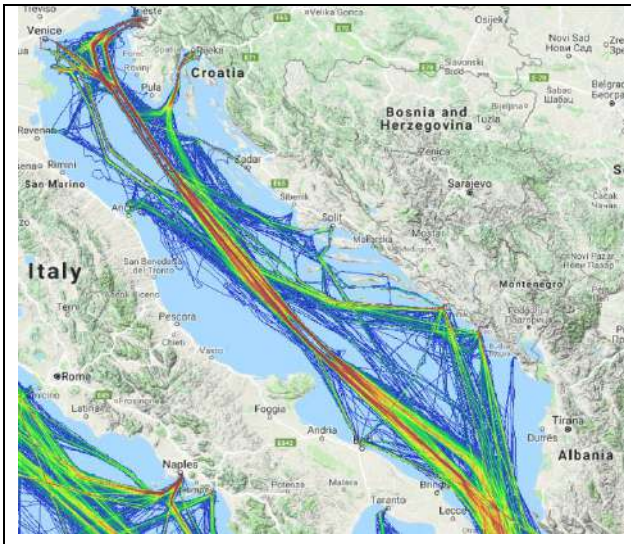
Container



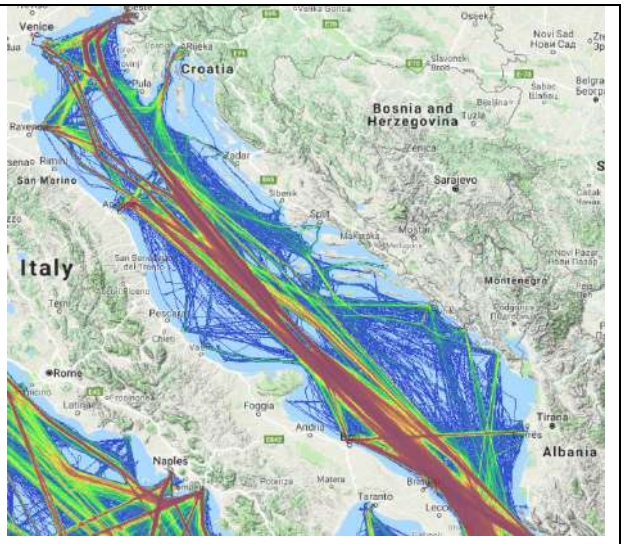
Gas carrier

**Figure 4.20. Density of sea traffic at the entrance to the Port of Split (AIS data, 2017)**

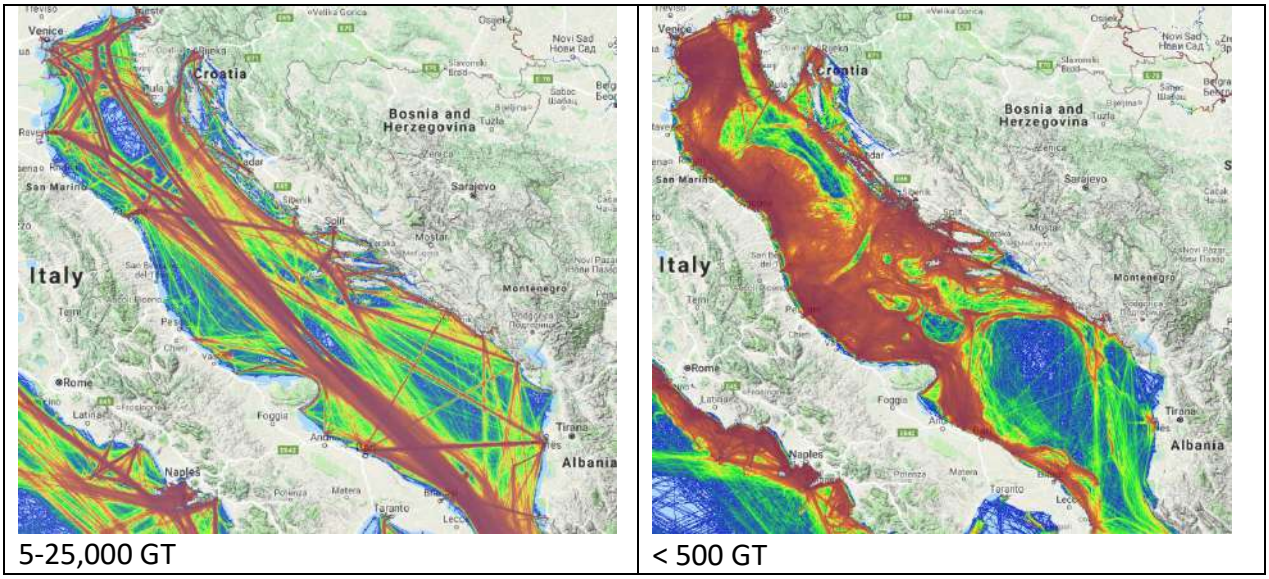
Source: Marine Traffic, 2017




> 60.000 GT




25-60,000 GT




5-25,000 GT | < 500 GT

**Figure 4.21. Density of sea traffic in the Adriatic by size of vessels (AIS data, 2017)**

Source: Marine Traffic, 2017

### 4.3.2. Croatia's Vessel Traffic Monitoring and Information System (VTMIS Croatia)

The introduction of VTMIS service was a requirement under Chapter 14 – Transport Policy, which the Republic of Croatia had to meet during the process of accession to the European Union. The project is based on the Commission White Paper on the European transport policy, in general, and on the Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC, in particular. The provisions of Decision 92/143 on radio-navigation systems for Europe and Directive 2002/59 concerning the Community Vessel Traffic Monitoring and Information System (VTMIS) have been transposed into Croatian legislation. Croatia's Vessel Traffic Monitoring and Information System (hereinafter: VTMIS) has been defined by the Maritime Code (National Gazette / Narodne Novine 146/08 and 61/11) and Law on Maritime Safety Services and is under jurisdiction of the

Ministry of the Sea, Transport and Infrastructure. The VTMIS has been in regular service since April 2011.

Croatia's VTMIS is a complex technical and information system designed for monitoring, management and organization of the overall maritime traffic in Croatia's internal waters, territorial sea and the Protected Ecological and Fishing Belt, consisting of the Coastal Automated Identification of Ships System (AIS), VTS Radar System, maritime radio-communication systems and other systems that allow insights into conditions at sea and interaction with the parties involved in sea traffic.

This system project was supported through the programs PHARE 2005 Maritime safety: Enforcement of Administrative Capacity – Monitoring and Management of Vessels, and PHARE 2006 Maritime safety: Enforcement of Administrative Capacity – Monitoring and Management of Vessels – PHASE 2. Project Phase 2 was composed of activities that were logical continuation of some of the activities and results provided in the Project Phase 1, applying to supply and setting up the radar sub-systems, supply and setting up the VHF communication sub-systems, continuation of the twinning project, port reception facility study, and technical assistance.

VTS services include:

- Information Service (IS), providing data relevant to safety of navigation to maritime vessels and structures,
- Navigational Assistance Service (NAS), providing advice and support to maritime vessels and structures while under way,
- Traffic Organization Service (TOS), providing essential and timely information necessary for the organization and management of the sea traffic.


**Figure 4.22. VTS sectors A and B of the Republic of Croatia**

Source: Croatian Hydrographic Institute, 2018

The term VTS Croatia refers to the service of monitoring and managing the sea traffic under the jurisdiction of the Ministry and the Harbour Master's Office authorized for providing VTS

services and have the capacity to interact with maritime structures and vessels and to respond in variable navigational conditions. Its task is to ensure traffic flow where all participants in maritime traffic can achieve their goals and where all requirements related to navigation regulations, safety at sea and marine environment protection are met.

VTS area is the area comprising internal sea waters, territorial sea and the Protected Ecological and Fishing Belt of the Republic of Croatia, where VTS service is in effect, consisting of a number of VTS sectors. A VTS sector is a part of the VTS area which covers an integral navigation surface and allows VTS operators to perform vessel traffic monitoring and information activity. A VTS operator may be in charge of several sectors at the same time; a VTS sector may be operated as a Surveillance Area, Routing Area, Maneuvering Area, and as a suspended navigation area (Exclusion Area).

Monitoring and management of the sea traffic have been aimed at increasing the safety of navigation, efficiency of maritime traffic and marine environment protection, and relates to Croatia's inland waters, territorial sea and the Protected Ecological and Fishing Belt (ZERP) in the Adriatic Sea, and includes:

- Gathering data on maritime facilities and vessels and sea traffic,
- Providing data to maritime facilities and vessels,
- Providing navigation advice and support,
- Organization of navigation and sea traffic management.

Services of the Croatia's Vessel Traffic Monitoring and Information System (CVTMIS) have been performed through the relevant Ministry directorates and services in cooperation with the respective Harbour Master's Office, Plovput (company in charge of maintaining fairways and aids to navigation) and Croatian Hydrographic Institute. CVTMIS may also require cooperation and support from the Coast Guard, police and other relevant operational supervision bodies.

By establishing the comprehensive and coordinated service, CVTMIS ensures:

- Meeting EU standards on maritime traffic safety;
- The use, exchange and integration of data on national level, regional level as well as EU level and the European Maritime Safety Agency (EMSA), in line with the requirements of EU Directive 2002/59/EC;
- Exchange of data with the European SafeSeaNet system;
- Achieving the level of administrative capacities of other EU coastal countries;
- Reduction of sea accidents;
- Significant improvement of Search and Rescue (SAR) mission results;
- Significant reduction of sea pollution from ships,
- Increased efficiency in addressing sudden pollution of marine environment from ships;
- Increased capacity to monitor the transport of dangerous cargo and harmful substances;
- Considerable enhancement of government services to end users, i.e. participants in maritime traffic;
- Groundwork for improving the performance of the maritime traffic and port operations.

### 4.3.3. Port congestion

Although the Port of Split experiences a considerable increase in vessel traffic during summer season, there are no major delays. Passenger and ro-ro traffic runs according to schedule and delays occur largely due to poor road and railway infrastructure and adverse hydro-meteorological conditions. The average turnaround of container ships in the port is up to one day, laying at anchorage is rare and short. The longest turnaround, from 2 to 5 days, is experienced by bulk carriers while their time at anchorage may last 1 to 3 days on average. The

major problems and cause of delays in the City Port of Split arise from the influx of tourists and vehicles during the summer season, especially at weekends. During peak periods the City Port handles up to 35,000 passengers per day and more than 100,000 passengers and around 16,000 vehicles at weekends. Figures below show the road access to the City Port of Split on 11th August (Saturday at around 1 p.m.). The average vehicle speed was about 500 meters per hour.

