

Influence of Cruise Ship Size on Length of Stay in Port

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ABSTRACT: How long the cruise ship is staying in port? Does that value change during the year? Is the period linked to the number of passengers and the size of the ship? What influences overall period of the stay in port? These questions are just a sample of questions appeared before the research team which tried to establish rules of the Cruise ships seasonal pattern on the East Coast of the Adriatic Sea several questions appeared. Answers to cited questions are presented in this article, obtained by analysing the behaviour of cruise vessels in three biggest ports on the East Coast of the Adriatic Sea during the period of two years.

1 INTRODUCTION

In shipping industry, as well as in other industries, present and future trends are intensely focused on any aspect of pollution, especially on air pollution caused by exhaust gases. Although, ships during their voyage or stay in port create pollution, in present researches and analysis of pollution are increasingly determined to obtain certain patterns in this area [6, 9]. Such efforts are mainly driven by results of climate changes that cause necessity for mitigating the effects of climate changes [8].

When investigating the topic of pollution from cruise ships, factor of great importance is seasonality of their visits during entire year. Many papers focus their research on air pollution caused from cruise ships during their time spent in ports, where most common source of data used is from the MedCruise Association [1]. Only minority of the researches tried to determine and analyse seasonality pattern [5].

An attempt is undertaken to analyse the seasonal pattern for the east coast of Adriatic Sea, analysing cruise ships and their behaviour during two

consecutive years, analysing three largest ports in the area, Split, Dubrovnik and Kotor. Results are presented in the paper prepared by Stanivuk et al. [11] describing similarities and differences with the Mediterranean pattern, bringing several new conclusions and information, but leaving some of questions unanswered. This team continued the research in the same area in order to provide answers to those questions, looking in the seasonal pattern not only on the large scale, but dividing cruise vessels in smaller segments.

In order to determine actual duration of cruise ship stay in port and if there is any link to the ship size, data collected for two-year period are analysed, providing mean values integrated within diagrams. Since literature review reveals that for most port calls for cruise ships take place during summer period, mean value is used to exclude any proportions of extremely large or small values that can occur during other seasons. Also, in this analysis focus is on Eastern Adriatic Sea, which is mainly observed through its most dominant hosting ports: Dubrovnik, Kotor and Split.

For this analysis ship size is divided according to the vessel's overall length, the group is divided into three categories: less than 100 [m], between 100 [m] and 200 [m] and greater than 200 [m]. In addition to this, median value for each category is presented as a dotted line, so it represents more consistent value for complete period of the year. This is achieved due to the fact that median value is less affected by any proportions of extremely large or small values. Median value allows easier spotting of the extremes and easier overall pattern description.

Data analysed in this paper are provided by each Port Authority [4, 7, 10], where vessels that have less than 500 GT are not included in this analysis. Analysed data in this paper refer for the period of two years, which are presented in the form of median value for more comprehensive presentation on does the ship size have an influence on length of ship stay in port.

2 NUMBER OF PORT CALLS

This part of the research deals with analysis of port call pattern for the Eastern Adriatic Sea, with respect to the observed period of the year 2017 and 2018. Figure 1. and Figure 2 present number of cruise ship port calls in 2017 and 2018 with respect to the overall length of the ships included in this analysis. Ship sizes are divided as in previously described manner. From Figure 1 and 2 it can be noted that number of port calls vary according to the size of the vessel. Largest vessels visits are very frequent during summer while during three (four) winter months (December, January, February and partially November) those vessels are not calling into East Adriatic ports. Middle group, containing medium size cruise vessels has similar seasonal pattern behaviour, only their winter break includes two more months (March and April). Both of these groups show characteristic seasonal pattern, described in previous research [11]. Unlike the previous two groups, the third group containing small vessels, with the length less than 100 [m] almost does not show any seasonal pattern, seasonal increase of the port calls is very small, negligible when compared to the other two groups.

