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Land Area Limitation of Durres Port Containers Terminal

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Keywords: *durres port, containers terminal, land area, terminal infrastructure, equipment.*

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Land Area Limitation of Durres Port Containers Terminal

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Abstract- A container terminal layout is usually based on various requirements for container storage and transfer. One of the most important factors that affect the performance and the output of a containers terminal is the available area of the terminal. Consequently we will discuss the potentials that Durres Port has in facing up the traffic increase in container handling as well as the limitations that exist in the land area that is available for the expansion of the terminal. There are a number of factors to be considered like port congestion, traffic management and safety aspects in the terminal. This paper after analyzing the increment of the containers traffic, gives an overall picture of various operations in Durres port containers terminal.

The aim of this paper is to analyze the situation, identify the shortages that the terminal has, and draw some conclusions. Since this port is very new in containers handling operations, and the container traffic forecast is optimistic, there are a number of issues to be addressed in order to make the Port of Durres an adequate port, able to handle the containerized cargo in the future, as well as to be a competitive port in the region.

Keywords: durres port, containers terminal, land area, terminal infrastructure, equipment.

I. Introduction

Port of Durres represents the main interface of the Albanian intermodal trade and serves as the gateway of Albania. Being just 40 km from the capital, Durres port has a very strategic position regarding the integrated European transport corridors, making cargoes and passengers move easily to the center of European continent.

The port actually serves 79% of Albanian imports and 88% of exports, or 85% of all seaborne cargo that go from/to Albania, goes through this port. Containers business is a new one for the port of Durres.

This port started to handle containers about e decade ago, when first boxes started to appear, and the first container stocks started to be built. Initially the port could handle just a few hundred of boxes. The handling of containers was not done with specialized containers equipment, but with conventional cranes, therefore the ships used to suffer unjustified delays and the port was not preferred from container shippers. This situation continued for first three years until the port realized that the container traffic had strong increasing tendencies. This appealed for more specialized equipment, and first reach stackers and spreaders were purchased. The port realized that the new equipment, changed the way the containers were handled, increasing efficiency, minimizing damages and increasing operations safety. Therefore, the port and the private container operator have undertaken several investments in order to improve the overall performance of the port. A number of containers handling equipment such as reach stackers with lifting capacity of 40 tons, forklifts, with lifting capacity of 35 tons, a considerable number of tractors and chassis for moving containers have been acquisitioned. Actually in addition to the existing mobile crane, the private operator has brought the second mobile containers crane with a capacity of 120 tons. The terminal is lacking a gantry crane, which for the existing wharf conditions seems impossible. Because of this, as well as the global trend on container business, the volume of the containers handled in this port/terminal, has been increasing significantly from year to year. Because of this continuous augmentation of the containers traffic, the terminal is reaching its handling and storage capacities because the land area of the terminal is limited.

II. Container's Terminal

Containers business is a new experience for Durres Port and it have a short history in handling them. Until 1996, only a very few 20 feet containers could be handled in this port due to the lack of proper infrastructure. The containers used to were handled through conventional loading/unloading gears and the operations were not safe. Actually Durres port Authority is managing the new containers terminal, which is capable of handling all types of containers from 10 – 45 ft. It started as a start up containers terminal, just to face the growing traffic. This terminal actually is being operated by a private operator, which is working under a concession contract. Container ships are being handled in wharfs 6 & 7, which have an overall length of 465ml and a backup area for storing containers of 60.000m^2. This area is being congested and the operator is frequently asking for contracting additional port spaces from other operators of the port. The following graph gives us an overall picture of the containers handled in this port during the last 10 years.