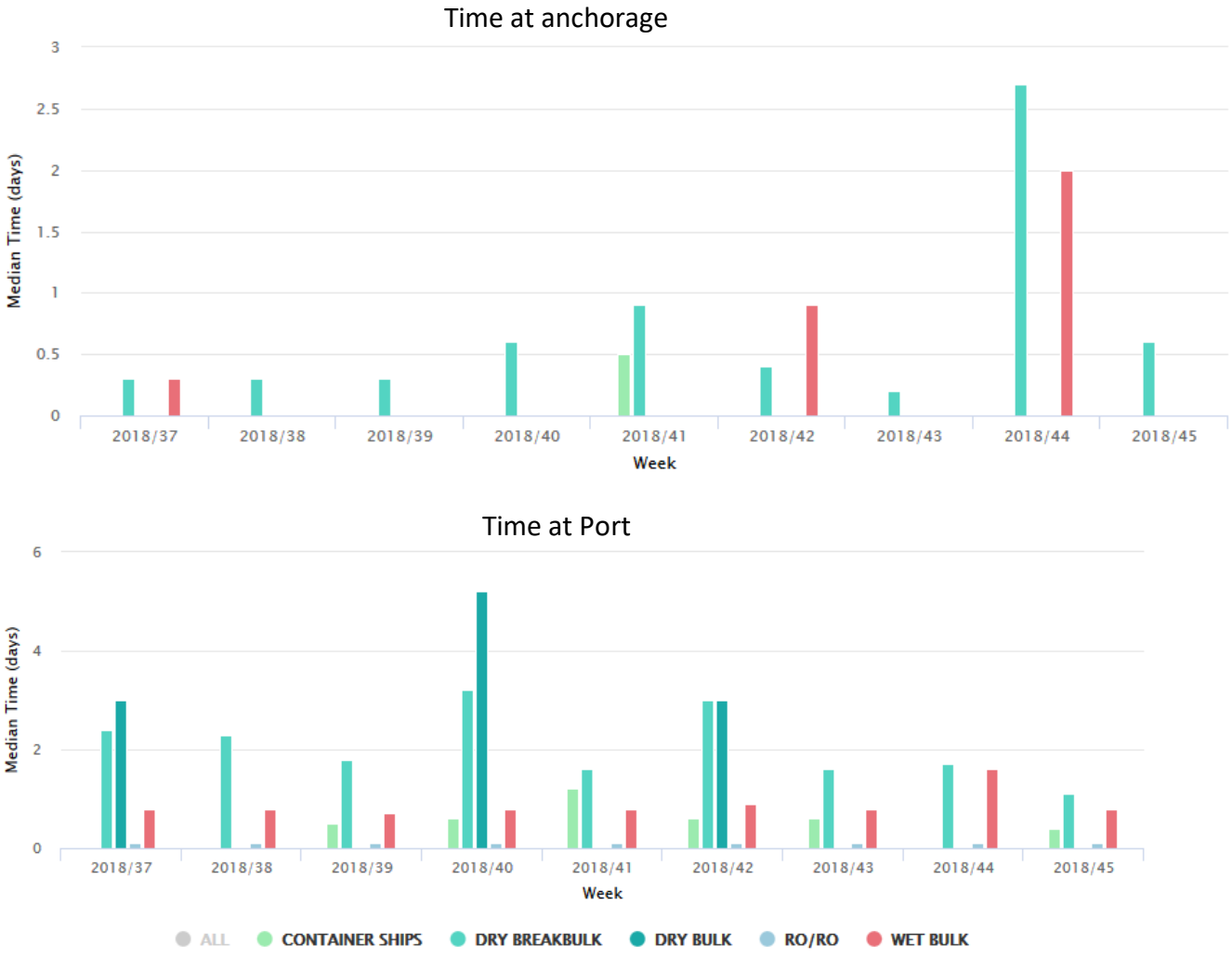
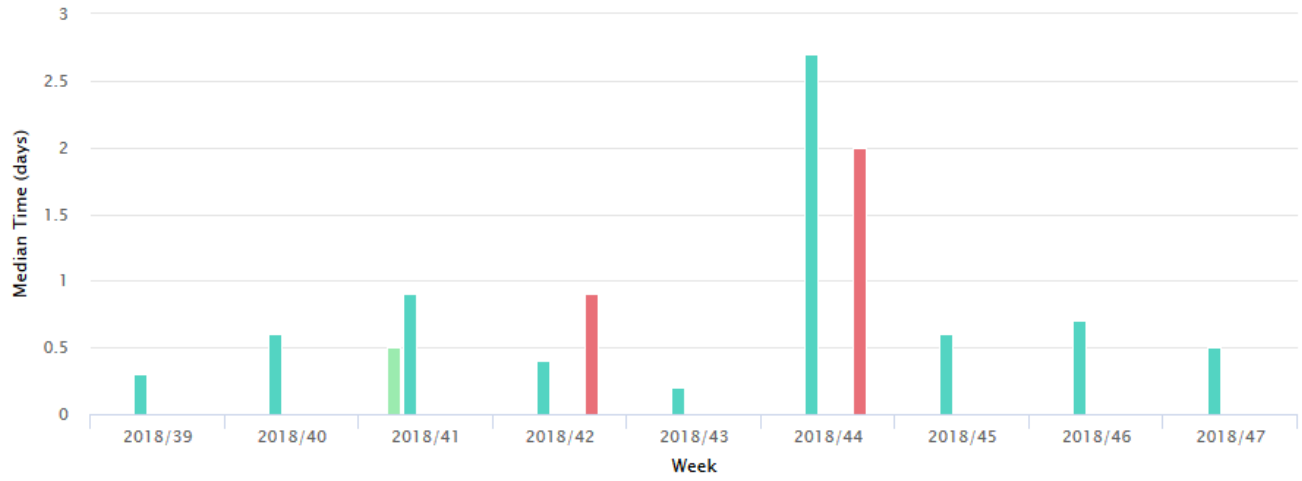



**Figure 4.22. Port congestion, example 1**

Source: Marine Traffic, 2018

Time at anchorage




Time at Port

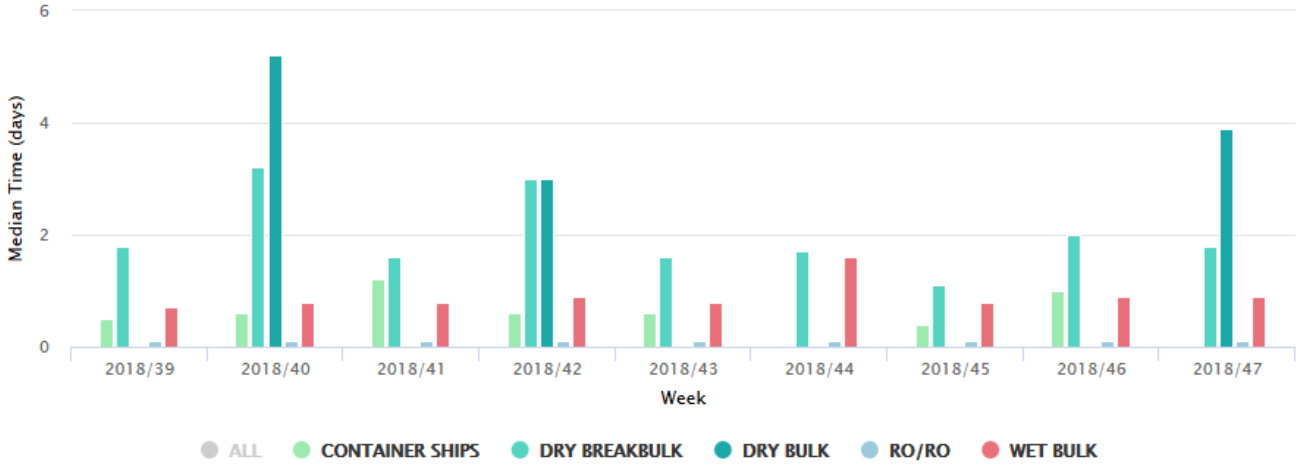



**Figure 4.23 Port congestion, example 2**

Source: Marine Traffic, 2018


**Figure 4.24. Port congestion**

Source: Slobodna Dalmacija, 2018

### 4.3.4. Environmental incentivizes

The port of Split is a member of EcoPorts association, a main environmental initiative of the European port sector having the aim to raise awareness on environmental protection through cooperation and sharing of knowledge between ports and improve environmental management. The Environmental Management System is established in accordance with the requirements of the PERS (Port Environmental Review System). There is one measuring station for air quality measurement in the port area, contributing to overall environmental protection with regular measurement of harmful gasses. Port authority Split prescribed several documents related on preventing the environment in the port area, like Ship Waste Management Plan in the area under the management of the Port authority Split, Ordinance on special security, protection and other measures in handling dangerous matters in the Port of Split, Ordinance on the Determination of Classes and Amounts of Hazardous Substances to be Handled in Port, i.e. with which the ship can sail to the Split port and the place in the port of Split, where it can be handled with dangerous substances and others.

The National Development Plan for Ports of Special International Economic Interest for Croatia predicts several infrastructure investments in the port of Split, of which two are related to the increase in environmental protection in the port. The future goals of Split port authority are related to realization of construction of facilities for LNG fuel supply in order to prepare the port for the potential introduction of emission controlled area (ECA) in the Adriatic / Mediterranean by 2020 and global Sulphur cap in 2020, where the permitted sulfur concentration in the combustion fuel must not exceed 0.5%. The other projects are related to the increase of use of renewable energy and implementation of cold ironing, a high-voltage land connections for vessels power supply while on berth.

# 5. OVERVIEW AND ANALYSIS OF THE EXISTING TRAFFIC FLOWS BETWEEN PORT OF SPLIT AND ITALIAN PORTS

## 5.1. EXISTING TRAFFIC FLOWS OF THE PORT OF SPLIT

This part of the document gives the review and analysis of existing maritime links in the Adriatic, with the focus on the Italian-Croatian traffic flows for the port of Split. The research is based on the analysis of general port statistics and trade exchange between Split port and respective destinations, with the focus on ferry and container freight traffic. The analysis is divided into two parts, where firstly the existing traffic flows of the port of Split are presented while the analysis of the current traffic flows between Italian-Croatian ports are shown in the second part of the analysis, having the focal point on ferry and container freight statistics, activities and traffic.

The existing traffic flows of the port of Split are divided on passenger and cargo transport activities related to ferry and container traffic flows. Moreover, the passenger ferry transport as a main activity for the port of Split is decomposed on domestic and international ferry transport and analyzed individually, while also comprising the vehicle transport statistics for the individual ferry line.

### 5.1.1. Domestic ferry passenger traffic flows

Domestic ferry passenger traffic flows calling the port of Split were already presented in the third chapter of this methodology, in the segment of departures towards the respective

destinations on central Dalmatian islands. This part of the research comprises passenger and vehicle traffic demand indicators analysis for the respective ferry traffic flows calling the port of Split for period from 2013 to 2017 presenting the overall passenger and vehicle turnover in port along with the statistics of the distances between ports on the specific ferry traffic routes and characteristic of ferry vessels operating on the individual domestic ferry line. The analysis of passenger traffic flows in domestic ferry transport calling the port of Split for period from 2013 to 2017 is presented in table 5.1.

**Table 5.1. Passenger traffic flow demand indicators in domestic ferry transport from 2013 to 2017.**

| LINE NUMBER | DOMESTIC PASSENGER TRANSPORT FERRY LINE | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|---|
| 602 | Vis – Split | 196,018 | 197,491 | 215,092 | 241,860 | 261,156 |
| 604 | Lastovo – Vela Luka (Korčula) – Hvar – Split | 174,923 | 177,645 | 207,299 | 215,115 | 230,713 |
| 631 | Supetar (Brač) – Split | 1,598,371 | 1,604,776 | 1,745,929 | 1,881,052 | 1,965,373 |
| 635 | Stari Grad (Hvar) – Split | 626,472 | 618,919 | 671,145 | 724,017 | 801,311 |
| 636 | Rogač (Šolta) – Split | 278,239 | 284,269 | 309,266 | 324,137 | 347,902 |

Source: CLSA, 2018

The vehicle traffic flow indicators in domestic ferry transport having a port of call in Split from 2013 to 2017 are presented in table 5.2.

**Table 5.2. Vehicle traffic flow indicators in domestic ferry transport from 2013 to 2017.**

| LINE NUMBER | DOMESTIC VEHICLE TRANSPORT FERRY LINE | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|---|
| 602 | Vis – Split | 40,730 | 40,318 | 41,330 | 48,798 | 52,912 |
| 604 | Lastovo – Vela Luka (Korčula) – Hvar – Split | 40,837 | 40,248 | 44,966 | 44,393 | 48,750 |
| 631 | Supetar (Brač) – Split | 321,827 | 327,477 | 343,332 | 360,641 | 387,074 |
| 635 | Stari Grad (Hvar) – Split | 141,947 | 144,756 | 148,731 | 159,903 | 166,257 |
| 636 | Rogač (Šolta) – Split | 55,395 | 56,269 | 61,109 | 66,731 | 72,672 |

Source: CLSA, 2018

The distance between port of Split and other ports on domestic ferry traffic flows with characteristic of typical ferry vessels operating on the individual domestic ferry line are shown in table 5.3.

**Table 5.3. Distance from port of Split towards the ports in domestic ferry transport with characteristics of typical ferry vessel operating on the ferry line**

| DOMESTIC FERRY LINE | DISTANCE (NM) | TYPICALL FERRY VESSEL | MAXIMUM / AVERAGE SPEED RECORDE ON THE FERRY LINE (KNOTS) | MAXIMUM NUMBER OF PASSENGERS / VEHICLES |
|---|---|---|---|---|
| Split – Rogač (Šolta) | 8.1 NM | "Biokovo" | 11.6 / 11.4 kn | 1,200 pax. / 138 passenger cars or 12 trailers of 40 t |
| Split – Supetar (Brač) | 8.3 NM | "Hrvat" | 11.5 / 10.2 kn | 1,200 pax. / 138 passenger cars or 12 trailers of 40 t |
| Split – Stari Grad | 21.8 NM | "Tin Ujević" | 12.2 / 11.6 kn | 1,000 pax. / 200 passenger cars |
| Split – Vis | 28.7 NM | "Petar Hektorović" | 14.2 / 13.4 kn | 1,080 pax. / 120 passenger cars |
| Split – Vela Luka (Korčula) | 44.7 NM | "Lastovo" | 15.8 / 14.6 kn | 500 pax. / 60 passenger cars |

Source: Faculty of Maritime Studies Rijeka, 2014; Marine Traffic, 2018; Jadrolinija, 2018 – modified

### 5.1.2. International ferry passenger traffic flows

There is only one international ferry passenger traffic flow, the ferry line towards Italy calling the port of Split and connecting it with Ancona. Considering the existence of single international ferry passenger traffic flow and obligation of detail elaboration of traffic flows between Italian – Croatian ports in the following chapter, the quantitative indicator analysis on the Split – Ancona ferry route will be presented afterwards.

