



Analysis of Stay of Cruise Ships in the Port of Kotor

Nikola Konjević¹ 
Sava Popović² 

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Abstract: *The business mission of ports specialized in receiving cruise ships is the optimal use of capacity for the reception and dispatch of ships and tourists sailing on them while applying all safety, security and environmental standards. Hence, the aim is to maximize the number of ship and passenger arrivals, and their time spent in the port. Using the port of Kotor example, this paper presents the achieved results of this mission.*

The main goal of reviewing this topic is to determine the correlation between the size of a ship and the place of its stay in the port and to define tendencies regarding the length of its stay. The paper also seeks to affirm the position of Kotor as a recognized point on the itinerary of cruise ships sailing the Adriatic and the Mediterranean.

1. INTRODUCTION

The Port of Kotor is an Adriatic port, located at the extreme Southeastern part of the Bay of Kotor in Montenegro. The geographical position is determined by the coordinates: N 42° 25' 52.80" - E 018° 45' 49.34. The official UN/Locode of this port is MEKOT. The position of the port concerning the environment makes it a natural shelter and very suitable for safe mooring and stay of ships and yachts. It is inextricably linked with the City of Kotor, which is located on the alluvium of the Skurda River that flows along its northern walls and the Gurdic spring that comes out along its southern walls. The slopes of Mount Lovcen with Saint John's Hill (260m) rise above it in the East, while the sea connects it with the world in the Southwest.

Data on the number of passengers, available in the Kotor Historical Archive, date back to 1925 (Konjević, 2003). "Back in 1952, 31,524 passengers passed through the port of Kotor, while that number increased to 64,988 in 1930. The period (1925–1930) is characterized by an increase in the number of passengers with a growth index greater than one hundred for all years, except in 1927. Monthly oscillations are noticeable, so July or August are the months with the highest passenger traffic, almost as a rule." (p.18).

The port of Kotor, as the main cruising port of Montenegro, has an important role not only in the development of this type of tourism but also in the tourism industry, dominantly in Kotor, the Bay of Kotor, and neighboring municipalities. As already emphasized above, its suitable geographical position, climatic and navigation conveniences, cultural and historical values, as well as the wealth and diversity of facilities in the hinterland, positioned Kotor as an important transit cruise port on the Eastern coast of the Adriatic. In this connection, the focus of interest of this paper is on the visiting ships with very popular itineraries for cruises on the Adriatic Sea and

¹ Faculty for Mediterranean Business Studies, Street Luke Tomanovica 1, 85330 Tivat, University Adriatik, 85000 Bar, Montenegro

² Faculty for Mediterranean Business Studies, Street Luke Tomanovica 1, 85330 Tivat, University Adriatik, 85000 Bar, Montenegro

the Mediterranean. These determinants indicate that the ships that visit the port of Kotor also represent the offer that the world's most famous shipping companies offer to tourists as tourist cruise packages in the Mediterranean.

At the same time, the business mission of ports specialized in the reception of cruise ships is the optimal use of capacity for the reception and dispatch of ships and tourists sailing on them, with the application of all safety, security and environmental standards. Therefore, the goal is to maximize the number of ship arrivals and passengers, and their time spent in the port. *This paper aims to determine and present the correlation between the size of a ship and the place of its stay in the port of Kotor, as well as to define the tendencies regarding the length of its stay.*