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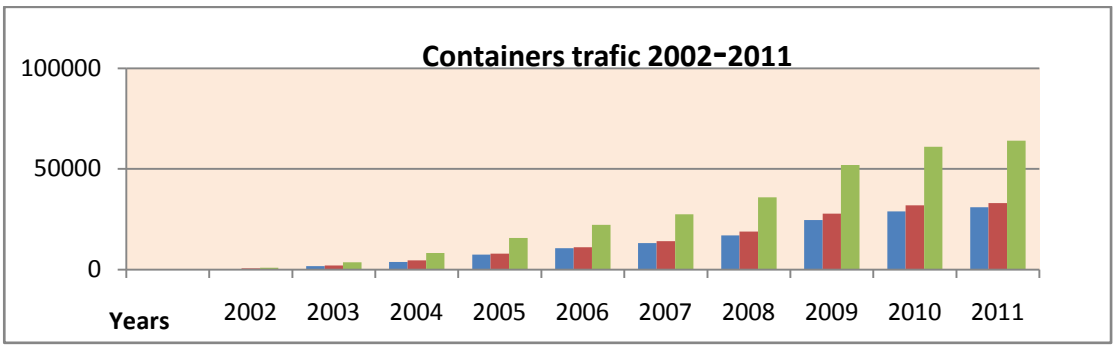
Figure 1 : Container's traffic in Durres Port during years 2002 – 2011



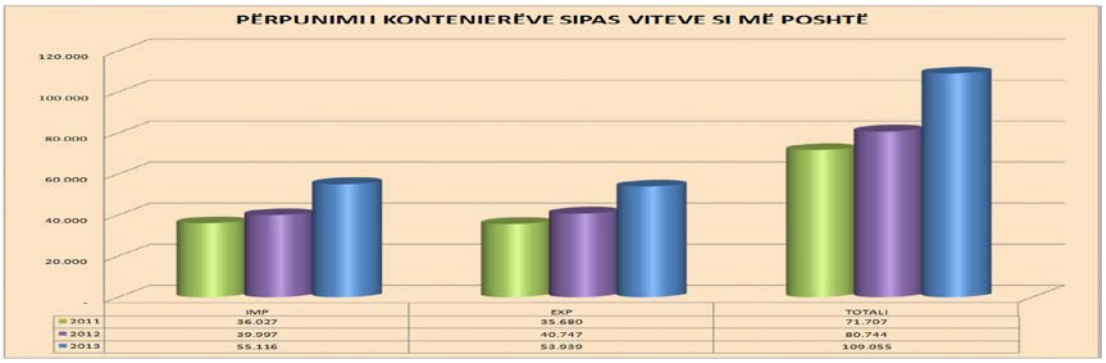
Source: Durres Port Authority

As it can be seen from this graphic, the traffic of containers has been in continuous increase from the start of this business in the port of Durres and on. In order to have a clearer picture of the traffic of containers in Durres port in the last three years, we have referred to the statistics of the Durres port for these years. The following graph in figure 2 shows the significant containers traffic growth for the years 2011 – 2013.

The continuous growing containers traffic is putting the terminal in a difficult position because the terminal is reaching its limit capacities. During years 2005 – 2009 the traffic growth was 140%. During the last years the effects of the global crises have affected the volume of the traffic in the port as well but it should be noted that the containers traffic still marked annual growth of 5%. The construction of the road axes from Durres to Pristina and further to Nish, created another possibility for Durres port to expand its hinterland and offer its services to Kosovo and further to Serbia.

The following figure 2 shows the containers traffic during years 2011 – 2013, which are considered as the years of the crises.

Figure 2 : Containers traffic in Durres Port during years 2011 - 2013



Source: http://www.apdurres.com.al

As it can be observed from figure 2, even during the period 2011 – 2013, the volume of containers has continued to increase and this demonstrates that containers are the future of this port. Considering that nowadays almost everything is shipped into containers, it means that in the future this terminal will handle the most part of the cargoes that comes/goes to/from this port.

III. Traffic Forecast

The main macroeconomic indicator used in forecasting the traffic in Durres Port is the Global Domestic Product (GDP). For this reason in the following table 1 we have given the values of the GDP during the last years.

Table 1: DGP 2000 - 2013

Year	2000	2001	2002	2003	2004	2005	2006
DGP in millions ALL	523,043.4	583,368.6	622,710.8	694,097.2	751,021.6	814,796.7	882,208.8
Year	2007	2008	2009	2010	2011	2012	2013
DGP Millions ALL	967,670.0	1,089,293.1	1,151,019.	1290350,1	1300624,0	1322811,0	1350554,8

Source: Bank of Albania- Statistical Report April 2015

For the purpose of this paper we have taken into consideration the traffic forecast up to 2030. Considering the annual tendency of the GDP growth we have assumed an average annual growth of 3,5%. To observe the relationship between GDP and seaborne cargoes handled in Durres Port, we have taken into consideration the volumes of cargoes for the following years 2000 – 2013 as they are shown in table 2 below.