### 5.1.3. Container traffic flows in the port of Split

The transport of containers in the port of Split is performed in its northern suburb located in the Vranjic-Solin basin where the cargo port is situated. The container transport for the port remained one of the few sectors recording a steady increase, with minor oscillations, in a ten year period. The overall container transport from 2014 to 2017 is shown in table 5.4.

**Table 5.4. Container traffic indicators from 2014 to 2017**

| YEAR | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| **TEU** (loaded and discharged) | 5,062 | 9,476 | 9,240 | 9,977 | 11,207 |

Source: Luka d.d. Split, 2018

The container traffic flows in the port of Split are mainly operated on the basis of regular weekly feeder service, connecting the cargo port with hub terminals in the Mediterranean. Before the economic crisis in 2008, the most prominent container companies like Maersk, Evergreen, Hapag – Lloyd, CMA CGM and others operated the regular international feeder service calling the port of Split, but the implications of the crisis forced them to cut their rising expenses and abandon the service. The port suffered a heavy loss of majority of feeder lines which was evident in the container cargo turnover statistics. From the year 2009 to 2016 only CMA CGM operated the feeder service for the transport of containers from large container ships, so called “mother” ships towards the port of Split which also included as a business

orientation chartering the cargo space on the X-PRESS Container line vessels at certain stages. The feeder line calling the Split port operated by CMA CGM in Intra-Mediterranean in 2015 and 2016 was as follows: Freeport (Malta) – Bar (Montenegro) with five ports of call: Bar (Montenegro) – Durres (Albania) – Ploče (Croatia) – Split (Croatia) – Freeport (Malta). From the year 2017 Maersk and CMA CGM jointly operate on the weekly container service Adriatic X-PRESS 1 (ADX 1), an X-PRESS Feeder service route directly connecting the port of Split with Freeport container terminal in Malta. This service is indicated also as a SSLMED Adriatic Feeder 1 service, on the Intra Mediterranean route in 2018 by CMA CGM.

The feeder line operated solely by CMA CGM in 2016, and jointly with Maersk in 2017 had a share of approximately 50% of overall container transport in the port of Split by the analysis of CIMIS – Croatian Integrated Maritime Information System, while the remaining part was performed by the other container vessels but also general cargo and multipurpose vessels whose cargo flows depend on the demand for various commodities, having similar destinations for loading or discharging on the traffic flows as the ones on the regular service. The possibility of a port agent error when entering the data and the overall disproportion of data should also be considered, so for the purpose of this chapter only container vessels categorized in CIMIS and port database are presented and analyzed mainly operating on the regular feeder service. The following table (table 5.5) shows statistic of container turnover in the port of Split, only for vessels categorized as “container vessels” based on the CIMIS data for the period from 2014 to 2017.

**Table 5.5. Container traffic turnover based on CIMIS data**

| CONTAINER VESSELS | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|
| Number of port of calls | 206 | 111 | 122 | 142 |
| Loaded (TEU) | 2,623 | 2,225 | 3,075 | 3,357 |
| Discharged (TEU) | 1,869 | 2,055 | 2,833 | 2,995 |
| In transit (TEU) | 938 | 1,056 | / | 8,908 |

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Source: CIMIS, 2018

The statistics of the regular feeder container service operated by CMA CGM and Maersk along with the share of most prominent import and export destinations in 2016 and 2017 is presented in table 5.6.

**Table 5.6. Container traffic (TEU) on feeder service in port Split along with most prominent import/export destinations in 2016 and 2017**

| YEAR | 2016. | | | 2017. | | |
|---|---|---|---|---|---|---|
| TYPE OF ACTIVITY | EXPORT TEU | IMPORT TEU | OVERALL TEU | EXPORT TEU | IMPORT TEU | OVERALL TEU |
| CMA CGM | 3,962 | 1,728 | 5,690 | 3,278 | 1,096 | 4,374 |
| Destinations (share %) | China 40,8%<br>UAE 40.1 % | China 60.5%<br>Ecuador 26,1% | / | China 58.1%<br>UAE 26.5% | China 62.7%<br>Ecuador 12.1% | / |
| MAERSK | / | / | / | 941 | 110 | 1,051 |
| Destinations (share %) | / | / | / | UAE 40.9%<br>USA 26.8%<br>China 26.3% | China 63.6%<br>Taiwan 18.2% | / |

Source: Luka d.d. Split, 2018

The container transport on the container traffic flows having the port of call in the port of Split on the related route are exclusively performed among the origin and destination ports in the Adriatic, comprising also the hub container port located in Malta.

## 5.2. CURRENT MARITIME TRAFFIC FLOWS BETWEEN PORT OF SPLIT AND ITALIAN PORTS

Current maritime traffic flows between Italian – Croatian ports calling the port of Split are analyzed individually for ferry and container transport, in order to define the current markets

and demand for services as well as the business dynamics (indicators) on the specific maritime route regarding the type of transport.

### 5.2.1. Current ferry traffic flows

The frequency of voyages on the specific ferry line were already discussed in the third chapter of the methodology concluding the existence of two international ferry passenger companies operating on the traffic flow Split – Ancona, the Croatian state owned company "Jadrolinija" and Italian ferry transport company "Società Navigazione Alta Velocità – SNAV", while until the end of year 2016 international ferry passenger company "Blue Line" also operated on the specific route. The distance between Split and Ancona is 134 NM when navigating through "Drvenički channel", 137 NM when navigating through "Šoltanski channel" and 145 NM when navigating through "Splitska vrata", where the distance differs from the navigation route determined by the ships master The overall number of passengers an vehicles, comprising passenger vehicle, busses, trucks and motorcycles, realized from 2014 – 2017 in the port of Split on the international turnaround ferry passenger traffic flow Split – Ancona for both companies are presented in table 5.7.

**Table 5.7. Passenger traffic flow demand indicators in international ferry transport from 2014 to 2017 in the port of Split on the Split – Ancona maritime route**

| TYPE OF TRANSPORT | COMPANY NAME | | | YEAR |
|---|---|---|---|---|
| | JADROLINIJA | BLUE LINE | SNAV | 2017. |
| Passengers | 73,704 | | 86,238 | 159,942 |
| Passenger vehicle | 11,693 | | 13,042 | 24,735 |
| Bus | 411 | | 658 | 1,069 |
| Trucks < 7m | 803 | | 405 | 1,208 |
| Trucks 7 – 18m | 3,932 | | 1,316 | 5,248 |
| Total trucks | 4,735 | | 1,721 | 6,456 |
| **Total vehicles** | **16,839** | | **15,421** | **32,260** |
| Motorcycles | 2,378 | | 2,295 | 4,673 |
| | JADROLINIJA | BLUE LINE | SNAV | 2016. |

| | | | | |
|---|---|---|---|---|
| Passengers | 62,484 | 58,432 | 70,930 | 191,846 |
| Passenger vehicle | 9,033 | 9,888 | 9,836 | 28,757 |
| Bus | 441 | 323 | 509 | 1,273 |
| Trucks < 7m | 823 | 119 | 129 | 1,071 |
| Trucks 7 – 18m | 3,661 | 1,331 | 1,592 | 6,584 |
| Total trucks | 4,484 | 1,450 | 1,721 | 7,655 |
| **Total vehicles** | **13,958** | **11,661** | **12,066** | **37,685** |
| Motorcycles | 1,512 | 2,186 | 1,894 | 5,592 |
| | **JADROLINIJA** | **BLUE LINE** | **SNAV** | **2015.** |
| Passengers | 53,054 | 75,721 | 82,263 | 211,038 |
| Passenger vehicle | 6,372 | 10,967 | 11,271 | 28,610 |
| Bus | 434 | 567 | 640 | 1,641 |
| Trucks < 7m | 937 | 186 | 112 | 1,235 |
| Trucks 7 – 18m | 3,479 | 1,673 | 1,544 | 6,696 |
| Total trucks | 4,416 | 1,859 | 1,656 | 7,931 |
| **Total vehicles** | **11,222** | **13,393** | **13,567** | **38,182** |
| Motorcycles | 887 | 2,722 | 2,319 | 5,928 |
| | **JADROLINIJA** | **BLUE LINE** | **SNAV** | **2014.** |
| Passengers | 75,005 | 63,760 | 66,646 | 205,411 |
| Passenger vehicle | 8,349 | 7,380 | 6,518 | 22,247 |
| Bus | 747 | 616 | 645 | 2,008 |
| Trucks < 7m | 698 | 198 | 142 | 1,038 |
| Trucks 7 – 18m | 3,377 | 1,440 | 1,339 | 6,156 |
| Total trucks | 4,075 | 1,638 | 1,481 | 7,194 |
| **Total vehicles** | **13,171** | **9,634** | **8,644** | **31,449** |
| Motorcycles | 1,425 | 1,572 | 2,172 | 5,169 |

Source: Port Authority Split, 2018

The overall number of ferry international calls in the port of Split on Split – Ancona traffic flow, on the basis of the monthly overview for the period from 2014 to 2017 is presented in table 5.8.

**Table 5.8. Overall number of ferry international calls in the port of Split on the Split – Ancona traffic flow (monthly overview)**

| | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|
| January | 10 | 9 | 9 | 8 |
| February | 9 | 9 | 8 | 8 |
| March | 11 | 11 | 16 | 9 |

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| | | | | |
|---|---|---|---|---|
| April | 23 | 38 | 34 | 28 |
| May | 37 | 44 | 41 | 30 |
| June | 38 | 43 | 39 | 26 |
| July | 44 | 46 | 44 | 38 |
| August | 48 | 49 | 48 | 45 |
| September | 37 | 44 | 41 | 30 |
| October | 17 | 41 | 31 | 16 |
| November | 9 | 11 | 7 | 11 |
| December | 7 | 10 | 8 | 9 |
| **OVERALL CALLS** | 290 | 355 | 326 | 258 |

Source: Port Authority Split, 2018

Among ferry international companies operating on a turnaround traffic flow Split – Ancona, the state owned company Jadrolinija recorded the most calls in port of Split (figure 5.1.), followed by two other companies SNAV and Blue Line who operated on the respective ferry line until the end of year 2016.

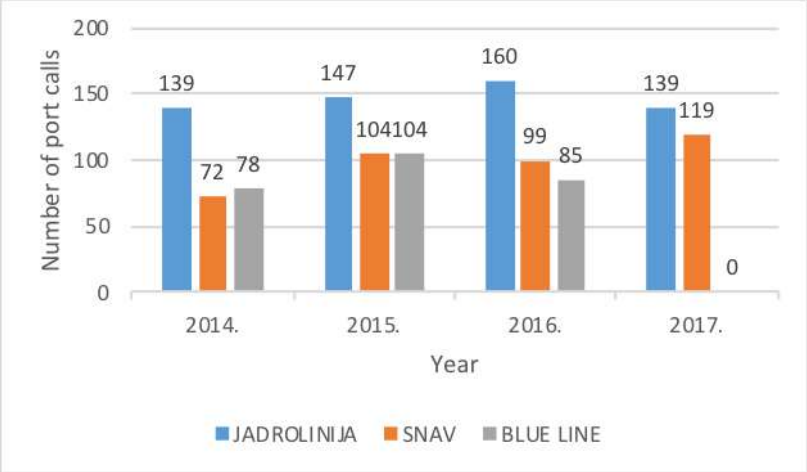


**Figure 5.1. Port of calls in port of Split based on the operator (company) on the ferry international traffic flow on Split – Ancona route**

Source: Port Authority Split, 2018

In a four year period (2014 – 2017) there were maximum of six (6) vessels in exploitation on the ferry international line Split – Ancona, where Jadrolinija used vessels "Marko Polo" (figure 5.2.), "Dubrovnik" and "Zadar", company SNAV two vessels "SNAV Adriatico" and "SNAV Aurelia" and Blue Line with one vessel "Regina della Pace" for the exploitation purposes.


