

† VEDRAN JELAVIĆ, Ph.D.
 MILOŠ BRAJOVIĆ, B.Sc.
 E-mail: milos.brajovic@unidu.hr
 IVICA ĐURĐEVIĆ-TOMAŠ, B.Sc.
 E-mail: ivica.durdevic@unidu.hr
 University of Dubrovnik, Department of Maritime Affairs
 Čira Carića 4, HR-20000 Dubrovnik, Republic of Croatia

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ANALYSES OF STATE AND DENSITY OF TRAFFIC IN THE PORT OF DUBROVNIK - GRUŽ

ABSTRACT

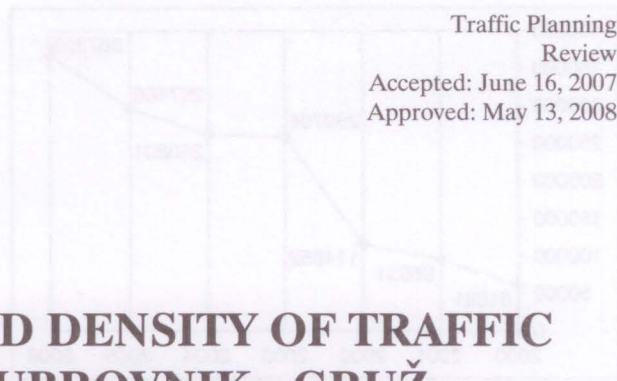
Port of Gruž is located in a naturally protected bay which can accommodate the biggest passenger cruisers and RO-RO ships that sail the Mediterranean. At the same time there are more yachts, visiting the port because of the vicinity of the Dubrovnik historic sites. The frequency of maritime traffic and other maritime services is rapidly increasing and sometimes causing overload in the summer months. The sizes of all kinds of ships and yachts that manoeuvre in the port are getting bigger. The itinerary for the following seasons and prognoses till 2010 stress the increase in the number of ships, vehicles and passengers. The activities at the passenger terminal are in progress at the moment and after completing all the works the passenger pier will be about 800m long with the depth of 12m. Handling of cruisers will therefore be much easier and more efficient. Another benefit for the bay will be the construction of the Yacht marina and marina for the local boats all along the south-west coast of the bay. Considering summer peaks in all kinds of traffic it is necessary to analyse the state of all relevant traffic factors and the density of traffic in order to organise safe and smooth flow of ships, vehicles and passengers through the port of Dubrovnik - Gruž.

KEY WORDS

Port of Gruž, cruisers, yachts, passengers, vehicles, traffic safety

1. INTRODUCTION

The Port of Gruž is located in a naturally protected bay which is opened to the north-west and closed to the south-east. The length of the bay is about 1600m with maximal width of 440m and the deepest point of about 29m. The bay is not exposed to high swells and gusts thus providing excellent shelter for all kind of ships. Secure anchorage and docking but also vicinity of the old city of Dubrovnik caused real boom of all kinds of maritime traffic in the last few years in the Port of Gruž. Hundreds thousands of passengers, hundreds of giant cruisers, thousands of yachts invade the port mostly in the summer months. Although the bay



of Gruž does not seem to be very big, a lot of different activities take place on the sea and around the coastal facilities in the port. In summer when the port is heavily loaded there may be found passenger cruisers, ferry boats, tourist boats, yachts and local boats (Figure 1) varying in sizes and types.