Table 2 : Cargoes handled in Durres Port 2000-2013

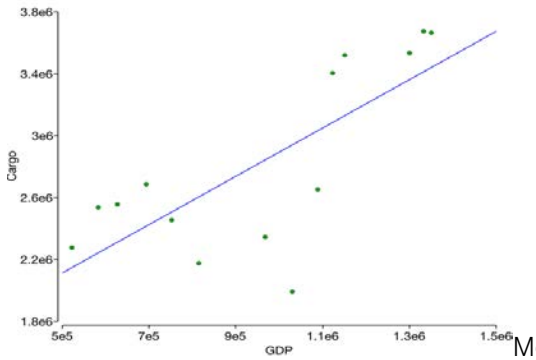
Year	2000	2001	2002	2003	2004	2005	2006
Cargo	2279897	2538826	2565116	2686979	2454243	2174347	2345433
Year	2007	2008	2009	2010	2011	2012	2013
Cargo	1991100	2654387	3521265	3406283	3526114	3673857	3663628

Source: Durres Port Authority, Statistical Department

The volume of cargo during years 2007, 2008 is lower than the normal trend due to the fact that handling of liquid bulk cargoes was transferred to the new oil port north of Durres.

In this table Considering GDP as an independent variable and cargo volume as a dependent variable we have calculated the correlation that exist between these two variables, as shown in the following graphic 3.

Figure 3 : The correlation between cargo and GDP



Model

Cargo=b0+b1*GDP

Correlation Coefficient=**0.743**
R Square=0.552
Covariance=128744807041.879

Parameter Estimates

Term	Estimate	Std. Err	t	p-value
b0	1330434.118	403154.023	3.300	0.0063
b1	1.5640	0.406	3.848	0.0023

Source: Calculated with StatViz

This graph indicates that there is a positive correlation between GDP and cargoes handled in the port of Durres. The correlation coefficient is 0,743, which shows a great significance.

Referring to the master plan of Durres Port there is a traffic forecast up to 2030. The company Royal Haskoning, which prepared the master plan, has applied the same correlation to forecast the traffic volume for the port of Durres. Although the general trend is to include almost every cargo in containers, there are still some cargoes that can't be containerized. To express the share of the general cargo that can be transported by containers we can use the equation:

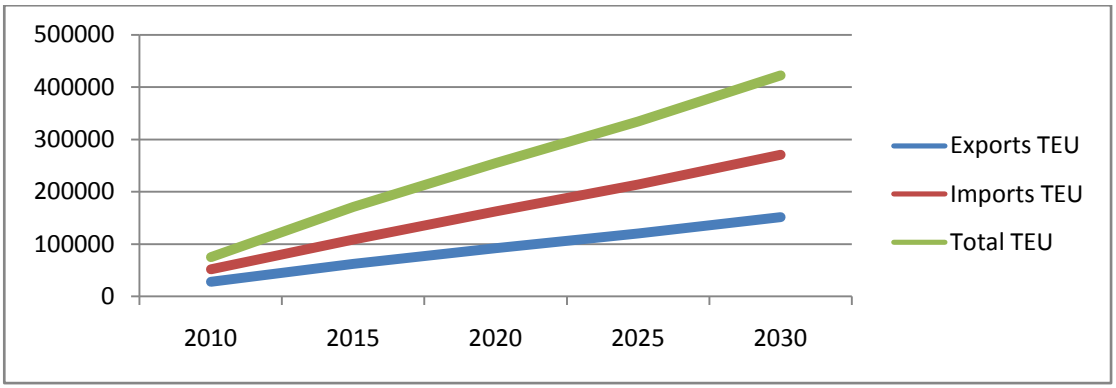
$$\frac{Gc}{Tc} = \frac{ContGc}{ContC} \; x \; \frac{ContGc}{TC}$$