**Figure 5.2. Ferry vessel "Marko Polo"**

Source: Wikipedia, 2018

The number of port of calls based on the individual ferry vessel is presented in figure 5.3.

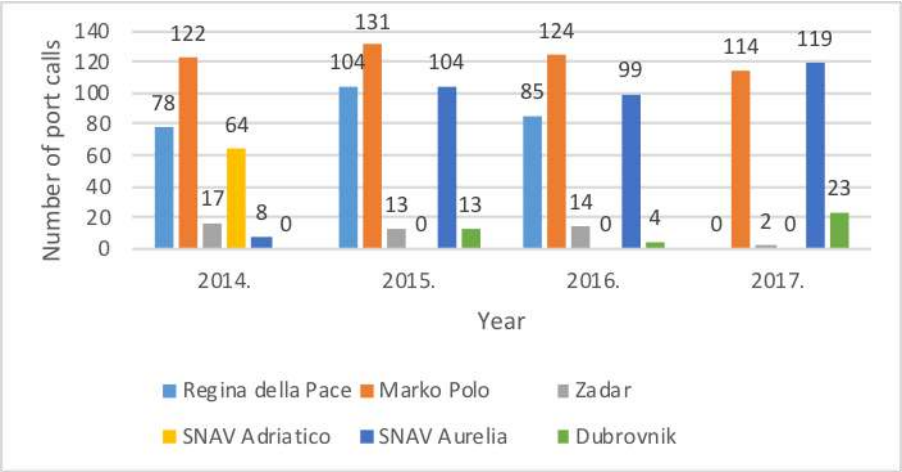


**Figure 5.3. Number port calls in the port of Split on the Split – Ancona ferry flow based on the individual ferry vessel**

Source: Port Authority Split, 2018

The main characteristics of the vessels operating on the Split – Ancona traffic flow, including the maximum and average recorded speed, maximum number of passengers and vehicles are presented in table 5.9.

**Table 5.9. Main characteristic of ferry vessels on the Split – Ancona traffic flow**

| VESSEL NAME | COMPANY | LENGTH OVER ALL / BREADTH EXTREME / DRAUGHT | GROSS TONNAGE | DEADWEIGHT | MAXIMUM / AVERAGE SPEED RECORDE ON THE FERRY LINE (knots) | MAXIMUM NUMBER OF PASSENGERS / VEHICLES |
|---|---|---|---|---|---|---|
| "Marko Polo" | Jadrolinija | 128.13 m / 19.6 m / 5.4 m | 10,154 | 1,132 t | 14 / 12.8 kn | 1,100 pax. / 270 passenger vehicles |
| "Dubrovnik" | Jadrolinija | 122.05 m / 18.5 m / 4.8 m | 9,795 | 1,310 t | 17.1 / 10.5 kn | 1,300 pax. / 300 passenger vehicles |
| "Zadar" | Jadrolinija | 116 m / 18.9 m / 4.9 m | 9,487 | 2,152 t | 17.4 / 16 kn | 1,053 pax. / 280 passenger vehicles |
| "SNAV Adriatico" | SNAV | 164.41 m / 27.6 m / 6.1 m | 31,910 | 4,642 t | 7.8 / 6.8 kn | 1,200 pax. / 524 passenger vehicles |
| "SNAV Aurelia" | SNAV | 147.97 m / 25.4 m / 5.4 m | 21,518 | 3,250 t | 8.3 / 7.2 kn | 2,280 pax. / 645 passenger vehicles |
| "Regina della Pace" | Blue Line | 136 m / 24.2 m / 5 m | 16,405 | 3,100 t | 15.4 / 13.7 kn | 1,700 pax. / 554 passenger vehicles |

Source: Marine Traffic, 2018; Jadrolinija, 2018; SNAV, 2018; Blue Line, 2018.

The usual vessel transit time on this international ferry traffic flow is 10 hours. Based on the Marine Traffic port congestion service, the average waiting time on anchorage is 0.0 days and average time in port for passenger ships (RO-RO) in port of Split is 0.1 days, as there is no possibility to determine the mentioned indicators for each individual ferry.

Other entities involved when performing port activities and their availability depends on their working hours. The regular working hours of major concessionaires are presented in table 5.10.

**Table 5.10. Port concessionaires in the port area and their working hours**

| PORT SERVICE | REGULAR WORKING HOURS | OVERTIME CHARGES | | | |
|---|---|---|---|---|---|
| | | Monday - Friday | Saturday | Sunday | Holidays |
| **PORT OPERATIONS CENTER** | Mon – Sun, 00.00 – 24:00hrs | / | / | / | / |
| **LUKA D.D. SPLIT (cargo handling)** | Mon – Fri,<br>1st shift 6:00 – 13:00<br>2nd shift 13:00 – 20:00<br>Sat, 06:00 – 16:00 | 3rd shift + 50% | 1st shift +50%<br>2nd shift +75%<br>3rd shift +100% | +100% | + 150% |
| **PILOTS** | Mon - Fri, 06:00 - 22:00hrs | +50 % | +50 % | +50 % | +100 % |
| **TUGBOATS** | Mon - Fri, 08:00 - 18:00hrs | +25 % | +25 % | +50 % | +50 % |
| **LINEHANDLERS** | Mon - Sun, 06:00 - 22:00hrs | +25 % | +25 % | +25 % | +50 % |

Source: Port Authority Split, 2018

### 5.2.2. Current container traffic flows

Container traffic flows between Italian – Croatian ports can be divided on the regular weekly feeder services and transport of containers on general cargo and multipurpose ships. This latter vessel category when performing container transport are hardly followed, predictable and analyzed, with limited available data, so for the purpose of this chapter only the regular service between Italian – Croatian ports calling the port of Split on the specific container routes are analyzed in detail. Also, in some segments of this subchapter, as for the limited data for the year 2017, the container traffic flows in 2018 are also presented and analyzed.

The current container traffic flow between Italian – Croatian ports, in 2018, is an Adriatic X-PRESS 1 (ADX 1) regular service route operated jointly by CMA CGM and Maersk on X-PRESS Container Feeders, where the port of Split is connected with Freeport container terminal in Malta (figure 5.4.).

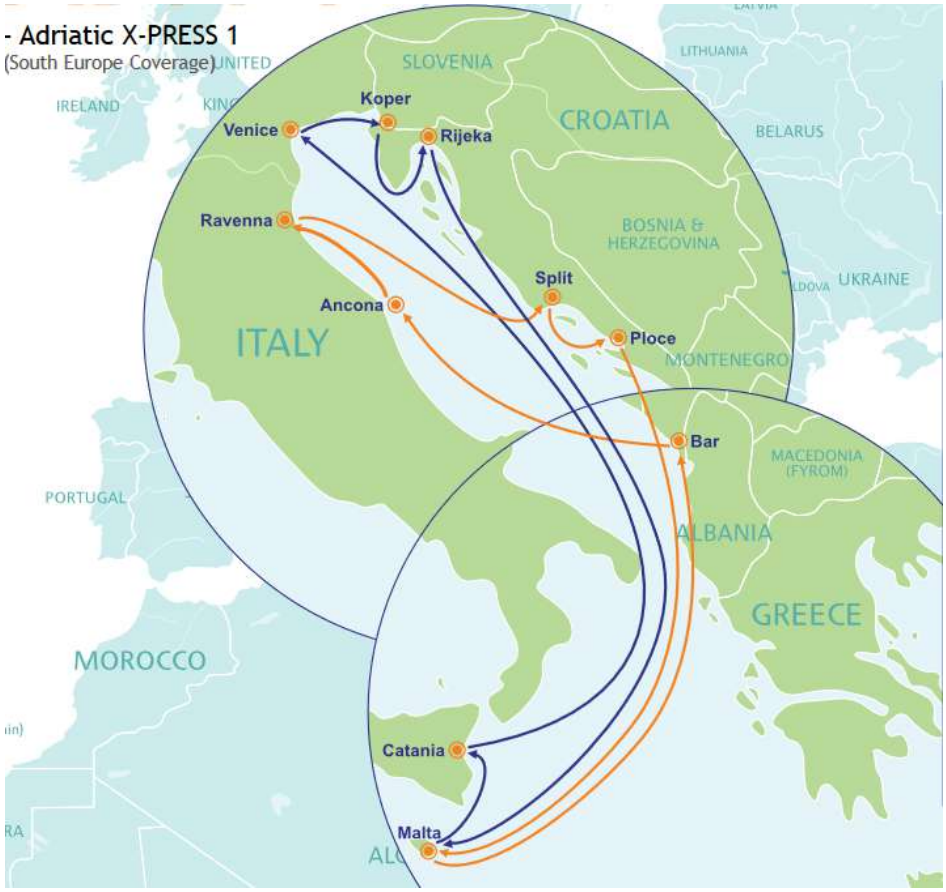


**Figure 5.4. Adriatic X-PRESS 1 (ADX 1) service route**

Source: X-PRESS Container Feeders, 2018

The overall feeder container traffic flow service has three vessels in a fleet, 11 port of calls and weekly frequency with overall duration of 21 days. There are two container lines on the Adriatic X-PRESS 1 (ADX 1) service route, northern and southern route. The north service (the orange line on figure 14.) has five (5) port of calls along with the origin and destination port in Malta. The feeder line traffic flow is as follows: Freeport (Malta) – Bar (Montenegro) – Ancona (Italy) – Ravenna (Italy) – Split (Croatia) – Ploče (Croatia) – Freeport (Malta). The southern route (the blue line on figure 14.) has four (4) port of calls along with the origin and destination port in Malta. The feeder line traffic flow is as follows: Freeport (Malta) – Catania (Italy) – Venezia

(Italy) – Koper (Slovenia) – Rijeka (Croatia) – Freeport (Malta). The overall transit times between ports are shown in table 5.11.

**Table 5.11. The overall transit times between ports on Adriatic X-PRESS 1 (ADX 1) service route**

| Port of loading / Port of destination | MALTA | BAR | ANCONA | RAVENNA | SPLIT | PLOČE | CATANIA | VENICE | KOPER | RIJEKA |
|---|---|---|---|---|---|---|---|---|---|---|
| MALTA | | 7 | 6 | 5 | 4 | 3 | 10 | 7 | 6 | 5 |
| BAR | 2 | | 20 | 19 | 18 | 17 | 13 | 10 | 9 | 8 |
| ANCONA | 3 | 1 | | 20 | 19 | 18 | 14 | 11 | 10 | 9 |
| RAVENNA | 4 | 2 | 1 | | 20 | 19 | 15 | 12 | 11 | 10 |
| SPLIT | 5 | 3 | 2 | 1 | | 20 | 16 | 13 | 12 | 11 |
| PLOČE | 6 | 4 | 3 | 2 | 1 | | 17 | 14 | 13 | 12 |
| CATANIA | 1 | 8 | 7 | 6 | 5 | 4 | | 18 | 17 | 16 |
| VENICE | 4 | 11 | 10 | 9 | 8 | 7 | 3 | | 20 | 19 |
| KOPER | 5 | 12 | 11 | 10 | 9 | 8 | 4 | 1 | | 20 |
| RIJEKA | 6 | 13 | 12 | 11 | 10 | 9 | 5 | 2 | 1 | |

Source: X-PRESS Container Feeders, 2018

The weekly service enables intra Adriatic connections with direct Malta hub port connection. There are three vessels operating on the specific container traffic flow “X-Press Shannon”, “Contship Joy” and “Max Venture”. The main vessels specifications operating on the container traffic flow, having the port of call in the port of Split, are presented in table 5.12.

**Table 5.12. Vessels main characteristic on the Adriatic X-PRESS 1 (ADX 1) service container traffic flow**

| VESSEL NAME | OPERATED BY | FLAG | LENGTH OVER ALL / BREADTH EXTREME / DRAUGHT | GROSS TONNAGE | DEADWEIGHT | MAXIMUM / AVERAGE SPEED RECORDE ON THE FERRY LINE (knots) | NOMINAL CAPACITY (TEU) / REEFER PLUGS |
|---|---|---|---|---|---|---|---|
| "X-Press Shannon" | X-PRESS FEEDERS | Malta | 134.44 m / 22.78 m / 7.4 m | 9,981 | 11,424 t | 16 / 12.4 kn | 868 / 234 |
| "Contship Joy" | CONMAR SHIPPING GMBH & CO KG. | Malta | 140.55 m / 23.08 m / 7.5 m | 10,965 | 12,611 t | 14.6 / 13.2 kn | 925 / 200 |
| "Max Venture" | VROON BV | Malta | 146.4 m / 22.6 m / 7.8 m | 10,609 | 12,244 t | 15.2 / 13.6 kn | 1,022 / 314 |

Source: Marine Traffic, 2018; Vessel Tracking, 2018; X-PRESS Container Feeders, 2018.