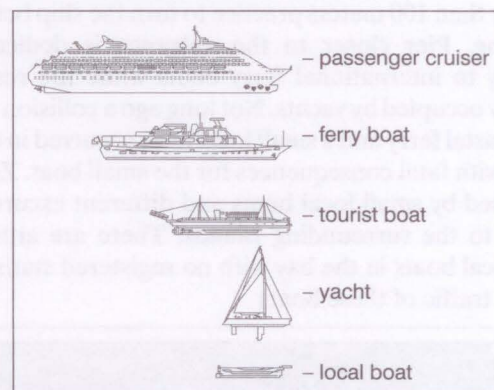


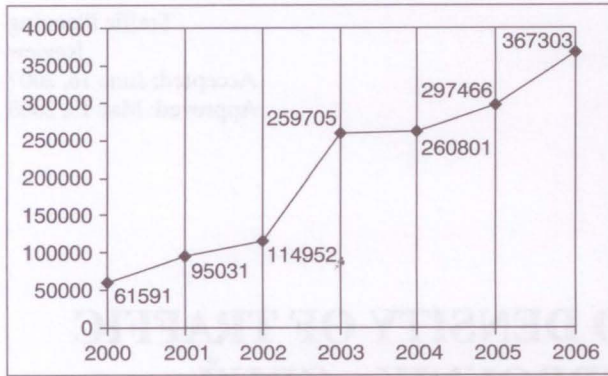
Figure 1 - Typical ships and boats in the Port of Gruž

Because of the very intensive maritime traffic through the port and relatively small manoeuvring area organisation of traffic and arrangement of port facilities need serious analysis. Very often all kinds of boats sail simultaneously in the restricted area of the bay and dangerously challenge the navigation safety.

2. PRESENT MARITIME TRAFFIC CONDITIONS IN THE PORT OF GRUŽ

In the last six years a real explosion occurred considering the increase of cruising passengers (Graph 1). The breakpoint happened in the year 2003 when the amount of passengers more than doubled compared to year 2002. An increasing trend is higher after 2003 than before that year.

There are 3 significant zones considering density and variety of sea traffic (Figure 2). It is remarkable



Graph 1 - Number of passengers in the port of Gruž in the years 2000-2006

that the size of ships which visit the bay is decreasing as the bay opens. Zone 1 is located at the beginning of the bay where all kinds of boats sail in and out. Within that zone the traffic load is the highest mainly because of big passenger cruisers that are allowed to dock only there. Zone 2 is less loaded but still big ferries interact with all other smaller boats. Within that zone ferries longer than 100 meters practice to turn the ship before docking. Pier closer to the entrance is dedicated mainly to international ferry boats while the rest is mostly occupied by yachts. Not long ago a collision of a big coastal ferry and a small local liner occurred in that zone with fatal consequences for the small boat. Zone 3 is used by small local boats and different excursion boats to the surrounding islands. There are around 300 local boats in the bay with no registered statistics about traffic of these boats

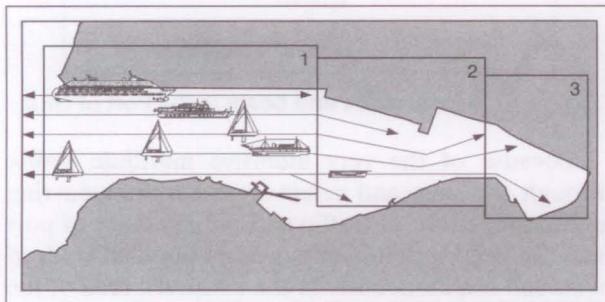
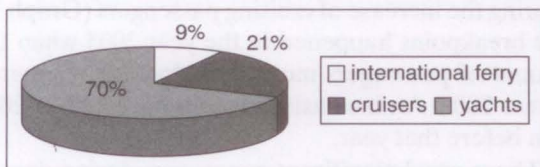


Figure 2 - Maritime traffic zones in the Port of Gruž

The arrivals and departures of international traffic in the year 2006 are presented in Graph 2.

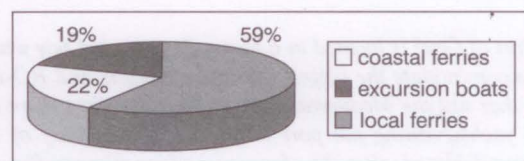
Most of the operations (70 %) are done by yachts while the lowest traffic rate (9%) is accounted for by international ferries calling in the port of Gruž from Italy. In 2006 the number of yacht operations reached



Graph 2 - Density of international traffic in 2006

2,648, cruisers operations reached 788 and international ferry operations reached the number of 347. Cruisers and ferries together account for only 30% of the port operations, and they provide most of the car and passenger traffic.