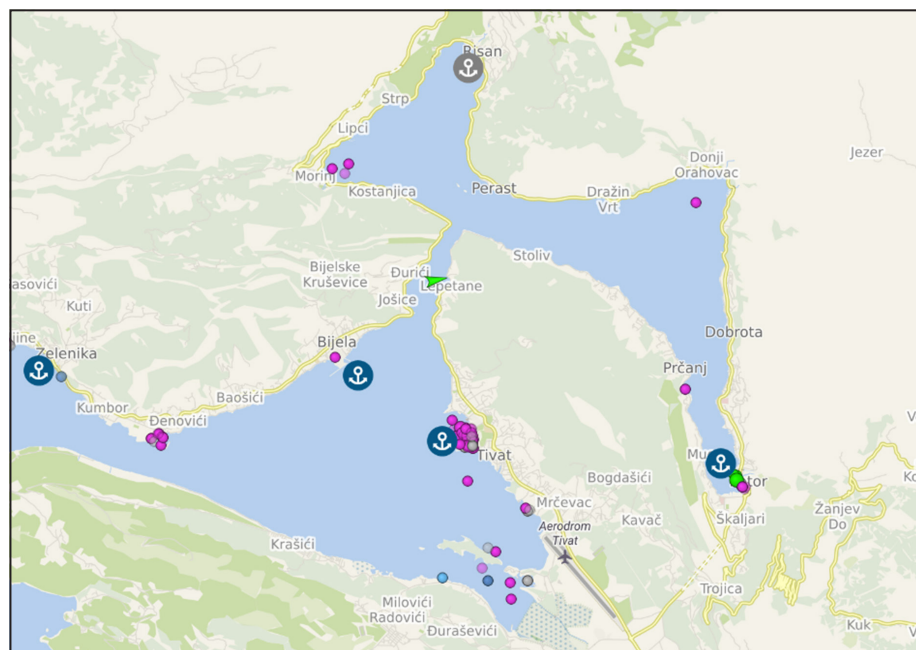


Figure 1. Location of the Port of Kotor

Source: VesselFinder, 2023

2. POTENTIAL, MANAGEMENT AND USE OF THE PORT OF KOTOR

The present-day form of the operational quay of the Port of Kotor was designed during its reconstruction carried out after the catastrophic earthquake that struck the Montenegrin coast in 1979. According to official data of the "Port of Kotor JSC" (2023) "the port operational quay managed by the Port of Kotor is 665 m long, including 512 m in the Western part, and 153 m facing the Skurda River. The operational quay can be functionally divided into 5 berths, namely:

- **Waterfront I**, an approximately 150 m long berth. The operational quay on this berth is equipped with 11 bollards.
- **Waterfront II**, an approximately 100 m long berth. Along this operational quay, there is only a 6-9 m wide narrow strip that can be used by ships.
- **Waterfront III**, approximately 250 m long, covers the Southern part of the waterfront.
- **River I** is an approximately 80 m long berth on the Northern part towards the Skurda River.
- **River II** is an approximately 70 m long berth."

In cruise ports, especially in the port of Kotor, anchorages are also important for the reception of passengers. The legislation of Montenegro that regulates ports stipulates: "An anchorage

of a port is a regulated and marked part of the sea intended for maneuvering and anchoring of ships" (Law on Ports, 51/08, Article 4, Item 14). Later Amendments to the Law (Law on Amendments to the Law on Ports, 2013) amended the term in such a way that the words "...and other vessels" were added after the introductory part of the previous definition "port anchorage ... intended", which extended the use of anchorage to other vessels.

Based on the conducted research, the following determinants related to the anchorages of the port of Kotor are noted: "... anchorages at the locations of Dobrota - opposite the Maritime Faculty, Kamenarovici bay and Orahovac bay" ("Port of Kotor" JSC, 2018). Two anchorages are also precisely specified in the document "Plan for the reception and control of the port area for the accommodation of foreign vessels and their crews during the COVID-19 pandemic in 2020" ("Port of Kotor" JSC, 2020), which specifies the location of the zone for self-isolation of a foreign vessel and its crew within the "Port of Kotor JSC" concession area. There are four segments. Two of them are located on the operational quay, while segments 3 and 4 (specified as the areas of restricted access) are at anchorages: "Anchorage No. 2, Kamenarovici bay". The position of this anchorage is used as a quarantine site for large vessels 110-330 meters long. Anchorage No. 3 "Orahovac". The position of this anchorage is used as a quarantine site for large vessels 110-330 meters long" (p.3).

The table below (Table 1) listing the main characteristics of the port's anchorage was drawn up after reviewing all available relevant literature and the Report of the Pilot Office of the Port of Kotor. This numbering will be used in the analyses that follow in this paper.