The following table (table 5.13.) shows the frequency of arrivals and departures between port of Split and Italian ports. It should be emphasized the differentiation of the itineraries between years as a change in business orientation of specific companies, which is reflected on data analysis and presentation. For example the itinerary on the container traffic flow calling the port of Split, operated by CMA CGM in Intra-Mediterranean in 2015 and 2016, was route Freeport (Malta) – Bar (Montenegro) with five ports of call.

There were 86 port of calls to port of Split on container traffic flows between Italian – Croatian ports in 2017, with 6 port of calls from Split to port destinations in Italy. It should be noted that the existence of container trade between Italian and Croatian ports is not necessarily interconnected with vessels port of calls on the specific feeder container flow, as there is possibility of container transit in the current terminal, where the cargo is intended to the following destination, having the final transshipment in the other port on the specific container feeder service.

**Table 5.13. Number of port calls to and from port of Split on container traffic flows between Italian – Croatian ports in the period 2014 – 2017.**

| YEAR / ROUTE | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|
| Ancona – Split (port of calls to Split) | 7 | 3 | 47 | 68 |
| Catania – Split (port of calls to Split) | / | / | / | 2 |
| Venezia – Split (port of calls to Split) | / | 1 | 10 | 16 |
| Ravenna – Split (port of calls to Split) | / | 22 | / | / |
| Trieste – Split (port of calls to Split) | 2 | 1 | / | / |
| Split – Ancona (port of calls from Split) | 6 | 16 | / | 2 |
| Split – Venezia (port of calls from Split) | / | / | / | 2 |
| Split – Ravenna (port from calls to Split) | / | 14 | 2 | 2 |
| Split – Napoli (port of calls from Split) | / | 1 | / | / |

Source: CIMIS, 2018

It can be concluded that the largest trade between Italian – Croatian ports in the container transport segment, calling the port of Split on the container traffic flow, was the container trade between Split and Ancona (figure 5.5.). It should also be assumed the dependence of the regular service and consistence of the itinerary, which also influenced on the obtained results.

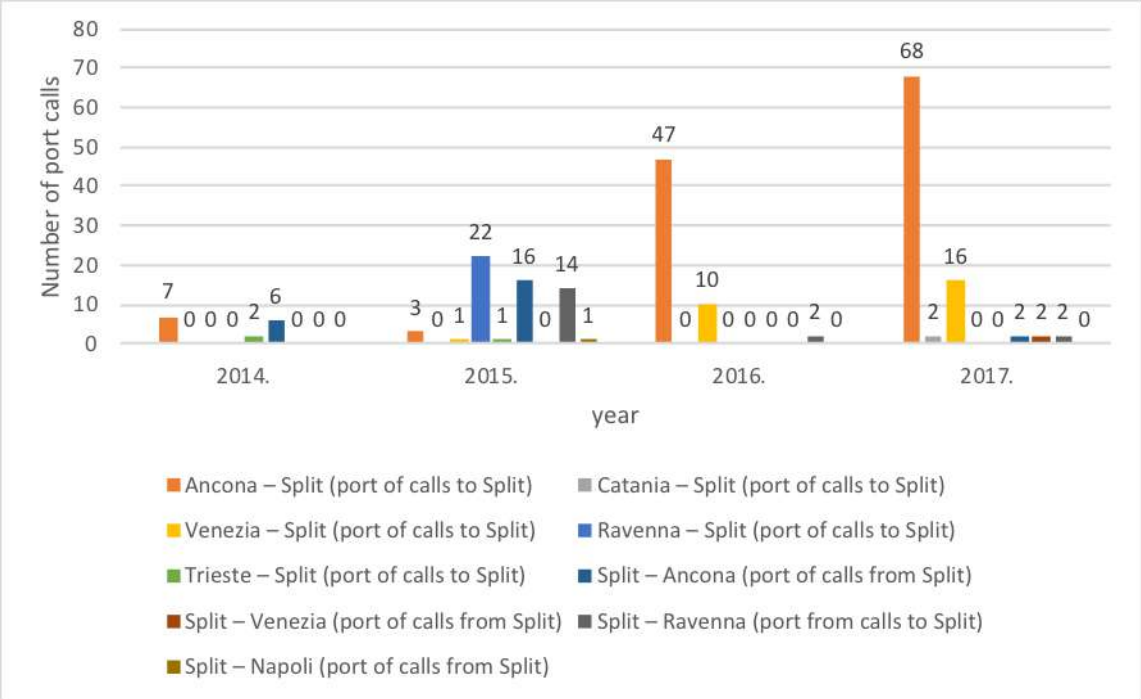


**Figure 5.5. Number of port calls in the container transport between Italian – Croatian ports calling the port of Split on its itinerary**

Source: CIMIS, 2018

It is essential to determine the container volumes of the trade between Italian and Croatian ports. The number of TEUs discharged in the port of Split from the preceding Italian port is relevant and their volumes represent the trade between Italian and Croatian port on the container traffic flow. Regarding the succeeding port or destination of containers loaded in Split, the final destination of containers on the feeder service route is mostly unknown mainly as the previous and succeeding port can become only transit ports where the container is directed from or to another destination on the route. To conclude, the export of containers from Split on the container route between Italian and Croatian port can only be assumed, so based on the CIMIS data for the period 2014 – 2017, the container volumes (traffic) calling the port of Split on its itinerary are presented in table 5.14.

**Table 5.14. Container volumes (TEUs loaded, unloaded and in transit) on the container traffic flow between Italian – Croatian ports in the period 2014 – 2017.**

| YEAR / ROUTE | 2014. | | | 2015. | | | 2016. | | | 2017. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOA. TEU | UNL. TEU | TRA. TEU | LOA. TEU | UNL. TEU | TRA. TEU | LOA. TEU | UNL. TEU | TRA. TEU | LOA. TEU | UNL. TEU | TRA. TEU |
| **Ancona – Split** | 72 | 43 | 18 | 109 | 126 | 300 | 400 | 392 | 3 | 1,098 | 784 | 3,604 |
| **Catania – Split** | / | / | / | / | / | / | / | / | / | 44 | 26 | 17 |
| **Venezia – Split** | / | / | / | / | / | / | 75 | 41 | 144 | 325 | 305 | 331 |
| **Ravenna – Split** | / | / | / | 683 | 645 | 16 | / | / | / | / | / | / |
| **Trieste – Split** | 41 | 34 | 1 | 6 | 20 | 0 | / | / | / | / | / | / |
| **Split – Ancona** | 0 | 18 | 14 | 89 | 73 | 382 | / | / | / | 149 | 250 | 303 |
| **Split – Venezia** | / | / | / | / | / | / | / | / | / | 198 | 213 | 531 |
| **Split – Ravenna** | / | / | / | 286 | 383 | 58 | 72 | 56 | 0 | 74 | 106 | 346 |

Source: CIMIS, 2018

As the itineraries depend on the demand for specific commodities, they are changed constantly in order to enable efficient and reliable regular feeder service which is proportionally connected with selection of different vessel operating on the specific route. The number of port calls based on the individual container vessel, on the container traffic flow between Italian – Croatian ports having the port of call in the port of Split, for the period 2014 – 2017 is shown in figure 5.6.

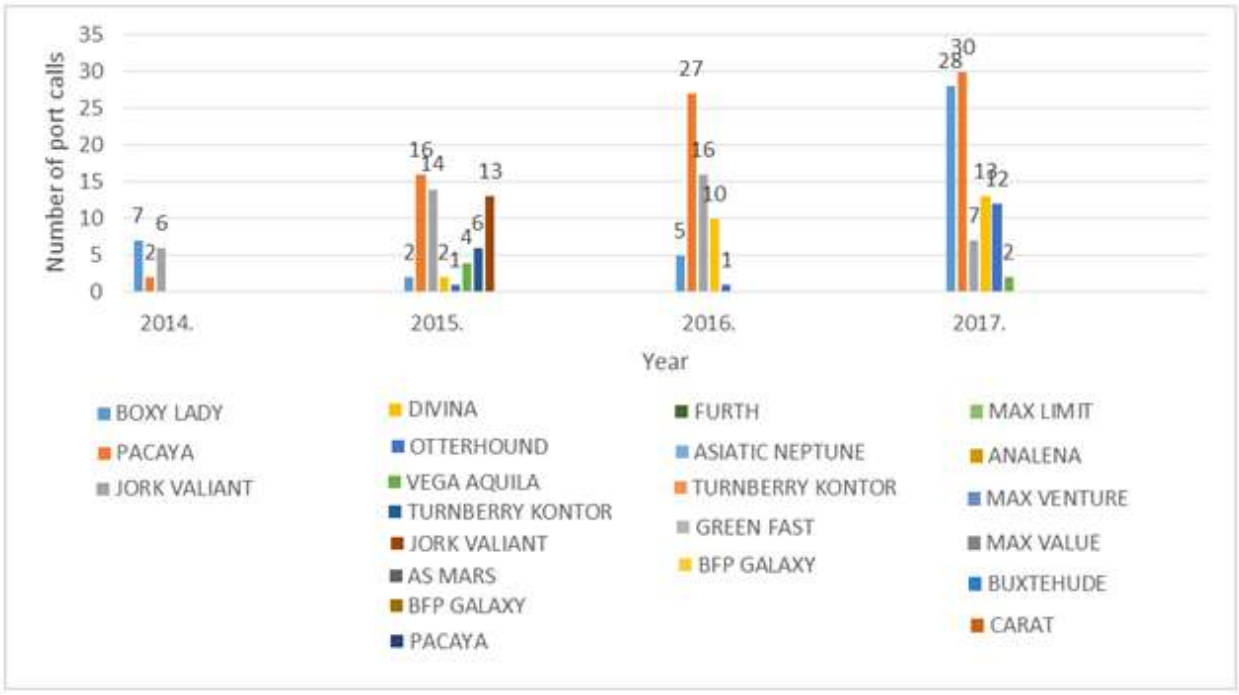


**Figure 5.6. Number of port calls based on the individual container vessel, operating on the container traffic flow between Italian – Croatian ports and having the port of call in the port of Split, for the period 2014 – 2017**

Source: CIMIS, 2018 - modified

Based on the data retrieved from Marine traffic port congestion services in a one year period from week 49 of the year 2017 to week 48 year 2018, the median time at port Split for container vessels was approximately 0,7 days. It was measured based on 38 records where the maximum time at port was 2.2 days while the minimum was 0.4 days. Median time at anchorage was approximately 0.8 days for container vessels waiting on the anchorage, based on 5 records where the minimum was 0 days and maximum 2.6 days. It should be emphasized the predominance of amount of 0 days at anchorage for container vessels signaling the immediate container manipulation.

# 6. ANALYSIS ON POTENTIAL MARKET FLOWS AND PROJECTION OF FUTURE TRAFFIC FLOWS BETWEEN PORT OF SPLIT AND ITALIAN PORTS

## 6.1. PROJECTION OF FUTURE FERRY TRAFFIC FLOWS

The current market flow volumes between Italian-Croatian ports on Split-Ancona route, for ferry passenger and vehicle transport shows a slight decrease in the years following the year 2014 as a base period for analysis. The numbers of port calls on the mentioned route are also reduced in the same period, mainly as an implication of abandonment of passenger and vehicle activity, in the port of Split, of company „Blue Line“ what had an impact on the movement of overall results and indicators. The movement of passengers and vehicles have reached highest values in 2017 in comparison with three previous years when analyzing only current operators on the Split-Ancona ferry passenger flow, „Jadrolinija“ and „SNAV“. These indicators affirm the demand for services component and cost effectiveness on the Split-Ancona traffic flow. The comparative advantage of the use of maritime rather than road transport modality on the specific route is firstly reflected by the price of the service and avoidance of congested road areas, traffic jams, border crossings and other elements characteristic for road transport. Furthermore, the transit time of two modalities is approximately the same while the maritime transport, for this route, is characterized by reliability of service. All these comparative advantages depend on the demand for passenger and vehicle transport between ports which increases during years when analyzing the two current operator indicators, regardless of the

slight overall decrease on the specific route. It should be concluded that the actual need for services on the Split-Ancona international passenger traffic flow increases, especially in the summer periods, so it is important for the port of Split to strengthen the traffic route and trade with Italy in the segment of passenger and vehicle transport along with accompanying and constant state analysis of demand for services.