Graph 3 presents arrivals and departures of domestic traffic in the year 2006. Most of the operations go to coastal ferries which connect the Port of Gruž and other Dalmatian ports out of Dubrovnik-Neretva County and local ferries which operate within the county. Local ferries dominate with 5006 operations, followed by coastal ferries with 1888 and excursions with 1570 operations. Coastal ferries are the biggest carrying most of the passengers cars and goods. There is no valid statistics about the number of operations of local small boats.



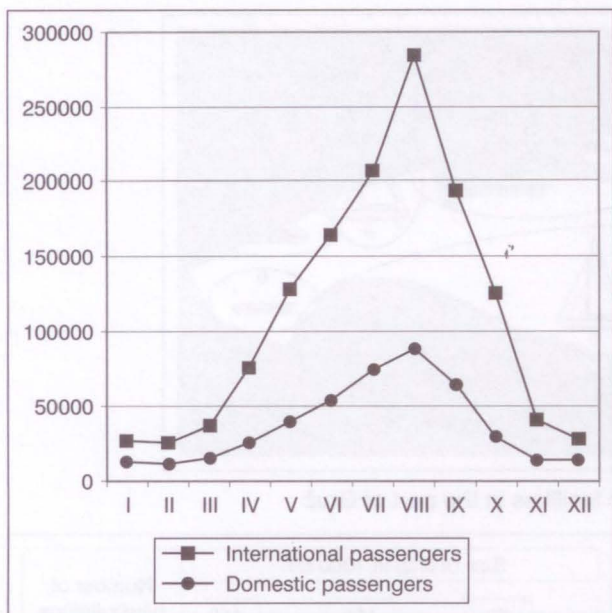
Graph 3 - Density of domestic traffic in 2006

International and domestic passenger traffic takes place throughout the year (Graph 4). It starts in January with just a few thousand passengers and then continuously increases till the month of August with the highest peak. After August the number of passengers rapidly decreases as the year comes to the end. The highest numbers of passengers occur in the summer months compared with the rest of the year. International traffic is higher than domestic traffic, especially in summer. At the beginning and at the end of the year the number of international passengers is not significantly higher than the number of domestic passengers.

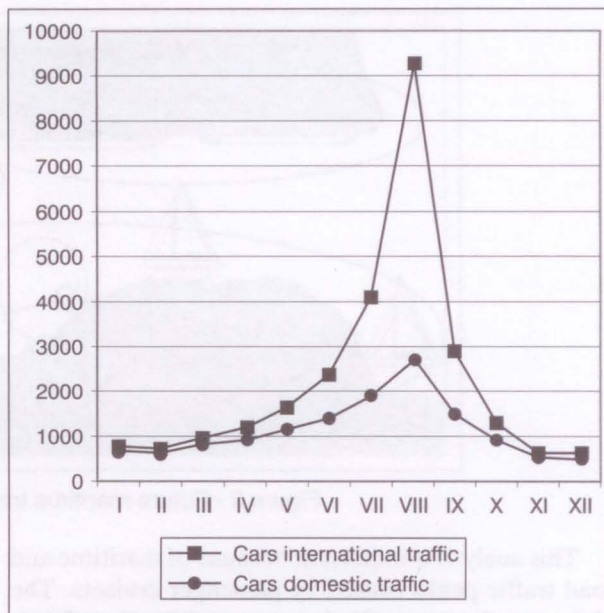
From January to March both international and domestic passengers are numbered in a few thousands. From April the difference in numbers is higher, culminating in August with 196,170 international passengers and 88,680 domestic passengers.

International and domestic car-ferry traffic through the months of 2006 is presented in Graph 5. The distribution of cars is similar to the distribution of passengers. The summer months are much heavier loaded than other periods of the year. Extreme peaks are experienced in August when 2,721 cars arrive with domestic lines and as many as 6,594 cars come to Gruž by international ferries. In winter months the international and domestic car traffic is almost equal.