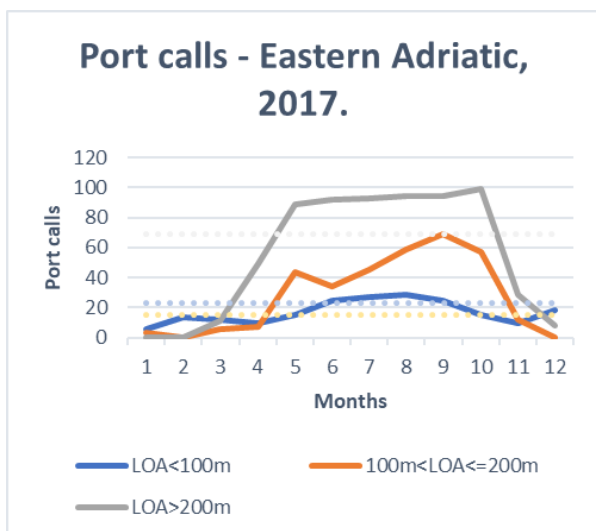


Figure 1. Cruise ship port calls for Eastern Adriatic, 2017.

During the summer, there are close to 100 monthly port calls of the vessels larger than 200 [m], about 50 of medium size vessels and less than 30 port calls of vessels smaller than 100 [m]. During the peak period, only about 10% of all cruise vessels calling to Eastern Adriatic ports are smaller than 100 [m].

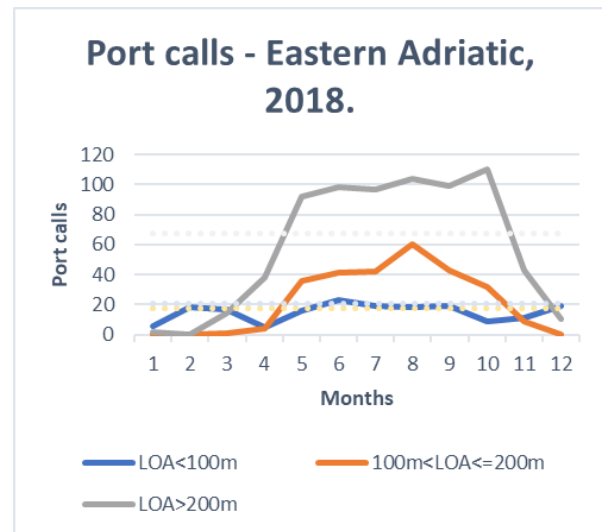


Figure 2. Cruise ship port calls for Eastern Adriatic, 2018.

Due to the cessation of arrivals of larger cruisers during the winter months, the percentage of arrivals of smaller cruisers during the winter months exceeds 90% (100% in the February).

3 CRUISE SHIPS STAY IN PORT

Stanivuk et al. [11] determined cruise ships average stay in port which is presented on the Figure 3.

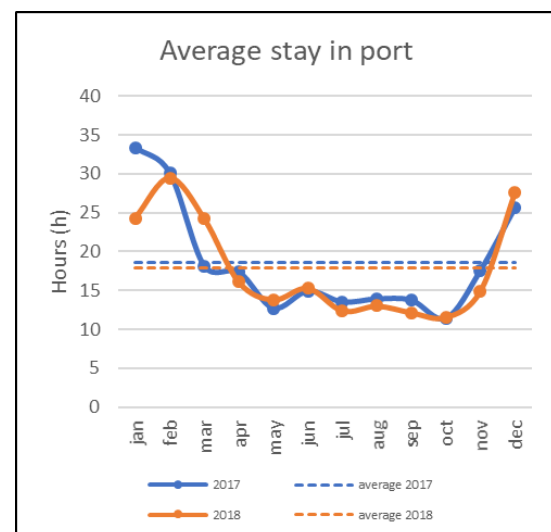


Figure 3. Eastern Adriatic coast Cruise ships average stay in port [11]

The presented diagram shows large decline of the stay during summer months, while during the winter that period is longer. Analysing average stay in port per previously described groups, the situation is different (Figure 4 and 5). Seasonal pattern, shown on the Figure 3 and described in the paper [11] cannot be identified when stay in port is divided into groups.