Table 1. Characteristics of the Kotor Port anchorage

Number of Anchorages	Name	Location	Recommended Anchoring Position
1.	Dobrota I	Dobrota	$\varphi = 42^{\circ} 25,87''N$ $\lambda = 018^{\circ} 46,06''E$
2.	Kamenarovici bay	Dobrota	$\varphi = 42^{\circ} 27,27''N$ $\lambda = 018^{\circ} 45,83''E$
3.	Orahovac bay	Ljuta	$\varphi = 42^{\circ} 28,59''N$ $\lambda = 018^{\circ} 45,22''E$

Source: Own processing

The Study prepared by UNEP/MAP-PAP/RAC and the Ministry of Ecology, Spatial Planning and Urbanism of Montenegro within the framework of the "GEF Adriatic" project, with the support of the Global Environment Fund (UNEP/MAP-PAP/RAC & MEPPU, 2021) mentions two points of anchorage for cruise ships in the Bay of Kotor: "The anchorage in front of the port of Kotor with a radius of 312 m (diameter 624 m) with depths of approximately 20 m is a protected shallow anchorage. It does not meet the anchoring criteria for ships of the size of the reference ship. The anchorage can be used for dynamic positioning and a combination of anchoring and direct dynamic positioning..." (p. 18). Anchorage Ljuta is a protected anchorage of medium depth with a radius of 0.7 m, depths of approximately 35 m and a proper bottom for anchoring. It meets the anchoring criteria for ships of the size of the reference ship. The distance from this anchorage to the pier in the port of Kotor is approximately 2.5 m. (p. 18).

The port of Kotor use, indicated in the current planning document: *Special Purpose Plan for the Coastal Area* (Ministry of Sustainable Development of Montenegro, 2015), as well as for peripheral port areas in the State Location Studies "Sector 15" and "Sector 16", is shown in Figure 2.

Therefore, the port of Kotor, as a port open to international maritime traffic and a port of national interest, is predominantly oriented to providing services to cruise ships and yachts. The constructed facilities and moorings, as well as the planned land and water area for the future VIP marina, are available for this purpose.

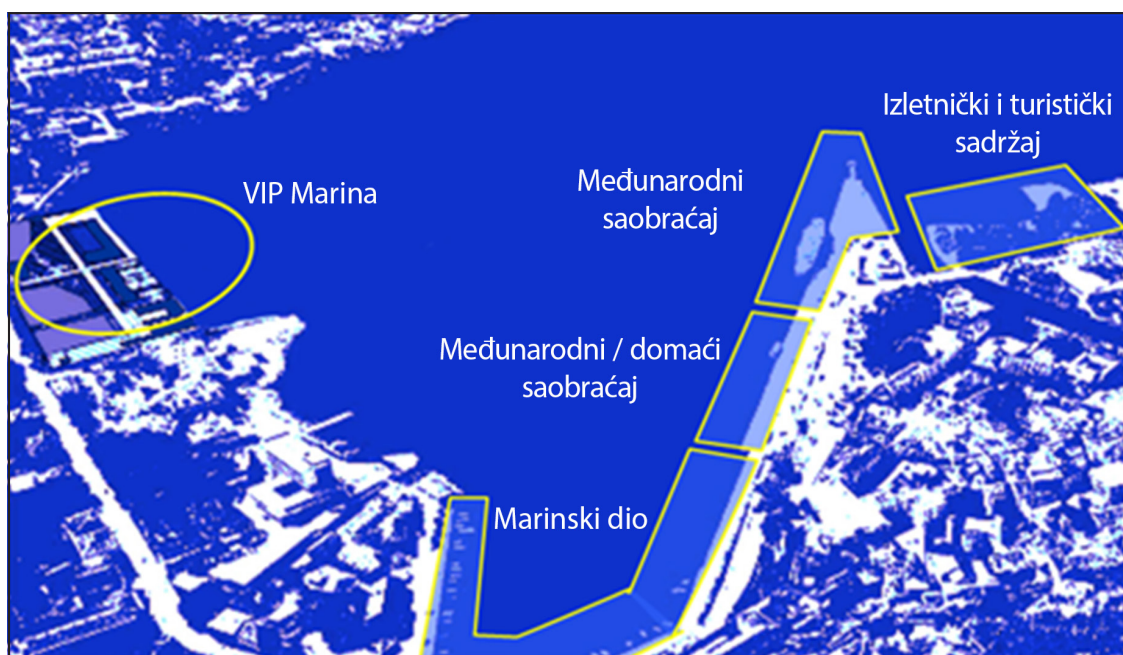


Figure 2. Port of Kotor facilities

Source: Ministry of Sustainable Development of Montenegro, 2015, p. 84

The port capacity is expressed as the number of ships that the port can receive daily: 3 ships/day (one up to 30,000 GRT; one up to 5,000 GRT, one ferry up to 3,500 GRT); 43 yachts/day (9 mega yachts; 20 yachts of 8-24m; 14 yachts on pontoon mooring) and 50 moorings for the local population (boats) (Ministry of Sustainable Development of Montenegro, 2015, p. 83).