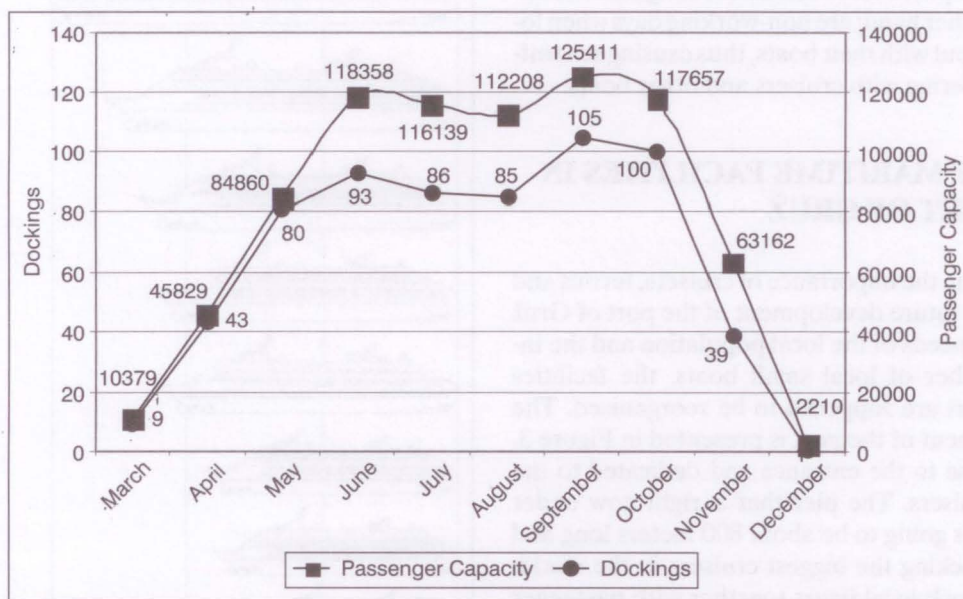
The only reliable prediction for the future time periods can be provided from the cruisers and ferry boats because they plan their time table at least one year ahead. With local boats and international yachts it is very difficult to manipulate with estimations because there are no advanced predictions about traffic of such boats.



Graph 4 - Number of international and domestic passengers in 2006

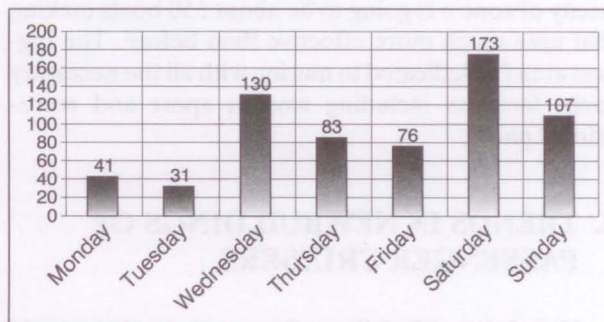


Graph 5 - Number of cars through international and domestic traffic in 2006



Graph 6 - Distribution of docking and passenger capacities in Dubrovnik per months of 2007

Graph 6 presents the number of cruisers and the number of passengers visiting Dubrovnik according to the received itineraries from all cruising companies. The majority of ships (74%) booked docking in the port of Gruž instead of anchoring near the old city of Dubrovnik. The number of dockings in Gruž often increases because every time the south wind blows all ships anchored close to the old city move to the port of Gruž. All the presented numbers are significantly higher than in the former years (2000-2006) proving continuous increase of cruising industry in Dubrovnik and Gruž.