The projections of future international passenger and vehicle traffic flows between port of Split and other Italian ports should be analyzed from the cost effectiveness standpoint and rational assessment of the potential demand and traffic flows. The rational assessment of the projection of future ferry passenger flows is limited for Adriatic area, mainly as for the profitability of service and realistic distances between ports for establishment of the potential ferry route. There were several international ferry passenger traffic flows between port of Split and Italy in the past which were abolished, like the ferry traffic flows from Split to Pescara and Venezia. These destinations in the Adriatic, with Bari as an international ferry passenger traffic flow calling the port Dubrovnik, are the potential international ferry lines with Split, when performing a projection of future traffic flows, based on the expert assessment method, as an implication of the data and research unavailability. The Split port authority management indicated these destinations as a potential ferry traffic flow trade with Italy, but also mentioned close distances between ports as a strategic problem where demand for services could overlap creating unprofitable environment for company operating on the potential service. So this assessment should be closely evaluated in detail. The distances between ports in Adriatic are shown in table 6.1.

**Table 6.1. Distances between ports in Adriatic (approximate values)**

| | Split | Ancona | Pescara | Venezia | Bari |
|---|---|---|---|---|---|
| Split | / | 131 NM | 116 NM | 215 NM | 146 NM |
| Ancona | 131 NM | / | 81 NM | 124 NM | 215 NM |

| | | | | | |
|---|---|---|---|---|---|
| Pescara | 116 NM | 81 NM | / | 201 NM | 149 NM |
| Venezia | 215 NM | 124 NM | 201 NM | / | 331 NM |
| Bari | 146 NM | 215 NM | 149 NM | 331 NM | / |

Source: Mooring Spot, 2018

Considering the port of Split, the close distances between Ancona and Pescara as a potential markets in the projection of the future ferry passenger traffic flows, a longer distance and proportionally potential unprofitable market with Venezia and already consolidated ferry passenger traffic flow on the route Dubrovnik-Bari are the impacts from the external environment representing a strategic problem, where the decision makers in the logistic transport chain should strive to analyze all the relevant inputs having the impact on current constellations in the market, primarily to define the feasibility of creation of new traffic flows calling the port of Split.

## 6.2. PROJECTION OF FUTURE CONTAINER TRAFFIC FLOWS

The projection of future container traffic flows between Italian-Croatian ports, calling the port of Split are logically limited to Adriatic area, but the area of Italian western part of the coast should be also considered as the potential future container flows. The strong dependence on the feeder container service and selection of hub port in the Mediterranean should be apostrophized as a characteristic of container routes calling the port of Split as an indicator of the analysis of the future routes between port Split and other Italian ports. There is no direct container route between Split and other Italian ports, which creates obstacles and increases the possibility of deviation from actual trade movement between individual ports on the feeder service line. The regular feeder container service included the Italian NAPA ports (Ravenna, Venezia and Trieste) on the itineraries in the period from 2014 to 2017, while the current itinerary in 2018 includes Ancona and Ravenna on the northern service route and Venezia on the southern part. The container traffic flows with Italian western cost destinations existed in the past calling, indirectly through Gioa Tauro hub port, Civitavecchia and Salerno, with also port Cagliari in Sardinia as a part of the service. The former itineraries of container companies having the port of Split on its service included Gioia Tauro container port as a hub port and Taranto container terminal on its regular services, which were based on the demand for services and former market constellations (figure 6.1.).


**Figure 6.1. Itineraries calling the port of Split in the past**

Source: Luka d.d. Split

Based on the analysis of statistical data, primarily number of port calls and container volumes (TEUs loaded, unloaded and in transit) on the container traffic flow between Italian – Croatian ports in the period 2014 – 2017 it can be concluded the existence of limited demand and trade between port Split and all the destinations in Italy, which can be indicated as negligible, in the comparison with other main import and export destinations from and to the port of Split. The cargo terminal in the port of Split should strive to modernize the road and rail transport infrastructure to increase competitiveness. The essential segment in the increase of throughput of the port Split is revitalization of the "Unska" railroad, which would, based on the expert assessment method, become an opportunity to expand the market in northern Croatian regions, Posavina and Slavonia, rest of Bosnia and Herzegovina as well as the new market in Serbia, more accurately in the autonomous province of Vojvodina. Also, with Unska railroad the port would strengthen the quality of intermodal services by investment in the road, rail and port cargo terminal capacities.

## 6.3. GENERAL DATA ON TRADE FLOWS BETWEEN ITALY AND CROATIA

In order to assess potential traffic flow through the Port of Split in the further text will be shown some general figures about trade between Croatia and Italy, including cross border traffic statistics.

### 6.3.1. Cross border traffic of the Republic of Croatia

Total arrivals of passengers in the cross-border traffic in the Republic of Croatia in 2017 amounted to 83.5 million and departures around 83 million. Trend is positive in general, but maritime traffic has negative trend (table 6.2). In 2017, there were 17.4 million tourist arrivals and 86.2 million tourist nights. In 2017, as compared to 2016, arrivals were increased by 13% and nights by 11%. Concerning the structure of total tourist arrivals, the share of foreign tourist arrivals in 2017 was 89% and of domestic ones 11%. The largest number of tourist in 2017 were from Germany (2.6 mill./overnights 19.5 mill.) while from Italy amounted to 1.1 million arrivals (with overnights 4,9 mill.). For comparison purposes, in 1980 number of overnight stays for tourists from Italy were 2.1 million, and 1990 5,4 million. The County of Istria generated the largest number of tourist nights in 2017, as much as 25 million nights, which was 29% of overall realized nights. On the other side, County of Split-Dalmatia realized 19% of tourist nights.

Road cross-border traffic of passenger motor vehicle is shown in table 6.3. In 2017, arrivals of passenger road motor vehicles in road cross-border traffic were 25.4 million (37% were related to Croatian-Slovenian border), departures 25.3 million (35.9 related to Croatian-Slovenian border). For the last seven years trend is slightly increasing, without significant oscillation (table 6.4).

## Table. 6.2. Cross–border traffic of passengers ('000)

| | Entry | | | | | | | | Exit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 2010. | 2011. | 2012. | 2013. | 2014. | 2015. | 2016. | 2017. | 2010. | 2011. | 2012. | 2013. | 2014. | 2015. | 2016. | 2017. |
| **Total traffic** | 71089 | 70615 | 66283 | 68242 | 73112 | 79648 | 81631 | 83475 | 69999 | 69540 | 65626 | 68008 | 72448 | 78698 | 81422 | 83027 |
| Domestic passengers | 22311 | 20947 | 19506 | 20221 | 22370 | 24220 | 24476 | 24929 | 22525 | 21246 | 20064 | 20746 | 22434 | 24299 | 24771 | 24684 |
| Foreign passengers | 48778 | 49668 | 46777 | 48021 | 50742 | 55427 | 57155 | 58546 | 47474 | 48294 | 45562 | 47262 | 50014 | 54400 | 56650 | 58344 |
| Road traffic | 66743 | 66040 | 61667 | 63522 | 68495 | 74812 | 76295 | 77748 | 65682 | 64986 | 60965 | 63258 | 67817 | 73901 | 76056 | 77252 |
| Domestic passengers | 21675 | 20269 | 18862 | 19680 | 21846 | 23691 | 23944 | 24259 | 21908 | 20587 | 19399 | 20216 | 21961 | 23804 | 24256 | 24016 |
| Foreign passengers | 45068 | 45770 | 42805 | 43842 | 46649 | 51121 | 52350 | 53489 | 43774 | 44399 | 41565 | 43042 | 45855 | 50097 | 51799 | 53236 |
| Railway traffic | 670 | 653 | 578 | 434 | 392 | 339 | 375 | 282,94 | 641 | 626 | 593 | 419 | 369 | 315 | 359 | 261,46 |
| Domestic passengers | 237 | 239 | 217 | 139 | 111 | 76 | 76 | 54,461 | 226 | 227 | 231 | 139 | 111 | 75 | 75 | 52,794 |
| Foreign passengers | 433 | 414 | 361 | 295 | 281 | 263 | 300 | 228,48 | 415 | 399 | 363 | 280 | 259 | 240 | 284 | 208,66 |
| Maritime traffic | 1513 | 1574 | 1524 | 1596 | 1356 | 1389 | 1441 | 1257,6 | 1490 | 1550 | 1516 | 1586 | 1330 | 1335 | 1413 | 1219 |
| Domestic passengers | 28 | 26 | 26 | 24 | 20 | 19 | 20 | 16,758 | 30 | 28 | 30 | 25 | 21 | 21 | 26 | 18,438 |
| Foreign passengers | 1485 | 1548 | 1498 | 1572 | 1336 | 1370 | 1421 | 1240,8 | 1460 | 1522 | 1487 | 1561 | 1309 | 1315 | 1387 | 1200,6 |
| Inland waterway traffic | 19 | 24 | 27 | 27 | 33 | 32 | 31 | 33,428 | 19 | 23 | 28 | 27 | 34 | 31 | 31 | 33,009 |
| Domestic passengers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Foreign passengers | 19 | 24 | 27 | 27 | 33 | 32 | 31 | 33,403 | 19 | 23 | 28 | 27 | 34 | 31 | 31 | 32,945 |
| Air traffic | 2144 | 2325 | 2487 | 2663 | 2835 | 3075 | 3489 | 4153,4 | 2167 | 2356 | 2523 | 2717 | 2898 | 3115 | 3563 | 4261,5 |
| Domestic passengers | 371 | 412 | 401 | 378 | 393 | 435 | 436 | 598,64 | 361 | 404 | 404 | 365 | 341 | 399 | 414 | 596,22 |
| Foreign passengers | 1773 | 1912 | 2086 | 2285 | 2442 | 2641 | 3053 | 3554,7 | 1806 | 1951 | 2120 | 2352 | 2557 | 2717 | 3149 | 3665,2 |

Source: Croatian Bureau of Statistics, 2017

## Table 6.3. Road cross-border traffic of passenger motor vehicle

| | Entry | | | | | | | | Exit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 2010. | 2011. | 2012. | 2013. | 2014. | 2015. | 2016. | 2017. | 2010. | 2011. | 2012. | 2013. | 2014. | 2015. | 2016. | 2017. |
| Vehicle's registration | | | | | | | | | | | | | | | | |
| **Passenger vehicles, total** | 21 759 | 21 587 | 20 603 | 21 053 | 21 938 | 23 112 | 24 333 | 25 414 | 21 598 | 21 394 | 20 577 | 20 978 | 21 780 | 23 051 | 24 445 | 25 256 |
| Domestic | 7 511 | 7 163 | 6 908 | 7 118 | 7 545 | 7 720 | 8 054 | 8 539 | 7 653 | 7 324 | 7 129 | 7 293 | 7 593 | 7 735 | 8 128 | 8 407 |
| Foreign | 14 248 | 14 424 | 13 695 | 13 935 | 14 394 | 15 392 | 16 279 | 16 875 | 13 945 | 14 070 | 13 447 | 13 685 | 14 187 | 15 316 | 16 318 | 16 850 |
| Passenger cars | 21 486 | 21 314 | 20 338 | 20 775 | 21 641 | 22 810 | 24 037 | 25 088 | 21 327 | 21 123 | 20 307 | 20 691 | 21 486 | 22 751 | 24 142 | 24 928 |
| Domestic | 7 430 | 7 087 | 6 836 | 7 039 | 7 457 | 7 634 | 7 971 | 8 446 | 7 571 | 7 248 | 7 055 | 7 213 | 7 508 | 7 648 | 8 043 | 8 314 |
| Foreign | 14 056 | 14 228 | 13 503 | 13 736 | 14 183 | 15 176 | 16 066 | 16 642 | 13 756 | 13 874 | 13 252 | 13 478 | 13 978 | 15 103 | 16 098 | 16 614 |
| Coaches | 273 | 272 | 265 | 278 | 298 | 301 | 296 | 326 | 271 | 272 | 270 | 287 | 294 | 300 | 304 | 328 |
| Domestic | 81 | 76 | 73 | 79 | 87 | 86 | 83 | 93 | 82 | 76 | 74 | 80 | 85 | 86 | 84 | 92 |
| Foreign | 192 | 196 | 192 | 199 | 210 | 216 | 214 | 233 | 189 | 196 | 195 | 207 | 208 | 213 | 220 | 235 |