The port management is observed in the period after the acquisition of the sovereignty of Montenegro when the preparation and adoption of the previously forgotten special **Law on Ports 51/08** was initiated as an institutional framework regulating the organization, management, development and ownership transformation of ports. In other words, it regulates the legal status, division of ports, management, compensation, concession, port order, inspection control and other issues of importance for the ports in Montenegro. The government has decided to limit its role to administrative, regulatory and development matters, and accordingly to create prerequisites for the full privatization of operational or commercial activities. Therefore, the current position on the management of ports of Montenegro is arranged in such a way that ports of national importance are managed by the administrative body responsible for ports, while ports of local importance are managed by the legal entity that manages maritime resources.

According to the **Decision on Designation of Ports According to Significance**, which the Government of Montenegro adopted on 17 March 2011 (Decision number: 03-2529), the ports of national interest include the Commercial Port of Bar, Nautical Tourism Port - Marina Bar, Commercial Port of Kotor, Shipyard Port of Bijela, and Fishing Port of Njivice (Article 2). Port of Budva, Port of Tivat - Porto Montenegro, Port of Tivat – Kalimanj, Port of Risan, Port of Zelenika and Port of Herceg Novi - City Port Skver are regarded as ports of local importance. Decisions of the competent state authorities made changes in the status of ports and titles of port managers for the ports of national importance.

The stay of ships in the Port of Kotor is organized through the Company “Port of Kotor JSC“ (“Luka Kotor” AD), which was registered for the provision of services in international maritime

traffic, following the Company Law, on 13 September 2002. For this reason, it is considered necessary to point out the changes in the institutional and legal form of the entity involved in the use and management of the port in recent history.

- "Port of Kotor" is a successor to the Labour Organization "Port of Kotor", which was founded on 12 July 1988 by the Decision of the Kotor Municipality Assembly, to manage the port of Kotor and other ports on the territory of the Municipality, including the associated coastal zone. Later amendments to the legislation caused the Company's name to be changed to Social Enterprise, which was organized as the Public Enterprise "Port of Kotor" by the Decision of the Municipal Assembly on 27 January 1992. The existing Joint Stock Company "Port of Kotor" - Kotor was registered in accordance with the Company Law on 13 September 2002.
- The field of activity in which the Company provided services was also changed following the competences related to the coastal zone management. Thus, the use and management of the Labour Organization and Social Enterprise "Port of Kotor", and the Public Enterprise "Port of Kotor" was assigned to the Public Enterprise for Coastal Zone Management following the Decision on the Coastal Zone of the Municipality of Kotor (the entire area that was under the jurisdiction of the Municipality) pursuant to the Coastal Zone Management Law of 1992. Later, in changed global and economic circumstances, the Agreement was amended by an annex concluded with the Public Enterprise for Coastal Zone Management of Montenegro, Budva. Immediately before the expiry of the term of validity of the mentioned Agreement, in order to maintain the continuity of the substantial and legal position of the user-operator of the Port of Kotor, the Government of Montenegro passed the Conclusion dated 14 May 2015 by which the area of the Port of Kotor was ceded for economic use in the full scope of application as in the mentioned Agreement on the Coastal Zone Use.
- The adoption of the above-mentioned Law on Ports introduced the starting principle according to which port land and infrastructure were state property, while long-term concessions give the right to use them to companies that own the superstructure and provide port services. In this way, the essential determination of the state to limit its role to administrative, regulatory and development tasks is defined (essentially a "landlord" model). In accordance with the new legal solution, at their 104th meeting held on 27 December 2018, the Government of Montenegro passed the Decision awarding the priority concession to the "Port of Kotor" JSC Kotor and accepted the Agreement on the priority concession for the economic use of the commercial port of Kotor. Accordingly, this Joint Stock Company is the concessionaire for the commercial use of the Commercial Port of Kotor for 12 years.