Graph 7 - Distribution of dockings in the port of Gruž per days of week

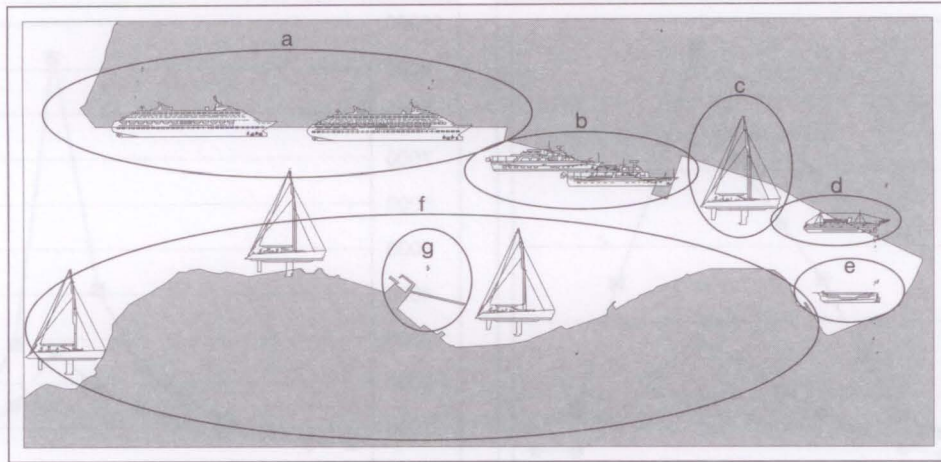


Figure 3 - Future maritime traffic facilities in the port of Gruž

This analysis is important because of maritime and road traffic peaks caused by passenger cruisers. The highest peaks are on Wednesdays and Sundays. Wednesdays must be seriously considered in road traffic because it is a workday when local cars together with buses from the port cause road traffic congestion. Sundays, on the other hand; are non-working days when local people go out with their boats, thus causing sea traffic jams interfering with cruisers and other boats.

3. FUTURE MARITIME FACILITIES IN THE PORT OF GRUŽ

Considering the importance of cruisers, ferries and yachts for the future development of the port of Gruž as well as the needs of the local population and the increasing number of local small boats, the facilities within the port are supposed to be reorganised. The new arrangement of the port is presented in Figure 3. Zone a is close to the entrance and dedicated to the passenger cruisers. The pier that is right now under construction is going to be about 800 meters long and capable of docking the biggest cruisers in the world. Zone b will dock local liners together with passenger and ro-ro ships. Zone c will accommodate yachts, zone d excursion boats and zone e local small boats. The capacity of zone e is going to be about 550 boats making that area much more effective than before. The biggest area f is dedicated to marina with all the necessary yacht facilities including smaller sport and recreational part g.

4. TRENDS IN NEWBUILDINGS OF PASSENGER CRUISERS

Trends in newbuildings of passenger cruisers could simply be described by one statement originally from the company «Royal Caribbean». It says: "The bigger it

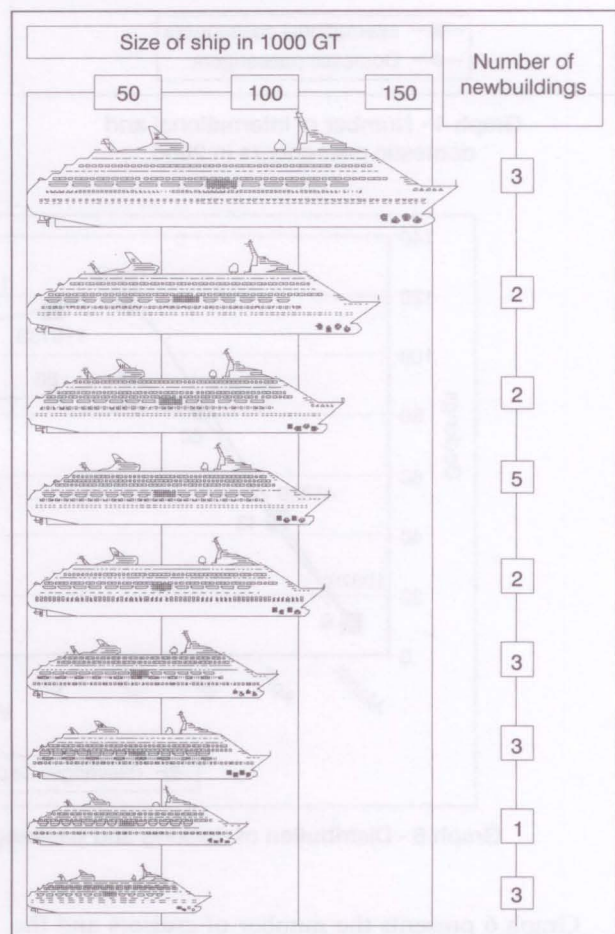


Figure 4 - Newbuildings of passenger cruisers till 2009 according to ISL Market Analysis from June 2005