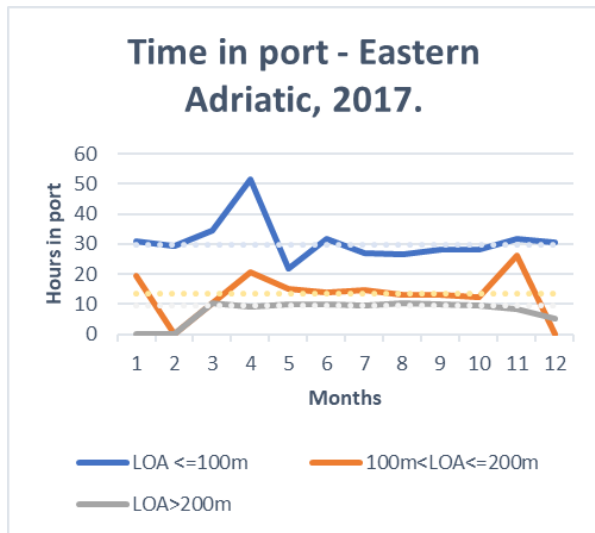


Figure 4. Cruise ships stay in port for Eastern Adriatic, 2017.

During the winter, smaller ships stay in port a little longer than in summer, about 20 hours longer which is attributed to worse weather during the winter months [2, 3]. Medium sized and large cruise vessels have almost constant stay in port, when there are ships from those groups in the port.

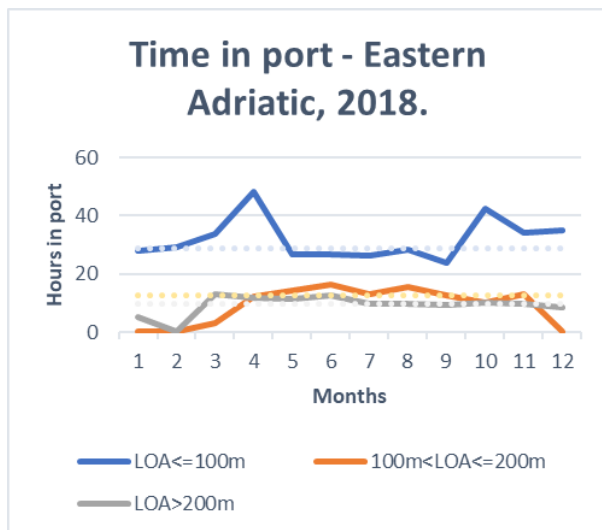


Figure 5. Cruise ships stay in port for Eastern Adriatic, 2018.

Inversely proportional correlation can be made between cruise ship size and length of stay in port, smaller vessels stay longer in the port while larger cruisers stay very short. It should be noted that this can only be concluded for Eastern Adriatic Sea, due to the fact that some worldwide cruise destinations are related with exclusively winter season. This fact can be supported with the assumption that some ships with length overall less than 100 [m] have navigation area restriction and cannot travel worldwide in order to visit attractive winter season cruise destinations.

4 CONCLUSION

Analysis in this paper was performed in order to determine duration of cruise ship stay in ports, as well as how that value changes and what influences that change. To achieve such comprehensive analysis port

authority's data were used so sample distribution of port calls and hours spent in port could be determined. Additionally, to provide more consistent sample distribution a two-year period is observed and mean value of each sample is introduced.

This study shows that during observed period significant changes in patterns occur from April to October, and vice versa. It can be concluded that cruise ship size does not correlate to the number of hours spent in ports, on the contrary ships with smaller size tend to have longer stay time in ports throughout whole year. Even though, cruise ships with larger size have more passenger capacity, hours spent in ports are lesser then on smaller capacity and size ships. Opposite pattern is noticed for port call point of view, meaning that cruise ships with greater size tend to make more port calls than ships with smaller size. Median values are used to exclude extremely small or high values that occur during winter time, i.e., period from October to April. This approach provides general values that can be used when investigating cruise ship patterns. From Figure representing average cruise ship stay in port, it can be concluded that it represents sum of wrong conclusions regarding ship stay in port. This means that it revealed in this paper that cruise ships do not stay significantly longer in port during winter, whereas this is caused by the absence of larger cruise ship port calls.

Such conclusions can be attributed to the weather conditions that are dominant in period from April to October and period from October to April. This could be directly related to cruise ship with smaller size, due to the fact that they are more affected by bad weather during winter season. In addition, it can be presumed that such ships have restricted navigation area which can contribute to development of presented pattern. However, larger cruise ships are less affected by seasonal condition during whole year and it is safe to say that are mostly equipped with no restrictions regarding navigation area. This leads to presumption that such ships tend to cruise in other seas during winter season. Future research will be directed on investigating other possible factors that can influence how long cruise ships stay in port and how does these values change in some winter season cruise destinations.

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