The thematic section below includes information obtained regarding the parameters related to the stay of ships in the port of Kotor and their technical and operational characteristics.

3. ANALYSIS OF THE STAY OF SHIPS IN THE PORT OF KOTOR (2014–2018)

The section above noted that cruise ships could use two berths and three anchorages during their stay in the port of Kotor. The data on the arrival of ships and passengers over a longer period were published earlier (Konjević, 2021, p. 113-118), including an overview of tourist visits during the COVID-19 pandemic. "The year after, in 2021, MV La Belle de l'Adriatique was the first ship to enter the port after its closure to traffic. In addition, in June, Kotor was visited by three other ships with a total of 487 tourists on board. At the end of the year, there was a total of 64 cruise ships with 9,139 passengers" (Konjević et al., 2023, p. 223). The data on the monthly frequency of ship arrivals for the period 2014-2018 are summarized below, and classified into

six categories (Table 2). The first, second, third, fourth, fifth and sixth categories include ships with LOA up to 100 m, 100-150 m, 150-200 m, 200-250 m, 250-300 m, and 300-350 meters in length, respectively. This system of categorizing ships by length was applied as relevant due to the fact that records are kept according to these criteria in the port of Kotor, which was used to create the table below.

Analyzing the data on the number of ships that visited the port starting in 2014, the following conclusions are drawn:

- The ships that visited the Port of Kotor were dominantly those classified in the fifth category (250-300 m), or 35.17 % in total cumulatively. On average, 181 ships of this length visited the port each year, that is, 27.90% on the five-year monthly level. The month of September is the most interesting for these ships (141 ships), while these ships have not visited Kotor in February. The ships from this category include: "MSC Musica"; "Rhapsody of the Seas"; "Norwegian Star". During 2018, the mentioned ships had 30, 24 and 20 calls, respectively, in the port of Kotor.
- The first category ships, up to 100 m LOA, with 562 total calls, take the second place. This means that an average of 112 of them came each year. Those are represented by "Athena", "To Callisto", "Crystal Esprit" and "Artemis", with 26, 17, 12 and 11 calls, respectively, during the last analyzed year.
- The second category of ships, 100-150 meters in length, occupy the third place in terms of the number of calls. The number of their calls is the highest in September (110), while in February even ships of this category did not visit Kotor. The world's largest sailing ship "Wind Surf", and the ships "Azamara Quest" and "Pacific Princess" represent this category.
- The fewest calls are made by mega cruisers, which visit the port most often from April to September. In 2018, the port of Kotor was visited by "Celebrity Eclipse".

Table 2. Monthly frequency of ship arrivals in the Port of Kotor (2014-2018)

Month/ Period	LOA / Category						Total
	2014-2018						
	1	2	3	4	5	6	
January	21	2	0	0	1	0	24
February	34	0	0	0	0	0	34
March	31	7	1	9	3	0	51
April	28	17	5	24	52	3	129
May	51	55	34	46	116	8	310
June	68	76	36	40	125	6	351
July	75	80	24	38	139	8	364
August	76	85	32	41	131	12	377
September	71	110	49	43	141	9	423
October	48	55	42	52	123	5	325
November	26	2	19	24	59	2	132
December	33	2	0	1	14	0	50
Total:	562	491	242	318	904	53	2570

Source: Own processing of data obtained from the "Port of Kotor JSC"

The average length of ships visiting the port is 182.07 m (Table 3). As can be seen from the table below, it is correlated with the previously presented data regarding the number of ship arrivals by category.

Table 3. Average values of ships for the period 2014-2020

Year	Average Value		
	Ship length	Period of Stay	Number of Passengers
2014	165.96 m	12h 27min	873
2015	187.9 m	12h 52min	1072
2016	187.79 m	13h 02min	1095
2017	194.58 m	11h 15min	1236
2018	189.6 m	12h 43min	1193
Average	182.07	12.47	1046.33

Source: Own processing of data obtained from the "Port of Kotor JSC"

Table 4. The main characteristics of ships that dominantly stayed in the port of Kotor in the period 2014-2018