Source: Croatian Bureau of Statistics, 2017

## Table 6.4 Road cross-border traffic, by direction

| | | Entry | | Exit | |
|---|---|---|---|---|---|
| | 000 | Passenger vehicles | Passengers | Passenger vehicles | Passengers |
| **2017.** | **Total** | **25 414** | **77 748** | **25 256** | **77 252** |
| 2017. | Across Croatian-Slovenian border | 9 520 | 40 174 | 9 070 | 40 886 |
| 2017. | Across Croatian-Hungarian border | 357 | 3 653 | 355 | 3 684 |
| 2017. | Across Croatian-Bosnian and Herzegovinian border | 953 | 26 094 | 963 | 24 869 |
| 2017. | Across Croatian-Serbian border | 12 241 | 6 575 | 12 506 | 6 580 |
| 2017. | Across Croatian-Montenegrin border | 2 343 | 1 252 | 2 363 | 1 233 |
| | | | | | |
| **2016.** | **Total** | **24 333** | **76 295** | **24 445** | **76 056** |
| 2016. | Across Croatian-Slovenian border | 12 174 | 39 921 | 12 366 | 40 195 |
| 2016. | Across Croatian-Hungarian border | 882 | 3 200 | 874 | 3 213 |
| 2016. | Across Croatian-Bosnian and Herzegovinian border | 8 689 | 24 733 | 8 622 | 24 464 |
| 2016. | Across Croatian-Serbian border | 2 260 | 7 124 | 2 249 | 6 890 |
| 2016. | Across Croatian-Montenegrin border | 328 | 1 317 | 335 | 1 294 |
| | | | | | |
| **2015.** | **Total** | **23 112** | **74 812** | **23 051** | **73 901** |
| 2015. | Across Croatian-Slovenian border | 11 538 | 38 436 | 11 695 | 38 471 |
| 2015. | Across Croatian-Hungarian border | 819 | 3 044 | 785 | 2 940 |
| 2015. | Across Croatian-Bosnian and Herzegovinian border | 8 356 | 25 372 | 8 167 | 24 714 |
| 2015. | Across Croatian-Serbian border | 2 087 | 6 737 | 2 088 | 6 542 |
| 2015. | Across Croatian-Montenegrin border | 312 | 1 224 | 317 | 1 234 |
| | | | | | |
| **2014.** | **Total** | **21 938** | **68 495** | **21 780** | **67 817** |
| 2014. | Across Croatian-Slovenian border | 10 797 | 34 364 | 10 842 | 34 320 |
| 2014. | Across Croatian-Hungarian border | 707 | 2 460 | 724 | 2 501 |
| 2014. | Across Croatian-Bosnian and Herzegovinian border | 8 125 | 23 930 | 7 900 | 23 277 |
| 2014. | Across Croatian-Serbian border | 2 020 | 6 454 | 2 028 | 6 494 |
| 2014. | Across Croatian-Montenegrin border | 289 | 1 287 | 286 | 1 224 |
| | | | | | |
| **2013.** | **Total** | **21 053** | **63 522** | **20 978** | **63 258** |
| 2013. | Across Croatian-Slovenian border | 10 235 | 32 108 | 10 297 | 32 448 |
| 2013. | Across Croatian-Hungarian border | 694 | 2 279 | 685 | 2 264 |
| 2013. | Across Croatian-Bosnian and Herzegovinian border | 7 945 | 21 829 | 7 863 | 21 736 |
| 2013. | Across Croatian-Serbian border | 1 868 | 5 875 | 1 850 | 5 568 |
| 2013. | Across Croatian-Montenegrin border | 311 | 1 431 | 284 | 1 243 |
| | | | | | |
| **2012.** | **Total** | **20 603** | **61 667** | **20 577** | **60 965** |
| 2012. | Across Croatian-Slovenian border | 9 909 | 31 809 | 9 891 | 31 707 |
| 2012. | Across Croatian-Hungarian border | 708 | 2 157 | 736 | 2 243 |
| 2012. | Across Croatian-Bosnian and Herzegovinian border | 7 985 | 21 234 | 8 048 | 21 296 |
| 2012. | Across Croatian-Serbian border | 1 758 | 5 351 | 1 682 | 4 777 |
| 2012. | Across Croatian-Montenegrin border | 243 | 1 116 | 219 | 942 |
| | | | | | |
| **2011.** | **Total** | **21 587** | **66 040** | **21 394** | **64 986** |
| 2011. | Across Croatian-Slovenian border | 10 115 | 32 416 | 10 064 | 32 192 |
| 2011. | Across Croatian-Hungarian border | 724 | 2 456 | 754 | 2 554 |
| 2011. | Across Croatian-Bosnian and Herzegovinian border | 8 561 | 24 092 | 8 516 | 23 852 |
| 2011. | Across Croatian-Serbian border | 1 853 | 5 757 | 1 744 | 5 250 |
| 2011. | Across Croatian-Montenegrin border | 334 | 1 319 | 316 | 1 139 |
| | | | | | |
| **2010.** | **Total** | **21 759** | **66 743** | **21 598** | **65 682** |
| 2010. | Across Croatian-Slovenian border | 9 594 | 30 821 | 9 591 | 30 513 |
| 2010. | Across Croatian-Hungarian border | 728 | 2 159 | 782 | 2 324 |
| 2010. | Across Croatian-Bosnian and Herzegovinian border | 9 310 | 26 964 | 9 146 | 26 440 |
| 2010. | Across Croatian-Serbian border | 1 847 | 5 724 | 1 817 | 5 447 |
| 2010. | Across Croatian-Montenegrin border | 280 | 1 075 | 262 | 958 |

Source: Croatian Bureau of Statistics, 2017

Considering the current passenger and vehicle traffic statistics, the global markets as well as the planned investments in road and rail infrastructure, the changes in the structure of traffic or change in volume are not expected.

Table 6.5 shows transport of goods and the accompanying ton-kilometers in Croatia. Ton kilometers performed in road transport of goods with Italy from 2012 until 2015 were around 500 million tkm. The trade of goods via road transport with Italy in 2011 was 895,000 t while in 2015 amounted to 1,410,000 t (1.754 mil. t in 2017 and around 900 mil. tkm, see table 6.10). Table 6.6 shows goods transported in intermodal transport units in Croatian railway transport and table 6.7 seawater and coastal transport of passenger and goods in Croatia by type of transport.

**Table 6.5. Transport of goods and tonne-kilometers**

| | Railway transport | | Road transport | | Transport via pipelines | | Seawater and coastal transport | | Inland waterway transport | | Air transport | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Goods carried '000 t | Tonne-km mln | Goods carried '000 t | Tonne-km mln | Oil and gas trans-ported '000 t | Tonne-km mln | Goods carried '000 t | Tonne-km mln | Goods carried '000 t | Tonne-km mln | Goods carried '000 t | Tonne-km mln |
| 2011 | 11 794 | 2 438 | 74 645 | 8 926 | 7 772 | 1 477 | 30 348 | 155 437 | 5 184 | 692 | 3 | 2 |
| 2012 | 11 088 | 2 332 | 65 439 | 8 649 | 6 878 | 1 216 | 25 636 | 125 678 | 5 934 | 772 | 4 | 3 |
| 2013 | 10 661 | 2 086 | 67 500 | 9 133 | 7 617 | 1 485 | 24 744 | 127 283 | 5 823 | 771 | 3 | 2 |
| 2014 | 10 389 | 2 119 | 66 146 | 9 381 | 6 918 | 1 447 | 20 335 | 107 709 | 5 377 | 716 | 3 | 2 |
| 2015 | 9 939 | 2 183 | 66 491 | 10 439 | 8 162 | 1 740 | 21 376 | 122 223 | 6 642 | 879 | 3 | 2 |
| 2016 | 9 985 | 2 160 | 72 503 | 11 337 | 8 970 | 1 921 | 20 951 | 113 103 | 6 409 | 836 | 3 | 2 |
| 2017 | 12 178 | 2 592 | 72 329 | 11 833 | 10 193 | 2 111 | 19 579 | 108 193 | 6 221 | 813 | 2 | 2 |

Source: Statistical report, 2016, 2018.

**Table 6.6. Goods transported in intermodal transport units in railway transport**

| 2011 | 2012 | 2013 | 2014 | 2015 | 2017 | Type of transport | Type of transport unit |
|---|---|---|---|---|---|---|---|
| Tonnes | | | | | | | |
| 18 191 | 36 676 | 41 179 | 122 892 | 138 502 | NA | National | Containers and swap bodies |
| 162 363 | 138 419 | 137 938 | 100 936 | 125 975 | NA | International-unloading | Containers and swap bodies |
| 191 683 | 174 341 | 186 431 | 179 046 | 228 877 | NA | International-loading | Containers and swap bodies |
| 242 748 | 123 097 | 139 420 | 116 851 | 19 833 | 416 973 | Transit | Containers and swap bodies |

Source: Statistical report, 2016, 2018.

**Table 6.7. Seawater and coastal transport of passenger and goods by type of transport**

| 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | |
|---|---|---|---|---|---|---|---|
| 19 926 | 12 474 | 12 770 | 13 029 | 13 082 | 13 525 | 14 315 | Passengers-total, '000 |
| 302 | 239 | 190 | 221 | 168 | 166 | 204 | Out of total in international transport |
| 315 | 325 | 331 | 335 | 337 | 352 | 379 | Passenger-miles, mln |
| 31 | 33 | 21 | 25 | 19 | 19 | 23 | Out of total in international transport |
| 30 348 | 25 636 | 24 744 | 20 335 | 21 376 | 20 951 | 19 579 | Goods-total, '000 tonnes |
| 29 571 | 24 860 | 24 021 | 19 629 | 20 635 | 20 245 | 18 880 | Out of total in international transport |
| 83 929 | 67 861 | 68 727 | 58 158 | 65 995 | 61 070 | 58 420 | Tonne-miles, mln |
| 83 812 | 67 741 | 68 613 | 58 048 | 65 878 | 60 956 | 58 307 | Out of total in international transport |

Source: Statistical report, 2016, 2018.

The perspective of Republic of Croatia for higher more inclusive economic growth in the following years remains uncertain. The low economical potential and relatively large poverty rates demand the strong reform agenda, but these reforms are slowly implemented. Consequently, the largest impact on the change in overall transport in Croatia could be expected by the external influences in the global economy and market.

### 6.3.2. Transports of goods and passengers between Croatia and Italy

According to the data of Croatian Bureau of Statistics, the overall foreign trade in goods with Italy, related to the import and export, increased in 2017 and amounted to around 4,7 billion €.

Both export and import were increased related to the previous year in value of traded goods category, export by 13.6% and import by 13%, regarding the slight decrease of export in tonnage category. The import and export between Croatia and Italy for period 2013-2017 is shown in table 6.8.

The data of the annual publication of Statistical Yearbook of the Republic of Croatia in 2018 indicated Italy as the second most important trade partner of Croatia in 2017 behind Germany at the first place. It should be noted that the export of Croatia towards Italy is the highest among all partner countries.

**Table 6.8. Export and import between Croatia and Italy for period 2013 - 2017**

| | 2013. | | 2014. | | 2015. | | 2016. | | 2017. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Exp. | Imp. | Exp. | Imp. | Exp. | Imp. | Exp. | Imp. | Exp. | Imp. |
| Italy (in thousand €) | 1,395,213 | 2,167,059 | 1,439,375 | 2,446,823 | 1,542,993 | 2,430,403 | 1,685,275 | 2,486,988 | 1,914,751 | 2,811,864 |
| Italy (in tons) | 3,663,682 | 1,870,024 | 3,796,264 | 1,867,346 | 3,490,967 | 1,772,294 | 4,217,721. | 1,830,347 | 3,841,037 | 2,161,257 |

Source: CBS, 2018

As the ports are traffic nodes of all transport modes, for the purpose of the macroeconomic perspective of trade between Croatia and Italy is important to determine the current maritime, road and rail trade flows including the transport of freight and passengers between the partner countries.

There are no relevant data on international railway transport of passengers between Croatia and Italy, so in this part of the analysis only railway transport of goods is presented. The international railway transport of goods between Croatia and Italy in the segment of freight loading and unloading is presented in table 6.9.

**Table 6.9. International railway transports of goods between Croatia and Italy (loading and unloading) for period 2013-2017 (in thousand tons)**

| | 2013. | | 2014. | | 2015. | | 2016. | | 2017. | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Country** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** |
| Italy | 3 | 371 | 1 | 302 | 10 | 310 | Not published | Not published | Not published | 325 |

Source: CBS, 2018

Only 325,000 tons of cargo was unloaded in Italy form Croatia in 2017, while the data of cargo loaded in Italy was left unknown, primarily as for the most recent data has not yet been published.