Source: Royal haskoning, Durres Port Masterplan

Where: Gc – general cargo
Tc – total cargo (cargo volume)
ContGc –containerized general cargo
ContC – containerized cargo

The left side of the equation is referred as the containerization coefficient. This coefficient for Durres port is 0,33, which means that only 33% of all cargoes that are handled in the port of Durres are containerized cargoes. This figure indicates that there is still a lot of room for the future cargoes that come/go to/from port of Durres to be containerized. Based on the calculations done the total containers traffic in 2013 for Durres Port is forecasted to be 270.000 TEU imported containers and the combined figure for Imports/exports will be over 422.000 TEU. Figure 4 shows the traffic forecast for Durres Port up to 2030.

Figure 4 : Traffic forecast for Durres port (2010 – 2030)



Source: Masterplan of the port of Durres (Europeaid 122348/C/Serial)

The actual statistics show that the containers traffic in Durres port has been slightly below the forecast. During 2013 the number of TEU handled in this port was 109.055 TEU while the forecast for 2015 is 171.146 TEU. This subtle deviation from the forecast is due to the global financial crises, which extended its effects over the Albanian economy as well.

IV. Terminal Needs for Storage Land Area

In order to calculate the storage area of containers we have to consider the dwelling time of containers and other performance indicators of the terminal. As it was indicated by figure 2 above, the number of TEU handled during 2013 was 109.055, and this figure is continuously increasing. The total area available for the containers terminal is 60.000m^2, which is at the very end limit of the terminal capacity. Considering the usage factors of the terminal areas, such as equipment needed area, dwell times 13 days (exports 6 days, imports 7 days), yard occupancy factor 0,75, and peak factor 1,3 we can calculate the needed storage area as follows:

$$110.000 \; x \; \frac{13}{365} x \; 12m^2 x \; 1{,}3 \; x \; \frac{1}{0{,}75} = 45{,}838m^2$$

It is obvious that the required land area to handle 110.000 TEU of 46.000m^2 is so close existing storage area of 60,000m^2 that is required for a normal operation of the terminal. Referring to the traffic forecast, in 2015 the forecasted traffic is 171.146 TEU. As we mentioned above the real figure might be a bit below that figure, let assume 150.000 TEU. The question is: *How much land area do we need in order to handle 150.000 TEU*? Using the above equation and assuming that the dwell time of containers, yard occupancy factor and peak factor, the area needed in order to handle 150.000 TEU is about 63.000 m2. That means that the containers terminal is in its limits and future increase of containers traffic will create congestion, and other delays. Considering the additional limitations that the terminal has, it makes it very difficult for the terminal to further increase its handling capacities beyond these figures if no further steps are taken in order to increase the storage and handling capacities of the terminal. In the above calculations we have assumed the dwell time, yard occupancy and peak factors. This situation appeals

foranswers relating the needs that the terminal has for storage areas.

The terminal of containers in Durres port has two ways of increasing its handling capacities in order to respond in a positive way to these traffic volume tendencies:

- The first one is to further improve terminal infrastructure as well as the operations performance
- The second one is to increase the mobility of the containers from/to the terminal through modern road and railway network system.

Considering the first option port/terminal has to improve operational indicators such as berth occupancy rate (BOR) as well as labor utilization rate (LUR). Both these indicators can be calculated by following equations:

$$\boldsymbol{BOR = \frac{hrs\ x\ meters\ used}{(available\ hrs\ \ x\ available\ meters) x\ 100}}$$

$$\boldsymbol{LUR = \frac{service\ time\ in\ port\ (hrs) x\ workers}{(available\ hrs\ x\ workesr) x\ x100}}$$

In order to increase the storage capacity of the containers theoretically the operator should store the containers as high as possible (up to equipment allowance), but in the case of this terminal, the loaded containers can not go higher than three, and empty containers not higher than four. This is due to the characteristics of the terminal ground.