God.	Ship	Characteristics	
2014	 Artemis	Gross Tonnage: 1206 t NRT: 377 t Length: 58,8 m Beam: 11 m Height: 16 m Draft: 3 m Speed: 9.8 kn / 13.6 kn Avg/Max	Flag: Malta IMO number: 9398010 Cruiseline: Overseas Adventure Travel Pax: 50 Crew: 21 Number of cabins: 26
2015	 CL Athena	Gross Tonnage: 1206 t NRT: 374 t Length: 60 m Beam: 10 m Height: 16 m, Draft: 5 m, Speed: 9.6 kn / 13.5 kn	Flag: Malta IMO number: 9398008 Cruiseline: Overseas Adventure Travel Pax: 50 Crew: 21 Number of cabins: 26
2016	 Costa Mediterranea	Gross Tonnage: 85619t NRT: 53 437 t Length: 292,2 m Beam: 32,2 m Height: 50 m Draft: 8 m Speed: 14.6 kn / 24.1 kn	Flag: Bahamas IMO number: 9237345 Cruiseline: Costa Cruises Pax: 2680 Crew: 912 Number of cabins: 1057
2017	 MSC Armonia	Gross Tonnage: 65542t NRT: 41 628 t Length: 275 m Beam: 32 m Height: 54 m Draft: 6,7 m Speed: 14.0 kn / 22.6 kn	Flag: Panama IMO number: 9210141 Cruiseline: MSC Cruises Pax: 2340 Crew: 721 Number of cabins: 975
2018	 MSC Musica	Gross Tonnage: 92409t NRT: 64 360 t, Length: 293,83 m Height: 32,31 m Beam: 59,64 m Draft: 7,85 m Speed: 15.0 kn / 22.8 kn	Flag: Panama IMO number: 9320087 Cruiseline: MSC Cruises Pax: 2550 Crew: 987 Number of cabins: 1275

Source: Own processing of data obtained from:
Overseas Adventure Travel, n.d.; Costa Cruises S.p.A., n.d.; MSC, n.d.

In the reporting period, the largest average length of ships was recorded in 2018, while the lowest value was recorded at the beginning of the observed period. Ships in the port of Kotor are docked for less than 13 hours on average, with 1046 passengers per ship.

The first part of this paper analysed the capacity of the port to receive cruise ships and their passengers, in particular emphasizing technical characteristics of the operational quay and port anchorages. The stay of ships in the port was previously reviewed emphasizing the dependence of their size and the available port capacity. Table 4 includes a systematized overview of the technical characteristics of the dominant ships and their other important features

4. CONCLUSION

The Port of Kotor is successfully building its position as the main cruise port of Montenegro, as well as one of the leading transit ports in the Adriatic Sea. This is also confirmed by the fact that the MedCruise Association in its MedCruise Statistics 2022, in the chapter Mayor Ports per MedCruise Region, ranked Kotor as the first Adriatic port based on the total cruise calls and transit cruise passenger movement. At the same time, based on the results achieved in Kotor, Montenegro was ranked seventh out of a total of 22 Mediterranean countries. It is important to emphasize that the current concessionaire of the port of Kotor is the "Port of Kotor" JSC assumed the obligation to install mooring buoys at the site of Plagenti, Dobrota, in order to ensure a better quality stay of ships in the port and to increase the level of safety of moorings of ships up to 350 m long. In order to significantly improve safety and security for large ships on the berth, especially in difficult weather conditions, the construction and installation of a dolphin pylon is also planned.

It has been proven that world-famous cruise companies bring tourists to Kotor and that some of them, such as "MSC Cruises" and "Costa Cruises", are dominant in terms of the number of calls in certain years. Ships belonging to the fifth category 250-300 meters long with a capacity of approximately 2,500 tourists are the most frequent visitors to the port, and that is in September. Small ships up to 100 meters long, with approximately 50 cruise passengers, come second in terms of the frequency of calls in the port. Tourists who use the itineraries of these ships predominantly come to Kotor in September. The fewest calls are made by mega cruisers, which visit Kotor mostly in August. The average time a ship stays in the port of Kotor, more than 12 hours and 40 minutes, is good for transit ports.

Certainly, the planning of the daily - optimal number of ships and passengers that come to Montenegro via the port of Kotor and visit primarily Kotor has to be based on the concept of sustainable development of cruise tourism.

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