Road transport of goods and passengers between Croatia and Italy is shown in table 6.10. It should be noted the absence of official statistics for international road passenger transport data, so only road traffic of trade between Croatia and Italy by the amount of cargo loaded and unloaded is presented.

**Table 6.10. International road transport of goods between Croatia and Italy (loading and unloading) for period 2013-2017**

| | 2013. | | 2014. | | 2015. | | 2016. | | 2017. | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Country** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** | **Loaded** | **Unloaded** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Italy (in thousand tons) | 815 | 915 | 997 | 1,135 | 1,043 | 1,410 | 1,157 | 1,820 | 975 | 1,754 |
| Italy (in million of ton / km) | 412 | 451 | 519 | 573 | 528 | 662 | 603 | 901 | 559 | 874 |

Source: CBS, 2018

The total loaded and unloaded road transport of goods between Croatia and Italy slightly decreased in 2017, when comparing it with 2016, and amounted to 2.7 million tons, where 975 thousand tons were loaded and 1,754 thousand tons unloaded. The amount of road transport transported between countries confirms the domination of the use of this specific transport mode.

Maritime transport indicators of trade between Croatia and Italy are analysed according to the movement of overall number of international traffic of passengers and goods transported. The international traffic of passengers in seaports (passengers embarked and disembarked) in period 2013-2017 is shown in table 6.11.

**Table 6.11. Number of passengers embarked and disembarked in international traffic of passengers in seaports between Croatia and Italy in the period 2013-2017**

| **Country of embarkation / disembarkation** | **2013.** | **2014.** | **2015.** | **2016.** | **2017.** |
|---|---|---|---|---|---|
| **Italy** | | | | | |
| – Departed from Croatian ports | 238,505 | 267,435 | 234,187 | 240,594 | 246,707 |
| – Arrived in Croatian ports | 1,323,694 | 1,177,471 | 1,153,507 | 1,240,713 | 1,079,280 |
| **OVERALL** | 1,562,199 | 1,444,906 | 1,387,694 | 1,481,307 | 1,325,987 |

Source: CBS, 2018

According to the official statistics, there has been a decrease of 10.5% in the overall movement of passengers in seaports between Croatia and Italy in 2017. The number of passengers departed from Croatian ports towards Italy recorded an increase of 2.5%, when compared to the year 2016, and in 2017 amounted to 246,707, while the category of passengers arrived in Croatian ports form Italy noted a decrease of 13% and amounted to 1,079, 280 passengers.

In contrast to the decrease of number of passengers transported in seaports between Croatia and Italy, the overall trade of freight between Croatian and Italian seaports noted an increase of 2% and in 2017 amounted to slightly above 3 million tons. The overall international traffic of freight by traffic realized between seaports of Republic of Croatia and Italy is presented in table 6.12.

**Table 6.12. Total international traffic of freight between seaports of Croatia and Italy**

| | 2013. | 2014. | 2015. | 2016. | 2017. |
|---|---|---|---|---|---|
| **Trade of Croatia with Italy** (total traffic in tons) | 3,108,034 | 3,620,152 | 2,635,437 | 2,992,114 | 3,053,173 |

Source: CBS, 2018

For the purpose of this research it is also important to define the starting and final destinations of the transit cargo transhipped (loaded and unloaded) in Croatian ports having Italy as the country of loading and unloading, to determine the current trade flows and demand for services and attractiveness of Croatian ports on the trade flows to or from Italy. In this way, the overall market supply demands on the trade flows between the two countries with the level of utilization of Croatian traffic route are defined. The data on total loaded and unloaded goods in transit with transhipment in Croatian seaports where Italy was the country of loading or

unloading by the country of departure or destination in 2016 and 2017 is shown in table 6.13 and table 6.14.

**Table 6.13. Total loaded goods in transit with transhipment in Croatian seaports with Italy as the country of unloading by the country of departure in 2016 and 2017**

| Country of unloading | Year | Overall (tons) | Country of departure | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | BIH | COL | HUN | POL | MNE | EGY | CHI | KOR | FYROM | SRB |
| ITALY | 2017. | 76,143 | 9,499 | 62,544 | 3,325 | 775 | / | / | / | / | / | / |
| | 2016. | 126,386 | 85,711 | / | 30,400 | / | 21 | 153 | 29 | 57 | 2,383 | 7,632 |

Source: CBS, 2018

**Table 6.14. Total unloaded goods in transit with transhipment in Croatian seaports with Italy as the country of loading by the country of destination in 2016 and 2017**

| Country of loading | Year | Overall (tons) | Country of destination | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | BIH | OMAN | CHI | MNE | FYROM | SRB |
| ITALY | 2017. | 33,215 | 25,809 | 26 | 7,380 | / | / | / |
| | 2016. | 12,162 | 11,594 | / | / | 449 | 7 | 112 |

Source: CBS, 2018

The total loaded goods in transit with transhipment in Croatian seaports and unloaded in Italy suffered a 39.8% of decrease in 2017 related to the previous year, where the departure countries were Colombia, Hungary, Bosnia and Herzegovina and Poland ranked according to the amount of freight transhipped in Croatian ports. However, the total unloaded goods in transit with transhipment in Croatian seaports and loaded in Italy recorded a drastically increase of 173.1% in 2017 in relation to year 2016, and amounted to 33,215. The main destination of this

transit cargo was predominately Bosnia and Herzegovina having more than 95% of share of the total freight transhipped in Croatian ports.

The insufficient growth of trade exchange between Croatia and Italy can be noticed from the available data, as well as the disparity between the overall range of import and export. Also, there is a market need for the use of Croatian ports as the transit points on the trade flows from and to Italy.

# 7. POTENTIAL UNDESIRABLE EFFECTS AND POINTS OF CONGESTION

The location of the port of Split is an area where the three modes of transport are encountered, road, rail and maritime. As the passenger terminal of the port of Split is located in the city center, the port is limited with available space for expansion and potential investments. Furthermore, the rail and bus terminals are also situated in the port area which creates congestion especially in the high season periods. If we indicate the existence of the two-way traffic passing through the port area the creation of the points of congestion and traffic jams on the access roads to the port should not be unexpected.

With the rising passenger and vehicle turnover in the city port basin, tourist flow from cruise vessels and smaller crafts for tourism purposes, like sailing ships and small cruise vessels, there is a rising need for unburdening the port area. The Split port authority is currently considering the possibility of transferring the domestic and international vehicle transport from the city port basin to the cargo port in the dislocated northern area of Stinice. The project foresees the reconstruction and construction of new port infrastructure on the Split port area, mainly the investment in construction of berths for Ro-Ro vessels on the district of Stinice, intended both for rising national and international transport of vehicles. With the potential project implementation, there would be a significant change in the structure and density of maritime traffic for the northern basins of the port of Split, Kaštela and Vranjic-Solin basins. Transferring the part of the RO-RO maritime traffic from the city port basin to northern dislocated cargo terminal would increase traffic on the access roads to the North Port, while in the structure of the maritime traffic, RO-RO vessels with the occasional arrival of the largest passenger ships would prevail. The projects outcomes predict the increase in number of port calls in the Vranjic-

Solin basin, which result with 8 times more of annual vessel traffic than the current situation. Also, the expansion of Sv. Petar pier and quay of Knez Domagoj are needed to increase capacity of the city port basin, where the modernized pier with five ramps for embarkation and disembarkation of vehicles are predicted for construction. Greater manipulation area will also reduce congestion of cars and time required for boarding the ferries.

Another important project to enable the proper and effective port development in the city center is the displacement of bus and rail terminal from the city center to area of Kopilica in the northern part of the city. The master plan of shifting these two terminals is being prepared at the moment. Complementary to this project, there is intention of establishing suburban railway connection from Split airport terminal trough the potential future railway terminal to the port improving the intermodal connection by offering value added services to users. These two projects would lead to unburdening the access roads to and from the passenger port terminal in the city basin due to reduced pressure from increasing transport of trucks and buses. The access roads to the port, Kralja Zvonimira Street which continues through quay of Knez Domagoj and Zagrebačka Street are two-way narrow roads where the congestion occurs. The same problem is on the exit roads from port, a one-way narrow road Katalinićev Prilaz which continues to Jadranska Street or the return voyage through quay of Knez Domagoj towards Kralja Zvonimira Street and Zagrebačka Street (figure 7.1.). These access roads have limited throughput.


**Figure 7.1. City port basin access roads**

Source: Google Maps, 2018 - modified

Bedsides the unburdening the city center from congestion and traffic, these two project incentives would enable the construction and accommodation of terminal building near newly

built berths for cruise vessels, having the final aim of increase in reputation and improvement of services of the port of Split as a port for cruise vessels.

The congestion areas in the cargo terminal on the northern side of port Split mainly occur as for poor condition and throughput of road and rail infrastructure. The exit road from the cargo terminal has no direct connection to the A1 highway what creates difficulties in efficient transfer of cargo from the terminal creating traffic stoppages. There are also restrictions in tunnel heights on the Split-Dugopolje road, a connection to A1 highway, which complicates the transport of high value cargo, a special cargo type, making the port uncompetitive in comparison with other nearby ports. Also, the capacity on the state road section is considerably below the traffic needs, in particular on the section of the state road D8 Trogir – Split – Omiš. The railway is burdened with continuous problems of maintenance and delays. Without the modernization and investment in rail infrastructure, the cargo port in incapable of achieving competitiveness in the region. It is manifested trough uncertainty in on time delivery of goods and cargo which proportionally leads to increase in the total cost of transport. One of the fundamental obstacles in the further development of the Split cargo terminal are the technical limitations in acceptance and manipulation of cargo. With the potential reconstruction of "Unska" railroad and its electrification, considering the estimated traffic on the mentioned railroad of yearly 4 million tons of cargo and 1,5 million passengers in the past periods, the part of that cargo would be redirected to port of Split and would affirm the potential and the need in infrastructural development of the cargo port area.

# 8. CONCLUSION

The favorable geostrategic location of the port of Split as its comparative advantage, primarily enabled the passenger transport development in all forms, positioning the port as a leader in the Adriatic, which in this report, was substantiated with port traffic statistics and overview of overall results in the specific period. The passenger transport along with transport of vehicles were mainly intended for markets situated on central Dalmatian islands and other coastal regions, while also performing regular international ferry passenger service with Italy, in Ancona. The cruise traffic indicators should also not to be neglected, as it affected the overall port traffic but also with promotion of the port and Split agglomeration. On the other hand, the freight transport indicators are unstable, showing moderate increase, and depend on the market elements of supply and demand, where the markets are mainly situated in the port hinterland of Split-Dalmatia county and northwest Bosnia and Herzegovina. However, besides the favorable location and acceptable connection with other transport modes, the state of access roads and rail infrastructure as one of the indicators of further port development is unsatisfactorily, having limited capacity and throughput, where the points of congestion mainly occur. Therefore, the investments in infrastructure are needed to maintain competitiveness in both passenger and cargo transport in Adriatic and Mediterranean, as indicated in the Transport Development Strategy of the Republic of Croatia (2017 - 2030). Investments in infrastructure would eliminate and reduce the pressure form existing and due to the expected growth potentially new points of congestion in port area and accompanying traffic infrastructure.

The analysis of the existing traffic flows between Italian and Croatian ports, with port of Split in the focal point, elaborated the ferry and container traffic flows where the results indicated important international ferry passenger traffic trade flow between Split and Ancona showing steady increase of passenger and vehicle volumes in several years. The analysis also showed

negligible container traffic volumes between port of Split and other Italian ports, which were minimal and mainly depended on the regular feeder container service in Adriatic and rotation between ports. Therefore, the projections of future traffic flows between Italian and Croatian ports, having the port of Split as the starting or final destination, depend on the demand for services and actual transport needs. Also, the historical traffic flows between port of Split and Italian ports were concisely presented in the research, were the passenger traffic possibilities were indicated as limited to Adriatic area, mainly as for the cost effectiveness and optimal distances between ports, while the container traffic activities depend on the demand for cargo volumes which in the past had been calling also the ports on the western coast of Italy, besides the existing ports on its eastern part. Port Authority Split, a non-profit legal person governing the port of Split, should examine the possibility of establishing the additional international ferry passenger traffic flows with Italy according to the market research and demand for services with additional value for the user. These additional services should not be limited only to conventional ferry transport but also to the HSC or catamaran services providing value for money to the users. With the investment in rail and road infrastructure, but also by modernizing the port infrastructure and superstructure the port of Split would strengthen the existing traffic flows and enable the greater cargo and container volumes on its operational docks.

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