During the last years the terminal has done a notable progress in improving its performance indicators but again the terminal has some limitations such as:

- The entrance channel of the port and the depth of the water in the quayside doesn't allow the berthing of ships with draft over 8,2m,
- The ground characteristics of the terminal do not allow for higher storage of loaded containers than three rows and empty ones higher than four rows.
- The rail spam dos not allow the installation of a gantry crane
- The port doesn't provide for further terminal area expansion
- The terminal operations are not automated.
- For the moment there are no ongoing works on expanding terminal storage areas, or building other storage areas near the port, therefore, if no further steps on improving capacity in order to accept the coming cargo, the port will not be able to respond to these increasing container traffic in the future.

V. Future Developments

Analyzing the present situation of the port of Durres and containers terminal, as well as the associated infrastructure, it is easily notable that this port needs to have a clear vision on how to improve its handling capacities and overcome the limitations it is facing. Looking at the investments that are done in the port, it seems that the areas where the port/terminal have room for improvement are as follows:

First, the port should improve the dwell time of containers in order to have a better efficient use of the terminal area. If the dwell time will be cut down from 13 to 11, or further to 10 days, the terminal area requirements will be as following:

$$110.000\ x\ \frac{12}{365} x\ 12m^2 x\ 1{,}3\ x\ \frac{1}{0{,}75} = 42{,}313m^2$$

$$110.000\ x\ \frac{11}{365} x\ 12m^2 x\ 1{,}3\ x\ \frac{1}{0{,}75} = 38{,}786\ m^2$$

$$110.000\ x\ \frac{10}{365} x\ 12m^2 x\ 1{,}3\ x\ \frac{1}{0{,}75} = 35{,}260\ m^2$$

As it can be seen from the above equations, if we can cut down the dwell time from 13 days to 12, or even 10 days, theoretically we can reduce the area requirements for container storage from 46,000 m2 that we need today to 35,000 m2. That makes the port more flexible and creates the opportunity for a more intensive and efficient usage of the terminal area. In order to achieve this, it is necessary that the mode used for the movement of the containers from port to the destination and vice versa, should be very effective. Today the only mode used is the one through chases and tractors. This method is costly, slower, and causes a lot of road traffic consequences such as traffic congestion, pollution, road damage, noises etc. the lack of rail link of terminal with rail network make it very difficult to cut down dwell time of containers. Therefore, this cut down of the dwell time seems out of the reality considering the present situation of the port overall infrastructure.

Second, the terminal should think of establishing other storage areas out of the port in order to increase the storage capacities. Free zones or logistic parks are another possibility of increasing terminal handling capacities.

VI. Conclusions

This paper underlines the importance of the land area requirement of a containers terminal. In analyzing the case of Durres Port we observed that this port is reaching its capacity handling and storage limits.

Lacking of rail link with containers terminal, and the overall poor conditions of Albanian railway network, its weak connections with network beyond Albanian borders, affects the performance and the productivity of the terminal and therefore the question of the land use v/s land area available becomes very important.

Terminal area limitations, and difficulties for terminal area expansion is another factor that creates

restrictions for the container handling capacity. The operator should identify other possibilities in order to build distant container yards in order to increase the storage capacity.

Improving the navigational capacities of the port such as deepening the access channel, basin and the quaysides will make it possible for the port to accommodate bigger ships and this will result in bigger throughput for the port but without resolving the issue of land needed in order to face the increasing forecasted future containers traffic, this investment will not achieve its expectations.

References Références Referencias

1. www.apdurres.com.al, Durres port authority, statistics department
2. Royal Haskoning, establishment/update of the master plan of the port of Durres
3. www.bankofalbania.org/statistics
4. Bank of Albania- Statistical Report April 2015
5. http://www.instat.gov.al/al/themes//llogaritekombeta re.aspx
6. Tongzon, J. and Heng, W. (2005) Port privatization, Efficiency and Competitiveness: Some Empirical Evidence from Container Ports (Terminals). *Transportation Research* Part A, 39, pp.405-424
7. Notteboom. T. E. (2004) Container Shipping and Ports: An overview. Reviw of Network Economics, 3. P. 86-106.
8. Masterplaniiportit Durrës .Europaid/122348/c/serial/AL.95072321/FR/40111 80/Nijm/10 July 2008.
9. DOWT, T,J, and Leschine T.M (1990), "Container Terminal Productivity a Perspective".

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