is – the more cost effective it is". Obviously, most of the cruising companies are building huge ships that are often more than 300 meters long, carrying thousands of passengers and crew. According to *ISL Market Analysis* from June 2005, out of 24 new buildings planned till the year 2009 even 14 cruisers are bigger than 100,000 gross tons. Three of them are going to be the biggest cruisers in the world with more than 150,000 GT.

5. CONCLUSION

Following the strategy of sustainable development and meeting the needs of local population, the planners of maritime activities in the port of Gruž should carefully consider every traffic issue in order to provide safe and reliable flow of all ships and boats within the bay. Every year there is more traffic in the port and the ships are getting bigger and bigger. Cruisers docking in the port look like small towns while bigger yachts are dimensioned like ships. Therefore, it is mandatory to organise and co-ordinate all the participants that are conducting any kind of maritime traffic in the port. The following measures have to be implemented urgently in order to comply with the safety standards:

- organising special service to co-ordinate all the activities around and within the port;
- providing stand-by tugs for the biggest passenger cruisers;
- prohibiting manoeuvring of two cruisers at a time;
- implementing "VTS" control;
- providing continuous watch and co-ordination from small pilot boats.

Co-ordination of traffic must include everyone, from the little local boats to the big ships with equal attention and care for safety.

† **Dr. sc. VEDRAN JELAVIĆ**
MILOŠ BRAJOVIĆ, dipl. ing.
 E-mail: milos.brajovic@unidu.hr
IVICA ĐURĐEVIĆ-TOMAŠ, dipl. ing.
 E-mail: ivica.durdevic@unidu.hr
 Sveučilište u Dubrovniku, Pomorski odjel
 Ćira Carića 4, 20000 Dubrovnik, Republika Hrvatska

SAŽETAK

ANALIZA STANJA I GUSTOĆE POMORSKOG PROMETA U LUCI DUBROVNIK - GRUŽ

Luka Gruž prirodno je zaštićena luka koja može primiti najveće cruisere i RO-RO brodove koji prometuju Meditera-

nom. Istodobno, zbog atraktivnosti i blizine dubrovačke stare gradske jezgre luku posjećuje sve više jahti. Frekvencija svih plovila i broj usluga koje se pružaju u luci uvišestručila se i u ljetnim mjesecima dovodi do prenapučenosti i preopterećenja. Istodobno se povećava veličina svih plovila koja manevriraju i borave u skućenom akvatoriju. Najave pomorskoga prometa za sljedeće godine i prognoze do 2010. godine ističu povećanja uplovljavanja brodova, broja putnika i broja vozila. Za sezonu 2008. najavljen je završetak radova na obali predviđenoj za prihvat cruisera kojim se dobiva oko 800 m ravne obale s dubinom od oko 12 m uz znatno bolje mogućnosti prihvata. Također se planira izgradnja marine i lučice za privez lokalnih brodice kojima bi se uredila jugozapadna obala gruškoga zaljeva u cijeloj dužini. Uzimajući u obzir granična opterećenja prometa u koja su uključeni brodovi, vozila i putnici, za učinkovito orkestriranje svih sadržaja u luci Gruž potrebna je kvalitetna analiza stanja svih čimbenika u pomorskom prometu i sagledavanje gustoće prometa prema pojedinim zonama.

KLJUČNE RIJEČI

luka Gruž, cruiseri, jahte, putnici, vozila, sigurnost prometa

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